Environmental Report 2002

Enel

ENERGY IN TUNE WITH YOU.

Enel's 2002 Environmental Report reviews the activities carried out by the Divisions and Companies belonging to the Enel Group as of December 31, 2002.
The data of each Division or Company refer to the entire year and include acquisitions, if any, made in the course of the year.
The data are equal to 100%, independently of Enel's holdings in the Companies.

By way of example:
> Eurogen, sold on May 31, 2002, is excluded;
> Camuzzi Gazometri, bought in May 2002, is included for the entire year;
> the data of Deval (of which Enel SpA has a 51% holding) and those of WIND (Telecommunications Division, of which Enel SpA had a 73.4% holding in 2002 and 100% ownership only from March 20, 2003) are equal to 100%.

In the Report, which has the typical format of annual reports, the reader will find a descriptive section with:
> the new organization of the Group;
> its environmental policy;
> its environmental management organization;
> its environmental governance;
> the environmental features and highlights of its areas of activity (with data sheets summarizing their environmental performance), followed by the eco-balance, which consolidates the results of the Group's Companies and Divisions, and includes indicators and diagrams.

A special section is dedicated to initiatives and results in the area of occupational health and safety. The verifier's statement closes the publication.

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For the individual Divisions and Companies of the Group, the contact persons are indicated in the relevant data sheets.

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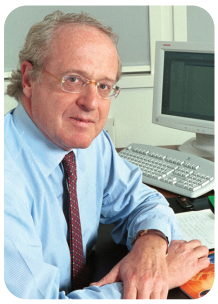
CEO's message



The seventh edition of the Report describes the environmental commitments and achievements of the Enel Group in 2002.
As set forth in the "Sustainability Report" presented at its shareholders' meeting of May 2002, Enel pursues a strategy of integration of economic, environmental and social targets, channeling them towards community-sustainable policies.
The year 2002 marked the end of the extensive program of retrofits of Italian power plants for environmental compliance, in accordance with the Decree of the President of the Republic no. 203 of May 24, 1988 and with the Decree of the Ministry of the Environment of July 12, 1990.
Enel played a key part in the program, since it owned most of the power plants which were retrofitted.
In 2002, this effort required a total investment of about 3.7 billion euro in the installation of flue gas abatement (desulfurization, denitrification and particulate collection) systems.
In 2002, Enel was very active on the environmental front.
Significant results were attained in terms of reduction of pollutants with respect to their 1990 levels: sulfur dioxide (SO_2) declined by 64%; nitrogen oxides (NO_X) were down by 73%, whereas particulates dropped by 82%.
In the course of the year, we brought on line our first high-efficiency gas-fired combined cycles (La Casella, Priolo Gargallo, Porto Corsini power plants), demonstrating the feasibility of efficiency gains in our generating mix. Recently, we also inaugurated:

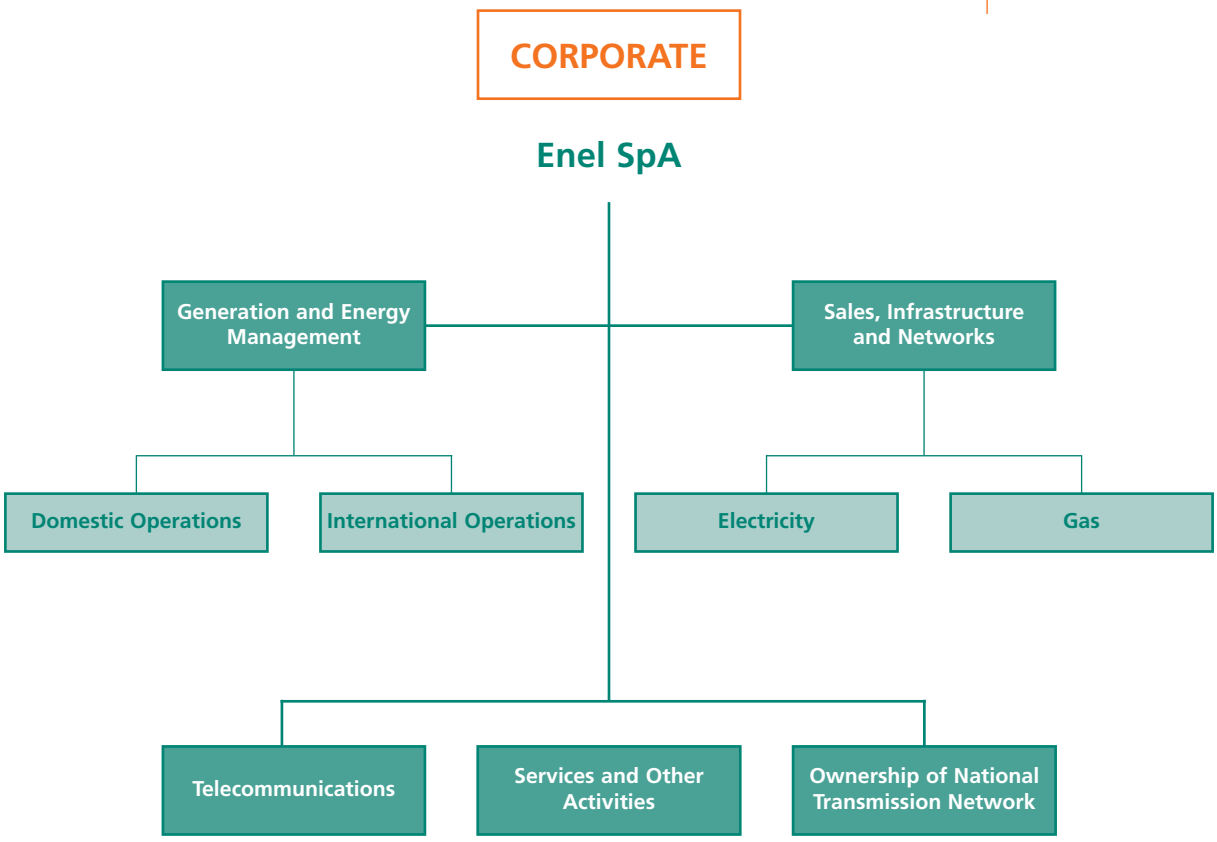
> the new wind power plant of Alta Nurra (Sassari), the first Italian plant with 7 high capacity wind generators (1,750 kW each, totaling 12.25 MW);
> the new plant of Caltabellotta (Agrigento) with 10 wind generators and a total capacity of 7.5 MW.

Together, the two plants can cover the electricity demand of about 20,000 households.
Particular attention was also paid to electricity distribution: the new electronic meter will enable final customers to make a rational use of electricity.
In 2002, Italy ratified the Kyoto Protocol. This move stepped up initiatives for hitting the national target of greenhouse gas emission reductions. Also in this field, Enel is giving a substantial contribution to the achievement of the target, by making investments in Italy and abroad, i.e. by purchasing both conventional thermal power plants to be renovated and power plants fed by renewables. In 2002, about 18 million tons of CO_2 emissions were avoided thanks to electricity generation from renewables.

Paolo Scaroni
Chief Executive Officer

Enel Group

In 2002, the Group changed its organizational structure, passing from the multi-utility model to an organization focused on its core business, i.e. electricity and gas.



Environmental policy

In a national and international context of stringent social, environmental and economic expectations, Enel's long-standing environmental policy has always reconciled sustainability and industrial development.
In line with its principles and targets, Enel obtained appreciable results in terms of:
> curbing the environmental impact of its activities;
> conserving and enhancing the value of land;
> rationally using resources and energy.

In 2002, Enel experienced profound changes, but it reiterated its environmental principles and targets, placing the environmental policy among its top industrial priorities.

Principles

> Protecting the environment and the safety & health of workers.
> Safeguarding the Group's value.
> Raising the Group's environmental and product quality standards.

Strategic targets

> Use of processes and technologies which prevent and/or mitigate environmental impacts.
> Rational and efficient use of energy resources and raw materials.
> Optimization of waste recovery.
> Application of international environmental and safety management schemes in the various activities.
> Optimized integration of installations into the landscape.
> Use of the best operating practices.
> Communication of the Group's environmental performance to the public at large and to institutions.
> Environmental awareness, education & training of employees.

Environmental management organization

In Enel's new organizational model, the "Environmental Policies" unit is part of the corporate "Institutional and International Affairs" department. This Unit has the task of formulating the Group's general environmental targets and of ensuring their consistency with the Divisions' programs and initiatives.
In particular, the Unit:

> tracks the process of law-making on environmental matters, at national and EU level;
> identifies indicators for monitoring the numerous quantities and environmental parameters that characterize the Group's activities;
> provides guidance to and coordinates the Group's Business Divisions on environmental matters, such as authorizations, implementation of legislation, green certificates, energy efficiency, greenhouse effect, electric & magnetic fields, etc.;
> entertains relations with central and local institutions and environmental associations on specific environmental issues that have a particular impact on the Group's activities and which arouse the interest of the public opinion (greenhouse effect and climate change, emissions, etc.);
> prepares the Group's Environmental Report.

Furthermore, depending on the specific activities to be performed and issues to be covered, each Business Division may have in-house environmental teams and/or specialists.

Environmental governance

Enel's new organization strengthened the governance of cross-cut processes, so as to maximize the effectiveness and efficiency of the Group's activities.
Environmental governance helps raise the social credibility of the Group and is one of the measures of the competitiveness and value of its policies vis-à-vis shareholders, customers and communities.
Today, Enel's environmental governance relies on environmental reporting, management, awareness, training & education instruments, through which it is also transferred to regional units in order to ensure homogeneous actions and behaviors.
Effective environmental governance means to analyze economic flows and correlate them with investments and current expenditure of an environmental nature. Although Enel has no dedicated environmental accounting system, environmental expenses are recorded with a well-established methodology.
Moreover, the governance process is designed in such a way as to address inevitable environmental criticalities, which occasionally evolve into lawsuits.

Reporting

The reporting system is a key instrument for monitoring the environmental interactions of Enel's industrial activities with the environment.
The effectiveness of the system was significantly improved over the years thanks to constant utilization, fine-tuning and introduction of techniques and procedures that ensure data reliability. The formats for data collection were revised both for recording occupational health & safety aspects and for making the reporting system more flexible and more adaptable to Enel's new organizational configuration as well as to evolving legislation.
Data reporting has now become engrained into Enel's environmental management system and its methodology ensures the highest possible homogeneity of the collected data.
The reporting system has become an instrument through which some of Enel's business areas periodically monitor their environmental performance vs. targets.

Environmental management

In 2002, Enel continued to put in place environmental management schemes in its electricity generating sites, in order to certify them under the ISO 14001 standard and subsequently register them under the EMAS (Eco-Management and Audit Scheme) Regulation.
Over 40% of Enel's installed capacity was certified, demonstrating the Group's strong commitment to environmental management systems.
The sites that are already both ISO 14001-certified and EMAS-registered are the thermal power plants of Fusina, La Casella, Montalto di Castro, Porto Marghera, Sulcis, Torrevaldaliga Nord, Torrevaldaliga Sud (Interpower) and the hydro power plants of the Avisio (2 plants) and Cordevole (9 plants) river valleys. Furthermore, the thermal power plants of Brindisi Sud, Leri Cavour, Porto Tolle, Priolo Gargallo and Vado Ligure (Interpower) were certified under the ISO 14001 standard.

Another 65 smaller plants completed preparations for and are awaiting the ISO 14001 certification.

Awareness, training & education

Also in 2002, the Enel Group relied on awareness, training & education programs to communicate its initiatives inside and outside the Group and to improve the skills and know-how of its employees.
In 2002, Enel developed environmental awareness, training & education modules for its environment-dedicated personnel, delivering a total of over 17,000 man-hours of courses.
Enel's communication activities achieved very satisfactory results also through the activation of the "Environment Channel" and of the "Nature Channel". As described last year, these two thematic sections of Enel's portal have the purpose of making the public aware of the relations between industrial settlements, the environment and nature.
Web users highly appreciated the material posted on the two channels. In 2002, the channels had an average of about 25,000 visitors per month, with about 100,000 accesses per month and average sessions of about 20 minutes each.
To strengthen its communication with the external world on specific topics of environmental protection and nature conservation, Enel created a special forum and a dedicated mailbox (ambiente@enel.it).
The "Environment Channel" gained the 2002 Bardi Web Award, sponsored by the Ministry of the Environment and Land Management, as the best environmental communication website.
In its "Nature Channel", Enel created a multi-media section ("Travel Notes") with atlases of Italian birds, mammals and orchids. A new online version of "Electricscapes" and "Visits to Power Plants" is also available.

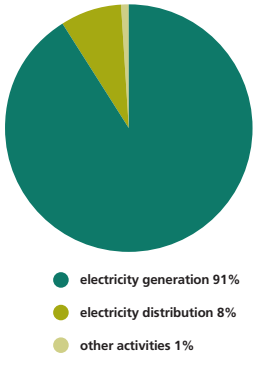
Economic resources

Also in 2002, protecting the environment involved considerable investments for the Group, especially in the electricity sector:
> 138 million euro of environmental investments;
> 794 million euro of current environmental expenditure.

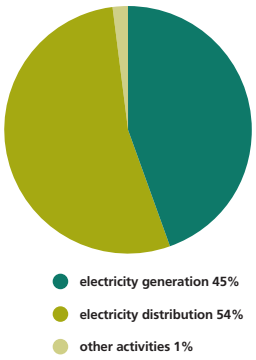
The sale of Eurogen and of other urban grids, including those of Milan and Verona, makes it difficult to compare the expenses of 2002 to those of previous years; therefore, the variations on 2001 are poorly significant in quantitative terms.

On the basis of the guiding principles of Enel's previous environmental reports, the environmental expenditure is defined as the costs incurred for protection of the external environment and of the health of the general population. This expenditure excludes the costs incurred for activities that, albeit beneficial to the environment, are carried out mainly for industrial and economic purposes, for protection of workers and for the safety and security of power installations.

ECONOMIC RESOURCES BY ACTIVITY



ENVIRONMENTAL INVESTMENTS BY ACTIVITY

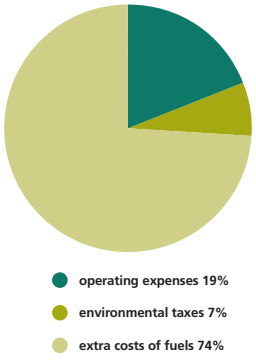


During the year, Enel completed the retrofitting of its thermal power plants for environmental compliance (1990-2002 plan). This fact decreased total environmental investments in electricity generation.

However, Enel is committed to continuously improving the environmental performance of its thermal power plants. Among its most significant new initiatives: the conversion of the Sulcis power plant to fluidized beds and the construction of the cooling towers of the Fusina power plant: most of the 2002 investments were allocated to the above improvements. The conversion of the power plants of La Casella, Pietrafitta, Porto Corsini, Priolo Gargallo and Termini Imerese to combined cycles – albeit not justified by environmental compliance – will significantly increase the efficiency of thermal power plants in the near future, enabling Enel to appreciably enhance its environmental performance.

The most significant environmental investments were made in the following areas:
> power grid: in the range of 73.5 million euro;
> thermal power plants: in the range of 52.5 million euro;
> geothermal plants: in the range of 7.5 million euro.

ITEMS OF CURRENT EXPENDITURE



The current environmental expenditure for 2002 includes:
> costs for the operation of equipment and systems for environmental protection, waste disposal and for the personnel of Enel and of third parties involved in these activities: about 149 million euro;
> eco-taxes, the most significant of which were the eco-tax on SO_2 and NO_X emissions and the carbon tax on fossil fuels: about 58 million euro.

It is worth stressing:
> the captive use – for purposes of environmental protection – of low-sulfur fuels, especially natural gas in multi-fuel steam generators and very low-sulfur fuel oil;
> the loss of revenue due to partial or total unavailability of power installations for environmental retrofits.

The extra costs of fuels incurred in 2002, accounting for the difference between the cost of the fuels used and the cost of the fuels originally planned for each plant, as well as for the use of plants with higher marginal cost, was estimated to be in the range of 580 million euro.

Environmental criticalities

The use of the most rigorous and advanced environmental measures, however, cannot avoid the occurrence of environmental criticalities, which arise from such factors as: the excessive stress that the media put on some issues, inducing a wrong perception of reality and wrong expectations among communities; or the widespread opposition to some initiatives that, albeit perceived as socially or environmentally beneficial, interfere with one's own private life, giving rise to the so-called NIMBY (*Not-In-My-Backyard)* syndrome.

Environmental criticality is the rejection of or opposition to power installations (and/or to the impact deriving from their operation). Such rejection or opposition is expressed – obviously for environmental reasons – by a third party feeling disturbed, damaged or threatened by present or future installations. Environmental opposition takes place through initiatives which include notices (including written protests) or administrative measures and which may involve significant costs owing to failed authorizations, suspension of works, retrofits of installations, etc.

These criticalities are presented for the first time in this Report, divided by:
> line of business giving rise to the criticality;
> environmental sector affected (using Eurostat's Classification of Environmental Protection Activities);
> type of initiative.

The environmental criticalities pending at December 2002 (excluding, for this first year, the Telecommunications Division) are summarized below.

About 75% of environmental criticalities concern the power transmission and distribution grid, whereas the remaining 25% involve electricity generation and geothermal drilling. The criticalities due to the power grid include the issues of electric & magnetic fields (which, by themselves, represent the absolute majority), biodiversity and landscape, noise and vibrations. The criticalities concerning air and climate, waste waters, waste, soil, groundwater and surface water only relate to electricity generation and geothermal drilling. The "other" criticalities (those which do not fall under the above-mentioned headings) are equally shared between the two above-mentioned groups of activities.
Also complaints were recorded.

Environmental lawsuits

As of 31 December 2002, Enel had 546 pending lawsuits, of which 64% administrative, 21% civil and 15% criminal.
Environmental lawsuits concerning the power transmission and distribution grid exceed the criticalities existing on the same date (about 80% more) and many of them are due to the power transmission grid (34% vs. 7% in the case of criticalities).
The remaining 19% of lawsuits mainly concern electricity generation and geothermal drilling, since the contributions of telecommunications and natural gas distribution are very low (1.5% and 0.2%, respectively).
The power grid and telecommunications cover all the lawsuits relating to biodiversity and landscape and those concerning electromagnetic fields. With regard to the latter issue, 339 lawsuits for electricity transmission and distribution vs. 6 lawsuits for telecommunications would suggest that the overwhelming majority of lawsuits are due to low-frequency fields, which are typical of power lines.
Air and climate rank first among the other lawsuits and only concern electricity generation and geothermal drilling.

In the course of 2002, at Group level, 71 new lawsuits were opened, whereas a higher number of lawsuits (92) were settled.
The new lawsuits are distributed differently from the pending ones: criminal suits (32%) dominate the civil ones (21%), whereas civil & criminal suits dominate administrative ones (47%). No substantial differences were observed in the distribution of lawsuits by line of business and by environmental sector affected.
The settled suits reflect the pending ones. Furthermore, in 90% of the cases, the judgment was in favor of Enel (however, the data do not include the Power Grid Business Area of the Infrastructure and Networks Division).

Business Activities

Generation and Energy Management

The "Generation and Energy Management" area is one of the five Divisions of Enel's new organization.
This area was created to consolidate all the Group's activities on wholesale energy markets. It gathers all assets of electricity generation in Italy and abroad, as well as of fuel trading and sourcing (managed by Enel Trade, i.e. the former Enel.FTL, and by its controlled companies).
The main mission of the Division is to generate electricity from conventional sources (fuel oil, natural gas, coal, orimulsion) and from renewables.
The "Business Areas" that are operationally involved in such activities in Italy are:
> "Thermal Generation", which manages thermal power plants;
> "Renewables", which develops technologies and operates power plants based on renewables.

In 2002, Interpower (sold in January 2003) was still active within the Group.
The Generation and Energy Management Division is implementing programs of rational use of fuels, development of renewables, increased efficiency of power plants, with positive repercussions on the environment.

DIVERSIFICATION OF THE FUEL MIX AND DEVELOPMENT OF RENEWABLES

The European Commission's Green Paper on energy supply security placed considerable emphasis on the need for diversifying energy sources, thereby substantiating Enel's choice of diversifying its fuel mix, relying on increased use of coal and natural gas in high-efficiency cycles and on the development of renewables.
This policy helps meet the country's requirements in terms of:
> lower electricity generation costs;
> lower dependence on oil;
> lower emissions.

To achieve these targets, Enel initiated a program of conversion of some of its oil-fired power plants to combined (natural gas) cycles. In 2002, the Group put into service the combined-cycle power plants of La Casella, Priolo Gargallo and Porto Corsini, which added to the already operational combined-cycle power plants of Trino Vercellese and La Spezia (2 units).
Enel also plans greater reliance on coal, thanks above all to the conversion of its oil-fired power plant of Torrevaldaliga Nord into a high-tech one, with lower emissions than those from the previous oil firing (-75% for SO_2; -25% for NO_x; -60% for particulates). Under a similar plan, the Porto Tolle power plant will be switched to orimulsion-firing with a considerable reduction of emissions.
As regards the program of development of renewables, Enel commissioned two wind plants in 2002: Alta Nurra (province of Sassari) with a capacity of over 12 MW and Caltabellotta (province of Agrigento) with a capacity of 7.5 MW. Together, the two plants can cover the electricity demand of approximately 20,000 households.
In 2002, electricity generation from renewables avoided about 18 million tons of CO_2 emissions from the otherwise necessary fossil-fired generation.
Given the high environmental value of renewables and the Group's global-scale activity in this field, Enel received the 2002 International Renewable Energy Award as the company of the year for renewable energy sources.

Generation and Energy Management

Thermal generation

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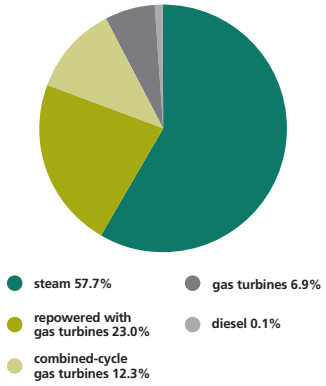
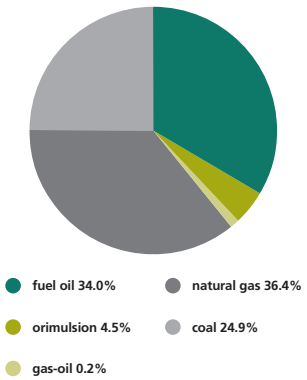
THERMAL POWER INSTALLATIONS

	Power plants no.	Generating units no.	Net maximum capacity MW
Steam (condensing)		60	15,083
Repowered with gas turbines		10	5,996
Combined-cycle gas turbines		9	3,222
Gas turbines		27	1,810
Diesel		39	20
	45	**145**	**26,131**

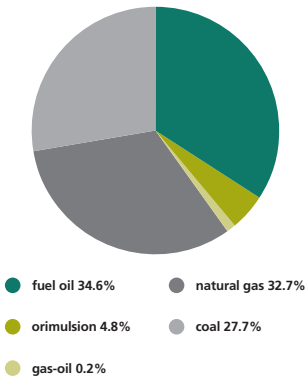
NET MAXIMUM CAPACITY
Total: 26,131 MW



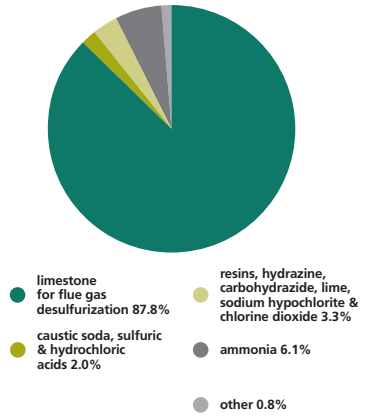
NET FOSSIL-FIRED THERMAL GENERATION
Total: 99,265 million kWh



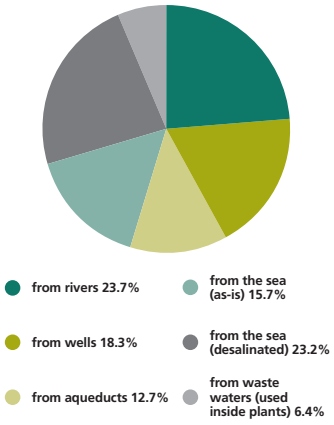
FUEL CONSUMPTION
Total: 22,499,920 t of oil-equivalent



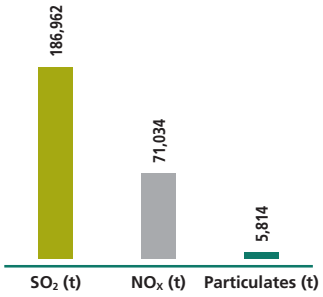
EXPENDABLES
Total: 346,647 t



WATER FOR INDUSTRIAL USES
Total requirements: 35,334,829 m³
Total abstraction from inland waters: 19,331,523 m³



EMISSIONS INTO THE ATMOSPHERE



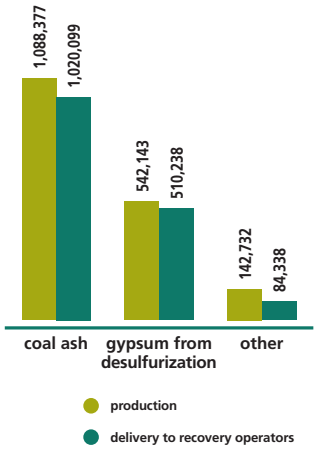
CO_2 (t)	**70,610,110**
from combustion	70,476,107
from desulfurization	134,003
SF_6 (kg)	**610**
(t of CO_2-equivalent)	14,568

WASTE WATERS

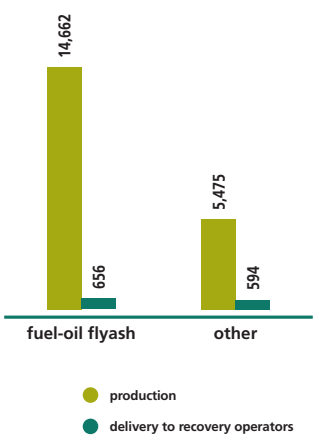
Discharged into water bodies: 14,621,621 m³
Used inside plants: 2,252,268 m³

Waste waters include those meteoric waters that are susceptible to pollution and are therefore fed to treatment systems before being discharged or used.

NON-HAZARDOUS SPECIAL WASTE (t)



HAZARDOUS SPECIAL WASTE (t)



Generation and Energy Management

Renewables

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POWER INSTALLATIONS

HYDRO

	Power plants no.	Head installations no.	Net maximum capacity MW
Run-of-river		321	1,654.1
Pondage/reservoir		194	5,148.0
Pure/mixed pumped storage		20	7,479.1
	501	**535**	**14,281.2**

GEOTHERMAL

	Power plants no.	Generating units no.	Net maximum capacity MW
Condensing		36	660.0
Atmospheric exhaust		1	6.0
	34	**37**	**666.0**

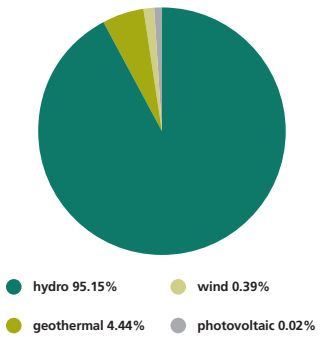
WIND

	no.	Net maximum capacity MW
Power plants	**9**	**58.8**

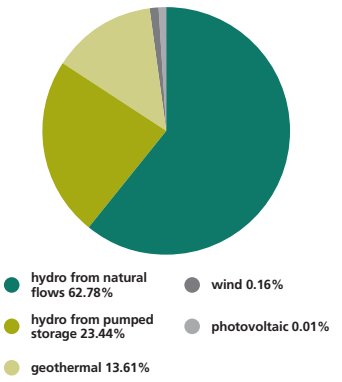
PHOTOVOLTAIC

	no.	Net maximum capacity MW
Power plants	**5**	**3.5**

NET MAXIMUM CAPACITY
Total: 15,010 MW

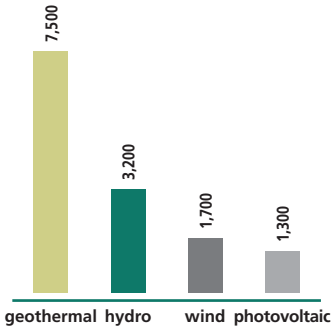


NET ELECTRICITY GENERATION



Hydro from natural flows	20,204
Hydro from pumped storage	7,543
Geothermal	4,382
Wind	50
Photovoltaic	2
Total (million kWh)	**32,182**

YEARLY EQUIVALENT HOURS OF UTILIZATION*



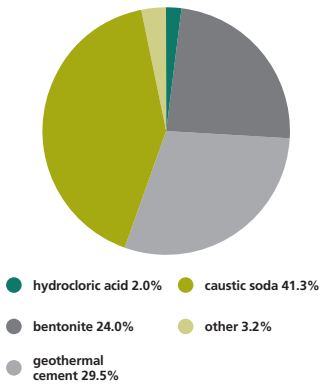
* On a statistical basis: yearly energy capability/capacity ratio (excluding hydro generation from pumped storage)

GEOTHERMAL FLUID (t)

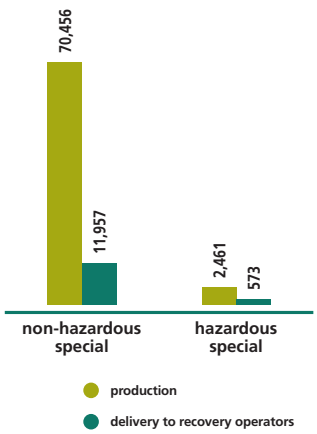
Total fluid extracted	**37,316,000**
Net of reinjected fluids	**23,001,000**
Steam for electricity generation	**37,112,000**
Fluid for non-electric uses	**910,000**
of which:	
used directly	*204,000*
used for electricity generation after expansion in atmospheric-exhaust turbine	*706,000*

Non-electric uses are uses of resources that do not have or have lost the thermodynamic properties making them suitable for geothermal generation.
These uses fall under two main categories: supply of heat (especially for greenhousing and district heating) and extraction of substances (e.g.: carbon dioxide for foodstuffs).

EXPENDABLES (GEOTHERMAL ACTIVITIES)
Total: 8,537 t



WASTE (t)



WATER FOR INDUSTRIAL USES (GEOTHERMAL ACTIVITIES)
Abstraction from inland waters (entirely from rivers): 27,000 m³

GAS-OIL (GEOTHERMAL ACTIVITIES)
Total consumption: 1,734 toe

Used for driving the drilling equipment.

EMISSIONS INTO THE ATMOSPHERE

H_2S (geothermal generation)	**21,196 t**
CO_2 (geothermal drilling)	**5,323 t**

Carbon dioxide is produced by the combustion of gas-oil, which is used for driving the drilling equipment.

SF_6 (all types of generation)	**329 kg**
(t of CO_2-equivalent)	7,871

AVOIDED CO_2 EMISSIONS (t)

Hydro generation from natural flows	14,543,000
Geothermal generation	3,154,000
Wind generation	36,000
Photovoltaic generation	2,000
Total	**17,735,000**

Avoided CO_2 emissions from the otherwise necessary conventional thermal generation.

OTHER DATA

HYDRO GENERATION

Desilted reservoirs	
quantity (no.)	18
alluvial sediments removed and reused locally (t)	284,440
Fish ladders (no.)	30
Fish restocking campaigns	
quantity (no.)	97
restocked fish individuals	2,450,000
in addition to kg	2,500

GEOTHERMAL ACTIVITIES

Drilled wells	
new (no.)	5
deepened (no.)	0
rehabilitated (no.)	0
Meters drilled (m)	12,960
In-service wells	
for steam production (no.)	212
for reinjection (no.)	31

WIND & PHOTOVOLTAIC GENERATION

Wind systems	
surface area occupied by machines, buildings and roads (ha)	85
total surface area affected by the installations (ha)	30 to 100 times larger
Photovoltaic systems	
surface area occupied by modules (ha)	6.7
total surface area affected by the installations (ha)	10.0

Generation and Energy Management

Interpower

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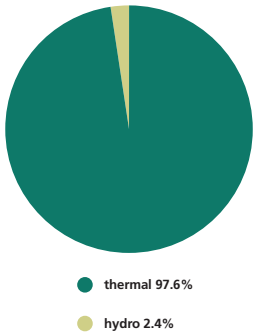
POWER INSTALLATIONS

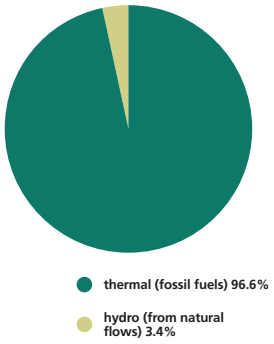
HYDRO	Power plants no.	Head installations no.	Net maximum capacity MW
Run-of-river		11	27
Pondage/reservoir		7	36
	16	**18**	**63**

THERMAL	Power plants no.	Head installations no.	Net maximum capacity MW
Steam (condensing)	**3**	**11**	**2,548**

NET MAXIMUM CAPACITY
Total: 2,611 MW

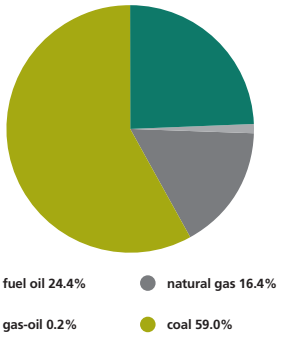


NET ELECTRICITY GENERATION

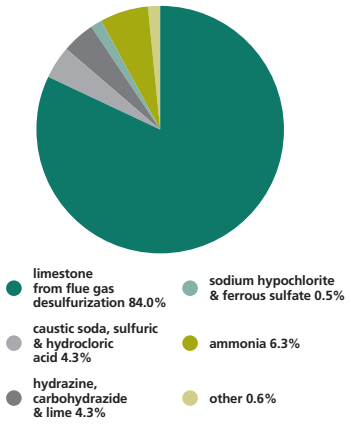


Hydro (from natural flows)	195
Thermal (fossil fuels)	5,470
Total (million kWh)	**5,666**

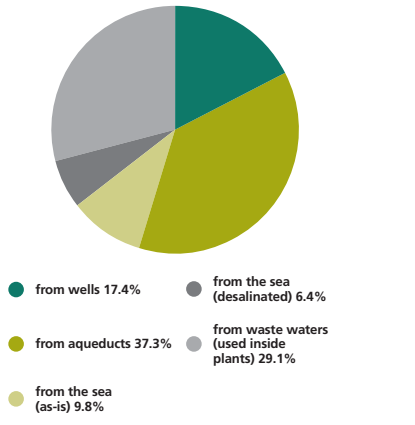
FUEL CONSUMPTION
Total: 1,363,629 t of oil-equivalent



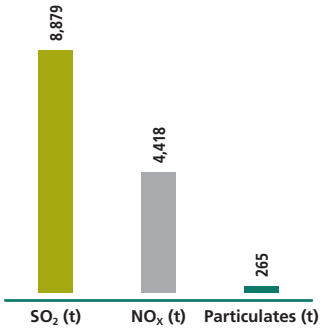
EXPENDABLES
Total: 27,519 t



WATER FOR INDUSTRIAL USES
Total requirements: 2,812,256 m³
Total abstraction from inland waters: 1,537,645 m³



EMISSIONS INTO THE ATMOSPHERE



CO_2 (t)	**4,780,529**
from combustion	4,770,361
from desulfurization	10,168
SF_6 (kg)	**101**
(t of CO_2-equivalent)	2,414

Hydro generation from natural flows avoided about 141,000 tons of CO_2 emissions from the otherwise necessary conventional thermal generation.

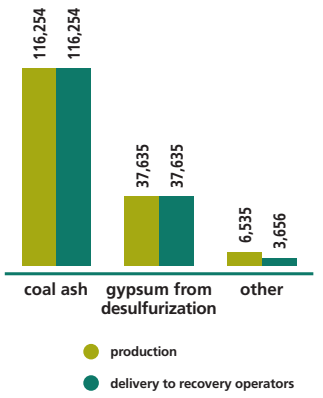
WASTE WATERS (THERMAL GENERATION)

Discharged into water bodies: 1,801,712 m³

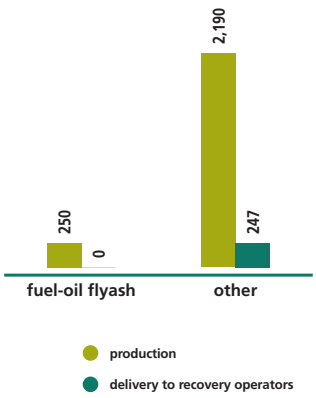
Used inside plants: 818,170 m³

Waste waters include those meteoric waters that are susceptible to pollution and are therefore fed to treatment systems before being discharged or used.

NON-HAZARDOUS SPECIAL WASTE (t)



HAZARDOUS SPECIAL WASTE (t)



OTHER DATA

Desilted reservoirs	
quantity (no.)	3
alluvial sediments removed and reused locally (t)	0
Fish ladders (no.)	2
Fish restocking campaigns	
quantity (no.)	8
restocked fish individuals	100,000
in addition to kg	1,000

Sales, Infrastructure and Networks

Enel's new organizational model places the know-how and assets of the power and gas grids under the responsibility of two operating Divisions, the Sales Division and the Infrastructure and Networks Division, strengthening – at the same time – the coordination of commercial activities.
In particular, the Sales Division has the mission of developing an integrated offering of electricity and gas products and services through focused distribution channels.
The Division acquired the assets of electricity and gas sales on the captive and eligible markets, of public and artistic lighting, as well as those of demand-side management.
Conversely, the Infrastructure and Networks Division has the task of managing the electricity and gas distribution grids in an integrated way, thereby optimizing costs and investments.
In the Valle d'Aosta region, electricity is distributed by Deval SpA, of which Enel SpA has a 51% majority holding.

INCREASED ENERGY EFFICIENCY IN FINAL USES

Enel made investments in programs of rational energy use, for which it expected greater impetus from the decrees of April 2001 on increased energy efficiency of electricity and gas. Actually, there was a slow-down in the implementation of the decrees and in the design of the market for the trading of energy efficiency certificates (white certificates) that are issued to distributors on the basis of their savings of primary energy. The applicable legislation will be revised in 2003.
Nevertheless, Enel deemed it useful to continue to offer efficient and integrated energy services to its customers, with a view to achieving two fundamental goals: optimization of primary energy consumption and, by curbing emissions into the atmosphere, a global and local environmental benefit.
The most significant services of the Group are:
> installation of power-driven heat pumps for air conditioning/heating;
> development of electricity consumption monitoring & control (energy management) systems;
> designing, building and operating combined heat & power plants;
> installation and maintenance of photovoltaic systems;
> installation of fluorescent lighting fixtures with electronic reactor replacing lighting fixtures with conventional ferromagnetic reactor;
> installation of systems for power factor correction of motors.

ELECTRIC & MAGNETIC FIELDS

The recently-approved decrees implementing frame-law 36/2001 on electromagnetic fields (establishing limits of exposure, attention thresholds and quality targets for power lines and mobile, radio and TV stations) concern an issue to which the public opinion is particularly sensitive. Aware of this issue, Enel designs its new installations by applying principles of precaution and grid rationalization.
In this connection, it is worth mentioning the "One Hundred Cities" program, resulting from the cooperation between Enel and the municipalities affected by works on the power distribution grid.
The program involves works to be conducted in at least 100 municipalities over a period of three years. In a matter of a single year, Enel signed memorandums of understanding with 42 municipalities, which were selected on the basis of:
> existence of an environmental rehabilitation plan prepared by the Municipality or other public or private institutions;
> high historical, artistic and monumental value of the center affected by the works;
> tourist value of the area.

Power grid

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POWER INSTALLATIONS

SUBSTATIONS

	no.	Installed transforming capacity MVA
HV/MV	1,963	86,654
Satellite substations and MV units	469	431
MV/LV	341,966	64,049
MV/MV	62,299	1,396
	406,697	**152,530**

LINES (km)

	Overhead bare conductors	Over-head cables	Under-ground cables	Total
HV	19,893	-	366	20,259
MV	207,967	6,205	116,543	330,714
LV	129,719	368,482	209,701	707,903
	357,579	**374,687**	**326,610**	**1,058,876**

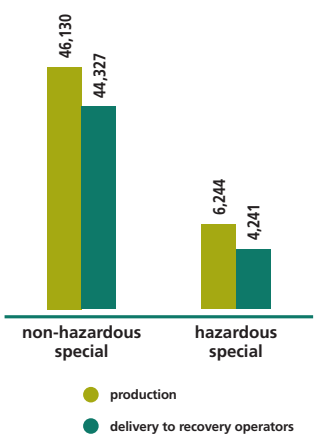
HV: >40 kV; MV: 1÷30 kV; LV: 380 kV.

GENERAL DATA

Regional units: 11
Operation centers: 29
Zones: 129
Municipalities served: 7,981
Customers connected to the divisional grid: 28,825,545
of which:
supplied by the Division: 28,805,148
only using its wheeling service: 20,397

The Power Grid Business Area also operates 199 isolated photovoltaic systems.
With a net maximum capacity of 589 kW and a yearly energy capability of about 648,000 kWh, they offer a cost-effective and environmentally sustainable solution for supplying power to mountain huts, nature sanctuaries and other small isolated consumers.

WASTE (t)



ELECTRICITY

Total electricity distributed:
257,578 million kWh

EMISSIONS INTO THE ATMOSPHERE

SF_6 (kg)	**2,353**
(t of CO_2-equivalent)	56,237

Sales, Infrastructure and Networks

Deval

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POWER INSTALLATIONS

SUBSTATIONS

	no.	Installed transforming capacity MVA
HV/MV	13	372
Satellite substations and MV units	4	22
MV/LV	1,315	231
MV/MV	195	30
	1,527	**655**

LINES (km)

	Overhead bare conductors	Over-head cables	Under-ground cables	Total
HV	57	-	0	57
MV	836	26	480	1,341
LV	12	1,845	879	2,736
	904	**1,871**	**1,359**	**4,134**

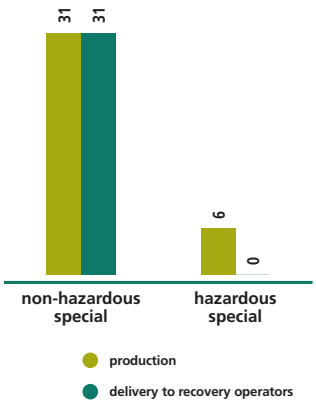
HV: >40 kV; MV: 1÷30 kV; LV: 380 kV.

GENERAL DATA

Municipalities served: 71
Surface area served: 3,264 km²
Customers connected to Deval's grid: 118,816
of which:
supplied by Deval: 118,677
only using its wheeling service: 139

Deval also operates 2 isolated photovoltaic systems, which feed as many customers, each with a subscribed demand of 1.5 kW.

WASTE (t)



ELECTRICITY

Total electricity distributed:
891 million kWh

EMISSIONS INTO THE ATMOSPHERE

SF_6 (kg)	**31**
(t of CO_2-equivalent)	746

Gas grid

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ambrogio.andreani@enel.it

INSTALLATIONS

STATIONS (no.)

HP/MP	509
MP/LP with a power of > 1,200 kW	6,377
	6,886

PIPELINES (km)

HP (p > 5 bar)	137
MP (0.04 bar < p ≤ 5 bar)	9,370
LP (p ≤ 0.04 bar)	15,383
	24,890

NATURAL GAS

Total natural gas distributed:
3,166.0 million m^3

Own consumption: 1.9 million m^3

Losses along the grid: 11.1 million m^3

Own consumption is the use of natural gas for its heating: before being distributed to customers, natural gas is heated indirectly through a water circuit in order to prevent it from freezing upon depressurization.

GENERAL DATA

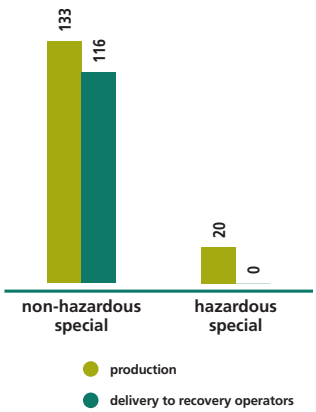
Municipalities served: 1,043
Surface area served: 30,144 km^2
Customers connected to the grid: 1,722,813

RESOURCE CONSUMPTION

Electricity: 2,482,000 kWh

Used for cathode protection of pipelines, for powering gas-heating circuit water pumps and for lighting of installations.

WASTE (t)



EMISSIONS INTO THE ATMOSPHERE

CH_4 (t)	**5,711**
(t of CO_2-equivalent)	119,931

The emissions of methane are the share of this gas in the natural gas lost along the grid.

CO_2 (t)	**3,729**

The emissions of carbon dioxide are produced by the combustion of natural gas used for own consumption.

Telecommunications

In addition to mobile telephony offerings, Enel's new "Telecommunications" Division (WIND) re-launched its program of converging services (fixed and mobile telephony) by taking over Infostrada, a fixed telephony operator. In the Internet world, WIND is present with "Libero", the leading Italian portal in terms of pages visited and market penetration.
In five years, WIND succeeded in acquiring over 28 million customers (fixed telephony: 7.4; mobile telephony: 8.7; Internet: 12.4).

ENVIRONMENTAL MANAGEMENT AT WIND

The highly competitive market of telecommunications led WIND to pursue quality and environmental protection targets. From the start, WIND planned, designed and organized its network in such a way as to offer an advanced and high-performance service. Each network project is not only submitted to the authorization of health authorities and local governments, but is carefully studied in order to minimize its impact on the environment and landscape: this long-established procedure enabled WIND to achieve the ISO14001 environmental certification, issued by DNV (an international certification body) on December 18, 2000.
WIND is the first telecommunications operator in Italy – and among the first in Europe – that has obtained the certification of its Environmental Management System also for mobile telephony. Its technologies minimize space requirements and thus visual impact. For example, WIND uses different designs for its installations depending on the environment where they are to be placed. In cities, its aerials are low (about 1.3 m) and mounted on light-weight supports. For sites of particular architectural value, WIND uses aerials with zero visual impact.

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INSTALLATIONS

Fiber-optic networks (km)	18,275
Local loops (km)	2,230
Fixed telephony switches (no.)	58
Mobile telephony switches (no.)	50
Radio base stations (telephony aerials) (no.)	7,369
Points of Presence (POPs) and IP POPs (no.)	167

USAGE

Voice - fixed telephony: 21.0 x 10^9 minutes
Voice - mobile telephony: 7.8 x 10^9 minutes
Internet: 27.0 x 10^9 minutes

GENERAL DATA

Fixed telephony customers: 7.4 millions
Mobile telephony customers: 8.7 millions
Internet customers: 12.4 millions
Population coverage by mobile network: 98%

RESOURCE CONSUMPTION

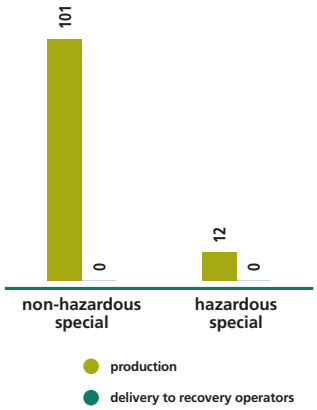
Electricity: 196,818,000 kWh

Used for powering telecommunications systems.

Gas-oil: 3,226 toe

Used in generating sets which supply electricity in emergencies and to installations not connected to the power grid.

WASTE (t)



EMISSIONS INTO THE ATMOSPHERE

CO_2 (t) **9,904**

The emissions of carbon dioxide are produced by the combustion of the gas-oil used in generating sets.

Terna

Terna owns 95% of the national high- and extra-high voltage (380 kV) power transmission grid. Within the Group, the Company is responsible for operation, maintenance and development of the grid based on the directions of GRTN (Gestore della Rete di Trasmissione Nazionale - Italian Independent System Operator).
Terna's transmission grid is the country's most important infrastructure for electricity transmission.
Terna also provides services to companies using high-voltage electrical systems.
Terna's operations are based on the following principles: centrality of customers, competence as a business factor, environmental protection. It also supplies specialist services to owners of high- and extra-high voltage systems and other systems potentially involved in remote control and operation, leveraging its excellent technical skills and innovation.
Terna also offers its installations as supports for network components (aerials, fiber-optic cables, sensors, etc.) and related services to WIND and third parties.

SEA - STRATEGIC ENVIRONMENTAL ASSESSMENT

The Strategic Environmental Assessment is a new instrument introduced by European Directive 42/2001 to integrate environmental aspects into the definition and adoption of national, regional or sectoral plans and programs, so as to ensure a high level of environmental protection and promote sustainable development.
With this instrument, environmental issues are identified upon the planning of initiatives.
By integrating environmental aspects into the early stages of the decision-making process, decisions can be changed before they are taken and when different alternatives are still possible.
Although the use of this new instrument inside the European Union is scheduled from July 2004, Enel has already started to study its application jointly with GRTN. Indeed, Enel feels that the environmental assessment at the project level will improve communications with environmental authorities and the public, which will be able to express their opinions within the planned timescales. The first applications of SEA concerned the design and installation of new extra-high voltage lines, especially of their cross-border sections.

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POWER INSTALLATIONS

ELECTRICAL STATIONS

	no.	Installed transforming capacity MVA
380 kV	119	74,370
220 kV	106	24,273
< 220 kV	50	2,850
	275	**101,493**

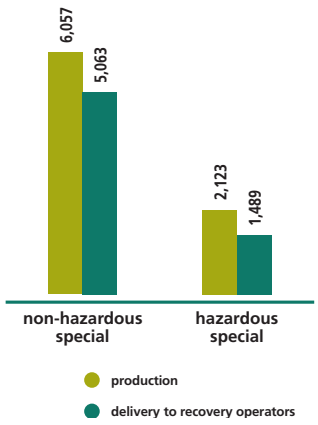
LINES (km)

	Circuits	Lines
380 kV	10,062	9,215
220 kV	10,115	8,253
< 220 kV	17,406	16,416
	37,583	**33,884**

ELECTRICITY

Own consumption (for operation of the power grid): 111 million kWh

WASTE (t)



EMISSIONS INTO THE ATMOSPHERE

SF_6 (kg)	**1,228**
(t of CO_2-equivalent)	29,355

Eco-Balance and Indicators

Eco-Balance

In the Enel Group, electricity generation, transmission and distribution are the activities which have the most significant interactions with the environment.

In 2002, primary energy (electricity and fuels) consumption, greenhouse gas emissions and special waste production in non-electric activities (gas distribution and telecommunications) were over 1,000 times lower than in electric activities alone.

However, the 2002 eco-balance extends to all the industrial activities that the Group carries out in Italy and quantifies their interactions with the environment.

The data of the eco-balance are divided into three sections:
> resources;
> processes and products, giving insight into the extent of the problems considered;
> emissions.

For each item, the eco-balance gives the data for the past five years (except for gas distribution and telecommunications; in particular, gas distribution only appeared within the Group in 2000), specifying their modes of collection and providing comments on their trends.

It is worth recalling that, in the course of 2002, the sale of some of assets of the Group reduced the size of its activities of hydro and thermal generation, as well as of electricity distribution:
> divestiture of Eurogen (then Edipower) – about 800 MW of hydro capacity and 6,200 MW of thermal capacity – which followed the sale of Valgen (then Geval) and Elettrogen (then Endesa Italia) in 2001;
> divestiture of the grids of the Municipalities of Milan and Rozzano to AEM Milano and of the Municipalities of Verona and Grezzana to AGSM Verona – with a total of about 475,000 customers – which followed the sale of the grids of Parma, Trieste, Rome and Turin in 2000 and 2001.

Both Elettrogen and Eurogen, as well as the distribution grids were sold in accordance with Legislative Decree no. 79 of March 16, 1999. The Decree stipulates that each power producer/importer shall not generate or import more than 50% of the total electricity generated in and imported to Italy. The Decree also contains provisions on rationalization of the electricity distribution business.

As a result of the aforesaid downsizing of the Group's activities, most of the variations appearing in the data during the reported five-year period are poorly significant or self-evident. Thus, the percentage changes recorded in the 2002 data vs. 1998 and 2001 have been omitted.

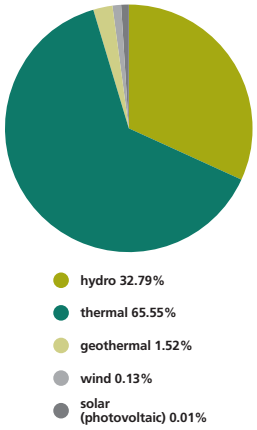
Since power plants and the power grid fall under the responsibility of different Divisions or Companies (see the individual data sheets, together with those concerning gas distribution and telecommunications, in the "Business Activities" section), the following table shows their aggregated data as of December 31, 2002, in order to facilitate the interpretation and assessment of the eco-Balance.

Power installations

	Net maximum capacity (MW)	Power plants (no.)
Total	43,752	613
hydro	*14,344*	*517*
thermal	*28,679*	*48*
geothermal	*666*	*34*
wind	*59*	*9*
solar (photovoltaic)	*4.1*	*5 (*)*

(*) In addition to 201 isolated photovoltaic systems

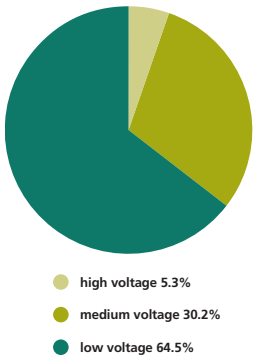
POWER PLANTS - NET MAXIMUM CAPACITY AS OF DEC. 31, 2002
Total: 43,752 MW



Power lines

	Length of circuits (km)
Total	1,100,593
high voltage (40 to 380 kV)	*57,899*
medium voltage (1 to 30 kV)	*332,055*
low voltage (up to 380 V)	*710,639*

POWER LINES - LENGTH OF CIRCUITS AS OF DEC. 31, 2002
Total: 1,100,593 km

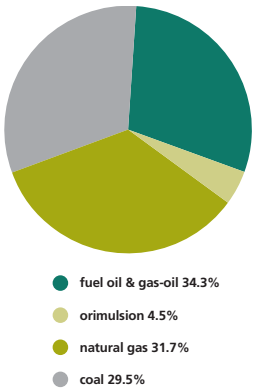


Eco-Balance

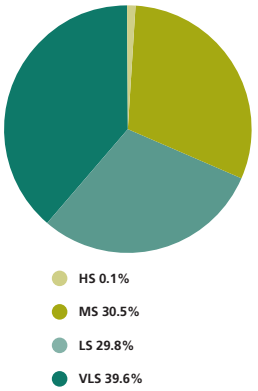
Resources

This section shows the consumption of energy resources (fossil fuels, geothermal steam) and non-energy resources (water for industrial uses, expendables).

FUEL CONSUMPTION FOR THERMAL GENERATION IN 2002
Total: 23,864 ktoe



FUEL-OIL CONSUMPTION FOR THERMAL GENERATION IN 2002
Total: 8,241 kt



Fossil fuels

In most cases, fossil fuels represent 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%).
Orimulsion is an emulsion of bitumen in water, coming from the Orinoco basin (Venezuela); like coal, it is used in power plants equipped with flue gas desulfurizers and denitrification systems.
Gas-oil, a high-cost fuel, is used on an exceptional basis in: gas-turbine power plants that are not connected to the natural gas grid; diesel-engine power plants (supplying some minor Italian islands); start-up of steam-fired thermal power plants; and, as an emergency fuel, in all gas-turbine plants. The maximum sulfur content (0.2%) in the gas-oil used for electricity generation is specified in the applicable legislation. However, Enel's gas turbines use gas-oil with a sulfur content of 0.05%.
A very small quantity of gas-oil is used also in other activities: for driving geothermal drilling equipment and in the generating sets of telecommunications installations.
The consumption of natural gas is broken down on the basis of its uses: non-technologically captive (when the use of gas is a corporate choice) and technologically captive (when gas feeds single- and combined-cycle turbines, for which it is the only practicable option).
With the exhaustion of the mines adjoining the Pietrafitta and Santa Barbara power plants, the use of brown coal was discontinued.

Fuel consumption, obtained from data measured and certified in each installation, is expressed in metric units (thousand tons or million cubic meters). To facilitate the summing of the various contributions, fuel consumption is also expressed in energy potential (thousand tons of oil-equivalent).

With regard to trends, note that, in the past two years, coal was the only fuel with a higher consumption value, in spite of the sale of Elettrogen and Eurogen: completion of the program of power plant retrofits for environmental compliance made it possible to benefit from a particularly competitive price of coal.

Geothermal fluid

Geothermal fluid, in the form of steam at adequate pressure and temperature values, is the energy source for geothermal generation. A minimum amount of this fluid is allocated to non-electric uses, i.e. uses of resources whose thermodynamic properties are unsuitable for geothermal generation. These uses fall under two main categories: supply of heat

(especially for greenhousing and district heating) and extraction of substances (e.g. carbon dioxide for foodstuffs).

The amount used is measured with special instrumentation.

After a drop in 2001 owing to the shutdown of some power plants for renovation works, the consumption of geothermal steam for electricity generation in 2002 reached values that are close to the peak ones of the period.

The capability of geothermal basins is mostly sustained by the reinjection of fluids into the geothermal reservoir. These fluids consist of: the water entrained by steam and separated from it at the well outlet; the steam that is condensed after its expansion in the turbine, net of the fraction evaporated in the cooling tower; and the fluid remaining after non-electric uses. Thanks to reinjection, the geothermal reservoir represents a practically inexhaustible heat resource.
The practice of reinjection of fluids deeply into the subsoil does not jeopardize shallow aquifers which, among others, are isolated from the wells by one or more in-series metal pipings, cemented to the soil and between them.

CONSUMPTION OF GEOTHERMAL FLUID IN 2002
thousand t

Primary electricity

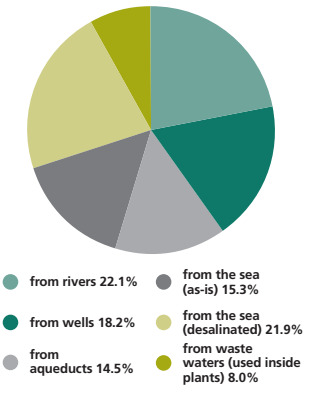
Electricity is used as energy raw material in telecommunications and, to a minimum extent, in gas distribution.
In the first instance, it is used for the functioning of telecommunications installations.
In the second instance, it is used for cathode protection of gas pipelines, for driving the feedwater pumps of the circuits which heat natural gas upon its depressurization, as well as for lighting gas installations.

Water for industrial uses

Water for industrial uses is consumed:
> in thermal power plants, mainly to make up for the amounts of water lost in the generation process of steam-turbine plants and in closed-cycle wet cooling towers, to carry out clean-up jobs (especially of boilers), and to feed auxiliaries and desulfurizers;
> in much lower amounts (about one thousand times lower) in geothermal activities, to prepare the drilling slurry (the functioning of cooling towers does not require water, as it is based on re-vaporization of part of the steam condensates discharged by turbines).

Water requirements do not include the water used for open-cycle cooling of thermal plants, that is returned to the original water body without appreciable physico-chemical changes.

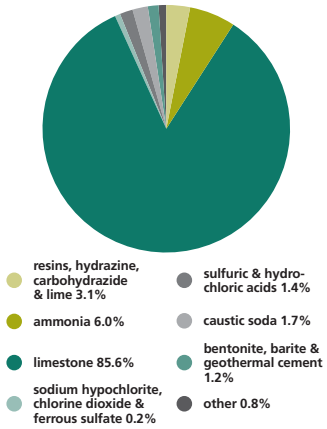
COVERAGE OF WATER REQUIREMENTS FOR INDUSTRIAL USES IN 2002
38.2 million m³



Eco-Balance

The 1999 peak in water requirements (mostly covered by as-is sea water) is related to the particular requirements of the initial operation of most desulfurizers. In effect, water requirements in 2000 (before the downsizing of the Group's thermal generation) declined significantly.

EXPENDABLES IN 2002
Total: 382,703 t



Expendables

Expendables complete the list of the resources used.

> Resins are used to produce (via ion exchange) the high-purity water which is needed for the thermal cycle of steam-fired power plants.
> Hydrazine and carbohydrazide deoxygenate the thermal-cycle water and regulate its pH.
> Magnesium oxide is injected into the flue gas circuits of thermal power plants fed with vanadium-containing fuels, to prevent corrosion of heat-transfer surfaces due to the indirect action of vanadium.
> Ammonia is used to regulate the pH of the thermal-cycle water and as a reagent in the flue gas denitrification process.
> Limestone is the reagent for the flue gas desulfurization process.
> Lime is mainly used in waste water treatment, thanks to its neutralizing and flocculating properties.
> Sodium hypochlorite and chlorine dioxide are occasionally added to the cooling waters of steam-fired power plants to prevent deposits and fouling. Ferrous sulfate is used to protect heat-transfer tube surfaces from corrosion.
> Sulfuric acid, hydrochloric acid and caustic soda are most commonly used in clean-up of equipment. However, in geothermal activities, the primary application of soda is as an additive in the slurries used in the drilling of geothermal wells.
> Bentonite is a clay which is used as a slurry for the drilling of geothermal wells.
> Barite is used in some cases to make bentonite slurries heavier, thereby improving their effectiveness upon the drilling of mechanically unstable geological formations.
> Geothermal cement is used for joining the steel walls of wells and as a thickener of drill cuttings, to facilitate their removal.

The figures shown for expendables are obtained from the accounting records of purchases, which are held in each installation. Given the small size of stocks and the high number of installations surveyed, the amounts purchased are practically equivalent to those consumed.

In the first years of the period, note the strong increase in the use of ammonia, limestone and lime. This increase is connected to the installation of denitrification systems and desulfurizers (ammonia) and to the treatment of desulfurizer drains (limestone & lime), respectively. The trend of this consumption in the past two years was minimally affected by the downsizing of thermal generation activities, demonstrating the widespread use of abatement systems in the power plants still owned by the Group.
The consumption of the typical resources used for geothermal activities remains highly variable, depending on the characteristics of the geological formations crossed by the wells.

Resources

		1998	1999	2000	2001	2002
Fossil fuels						
Thermal generation						
fuel oil	thousand t	19,305	15,420	13,639	10,708	8,241
- HS	*thousand t*	*904*	*1,176*	*173*	*221*	*6*
- MS	*thousand t*	*7,944*	*6,514*	*5,741*	*4,446*	*2,518*
- LS	*thousand t*	*5,237*	*3,530*	*4,114*	*3,266*	*2,458*
- VLS	*thousand t*	*5,220*	*4,201*	*3,610*	*2,775*	*3,260*
orimulsion	thousand t	693	1,689	2,508	1,589	1,620
gas-oil	thousand t	90	209	136	75	58
natural gas	million m³	8,831	11,302	13,208	10,549	8,893
- non-technologically captive use	*million m³*	*6,414*	*7,966*	*9,547*	*6,452*	*6,487*
- technologically captive use	*million m³*	*2,417*	*3,336*	*3,661*	*4,097*	*2,407*
coal	thousand t	8,176	8,395	9,489	10,425	11,295
brown coal	thousand t	156	80	19	0	0
coke-oven gas	million m³	1	0	0	0	0
Total	**thousand toe**	**31,880**	**31,046**	**32,083**	**27,022**	**23,864**
Other activities:						
geothermal drilling & telecommunications	thousand toe	n.a.	n.a.	n.a.	n.a.	5.0
Grand total	**thousand toe**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**23,869**
Geothermal fluid						
Total fluid extracted	thousand t	n.a.	n.a.	n.a.	n.a.	37,316
net of reinjected fluids	thousand t	n.a.	n.a.	n.a.	n.a.	23,001
Geothermal steam for electricity generation	thousand t	34,201	35,339	37,500	35,374	37,112
Primary electricity						
(gas distribution & telecommunications)	GWh	n.a.	n.a.	n.a.	n.a.	199
Water for industrial uses						
From rivers	million m³	11.1	11.1	10.8	10.7	8.4
From wells	million m³	15.5	12.9	14.1	11.4	7.0
From aqueducts	million m³	4.8	5.5	5.8	5.6	5.5
Total abstraction from inland waters	**million m³**	**31.4**	**29.6**	**30.7**	**27.7**	**20.9**
From the sea (as-is)	million m³	2.7	12.2	6.9	5.1	5.8
From the sea (desalinated)	million m³	6.5	8.0	8.7	8.1	8.4
From waste waters (used inside plants)	million m³	3.1	4.1	3.6	3.2	3.1
Total requirements	**million m³**	**43.7**	**53.9**	**49.9**	**44.1**	**38.2**
For thermal generation	*million m³*	*43.5*	*53.8*	*49.7*	*44.1*	*38.1*
For geothermal drilling	*million m³*	*0.24*	*0.09*	*0.19*	*0.04*	*0.03*
Expendables						
Resins	t	117	90	63	81	35
Hydrazine	t	114	71	47	35	51
Carbohydrazide	t	n.a.	n.a.	n.a.	1	13
Magnesium oxide	t	n.a.	n.a.	n.a.	213	153
Ammonia	t	8,969	15,482	18,703	20,455	22,909
Limestone	t	178,393	333,275	325,150	302,067	327,661
Lime	t	9,034	12,135	14,005	13,541	11,926
Sodium hypochlorite	t	667	1,077	1,071	962	612
Chlorine dioxide	t	n.a.	n.a.	n.a.	0	28
Ferrous sulfate	t	n.a.	n.a.	n.a.	0	3
Sulfuric & hydrochloric acids	t	9,359	7,834	8,354	7,440	5,432
Caustic soda	t	6,774	6,692	7,728	7,237	6,314
Bentonite	t	2,803	1,361	623	1,044	2,045
Barite	t	362	6	8	60	0
Geothermal cement	t	5,819	2,748	1,545	2,331	2,520
Other	t	9,703	6,242	8,915	4,360	3,002

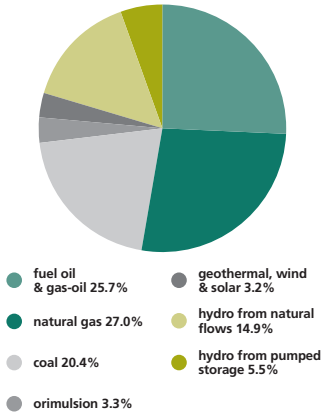
n.a.: not available (in the years from 1998 to 2000, the amounts of carbohydrazide, magnesium oxide, chlorine dioxide and ferrous sulfate were included in the "Other" expendables)

Eco-Balance

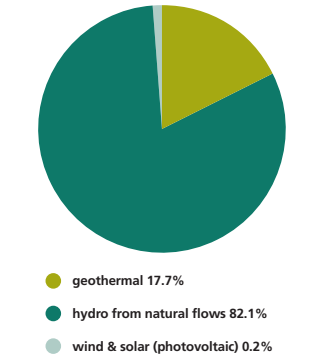
Processes and products

The strategy of diversification led Enel to add gas distribution and telecommunications (fixed & mobile telephony and Internet) to electricity generation, transmission and distribution.

NET ELECTRICITY GENERATION BY SOURCE IN 2002
Total: 137,112 million kWh



NET ELECTRICITY GENERATION FROM RENEWABLES IN 2002
Total: 24,834 million kWh



Electric activities

As regards electricity generation, it is worth pointing out that the 2001 data exclude Elettrogen and Valgen, while the 2002 data exclude Eurogen too.
Furthermore,

> the various contributions are net of the electricity consumed by power plant auxiliaries;
> in 1998, the consumption of auxiliaries of decommissioned nuclear power plants has been subtracted from total consumption;
> the hydro generation from pumped storage is the electricity that is produced, in peak-load hours, through the falling of water pumped from a lower reservoir to an upper reservoir, using thermal generation surpluses in low-load hours (pumped storage is the only available option for storing significant amounts of electricity, albeit indirectly);
> the actually available generation is the total net generation, after deducting the electricity consumed for pumped storage;
> the sale of the companies Valgen, Elettrogen and Eurogen justifies the drop in hydro generation from natural flows and in thermal generation from fossil fuels which was recorded in the past two years. By contrast, hydro generation from pumped storage (ensured by the Group's remaining generating assets) steadily rose in the period as a result of the trend of electricity demand;
> for the contributions of coal and geothermal sources in 2002, the reader is referred to the "Resources" section of the eco-Balance, which deals with consumption of coal and geothermal steam.

As regards electricity transmission and distribution, with the disaggregation of its vertically integrated electric activities, the transfer of its dispatching assets to GRTN (Gestore della Rete di Trasmissione Nazionale - Italian Independent System Operator) and the start of the liberalized market (possibility for "eligible" customers to choose their supplier), the Enel Group has lost the possibility of measuring the electricity wheeled on the transmission grid and, in general, of both measuring and directly controlling grid losses,. These losses have so far been expressed as a percentage of electricity demand and included among the indicators of power system efficiency.
Therefore, for 2002, reference is made only to the electricity wheeled on the distribution grid (total electricity delivered to customers, including intra-Group transfers).

Natural gas distribution

The amount of natural gas wheeled represents the total amount of gas that is delivered to customers.
The consumption of natural gas for operation of the grid ("own consumption") is due to the combustion of one fraction of the gas that is wheeled; this fraction is used for heating of the gas, to prevent it from freezing upon depressurization.

The natural gas losses from the grid are estimated on the basis of the amount of natural gas wheeled, using loss factors (average value in 2002: 0.35%) which account for gas pressure level, length and configuration of pipelines, their state of conservation, etc.

Telecommunications

Usage (voice and the Internet) is the "product" of this activity, i.e. the quantity that defines the extent of the relevant process.

Processes and products

		1998	1999	2000	2001	2002
Electricity generation (net)						
Thermal from fossil fuels	million kWh	141,052	136,946	141,391	118,569	104,735
from fuel oil & gas-oil	*million kWh*	*84,446*	*66,987*	*59,325*	*46,211*	*35,184*
from natural gas	*million kWh*	*33,710*	*43,426*	*52,147*	*42,259*	*37,024*
from coal & brown coal	*million kWh*	*21,016*	*21,872*	*23,316*	*25,883*	*28,038*
from coke-oven gas	*million kWh*	*3*	*0*	*0*	*0*	*0*
from orimulsion	*million kWh*	*1,877*	*4,661*	*6,602*	*4,216*	*4,489*
From renewables	million kWh	32,459	35,488	34,660	31,423	24,834
thermal from biogas	*million kWh*	-	-	-	*25*	-
geothermal	*million kWh*	*3,958*	*4,128*	*4,415*	*4,239*	*4,382*
hydro from natural flows	*million kWh*	*28,480*	*31,335*	*30,221*	*27,129*	*20,399*
wind & solar (photovoltaic)	*million kWh*	*21*	*25*	*24*	*29*	*53*
Hydro from pumped storage	million kWh	6,006	6,379	6,477	6,961	7,543
Total [1]	**million kWh**	**179,484**	**178,813**	**182,527**	**156,952**	**137,112**
Consumption for pumping	million kWh	8,285	8,800	9,066	9,653	10,595
Available generation	million kWh	171,199	170,013	173,461	147,299	126,518
Electricity distribution						
Electricity wheeled	million kWh	n.a.	n.a.	n.a.	n.a.	258,469
Natural gas distribution						
Natural gas wheeled	million m^3	-	-	n.a.	n.a.	3,166
Consumption of natural gas for operation of the grid	million m^3	-	-	n.a.	n.a.	2
Losses of natural gas along the grid	million m^3	-	-	n.a.	n.a.	11
Telecommunications						
Voice usage - fixed telephony	billion minutes	n.a.	n.a.	n.a.	n.a.	21.0
Voice usage - mobile telephony	billion minutes	n.a.	n.a.	n.a.	n.a.	7.8
Internet usage	billion minutes	n.a.	n.a.	n.a.	n.a.	27.0

[1] The 1998 figure is also net of consumption by nuclear plant auxiliaries.

n.a.: not available

Eco-Balance

Emissions

The tables display the amounts of emissions in the gaseous, liquid and solid form.

Emissions into the atmosphere

The emissions of some substances into the atmosphere have a polluting effect, while the emissions of other substances contribute to the greenhouse effect.
The most significant emissions into the atmosphere, which are typical of Enel's industrial activities are as follows: in the first category, sulfur dioxide (SO_2), nitrogen oxides (NO_X), particulates and hydrogen sulfide (H_2S); and, in the second category, carbon dioxide (CO_2) sulfur hexafluoride (SF_6) and methane (CH_4).

REDUCTION OF SO_2 EMISSIONS FROM 1980 LEVELS

Year	Regulatory target	Enel's result
1990	-30% (1)	-42%
1993	-30% (2)	-57%
1998	-39% (2)	-62%
2000	-	-73%
2002 (3)	-	-79%
2003	-63% (2)	

(1) Ministerial Decree no. 105/87.
(2) Ministerial Decree of May 8, 1989 (Enel's share).
(3) Endesa Italia (former Elettrogen) and Edipower (former Eurogen) are included.

Results were evaluated with reference to all the thermal power plants which were in operation in the years shown, i.e. for aggregates of plants larger than those considered in the target-setting Ministerial Decrees.

REDUCTION OF NO_X EMISSIONS FROM 1980 LEVELS

Year	Regulatory target (1)	Enel's result
1993	-2%	-19%
1998	-30%	-51%
2000	-	-64%
2002 (2)	-	-70%

(1) Ministerial Decree of May 8, 1989 (Enel's share)
(2) Endesa Italia (former Elettrogen) and Edipower (former Eurogen) are included.

Results were evaluated with reference to all the thermal power plants which were in operation in the years shown, i.e. for aggregates of plants larger than those considered in the target-setting Ministerial Decrees.

> SO_2, NO_X and particulates originate from the combustion process in thermal power plants.
The amounts shown include both emissions that are yearly reported to the Ministry of the Environment (SO_2 and NO_X from "large combustion systems" and particulates from "steam-fired thermal power plants") and emissions from the other power plants.
Their values are obtained by multiplying their concentrations in the flue gases (generally continuously monitored) by the volumes of the same flue gases. NO_X are expressed in terms of NO_2-equivalent.
Over the years, all these emissions fell significantly, thanks above all to advanced combustion technologies, continuous tuning of combustion systems, progress in the installation or upgrading of flue gas abatement systems and use of high-grade fuels.

> H_2S is the only potentially polluting substance which is present in significant amounts in geothermal fluid.
Its values are estimated on the basis of periodical monitoring of the composition and flow rate of geothermal steam used by power plants.
In 2002, in spite of the resumption of geothermal generation, the emissions of this substance declined thanks to the installation of abatement systems.

> CO_2 is the typical product of combustion of all fuels and, as such, it comes from the near totality of thermal power plants. Small amounts – reported here in view of the attention paid to the greenhouse effect – also derive from geothermal drilling (combustion of gas-oil driving the diesel engines of drilling equipment), from distribution of natural gas (combustion of one fraction of the wheeled gas for heating of the gas upon depressurization) and from telecommunications (combustion of gas-oil feeding the generating sets of telecommunications installations).
CO_2 is also contained, albeit in much lower amounts, in the reaction products from the process of desulfurization of the flue gases outgoing from the boilers of thermal plants.
The CO_2 from combustion is computed by applying specific emission factors to the consumption of the various fuels. The factors used in the past conformed to the criteria adopted by the Ministry of the Environment: 4.03 t of CO_2/toe for coal and coal-derived products; 3.27 for oil products; 2.35 for natural gas. Since 2001, these factors have been replaced by those recommended by the 1996 IPPC (International Panel on Climate Change) Guidelines for national greenhouse gas inventories and transposed into the second national report on greenhouse gas emissions: 3.24 t of CO_2/toe for fuel oil; 3.38 for orimulsion; 3.10 for gas-oil; 2.35 for natural gas; 4.02 for coal; 4.24 for brown coal;

2.00 for coke-oven gas. Each of these factors is then multiplied by a correction coefficient which accounts for the typical fraction of unburned carbon: 0.980 for solid fuels; 0.990 for liquid fuels; 0.995 for gaseous fuels. As in the past, the computation considers that the burned carbon fraction – now assumed to lie below 100% – is completely oxidized to CO_2. As the application of the new emission factors and of the related correction coefficients was extended to the entire time series, it also modified the time series of specific CO_2 emissions (from fossil-fired thermal generation and total electricity generation), as well as of avoided CO_2 emissions.
The amount of CO_2 from the desulfurization process is computed stoichiometrically from the amount of limestone used.

In line with the above-mentioned IPCC Guidelines, the following emissions have not been reported:

> emissions of CO_2 from combustion of renewable organic sources, because the CO_2 that is released into the atmosphere practically offsets the CO_2 that is absorbed by biomass during its growth (these emissions only refer to 2001, when the Group generated electricity from landfill gas);

> emissions of CO_2 from geothermal steam, which are not regarded as anthropogenic; indeed, the emissions from geothermal power plants are counterbalanced by an equivalent reduction of natural emissions – visible or invisible exhalations – from the soil of geothermal areas.

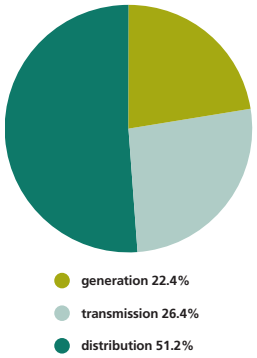
REDUCTION OF CO_2 EMISSIONS FROM 1990 LEVELS

Italian target in 2008-2012	-6.5%
Enel's result in 2002 (1)	-6.3%

(1) Endesa Italia (former Elettrogen) and Edipower (former Eurogen) are included.

> SF_6 is used as an insulant and for electric arc extinction. Its emissions into the atmosphere are due to leaks from the equipment where it is used. In 2002, 22% of SF_6 emissions were due to generation, 27% to transmission and 51% to distribution.
These emissions are determined with a complex procedure (difference between the weights of SF_6 contained in the bottles used for replenishment, at the start of the year and at the end of the year, increased by the weight of SF_6 contained in the bottles purchased or acquired during the year and decreased by the weight of SF_6 contained in the bottles used or transferred during the year). This procedure made it possible to get fairly reliable data on SF_6 emissions released from 1999 on. These data confirm the order of magnitude of the amounts 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 Global Warming Potential (GWP = 23,900).
The values of SF_6 expressed in CO_2-equivalent are low ((in 2002, 1.5‰ of the Group's overall greenhouse gas emissions). The variability of SF_6 emissions from one year to the other is largely due to the occasional character of the above-mentioned replenishment jobs.

SOURCES OF SF_6 EMISSIONS IN 2002
Total: 4,652 kg



> CH_4 emissions are due to the losses of natural gas from the distribution grid.
They are determined on the basis of grid losses, taking into account the methane content of natural gas (average value in 2002: 92.9%) and its density (average value in 2002: 0.555 kg/m³).

They are expressed both in weight of CH_4 and in weight of CO_2-equivalent, in terms of Global Warming Potential (GWP = 21).
The values of CH_4 expressed in CO_2-equivalent are extremely low (1.6‰ of the Group's overall greenhouse gas emissions in 2002).

Avoided CO_2 emissions

Avoided CO_2 emissions are an indicator of the environmental benefits arising from the mix of energy sources that are used for electricity generation and from the efficiency of the full cycle, from the utilization of the sources to the end-uses of the various products.
The tables show the CO_2 emissions which were avoided thanks to electricity generation from renewables, rather than from the otherwise necessary conventional fuels.

These emissions are determined by multiplying the electricity generation from each renewable source by the average specific CO_2 emissions from Enel's fossil-fired thermal generation.
In the case of hydro power, reference is made to generation from natural flows alone, excluding the contribution of pumped-storage power plants.

The reported percentage variations are obviously consistent with the corresponding variations in electricity generation.
In 2002, generation of electricity from renewables avoided almost 20% of CO_2 emissions from the otherwise necessary conventional thermal generation of the Group.

Waste waters

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 used inside the plants – thereby contributing to the coverage of water requirements for industrial uses – and in part returned to water bodies.

The volumes of waste waters are estimated by referring to the potential capability of water treatment systems, to their utilization and modes of operation.

As is obvious, their trend reflects the trend of water requirements for industrial uses.

Special waste

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

> Non-hazardous waste includes not only coal ash and gypsum from desulfurization, but also fuel-oil bottom ash, orimulsion ash (since 2002 only bottom ash) and other materials which are typical of the various activities: machinery & equipment and their parts; supports of power lines; conductors; cables; sludges from water treatment; materials removed by Enel from the trashracks of hydro plant intake structures; the part of alluvial sediments that are removed from hydro basins upon desilting and that are not reused locally; etc. This waste also includes materials of a general or exceptional nature (packaging materials, clothing, debris from construction and demolition, etc.).

> Hazardous waste comprises fuel-oil flyash, materials which are typical of the various activities (namely, 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.).

The waste data shown are those yearly reported 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 waste.
"Waste production" refers to the amounts of waste recorded as "incoming waste" in the books of incoming and outgoing waste.
"Waste delivered to recovery operators" refers to the amounts of waste which is delivered to authorized operators of waste recovery plants (possibly, the Enel Group itself).

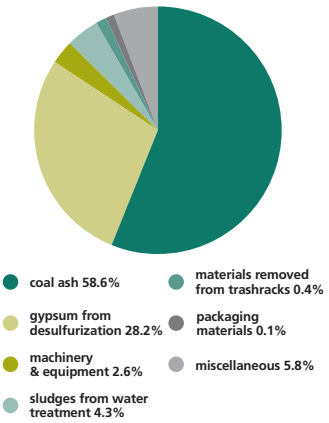
The following trends emerge from the data:

> the production of ash is obviously correlated with fuel consumption and characteristics, but it reflects fluctuations that depend on: the frequency of ash removal from flue gas ducts and from the hoppers of boilers and of particulate collectors; the possible addition of water to the ash to prevent the formation of dust during its temporary storage on the plant site; the combustion of flyash in the upper part of boiler furnaces in the case of dual oil-gas firing, etc.;

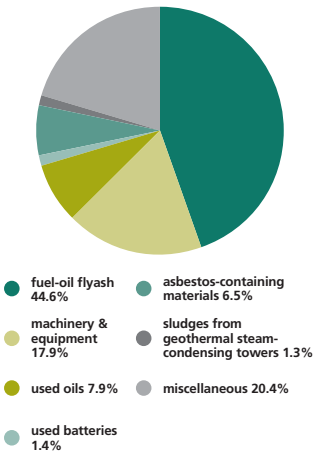
> the production of gypsum from desulfurization reflects limestone consumption;

> the production of "other waste", non-hazardous and hazardous, generally depends on contingent circumstances (e.g. demolition work).

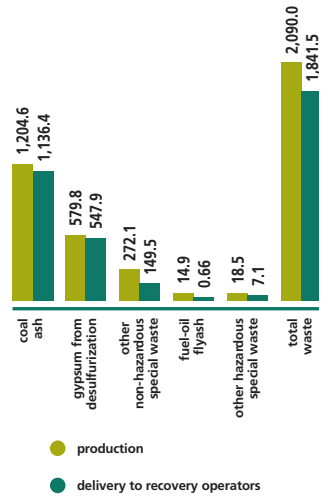
NON-HAZARDOUS SPECIAL WASTE IN 2002
Total production: 2,056,582 t



HAZARDOUS SPECIAL WASTE IN 2002
Total production: 33,443 t



MAIN CATEGORIES OF WASTE IN 2002 (thousand t)



Eco-Balance

Emissions

	Source		1998	1999	2000	2001	2002
Emissions into the atmosphere							
SO_2	fossil-fired thermal generation	thousand t	489	404	354	284	196
NO_X	fossil-fired thermal generation	thousand t	178	144	129	101	75
Particulates	fossil-fired thermal generation	thousand t	19	16	14	10	6
H_2S	geothermal generation	thousand t	24	25	28	25	21
CO_2	*fossil-fired thermal generation (from combustion)*	*million t*	*100*	*95*	*98*	*84*	*75*
	fossil-fired thermal generation (from desulfurization)	*million t*	*0.078*	*0.147*	*0.143*	*0.133*	*0.144*
	total from fossil-fired thermal generation	million t	100	95	98	84	75
	geothermal drilling gas distribution, telecommunications	thousand t	n.a.	n.a.	n.a.	n.a.	19
	Total	**million t**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**75**
SF_6	electricity generation, transmission & distribution	kg	n.a.	3,447	4,906	4,398	4,652
		thousand t CO_2-equivalent	n.a.	82	117	105	111
CH_4	gas distribution	thousand t	-	-	n.a.	n.a.	6
		thousand t CO_2-equivalent	-	-	n.a.	n.a.	120
Total greenhouse gases		million t CO_2-equivalent	n.a.	n.a.	n.a.	n.a.	76
Avoided CO_2 emissions							
Hydro generation from natural flows		thousand t	20,121	21,809	20,917	19,191	14,684
Geothermal generation		thousand t	2,796	2,873	3,056	2,999	3,154
Generation from wind & solar		thousand t	15	17	17	20	38
Generation from biogas		thousand t	-	-	-	18	-
Total		thousand t	22,932	24,700	23,989	22,228	17,876
Waste waters (discharged into water bodies)	thermal generation	million m^3	22.0	23.0	22.3	20.2	16.4

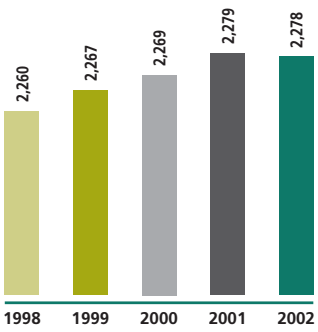
Emissions

	Source		1998	1999	2000	2001	2002
Non-hazardous special waste							
Coal bottom ash	thermal generation						
production		t	41,144	50,542	34,738	63,761	58,311
delivery to recovery operators		t	37,733	50,097	34,265	63,735	58,336
Coal flyash	thermal generation						
production		t	842,701	839,411	952,367	1,056,605	1,146,320
delivery to recovery operators		t	909,582	891,744	958,411	981,465	1,078,017
Gypsum from	thermal generation						
desulfurization production		t	275,651	509,294	562,220	470,240	579,777
delivery to recovery operators		t	240,820	502,325	574,151	428,666	547,872
Other							
production	electricity generation & geothermal drilling	t	164,251	116,473	135,950	168,867	219,723
	electricity transmission & distribution	t	86,694	96,537	87,842	61,598	52,218
	gas distribution & telecommunications		n.a.	n.a.	n.a.	n.a.	233
	Total	**t**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**272,110**
delivery to recovery operators	electricity generation & geothermal drilling	t	50,077	74,706	81,222	116,938	99,950
	electricity transmission & distribution	t	70,676	86,016	83,074	57,145	49,422
	gas distribution & telecommunications		n.a.	n.a.	n.a.	n.a.	116
	Total	**t**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**149,488**
Hazardous special waste							
Oil flyash	thermal generation						
production		t	55,205	40,520	27,588	14,532	14,911
delivery to recovery operators		t	15,440	16,172	4,393	2,639	656
Other							
production	electricity generation & geothermal drilling	t	6,186	6,995	6,882	6,298	10,126
	electricity transmission & distribution	t	9,432	6,222	4,472	6,864	8,373
	gas distribution & telecommunications	t	n.a.	n.a.	n.a.	n.a.	32
	Total	**t**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**18,532**
delivery to recovery operators	electricity generation & geothermal drilling	t	2,508	2,869	1,699	1,408	1,414
	electricity transmission & distribution	t	5,742	5,086	2,807	4,417	5,730
	gas distribution & telecommunications	t	n.a.	n.a.	n.a.	n.a.	0
	Total	**t**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**7,144**

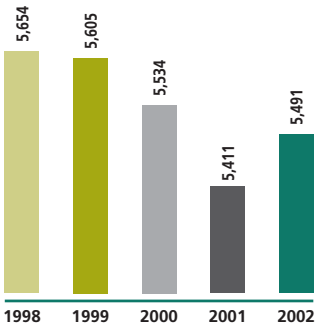
n.a.: not available

Indicators

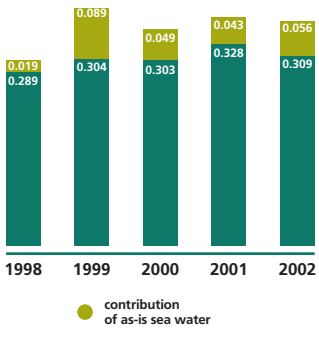
NET HEAT RATE OF FOSSIL-FIRED THERMAL GENERATION (kcal/kWh)



NET HEAT RATE OF GEOTHERMAL GENERATION (kcal/kWh)



SPECIFIC REQUIREMENTS OF WATER FOR INDUSTRIAL USES IN THERMAL GENERATION (liters/kWh)



Indicators (ratios between homogeneous or heterogeneous quantities) are used to analyze Enel's environmental performance over time, regardless of the volume of activities in each year.

The following paragraphs describe the characteristics of the indicators presented in the tables and provide comments, if any, on their trends.

Conservation and quality of resources

> The net heat rate of fossil-fired thermal generation defines the average quantity of fossil fuels which are consumed by thermal power plants to generate one kWh net.

> Its trend results from the opposite effects of growing consumption of electricity by the power plant auxiliary services (in turn due to the dissemination of emission abatement systems) and of the entry into operation of new high-efficiency combined-cycle plants.

> The net heat rate of geothermal generation defines the average quantity of geothermal steam which is used by geothermal power plants to produce one kWh net. Except for its increase in 2001 (due to the shutdown of some old plants for renovation works), the declining trend of this indicator shows an increasingly efficient utilization of the geothermal resource.

> The net efficiency of hydro generation from pumped storage expresses, in percentages, the ratio of the electricity produced by pumped-storage hydro power plants to the electricity consumed for pumping.

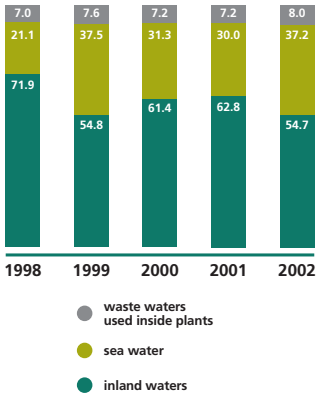
> The natural gas consumption for operation of the grid and the losses of natural gas from the grid are expressed as percentages of the total gas distributed.

> The net specific requirements of water for industrial uses in thermal generation express the amount of water consumed per kWh net of thermal generation.

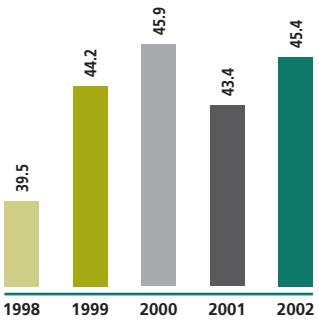
> Their increase over the entire period is due to the operation of desulfurizers and is affected by the previously mentioned discontinuity in the 1999 water requirements for industrial uses. However, this increase is minimum, if the contribution of as-is sea water (main source for coverage of the water requirements of desulfurizers) is excluded.

> The percentage contributions to coverage of the requirements of water for industrial uses (apart from the 1999 discontinuity) display a generalized decrease of inland waters (rivers, wells and aqueducts) and, by contrast, an increase in all other contributions.
> The fossil fuel consumption exhibits: i) the progressive decrease of all types of fuel oil; however, in 2002, this decrease was accompanied by a sharp increase in very low-sulfur (VLS) oil; ii) again, a slight decline in the consumption of natural gas; iii) the return of technologically captive and non-captive uses of gas to the typical values of the first three years of the period, also as a consequence of the sale of Eurogen; and iv) the steadily growing contribution of coal, thanks to its environmental sustainability (widespread use of advanced emission abatement technologies).
> The generation from renewables, expressed as a percentage of total electricity generation, is affected by the low hydro energy capability value in 2002, but shows the progressive growth of the contribution of geothermal, wind and solar sources.

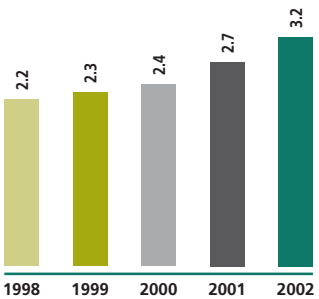
COVERAGE OF REQUIREMENTS OF WATER FOR INDUSTRIAL USES (%)



CONSUMPTION OF NATURAL GAS AND VLS FUEL OIL (% of total fuel consumption for fossil-fired thermal generation)

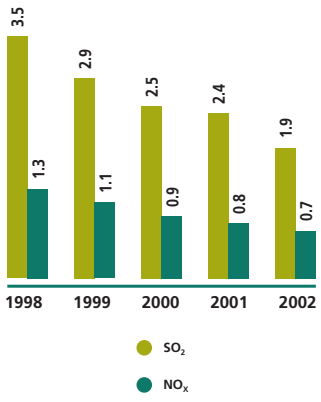


THERMAL GENERATION FROM BIOGAS, GEOTHERMAL, WIND & SOLAR (PHOTOVOLTAIC) SOURCES VS. TOTAL ELECTRICITY GENERATION (%)

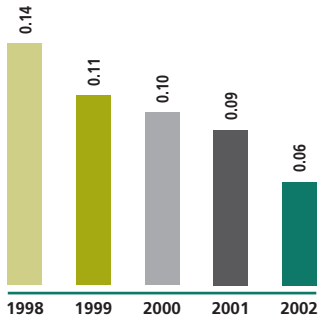


Indicators

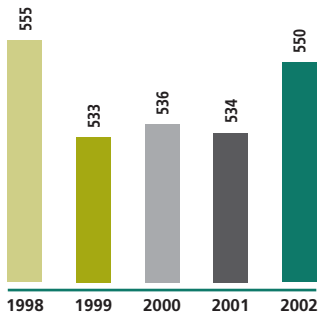
SPECIFIC SO_2 AND NO_x EMISSIONS FROM FOSSIL-FIRED THERMAL GENERATION (g/kWh net)



SPECIFIC PARTICULATE EMISSIONS FROM FOSSIL-FIRED THERMAL GENERATION (g/kWh net)



SPECIFIC CO_2 EMISSIONS FROM FOSSIL-FIRED THERMAL GENERATION WITH RESPECT TO OVERALL ELECTRICITY GENERATION (g/kWh net)



Specific emissions into the atmosphere

As far as electricity generation is concerned, they express the amounts of the typical substances (see the "Emissions" section of the eco-balance) that are released into the atmosphere per kWh net (thermal, geothermal or total).

Specific emissions represent:

> for SO_2, NO_X and particulates: the cumulative effect of the fossil fuel mix, of the efficiency of thermal power plants and of direct prevention and abatement measures;

> for CO_2: the cumulative effect of the fossil fuel mix and of the efficiency of thermal power plants (the contribution due to the operation of desulfurizers is definitely marginal);

> for H_2S: the cumulative effect of the composition of geothermal steam and of the efficiency of geothermal power plants.

The trends of specific emissions of SO_2, NO_X and particulates show progressive reductions, thanks to the combined effect of advanced combustion systems, flue gas emission abatement systems and use of high-grade fuels.

The recent installation of abatement systems also justifies the radical drop in specific emissions of H_2S in the past two years.

After their progressive decline in previous years, specific emissions of CO_2 increased in the past two years owing to a relatively higher percentage of coal among the fossil fuels used.

In line with a 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 overall mix of energy sources.

The lower share of generation from renewables with respect to overall electricity generation affects the 2002 value.

Relative SF_6 emissions, which concern all electric activities, express the ratio of the yearly emissions of SF_6 to the volume of SF_6 contained in in-service equipment, in the bottles used for replenishment and of SF_6 stocks.

Although the percentages of SF_6 over the years show fluctuations (due above all to the occasional character of replenishment jobs), they all lie below the typical value indicated in the 1996 IPPC Guidelines for national greenhouse gas inventories (1%).

Emissions due to gas distribution express the ratio of CH_4 emissions to the total gas wheeled.

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 flyash per kWh of the corresponding generation.

The use of better quality fuels (lower production of ash) and the generalized application of advanced particulate collection technologies (higher production of flyash) have opposite effects, but their combination induces a stable trend. These effects are accompanied by fluctuations that depend on contingent circumstances, as previously pointed out with reference to the waste production figures in absolute terms.

Waste recovery

For the main groups of waste, this indicator expresses the ratio of the quantities delivered to recovery operators to the quantities produced.

The trends infer that:

> full recovery of very high percentages of coal ash and gypsum remains a well-established practice;

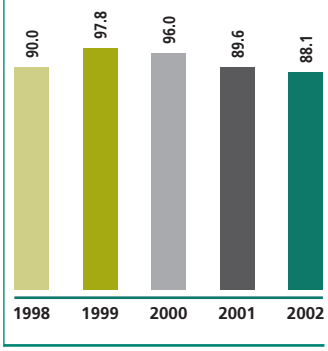
> recovery of fuel-oil ash in 2001 reflects a further drop in demand by the markets of recovered materials (heavy metals);

> recovery of "other" non-hazardous waste from electricity generation and geothermal drilling was penalized by the need for delivering to disposal facilities most of the waste produced by geothermal site rehabilitation works;

> recovery of "other" hazardous waste from electricity generation and geothermal drilling diminished further in the last period, owing to an above-average production of asbestos-containing waste, which could not be vitrified;

> recovery of "other" non-hazardous waste and hazardous waste from electricity transmission and distribution, which was already significant, increased further in the last year.

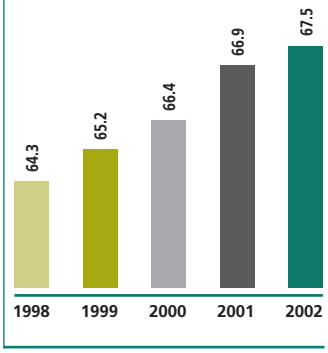
TOTAL WASTE RECOVERY (% of production)



Land

With regard to landscape and land conservation, note the progressive increase in the percentage of overhead and underground cables for low- and medium-voltage lines and, consequently, the decreasing percentage of bare conductors.

OVERHEAD AND UNDERGROUND CABLES IN LOW- AND MEDIUM-VOLTAGE LINES (% of entire LV and MV grid)



Indicators

Indicators

		1998	1999	2000	2001	2002	% ('02-'98)/'98	% ('02-'01)/'01
Resource conservation and quality								
Net heat rate of fossil-fired thermal generation	kcal/kWh	2,260	2,267	2,269	2,279	2,278	0.8	0.0
Net heat rate of geothermal generation	kcal/kWh	5,654	5,605	5,534	5,411	5,491	-2.9	1.5
Net efficiency of hydro generation from pumped storage	%	72.5	72.5	71.4	72.1	71.2	-1.8	-1.3
Consumption of natural gas for operation of the grid	% of natural gas distributed	-	-	n.a.	n.a.	0.06	-	n.a.
Losses of natural gas along the grid	% of natural gas distributed	-	-	n.a.	n.a.	0.35	-	n.a.
Net specific requirements of water for industrial uses in thermal generation								
including contribution of as-is sea water	liters/kWh	0.308	0.393	0.352	0.371	0.364	18.1	-1.9
excluding contribution of as-is sea water	liters/kWh	0.289	0.304	0.303	0.328	0.309	6.7	-6.1
Coverage of requirements of water for industrial uses								
from rivers	% of requirements	25.4	20.6	21.7	24.2	22.0	-13.2	-9.0
from wells	% of requirements	35.5	24.0	28.2	25.9	18.2	-48.6	-29.5
from aqueducts	% of requirements	11.0	10.2	11.5	12.7	14.5	31.4	13.6
from the sea (as-is)	% of requirements	6.2	22.7	13.8	11.6	15.3	146.9	32.1
from the sea (desalinated)	% of requirements	15.0	14.8	17.5	18.4	21.9	46.6	19.1
from waste waters (used inside plants)	% of requirements	7.0	7.6	7.2	7.2	8.0	15.0	11.8
Fossil fuel consumption								
fuel oil	% of total fuel consumption	59.3	48.5	41.6	38.9	34.1	-42.6	-12.4
orimulsion	% of total fuel consumption	1.4	3.6	5.1	3.9	4.5	213.9	16.2
gas-oil	% of total fuel consumption	0.3	0.7	0.4	0.3	0.2	-15.8	-15.0
natural gas	% of total fuel consumption	23.2	30.7	34.6	33.1	31.7	37.0	-4.2
coal	% of total fuel consumption	15.8	16.5	18.2	23.9	29.5	86.9	23.5
brown coal	% of total fuel consumption	0.06	0.03	0.01	0.00	0.00	-100.0	-
coke-oven gas	% of total fuel consumption	0.003	0.000	0.000	0.000	0.000	-100.0	-
HS fuel oil	% of total fuel-oil consumption	4.5	7.5	1.2	2.0	0.1	-98.5	-96.7
MS fuel oil	% of total fuel-oil consumption	40.7	41.7	41.6	41.1	30.0	-26.2	-26.9
LS fuel oil	% of total fuel-oil consumption	27.2	22.9	30.1	30.4	29.7	9.0	-2.4
VLS fuel oil	% of total fuel-oil consumption	27.6	27.9	27.1	26.5	40.2	45.6	51.8
natural gas, non-technologically captive use	% of total natural gas consumption	72.4	70.5	72.1	62.5	72.9	0.7	16.6
natural gas, technologically captive use	% of total natural gas consumption	27.6	29.5	27.9	37.5	27.1	-2.0	-27.8
Geothermal steam for electricity generation	% of total geothermal fluid extracted	n.a.	n.a.	n.a.	n.a.	99.5	n.a.	n.a.
Electricity generation from renewables								
thermal from biogas	% of total generation	-	-	-	0.016	-	-	-
geothermal	% of total generation	2.2	2.3	2.4	2.7	3.2	44.9	18.3
hydro from natural flows	% of total generation	15.9	17.5	16.6	17.3	14.9	-6.2	-13.9
wind & solar (photovoltaic)	% of total generation	0.012	0.014	0.013	0.018	0.038	228.9	110.4
Total	**% of total generation**	**18.1**	**19.8**	**19.0**	**20.0**	**18.1**	**0.2**	**-9.5**

Indicators

		1998	1999	2000	2001	2002	% ('02-'98)/'98	% ('02-'01)/'01
Specific emissions into the atmosphere								
SO_2 (fossil-fired thermal generation)	g/kWh thermal net	3.5	2.9	2.5	2.4	1.9	-46.1	-22.0
NO_X (fossil-fired thermal generation)	g/kWh thermal net	1.3	1.1	0.9	0.8	0.7	-42.9	-15.1
Particulates (fossil-fired thermal generation)	g/kWh thermal net	0.14	0.11	0.10	0.09	0.06	-57.5	-32.4
H_2S (geothermal generation)	g/kWh geothermal net	6.0	6.1	6.4	5.9	4.8	-19.6	-18.6
CO_2 (fossil-fired thermal generation)	g/kWh thermal net	706	696	692	707	720	1.9	1.8
	g/kWh thermal net	555	533	536	534	550	-1.0	2.9
SF_6	% of SF_6 in stock or in equipment	n.a.	0.6	0.9	0.8	0.8	n.a.	1.0
CH_4 (gas distribution)	g/m³ of natural gas wheeled	n.a.	n.a.	n.a.	n.a.	1.8	n.a.	n.a.
Net specific production of waste								
Coal ash	g/kWh net from coal	42	41	42	43	43	2.2	-0.7
Fuel-oil flyash	g/kWh net from fuel oil & gas-oil	0.65	0.60	0.47	0.31	0.42	-35.2	34.8
Waste recovery								
Coal ash	% of production	107	106	101	93	94	-12.0	1.1
bottom ash	% of production	92	99	99	100	100	9.1	0.1
flyash	% of production	108	106	101	93	94	-12.9	1.2
Gypsum from desulfurization	% of production	87	99	102	91	94	8.2	3.7
Other non-hazardous special waste								
electricity generation & geothermal drilling	% of production	30	64	60	69	46	49.2	-34.3
electricity transmission & distribution	% of production	82	89	95	93	95	16.1	2.0
gas distribution & telecommunications	% of production	n.a.	n.a.	n.a.	n.a.	50	n.a.	n.a.
Total	**% of production**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**55**	**n.a.**	**n.a.**
Fuel-oil flyash	% of production	28	40	16	18	4	-84.3	-75.8
Other hazardous special waste								
electricity generation & geothermal drilling	% of production	41	41	25	22	14	-65.6	-37.5
electricity transmission & distribution	% of production	61	82	63	64	68	12.4	6.4
gas distribution & telecommunications	% of production	n.a.	n.a.	n.a.	n.a.	0	n.a.	n.a.
Total	**% of production**	**n.a.**	**n.a.**	**n.a.**	**n.a.**	**39**	**n.a.**	**n.a.**
Land								
LV cable lines								
overhead cable (insulated)	% of entire LV grid	50.1	50.4	50.7	51.5	52.1	4.0	1.2
underground cable	% of entire LV grid	28.5	29.2	29.8	29.7	29.6	3.9	-0.1
Total	**% of entire LV grid**	**78.6**	**79.6**	**80.5**	**81.2**	**81.7**	**3.9**	**0.7**
MV cable lines								
overhead cable (insulated)	% of entire MV grid	0.45	0.68	1.12	1.54	1.88	315.8	21.9
underground cable	% of entire MV grid	33.1	33.8	34.8	34.8	35.2	6.5	1.2
Total	**% of entire MV grid**	**33.5**	**34.5**	**35.9**	**36.4**	**37.1**	**10.6**	**2.0**
Double-circuit 380-kV lines	% of total 380 kV lines	8.4	8.7	8.7	8.6	9.2	9.8	7.3

n.a.: not available

Occupational Health & Safety

Protection of workers' health and improvement of workplace safety & security

As set forth in its Code of Ethics, "Enel undertakes to spread and reinforce a culture of safety, developing an awareness of risks while promoting responsible forms of behavior on the part of all staff members".
Therefore, in 2002, occupational health & safety continued to be an integral part of Enel's culture and industrial policy and their implementation actively involved all workers, as well as their representatives.
This commitment translates into actions on various fronts:
> awareness, education & training of employees;
> regulations for prevention of electric risks;
> application of occupational health & safety systems conforming to OHSAS 18001 international standards.

Organization

The occupational health & safety organization of the Group is described in a document (issued in 1997 and updated in 2000), which is used as a reference by all the units in charge of health & safety.
For each Division or Company, the document identifies the "Production Unit" and the persons in charge of it (employer, manager, controller).
For each Production Unit, Enel also created the Occupational Health & Safety Service, appointing its Manager and the Physicians in charge of health surveillance.

Awareness, training & education

In 2002, Enel delivered about 325,000 hours of awareness, training & education courses on health & safety in workplaces. These are, in practice, continuing education courses which are intended for electrical equipment workers and are based on the correct performance of working procedures and methods which mitigate the risk of accidents.
Enel also continued its training of personnel for the positions referred to in Legislative Decrees no. 626/94 (prevention and protection manager, emergency staff, workers' safety representative) and no. 494/96 on the safety of temporary and mobile construction sites (design coordinator, site management coordinator).
In 2002, the hours of specific training diminished as a result of decreasing actions of electric risk awareness actions for the personnel involved in distribution activities and of Terna. These actions were particularly intensive in 2001, when the new internal regulations for electric risk prevention were adopted.

Expenditure

Also for 2002, the most significant items of current expenditure fall under the following macro-categories:

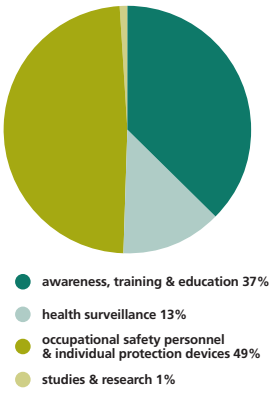
> awareness, training & education;
> health surveillance (appointment of the physician in charge, creation of health facilities, periodical medical examinations, etc.);
> personnel dedicated to occupational safety and related individual protection systems;
> specialist studies and research (participation in national and international projects on occupational health & safety, epidemiological studies, analysis of the trend of injuries).

The above categories of expenditure amounted to 24 million euro.

The "awareness, training & education" category also embodies the activities that are listed in Legislative Decrees no. 626/94 and no. 494/96, i.e. training of workers' safety representatives, prevention and protection manager, emergency staff, design and site management coordinators.

Investments are not reported due to the difficulty of recording them in the accounting system separately from overall investments.

MAIN ITEMS OF CURRENT EXPENDITURE



Initiatives

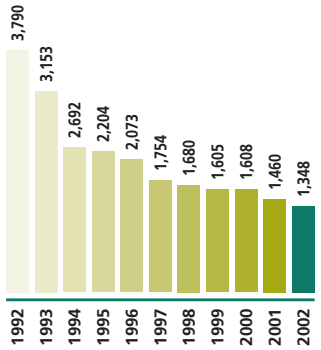
In 2002, Enel continued its efforts for identifying and assessing risks and putting in place prevention and protection measures.

In particular:

> Corporate Rules on Prevention of Electric Risks, intended for the personnel involved in distribution and generation and of Terna, were revised to conform to the CEI EN 50110-1 standard;
> an inter-company Task Force, coordinated by Enel's Corporate Safety Unit, was set up; the Task Force has the mission of defining homogeneous behaviors and procedures for works to be carried out at the boundaries of power installations operated by different operators; the work of the Task Force resulted into a memorandum of understanding which was signed on October 1, 2002 by Enel's Companies involved; the memorandum is a useful reference document also for third parties carrying out similar works on the national power system;
> the asbestos survey continued; this two-part (industrial hygiene and health) survey is intended to identify possible diseases due to asbestos exposure among workers who, prior to 1990, have been engaged in maintenance (especially of thermal power plants) for at least 6 months; over 4,000 workers voluntarily participated in the survey;
> an epidemiological survey was initiated among workers (about 2,000) involved in thermal and hydro plant maintenance, with a view to identifying possible diseases related to noise exposure;
> a multi-year program for reduction of occupational injuries was initiated; the program ("New Actions for Occupational Safety") has the purpose of developing cooperation between the persons in charge of the Occupational Safety & Health Service and workers' safety representatives, so as to raise the awareness of the need for injury prevention measures among field personnel members.

Occupational Health & Safety

NUMBER OF INJURIES INVOLVING AT LEAST ONE DAY OF ABSENCE FROM WORK



Injuries

In 2002, the number of injuries confirmed the downward trend recorded in previous years. The injuries which involved at least one day of absence from work dropped to 1,348 from 1,460 in 2001.

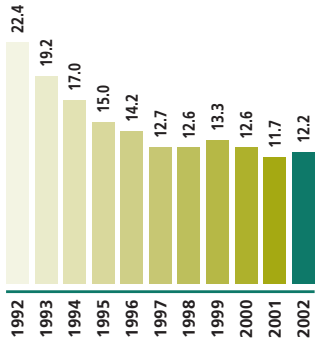
Always in 2002, serious injuries (involving more than 30 days of absence from work) were 16 vs. 22 in 2001.

This good performance is counterbalanced by a slight increase in the frequency of injuries (total number of injuries per million hours of work, with reference to the Group's consolidated companies). This shift in the trend might be interpreted as the achievement of a level which can hardly be exceeded in the future.

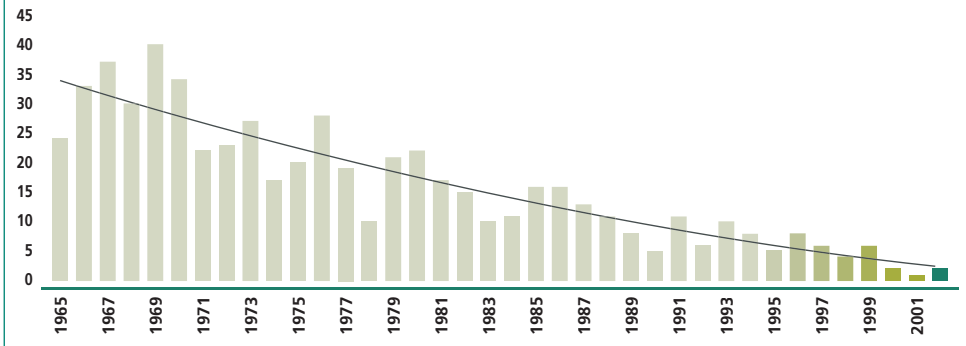
Enel is committed to reducing all occupational injuries, giving priority to fatal and serious ones, which have major socio-economic consequences.

Fatal injuries hit an all-time low in 2001 (1 due a road accident), but unfortunately rose to 2 in 2002 (1 due to work on electrical components and 1 due to a road accident).

NUMBER OF INJURIES PER MILLION HOURS OF WORK



FATAL INJURIES (no.)



Certification Report

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Verification of Enel SpA's 2002 Environmental Report

Enel SpA asked The IT Group Infrastructure & Environmental Italia Srl to verify its Environmental Report for 2002. The following statement provides the reader with the results of such verification.

Our approach to the verification activity was largely based on the guidelines issued by the "*Forum on certification of environmental reports*", which was held at Fondazione Eni Enrico Mattei.

We reviewed the Report, as well as the activities and procedures for collection and aggregation of the reported data, in order to determine whether:

- the Report was complete and included all the aspects and significant impacts of Enel Group's activities;
- the Report was understandable and clear;
- the system used for data collection and aggregation was adequate and reliable;
- appropriate evidence was available that the individual companies of the Group had gathered and reported the data in homogeneous and correct ways.

Our verification covered all the parts and contents of the Report, as well as the modes of collection and aggregation of the data, from their provision by single companies of the Group - and their peripheral sites - to final data presentation in the Report.

We sample-checked the reported data by conducting audits at:

A – Generation and Energy Management
Thermal Generation Business Area
- BRINDISI thermal Business Unit (thermal plant of Brindisi Sud);
- FUSINA thermal Business Unit (thermal plants of Fusina and Porto Marghera);
- LA SPEZIA thermal Business Unit (thermal plants of La Spezia and Genova);
- PORTO TOLLE thermal Business Unit (thermal plants of Porto Tolle and Porto Corsini);
- TERMINI IMERESE thermal Business Unit (thermal plant of Termini Imerese);
- LA CASELLA thermal Business Unit (thermal plant of Trino Vercellese).

Renewables Business Area
- CUNEO Business Unit (hydro)
- MONTORIO AL VOMANO Business Unit (hydro)
- NAPOLI Business Unit (hydro)
- PARMA Regional Unit (alternative sources)
- LUCCA Regional Unit (alternative sources)

B – Infrastructure and Networks Division
Power Grid Business Area
- TRIVENETO Grid Regional Unit

Gas Grid Business Area
- Headquarters (Milan offices)

C – Telecommunications Division (Wind SpA)
- Headquarters (Rome offices)

D – Terna SpA
- PALERMO Transmission Field Unit

At the central-level unit which is responsible for the preparation of the Report, we carried out general verifications on data management, by sample-checking the data coming from the various Divisions and Companies and assessing the reliability of the data collection system. We also sample-checked the reliability and consistency of the data.
At the peripheral sites of the various Divisions and Companies, we conducted our audits in accordance with ASTM (E 1527 – 97) standards, involving document analyses, interviews with the personnel in charge of the various activities of interest and gathering of visual evidence.

The data were gathered in a uniform way throughout the Group according to a standard format for presentation of the data in the Report.
This data collection system enabled Enel to review and compare the data of the individual Divisions and Companies, assessing their consistency and consolidating their Health, Safety and Environment aspects.

The system of data collection and management - still based in part on manual data entry - proved to be reliable and accurate in consolidating the data of the different Divisions and Companies, enabling us to check their consistency and facilitating our work.
The set of data collection, management and processing activities that are in place represent a sound Information System of the Group for accounting Health, Safety and Environment data and making the related outputs reliable and verifiable.

However, for the future, we recommend:

1. to complete the program for adoption of certified Environmental Management Systems by all the operating sites of the Group; indeed, these systems are largely demonstrated to facilitate the day-to-day management of environmental issues, making the implementation of the Group's policies more effective;
2. to extend the environmental data and performance management information system to all the levels of the Group; the collection of data by the individual companies or divisions should be continuous and systematic and rely on the use of a comprehensive information system affording:
    a. communication between Enel's central system and the individual Divisions' and Companies' systems;
    b. continuous monitoring of HSE performance.

This is important not only to accelerate the preparation of the Report, but above all to place environmental issues on the same level as the other issues that are constantly monitored by the management of the companies.

The format of the Report is clear and reader-friendly and we can state that it is gradually becoming aligned with the most advanced and innovative international standards in this area.

The Report is complete, clear and understandable. The performance indicators and the data are correctly reported.
In our opinion, Enel SpA's 2002 Environmental Report is complete, understandable and reliable.

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