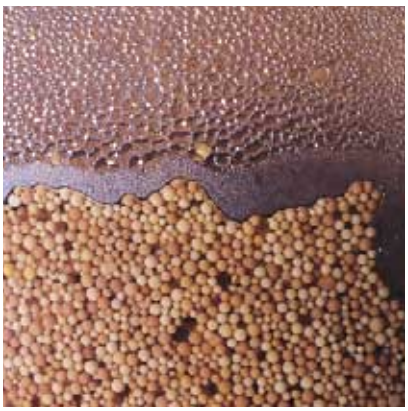
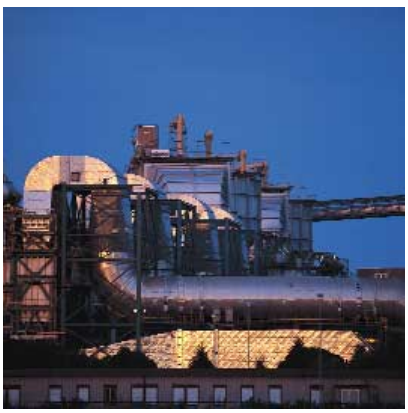
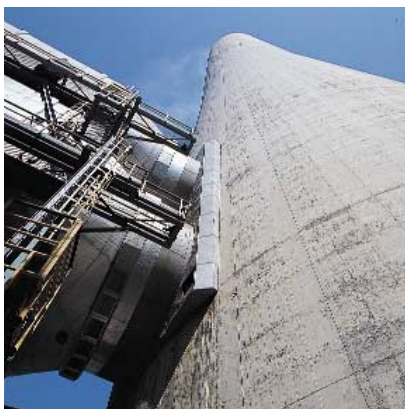
1999 Environmental Report







Enel

1999 Environmental Report

Contents

Over the past few years, the Enel Group has shaped and pursued an environmental policy that led to a gradual and significant progress in its environmental performance in all areas of business. The annual Environmental Report, which has been published since 1996, takes stock of initiatives taken and results achieved.

In the course of 1999, the organizational structure of the Group was radically changed and separate companies were established to cover its various areas of business. This fact required a major effort of coordination of the companies' activities. Even though these companies have different missions, their environmental policy targets should be consistent between them and with those of their parent company, which retains a role of direction and of scrutiny of their results.

In 1999, progress was made in retrofitting thermal power plants for environmental compliance. Emissions into the atmosphere from generation activities (total and specific, i.e. per kWh generated) dropped significantly.

Enel continued the phasing-in of environmental management schemes, with a view to obtaining the EMAS certification for at least 50% of its installed generating capacity within 2000. The related activities were carried out in 21 thermal sites, 3 geothermal sites and 3 hydro sites. Always in 1999, the EMAS certification was obtained for the thermal power plant of La Casella (Emilia Romagna) and for the hydro power plants on the Cordevole River (Veneto), previously certified under the ISO 14001 Environmental Management Scheme Standard.

In 1999, Enel increased its generation from renewables, contributing about 20% to total generation. With respect to 1990, base year for the Kyoto Protocol, Enel's generation from renewables mounted from 23.4 to 35.5 billion kWh (+51%). The setting-up of Erga, a new company specializing in renewables, testifies the emphasis that the Enel Group places on development of these sources.

In the same year, Enel intensified the use of underground and insulated overhead cables on its power lines: low-voltage cable lines increased by about 13,800 km (roughly 7,300 km of underground cables and approximately 6,500 km of insulated overhead ones), whereas bare-conductor lines decreased by about 4,600 km. Medium-voltage cable lines increased by about 4,300 km (roughly 3,500 km of underground cables and approximately 800 km of insulated overhead ones), whereas bare-conductor lines decreased by about 1,200 km.

Enel also organized an industrial-design competition ("Sostegni per l'ambiente"—towers for the environment) for new designs of high-voltage power line towers featuring better integration into the landscape. The proposals submitted by world-scale architects and designers are being presented to the public in various parts of Italy. Prototypes of the winning tower design projects are being built and, in the coming months, we are likely to see the first installations of the new towers in various parts of Italy.

Recovery of waste recorded an outstandingly high percentage (roughly 98%).

Finally, Enel initiated a program of deployment of efficient electrotechnologies. These technologies, which are based on electricity end-uses, reduce overall energy requirements and environmental impact, service rendered remaining equal. Among these technologies, it is worth mentioning reversible, heat pump-driven air conditioners/heaters and electric vehicle recharge posts.

In the next two years, we will have to respond to the following challenge: demonstrating that, thanks to the considerable environmental improvements that we are obtaining in our installations, electricity can be used as a clean and safe source in industry and services (e.g. urban transportation) and become one of the building blocks of Italy's sustainable development.

Chairman
Chicco Testa

The Enel Group and the Environment

New organization

The liberalization of the Italian electricity market was accelerated by the enactment of the Legislative Decree of March 16, 1999 (implementing the Directive 96/92/EC on common rules for the internal electricity market), known as "Bersani Decree".
With the opening-up of the Italian electricity market, Enel was required to downsize its electricity business. It responded to the challenge by embarking on a wide-ranging process of reconfiguration and reorganization. The process was intended to optimize Enel's traditional business and offset its reduction by catching new opportunities in electricity-related businesses or in businesses arising from Enel's service activities.
The reorganization led Enel to become a multi-utility group, according to a restructuring plan that Enel's Management had formulated prior to the Bersani Decree.
The reconfiguration of Enel took place through:

- the splitting-up of electricity generation, transmission, distribution, and sales activities into separate companies and, in particular, into multiple generation companies, so as to enable the sale of some of Enel's generation assets;
- the transformation of service units (estate management and general services, telecommunications, information systems, engineering & contracting, research) into companies, each of which would not only deliver services to the other companies of the Group, but also compete in and acquire external markets;
- the setting-up of companies in new electricity-related businesses, such as public lighting, beyond-the-meter services, waste and water management;
- the transfer of the activities of transmission grid management and of nuclear plant decommissioning to companies to be assigned to the Ministry of the Treasury, Budget, and Economic Planning.

Many of the new companies are environmentally unique, in that they can give a positive contribution to sustainable development.
The most prominent among them are:

- Erga, with development of renewables;
- Enel.Hydro, with efficient management of water resources;
- Elettroambiente, with energy recovery from waste;
- Enel.si, with rationalization of beyond-the-meter systems and deployment of efficient electrotechnologies;
- So.l.e, with public lighting optimization;
- Sei and Conphoebus, with benefits deriving from the application of high energy efficiency concepts in buildings;
- WIND, ITnet, and Enel.it, with the contribution that ICT systems can give to reducing people mobility;
- Cesi, with research focused on environmentally advanced technological concepts for the power system;
- Sfera, with personnel education, also on environmental topics.

Enel SpA

electricity generation	**Enel Produzione**
electricity generation from renewable, geothermal, and alternative sources	**Erga**
electricity generation	**Eurogen**
electricity generation	**Elettrogen**
electricity generation	**Interpower**
electricity transmission	**Terna**
electricity distribution and sale	**Enel Distribuzione**
sale of electricity to eligible customers	**Enel Trade**
public lighting	**So.l.e.**
electrical equipment maintenance	**Enel.si** (formerly Se.m.e.)
Enelpower	design and construction of power plants and transmission facilities
Elettroambiente	electricity generation from waste
Enel.Hydro (formerly ISMES)	design, construction, and management of water distribution networks
Sei	general services and real estate management
Dalmazia Trieste	real estate management
Conphoebus	photovoltaic plants and real estate technologies
Enel.it	information technology and data transmission services
Sfera	personnel training and development
CESI	services and research for the electricity sector
WIND	telecommunications
ITnet	internet provider

Environmental policy

The environmental policy, which Enel shaped some years ago, was translated into a number of initiatives. These initiatives induced a progressive and significant improvement of Enel's environmental performance in all fields of activity. The improvement is testified by Enel's annual Environmental Report, a consolidated communication tool which has been published since 1996 and which describes the initiatives taken and the results achieved by the Enel Group.

Deep changes occurred in Enel's organization, especially in 1999. Although the companies of the Group are active in very diversified businesses, the environmental policy targets that they pursue are consistent not only with one another, but also with the strategic targets of the parent company. The latter targets, which are listed below and which were set in previous years, were revised in the light of the new configuration of the Enel Group. The environmental policy of the Group will thus be strengthened, in view of the need for ensuring a sustainable industrial development. This policy will be hinged on principles and targets responsibly adopted by each company, which will ensure quality products and services at competitive prices, and high standards of environmental care.

This choice is based not only on ethical principles, but also on the awareness that the environment may be a competitive edge, in a market which is more and more enlarged and demanding in terms of quality and behaviors.

Principles

- Protection of the environment and of occupational safety & health is integral with Enel's decision-making process and not limited to compliance with legislation
- Pursuing high environmental standards is in tune with performance improvement and a key element for enhancing the value and profitability of the Group's companies.

Strategic targets

- Rational and efficient use of energy resources and raw materials
- Use of processes and technologies which represent the best international practices to prevent or minimize environmental impacts
- Optimization of waste recovery
- Systematic introduction of officially recognized environmental management schemes in the various activities
- Tapping the potential of electricity for sustainable development
- Care in integrating new power installations into the environment and improvement of existing installations
- Research for continuous improvement of technologies and know-how
- Communication with the public at large and institutions on the environmental management of the Group
- Education of employees and raising of their environmental awareness, to enable them to perform their duties in environmentally responsible ways.

Resources and tools

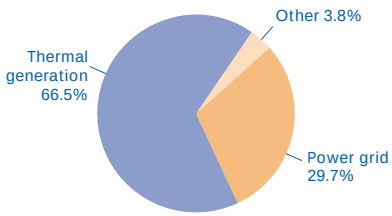
Environmental organization

The environmental responsibility of the Enel Group is vested with the parent company, whose main tasks consist in defining and updating environmental policies, issuing policy implementation guidelines for the companies of the Group, monitoring, analyzing and reporting environmental data, cooperating with the relevant national and international organizations and institutions.
Each company relies on environmental experts or environment-dedicated field units, depending on its mission. Given the interaction of power installations with the environment, the main generation companies have put in place an environment, safety & health function, in each thermal power plant or hydro group, and a corresponding oversight function at the central level.

Environmental expenditure

The financial resources allocated for the environment in 1999 are estimated to amount to approximately 1,300 billion Lire (about 670 million Euros) in terms of investments and to approximately 1,400 billion Lire (about 720 million Euros) in terms of current expenditure.
With respect to 1998, investments had the same order of magnitude, whereas the current expenditure slightly decreased, owing above all to the fuel market cycle (narrower gap between high- and low-sulfur or sulfur-free fuel costs).
In line with the guiding principles stated in the previous Environmental Reports, the environmental expenditure covers the costs incurred for protection of the external environment, whether required for environmental legislation compliance or for implementing voluntary decisions made by Enel. These costs do not include occupational safety & health items.

Environmental investments in the different areas of activity

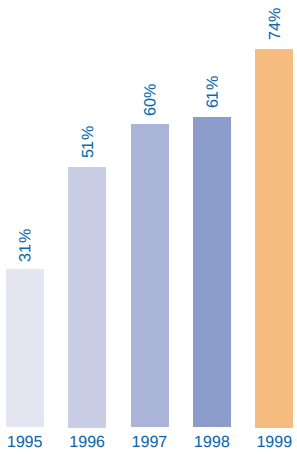


The most significant environmental investments in 1999 include:

- expenses for retrofitting thermal power plants for environmental compliance, in the range of 700 billion Lire (about 360 million Euros), and for the installation of environmental protection systems in new plants, in the range of 200 billion lire (approximately 100 million Euros), totaling about 75% of the total investments in thermal generation;
- expenses for the power grid, which reached roughly 390 billion Lire (approximately 200 million Euros), i.e. over 10% of total investments in the grid. The most substantial component of this figure (350 billion Lire, i.e. about 180 million Euros) is represented by investments in the installation of insulated overhead or underground cables on low- and medium-voltage power grids.

Investments in thermal power plants for environmental compliance

% of total investments in thermal power plants



The current environmental expenditure for 1999 includes:

- costs for the operation of all power installations, in the range of 250 billion Lire (about 130 million Euros). This amount comprises operating costs for environmental protection equipment and systems, costs for waste disposal, for Enel's personnel, and for external services (mostly required for power plants);
- eco-taxes: for thermal generation, the eco-tax on SO_2 and NO_x emissions was equal to 70 billion Lire (about 35 million Euros), while the carbon tax on fossil fuels amounted to another 70 billion Lire (about 35 million Euros);
- costs related to the environment, such as those deriving from the implementation of local agreements on environmental matters, in the range of 80 billion Lire (about 40 million Euros);
- costs for the use of low-sulfur fuels for environmental compliance, especially natural gas (in all cases where this use is not technologically captive), accounting for an extra expenditure of roughly 900 billion Lire (about 470 million Euros);
- costs incurred for decommissioning nuclear power plants and terminating the nuclear fuel cycle, in the range of 80 billion lire (about 40 million Euros).

Other costs, which also qualify as "environmental", are the incentives to power generation from renewables or "equivalent" sources (about 1,260 billion Lire, i.e. about 650 million Euros). Although the power from these sources is transferred onto Enel's power grid, the costs for these incentives do not burden Enel's accounts.

Reporting

Environmental data collection, processing, and analysis are basic tools for assessing environmental performance, monitoring the individual companies' implementation of the Group's environmental policy, and for the continuous process of refocusing of targets and redirection of policies.

The units which are active in the electricity business already participate in data collection and reporting on a quarterly basis.

It goes without saying that most of the quantitative data shown in this Environmental Report result from the reporting activity.

The methodology for computerized data collection, which was used in previous years, was revised to reflect the changes which occurred in the Enel Group in 1999. Further refinements will be needed, as the reorganization of the Group proceeds.

Environmental management schemes

Environmental management schemes represent an increasingly strategic tool. The complexity of environmental issues directly and indirectly affects the companies of the Group. Consequently, tools are required for daily management of operations and of decisions which are aimed at preventing or minimizing the impact of Enel's activities on the environment.

With this consideration in mind, Enel set the target of registering, within 2000, at least 50% of its installed generating capacity with EMAS. EMAS is an environmental management and audit scheme, which was developed within the EU. Companies may join EMAS on a voluntary basis and apply for an independent conformity certification of their sites.

In 1999, Enel continued the phasing-in of environmental management schemes in: 21 thermal sites, 3 geothermal sites, and 3 hydro sites (including multiple power plants belonging to the same hydroelectric scheme).

Always in 1999, Enel obtained the EMAS certification for its thermal power plant of La Casella (Emilia) and for its hydro power plants on the Cordevole River (Veneto). Both sites had previously been certified under the ISO 14001 standard on Environmental Management Schemes. These are the first thermal site and the first hydro site in Italy which obtained the EMAS certification.

The benefits which derive from the introduction of environmental management schemes into power plants encompass the acquisition of new skills and, above all, the involvement and satisfaction of the members of the personnel and of the Management, who fully understood the potential of EMAS for enhanced performance.

Awareness and education

Education is essential to enable the members of the personnel, at all levels, to gain greater understanding and awareness of environmental issues and to correctly fulfill their duties. In 1999, over 34,000 hours of education covered environmental topics, whereas about 440,000 hours were devoted to occupational safety & health themes.
Always in 1999, Enel launched a project of distance teaching on environmental topics, by developing a first module (greenhouse effect and climate change), which was made available on Enel's internal information system.

Environmental research

Research is a major environmental policy tool, because it is targeted to deliver performance-enhancing solutions.
Enel's environmental research activities may be outlined as follows:

- analysis of the environmental compatibility of the power system, via monitoring and modeling;
- systematic improvement of environmental efficiency, via integrated pollution control, development of innovations, and introduction of advanced technologies capable of yielding competitive advantages;
- definition of sustainable development prospects for the power system, via minimization of climate effects, conservation of resources, minimization and recovery of waste, deployment of efficient electrotechnologies, biodiversity conservation.

Some activities are designed to guide Enel's choices, whereas other activities are intended to give a general contribution to the electricity industry and to its operators. Since January 1, 2000, all the activities of the Enel Group belonging to the latter category ("system research") have been transferred to Cesi. These activities will be funded by a special component of the electricity rates.

Main Results and Initiatives for Sustainable Development

Also in 1999, in line with its environmental policy principles and targets, Enel strived to carry out its activities in environmentally friendly and sustainable ways. These efforts further improved Enel's environmental performance in all fields of activity, as demonstrated by the mass of data reported in the chapter "Eco-Balance and Indicators" (to which the reader is referred for details).

As in the previous Environmental Reports, the tables in the above-mentioned chapter display all the time series of the resources consumed, of the process, of the product, of the interactions, as well as a number of indicators.

This chapter, instead, gives the highlights—results and initiatives—of 1999.

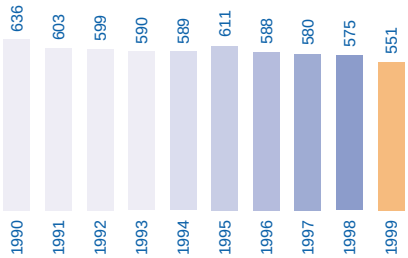
Contribution to reduction of the greenhouse effect

Thanks to the progress recently made in international negotiations, the issue of CO_2 and of the greenhouse effect moved from the realm of scientific debates to actual strategies of action.
Under the Kyoto Protocol (December 1997), the EU committed to driving down its greenhouse gas emissions by 8% from 1990 levels, in the period from 2008 to 2012. A specific Community agreement set a 6.5% reduction target for Italy.
In November 1998, the Italian Interministerial Committee on Economic Planning (CIPE), issued a resolution (providing guidelines for national greenhouse gas emission reduction policies and actions), which set the following targets to be achieved in the same 2008-2012 period: i) for thermal generation, curbing CO_2 emissions by 20-23 million tons from their trend values; ii) for the energy industry as a whole, avoiding 18-20 million tons of CO_2 emissions by greater reliance on renewables.
To maximize its contribution, the Enel Group plans to enter into a voluntary agreement with the Government, an instrument explicitly indicated in the above CIPE resolution.
Enel is aware of the active role that it can play in this area and is determined to do so by reconciling this role with its economic requirements. This is possible by leveraging all the opportunities offered by the global character of the greenhouse effect, whose potential consequences on climate are independent of the place of emissions.
In this spirit, the Kyoto Protocol introduced some flexibility instruments. Among these instruments, a notable one for its nation- and Europe-wide implications is the emissions trading, to which the European Commission devoted a Green Paper in March 2000.
Another key element is the possibility of pursuing emission reduction targets by resorting to indirect actions, such as larger use of efficient electrotechnologies in replacement of less efficient, electric or fossil fuel-based technologies.
Hence, the issue of the greenhouse effect cross-cuts all the companies of Enel Group, as it involves not only thermal generation, but many other business units.

Greenhouse gas emission reduction

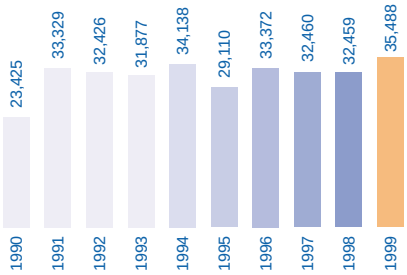
Larger use of natural gas and higher contribution from renewables are the main factors which reduced CO_2 emissions in 1999 vs. 1998, as the level of thermal generation remained practically unaltered: the reduction of absolute and specific (per kWh generated) CO_2 emissions exceeded 4%.
With respect to 1990 (base year for the Kyoto targets), CO_2 reductions were equal to 8% in absolute terms and to 13% in specific terms.

Net specific CO_2 emissions of Enel's total generation
g/kWh



Enel's net generation from renewables

million kWh



In particular, generation of electricity from renewables reduces the need for using fossil fuels, thus holding down greenhouse gas emissions.
In 1999, the Enel Group increased its net generation from renewables by over 9% as against 1998. This result is due to the increase in hydro generation, thanks to favorable precipitation levels.
Also the contribution of geothermal, wind, and solar sources is gradually growing (+4% from 1998 to 1999 and +36% in the past decade).
Mention is to be made of the coming on line of two new geothermal power plants and of the last sub-array of the photovoltaic power plant of Serre (Salerno).

Involvement of Enel's field units

In 1999, Enel organized a seminar on the challenges and opportunities deriving from the implementation of the Kyoto Protocol. The seminar was intended for the Top Management and the heads of the various business units of the Group.
During the seminar, an in-depth analysis was conducted on the flexibility mechanisms introduced by the Protocol: both project-based (joint implementation and clean development mechanism) and market-based (emissions trading) ones.
The Seminar was followed by initiatives on specific topics at various levels.
A scheme was formulated for applying the emission trading mechanism within the Enel Group, involving other business units in addition to thermal generation ones. The scheme is expected to tap the potential of indirect emission reduction actions (generation from renewables, reduction of power grid losses, deployment of efficient electrotechnologies) through the recognition of emission credits. The scheme will be refined during 2000, also to reflect the new organization of the electricity industry.
Enel started considering CO_2 credits also in assessing the feasibility of its activities abroad. In effect, CO_2 credits may be generated, if the authorities of the countries concerned recognize these activities as joint implementation or clean development mechanism projects. This approach was taken for the first time by Enelpower for a project of construction of a hydro power plant in Albania.

Inventory of greenhouse gas emissions

In 1999, Enel issued guidelines and prepared tools for computation and storage of greenhouse gas emission data and related indicators. Reference was made to guidelines officially recognized and internationally adopted by the United Nations, which were adapted to the case of Enel. These guidelines also concern the credits arising from indirect emission reduction actions, such as generation from renewables, reduction of power grid losses, and demand-side initiatives.
The selected tools will also help keep accounting records of emissions trading transactions, both inside and outside the Enel Group.
The adoption of these guidelines will facilitate monitoring of the Group's results and their recognition by authorities.

Research activities

In 1999, Enel conducted various activities of research on the greenhouse effect.
Some of these activities respond to specific interests of the Group, such as cost-benefit analyses of technologies for removing CO_2 from the flue gases of thermal power plants, and analyses of existing waste-to-energy technologies.
Other activities, instead, span both the interests of the Group and more general interests ("system research"). These activities encompass the study of the potential absorption of CO_2 with the use of special forest management or agricultural practices and of marketable algae.
Finally, other activities qualify as typical system research, such as monitoring of atmospheric concentrations of the main greenhouse gases and climate modeling.

International activities

- In 1999, Enel participated in the design of an emission trading simulation exercise, organized by Eurelectric (Association of European electricity companies). The simulation, which is in progress, concerns two parallel electricity markets and emission rights. The project is called Greenhouse Gas and Electricity Trading Simulation (GETS2). GETS2 involves not only the electricity industry but many other industries (oil, gas, steel, chemicals, cement, paper). Its purpose is to give a contribution to the international negotiations which will be held in the Hague in November 2000, on the occasion of the Conference of the Parties (COP6). The negotiations are hoped to yield a more accurate definition of the Kyoto flexibility mechanisms.
  The participants in the simulation exercise are over 30 virtual companies. Based on their strategies, these companies aim at achieving their demand coverage and emission limit compliance targets through investments and periodical trading sessions. The sessions take place on a specially-designed Internet platform.

- In 1999, as a member of the E7 Group (leading electricity companies of the world), Enel formulated an electricity industry proposal on the key points of the Kyoto flexibility mechanisms. The proposal, that Enel drafted jointly with electricity companies of developing countries, such as China, Indonesia, Thailand, South Africa, Zimbabwe, and Jordan, will be submitted to the COP6. Particular emphasis will be placed on clean development mechanism projects in developing countries. Methods will also be proposed for computing the CO_2 credits to be assigned to the various projects. This is a particularly significant aspect, because the amount of credits may impact the profitability of the investment in and thus the materialization of a given project.

- Enel participates in a green certificate initiative, which was launched by some European companies. The initiative, called RECS (Renewable Energy Certificate System), has the purpose of demonstrating—through a pilot project—the feasibility of this system at the European level and to identify the pre-requisites for its effective operation. The system, based on market considerations, is designed to induce cost reductions, consistently with the requirements of competitive energy market operators.
  The initiative is in line with the trend of some European countries, including Italy, to move towards a green certificate system. In effect, under the Bersani Decree on restructuring of the electricity industry, thermal generation operators and electricity importers will be held to supply to the power grid a given percentage of generation from renewables. This obligation, which will have effect starting from 2002, will be met with a corresponding amount of green certificates.

Enel's commitment to the local Agenda 21 of Rome

At the 1992 Earth Summit of Rio de Janeiro, 140 countries, including Italy, signed Agenda 21. The signatories of the document undertook to initiate consultations with their social, economic, and cultural communities, with a view to identifying the best sustainable development strategies.

With the 1994 Aalborg Charter, many European and Italian towns and cities, including Rome, joined the initiative of implementing Agenda 21 at the local level and of formulating an environmental action plan.

The key feature of the local Agenda 21 is a participatory process which involves all the members of society (citizens, local associations, enterprises) in the definition and implementation of a program of actions for sustainable urban development.

In 1999, the Municipality of Rome initiated the local Agenda 21 by establishing a Consultation Forum for the definition of Rome's Environmental Action Plan.

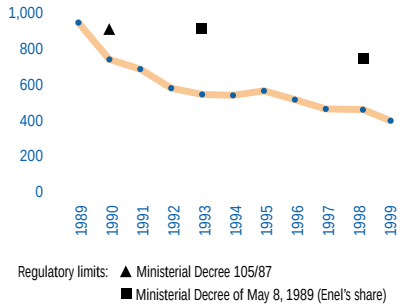
Enel takes part in the Forum and in some thematic work-groups (Waste Management; Energy Policies; Mobility; Air Quality; Noise). In this framework, Enel made suggestions to the Municipality of Rome on the role that electricity can play in policies of global sustainability (rational energy use, increased energy generation from renewables, reduction of greenhouse gas emissions, decrease of air pollutants) and of local sustainability (improvement of the quality of air and, more generally, of the urban environment).

In particular, Enel proposed the following two projects:

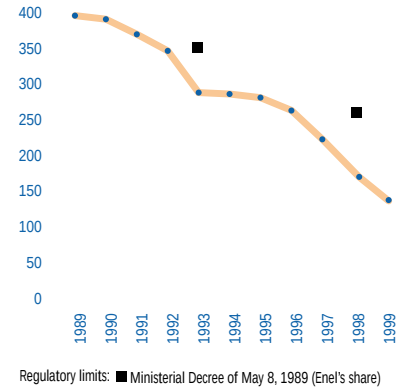
- in the territory of the Municipality, application of models to assess the effectiveness of strategies aimed at improving air quality in urban areas, through larger use of electricity;
- enhancement of the environmental and cultural value of the hydro power site of Castel Giubileo, through the creation of "energy and nature trails" connected with electricity generation processes.

Reduction of polluting emissions

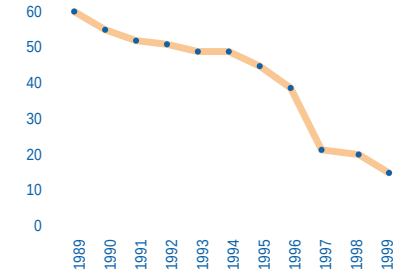
Total SO_2 emissions
thousand tons



Total NO_x emissions
thousand tons



Total particulate emissions
thousand tons



The issue of polluting emissions into the atmosphere continues to have international focus.
Practically, the only activity of Enel which produces these emissions is thermal generation (combustion products, mainly including SO_2, NO_x, and particulates).
In the past few years, Enel has undertaken major efforts to curb its emissions into the atmosphere.
The Italian legislation on emissions, which also derives from Community directives and international protocols, is very detailed and ranks Italy among the few countries in the world which specify limits on both total and point-source emissions from thermal power plants.
Under the Ministerial Decree of July 12, 1999, Enel put in place a program of reduction of emissions from its power plants, to be completed within 2002.
The program involves operational measures and investments for retrofitting power plants (i.e. for preventing the formation of pollutants at source or for abating them, if their percentage in combustion products is too high), and for converting some generating units to combined cycles (high energy efficiency and low emission technology).
The actions which were envisaged are:

- continuous improvement of combustion to prevent the formation of unburned gases and particulates;
- installation of low NO_x combustion systems and technologies, mostly developed and fine-tuned by Enel in conjunction with the national industry: at the end of 1999, these technologies had been installed on 59 thermal units (total rating: 23,000 MW);
- use of low or very low sulfur fuels: in 1999, the percentage of natural gas and very low sulfur oil passed to 44.2% from 39.5% in 1998;
- installation of flue gas desulfurizers on coal-fired units: in 1999, desulfurizers were in service on a total generating capacity of 4,800 MW, vs. 3,800 MW in 1998;
- installation of flue gas denitrification systems (to complete the measures for improvement of combustion systems) on a total of 12,350 MW in 1999, vs. about 10,000 MW in 1998;
- use of particulate collectors, with advanced technological and operational processes developed by Enel to improve particulate collection efficiency (pulse feed, electrode cleaning systems, flow homogenization, additives).

In 1999, the implementation of this program produced the following results:

- compliance of over 62% of Enel's installed generating capacity with point-source emission limits, vs. a regulatory target of 60% for 1999; this result is documented by continuous emission monitoring systems, which were installed on all thermal units with a power rating in excess of 100 MW;
- progressive reduction of total and specific (per kWh generated) emissions from generation activities; the following reductions were obtained with respect to 1998 values:

– sulfur dioxide (SO_2)	-17% in total emissions
	-15% in terms of g/thermal kWh net;
– nitrogen oxides (NO_x)	-19% in total emissions
	-17% in terms of g/thermal kWh net;
– particulates	-19% in total emissions
	-17% in terms of g/thermal kWh net.

- maintenance of good air quality levels around thermal power plants, documented by continuous monitoring in 30 stations, most of which have been in operation for over twenty years around Enel's main thermal power plants;
- validation of good air quality levels around Enel's power plants, thanks to the results from experimental biological monitoring networks, i.e. networks consisting of indicator plant species, which are sensitive to pollutants, namely to heavy metals. These networks are active around the power plants of Civitavecchia, Monfalcone, Montalto di Castro, Rossano Calabro, Trino Vercellese.

As previously pointed out for CO_2 reduction, the growth of generation from renewables contributed to these results. This generation went up by over 3 billion kWh from 1998 to 1999, thereby displacing an equivalent amount of thermal generation.

In addition to the above-mentioned measures for holding down emissions from generation activities, Enel took a number of initiatives in other fields.
The following two examples show that environmental care can be reconciled with overall efficiency enhancement targets. As these initiatives mostly cut down urban emissions, they have a high environmental value.

- Sei Spa, which owns Enel's real estate and manages it in 16 large urban areas, converted the heating systems of 30% of its buildings from gas-oil- to natural gas-firing and began the installation of air conditioning systems using power-driven high-efficiency heat pumps.
- Throughout Italy, Enel's vehicle fleet was streamlined, by eliminating about 40,000 vehicles having an average age of 7-8 years. The requirements of the Group are now covered by leasing agreements with vehicle operators. Thanks to this approach, Enel can rely on the latest models of vehicles, which are always fitted with the most advanced emission reduction systems. At present, the fleet comprises about 28,000 vehicles. Considering the lower emissions from the most modern vehicles, this policy (started in 1998) is estimated to have slashed approximately 75% of emissions from Enel's vehicles.

Electromagnetic fields: actions on the power grid and on telecommunications systems

In the past few years, there have been growing concerns about the potential effects of electromagnetic fields. This issue spans many activities that are vital to a modern country. Citizens need transportation, power for industrial and residential uses, signal transmission for radio, television, radar equipment, mobile telephony.
The issue of electromagnetic fields has an impact on Enel's power lines and telecommunications systems, such as those of WIND.
The extent of the Italian debate on electromagnetic fields is unprecedented in other nations. This fact led to a proliferation of regional and parliamentary regulatory proposals. The most significant one is a government-initiative bill, introducing protection from the "long-term effects" of electromagnetic fields and stipulating that new limits will be set by subsequent decrees.
Enel made available its data and studies to decision-makers, in order to enable them to get the most comprehensive possible picture of this complicated situation.

Contribution to research on electromagnetic fields

In a context of uncertainty over the causal relationship between electromagnetic fields and long-term carcinogenic effects, international research continues along different lines. An example is the EMF International Project of the World Health Organization, which was begun in 1997 and will be completed in 2005.
Enel carries out an intense activity of engineering research, which is targeted to: i) gain greater insight into human exposure to electromagnetic fields; and ii) in accordance with a prudent management principle, investigate systems and technologies which can reduce the magnetic fields generated by its transmission and distribution systems. Obviously, this research is part of more far-reaching project focused on improving the integration of power lines into the environment and covering not only magnetic field reduction, but also important issues, such as minimization of land use, reduction of visual impact on the landscape, as well as minimization of the length of lines combined with maximization of electricity transmission.
A company of the Group which is active in the area of high-frequency research is WIND, which, however, has offered maximum quality and safety standards since its setting-up. WIND is among the contributors to Elettra 2000, a research consortium also financed by the Fondazione Guglielmo Marconi, Tim, Omnitel, and the University of Bologna. The consortium operates with the scientific support of Icemb (University center for the study of interactions between electromagnetic fields and biosystems). Its mission is to improve the understanding of the impact of electromagnetic waves, emitted by telephony systems, on health, the environment, and society.
Furthermore, WIND constantly pursues quality targets in terms of electromagnetic emissions and participates in ad-hoc work-groups established by a special ministerial decree (Italian networks, ISPESL, ANPA).

Power grid

The power grid has a paramount importance for Italy, since it is an infrastructure that should grow in parallel with socio-economic development requirements and that covers the near-totality of the country.
Usually, land planning policies do not consider the needs of the power grid, discounting its adaptability to new requirements.
Furthermore, the siting of power lines has become more and more problematic over time, because increased public concerns over environmental and land issues and over the potential risks of power installations often fail to be counterbalanced by the realization that these installations are vital to the country.

This is the reason why Enel has urged local authorities to integrate electricity planning in their land management policies, i.e. to incorporate power grid development in the early stages of land development planning.
The first results were achieved in Emilia Romagna: some of the provincial authorities of this Region included power grid development in their land development coordination plans. Similar steps were also taken in other Regions, such as Liguria, Marche, Piedmont, and Tuscany.
To promote more and more transparent and constructive relations with regional authorities, initiatives were also taken for the creation of regional inventories of power installations (in Emilia Romagna, Piedmont, and Liguria).

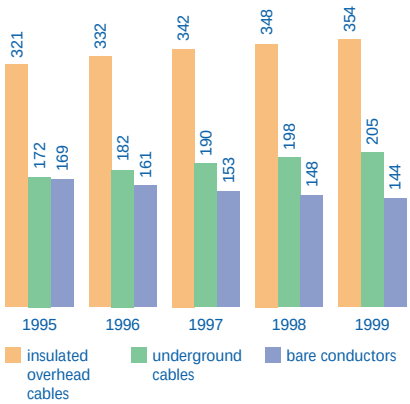
Enel's power grid

With holdings in the companies Terna and Enel Distribuzione (set up in 1999), Enel owns the majority of the national transmission grid and a large number of distribution grids.
The national transmission grid is the backbone of the power transmission system. The grid is fed by power installations and is interconnected with the power grids of neighboring countries (thus enhancing the reliability of the Italian power system). The transmission grid feeds the high-voltage distribution grid. Under the Ministerial Decree of June 25, 1999 (defining the national transmission grid), Enel's transmission grid consists of 9,800 km of 380-kV circuit lines, roughly 9,500 km of 220-kV circuit lines, and approximately 17,800 km of 220- to 120-kV circuit lines. On the basis of functional criteria, all these lines are designated to be of "national interest". Enel's transmission grid includes 248 electrical stations.
High-voltage distribution grids (in the case of Enel, about 20,000 km of mostly 132/150-kV lines and 1,864 HV/MV substations) and medium-voltage distribution grids (in the case of Enel, about 330,000 lines and over 400,000 MV/LV substations) make up the system which covers the local electricity demand and thus fosters the development of the local communities. The customers with the highest consumption (e.g. iron & steel plants) are directly fed at the above voltage levels. Low-voltage lines (for Enel, over 700,000 km) represent the distribution system which reaches individual customers, a service which is absolutely necessary to ensure a balanced development of the country and to contribute to a better quality of life.

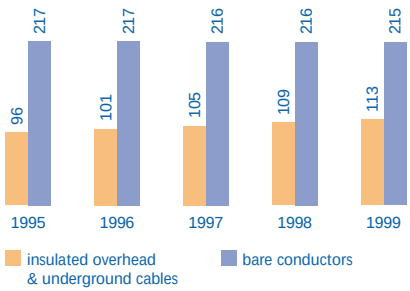
Enel is aware of the importance of electricity for sustainable development and, in the past few years, it has placed more and more emphasis on environmentally correct power grid management and development policies.
In accordance with its environmental policy principles, Enel applies a "prudent management" approach, which involves the use of the most effective engineering techniques and the adoption of the most advanced technologies, over and above actions for streamlining the existing grid.
For new low- and medium-voltage lines, Enel makes an extensive use of cables (conductors equipped with insulating sheaths), whereas, for high-voltage ones, the technique which offers the best results consists in carrying out detailed studies on optimum power line routing.
In general, the routing of high-voltage lines is quite flexible: their length may reach several tens of kilometers and they usually cross areas with scarce anthropic activities. Conversely, the routing of low- and medium-voltage lines is rather inflexible, as these lines have a short length or cross urbanized areas.
When planning new capacity, Enel strives to rationalize existing local lines, without sacrificing power grid stability and efficiency. These efforts may require the demolition of some sections of the lines.

When upgrading or renovating low- and medium-voltage lines, Enel tends to replace old bare-conductor lines with cable ones. In 1999, bare-conductor lines decreased by 4,600 km on the low-voltage grid and by 1,200 km on the medium-voltage one.
The comparison with other electricity companies, on the European and international scene, confirms that Enel's technologies are largely in line with the standards of the most advanced countries.

Low-voltage lines
thousand km



Medium-voltage lines
thousand km



Insulated overhead cable

It is a well-established technology for low-voltage power lines and, thanks to the solution of structural problems due to the need for heavier conductors, it has lately become practicable also for medium-voltage lines.
The three phases, coated by insulating material, are braided to form a single cable, which is supported by poles. This configuration eliminates the electric field and radically reduces the magnetic one. It does not require safety clearances to protect against electrical discharges and is thus particularly suited for crossing forested areas (as it minimizes the cutting and trimming of trees).
On low-voltage power lines in non-urban and rural areas, the insulated overhead cable is a routine option. On medium-voltage power lines, this solution is generally preferred in areas of environmental value, such as forests.
Enel is among the top companies of the world which extensively use this technology, since many industrialized countries still resort to conventional bare-conductor lines.

Underground cable

It is the best solution in terms of visual impact. However, it interferes with the surrounding environment and with road traffic, because it requires the digging of trenches for cable laying and maintenance.
Underground cables are used on low- and medium voltage lines in urban areas, but also in non-urban areas, when particular circumstances or constraints make it necessary to underground power lines.
In the case of high-voltage lines, the technical, economic and environmental difficulties rise significantly. This is why underground cables on 132-150 kV lines are only used for crossing urban centers and reaching HV/MV substations.
For higher voltages (380 kV), the technical problems, environmental impact, and costs of undergrounding are such as to make it hardly practicable. In effect, in all countries of the world, underground cables on 380-kV transmission grids are only used for very short sections and in particular cases.

Towers for the environment

Extra-high-voltage power line towers are perceived by the public as structures that the electricity industry designs and builds with the sole purpose of meeting its own requirements. This fact raises environmental sustainability issues in suburban and rural areas.
Advantages in terms of integration into the environment and landscape can be obtained by using tower designs more aesthetically-pleasing and with limited space requirements. It is with this goal in mind that Enel organized an international competition ("Sostegni per l'ambiente", towers for the environment), inviting proposals for tower designs harmonizing with the townscape and not intrusive into the natural environment.
A technical committee assessed the feasibility of and selected the proposals. The aesthetic value and interaction of the proposed projects with rural and suburban environments were examined by a panel specially appointed by the Ministries of the Enviroment, Public Works, Cultural Heritage and Activities, jointly with representatives of the cultural community and with Enel's experts. Leading international architects and designers participated in the competition, whose ex-aequo winners were Achille Castiglioni/Michele De Lucchi and Norman Foster & Partners.

Actions on the existing power grid and design concepts: some examples

The applicable legislation requires Enel to carry out remediation actions on its power lines by 2004 (Decrees of the President of the Council of Ministers of April 23, 1992 and of September 28, 1995 and interministerial procedural agreement of March 18, 1996). In 1996, after conducting surveys over its entire grid, Enel started submitting remediation projects to the relevant authorities within the set deadlines. The works are carried out as soon as all the required authorizations are available.
Enel established cooperation relations with a view to rationalizing and improving the integration of its power installations into areas of high environmental value. Among these initiatives, it is worth recalling the Memorandum of Understanding that Enel and the Abruzzo National Park authority signed in March 1999. Similar actions are in progress in other valued areas, such as national or regional parks.
In the course of 1999, Enel also took specific initiatives for better integration of the power grid into particularly significant settings.

Portofino area

This initiative is geared to rationalize and better integrate low- and medium-voltage power installations into the protected area of the Portofino Park and into the surrounding area.
The works will improve the quality of the electricity supply service in the Municipalities of Recco, Camogli, Portofino, Santa Margherita, Rapallo, Zoagli, and Chiavari and progressively and constantly mitigate the environmental impact of existing overhead lines.
Under the program, to be completed in 2001, 136 towers and 15 km of lines will be demolished, 19 km of lines will be undergrounded, and insulated ("elicord") cables will replace 4 km of lines.
In the protected area of the Portofino Park, the quality-of-service improvement works, which are scheduled in the 1999-2000 period, will involve demolition of 26 towers, 3 km of lines and undergrounding of 4.2 km of lines.

The eastern Rome area

Enel implemented an extensive plan of rationalization and improved integration of its power grid into the environment of the eastern area of Rome.
The environmental regeneration plan was focused on the Tor Vergata district, which was planned to host the World Youth Day, as part of the Jubilee Year celebrations.
The works included, among others: the demolition of 50 km of overhead lines and of 169 high-voltage lattice towers; the construction of 27 km of underground lines and of a new HV/MV substation designed with high environmental standards. Works were also completed for the construction of 50 km of underground cables for the medium- and low-voltage grid and 26 new MV/LV substations.
Implementation of the plan was made possible by fast granting of authorizations by the Municipality of Rome, which funded most of the works.
More than 500,000 Romans will enjoy better quality of service and a townscape free of lattice towers: 13 are the Roman districts involved by the environmental regeneration plan.
Enel combined state-of-the-art engineering techniques with emphasis on the history of the city buried in the subsoil. Excavation works for undergrounding power line—in which a team of archaeologists participated—unearthed, among others, the relics of an ancient Roman villa.

Telecommunications systems

Leading-edge technologies and correct planning of the telecommunications network go in the direction of environmental sustainability.
WIND, albeit recently set up, is already actively engaged in human health and environmental protection. Keeping abreast of the times also means relying on the contributions of advanced scientific research.

Radio base stations

The electromagnetic emissions of the telecommunications systems that WIND designs and installs lie below the limits of the strict national legislation. Moreover:

- all of WIND's radio base station projects are supported by a report on electromagnetic wave emissions, which is submitted to control authorities;
- when the selected area already has electromagnetic sources, WIND always ensures that, after the installation of its new aerials, total emissions lie below the regulatory limits.

WIND's excellent technology

To reconcile quality of service with health protection, WIND also relies on the features of its GSM technology. Cell transmitters, except for the control channel, do not transmit the signal continuously, but only in the time interval of the conversation. Through power control, the same technology automatically reduces the power transmitted by the repeating station and by the mobile terminal to the level which is required for maintaining a reliable connection. The system only transmits when there is a voice signal and not during conversation pauses (discontinuous transmission). This feature reduces the radiated energy by about 50% on average.
Furthermore, the technologies selected by WIND minimize space requirements and, consequently, visual impact.

Communication to customers

To keep customers informed about issues and solutions, WIND disseminated a brochure (WIND aerials—Lower environmental impact and higher health protection). Environmental information may also be obtained from a toll-free number and from WIND's website "www.wind.it".

Enhancement of the land heritage

Power installations are disseminated throughout the country and often affect substantial parts of it. In many cases, the presence of industrial settlements discouraged human activities in surrounding areas, thereby conserving the natural environment. This realization prompted Enel to formulate its Nature & Land program, i.e. a set of initiatives to enhance the natural value of the areas adjoining Enel's power installations, by creating nature sanctuaries or earmarking these areas for recreation or sports.
To this end, Enel established cooperation relations with key environmental associations (Legambiente, LIPU, WWF) engaged in the conservation of biodiversity, ecosystems, autochthonous and migratory animal species, and also offered technological solutions for research purposes.
In addition to this program, Enel conducts bird and fish protection-targeted activities.

Nature & Land

Nature & Land is the program that Enel developed to enhance the environmental, tourist, and recreational value of the areas adjoining its power installations. With this nation-wide program, Enel provides Italian communities with an environmentally sound system for flora and fauna conservation.
The program thus contributes to consolidating the presence of Enel throughout the country and to strengthening its ties with local authorities and communities.
Nature & Land identified a number of actions to be implemented within the framework of three projects:

- environment
- sports and tourism
- cultural itineraries.

The environment

The program consists of actions for improvement of existing nature sanctuaries, creation of new ones, conservation of biodiversity in parks and protected areas adjoining Enel's power installations.

New sanctuaries

In March 1999, on the occasion of the WWF Nature Sanctuary Festival, Enel loaned for use five areas of high environmental and natural value to WWF. The areas (covering a total of 150 hectares) are part of the hydroelectric schemes of Nembia (Adamello-Brenta Park, Trentino), Canterno (Latium), Alanno (Abruzzi), Le Mortine (Campania), and Piana degli Albanesi (Sicily).
In the course of 1999, procedures were completed for the creation of two nature sanctuaries in the above areas:

- the Sanctuary of Le Mortine, which lies on the right bank of the Volturno River, downstream of its confluence with the Sava River; it is an extensive wetland and fluvial forest area, hosting numerous species of trees and of water and land wildlife;
- the Sanctuary of Piana degli Albanesi, a lake which is located in the northernmost portion of the Belice basin; it is a relic of old Sicilian wetlands and home to numerous species of aquatic and raptor birds, which nest in the surrounding mountains; during migratory periods, also ospreys may be sighted.

The two new sanctuaries will add to the existing ones, which are run by environmental associations on Enel-owned land:
- Albanella-Porto Tolle (Rovigo)
- Alviano (Terni)
- Crava Morozzo (Cuneo)
- Orti Bottagone (Livorno)
- Vulci (Viterbo)

Sports and tourism

In some instances, Enel's areas, basins, and infrastructures lend themselves to being opened to the public for recreation and sports (free climbing, trekking, rowing, rafting, cycle tracks). Partners in the program are local authorities and associations. The program is also focused on the creation of "Sentieri energia e natura" (energy & nature trails), in areas whose cultural, technological and natural landmarks offer leisure-time opportunities. The trails are equipped with signs showing their features and sporting uses, data on the local plant & animal life, and on the nearby Enel's power installations.

In 1999, the program produced:
- energy & nature trails in Piedmont, Val d'Aosta, Lombardy, Marche, Toscana, and Sardinia;
- sailing regattas on the lake of Goillet (Val d'Aosta);
- free climbing on the Beauregard dam (Val d'Aosta);
- cycle tracks in the Ticino Park;
- rowing races on the Enza and Limentra Rivers (Emilia Romagna);
- rowing, sailing, and dragon-boating in the basins of Presenzano, Capriati, and Gallo Matese (Campania);
- sports on the lakes of Piana degli Albanesi (Sicily) and Vagli (Tuscany); the latter lake also hosted sport events for the disabled.

Other initiatives were taken for raising the environmental and tourist profile of the Marmore (Terni), Toce (Verbano-Cusio-Ossola), and Serio (Bergamo) waterfalls. These initiatives involved, among others, the extension of water-releasing hours, enabling a wider use of the waterfalls as a tourist resource.

Cultural itineraries

Works for the construction of power installations unearthed unique archaeological and paleontological remains. Moreover, some power installations and infrastructures have scientific and educational significance, such as the Geothermal Museum of Larderello (Pisa), the Earth Museum of the Municipality of Latera (Viterbo), and the hydro power technology exhibition center of Casa Abrami at Vagli (Lucca).

Bird conservation

Nests on power line towers

Migratory birds have big difficulties in finding nesting trees and sites on their routes, owing to the century-old and intensive urbanization of the land. This fact causes the decrease of bird populations and, in particular, of some threatened species, such as raptors. Some years ago, Enel tackled this problem by signing a cooperation agreement with Istituto Superiore di Sanità (National Health Institute). The agreement provides for the installation of nest boxes and artificial perching sites for migratory birds on Enel's power lines. This faunal conservation practice has already been successfully adopted by major electricity companies in the United States (Idaho Power Company) and by Endesa in Spain.

Two hundred and twenty nests have already been installed in areas of Latium (urban Parks of Decima and Marcigliana) which are crucial for the passage of some species. The program is gradually being extended to Lombardy (Adda Park) and Apulia (Cillarese Park). A nest-monitoring program (with remote observations and brood control) has been started since 1998. These activities enable to gain greater insight into the behavior of the various species and into the lifecycle of the birds occupying the nests (especially kestrels and tawny owls). Nest monitoring activities, which are carried out within the shortest possible time and by taking care of not interfering with the breeding process, revealed a high number of nests. During inspections, most of the young were weighed and ringed for follow-up.

The return of the white stork

Also in 1999, like in previous years starting from 1996, a pair of white storks nested on the same tower of a medium-voltage line at Sala Consilina (Salerno). Enel took all the necessary measures to protect the nest. Jointly with the Cilento Park authority, WWF and LIPU, Enel also contributed to the installation of viewing lodges and remote video cameras for conducting educational-scientific activities during brooding and weaning of the young storks.
Also at Cerignola (Foggia), a pair of storks selected the pole of one of Enel's low-voltage lines as its nest site. In this case too, measures were taken to protect the birds, and bird watching sessions were organized as part of environmental education programs.

Fish conservation

Hydroelectric dams or weirs create an obstacle to fish movement and may cause severe disturbances to some species, especially during breeding. Over the years, to help solve this problem, Enel built more than 30 fish ladders.
Enel also conducts periodical campaigns of restocking of fish (especially trout: eggs, fries, and adults of various sizes). Numerous restocking campaigns are also carried out in the Po River, which accommodates multiple power plants, in accordance with the requirements of public water diversion leases.
To preserve the balance of the local ecosystems, Enel continued its activities of cooperation with some basin authorities, with a view to experimentally determining the so-called "minimum in-stream flow", i.e. the minimum flow that should be maintained in river beds in order not to damage the life of the ecosystem involved.

Green classes beyond classroom walls

An outdoor educational facility was created in an area owned by Enel.Hydro and located in the immediate vicinity of its Seriate site. It is intended to provide environmental education to the students of the Bergamo province. There students can put into practice the theoretical concepts that they learn in their classrooms.
The facility replicates the plant & animal habitats which are typical of the Bergamo area.
By walking through the different environments, students can get an understanding of the overall ecological system, which results from the combination of multiple ecotopes.
The facility, covering a surface area of approximately 10,000 m^2, is situated at Cassinone (Seriate), next to the site of Enel.Hydro. Thanks to this location, it may be interconnected with an indoor multimedia classroom of the company.
Students can integrate their knowledge of the natural environment with the knowledge of human activities: information technology, new environmental technologies, monitoring, waste management, water pollution, etc.
Partners in the project are the Municipality of Seriate and the Municipality and Provincial authority of Bergamo.

The facility consists of the following environments:

- Agricultural environment (grassland, artificial ditches, and rows of crops: full access and enjoyment)
- Filtering environment (shrubs: teaching activity)
- Natural environment (tree area: limited access, i.e. use of trails to visit it)
- Wetland environment (small lakes and canals: limited access, i.e. only viewing from trails)

The entrance to the outdoor educational facility is equipped with billboards, which show the subjects of the green classes. A guided path and key-data posters illustrate the microclimates of the area.
The various environments are linked with one other to represent various ecological themes, which are organized and described under the following headings:

- Biodiversity and insects
- Ecosystems and ecology principles
- Water cycle
- Food chain
- Man and the environment

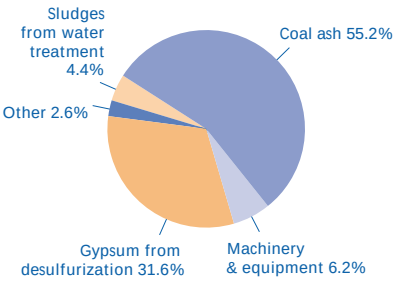
Waste minimization and recovery

Waste management is not only an environmental emergency, but an issue that every environmentally conscious company should address.
Wise and environmentally correct waste management policies may translate into substantial economic gains.
This is why waste minimization and recovery are priority targets for Enel and, among others, specifically referred to in Legislative Decree 22/97 (Ronchi Decree).

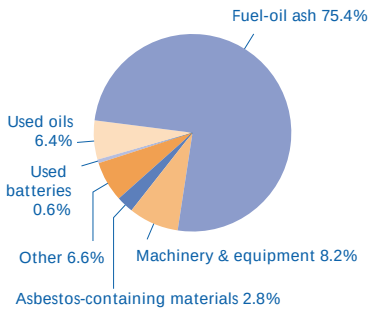
Waste production

In 1999, the waste from traditional electric activities grew by approximately 12.5%, passing from 1,481,000 to 1,666,000 tons. The waste from other activities was negligible (about 1% of the total waste).
This increase is chiefly due to the gypsum which is generated by new flue-gas desulfurizers. Coal-ash production remained stationary, whereas fuel-oil ash diminished.
As regards non-hazardous special waste, sludges had a sharp increase (from about 40,000 to about 72,000 tons), also due to the higher number of desulfurizers in operation. However, the waste streams from other activities (used materials and equipment, materials from demolition, and packaging materials) had a strong decrease (from about 210,000 to about 140,000 tons).
In 1999, also the production of other hazardous special waste (i.e. different from fuel-oil ash) recorded a significant fall (from about 16,000 to about 13,000 tons).

Non-hazardous special waste
1999 total: 1,612,256 tons



Hazardous special waste
1999 total: 53,738 tons



Waste production
thousand tons

	1995	1996	1997	1998	1999
Coal ash	1,076.3	916.3	773.9	883.8	890.0
Gypsum from desulfurization	-	-	11.9	275.7	509.3
Other non-hazardous special waste	115.1	151.8	169.6	250.9	213.0
Fuel-oil ash	24.7	31.2	39.6	55.2	40.5
Other hazardous special waste	8.8	8.5	15.6	15.6	13.2
TOTAL	**1,224.9**	**1,107.8**	**1,010.6**	**1,481.2**	**1,666.0**

Waste recovery

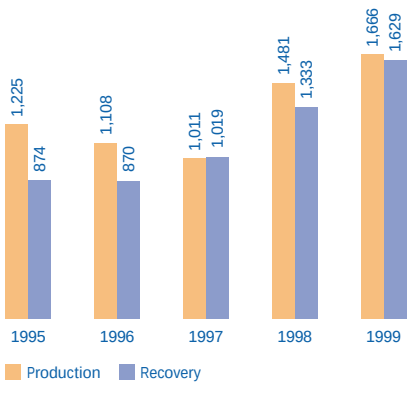
In 1999, non-hazardous and hazardous waste recovery hit 98% (ratio between amounts delivered to recovery operators and amounts produced), i.e. up by almost 9% on 1998. This result confirmed the effectiveness of policies minimizing the delivery of waste to dump sites.
The recovery of coal ash recorded a very high percentage, thanks to its use in cement production or as an aggregate for road paving. Also in 1999, coal ash recovery exceeded 100% of the amount produced, owing to the delivery to recovery operators of some of the ash produced and stored in the last months of 1998.

Waste recovery
% of production

	1995	1996	1997	1998	1999
Coal ash	77	90	113	107	106
Gypsum from desulfurization	-	-	33	87	99
Other non-hazardous special waste	38	29	75	48	75
Fuel-oil ash	7	4	15	28	40
Other hazardous special waste	-	46	53	60	
TOTAL	**72**	**79**	**101**	**90**	**98**

The properties of gypsum from the desulfurization process make it suitable for multiple uses. In 1999, the gypsum produced was almost entirely recovered (about 99% vs. 87% in 1998).
Growing recovery percentages were also recorded for the other non-hazardous special waste, fuel-oil ash, and other hazardous special waste. Further details on the latter waste are given below.

Total waste production and recovery
thousand tons



The waste recovered in 1995 and 1996 does not include hazardous waste other than fuel-oil ash, which can be estimated at 10,000 tons at the most.

Used oils

In 1999, 2,093 tons of used oils, without PCBs or with a PCB content below 25 ppm, were produced and totally delivered to a special consortium.
The used oils with a PCB content in excess of 25 ppm (1,338 tons) were totally delivered to authorized operators.
After the enactment of Legislative Decree no. 209 of May 22, 1999 (implementing the Directive 96/59/EC on disposal of polychlorinated biphenyls and polychlorinated triphenyls), Enel made a study to identify the data to be notified to the regional offices of the Waste Inventory.
The same decree indicated the option of decontaminating PCB-containing oils and equipment. By exercising this option, Enel delivered its contaminated transformers to decontamination operators for subsequent delivery to recovery operators.

Asbestos-containing materials

In 1999, the production of asbestos-containing waste was equal to 1,500 tons. Most of this waste derived from remediation actions in thermal and geothermal power plants.
Fifty percent of this amount was delivered to special operators to undergo an inertization process. The process, which is based on vitrification, yields a by-product which is suitable for road foundations.
The remaining amount was transferred to authorized dump sites.

Used batteries

In 1999, 340 tons of used lead batteries were disposed of and totally delivered to COBAT (special consortium for management of used lead batteries and lead-containing waste).

Radioactive waste

As of December 31, 1999, low- and medium-activity waste amounted to 6,100 m^3, slightly up from 1998. The change is due to routine waste production and completion of the process of conditioning of the Garigliano power plant waste.
Radioactive waste management is entrusted to Sogin, a company which was set up in 1999 in accordance with Legislative Decree no. 79 of March 16, 1999, and which is in charge of decommissioning nuclear power plants.
In 1999, to further reduce the volume of radioactive waste, Sogin initiated activities for:

- installation of a radioactive waste vitrification system in the Caorso site;
- construction of a furnace in the Latina site for the smelting of contaminated metal materials deriving from the dismantling of old power plants.

Occupational safety & health

Occupational safety & health are priority targets and fundamental values for the development and success of the companies of the Group.
1999 was a year of profound change, which required Enel to undertake considerable efforts to adapt occupational safety & health systems to its new organizational structure. Many results were attained, but there are still many targets to be pursued, because achieving and maintaining optimum quality standards in workplaces is a challenge that spurs Enel to work with increasingly high levels of effectiveness.

Initiatives for risk prevention, health protection, and workplace hygiene

In line with its objectives and taking into account general conditions, Enel continued its efforts to update its risk assessment documents, by specifying in particular general risk prevention and emergency management criteria, as laid down in the Legislative Decree of March 10, 1998. Consideration was given to the reduction of risk factors, with a view to making workplaces safe, both during routine activities and under conditions of severe and immediate danger.
Enel considered not only the possible risks which are intrinsic in the structure and type of its workplaces, but also:

- risks in terms of workplace hygiene, e.g. those connected with microclimate, air quality, lighting, etc.;
- horizontal risks, i.e. those related to working conditions, work organization, ergonomic and psychological factors, etc.;
- risks connected with the use of working equipment, namely that fitted with computer screens.

Enel went on with its risk prevention program, by implementing specific measures in the physical environment, as well as in the complex system of working conditions and of the interactions of workers with workplaces and land.
The highlights of 1999 are as follows:

- Enel Produzione, through its central staff Unit for occupational health & safety, completed the procedure for obtaining the prestigious ISO 9002 quality certification for its hygiene-health surveillance activities and for the provision of consulting services to third parties; the actual certification is expected within the first half of 2000;
- pilot scheme for auditing the safety management systems of hydro power plants, i.e. an extension of the plan already implemented in 1998 for thermal power plants; in the year 2000, a three-year auditing program will be initiated in all the thermal and hydro power plants of Enel Produzione;
- agreement with the national fire brigade on the utilization of the fire prevention camps located in thermal power plant areas for training purposes;
- guidelines for improving working conditions in jobs involving heavy physical or mental strain (e.g. shift work), and for improving the working conditions and ensuring the protection of working mothers, in compliance with recently issued national and European legislation;
- Enel.Hydro achieved the ISO 9001 standard quality certification for its Ismes and Ingegneria e Costruzioni business units; Terna began the procedure for obtaining the same certification for engineering and maintenance of its high-voltage power installations under safety conditions;
- jointly with CESI and CEMOC (Center for occupational and community medicine, Milan), Enel Distribuzione started a project for monitoring activities of manual handling of loads, use of facilities equipped with computer screens, and exposure to mineral oils.

Protection and promotion of occupational health

Based on the guidelines of the World Health Organization, Enel not only complied with European and international standards on occupational health, but also strived to raise health awareness among its organizational units.

Health protection actions (monitoring environmental parameters in workplaces and pollutant levels in the main structures of the Group, implementing health surveillance plans, etc.) have become a routine practice in which workers are directly involved. This choice fosters pro-active attitudes among workers for the improvement of their working conditions.

- In this context, it is worth mentioning the following 1999 initiatives:
- standardization of clothing and of personal protective equipment;
- survey of possible asbestos-related diseases among workers in charge of power plant maintenance;
- renewal of an agreement entered into with EDF (Electricité de France) on the Eurelex research program (European project for identifying common methodologies of electricity companies to be applied in epidemiological surveys on the working population);
- application of a specific health protocol (examination of workers by specialist doctors, psychometric tests) to workers in charge of typically electrical activities (cable laying, live maintenance).

Awareness, education & training

Personnel career development plans encompass constant activities of awareness, education & training on occupational health & safety topics.

In 1999, Enel implemented an intense education & training program and continued its communication activities to keep workers informed about safety equipment available in workplaces, planned measures, and emergency procedures.

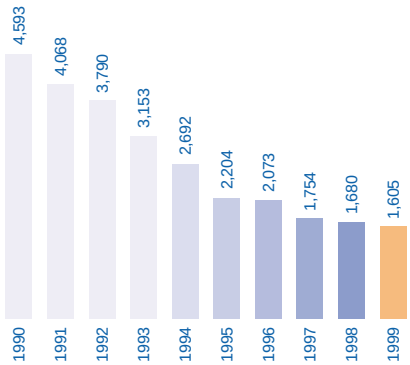
Courses were repeated for training the personnel for the positions set out in Legislative Decree 626/94 (head of risk prevention and health protection, emergency management, workers' safety representatives) and by Legislative Decree 494/96 (design coordinator and site management coordinator).

Over and above conventional education & training efforts, new teaching techniques were experimented by Terna. These techniques rely on computer-based or virtual-reality simulation of some risky activities (live maintenance).

Enel also continued its distribution of multimedia packages with guidelines on prevention of electrical risks. These packages were also used for training about 300 field tutors.

Injuries

Trend of total occupational injuries
(no. of injuries with over one day of absence from work)



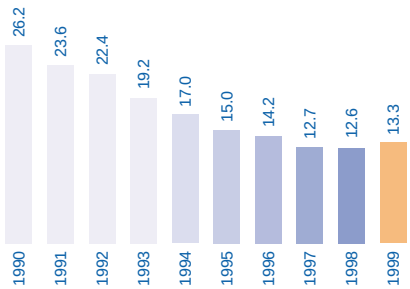
In 1999, the number of injuries (events involving at least one day of inability to work) decreased in absolute terms, whilst their frequency (number of injuries per million hours of work) rose slightly: from 12.63 in 1998 to 13.30 in 1999. In the past decade, this indicator had an overall decline of 49%.

Six fatal injuries were recorded in 1999: one of an electrical nature, 2 due to falling from elevated work areas, 1 due to collision with moving objects and 2 due to road accidents. In 1998, there were 4 fatal injuries, none of which was due to road accidents.

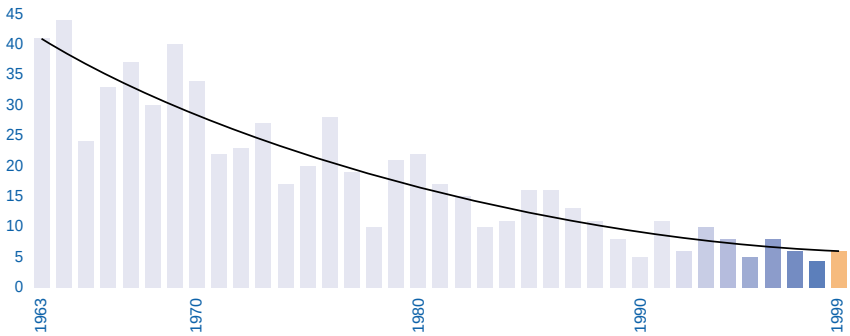
These results show that Enel performed well in terms of minimization of occupational injuries. At any rate, the companies of the Group continue to place particular emphasis on this aspect.

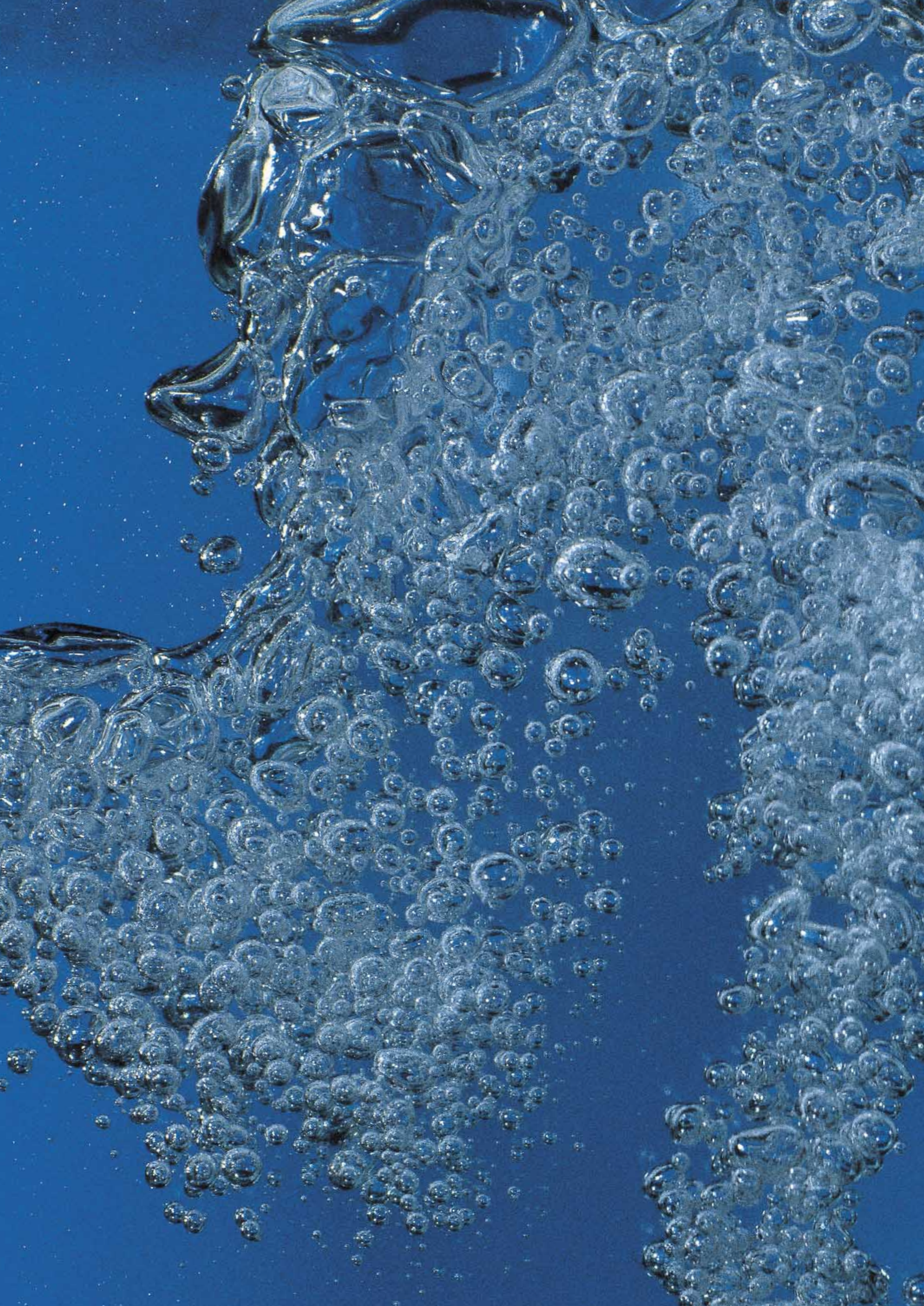
Enel plans to continue its activities of communication and awareness among its operational and functional units. By so doing, Enel expects that the personnel will be increasingly committed to complying with internal rules and regulations and to using personal protective equipment, thereby also minimizing the injuries due to lack of attention.

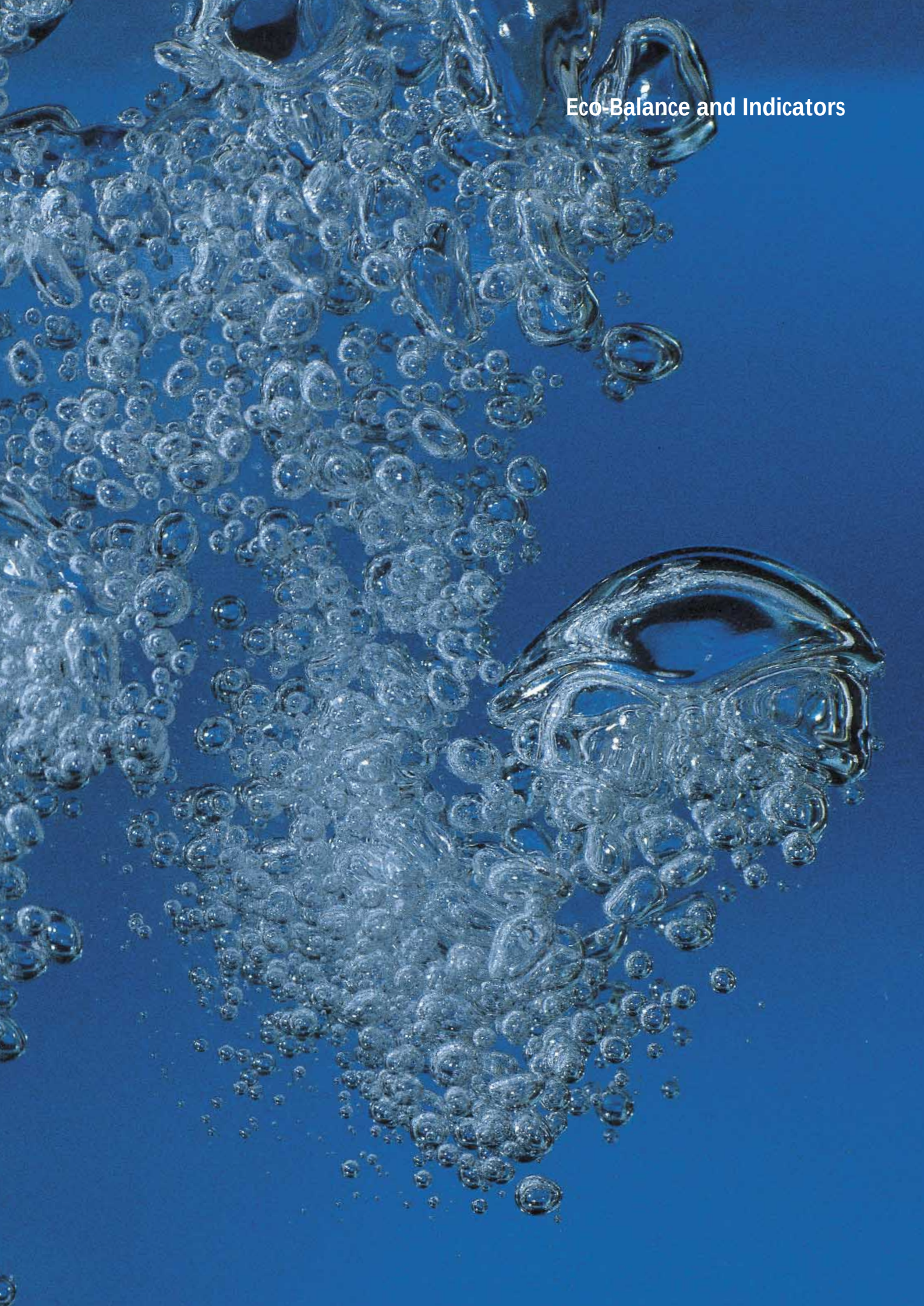
Frequency of occupational injuries
(no. of injuries per million hours of work)



Fatal injuries







Eco-Balance and Indicators

The eco-balance

Among the various activities of Enel, the process of electricity generation, transmission and distribution is the one which has the most significant relations with the environment. Given their nature, variety, and extent, these relations may be regarded as environmentally representative of the entire Group, also taken into account that its diversification has just started.
The eco-balance quantifies the relations between the processes of electricity generation, transmission, and distribution and the environment.

The eco-balance tables consist of three sections, which refer to:
- the consumption of environmental resources;
- the process and the related product (electricity): these elements give indications on the extent of the problem considered;
- the interactions due to releases into the environment.

For each item, the tables show the data for the past five years and the percentage change recorded over the entire period and in 1999. To facilitate comparisons, it was deemed useful to retain the same time series as those adopted in Enel's previous Environmental Reports.
This objective was achieved by grouping the data relating to homogeneous sets of activities, even if conducted by different companies of the Group: on one hand, the generation activities carried out by Enel Produzione, Erga, Eurogen, Elettrogen, and Interpower, which inherited the Generation Division; on the other hand, the set of transmission and distribution activities, carried out by Terna and Enel Distribuzione, respectively. The aggregation of transmission & distribution data solved a data reporting discontinuity problem: the transfer of electrical stations and lines between the two companies, resulting from the demarcation of the respective lines of business.

The main data of power installations as of December 31, 1999 are shown below.

Power plants

net maximum capacity	55,841 MW
of which:	
hydro	*16,581 MW*
thermal	*38,648 MW*
geothermal	*584 MW*
wind	*25 MW*
solar (photovoltaic)	*3 MW*

Power lines

length		1,088,200 km
of which:		
high voltage	*(from 40 to 380 kV)*	*57,300 km*
medium voltage	*(from 1 to 30 kV)*	*328,200 km*
low voltage	*(380 V)*	*702,700 km*

The profiles of the various companies of the Group and their 1999 highlights are shown in the Annexes.

Resources

							%	%
		1995	**1996**	**1997**	**1998**	**1999**	**1999-95**	**1999-98**
Fuels								
fuel oil	thousand t	23,169	22,028	21,170	19,305	15,420	-33.4	-20.1
HS	*thousand t*	*671*	*496*	*173*	*904*	*1,176*	*75.2*	*30.1*
MS	*thousand t*	*4,390*	*4,359*	*4,258*	*7,944*	*6,514*	*48.4*	*-18.0*
LS	*thousand t*	*15,932*	*14,558*	*13,239*	*5,237*	*3,530*	*-77.8*	*-32.6*
VLS	*thousand t*	*2,176*	*2,615*	*3,500*	*5,220*	*4,201*	*93.0*	*-19.5*
gas-oil	thousand t	106	135	62	90	209	97.2	132.2
natural gas	million m^3	6,882	7,008	7,686	8,831	11,302	64.2	28.0
non technologically-captive use	*million m^3*	*6,160*	*6,434*	*6,036*	*6,394*	*7,966*	*29.3*	*24.6*
technologically-captive use	*million m^3*	*722*	*574*	*1,650*	*2,437*	*3,336*	*361.8*	*36.9*
coal	thousand t	8,167	7,505	7,015	8,176	8,395	2.8	2.7
brown coal	thousand t	379	295	176	156	80	-78.9	-48.7
coke-oven gas	million m^3	59	58	62	1	0	-100.0	-100.0
orimulsion	thousand t	-	-	1	693	1,689	-	143.7
TOTAL	thousand toe	33,631	32,347	31,712	31,880	31,046	-7.7	-2.6
Geothermal steam	thousand t	30,611	31,034	32,108	34,201	35,339	15.4	3.3
Water for industrial uses								
from rivers	million m^3	12.2	12.4	11.8	11.1	11.1	-8.9	0.1
from wells	million m^3	17.5	18.2	17.9	15.5	12.9	-26.0	-16.5
from aqueducts	million m^3	6.7	4.9	5.3	4.8	5.5	-18.4	14.3
TOTAL ABSTRACTION FROM INLAND WATERS	million m^3	36.4	35.5	35.0	31.4	29.6	-18.9	-5.9
from the sea with direct use	million m^2	-	-	-	2.7	12.2	-	351.4
from the sea after desalination	million m^3	2.9	3.6	4.0	6.5	8.0	178.9	22.3
from internal recovery	million m^3	1.3	1.5	1.7	3.1	4.1	209.4	34.8
TOTAL REQUIREMENTS	million m^3	40.6	40.7	40.7	43.7	53.9	32.6	23.2
Expendables								
resins	t	204	222	290	117	90	-56.1	-23.7
lime	t	5,244	5,414	6,399	9,034	12,135	131.4	34.3
ammonia	t	168	177	2,878	8,969	15,482	9115.8	72.6
hydrazine	t	329	296	358	114	71	-78.3	-37.4
limestone	t	-	-	12,428	178,393	333,275	-	86.8
soda	t	9,665	9,540	8,318	6,774	6,692	-30.8	-1.2
sulfuric and hydrochloric acids	t	18,771	17,752	16,720	9,359	7,834	-58.3	-16.3
bentonite	t	2,312	1,915	2,060	2,803	1,361	-41.1	-51.4
barite	t	382	289	441	362	6	-98.3	-98.2
geothermal cement	t	8,075	6,105	4,185	5,819	2,748	-66.0	-52.8
other	t	15,216	14,538	11,881	10,369	7,319	-51.9	-29.4

Process and product

million kWh	1995	1996	1997	1998	1999	% 1999-95	% 1999-98
Generation process							
total net electricity generation	180,339	179,875	177,201	179,484	178,813	-0.8	-0.4
thermal	147,228	141,645	139,954	141,052	136,946	-7.0	-2.9
from fuel oil and gas-oil	*100,228*	*96,062*	*92,194*	*84,446*	*66,987*	*-33.2*	*-20.7*
from natural gas	*24,757*	*25,446*	*28,964*	*33,710*	*43,426*	*75.4*	*28.8*
from coal and brown coal	*22,130*	*20,028*	*18,676*	*21,016*	*21,872*	*-1.2*	*4.1*
from coke-oven gas	*113*	*109*	*118*	*3*	*0*	*-100.0*	*-100.0*
from orimulsion	-	-	*2*	*1,877*	*4,661*	-	*148.3*
from renewables	29,116	33,372	32,460	32,459	35,488	21.9	9.3
geothermal	*3,219*	*3,533*	*3,672*	*3,958*	*4,128*	*28.2*	*4.3*
hydro from natural flows	*25,891*	*29,831*	*28,773*	*28,480*	*31,335*	*21.0*	*10.0*
wind and solar	*6*	*8*	*15*	*21*	*25*	*316.7*	*19.0*
hydro from pumped storage	4,032	4,892	4,822	6,006	6,379	58.2	6.2
Transmission & distribution process							
generation for consumption	*174,756*	*173,095*	*170,554*	*171,199*	*170,013*	*-2.7*	*-0.7*
net exchanges with other national operators	*16,362*	*19,400*	*26,935*	*31,519*	*35,897*	*119.4*	*13.9*
net imports	*37,427*	*37,389*	*38,832*	*40,732*	*42,010*	*12.2*	*3.1*
electricity demand on the network	228,545	229,884	236,321	243,450	247,920	8.5	1.8
electricity sold and transferred under various arrangements	*212,256*	*214,208*	*220,003*	*226,403*	*230,853*	*8.8*	*2.0*
own consumption	*659*	*604*	*614*	*718*	*636*	*-3.5*	*-11.4*
grid losses	*15,630*	*15,072*	*15,704*	*16,329*	*16,431*	*5.1*	*0.6*

Interactions

	source							%	%
			1995	**1996**	**1997**	**1998**	**1999**	**1999-95**	**1999-98**
Emissions into the atmosphere									
SO_2	thermal generation	thousand t	585	536	484	489	404	-31.0	-17.4
NO_x	thermal generation	thousand t	286	268	228	178	144	-49.7	-19.2
particulates	thermal generation	thousand t	45	39	22	19	16	-65.3	-18.9
H_2S	geothermal generation	thousand t	n.a.	21	22	24	25	n.a.	5,1
CO_2	*thermal generation (from combustion)*	*million t*	*109*	*104*	*101*	*101*	*97*	*-11.1*	*-4.6*
	thermal generation (from desulfurization)	*million t*	-	-	*0.005*	*0.078*	*0.147*	-	*86.8*
	geothermal generation	*million t*	*1.520*	*1.669*	*1.612*	*1.794*	*1.794*	*18.0*	*0.0*
	total	million t	110	106	103	103	99	-10.5	-4.4
SF_6	total	kg	n.a.	n.a.	n.a.	n.a.	3,447	n.a.	n.a.
		thousand t of CO_2-equivalent	n.a.	n.a.	n.a.	n.a.	82	n.a.	n.a.
Waste waters									
production	thermal generation	million m^3	28.4	27.2	25.9	25.1	27.1	-4.7	8.0
internal recovery	thermal generation	million m^3	1.3	1.5	1.7	3.1	4.1	209.4	34.8
Non-hazardous special waste									
coal bottom ash									
production	thermal generation	t	81,680	72,840	53,430	41,144	50,542	-38.1	22.8
delivery to recovery operators	thermal generation	t	55,221	58,670	46,511	37,733	50,097	-9.3	32.8
coal flyash									
production	thermal generation	t	994,655	843,451	720,490	842,701	839,411	-15.6	-0.4
delivery to recovery operators	thermal generation	t	773,558	765,172	827,484	909,582	891,744	15.3	-2.0
gypsum from desulfurization									
production	thermal generation	t	-	-	11,880	275,651	509,294	-	84.8
delivery to recovery operators	thermal generation	t	-	-	3,957	240,820	502,325	-	108.6
other									
production	*generation*	*t*	*75,153*	*112,884*	*74,423*	*164,251*	*116,473*	*55.0*	*-29.1*
	transmission & distribution	*t*	*39,944*	*38,902*	*95,170*	*86,694*	*96,537*	*141.7*	*11.4*
	total	t	115,097	151,786	169,592	250,945	213,010	85.1	-15.1
delivery to recovery operators	*generation*	*t*	*5,118*	*8,620*	*23,569*	*50,077*	*74,706*	*1,359.6*	*49.2*
	transmission & distribution	*t*	*38,391*	*35,957*	*104,256*	*70,676*	*86,016*	*124.1*	*21.7*
	total	t	43,509	44,577	127,825	120,753	160,721	269.4	33.1

n.a.: not available

Interactions

	source							%	%
			1995	**1996**	**1997**	**1998**	**1999**	**1999-95**	**1999-98**
Hazardous special waste									
fuel-oil ash									
production	thermal generation	t	24,717	31,185	39,576	55,205	40,520	63.9	-26.6
delivery to recovery operators	thermal generation	t	1,718	1,346	5,857	15,440	16,172	841.3	4.7
other									
production	*generation*	*t*	*3,576*	*3,794*	*9,902*	*6,186*	*6,995*	*95.6*	*13.1*
	transmission & distribution	*t*	*5,175*	*4,744*	*5.680*	*9,432*	*6,222*	*20.2*	*-34.0*
	total	t	8,751	8,538	15.582	15,618	13,217	51.0	-15.4
delivery to recovery operators	*generation*	*t*	*n.a.*	*n.a.*	*2.518*	*2,508*	*2,869*	*n.a.*	*14.4*
	transmission & distribution	*t*	*n.a.*	*n.a.*	*4,652*	*5,742*	*5,086*	*n.a.*	*-11.4*
	total	t	n.a.	n.a.	7,170	8,249	7,955	n.a.	-3.6
Other solid waste									
waste from geothermal drilling	geothermal generation	t	n.a.	13,537	12,756	24,096	1,662	n.a.	-93.1
alluvial sediments removed from hydroelectric basins	hydro generation	t	n.a.	n.a.	498,729	487,944	217,690	n.a.	-55.4
floating debris and material removed from the trashracks of hydro power plants	hydro generation	t	6,452	11,139	8,509	10,198	8.240	27.7	-19.2

n.a.: not available

Notes to the eco-balance

The following paragraphs describe the characteristics and modes of collection of the data shown in the eco-balance tables and, in some cases, provide comments on their trends.

Resources

This heading includes the resources consumed as energy sources (fuels, geothermal steam) and those consumed as materials (water for industrial uses, expendables).

Fuels are the energy source for thermal generation.
The consumption of fuel oils is indicated on the basis of their sulfur content (HS = high: >2.5%; MS = medium: >1.3% and ≤2.5%; LS = low: >0.5% and ≤1.3%; VLS = very low: ≤0.5%).
The consumption of natural gas is broken down into its uses: non-technologically captive (when gas is an environmental protection option) and technologically-captive (when gas feeds single- and combined-cycle turbines, for which it is practically the only available fuel).
Gas-oil (sulfur content: 0.2%) is used in gas-turbine power installations which are not connected to the natural gas grid, in diesel-engine power installations (supplying some minor islands), in the start-up of steam-fired thermal power plants, and as an emergency fuel in the other gas-turbine power installations.
Orimulsion, an emulsion of bitumen in water coming from the Orinoco River Basin, is used in Enel's thermal power plants equipped with desulfurizers.
Fuel consumption, obtained from data measured and certified in each power installation, is expressed both in metric units (thousand tons or million m^3) and in energy potential (thousand tons of oil-equivalent). The latter convention facilitates aggregations and comparisons.
Note the further decrease which was recorded in total fuel-oil consumption in 1999. This decrease was offset by a new strong increase in the consumption of natural gas, thanks to the supply of Nigerian gas under a long-term contract.
The rise in HS fuel oil (accounting for a small percentage of total fuel-oil consumption) is due to its occasional use in coal-fired power installations equipped with desulfurizers, owing to coal management problems.

Geothermal steam is the energy source for geothermal generation. The amount used is measured with special instrumentation.
Its upward trend is the result of careful management of wells, based on their productivity. Injection of condensed geothermal steam, together with meteoric waters (from outdoor power plant areas), into the subsoil represents not only an environmental measure but, above all, a way to sustain geothermal reservoirs, whose energy potential is almost inexhaustible.

Water for industrial uses is consumed:
- in thermal power plants, especially to make up for the amounts lost in the generation process of steam-turbine power plants and in closed-cycle wet cooling towers, to carry out clean-up jobs (especially of boilers) and to feed auxiliaries and desulfurizers;
- in geothermal activities, to prepare the drilling slurry.

The higher water requirements of 1999 are related to the higher number of desulfurizers in operation. However, desulfurizers are designed to use a percentage of untreated sea water of about 80%. This choice, together with the growing use of desalinated water and the reuse of waste waters, further reduced abstraction from inland waters.

Expendables complete the list of the resources used:

- resins are used, via ion exchange, to produce the high-purity water which is needed for the thermal cycle of steam-fired power plants;
- lime abates water hardness;
- ammonia is the reagent for the flue gas denitrification process and is used to regulate the pH of the thermal-cycle water;
- hydrazine deoxygenates the thermal-cycle water and regulates its pH;
- limestone is the reagent for the flue gas desulfurization process;
- soda, sulfuric and hydrochloric acids are most commonly used in clean-up of equipment (however, in geothermal activities, the primary use of soda is as an additive in the slurries used in the drilling of geothermal wells);
- bentonite is a clay which is contained in the slurries used in the drilling of geothermal wells;
- barite is used to thicken bentonite slurries, thereby improving their effectiveness;
- geothermal cement is used for joining the steel walls of wells and as a thickener of drill cuttings.

Other expendables include: i) sodium hypochlorite and ferrous sulfate, which are occasionally used as additives in the cooling waters of steam-fired thermal power plants, to prevent deposits and fouling and to protect heat-transfer tube surfaces from corrosion, respectively; and ii) magnesium oxide, which is injected into the flue gas circuit of boilers fed with vanadium-containing fuels, to prevent corrosion of heat-transfer surfaces due to the indirect action of vanadium.

The figures shown are obtained from the accounting records of purchases, which are held in each power installation site.

The new, sharp increase in ammonia and limestone consumption is related to the higher number of denitrification systems and desulfurizers in operation. The consumption of the other expendables generally shows a trend towards a more rational use of the various products. The low consumption of bentonite is also due to the lower circulation losses which were recorded in the drilling of geothermal wells, whereas the radical drop in the consumption of barite is to be ascribed to the characteristics of the geological formations crossed by the wells.

The process and the product

The reported data, which are measured values, give a concise representation of Enel's electric balance, which separately considers the generation process and the transmission & distribution one.

For the generation process, the result is shown, i.e. the net generation of electricity (supplied to the network) and the contributions of the respective sources.

Among these sources: the thermal contribution, albeit down by 2.9% on 1998, has a dominant position; natural gas displays a significant upward trend; and fuel oil shows a downward trend.

Enel ranks among the top geothermal and hydro generation operators of the world: geothermal generation has a growing trend, thanks to Enel's efforts in the use of geothermal resources; instead, hydro generation (Italy is one of the countries with the highest utilization of water resources for power generation) is characterized by fluctuations due to the variability of precipitation.

Furthermore, electricity generation from new renewables (wind and solar) displays a steep growth, even if its contribution to total generation is still marginal.

The transmission & distribution process is summarized by indicating the value of electricity demand on the network, i.e. the sum of consumption values and of power grid losses. Consumption values are derived from electricity sales (including a small portion of electricity transferred under various arrangements) and from Enel's own usage (electricity withdrawn from the grid and used in Enel's power installations and offices).
Demand is covered by Enel's own generation (production for consumption, i.e. net of the electricity consumed in pumped storage hydro power plants) and by electricity exchanged with other national and foreign operators.
Observe the substantial increase in the amount of electricity that Enel purchased from other national operators. This electricity was mostly produced from renewable or "equivalent" sources.

Interactions

Interactions refer to gaseous, liquid, and solid releases into the environment.

Emissions into the atmosphere which are typical of electric activities are represented by sulfur dioxide (SO_2), nitrogen oxides (NO_x), particulates, hydrogen sulfide (H_2S), carbon dioxide (CO_2), and sulfur hexafluoride (SF_6).

- SO_2, NO_x, and particulates are typical pollutants of the combustion process in thermal power plants.
  Their emission values are obtained by multiplying the related flue gas concentrations (mostly continuously monitored) by the flue gas volumes.
  The values shown refer both to emissions from large combustion plants (annually reported to the Ministry of the Environment) and from gas turbines.
  In 1999, Enel continued to reduce its emissions of NO_x and particulates. SO_2 emissions decidedly resumed their declining trend as a result of advanced combustion technologies, continuous tuning of combustion systems, progress in the installation/upgrading of flue gas abatement systems, and use of LS fuels.
- H_2S is the only potential pollutant with significant percentages in geothermal fluid. Beginning in 1996, its emissions are estimated on the basis of periodical sampling of fluid composition and of the related volumes dispersed into the atmosphere. The rise in these emissions is due to the increase of geothermal generation.
- CO_2 is the typical product from combustion of all fuels. However, it is also contained, albeit in much lower amounts, in the reaction products from the desulfurization process and in geothermal steam.
  The CO_2 from combustion is computed by applying, to the consumption of the various fuels, the emission factors (tons of CO_2 per ton of oil-equivalent) that the Italian Ministry of the Environment specified in its 1st National Communication on Greenhouse Gases: 4.03 for coal and coal products; 3.27 for oil products; 2.35 for natural gas.
  The amount of CO_2 from the desulfurization process is computed stoichiometrically from the amount of limestone used.
  Beginning in 1996, the CO_2 from geothermal steam is estimated with reference to periodical sampling of fluid composition and to determination of the related volumes dispersed into the atmosphere. For previous years, geothermal emissions of CO_2 are estimated on the basis of 1996 specific emissions.
- The emissions of SF_6 are due to leaks from the equipment where it is used as an insulant and for electric arc extinction.
  SF_6 emissions are computed with a complex process which takes into account the amounts replenished. The 1999 values of SF_6 emissions are fairly reliable and confirm the order of magnitude of the values estimated in previous years.

The amounts of SF_6 are expressed in weight of SF_6 and in weight of CO_2-equivalent (in terms of possible effect on global warming). The values expressed in CO_2-equivalent show that SF_6 emissions are very low (less than 1/1000) with respect to CO_2 ones.

Waste waters include residual process water and meteoric waters collected from the outdoor areas of thermal power plants. After being treated, these waters are in part recovered and in part returned to surface water bodies.
The quantitative data of waste waters are estimated by referring to the potential capability of water treatment systems, to their utilization and modes of operation.
After gradual reduction, waste waters had a reverse trend in 1999, due to the installation of new desulfurizers. However, waters from internal recovery also recorded an upward trend.

Special waste represents the refuse from the industrial activity of Enel. This waste is regulated by Legislative Decree no. 22 of February 5, 1997, as amended, which classifies it into non-hazardous and hazardous waste.

- The non-hazardous waste produced by Enel includes not only coal ash and gypsum from desulfurization, but also materials which are typical of electric activities (machines and equipment, their parts, supports of power lines, conductors, cables, sludges from water treatment, etc.) or materials of a general or exceptional nature (packaging materials, clothing, debris from construction and demolition, etc.).
- Hazardous waste comprises fuel-oil ash, materials which are typical of electric activities (PCB-containing transformers and capacitors, their parts, batteries, used oils, sludges from condensation of geothermal steam, etc.) or of a general or exceptional nature (sludges, asbestos, etc.).

"Waste delivered to recovery operators" means the amounts of waste which are delivered to authorized waste recovery operators (possibly, Enel itself).
The waste data shown are obtained from yearly reports to the Public Inventory of Waste. These reports are based on the qualitative and quantitative characteristics of the waste, recorded at least on a weekly basis in the books of incoming and outgoing materials.
The following trends emerge from the data:

- the production of ash is generally correlated with fuel consumption and characteristics; however, it is subject to fluctuations, depending on the frequency of ash removal and on whether water is added or not;
- the new strong rise in the production of gypsum is related to the higher number of desulfurizers in operation;
- the production of other non-hazardous waste generally depends on contingent circumstances (e.g. materials from demolition) and on higher production of sludges from the drains of desulfurizers;
- the waste delivered to recovery operators shows a generalized increase.

The following items are identified separately as other solid waste:

- cuttings from drilling of geothermal wells, because they are not subject to the waste management legislation;
- alluvial sediments from desilting of hydroelectric basins and materials removed from the trashracks placed near the intake structures of hydro power plants; although Enel does not produce this waste, it takes care of its disposal.

Indicators

Indicators are used to analyze Enel's environmental performance over time, regardless of the "volume of activities" which are carried out in each year.
The following paragraphs describe the characteristics of the indicators presented in the subsequent tables and provide comments, if any, on their trends.

Conservation and quality of resources

- The net heat rate of thermal power plants defines the average quantity of fuels which are consumed by thermal power plants to generate one kWh net.
- The net heat rate of geothermal power plants defines the average quantity of geothermal steam which is used by geothermal power plants to produce one kWh net.
- The net efficiency of pumping cycles expresses, in percentages, the ratio between the hydro power produced by pumped-storage power plants and the electricity consumed for pumping.
- The grid losses are expressed as percentages of the electricity demand on the grid.

The above-mentioned indicators show that the overall efficiency of Enel's electric system is constantly high. Note the growing efficiency in the utilization of geothermal resources.

- The net specific requirements of water for industrial uses express the amount of water consumed per kWh net of thermal generation. Their increase is due to the operation of desulfurizers; however, this increase is minimum, if the contribution of sea water with direct use (main source for coverage of the water requirements of desulfurizers) is excluded;
- The percentage contributions to coverage of the requirements of water for industrial uses show a further generalized decrease of inland waters (rivers, wells, and aqueducts), a sharp increase in sea water with direct use, and unchanged values for desalinated water and water from internal recovery.
- The fuel consumption (hydrocarbons) shows a general drop in the contribution of fuel oil and an increase in the overall contribution of natural gas which is higher than in the past.
- The generation from renewables, expressed as a percentage of total electricity generation, shows fluctuations which are especially due to the variable contribution of hydro generation. The contribution of geothermal generation, instead, shows a steady growth. Generation from new renewables (wind and solar), although rising progressively, provides a very limited contribution in absolute terms.

Indicators

		1995	1996	1997	1998	1999	% 1999-95	% 1999-98
Resource conservation and quality								
net heat rate of thermal power plants	kcal/kWh	2,284	2,284	2,266	2,260	2,267	-0.8	0.3
net heat rate of geothermal power plants	kcal/kWh	5,870	5,749	5,704	5,654	5,605	-4.5	-0.9
net efficiency of pumping cycles	%	72.2	72.2	72.5	72.5	72.5	0.4	0.0
grid losses	% of electricity demand	6.8	6.6	6.6	6.7	6.6	-3.1	-1.2
net specific requirements of water for industrial uses in thermal generation								
including sea water with direct use	liters/kWh	0.275	0.286	0.290	0.308	0.393	43.1	27.4
excluding sea water with direct use	liters/kWh	0.275	0.286	0.290	0.289	0.304	10.6	5.0
coverage of requirements of water for industrial uses								
from rivers	% of requirements	30.0	30.6	29.0	25.4	20.6	-31.3	-18.8
from wells	% of requirements	43.0	44.7	44.0	35.5	24.0	-44.2	-32.3
from aqueducts	% of requirements	16.6	12.1	13.0	11.0	10.2	-38.5	-7.2
from the sea with direct use	% of requirements	-	-	-	6.2	22.7	-	266.3
from the sea after desalination	% of requirements	7.1	8.9	9.9	15.0	14.8	110.3	-0.8
from internal recovery	% of requirements	3.3	3.8	4.1	7.0	7.6	133.2	9.3
fuel consumption (hydrocarbons)								
natural gas	% of total fuel consumption	17.0	18.0	20.3	23.2	30.7	80.3	32.5
non-technologically captive use	*% of total fuel consumption*	*15.2*	*16.5*	*15.9*	*16.8*	*21.6*	*42.0*	*29.0*
technologically-captive use	*% of total fuel consumption*	*1.8*	*1.5*	*4.4*	*6.4*	*9.1*	*407.0*	*41.7*
fuel oil	% of total fuel consumption	67.0	66.7	65.3	59.3	48.5	-27.5	-18.2
VLS	*% of total fuel consumption*	*6.3*	*8.0*	*10.9*	*16.4*	*13.6*	*114.0*	*-17.3*
LS	*% of total fuel consumption*	*46.1*	*44.1*	*40.9*	*16.1*	*11.1*	*-75.9*	*-31.2*
MS	*% of total fuel consumption*	*12.6*	*13.1*	*13.0*	*24.1*	*20.2*	*60.9*	*-16.1*
HS	*% of total fuel consumption*	*1.9*	*1.5*	*0.5*	*2,7*	*3.6*	*90.7*	*37.0*
natural gas + VLS fuel oil	% of total fuel consumption	23.3	26.0	31.2	39.5	44.2	89.4	11.9
natural gas + VLS & LS fuel oil	% of total fuel consumption	69.5	70.1	72.1	55.7	55.3	-20.4	-0.6
generation from renewables	% of total generation	16.1	18.6	18.3	18.1	19.8	22.9	9.7
geothermal	*% of total generation*	*1.8*	*2.0*	*2.1*	*2.2*	*2.3*	*29.3*	*4.7*
hydro from natural flows	*% of total generation*	*14.4*	*16.6*	*16.2*	*15.9*	*17.5*	*22.1*	*10.4*
wind and solar	*% of total generation*	*0.0033*	*0.0044*	*0.0085*	*0.0117*	*0.0140*	*320.2*	*19.5*

Indicators

							%	%
		1995	**1996**	**1997**	**1998**	**1999**	**1999-95**	**1999-98**
Net specific emissions from thermal generation								
SO_2/thermal generation	g/kWh	4.0	3.8	3.5	3.5	2.9	-25.8	-15.0
NO_x/thermal generation	g/kWh	1.9	1.9	1.6	1.3	1.1	-45.9	-16.7
particulates/thermal generation	g/kWh	0.31	0.28	0.16	0.14	0.11	-62.7	-16.5
CO_2/thermal generation	g/kWh	738	735	723	719	707	-4.3	-1.6
Net specific emissions from geothermal generation								
H_2S/geothermal generation	g/kWh	n.a.	6.07	6.11	6.01	6.06	n.a.	0.7
CO_2/geothermal generation	g/kWh	472	472	439	453	435	-8.0	-4.1
Net specific emissions from total generation								
CO_2 (thermal)/total generation	g/kWh	603	579	571	565	541	-10.2	-4.1
CO_2 (thermal+geothermal)/total generation	g/kWh	611	588	580	575	551	-9.8	-4.1
Avoided CO_2 emissions								
geothermal generation (net of typical emissions)	*thousand t*	*856*	*927*	*1,043*	*1,050*	*1,124*	*31.3*	*7.0*
hydro generation from natural flows	*thousand t*	*19,116*	*21,916*	*20,806*	*20,468*	*22,150*	*15.9*	*8.2*
generation from wind and solar	*thousand t*	*4*	*6*	*11*	*15*	*18*	*298.9*	*17.1*
total	thousand t	19,976	22,849	21,860	21,533	23,292	16.6	8.2

n.a.: not available

Indicators

		1995	1996	1997	1998	1999	% 1999-95	% 1999-98
Specific waste production								
coal ash	g/kWh from coal	49	46	41	42	41	-16.3	-3.3
fuel-oil ash	g/kWh from fuel oil	0.2	0.3	0.4	0.7	0.6	145.3	-7.5
Waste recovery								
coal ash	% of production	77	90	113	107	106	37.4	-1.3
bottom ash	*% of production*	*68*	*81*	*87*	*92*	*99*	*46.6*	*8.1*
flyash	*% of production*	*78*	*91*	*115*	*108*	*106*	*36.6*	*-1.6*
gypsum from desulfurization	% of production	-	-	33	87	99	-	12.9
other non-hazardous special waste								
generation	*% of production*	*7*	*8*	*32*	*30*	*64*	*841.8*	*110.4*
transmission & distribution	*% of production*	*96*	*92*	*110*	*82*	*89*	*-7.3*	*9.3*
total	% of production	38	29	75	48	75	99.6	56.8
fuel-oil ash	% of production	7	4	15	28	40	474.2	42.7
other hazardous special waste								
generation	*% of production*	*n.a.*	*n.a.*	*25*	*41*	*41*	*n.a.*	*1.2*
transmission & distribution	*% of production*	*n.a.*	*n.a.*	*82*	*61*	*82*	*n.a.*	*34.3*
total	% of production	n.a.	n.a.	46	53	60	n.a.	13.9
Land								
LV cable lines	% of entire LV network	74.5	76.2	77.6	78.6	79.6	6.8	1.2
insulated overhead cable	*% of entire LV network*	*48.5*	*49.2*	*49.9*	*50.1*	*50.4*	*4.0*	*0.5*
underground cable	*% of entire LV network*	*26.1*	*27.0*	*27.7*	*28.5*	*29.2*	*12.0*	*2.4*
MV cable lines	% of entire MV network	30.7	31.7	32.8	33.5	34.5	12.5	2.9
insulated overhead cable	*% of entire MV network*	*0.10*	*0.15*	*0.31*	*0.45*	*0.68*	*599.8*	*51.5*
underground cable	*% of entire MV network*	*30.6*	*31.6*	*32.5*	*33.1*	*33.8*	*10.6*	*2.3*
double-circuit 380-kV lines	% of total 380-kV lines	8.4	8.8	8.7	8.4	8.7	2.4	3.4

n.a.: not available

Net specific emissions

They express the amounts of substances which are released into the atmosphere per kWh net of electricity generated (thermal, geothermal, or total).
Specific emissions represent:

- for SO_2, NO_x, and particulates, the cumulative effect of the fuel mix, of the efficiency of thermal power plants, and of direct prevention and abatement measures;
- for the CO_2 from thermal power plants, the cumulative effect of the fuel mix and of the efficiency of power plants (the contribution of desulfurizers is definitely marginal);
- for H_2S and CO_2 from geothermal generation, the cumulative effect of the composition of geothermal steam, of the efficiency of geothermal power plants, and of the percentage of recovery of steam condensate.

In line with the practice adopted by many electricity companies, specific CO_2 emissions are also determined with reference to total (net) generation of electricity, thereby mirroring also the effect of the more general mix of energy sources.
All the trends of specific emissions from thermal generation reflect progressive reductions. Instead, the variability of H_2S and CO_2 from geothermal generation is related to the characteristics of the geothermal steam used.

Avoided CO_2 emissions

Avoided CO_2 emissions are an indicator of the environmental benefits which derive from the mix of energy sources used for electricity generation and from the efficiency of the full cycle, from their utilization to electricity end-uses.
The CO_2 emissions shown were avoided thanks to electricity generation from renewables, rather than from conventional fuels.
These emissions are determined by multiplying the electricity generation from each renewable source by the average specific CO_2 emissions from thermal generation.
In the case of hydro generation, reference is made to production from natural flows alone, excluding the contribution of pumped-storage plants.
In the case of geothermal power, the CO_2 emissions typical of geothermal generation are subtracted from the result.
The percentage variations shown are obviously consistent with the related variations in electricity generation.
Thanks to the total avoided CO_2 emissions, CO_2 emissions accounted for about 80% of the emissions which would have occurred without the use of renewables.

Specific waste production

Ash is the only waste which has a significant correlation with the volume of activities. As a result, the tables show the production of coal ash (bottom ash and flyash) and of fuel-oil ash per kWh of the corresponding generation.
In both cases, the trends highlight the stability of the results achieved in the past few years, thanks above all to the use of better quality coals and of advanced particulate collection technologies, also on fuel-oil-fired power installations.

Waste recovery

For the main groups of waste, this indicator expresses the ratio between the quantities delivered to recovery operators and the quantities produced.
The trends infer that:

- full recovery of coal ash is a consolidated practice;
- full recovery of gypsum from desulfurization met the expectations in terms of market intake;
- recovery of fuel-oil ash is rising at a sustained pace;
- recovery of other non-hazardous waste and hazardous waste shows averagely growing values, albeit with contingent fluctuations.

Land

With regard to landscape and land conservation, note the progressive and generalized increase of insulated overhead and underground cables for low- and medium-voltage lines and consequently a minimum percentage of bare-conductor lines.

Verifier's Statement

ERNST & YOUNG

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ENEL'S 1999 ENVIRONMENTAL REPORT VERIFICATION

The present statement contains the results of the verification performed by Ernst & Young on the 1999 Environmental Report of Enel S.p.A.

The verification has been conducted in accordance with the Guidelines for Environmental Report Certification defined within the Forum promoted by FEEM and Ernst & Young. The main objectives have been to verify:

- the reliability of the environmental data management system and the adequacy of corporate collection, collation and filing procedures;
- the completeness of the report with respect to data and information concerning the most significant impacts of Enel's activities;
- the comprehensibility of the report in terms of readability of data and information.

The verification process has been performed at Holding level, where the collection of data and the preparation of the Report have taken place. Visits have also been performed at company level. Within Enel Produzione, the following were visited: the Management Area Sud (gas turbine power plants of Maddaloni and Giugliano; the Regional Head office Alpi Nord-Est (Trento and Bolzano Hydro Groups); the Management Area Centro (Thermal power plants of Piombino, Livorno, Pietrafitta and S. Barbara). Within Eurogen, visits were performed on the Thermal power plants of Turbigo and Piacenza. At Elettrogen, visits concerned the Thermal power plant Ostiglia and the Terni Hydro Group. For Interpower, the Napoli Thermal power plant was visited. Within Enel Distribuzione, the Regional Head office Abruzzo e Molise was visited. Concerning Erga visits were performed on the Lago Geothermal Field unit and the Ceprano Hydro Field unit. For Terna, the Regional Head office Roma was visited.

The above mentioned sites have been chosen on the basis of the new structure of the Enel Group, which has determined the creation of a number of electricity generation, transmission and distribution companies.

The verification process has involved an examination of the data collection, collation and aggregation procedures implemented at Holding and company levels and has been carried out through the analysis of a sample of documents as well as through meetings and interviews with the personnel involved in such issues, in accordance to the E&Y procedure and the ASTM standard (E 1527-97). The verification was not aimed at performing a specific data audit and, as a consequence, this statement is not to be considered a certification of the data contained in the Report.

Regarding environmental data management, although the existing internal reporting system should have guaranteed the reliability of generated data, Enel's reorganisation process and the transfer of people and assets among the different companies has created problems in the data reporting, filing and aggregation process, thus influencing data quality.

These problems arose primarily in relation to data concerning waste; nevertheless they involved waste types considered as marginal both for quality and quantity. Concerning atmospheric emissions and waste water discharges, discrepancies were detected in data assessment and estimation methodologies.

On the basis of the verification activities performed it is believed that a better implementation, within the new organisational structure, of the internal reporting system would greatly benefit from a revision of existing data management procedures and from the documentation of operating instructions defining data aggregation methodologies for specific installations. These activities should be supported by training and information of the personnel involved in such issues, especially personnel operating on minor or peripheral sites.

Concerning the Environmental Report, worth of notice are the efforts to increase its readability. The Report in fact provides clear and complete data concerning the most significant environmental impacts associated with the generation, transmission and distribution of electricity and gives adequate information concerning the activities carried out in order to improve the Group's environmental performance. It is therefore consistent with the requirements of the main international and national guidelines on environmental reporting.

Nevertheless, improvement areas have been identified for future attention, such as the issue of water resources and the quantification of polluting substances in waste waters. Furthermore, in view of the process of diversification of the Group's activities, it is advisable to extend the analysis of environmental aspects to those associated with activities not directly related to electricity.

Overall, we consider the 1999 Environmental Report positively, also in consideration of the difficulties encountered in collecting data during the present reorganisation process involving the transfer of assets among different companies and new organisational functions. Given the above mentioned difficulties, the effort undertaken by the management to maintain a dialogue with stakeholders, demonstrates the intention to operate in a highly transparent manner, coherent with the ongoing active contribution to sustainable development and careful environmental management.

Stefano Dionisio
Managing Director
Environmental Division

Rome, May 18, 2000

Annexes

The data sheets of the Group's companies

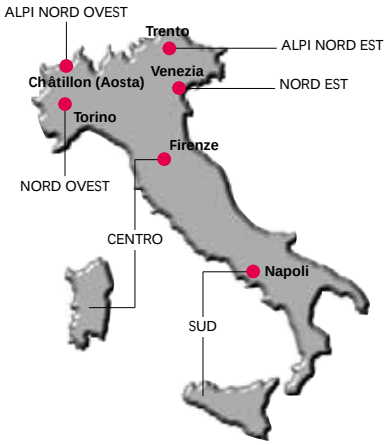
The previous chapters have emphasized the structural changes that occurred in the Enel Group in 1999. These changes made it impossible to continue the practice adopted for the previous Environmental Reports, i.e. presenting the power installation data on the basis of time series and dividing them by regional head office, a structure which disappeared or was modified in the new organization of the Enel Group. However, Enel deemed it helpful to continue the presentation of both overall eco-balance data and specific power installation data. Hence, the following pages contain one data sheet for each of the companies of the Group.
The data sheets describe the companies' missions and their activities of environmental relevance. They also show the environmental data of the activities for which they are available, i.e. the traditional ones in the electricity sector.

Enel Produzione

Viale Regina Margherita, 125 - 00198 Roma

Enel Produzione was set up on October 13, 1998. Its mission is to make available all the electricity required for covering demand at the least cost and in compliance with regulatory environmental and safety standards.
Competitiveness on the free market is the prime target of the company, which intends to respond to new challenges and capture all market opportunities, by optimizing its generating capacity, and achieving levels of efficiency comparable to those of major international operators.
Enel Produzione is equipped with technologically-diversified power plants, which are distributed all over the country and which consist of both thermal plants (natural gas, fuel-oil, coal, and orimulsion) and hydro power plants (run-of-river, reservoir, and pumped storage).

Workforce **11,376 members**



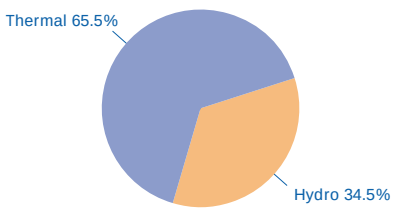
MANAGEMENT AREAS/REGIONAL HEAD OFFICES and their locations (●)

Power installations

	Power plants no.	Gross maximum capacity MW
Hydro		
Run-of-river	88	1,303
Pondage/reservoir	141	5,243
Pure/mixed pumped storage	19	7,510
	248	**14,056**

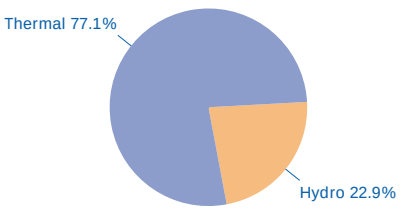
	Power plants no.	Units no.	Gross maximum capacity MW
Thermal			
Steam	19	64	17,682
Repowered with gas turbines	3	10	6,218
Combined cycle	1	2	690
Gas turbines	11	30	2,076
Diesel	9	36	18
	43	**142**	**26,684**

Gross maximum capacity



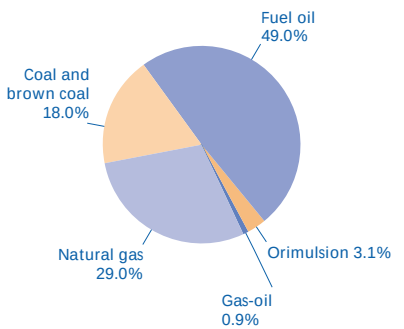
Total (MW)	40,740

Gross electricity generation



Hydro	30,025
Thermal	101,371
Total (million kWh)	131,396

Fuel consumption



Total (tons of oil-equivalent)	21,476,000

For details, apply to:
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Viale Regina Margherita, 125 - 00198 Roma
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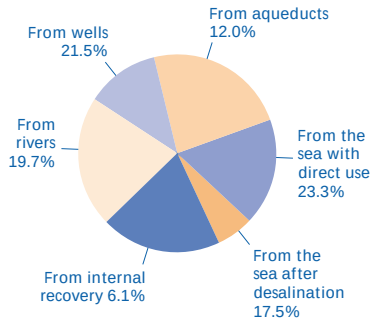
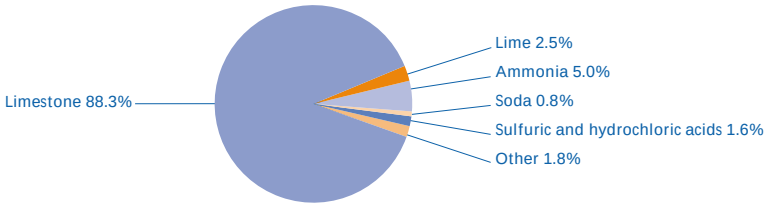
Water for industrial uses



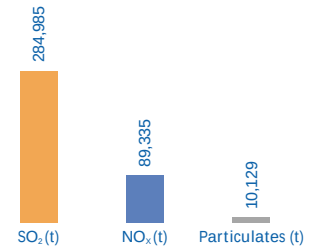
Total requirements (m³)	37,188,000
Total abstraction from inland waters (m³)	19,747,000

Expendables



Total (t)	278,963

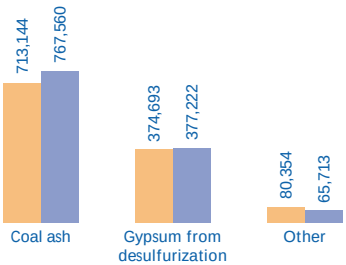
Emissions into the atmosphere



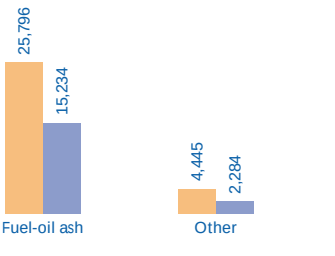
CO_2 (t)	67,559,000
from combustion	67,451,000
from desulfurization	108,000
SF_6 (kg)	408
(tons of CO_2-equivalent)	9,800

Hydro generation avoided the emission of about 16,596,000 tons of CO_2.

Non-hazardous special waste



Hazardous special waste



Waste waters

Production (m³)	17,079,000
Internal recovery (m³)	2,273,000

Waste waters produced include meteoric waters which are fed to treatment systems, if they are susceptible to pollution.

Other data (hydro power plants)

Desilted reservoirs (no.)	2
Removed alluvial sediments (t)	161,344
Floating debris and material removed from trashracks (t)	5,782
Fish ladders (no.)	6
Fish restocking campaigns (no.)	91
Restocked fish (individuals)	737,000
in addition to (kg)	3,500

Erga
Gruppo Enel

Via Giovanni Battista Martini, 3 - 00198 Roma

Erga (Energie Rinnovabili Geotermiche e Alternative—Renewable, Geothermal, and Alternative Sources) was established on May 31, 1999. The company has expertise in geothermal, wind, photovoltaic, and mini-hydro generation.
Erga's mission is to develop the business of electricity generation from renewables, by maximizing their economic value through better utilization of power installations, identification of new renewables, development of technologies, and better use of available resources.

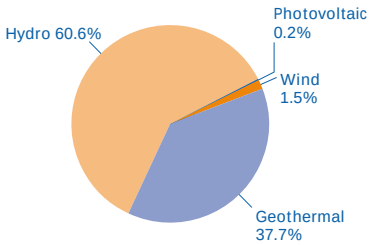
Workforce **2,254 members**

Power installations

	Power plants no.	Gross maximum capacity MW
Hydro		
Run-of-river	208	548.9
Pondage/reservoir	51	447.5
	259	**996.4**
Geothermal		
	32	621.0
	32	**621.0**

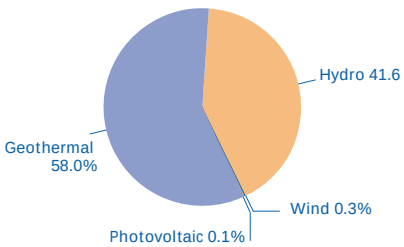
	no.	Gross maximum capacity MW
Wind		
Power plants	2	20.0
Test fields	2	5.1
		25.1
Photovoltaic		
Power plants	2	3.4
Test fields	1	0.1
		3.5

Gross maximum capacity



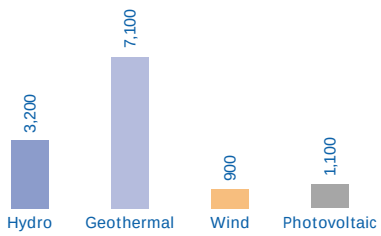
Total (MW) 1,646

Gross electricity generation



Hydro	3,161
Geothermal	4,403
Wind	21
Photovoltaic	4
Total (million kWh)	7,588

Hours of utilization by technology*



Average value: 4,600

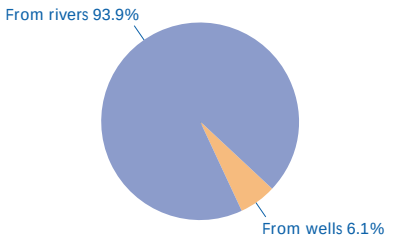
*generation/capacity ratio ("power plants" only)

Consumption of geothermal steam

Total (t) 35,339,000

For details, apply to:
Aldo Baldacci
Via Andrea Pisano, 120 - 56123 Pisa
Tel.no. +39-050535969 - baldacci.aldo@enel.it

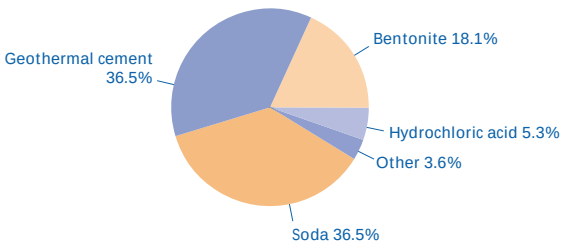
Water for industrial uses



Total abstraction from inland waters (m^3)	93,000

Abstraction of water to be used in the drilling of geothermal wells is limited and occasional, because the required water is obtained from a small portion of endogenous steam condensates. The remaining part of these condensates, together with meteoric waters, is reinjected into geothermal reservoirs. This practice has the advantage of recharging the geothermal reservoirs and of avoiding the production of waste waters.

Expendables



Total (t)	7,519

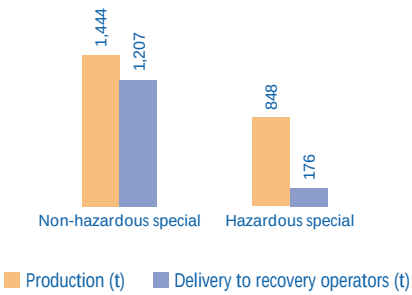
Emissions into the atmosphere

H_2S geothermal (t)	25,000
CO_2 geothermal (t)	1,794,000
SF_6 (kg)	85
(tons of CO_2-equivalent)	2,000

Avoided CO_2 emissions

Hydro generation	2,203,000
Geothermal generation, net of CO_2 emissions	1,124,000
Wind and photovoltaic generation	18,000
Total (t)	3,345,000

Waste



Other data

Geothermal power plants

Drilled wells	new (no.)	5
	rehabilitated (no.)	2
	deepened (no.)	0
Meters drilled (m)		11,334
Drill cuttings (t)		1,662
In-service wells for steam production (no.)		214
In-service wells for reinjection (no .)		30

Hydro power plants

Desilted reservoirs (no.)	4
Removed alluvial sediments (t)	54,033
Floating debris and material removed from trashracks (t)	1,421
Fish ladders (no.)	24
Fish restocking campaigns (no.)	10
Restocked fish (individuals)	1,656,000
in addition to (kg)	1,400

Land used by wind and photovoltaic power systems

Wind systems	Surface area occupied by machines, buildings, and roads (ha)	Total surface area affected by the installations (ha)
Collarmele plant	5.00	30-100 times larger
Monte Arci plant	22.00	
Acqua Spruzza test field	0.82	
Alta Nurra test field	1.75	

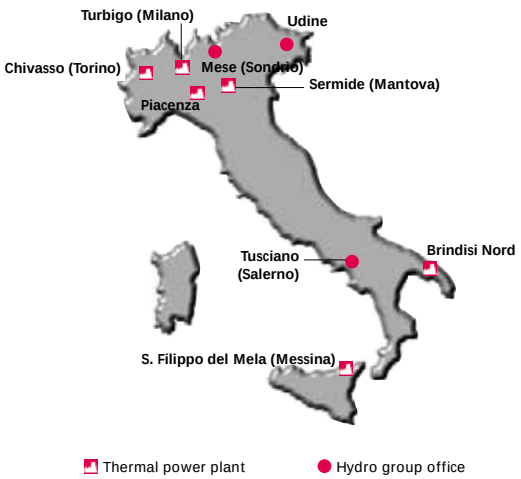
Photovoltaic systems	Surface area occupied by modules (ha)	Total surface area affected by the installations (ha)
Serre plant	3.10	7.00
Vulcano plant	0.12	0.30
Adrano test field	0.10	1.50

Eurogen

Via Giovanni Battista Martini, 3 - 00198 Roma

Eurogen is one of the new companies which were set up on October 1, 1999 with the mission of contributing, together with Enel Produzione and other national operators, to the coverage of present and future Italian electricity supply requirements.
Under Legislative Decree no. 79 of March 16, 1999, Enel formulated a plan to assign some of its power plants to three companies: Elettrogen, Eurogen, and Interpower. Eurogen operates power plants with a total capacity of about 7,400 MW gross.
Valuation of the assigned assets and know-how is under way, in order to enable the company to acquire value to the benefit of its future shareholders and of Enel.

Workforce **2,200 members**

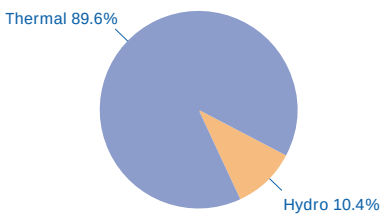


Power installations

	Power plants no.	Gross maximum capacity MW
Hydro		
Run-of-river	35	137
Pondage/reservoir	11	629
	46	**766**

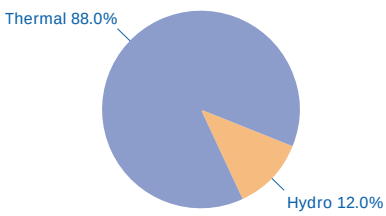
	Power plants no.	Units no.	Gross maximum capacity MW
Thermal			
Steam	5	18	4,890
Repowered with gas turbines	1	4	1,730
	6	**22**	**6,620**

Gross maximum capacity



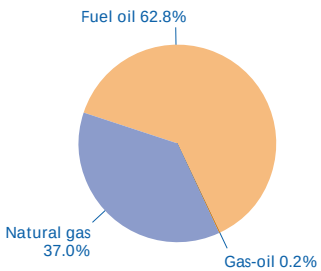
Total (MW) 7,386

Gross electricity generation



Hydro	2,430
Thermal	17,755
Total (million kWh)	20,185

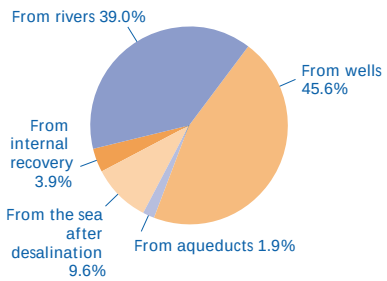
Fuel consumption



Total (tons of oil-equivalent) 3,750,000

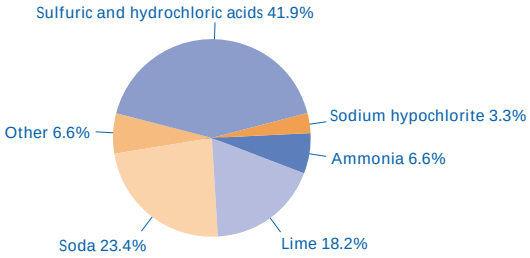
For details, apply to:
Anna Brogi
Via G. B. Martini, 3 - 00198 Roma
Tel.no. +39-0685095618 - brogi.anna@enel.it

Water for industrial uses



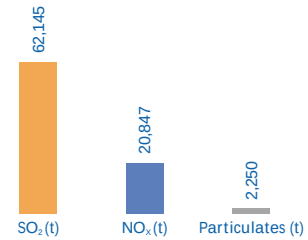
Total requirements (m^3)	5,043,000
Total abstraction from inland waters (m^3)	4,362,000

Expendables



Total (t)	4,113

Emissions into the atmosphere



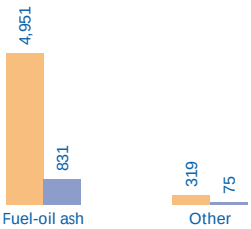
CO_2 from combustion (t)	10,987,000
SF_6(kg)	75
(tons of CO_2-equivalent)	1,800

Hydro generation avoided the emission of about 1,694,000 tons of CO_2.

Non-hazardous special waste

Production (t) Delivery to recovery operators (t)

Hazardous special waste



Production (t) Delivery to recovery operators (t)

Waste waters

Production (m^3)	3,517,000
Internal recovery (m^3)	196,000

Waste waters produced include meteoric waters which are fed to treatment systems, if they are susceptible to pollution.

Other data (hydro power plants)

Desilted reservoirs (no.)	0
Floating debris and material removed from trashracks (t)	86
Fish ladders (no.)	0
Fish restocking campaigns (no.)	6
Restocked fish (individuals)	135,000
in addition to (kg)	0

Elettrogen

Via Giovanni Battista Martini, 3 - 00198 Roma

Elettrogen is one of the new companies which were set up on October 1, 1999 with the mission of contributing, together with Enel Produzione and other national operators, to the coverage of present and future Italian electricity supply requirements.
Under Legislative Decree no. 79 of March 16, 1999, Enel formulated a plan to assign some of its power plants to three companies: Elettrogen, Eurogen, and Interpower. Elettrogen operates power plants with a total capacity of about 5,700 MW gross.
Valuation of the assigned assets and know-how is under way, in order to enable the company to acquire value to the benefit of its future shareholders and of Enel.

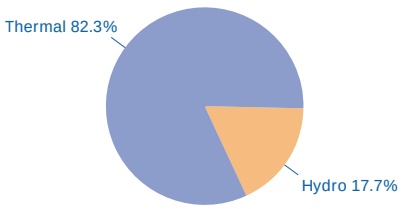
Workforce **1,801 members**

Power installations

	Power plants no.	Gross maximum capacity MW
Hydro		
Run-of-river	9	29
Pondage/reservoir	15	986
	24	**1,015**

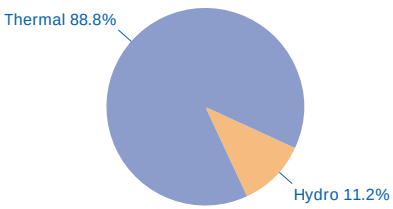
	Power plants no.	Units no.	Gross maximum capacity MW
Thermal			
Steam	4	16	4,536
Gas turbines	1	2	169
	5	**18**	**4,705**

Gross maximum capacity



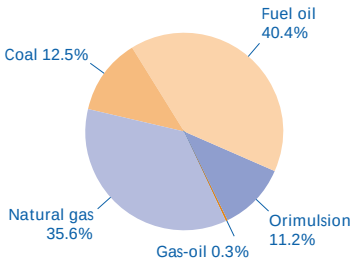
Total (MW) 5,720

Gross electricity generation



Hydro	2,314
Thermal	18,425
Total (million kWh)	20,739

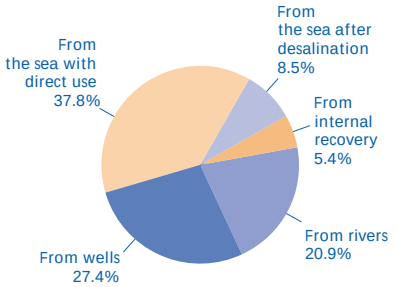
Fuel consumption



Total (tons of oil-equivalent) 3,902,000

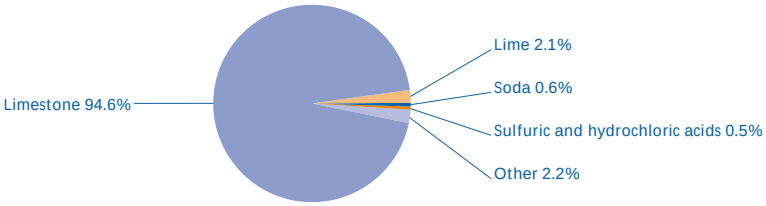
For details, apply to:
Sebastiano Serra
Via G. B. Martini, 3 - 00198 Roma
Tel.no. +39-0685098970 - serra.sebastiano@enel.it

Water for industrial uses



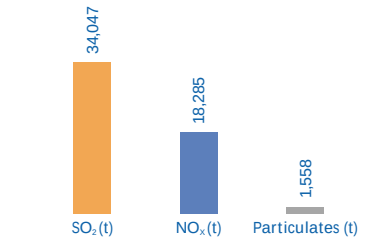
Total requirements (m^3)	8,314,000
Total abstraction from inland waters (m^3)	4,016,000

Expendables



Total (t)	72,224

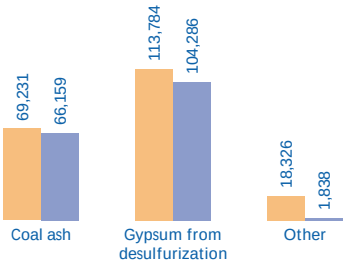
Emissions into the atmosphere



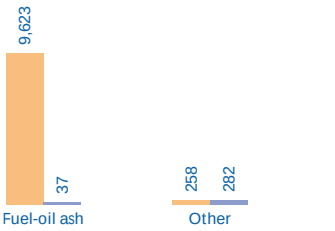
CO_2 (t)	11,881,000
from combustion	11,851,000
from desulfurization	30.000
SF_6 (kg)	368
(tons of CO_2-equivalent)	8,800

Hydro generation avoided the emission of about 1,613,000 tons of CO_2.

Non-hazardous special waste



Hazardous special waste



Waste waters

Production (m^3)	3,641,000
Internal recovery (m^3)	450,000

Waste waters produced include meteoric waters which are fed to treatment systems, if they are susceptible to pollution.

Other data (hydro power plants)

Desilted reservoirs (no.)	1
Removed alluvial sediments (t)	28
Floating debris and material removed from trashracks (t)	936
Fish ladders (no.)	0
Fish restocking campaigns (no.)	7
Restocked fish (individuals)	20,000
in addition to (kg)	4,500

Interpower

Via Giovanni Battista Martini, 3 - 00198 Roma

Interpower is one of the new companies which were set up on October 1, 1999 with the mission of contributing, together with Enel Produzione and other national operators, to the coverage of present and future Italian electricity supply requirements.
Under Legislative Decree no. 79 of March 16, 1999, Enel formulated a plan to assign some of its power plants to three companies: Elettrogen, Eurogen, and Interpower. Eurogen operates power plants with a total capacity of about 2,800 MW gross.
Valuation of the assigned assets and know-how is under way, in order to enable the company to acquire value to the benefit of its future shareholders and of Enel.

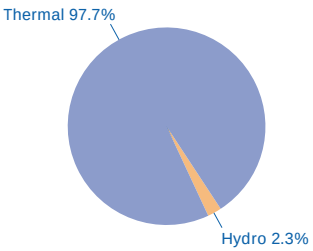
Workforce **1,122 members**

Power installations

	Power plants no.	Gross maximum capacity MW
Hydro		
Run-of-river	11	27
Pondage/reservoir	6	36
	17	**63**

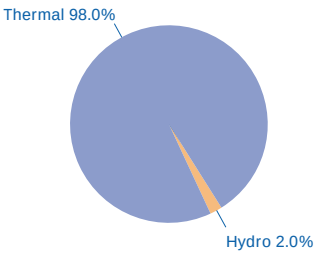
	Power plants no.	Units no.	Gross maximum capacity MW
Thermal			
Steam	3	10	2,718
	3	**10**	**2,718**

Gross maximum capacity



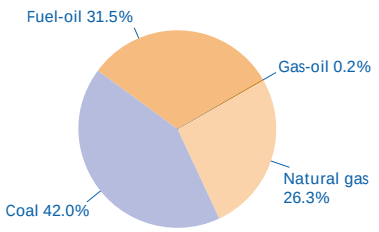
Total (MW) 2,781

Gross electricity generation



Hydro	181
Thermal	8,736
Total (million kWh)	8,917

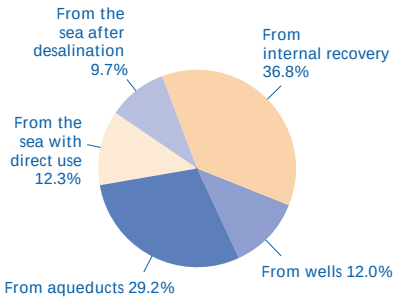
Fuel consumption



Total (tons of oil-equivalent) 1,927,000

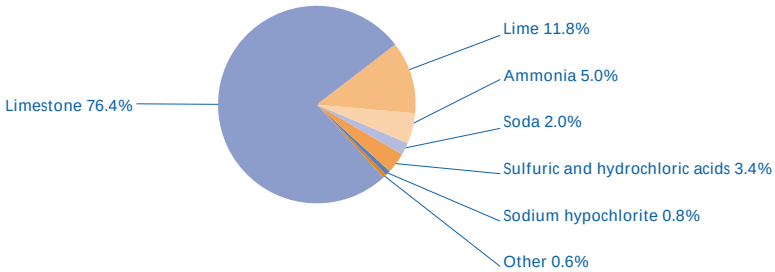
For details, apply to:
Salvatore Musella
Centro Direzionale - Torre A1
Via G. Porzio, 4 - 80143 Napoli
Tel.no. +39-0817824179 - musella.salvatore@enel.it

Water for industrial uses



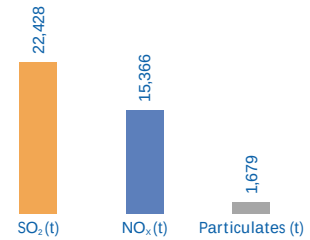
Total requirements (m^3)	3,266,000
Total abstraction from inland waters (m^3)	1,347,000

Expendables



Total (t)	24,195

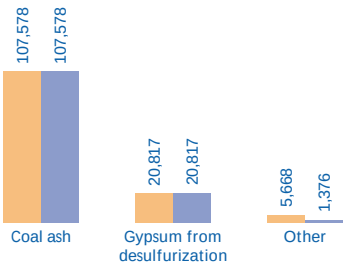
Emissions into the atmosphere



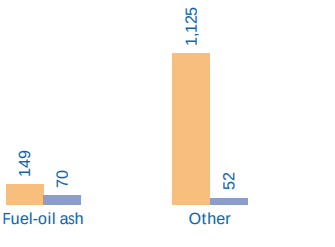
CO_2 (t)	6,457,000
from combustion	6,449,000
from desulfurization	8,000
SF_6 (kg)	70
(tons of CO_2-equivalent)	1,700

Hydro generation avoided the emission of about 44,000 tons of CO_2.

Non-hazardous special waste



Hazardous special waste



Waste waters

Production (m^3)	2,837,000
Internal recovery (m^3)	1,202,000

Waste waters produced include meteoric waters which are fed to treatment systems, if they are susceptible to pollution.

Other data (hydro power plants)

Desilted reservoirs (no.)	1
Removed alluvial sediments (t)	2,285
Floating debris and material removed from trashracks (t)	15
Fish ladders (no.)	2
Fish restocking campaigns (no.)	7
Restocked fish (individuals)	80,000
in addition to (kg)	400

Terna
Gruppo Enel
Viale Regina Margherita, 125 - 00198 Roma

For details, apply to:
Romeo Rendina
Viale Regina Margherita, 125 - 00198 Roma
Tel.no. +39-0685098084 - rendina.romeo@enel.it

Terna, which was set up on May 31, 1999, inherited Enel's Transmission Division. Enel transferred to Terna the ownership of its transmission grid, after assigning its activities of dispatching and management of the national transmission grid to the Gestore della Rete di Trasmissione Nazionale (a company controlled by the Ministry of the Treasury).
The mission of Terna is to deliver an excellent power transmission service, by ensuring power installation efficiency and minimizing the related costs.
Terna operates & maintains power installations and develops the transmission grid according to the specifications issued by the Gestore della Rete and covered by an appropriate agreement.

Workforce **3,261 members**

Power installations

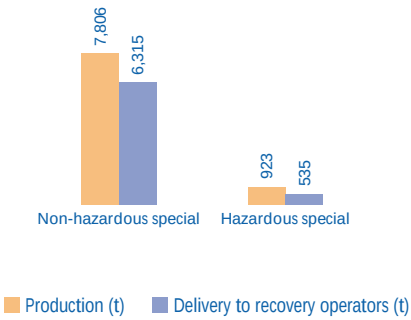
	no.	Installed transforming capacity MVA
Electrical stations		
380 kV	115	71,126
220 kV	106	23,378
<220 kV	27	2,862
	248	**97,366**

	Circuits km	Lines km
Lines		
380 kV	9,768	8,990
220 kV	9,527	7,882
<220 kV	16,996	16,052
220 kV d.c.	859	540
	37,150	**33,464**

Emissions into the atmosphere

SF_6 (kg)	1,190
(tons of CO_2-equivalent)	28,400

Waste



Enel Distribuzione

Via Ombrone, 2 - 00198 Roma

For details, apply to:
Lorenzo Sartore
Via Ombrone, 2 - 00198 Roma
Tel.no. +39-0685098831 - sartore.lorenzo@enel.it

Enel Distribuzione, established on May 31, 1999, has the mission of operating the distribution grid and of selling electricity to "captive" customers, by creating value, delivering an excellent service at competitive costs, and complying with the quality standards that are set by the electricity and gas Regulator.
Enel Distribuzione provides a public-interest service to about 30 million residential, industrial, commercial, and agricultural customers scattered all over Italy, from large towns to rural areas.
To achieve these goals, Enel Distribuzione initiated a wide-ranging program of reorganization of its processes, supported by technological innovation projects. The program is expected to allow Enel Distribuzione to take a quantum leap in service provision to its customers.

Workforce **47,841 members**

REGIONAL HEAD OFFICES and their locations (●)

General data

Regional Head Offices (no.)	**14**
Operation Centers (no.)	**74**
Zones (no.)	**300**
Customers (no.)	**29,674,090**
Electricity sales (million kWh)	**229,523**

Power installations

Substations

	no.	Installed transforming capacity MVA
HV/MV	1,864	87,787
Satellite substations and MV units	481	2,939
MV/LV	339,945	59,133
MV/MV	63,562	1,800
	405,852	**151,659**

Lines (km)

	Bare conductors	Insulated overhead cables	Underground cables	Total
HV	19,747	-	442	20,188
MV	214,877	2,244	111,067	328,188
LV	143,535	354,089	205,075	702,699
	378,159	**356,333**	**316,584**	**1,051,075**

Emissions into the atmosphere

SF_6 (kg)	1,251
(tons of CO_2-equivalent)	29,900

Waste

Enel Trade

Via Ombrone, 2 - 00198 Roma

Enel Trade was established on May 31, 1999, to sell electricity to large industrial customers and meet their needs. Liberalization of the electricity market offers a new opportunity to Italian companies: electricity becomes a resource, which combines technical aspects with contractual, economic, and operational values, and a competitive element to maintain leadership in increasingly dynamic markets.

Enel Trade's mission is to provide its customers with competitively-priced electricity, a wide range of additional services, flexibility, and customized solutions to suit the needs of any industrial customer.

The business of Enel Trade has only indirect environmental implications, as electricity is one of the determinants of sustainable development.

The current workforce of Enel Trade consists of 91 members.

So.l.e.
Gruppo Enel

Via Tagliamento, 46 - 00198 Roma

So.l.e. was set up on July 28, 1998. It is the company of the Enel Group which designs, builds, and operates public and artistic lighting systems, in Italy and abroad.
So.l.e. owns about 1,500,000 lighting points in Italy and serves over 60% of Italian Municipalities.
So.l.e. offers its products and services to municipalities, provincial and regional authorities, public entities, and large companies. Its offerings cover a full range of: i) products (public, artistic, and interior lighting systems, systems for environmental monitoring of noise and traffic, safety and traffic video-monitoring systems, lamp-posts with environmental data displays, and recharge posts for electric vehicles); and ii) services (consulting for lighting-focused land management plans, management of civil and criminal liability for installed systems, lighting projects, and related financial resources).
Its current workforce consists of 225 members.

The target of So.l.e. is to illuminate towns, so as to improve the livability of the urban environment and to enhance its artistic and monumental heritage.
In the area of public lighting, So.l.e. defined standards to improve energy efficiency and to strongly reduce the effects of light pollution. From the standpoint of methodologies, So.l.e. intends to define lighting-focused land management plans in order to achieve adequately-lit and thus secure outdoor environments.
So.l.e. designs and develops electric vehicle recharging systems ("Biberon") for municipalities. These systems offer short recharging times and appropriate vehicle range between charges. Following the July 1999 agreement with the Ministry of the Environment (on environmental quality of urban areas). So.l.e. is in charge of: i) designing eco-recharge stations; and ii) giving technical support to municipalities whose transportation electrification plans are selected and funded by the Ministry of the Environment.
Furthermore, So.l.e. developed an environmental monitoring system for real-time collection of environmental pollution and local microclimate data, which are critical to environmental rehabilitation and nation-wide monitoring projects.
So.l.e.'s environmental monitoring system may be installed on special lamp-posts ("Lanterne della comunicazione", patented by So.l.e.), which are equipped with LED displays. The displays show real-time pollution data, crucial to safe environmental management.
The advantage of this system to local authorities lies in its cost-effective operation and wide geographic coverage.

Enel.si
servizi integrati

Via Giovanni Battista Martini, 3 - 00198 Roma

Enel.si is the new name of Se.m.e. (electrical maintenance services), which was established on March 25, 1999. Enel.si has the task of carrying out maintenance on power installations and, more generally, on the installations and grids of electricity users (Enel and non-Enel customers).

The key activities of the company are: design, construction, renovation, maintenance, operation, troubleshooting, and any other activity ensuring full efficiency, reliability, and safety of power installations.

Enel.si will resort to the expertise of the other companies of the Group, as well as to outsourcing contracts, joint ventures and to a country-wide network of qualified operators, especially for its business on the large market of low-voltage customers.

The activities carried out by Enel.si have indirect environmental implications: correct construction and operation of beyond-the-meter systems and deployment of efficient electrotechnologies favor a safe and rational use of electricity.

Enel.si workforce currently includes 26 members.

Enelpower
Enel Group

Via Gerolamo Cardano, 10 - 20124 Milano

Enelpower was established on April 27, 1999. It has become fully operational since January 1, 2000, when it acquired Enel's Engineering & Contracting Service Unit with its assets (design, construction, and commissioning of thermal power plants, power lines, and transforming stations) and personnel.
The company is based in Milan and has a branch office in Rome. Its personnel includes 1,000 members.
In addition to serving the other companies of the Enel Group, Enelpower has taken on the role of independent operator on domestic and worldwide markets, with the following mission:

- *to act as Engineering, Procurement, and Construction (EPC) Contractor;*
- *to act as Power System Developer;*
- *to acquire holdings in new companies for construction of new power installations, by developing Build, Operate, and Own (BOO) as well as Build, Operate, and Transfer (BOT) initiatives.*

The company has the goal of leveraging Enel's top-level skills, know-how and expertise, by making them available to new customers on the international electricity marketplace, also through alliances with strategic partners.

The environmental, health & safety policy of Enelpower hinges on the following points:

- raising the awareness of environmental, health and safety among its designers, so that these aspects may become critical elements of their design choices;
- continuous technical updating, so as to provide internal/external clients with innovative processes and technologies for mitigating environmental impacts;
- studies and analyses to optimize the integration of power installations into the environment.

The specific environmental activities that Enelpower carries out for its internal client stem from general strategies formulated by the Group's Top Management, leading to contracts under which the Group's generation, transmission, and distribution companies entrust Enelpower with design & construction of power installations or their retrofitting for environmental compliance.
In 1999, to serve its internal clients, Enelpower retrofitted 8 thermal generating units (7 x 320 MW and 1 x 660 MW) for environmental compliance and completed environmental impact studies for new power installations on the national transmission network, including the Teramo electrical station and the Sulcis-Villasor (380 kV) and Acciaiolo-Cascina (132 kV) power lines.
Enelpower is directly responsible for compliance with Legislative Decree 626/94 on occupational safety and Legislative Decree 494/96 on safety of temporary and mobile jobsites.
In 1999, to implement the provisions of Legislative Decree 494/96, Enelpower: i) trained 15 engineers (120 hours of courses) for the positions of design or site management coordinators; ii) drew up 9 safety plans for new works to be contracted-out; iii) prepared 9 jobsites according to the rules set forth in the Decree; and iv) organized 4 meetings to build awareness of safety issues among all technicians and engineers who are in charge of the design and construction of power installations.

Elettroambiente
Gruppo Enel

Via Giovanni Battista Martini, 3 - 00198 Roma

Elettroambiente was established on January 15, 1996. Its prime mission is to develop initiatives, in Italy and abroad, for energy recovery from waste (municipal, special, particularly sludges, etc.) or from vegetal biomass (residues from crop growing and processing of agricultural produce, etc.).
To fulfill its mission, Elettroambiente maximizes waste recovery by producing energy from the combustible fraction of waste which would otherwise be unusable.

In 1999, Elettroambiente carried out studies for developing systems of energy recovery from municipal waste and from biomass, assessing their benefits in terms of energy savings and reduction of the greenhouse effect.
Elettroambiente also completed a study for optimized management of Enel's waste. For some categories of waste deriving from process and service activities, the study identified the possible strategies to improve the waste cycle (production, collection, recovery, and final disposal). The study, which was based on a shared-responsibility approach, was targeted to achieve not only economic savings, but also an integrated waste management system, as laid down in Legislative Decree no. 22 of February 5, 1997.

Enel.Hydro

Via Pastrengo, 9 - 24068 Seriate (BG)

Enel.Hydro was set up on February 18, 2000, to inherit Enel's assets and know-how in hydro power generation and water management and ISMES skills in water structure design & engineering support services.
Enel.Hydro has the mission of developing business in design, construction, and operation of water supply systems.
Enel.Hydro's activities for an Integrated Water Supply Service will be supported and maximized by consolidated structural engineering and environmental know-how.
Integration of services (engineering, experimentation, digital approach) enables Enel.Hydro to tackle complex problems with significant strengths in environmental conservation and protection.
Enel.Hydro's workforce currently includes 547 members.

Sei
Gruppo Enel

Via Dalmazia, 15 - 00198 Roma

Sei, created in February 1993, took over the management of Enel's real estate and, gradually, of all the general services of the Enel Group: from the vehicle fleet to warehouses, from catering to security control and office buildings. The mission of Sei is: i) to enhance the value of Enel's unused real estate and to place it on the market; ii) to optimize the use of space and the functioning of the buildings used by Enel; iii) to manage Enel's leased vehicle fleet; and iv) to operate outside the Group, by offering services on the free market.
Sei manages a real estate of about 5,500 billion lire. Its present workforce includes about 1,500 members.
Management of institutional buildings for residential use is entrusted to its subsidiary Dalmazia Trieste.

In 1999, Sei embarked on an impressive project of revamping of Enel's traditional offices in large towns, by transforming them into open-space work areas. This choice involved: i) the renovation of office buildings, including their technological systems (electricity, air conditioning, water and fire prevention); and ii) the replacement of old furniture with new ergonomic furniture, in compliance with the safety standards of the latest European legislation. The dominant use of power-driven high-efficiency heat pumps for heating systems or the conversion of other heating systems from gas-oil to natural-gas firing contributed to reduce emissions into the atmosphere.
Replacement and streamlining of Enel's vehicle fleet gave a further contribution to the reduction of releases into the atmosphere.
Also the removal of asbestos from coverings and pipings (especially from the sheds used as warehouses) helped reduce the environmental impact.
In 1999, Sei decreased the number of Enel's warehouses/depots from 53 to 19 and started the renovation of warehouses which are planned to be equipped with storage and handling platforms in 2000. Thanks to new methodologies based on process streamlining and integration, this revamping program upgrades and facilitates the handling of materials and yields occupational safety and environmental benefits.
The key instruments of Sei are: i) orderly and space-efficient layouts; ii) state-of-the-art and adequate-capacity equipment and facilities; iii) rigorous compliance with injury prevention regulations; and iv) specific rules of conduct for human resources.

Conphoebus
Gruppo Enel

Passo Martino, Zona Industriale - 95021 Catania

Conphoebus has been part of the Enel Group since 1980, when it was established with the mission of operating in the areas of efficient energy use and renewables. Now, Conphoebus is an engineering, consulting, and specialist service company.
Conphoebus designs and operates systems and buildings by applying:
- *innovative technologies for air conditioning & heating;*
- *methodologies of energy management of buildings;*
- *bioclimatic architecture criteria;*
- *solar energy and photovoltaic systems.*

Conphoebus can also deliver the following services:
- *auditing environmental quality standards in indoor areas (visual and acoustic comfort, air quality, and microclimate);*
- *analysis, auditing, and certification of technical quality, and energy efficiency of buildings.*

Conphoebus works synergetically with Sei in the provision of services to the Group and to third parties.
Its present workforce includes 74 members.

In 1999, the main environmental initiatives of Conphoebus were as follows:
- for the project of extension of the ENVIPARK (scientific and technological park) of Turin, planning & design of environment- and energy-efficient systems with innovative concepts: i) solar systems (air- and water-based and photovoltaic); ii) systems for sunlight control and redirection of daylight into interiors; iii) energy-saving air conditioning and heating systems; and iv) generally, energy-efficient architectural solutions;
- for the project of environmental and energy efficiency of WWF's new national headquarters in Rome: selection of design concepts in line with WWF's operational programs, e.g. high-energy-efficient lighting system with lighting controls based on available natural light and number of users, and hot water system powered by solar panels and a photovoltaic rooftop;
- for a project of experimental residential construction, funded by the Ministry of Public Works and included in a contract for development of the Quattrograne Ovest district of Avellino: final design of environment- and energy-efficient systems;
- operation & maintenance of photovoltaic installations of Enel and third parties, thus contributing to the use of renewables;
- contribution to preparation of energy plans (among others, those formulated by the regional authority of Latium and by the Municipality of Catania) for the use of renewables.

Enel.it

Via Carlo Veneziani, 56 - 00148 Roma

Enel.it is the ICT company of the Enel Group. The company, which was set up on October 15, 1999, inherited the assets of Enel's Information Systems Service Unit. Since January 1, 2000, Enel.it has been providing ICT services for managing the business and administrative processes of the companies of the Group.
Enel.it has also the goal of competing on the market by offering the following services: development of integrated systems and solutions, outsourcing of central and distributed systems, and management of telecommunications network.
The company places emphasis on technological innovation, thereby contributing to optimizing the Group's efforts in terms of energy savings, pollution control, and occupational health.
Enel.it gives an indirect contribution to environmental protection, by reducing people mobility through telecommunications networks.
Its present workforce includes 1,053 members.

Sfera
Gruppo Enel

Via Giovanni Battista Martini, 3 - 00198 Roma

Sfera (Società per la Formazione e le Risorse Aziendali) was set up on October 28, 1999 as a non-profit shareholder-owned company, with the mission of developing the skills of the Enel Group's employees and adapting their profiles to the increasingly new requirements of Enel and of the labor market, so as to maximize their employment opportunities.
With a view to achieving national geographic coverage, Sfera will rely on field offices and on distance teaching.
Environmental education & training fall under the responsibility of Sfera.

CESI

Via Rubattino, 54 - 20134 Milano

Since January 1, 2000, Enel's Milan-based Research facilities have flowed into CESI. The shareholders of CESI include major national electricity operators.
CESI's mission is:
- *to become the reference operator for national system research;*
- *to acquire national and international leadership in the electricity-energy market, by developing innovative projects and solutions and providing specialist services;*

CESI's activities are carried out by six Business Units:
- *generation processes;*
- *transmission & distribution grid;*
- *industrial services, end uses, renewables;*
- *environment;*
- *tests and components;*
- *certification.*

Its current workforce consists of 1,070 members.

CESI's environmental expertise (system research and technological innovation to the benefit of Enel's companies and of the electricity industry) encompasses:
- scientific and technological support to improve the environmental performance of the national power system, by optimizing land and resource use;
- improvement of the environmental efficiency of generation processes;
- design and construction of systems of generation from renewables;
- studies on the environmental effects of electromagnetic fields and electromagnetic compatibility tests on electrical components and equipment;
- environmental management of industrial systems, due diligence, and certification of environmental management schemes under ISO 14000 standards;
- environmental impact studies, landscape studies, clean air plans, and management of protected areas, environmental accounting and reporting;
- synoptic or local surface weather charts and monitoring of lightning strikes;
- characterization and management of water resources, decontamination of contaminated land.

WIND

Via Cesare Giulio Viola, 48 - 00148 Roma

WIND, established on November 25, 1997, is the first initiative of the Enel Group for diversification and enhancement of its assets.
The company is 51% controlled by Enel SpA and is currently the only Italian operator offering integrated, fixed/mobile telephony, and Internet services. Within a short time, also data transmission services will be offered.
As of December 31, 1999, WIND had about 2,000,000 customers. In July 1999, WIND took over the company ITnet, through which it serves about 2,000 business customers.
WIND's current workforce consists of about 3,200 members.
The target of WIND is to become the first Italian alternative operator of global and integrated telecommunications, international telephony, and data transmission services.

The environmental relevance of WIND is connected with electromagnetic field and visual impact issues. However, WIND's activities have indirect environmental benefits, as telecommunications reduce people mobility.
As regards environmental impacts, WIND operates in close contact with health and local authorities. However, the electromagnetic fields generated by the company's radio base stations largely lie within the regulatory limits. Furthermore, WIND technologies minimize space requirements and thus visual impact.
As of December 31, 1999, WIND had a total of roughly 90 switches and 1,500 radio base stations, 1,200 of which were installed in 1999. All these innovative-technology systems are regularly authorized and compliant with the applicable legislation.
In terms of occupational health & safety, WIND places particular emphasis on jobs in elevated work areas and call center activities. In the course of 1999, WIND prepared a risk assessment document and two brochures on Legislative Decree 626/94. It also organized occupational safety & health courses which were attended by all the members of its technical personnel.

Sogin

Società gestione impianti nucleari

Via Torino, 6 - 00184 Roma

In July 1999, in accordance with Legislative Decree no. 79 of March 16, 1999 (concerning, among others, the decommissioning of nuclear power plants and the termination of the fuel cycle), Enel SpA established a shareholder-owned company. On November 1, Enel transferred its nuclear assets to the new company (Sogin).

For the time being, the shares of Sogin are held by Enel but, in the short term, they will be gratuitously transferred to the Ministry of the Treasury.

Sogin's mission consists of three main points:

- *dismantling Enel's nuclear power plants (Caorso, Garigliano, Latina, and Trino) until abandonment of the sites under safe (radiation-free) conditions;*
- *managing the termination of the fuel cycle (dry storage of fuel and of waste from reprocessing);*
- *leveraging nuclear assets and know-how, by delivering nuclear engineering and consulting services, in Italy and abroad.*

Practically, all the activities of Sogin have environmental relevance.

Its present workforce includes 589 members.

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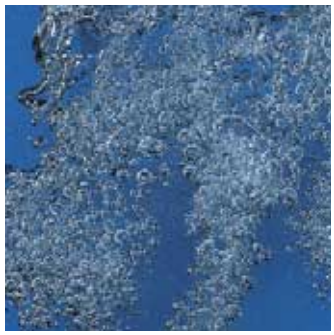
Coal deposit

Desulfurizer drain treatment tank

Flocculation tank

Gypsum from flue gas desulfurization

Cation exchange resin



Purified water

Flue gas sampling points on denitrification system inlet

Desulfurizer inlet/outlet flue gas ducts

Stack: inlet of purified flue gases