

# *Environmental Report 2006*



 **Enel**  
ENERGY IN TUNE WITH YOU.

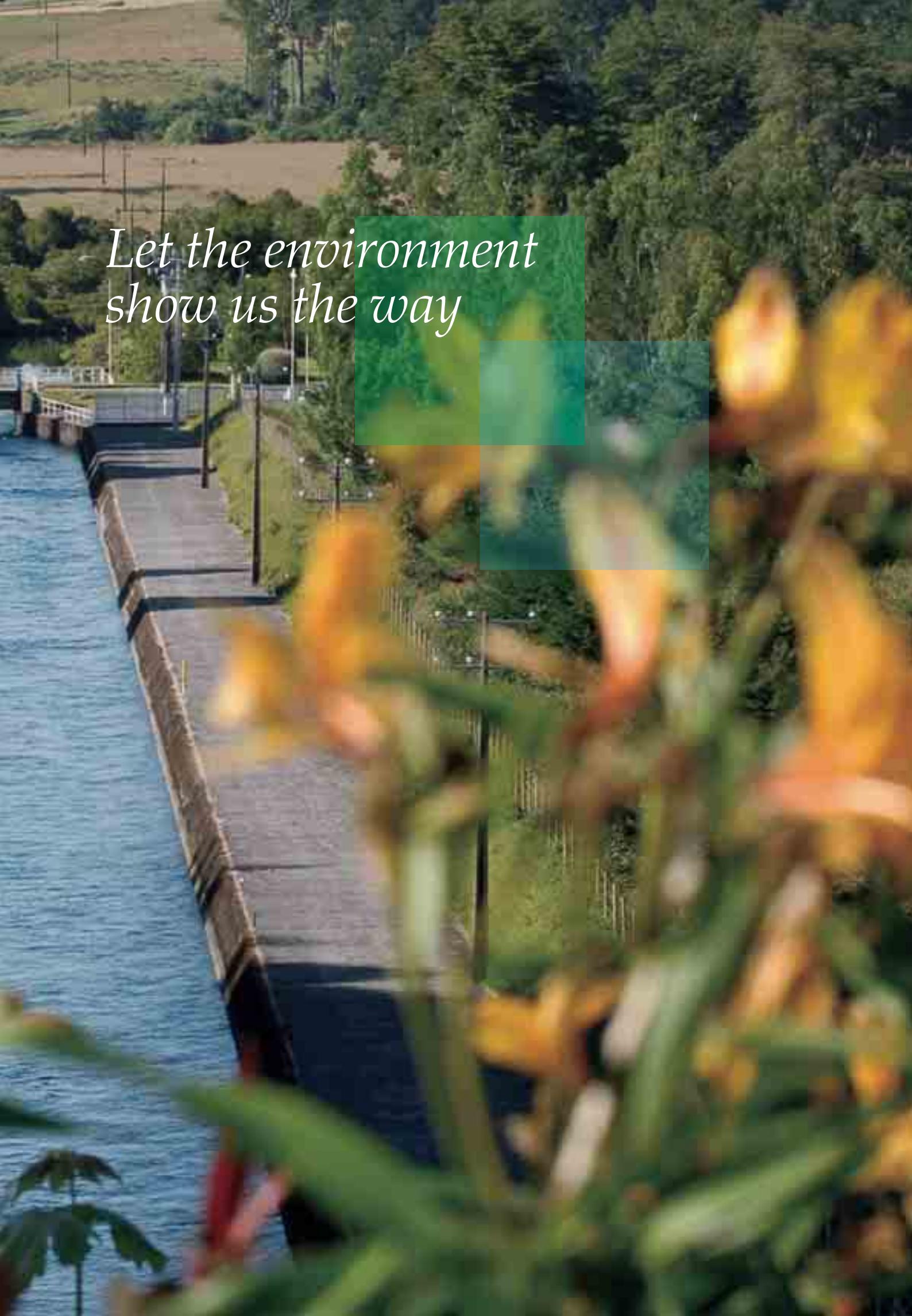


**Environmental Report**

**2006**



Chile, Pilmiquén  
hydroelectric plant



*Let the environment  
show us the way*



*Quality, competitiveness  
and innovation:  
our commitment  
to 34 million customers*

Italy, Rome  
generation plant control room







Guatemala, Matanzas

*We speak energy in 18 languages*





*Our best resources  
go into research  
and environmentally  
friendly technologies*

Costa Rica, Tierras Morenas - Tilarán  
wind farm



The Environmental Report 2006 covers the industrial aspects of electricity generation and electricity & natural gas distribution activities that Enel carries out in and outside Italy (Bulgaria, Romania, Slovakia, Spain, Americas) with companies included (on a line-by-line basis or proportionally) in its scope of consolidation.

The status data reflect the situation of the companies as of December 31, 2006 or of each of the reported years.

With regard to the flow data, the same companies are considered in their configuration as of December 31, 2006 or of each of the reported years and with reference to the entire year, including acquisitions, if any, made in the course of the year.

All the reported data are equal to 100%, whatever the extent of the holdings of Enel in the companies and the method used for including them in its scope of consolidation.

The Report opens with the 2006 energy and environmental highlights of the overall Group and with the organizational and operational framework of its environmental activities.

After describing Enel's position on climate change, the Report reviews the environmental performance of Enel's Italian and non-Italian operations, passing from general information to detailed data.

A special section is devoted to initiatives and results in the area of occupational health & safety.

The verifier's statement closes the publication.

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## *Being an environmental leader*



Technological and environmental leadership is one of Enel's strategic targets. In our vision of the future, we will be able to produce the necessary amount of energy at reasonable costs and zero emissions. We want to be part of this future.

This is not a new commitment for Enel. I will just recall our program to convert power plants from oil- to combined-cycle natural gas-firing, a technology where we stand as a national leader, with about 5,000 MW.

This program, together with investments in renewables, has enabled us to cut our CO<sub>2</sub> emissions by over 15 million tonnes in the past six years, in countertrend to Italian total emissions.

Our Environmental Report epitomizes our care for the environment. For eleven years, it has been a key vehicle for monitoring and communicating our environmental performance, as well as for reviewing and fine-tuning our environmental strategy. Enel has now become a multinational in the energy sector: with the growth of our international presence, the Report has also been instrumental in extending the application of our environmental policies to all of our activities outside Italy.

This year's results, just as last year's, confirm that our efforts in pursuing major targets have been successful.

We lowered our specific CO<sub>2</sub> emissions to 496 g/kWh, further improving on our 2005 value of 501 g/kWh. This value had already allowed us, one year in advance, to reach and go below the target of 510 g/kWh, a voluntary commitment that we had taken with the Environment and Industry Ministers as early as in 2000.

We have thus moved much ahead of the schedule indicated in the Kyoto Protocol-derived legislation, spearheading the struggle against climate change.

Through our global presence, we are well placed to make a viable contribution to protection of the Planet and of new generations. We rank among the world leaders in renewables, with about 30 billion kWh generated every year, i.e.

roughly 23% of our overall output. In 2006, our generation from renewables and nuclear energy (a sector that we re-entered through the acquisition of Slovenské elektrárne) displaced approximately 30 million tonnes of CO<sub>2</sub> emissions.

Our international presence will make it possible to transfer the best technologies and innovative solutions for power generation and distribution to developing countries.

But Enel's commitment is not confined to reducing CO<sub>2</sub> emissions. The programs of environmental enhancement that we initiated in the 1990s and that we have been supporting with substantial investments have yielded significant results in terms of reduction of pollutant emissions into the atmosphere: from 2000 to 2006, we curbed specific emissions of sulfur oxides, nitrogen oxides and particulates by 63%, 36% and 70%, respectively.

We use leading-edge technologies and the most efficient production processes, thereby optimizing the use of primary energy sources, materials and precious resources, such as water. Over the years, our recovery of special waste has attained levels of excellence: in Italy, we recover about 90% of our waste.

The emphasis that we place on the environment is also testified by the widespread use of environmental management systems. With regard to Italian and non-Italian operations, 97% of the power grids and 75% of the generating capacity are ISO 14001-certified.

Lately, we have vigorously renewed our commitment to the environment, by launching a large investment plan that we called "Environment & Innovation Project": over 4 billion euro in five years for research, renewables, development and application of the most advanced technologies. The plan, which is unprecedented at Enel and almost unequalled in the world, will add to our day-to-day attention to efficiency and continuous improvement.

Our goal is zero-emission power generation. The Project doubles our financial efforts for developing generation from renewables (from 1.6 billion in the 2001-2005 period to 3.3 billion in 2007-2011).

We will invest another 800 million euro in the study of innovative renewable-energy concepts, in projects of research on CO<sub>2</sub> capture and storage and on the hydrogen frontier and in encouraging and incentivizing energy savings, i.e. the foremost and simplest way of conserving our environment. In this particular field, we plan to further improve on the excellent results that we have achieved so far.

We also take part in the Combat Climate Change initiative, through which the most important international energy companies are engaged in a common effort to combat climate change, a contribution going beyond the Kyoto Protocol horizon.

Environmental sustainability continues to be a key focus of our activities. As a global energy player, we have to work to the best of our ability to deliver a better world to future generations and disseminate environmental awareness, so as to respond to the challenge of not changing the world: that's the real revolution.

The Chief Executive Officer

*Fulvio Conti*

A handwritten signature in blue ink, appearing to read "Fulvio Conti".

# Enel in the world

## Highlights of 2006

### ELECTRICITY GENERATION (simple and combined heat & power generation)

Installations	
Power plants (no.)	808
Net maximum electrical capacity (million kWh)	49.8
<i>&gt; thermal</i>	29.3
<i>&gt; nuclear</i>	1.6
<i>&gt; hydro</i>	17.3
<i>&gt; geothermal</i>	0.7
<i>&gt; wind and solar (photovoltaic)</i>	1.0
With certified environmental management systems (% of overall capacity)	75
Net electricity generation (billion kWh)	133.3
From fossil fuels	85.3
<i>&gt; fuel oil &amp; gas-oil</i>	15.6
<i>&gt; natural gas</i>	32.7
<i>&gt; coal</i>	29.9
<i>&gt; brown coal</i>	7.2
From waste (non-biodegradable fraction)	0.025
Nuclear	10.9
From renewables	30.1
<i>as above, % of overall electricity generation</i>	22.6
<i>&gt; hydro (from natural flows)</i>	22.7
<i>&gt; geothermal</i>	5.2
<i>&gt; wind and solar (photovoltaic)</i>	2.0
<i>&gt; biomass</i>	0.2
Hydro from pumped storage	7.0
Heat generation combined with thermal and nuclear power generation (billion kWh <sub>eq</sub> )	1.5
Carbon dioxide emissions from simple thermal power generation and combined heat & thermal power generation (million t)	65
Specific carbon dioxide emissions from simple thermal power generation calculated with respect to simple net thermal power generation (g/kWh)	743
Specific carbon dioxide emissions from simple thermal power generation and from combined heat & power generation calculated with respect to overall net electricity and heat generation (g/kWh <sub>eq</sub> )	484
Saved fossil fuels <sup>(1)</sup> (million t of oil-equivalent)	9
<i>&gt; electricity generation from renewables</i>	7
<i>&gt; nuclear generation</i>	2
Avoided carbon dioxide emissions <sup>(2)</sup> (million t)	30
<i>&gt; electricity generation from renewables</i>	22
<i>&gt; nuclear generation</i>	8

(1) Product between the electricity generation obtained from the sources considered and the average heat rate of Enel's overall fossil-fired thermal generation.

(2) Product between the electricity generation obtained from the sources considered and the average specific CO<sub>2</sub> emissions from Enel's overall fossil-fired thermal generation.

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#### ELECTRICITY DISTRIBUTION

##### Lines

Overall length (thousand km)	1,179.3
> <i>high voltage</i>	25.0
> <i>medium voltage</i>	369.6
> <i>low voltage</i>	784.7
With certified environmental management systems (% of overall length)	97
Overhead and/or underground cables in low- and medium-voltage lines	
(% of overall length of low- and medium-voltage lines)	68
Electricity distributed (billion kWh)	269.1

#### NATURAL GAS DISTRIBUTION

##### Pipelines

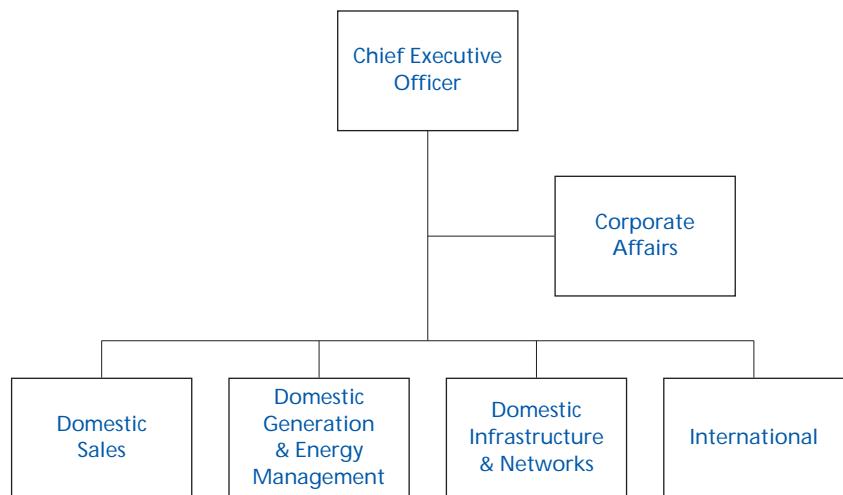
Overall length (thousand km)	30.6
> <i>high pressure</i>	0.2
> <i>medium pressure</i>	11.6
> <i>low pressure</i>	18.8
Natural gas distributed (billion m <sup>3</sup> )	3.7

## *Enel SpA*

Enel's present organizational structure, which was adopted in November 2005, consists of the following Divisions: Domestic Sales, Domestic Generation & Energy Management, Domestic Infrastructure & Networks and International.

In particular, the International Division was created with the mission of increasing Enel's penetration and activities in electricity & gas markets outside Italy and of formulating Enel's strategy for a balanced development of its production capacity in foreign regional markets.

In the current organization, guidance, coordination, monitoring and support activities are centralized in the parent company (the so-called "Corporate"), whose mission is to leverage the synergies of the Group and optimize the management of activities that sustain its core business.



# *Environmental policy*

Enel's care for the environment and landscape is a well-established reality. Mitigation of emissions, efficient use of resources, sustainable operation of installations and their integration into the landscape are priorities for Enel. Environmental protection has thus become a strategic asset, which adds value to Enel's industrial policies and which has high social relevance. Good environmental performance over the years led Enel to reiterate its environmental policy and underlying principles also in 2006 and to propose the achievement of the related targets with renewed impetus.

## **Principles**

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

## **Strategic targets**

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

## Environmental organization

Enel's "Corporate" /Regulatory Affairs and Corporate Strategy/Environmental Policies unit has the mission of identifying Enel's strategic environmental targets and of ensuring their consistency with the Divisions' programs and initiatives.

In particular, the Environmental Policies unit:

- > formulates environmental policies and prepares the related guidelines;
- > identifies indicators, monitors and controls the progress of corporate initiatives in terms of environmental impact;
- > prepares Enel's environmental balance.
- > promotes, implements and coordinates programs and agreements with environmental institutions and agencies.

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

Enel's total human resources that are full- or part-time dedicated to environmental matters in Italy amount to about 200 equivalent full-time units. These human resources include support personnel at regional and divisional level which provides services to multiple units.

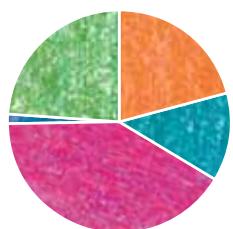
In the Domestic Generation & Energy Management Division, all the Business Units of the Renewables Business Area and the medium and large Business Units of the Thermal Generation Business Area include a Safety & Environment/Operation unit, which deals – among others – with site-specific environmental matters.

In the Domestic Infrastructure & Networks Division, the Quality, Safety & Environment unit is in charge of country-wide operational coordination of environmental activities concerning its own power and gas grids and the public lighting systems that it owns or operates.

Outside Italy, Slovenské elektrárne has an environmental team of 24 members at its headquarters. Significant environmental teams are also active in the other companies, especially for thermal power plants (Enel Viesgo Generación with 10 members and Enel Maritza East 3 with 4 members) and distribution grids (Enel Electrica Banat and Enel Electrica Dobrogea with a total of 8 members); moreover, each of Enel Latin America's hydro and wind power plants has one member of the personnel dedicated to the environment.

In 2006, the International Division set up the Operations & Integration function, which includes the Safety & Environment unit and is in charge of coordinating non-Italian operations.

**Personnel dedicated to environmental activities in Italy as of Dec. 31, 2006**  
Total: 194 equivalent full-time units



Thermal generation	<b>22.2%</b>
Hydro generation	<b>13.4%</b>
Electricity distribution	<b>43.7%</b>
Gas distribution	<b>0.9%</b>
Support activities	<b>19.8%</b>

## *Environmental governance*

In Enel's organizational model, the parent company is responsible, among others, for governing the cross-cutting processes and activities of the Group in such a way as to maximize their effectiveness and efficiency.

In this framework, environmental governance helps raise the social credibility of Enel and is a measure of the competitiveness and viability of its industrial choices vis-à-vis shareholders, customers and communities.

Enel's environmental governance is currently implemented via reporting, management systems, awareness, training & education schemes, through which such governance is also transferred to regional units in order to ensure consistent actions and behaviors. Effective environmental governance also means careful management of financial resources. Although Enel has not an environment-focused accounting system, its environmental expenditure is recorded with an increasing level of detail, in order to optimize investments of an environmental nature.

Moreover, the governance process is designed in such a way as to address the inevitable environmental criticalities that occasionally evolve into lawsuits.

### **Environmental reporting**

The reporting system is a key vehicle for constantly monitoring the interactions of Enel's industrial activities with the environment. The effectiveness of the system has been improved over the years with the introduction of techniques and procedures that ensure data management reliability.

The formats for collection of both process and governance data are continuously updated to take into account the evolution of Enel's organizational configuration, legislation, technologies, growing internationalization and experience feedbacks. In 2006, with the acquisition of the Slovak Slovenské elektrárne, the reporting system was integrated with formats for capturing data on nuclear power generation. Always in 2006, collection of governance data was extended to Enel's activities outside Italy. Experimental collection of environmental expenditure data concerning Enel's non-Italian operations (under the same criteria as those used for Italian operations) was also re-proposed. The intent is to make this activity operational within a short time, after an adequate period of familiarization.

In addition to formats for data collection, each business activity relies on tools which are provided by the Environmental Policies unit and which contain a wide

array of indicators (ratios between homogeneous or heterogeneous quantities). These tools make it possible to compare the data of different units, to monitor the performance of a single unit over time (regardless of variations in its volume of activity), to identify environmental performance deviations from average or target values and immediately check data reliability and consistency.

Data reporting is an integral part of Enel's environmental management system and its methodology ensures the utmost homogeneity of the collected data. The reporting system has become an instrument through which many of Enel's units periodically track their environmental performance vs. targets. Some years ago, within Enel's Domestic Infrastructure & Networks Division, Power Grid automated its environmental reporting system. On a quarterly basis, the system updates a software application, called "ambientesicurezza" (environment & safety) which runs on Enel's intranet (see next paragraph on "Awareness, training & education").

### **Environmental management systems**

In 2006, Enel further extended the adoption of international standards for certifying its environmental management systems.

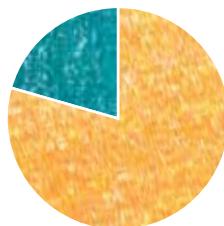
With regard to electricity generation in Italy, about 80% of Enel's installed capacity (385 out of 600 power plants) was certified under ISO 14001 as of December 31, 2006; 141 of these plants (about 45% of Enel's installed capacity) were also registered under EMAS (Eco-Management and Audit Scheme).

The Business Units which are both ISO 14001-certified and EMAS-registered are: i) in the Thermal Generation Business Area, those of Fusina, Genova, La Casella, La Spezia, Leri Cavour, Montalto di Castro, Porto Corsini, Sulcis and Torrevaldaliga Nord; ii) in the Renewables Business Area, those of Bologna, Bolzano, Sardegna and Trento. The hydro generation groups of Cuneo, Montorio and Vittorio Veneto, belonging to the homonymous Business Units, complete the list.

The sites/organizations which, for the time being, are only ISO 14001-certified are: i) in the Thermal Generation Business Area, the Business Units of Bastardo, Brindisi Sud, Pietrafitta, Porto Tolle and Priolo Gargallo; ii) in the Renewables Business Area, all the geothermal power plants; the Business Units of Domodossola, Napoli, Sondrio and Sicilia and the hydro generation groups of Cedegolo (Business Unit of Bergamo) and Feltre (Business Unit of Vittorio Veneto).

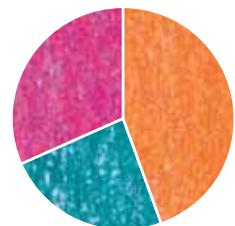
With regard to the Renewables Business Area, the only sites/organizations that still have to complete their ISO 14001 certification process (planned completion by 2008) are the hydro generation groups of Ascoli, Ceprano and Roma (Business Unit of Montorio), Bergamo (Business Unit of Bergamo) and Torino (Business Unit of Cuneo).

**ISO 14001 in power plants in Italy  
as of Dec. 31, 2006**  
(% of overall in-service capacity)



■ Certified **79.7%** (32,272 MW)  
■ Planned certification **20.3%**

**EMAS in power plants in Italy  
as of Dec. 31, 2006**  
(% of overall in-service capacity)



■ Registered **44.6%** (18,064 MW)  
■ Registration under way **23.8%**  
■ Planned registration **31.6%**

In 2006, the Domestic Infrastructure & Networks Division's Power Grid passed the verification for maintaining the ISO 14001 certification of its environmental management system, obtained in 2004.

The Environmental Management System of Power Grid is applied to the entire organization (headquarters, regional branches – with their high-voltage centers, control centers, medium/low-voltage centers and regional warehouses), as well as to high-, medium- and low-voltage installations.

The system continuously monitors & controls all the significant environmental aspects of planning, design, construction, operation and maintenance of power grids.

The "ambientesicurezza" software application (described in the following paragraph on "Awareness, training & education") is vital to the operation of the system.

Certified environmental management systems are also in place in many of Enel's non-Italian operations; those which are ISO 14001-certified are:

- > all the installations and headquarters of Slovenské elektrárne (Slovakia);
- > more than half of the wind power plants of Enel Unión Fenosa Renovables (Spain);
- > 27% of the installed capacity of Enel Latin America; and
- > the electricity distribution companies Enel Electrica Banat and Enel Electrica Dobrogea (Romania).

Further details are given in the section on "Environmental Results - Non-Italian operations".

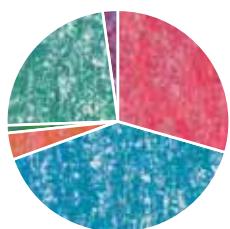
### Awareness, training & education

Environmental awareness, training & education initiatives have become core elements of the yearly plan for improving the skills and know-how of Enel's human resources.

In this Report, training & education activities are mentioned with reference to the recipient units, whatever the organizational entity that proposed or manages them. The reported data also concern support personnel, i.e. the personnel that renders services to multiple units, even if such units are involved in the same industrial business activity. Indeed, the environmental responsibilities of an intellectual nature that this personnel fulfills are assumed to provide support to industrial operations only.

#### Environmental training & education in Italy in 2006

Total: 17,679 man-hours



■ Thermal generation	<b>30.6%</b>
■ Hydro generation	<b>41.7%</b>
■ Geothermal generation	<b>2.8%</b>
■ Wind generation	<b>0.1%</b>
■ Electricity distribution	<b>23.8%</b>
■ Support activities	<b>1.0%</b>

In Italy, Enel developed education modules for its environment-dedicated personnel, delivering a total of approximately 18,000 man-hours of courses in 2006. The sharp decline in this figure vs. 2005 (over 43,600 man-hours) is largely due to the fact that, pending the revision of national environmental legislation, many of these activities have been deferred.

Outside Italy, environmental training & education efforts in 2006 were concentrated where certified environmental management systems are in place:

- > Enel Electrica Banat and Enel Electrica Dobrogea delivered a total of over 38,000 man-hours of courses;
- > Slovenské elektrárne organized environmental management courses for the top management and employees of its headquarters; it also extended its training & education activities (focused on maintaining the ISO 14001 certifications of its power plant environmental management systems) to the personnel of its contractors and suppliers;
- > Enel Unión Fenosa Renovables organized training & education modules on bird fauna and hazardous waste management for the personnel of its wind facilities.

Also Enel North America and the Maritza thermal power plant devoted over 70 and over 30 man-hours to environmental training & education, respectively. In the case of Maritza, the courses were organized also in view of the planned introduction of a certified environmental management system.

Enel also relies on communication for disseminating knowledge of its initiatives internally and externally.

Within the Domestic Infrastructure & Networks Division, Power Grid uses a software application ("ambientesicurezza") running on Enel's intranet for gathering and handling process data, distributing sector-specific documents, regulations and legislation and publishing a quarterly environmental report for internal use.

Enel's website ([www.enel.it](http://www.enel.it)) features an "Energy & Ecology" channel and an "Environment" mini-website.

The "Energy & Ecology" channel provides information about Enel's environmental and energy policies and represents a source of documentation and debate on the energy sector at national, Community and international level. The channel is centered on political, economic and industrial issues, health aspects and environmental impacts of production activities.

In addition to its "Energy" and "Ecology" sections (with articles on topical issues), the homepage of this channel offers a rich menu of news and book reviews, as well as a calendar of conferences, a glossary and a newsletter, and provides access to:

- > "Atlas" (interactive tool): environmental and energy data of all countries of the world;
- > "Enel's Documents": Enel's past Environmental Reports, EMAS Environmental Declarations and Environmental Product Declarations;
- > "Key documents": reasoned selection of documents and data on energy and the environment, produced by institutional entities.

In December 2006, through its "Environment" mini-website, Enel launched its "Environment & Innovation Project" in support of sustainable development. Each section of the Project gives access to a number of drill-down search pages with links to other areas of Enel's portal and to external sites with relevant information.

In 2006, the two environmental channels of Enel's website recorded a monthly average of about 18,000 "unique visitors"; as a whole, they were visited more than 460,000 times and "page views" were 1,736,000.

### **Financial Resources**

In 2006, after previous preparatory work, Enel started recording the environmental expenditure of its Italian operations according to a new classification system.

The system, which is based on the criteria adopted by Eurostat and Istat (the latter being the Italian statistical institute), is described in detail in the Environmental Report 2005.

Here, it will suffice to say that, under Istat's criteria, "environmental protection expenditure" is defined as the costs incurred for preventing and mitigating environmental pollution and degradation and for restoring the quality of the environment, whatever the origin of such costs (legislation, agreements with local governments, corporate decisions, etc.). It excludes expenditure incurred for minimizing the use of natural resources, as well as for activities that, albeit environmentally beneficial, primarily satisfy other requirements, such as health and safety in workplaces.

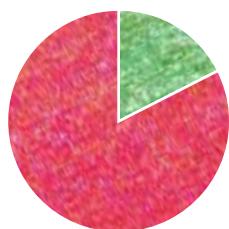
The term "expenditure" always has an algebraic sense, as it may also refer to revenues, such as those which may accrue from waste delivery to disposal operators.

The Domestic Generation & Energy Management Division developed a procedure for recording environmental costs. This is a structured methodology which relates environmental quantities to economic quantities, as general accounting and cost accounting systems are inadequate to fully accommodate the new criteria.

The need thus arose to standardize the individual items of costs and revenues of an environmental nature and to adapt some parts of the cost accounting system in order to fit these economic quantities within the related chart of accounts.

#### **Environmental expenditure in Italy in 2006**

Total: 679.1 million euro



■ Capital expenditure **17.5%**  
■ Current expenditure **82.5%**

The financial resources that Enel allocated to environmental protection in Italy in 2006 were as follows:

- > 119 million euro of investments;
- > 560 million euro of current expenditure.

The near totality of the above figures refer to electric activities.

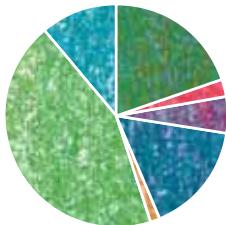
Electricity distribution accounts for 33% of environmental investments in existing installations (67% of the total), while electricity generation represents 67%.

Among the latter investments:

- > continuing of improvements to SO<sub>2</sub> and NO<sub>x</sub> emission abatement systems in the Brindisi Sud power plant;
- > upgrading and renovation of emission monitoring systems in the Fusina and Porto Marghera power plants, respectively;
- > accessory works in the Fusina power plant after installation of desulfurizers and flue gas denitrification systems on its units 1 and 2 and improvement of the efficiency of the same systems on its units 3 and 4;
- > improvements to desulfurizers in the Sulcis power plant;
- > reshaping of mined surfaces and restoration of the original flora and fauna in the disused brown-coal mine site of Pietrafitta (as specified by the Decree of the Ministry of Industry, Trade and Handicraft authorizing the construction of the new Pietrafitta power plant);
- > as part of rehabilitation of contaminated sites in areas designated as of "national interest" by Law 426 of 1998: rehabilitation of the Augusta power plant; characterization and rehabilitation of the Fusina power plant; environmental characterization of the Brindisi and Sulcis sites; and restoration of the former brown-coal mine site of Santa Barbara;
- > in hydro power plants, installation or upgrading of systems for de-oiling drain collection tanks; adoption of noise abatement systems; replacement of trash-racks and gates; removal of asbestos-containing materials;
- > in geothermal activities, continuing of works for installation of mercury and hydrogen sulfide emission abatement systems and for removal of asbestos from steam pipelines.

**Overall environmental investments  
in Italy in 2006 (by environmental  
protection activity)**

Total: 119.2 million euro



Air and climate protection	<b>20.2%</b>
Waste water management	<b>1.7%</b>
Waste management	<b>5.4%</b>
Soil, groundwater and surface water conservation and remediation	<b>16.4%</b>
Noise and vibration abatement	<b>0.3%</b>
Biodiversity and landscape conservation	<b>44.8%</b>
Other environmental protection activities	<b>11.2%</b>

Electricity distribution accounts for as much as 95% of environmental investments in new installations (33% of the total).

These investments mainly concern the construction of environmentally sustainable power lines (new or replacements). Considering that Enel, also for financial reasons, relies on well-established standard construction practices, only the following cost items are regarded as environmental investments:

- > extra costs for the use of (underground and overhead) cables in place of bare conductors in medium-voltage lines in low-populated areas;
- > extra costs for the use of underground cables in place of overhead cables in low-voltage lines in the above areas;
- > extra costs for the use of underground cables in place of bare conductors in high-voltage lines, whatever their location.

Electricity generation accounts for the largest proportion (98%) of Enel's current environmental expenditure in 2006.

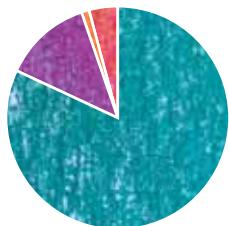
85% of this expenditure (474 million euro) is due to extra costs of fuels, i.e. costs incurred for using low-sulfur fuels in order to comply with environmental regulations, instead of using the originally planned fuels. These extra costs, if any, are computed by determining the difference between the cost of low- and very low-sulfur fuel oil or of natural gas and the cost of a corresponding quantity of medium-sulfur fuel oil, in each fuel-oil or fuel-oil/natural gas power plant.

With regard to indicators correlating environmental expenditure with performance, the Environmental Policies unit developed a mathematical model to assess the unit cost of reducing sulfur dioxide emissions in the above-mentioned power plants.

The priority assigned to this indicator is justified by the fact that: i) extra costs of fuels have taken on huge proportions; ii) consequently, a tool is needed to critically review the power plant design, construction and operation choices which were made at a time of much lower costs of fuels; and iii) in practical terms, this item of expenditure is uniquely correlatable with the positive environmental effect that it produces.

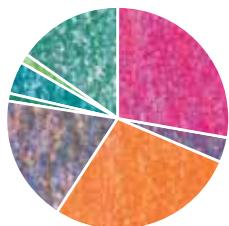
**Current environmental expenditure in Italy in 2006, excluding extra fuel costs (by business activity)**

Total: 86.2 million euro



■ Electricity generation **85.0%**  
■ Electricity distribution **11.8%**  
■ Gas distribution **0.2%**  
■ Support activities **3.0%**

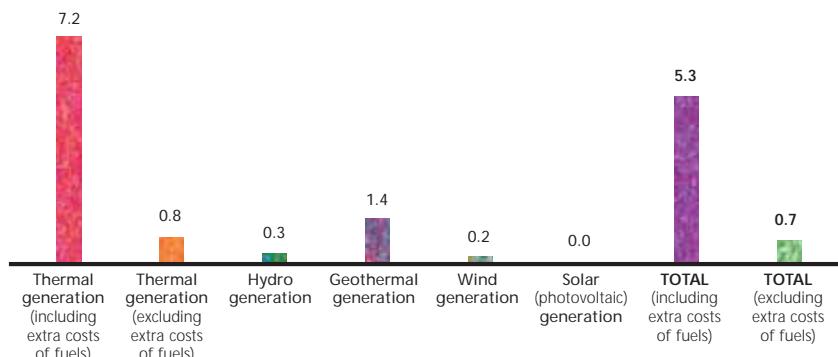
**Current environmental expenditure in Italy in 2006, excluding extra fuel costs (by environmental protection activity)** Total: 86.2 million euro



■ Air and climate protection **29.0%**  
■ Waste water management **2.5%**  
■ Waste management **28.7%**  
■ Soil, groundwater and surface water conservation and remediation **19.5%**  
■ Noise and vibration abatement **0.1%**  
■ Biodiversity and landscape conservation **4.8%**  
■ Research & development for environmental protection **0.2%**  
■ Other environmental protection activities **15.2%**

The remaining items of current expenditure cover environmental protection activities that are conducted directly or outsourced: operation and maintenance of environment-related equipment and systems, waste disposal, installation and operation of environmental management systems, personnel of Enel and of contractors involved in these activities, environmental training & education, etc. They also include the costs of environment-dedicated support personnel, i.e. the personnel that provides services to multiple units, even if they are engaged in the same industrial business activity. Indeed, the intellectual tasks that this personnel performs in the environmental field are supposed to give support to industrial operations only.

**Current environmental expenditure per kWh net generated in Italy in 2006**  
Comparison between the different types of electricity generation (thousandths of euro)



In 2006, taxes with an "environmental tax base" were as follows:

- > taxes on sulfur dioxide ( $\text{SO}_2$ ) and nitrogen oxide ( $\text{NO}_x$ ) emissions - 6.3 million euro;
- > geothermal kWh contributions - 10.2 million euro;
- > coal consumption tax component of the carbon tax - 5.6 million euro.

These items are not posted as current environmental expenditure but separately recorded, as they do not fully meet the requirements of "specific environmental taxes":

- > payment without a specific consideration;
- > direct outlay, i.e. excluding taxes incurred by suppliers or service providers, which are passed through to the industrial price of goods or services;
- > tax base included among those that Eurostat regards as environmentally relevant (emissions into the atmosphere, ozone-depleting substances, releases of polluting substances into water bodies, waste management, noise, energy products, transportation, resources);

- > use of the tax revenue to finance environmental protection expenditure, in the specified proportion (partially or totally).

However, Enel had a burden of another 28 million euro for the other component of the carbon tax that is related to re-determination of excise duties on all fuels.

Other items of expenditure pertaining to financial year 2006, which were separately recorded as they were not explicitly allocated to environmental protection, are:

- > 84 million euro (at Group level) for purchasing carbon dioxide emission allowances to cover the deficit of allocations (under Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading) with respect to actual emissions;
- > 73 million euro for purchasing Green Certificates in order to fully comply with the renewables obligation: under Legislative Decree no. 79 of 1999, importers or producers of electricity from non-renewable sources are required to inject into the power system a given proportion of electricity generated by renewable-energy power plants that have become operational from April 1, 1999 on.

Finally, it is worth mentioning the loss of revenues due to reduced generation by some hydro power plants, which were required to release part of the diverted water into the original streambed (minimum in-stream flow) in order to protect ecosystems. In 2006, these losses were equal to as much as 62.7 million euro.

### **Environmental criticalities**

The use of the most rigorous and advanced organization and management measures cannot avoid the occurrence of environmental criticalities, which originate from various factors, including the excessive emphasis that the media place on some issues, thus inducing a wrong perception of reality and improper expectations among communities.

An environmental criticality is the rejection of or opposition to 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 translates into public or private initiatives which may involve significant costs owing to failed authorizations, suspension of works, modifications of installations, etc. Examples are administrative measures, warning letters, written protests (direct or through the press), actions by mass media, as well as verbal complaints (when reception desks or on-site premises are available).

Each protest concerning the same installation corresponds to a different criticality. A criticality ends with the end of the circumstances generating it.

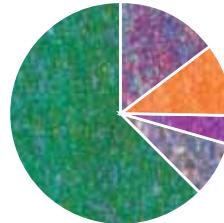
However, environmental litigations are excluded from environmental criticalities.

Environmental criticalities related to Enel's activities in Italy have been sharply declining over time: they passed from 219 in 2003 to 165 in 2004, to 84 in 2005 and to 75 in 2006.

In 2006, most of the environmental criticalities concerned the power distribution grid. With regard to environmental domains, the most recurrent criticalities involved electric & magnetic fields, biodiversity and landscape.

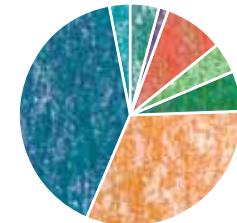
All of the criticalities involving electric & magnetic fields concerned the power grid, while those pertaining to biodiversity and landscape were distributed, by decreasing order, among the power grid, wind, hydro, geothermal and thermal generation. 47% of the criticalities arose from administrative measures, 8% from warning letters and the remaining part from the other above-mentioned initiatives.

**Environmental criticalities in Italy as of Dec. 31, 2006 (by business activity)**  
Total: 75



■ Thermal generation **14.7%**  
■ Hydro generation **10.7%**  
■ Geothermal generation **4.0%**  
■ Wind generation **8.0%**  
■ Electricity distribution **62.6%**

**Environmental criticalities in Italy as of Dec. 31, 2006 (by environmental domain)**  
Total: 75



■ Air and climate **4.0%**  
■ Waste waters **1.3%**  
■ Waste **8.0%**  
■ Soil, groundwater and surface waters **4.0%**  
■ Noise and vibrations **5.3%**  
■ Biodiversity and landscape **37.4%**  
■ Radiation (including electric and magnetic fields) **37.3%**  
■ Other **2.7%**

Outside Italy, criticalities pertaining to thermal generation were dominant (58%). As in the case of Italian operations, the most frequent criticalities (38%) involved biodiversity and landscape (they were related to electricity generation and, to a much lesser extent, to hydro generation); no criticalities were recorded in the area of electric & magnetic fields.

54% of the criticalities originated from administrative measures.

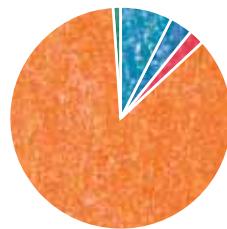
## Environmental litigations

As of December 31, 2006, Enel had 303 pending lawsuits in Italy, 86% of which concerned its power distribution grid.

The distribution of lawsuits by environmental domain shows that electric & magnetic fields are largely dominant (all lawsuits pertain to the power grid), while biodiversity and landscape (over 96% of the lawsuits pertain to the power grid) have a much smaller share.

**Environmental litigations pending in Italy as of Dec. 31, 2006 (by business activity)**

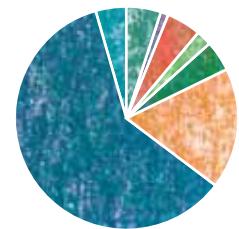
Total: 303



■ Thermal generation **7.6%**  
 ■ Hydro generation **3.3%**  
 ■ Geothermal generation **2.3%**  
 ■ Electricity distribution **86.5%**  
 ■ Gas distribution **0.3%**

**Environmental litigations pending in Italy as of Dec. 31, 2006 (by environmental domain)**

Total: 303



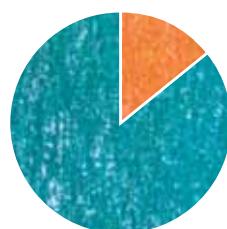
■ Air and climate **5.0%**  
 ■ Waste waters **1.3%**  
 ■ Waste **5.0%**  
 ■ Soil, groundwater and surface waters **2.3%**  
 ■ Noise and vibrations **4.3%**  
 ■ Biodiversity and landscape **17.5%**  
 ■ Radiation (including electric and magnetic fields) **60.3%**  
 ■ Other **4.3%**

In 2006, 14 new lawsuits were filed and 26 were settled.

The grounds for the lawsuits had a reverse trend with respect to 2005, with the return of electric & magnetic fields (all lawsuits pertain to the power grid). Consequently, the percentage of new lawsuits involving the power grid is the same as the one of pending lawsuits.

**Italian environmental litigations initiated in Italy in 2006 (by business activity)**

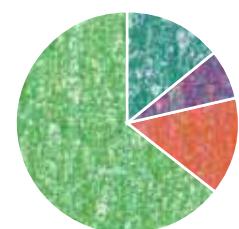
Total: 14



■ Hydro generation **14.3%**  
 ■ Electricity distribution **85.7%**

**Environmental litigations initiated in Italy in 2006 (by environmental domain)**

Total: 14



■ Waste waters **14.3%**  
 ■ Waste **7.1%**  
 ■ Biodiversity and landscape **14.3%**  
 ■ Radiation (including electric and magnetic fields) **64.3%**

Outside Italy, 3 criminal proceedings involving biodiversity and landscape were pending against Electra de Viesgo Distribución as of December 31, 2006.

On the same date, Slovenské elektrárne had 65 claims pending for damages to agricultural production, allegedly caused by pollutant emissions from the thermal power plants of Novaky and Vojany in the years 2004, 2005 and 2006.

For these claims, totaling 31.4 million Slovak crowns (about 800,000 euro), out-of-court settlement is expected.

It should be pointed out that the above litigations are only those which arose from third parties' appeals seeking the quashing of administrative judgments in favor of Enel and the civil and criminal ones where Enel was sued ("passive litigation"). Furthermore, these litigations have a "dominant environmental component", while those concerning workplaces are excluded.

## Climate change and Enel's response

### Directive 2003/87/EC (EU Emissions Trading Scheme)

Directive 2003/87/EC established a scheme for greenhouse gas emission allowance trading within the Community (EU-ETS). The national plans for allocation of allowances are a central element of the scheme and apply to all the installations listed in Annex I of the Directive (combustion and industrial installations).

With its decree (DEC/RAS/074/2006) of February 23, 2006, the Italian Ministry of the Environment issued the first National Allocation Plan (NAP). The NAP sets out how the CO<sub>2</sub> allowances will be allocated among the Italian installations covered by the scheme in the 2005-2007 trading period.

The total allowances allocated nationally for the 2005-2007 three-year period amount to 223.1 million tonnes of CO<sub>2</sub>/year on average.

The following allowances were allocated to the installations of Enel Produzione: 48.2 million tonnes for 2005, 40.5 million tonnes for 2006 and 39.9 million tonnes for 2007.

Actual emissions exceeded allocations by about 8 million tonnes for 2005 and about 11 million tonnes for 2006.

However, it should be stressed that, for the 2005-2007 period, Enel lodged an appeal with TAR (Regional Administrative Court) of Latium against the allocation decision.

The Italian NAP for the 2008-2012 trading period was submitted to the European Commission on December 18, 2006. A decision is expected from the Commission by the end of the Summer of 2007. For the 2008-2012 period, the new NAP sets an average yearly cap for the thermal generation sector of 116.5 million tonnes of CO<sub>2</sub> (-11% on the previous period), of which 10.3 on a payment basis.

In particular, Enel Produzione's existing installations were granted emission allowances equal to about 40 million tonnes/year on average, of which about 34 million on a free-of-charge basis and about 6 million on a payment basis. Additional allowances will be allocated to new entrants, such as the Torrevaldaliga Nord power plant. Depending on the European Commission's decision, these

allocations may be revised. Also in this case, Enel filed an appeal with TAR against the Ministerial Decree of December 18, 2006 (DEC/RAS/1448/2006), which approved the NAP for the 2008-2012 period. The appeal is still pending.

With regard to Spain, Enel Viesgo Generación had an average yearly allocation of roughly 3.3 million tonnes for the 2005-2007 period. Actual emissions from the Company's installations exceeded the allocated allowances by 2.1 million tonnes in 2005 and by 0.7 million in 2006.

The Spanish NAP for 2008-2012 was approved by the Government (Royal Decree of November 24, 2006) and notified to the European Commission on November 30, 2006.

With its decision of February 27, 2007, the European Commission approved the Spanish NAP (allocating 152.7 million tonnes/year of emission allowances) imposing a 0.3% reduction on the proposed total cap.

The approval of the NAP is subject to a few amendments to be made, among which the inclusion of a comprehensive list of installations and of related allocations. Therefore, the allowances granted to Enel Viesgo Generación are not yet known. Anyway, Enel Viesgo Generación filed an appeal against the NAP issued by the Spanish Government, challenging the criteria under which allowances will be allocated among installations using the same technology but owned by different operators.

The Slovak NAP assigned 5.3 million tonnes of allowances to Slovenské elektrárne for 2006, but the Company's actual emissions were about 0.6 million tonnes lower.

The 2008-2012 NAP was approved by the European Commission on November 29, 2006 but with a 25% reduction of the total cap.

The Slovak Government lodged an appeal against the Commission's decision. However, by the end of 2007, Slovakia will have to revise its NAP with a new allocation of allowances among installations in the different sectors.

The Bulgarian NAP has not yet been transmitted to the European Commission. In the document describing the Government's decision and submitted for public consultation, the total amount of CO<sub>2</sub> allowances for 2008-2012 is 67.7 million tonnes/year. The document does not provide a complete list of installations and the related allocations in the above period. However, there is a list of allocations proposed for 2007 (year of entry of Bulgaria into the EU), granting 5.18 million tonnes to the Maritza East III power plant.

Every year, to be compliant with Directive 2003/87/EC, each installation should possess a number of allowances at least equal to its emissions.

Enel's strategy of compliance with the EU-ETS is managed at central level and based on an array of options, whose weight depends on their cost-effectiveness:

1. reducing emissions by fuel switching, i.e. using lower carbon fuels wherever possible and investing in enhanced efficiency of power plants and in renewables;
2. trading CO<sub>2</sub> emission allowances on the various European trading platforms;
3. using CO<sub>2</sub> credits accrued from CDM and JI projects; these credits may be gained through bilateral contracts, by directly developing projects in the geographic areas and core-business sectors of the Group and by taking part in selected carbon funds.

Enel entirely covered its deficit of allowances with respect to actual emissions, especially by buying allowances on the market at competitive prices.

Among Enel's emission reduction obligations within the framework of the EU-ETS, those pertaining to its Italian operations are dominant. As demonstrated by the experience acquired in the first trading period of the scheme, Italy's large deficit of allowances has put Enel in a disadvantaged position. And yet, both Italy and Enel can boast higher energy and emission efficiency than other countries enjoying a surplus of allowances.

Enel has made moves in all available fora, at both European (e.g. upon the European Commission's consultation of stakeholders) and worldwide level (e.g. G8 and International Energy Agency), emphasizing the need for more effective climate change policies, which should reward the most efficient operators and not cause competitiveness and competition distortions at international level.

In particular, the ongoing process of revision of Directive 2003/87/EC is hoped to offer an opportunity to improve at least three fundamental aspects:

- > changing the approach to burden sharing between EU Governments, i.e. passing from a top-down model hinged on a political agreement to a bottom-up one identifying emission targets that are consistent with available technologies, fair competition and energy security and based on different benchmarks for the different fuels and technologies;
- > permitting an unlimited use of the Kyoto Protocol flexibility mechanisms (CDM and JI) and thus of CO<sub>2</sub> credits accrued from projects implemented abroad; in this way, opportunities of reducing emissions at lower cost would be caught and transfer of technologies to developing countries would be favored;
- > establishing a firmer regulatory framework, by lengthening the trading period (e.g. 10 years) and taking allocation decisions ahead of time (e.g. 5 years prior to the start of each trading period) so as to enable a more adequate planning of investments.

## Environment & Innovation Project

In Enel's business plan, environment and technological innovation are a strategic target.

To be a leader in the European energy market, Enel must be a leader in innovation and technologies for the environment.

This is why Enel launched a 4.1 billion euro plan of investments over the next 5 years for developing renewables and for research, efficiency and technological innovation.

The "Environment & Innovation Project" has an unprecedented scale and mobilizes many human and other resources at central and local level. Upon completion, the effects of the Project will displace roughly 4 million tonnes of CO<sub>2</sub> emissions per year, adding to the results already achieved by Enel in the past few years: over 15 million tonnes of CO<sub>2</sub> less from 2000 to date, i.e. down by about 23%.

3.3 billion euro will be used to develop new capacity from renewables (1,700 MW of additional capacity) in Italy and outside Italy.

On the innovation front (800 million euro in total), the main initiatives are:

- > **Archimedes Project**, jointly with ENEA (Italian national agency for new technologies, energy and the environment): parabolic collectors concentrating solar radiation and heating a mixture of molten salts capable of storing heat, which is thus available also at night. In the first stage of the project, a 5 MW array will be built. The facility may be subsequently extended.
- > **Development of photovoltaic technology** to build high-efficiency distributed generation systems: non-silicon semi-conductor materials making it possible to reach an efficiency of 30%; solar concentration systems based on refraction (Fresnel lenses) or reflection (mirrors) to better harness available solar radiation; use of a satellite network of the European Space Agency for optimized installation (position and orientation) & maintenance, as well as for centralized monitoring, control and operation of small-sized systems.
- > **Installation of photovoltaic solar systems** on the high-voltage/medium-voltage substations of the power distribution grid, totaling over 20 MW (at the end of the plan).
- > **Development of biomass**: co-firing of biomass in coal-fired power plants with significant benefits in terms of reduction of CO<sub>2</sub> emissions; participation in the development of a biodiesel system using waste biomass to generate electricity; development of an energy farm to test innovative crops for production of high-energy and low-cost biomass.
- > **Off-shore wind power facilities**: identification of the site and construction of a first plant.
- > **"Green Islands" Project**: testing of alternative power-generating systems on Italian small islands, using biodiesel and renewables to make them cleaner and more independent from grid power supply.

> **Improvement of end-use efficiency** through:

- massive campaign for energy efficiency awareness;
- jointly with Dash, promotional campaign for distribution of 3,700,000 low-consumption light bulbs and 600,000 water flow reducers;
- projects to increase the efficiency of street and monument lighting systems relying on high-efficiency lamps that reduce light pollution;
- 10% discount on the purchase of class A household appliances to customers that are members of the "Enel Club";
- for residential gas customers, promotion of supply of high-efficiency boilers and air-conditioners as well as of thermal solar systems;
- development of in-home monitors of electricity usage, to be combined with the new electronic meters, enabling customers to read their energy consumption in real time and thus save energy;
- design, development and operation of high-efficiency micro-generation, co-generation and tri-generation systems;
- creation of innovative "smart" grids responding to the new requirements of distributed generation.

> **Research on and testing of a zero-emission fossil-fuel power plant.** The focus is on three main technological areas: innovative combustion in oxygen; capture of CO<sub>2</sub> in flue gases; coal gasification. These demonstration projects aim at developing concrete experiences in the key sectors of research into CO<sub>2</sub> capture and sequestration.

> **Hydrogen research and demonstration:** testing of and acquisition of know-how in hydrogen production and utilization in power-generating systems and in high-efficiency distributed generation (fuel cells). In its Fusina power plant, Enel plans to build an industrial-scale demonstration facility, where a 12-MW gas turbine will be fueled by hydrogen and integrated with the existing coal-fired power plant.

### The 3C Initiative: "Combat Climate Change"

Jointly with other leading companies of the world and with several industrial sectors, Enel promoted the 3C Initiative (<http://www.combatclimatechange.org>) to combat climate change. Like Enel, all the participating companies are committed to the environment through various projects, such as development of renewables, energy savings and capture of CO<sub>2</sub> to avoid its release into the atmosphere.

The members of 3C are active in geographic areas where political approaches to climate change are very variable, spanning from total compliance with to rejection of the Kyoto Protocol. With the 3C initiative, participating companies aim at creating a global reference framework capable of widening the involvement of the worldwide community in climate change issues through incentives and the use of market mechanisms.

3C encourages policy-makers to abide by some key principles.

- > **Setting long-term targets as early as possible.** Targets should be founded upon sound scientific and economic analyses. With a predictable and stable reference framework, targets may translate into a roadmap featuring the best combination of short- and long-term actions.
- > **Aiming at a global solution.** Industrialized countries should take the lead and lay the groundwork for the involvement of developing countries. All human activities in all countries and all greenhouse gases (not only CO<sub>2</sub>) should be addressed. A global emissions market may facilitate participation and make resources available to tackle the issue.
- > **Reducing emissions at the least cost.** A global price for greenhouse gas emissions and a well-designed emissions trading system may ease the attainment of this goal.
- > **Minimizing impacts on competitiveness and competition.** Holding down greenhouse gas emissions has an impact on the prices of energy and transportation. A fair and sustainable global burden sharing must be reached. Harmonization among national rules is needed in order to avoid market distortions and protectionism.
- > **Guaranteeing secure and affordable energy supplies for a stable development.** All options, including clean coal and nuclear energy, should be left open, using the best available technologies and providing incentives to research.

## THE 3C STATEMENT

### **3C - Combat Climate Change - A Business Leaders' Initiative**

The 3C Initiative aims at forming a global opinion group consisting of companies showing leadership by demanding an integration of climate issues into the world of markets and trade facilitated by means of a global framework coming into force in 2013.

Many of the companies signing the 3C Initiative also take part in other activities on climate change such as the World Economic Forum's G8 Climate Change Roundtable and various Trade Associations' initiatives. By the 3C initiative we want to underline the need for urgent action by the Global Community.

### **Urgent request to the Global Community and all its representatives**

There are clear indications of an ongoing global climate change. The root cause seems to be the emission of greenhouse gases due to human activity. A change in the climate could potentially alter the conditions that govern human life and lead to major costs. Therefore, we believe that the global community should aim at reducing the emissions of carbon dioxide and other greenhouse gases to acceptable levels as rapidly as possible, as well as providing secure and affordable energy for a stable, global development.

We have drawn the following conclusions regarding how to combat climate change.

#### **1. A switch-over to a low emitting economy is a necessity**

The provision of secure, reliable and affordable energy supplies for customers and society is and will remain a key priority for each of our companies. However, we are well aware that all forms of energy provision have environmental consequences and that the long-term impact has to be compatible with a sustainable society, consequently a long-term switch-over to substantially lower emissions of greenhouse gases is a necessity.

#### **2. A global solution is needed**

Curbing climate change is first and foremost a question of minimising the influence of man-made carbon dioxide in the natural environment. However, other greenhouse gases cannot be neglected. The greenhouse effect is global, a global solution is needed – in the end all human activity in all countries has to be addressed. We urgently need to develop a worldwide policy framework to replace the Kyoto Protocol from 2013 and onwards. While respecting different contexts, harmonisation among national rules is needed in order to avoid market distortions and protectionism.

#### **3. A common, global goal limiting climate changes is needed**

The emissions scenarios of the Intergovernmental Panel on Climate Change show that the global average surface temperature will increase by 1.4 to 5.8 degrees centigrade between 1990 and 2100. The priority should be to focus on a common, global goal of limiting global warming. Limiting emissions over time can and has to be done following an appropriate path towards 2100. According to present knowledge, the goal should be to stabilise the carbon dioxide equivalent concentration at a level below 550 parts per million (volume) in order to stabilise the temperature increase at an acceptable level. There are signals indicating that the acceptable concentration level may have

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to be even lower in the future. The long-term goal must be based on sound scientific and economic analyses. An assessment process should be designed to monitor the progress.

**4. Greenhouse gas emissions must have a global price**

In order to minimise the cost of staying below the cap it is necessary to establish a global price for the emission of greenhouse gases. To limit negative effects on global wealth, a global system facilitating emissions trading should be established. We recognise that gaining control of the carbon cycle will demand resources and will certainly influence transport and energy prices. Consequently, it is important to ensure that impacts on competitiveness and comparative advantages and disadvantages are minimised. Emission reductions should be achieved at the lowest possible cost. The predictability and stability of price trends are important factors.

**5. A well laid-out combination of short- and long-term actions is needed**

Any solution to the problem must work in both the short and long-term. This means that the world shall neither in the short- nor long-term, in fact never, experience any unacceptable consequences from the global warming problem. Many of the actions required are by nature long term. For example, an investment in a new power plant has a time horizon of 40-50 years. To commercialize new technology, 20-30 years or more is usually required. The simple conclusion is that a focus only on short-term objectives and programs is totally inadequate. On the other hand, we cannot neglect the short-term, it should always be possible to apply the best available technologies. We have to act today and apply a 100-year perspective, that is, take responsibility for our actions from now until 2100.

**6. No options should be excluded**

The efficient use of resources and strong incentives for research and development are crucial. Diversification is essential to guarantee security of supply. Choice cannot be limited to the alternatives available today. Governments, producers and customers must be open to new solutions and technological developments.

**7. A global emissions market is needed**

A stable framework must be established for the investments that will be essential to reach the long-term goal. The regime shall be robust, but at the same time adaptive. As new knowledge is accumulated, parameters may change, but not the basic principles. Curbing greenhouse gas emissions is particularly well suited to emissions trading. From an environmental point of view, the location of the emissions is unimportant. There are strong reasons for believing that the costs for reducing greenhouse gas emissions vary widely among sources and countries and the cost savings will thus be larger the wider the trading scheme.

**8. The developed countries must lead the way and the developing countries should follow as soon as they are able**

Global trade requires a clear division of roles between the political sphere and the market, as well as mutual understanding. The developed economies must lead the way. In the long run it must be more attractive to be part of the system than to remain outside. Putting a price tag on emissions and creating the correct incentives will create resources that can be used to tackle the problem. Price setting must reflect supply and demand. The expansion of a global trading scheme must be built on mutual trust and avoidance of improper use.

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9. Fair and sustainable global burden-sharing must be reached

All countries should commit to participate from the start. No poor country shall be denied its right to economic development. Richer countries shall pull a larger weight, but no country shall be forced to disruptive change. Fair effects on competitiveness shall be achieved.

**Our commitment - drawing a roadmap to a low-emitting society**

We, the undersigned, are committed to taking our share of the responsibility to combat global climate change and we are prepared to take action now. We need the support of the global community to create incentives for commercial solutions, technological development and market-based investments.

We appeal to the global community and all its representatives; let us join forces around a common vision of a low-emitting, sustainable society and let us together create and promote a common roadmap that will, step by step, lead to the realisation of this vision. The knowledge and expertise of industry are important resources in the effort to combat climate change. We are prepared to play a proactive role and to make our knowledge and experience available in order to expedite the conclusion and agreement of a global policy framework required to combat climate change.

Participating companies make their know-how and expertise available to facilitate and speed up the conclusion of a global agreement on climate change. To this end, 3C is developing detailed proposals to move towards a low-emitting society. The proposals will be submitted to the world's policy-makers in multiple fora.

Other companies or organizations may join in the 3C initiative.



Costa Rica, Río Volcán  
hydroelectric plant

## **Environmental results - Italian operations**

## *Eco-Balance*

Electricity generation (especially thermal) is the activity of Enel which has the most significant effects on and interactions with the environment.

However, with a rigorous technical approach, the Eco-Balance takes into consideration all the industrial activities that Enel carries out in Italy and quantifies their interactions with the environment in an integrated way.

The data of the Eco-Balance are divided into three parts:

- > resources;
- > processes and products;
- > emissions.

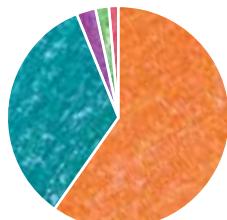
For each item, the Eco-Balance gives and comments on the data for the past five years, except those concerning fuel-oil storage & handling, which are reported from 2004.

For additional details about the status and flow data of 2006, the reader is referred to the individual Divisions' fact sheets of this Report.

It is worth recalling that, in the period considered (2002-2006), Enel recorded major changes in its assets.

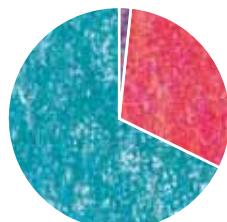
- > With regard to electricity generation, Enel completed the divestiture of the so-called Gencos in 2003 with the sale of Interpower, later on called Tirreno Power, in accordance with Legislative Decree no. 79 of March 16, 1999; the Decree provides that each producer/importer shall not generate/import more than 50% of the total electricity generated/imported in/to Italy. Therefore, the generation assets mentioned in the Environmental Report from 2003 are those presently owned by Enel.
- > In 2003 and 2004, some sections of the high-voltage power distribution grid were transferred from Enel Distribuzione to Terna, as per Ministerial Decree of December 23, 2002 (as amended on the basis of grid development plans); with the Decree, the Ministry of Productive Activities changed the composition of the assets of the national transmission grid by incorporating elements of the high-voltage grid previously belonging to distribution grids.
- > In 2006, Enel sold the power grids that it owned in 18 municipalities of the province of Modena (3,700 km), continuing its activities of sale (dominant vs. acquisitions) of power grids to local companies, in accordance with Legislative Decree no. 79 of March 16, 1999 (namely with its provisions on

**Net maximum capacity  
of power plants as of Dec. 31, 2006**  
Total: 40,475 MW



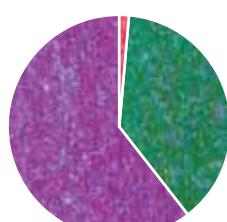
■ Thermal **62.05%**  
■ Hydro **35.53%**  
■ Geothermal **1.66%**  
■ Wind **0.75%**  
■ Solar (photovoltaic) **0.01%**

**Circuit-length of power lines  
as of Dec. 31, 2006**  
Total: 1,096,299 km



■ High voltage **1.7%**  
■ Medium voltage **30.7%**  
■ Low voltage **67.6%**

**Length of gas pipelines  
as of Dec. 31, 2006**  
Total: 30,600 km



■ High pressure **0.6%**  
■ Medium pressure **38.0%**  
■ Low pressure **61.4%**

rationalization of the electricity distribution business).

- > In 2006, Enel also continued its expansion into the natural gas distribution business, by purchasing a grid with an about 15,000 customer base in the provinces of Catania, Ragusa and Siracusa.
- > Finally, in 2005, Enel completed the sale of Terna and Wind, which are no longer included in its scope of consolidation. The following data thus exclude electricity transmission and telecommunications for the entire five-year period.

To facilitate the understanding and assessment of the Eco-Balance, the following table summarizes the key data of Enel's installations in Italy as of December 31 of each of the years elapsing from 2001 to 2005.

**Power installations**

	2002	2003	2004	2005	2006
Power plants (no.)	613	593	595	599	600
> thermal	48	45	46	46	46
> hydro	517	495	495	500	500
> geothermal	34	34	31	32	31
> wind	9	14	18	17	19
> solar (photovoltaic)	5	5	5	4	4
> in addition to: isolated photov. units	201	201	200	200	109
Net maximum capacity (MW)	43,752	41,847	42,047	42,216	<b>40,475 <sup>(1)</sup></b>
> thermal	28,679	26,719	26,837	26,902	<b>25,117</b>
> hydro	14,344	14,330	14,318	14,363	<b>14,379</b>
> geothermal	666	666	642	671	<b>671</b>
> wind	59	128	247	277	<b>305</b>
> solar (photovoltaic)	4	4	4	4	<b>4</b>

(1) The sharp drop in power plant capacity, recorded in 2006, is due to: i) decommissioning of unit 1 of the Torrevaldaliga Nord power plant, which will not be converted to coal-firing; and ii) completion of decommissioning activities in other power plants: the intent of decommissioning the latter plants was reported to the then Ministry of Productive Activities as early as in 2004.

**Power lines (circuit-length - km)**

	2002	2003	2004	2005	2006
Total	1,063,010	1,082,367	1,089,845	1,090,129	<b>1,096,299</b>
> high voltage (40 to 380 kV)	20,316	19,336	19,114	18,951	<b>18,804</b>
> medium voltage (1 to 30 kV)	332,055	334,546	335,841	335,151	<b>336,517</b>
> low voltage (up to 380 V)	710,639	728,486	734,890	736,026	<b>740,979</b>

**Gas pipelines (length - km)**

	2002	2003	2004	2005	2006
Total	24,890	27,194	29,379	29,372	<b>30,600</b>
> high pressure (p > 5 bar)	137	123	184	191	<b>191</b>
> medium pressure (0.04 bar < p ≤ 5 bar)	9,370	10,566	11,052	11,315	<b>11,615</b>
> low pressure (p ≤ 0.04 bar)	15,383	16,505	18,144	17,866	<b>18,794</b>

## Resources

This part of the Eco-Balance reports the consumption of energy resources (fossil and non-fossil fuels, geothermal fluid, primary electricity) and of non-energy resources (water for industrial uses, expendables).

## Fuels

The near totality of fuels (mostly of fossil origin) are used 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); until 2004, orimulsion (just as coal) was used in power plants equipped with flue gas desulfurizers and denitrification systems; in 2005, procurement difficulties zeroed the consumption of this fuel.
- > Gas-oil, a high-cost fuel, is used on an exceptional basis: i) in single-cycle gas-turbine power plants that are not connected to the natural gas grid (as an emergency fuel in the other gas-turbine power plants); ii) in diesel-engine power plants (supplying some minor Italian islands); iii) in the start-up of steam-cycle power plants, in auxiliary boilers and emergency generating sets. The maximum sulfur content in the gas-oil used for electricity generation is 0.2%, as specified in the applicable legislation. However, Enel uses gas-oil with a sulfur content not exceeding 0.15%.
- > 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-cycle, combined-cycle or repowering gas turbines, for which it is the only practicable option).
- > The contribution of non-fossil fuels, albeit still very small, went up in 2006.

This contribution consists of:

- refuse-derived fuel (RDF), accounting for 88% (in terms of energy content) of the non-fossil fuels used by Enel; RDF was co-fired with coal at the Fusina power plant;
- solid biomass, representing the remaining share; this fuel was co-fired with coal in units 2 and 3 of the Sulcis power plant; the Mercure power plant (reactivated in 2005 and converted to biomass firing) remained idle throughout 2006, pending the result of the assessment of its impact on the nearby special protection zones and sites of Community interest (as requested by the regional authorities of Calabria).

Natural gas and start-up gas-oil also feed the boilers which heat the fuel oil stored in Enel's facility of Ravenna (heating fluidifies fuel oil before its transfer to destination).

Small quantities of gas-oil are also used for driving geothermal drilling equipment and in emergency generating sets, which are present in practically all of Enel's installations.

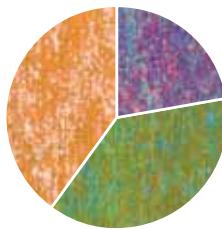
Fuel consumption, obtained from data measured and certified in each installation, is expressed here in metric units (thousand tonnes or million cubic meters).

To facilitate the summing of the various contributions, overall fuel consumption is expressed in energy potential (thousand tonnes of oil-equivalent).

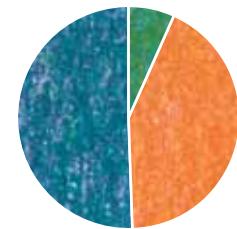
The further drop in overall fuel requirements in 2006 is mostly attributable to natural gas (whose consumption decreased by equal amounts in technologically captive and non-technologically captive uses) and to coal. The reasons for this result are: i) the need to hold down natural gas consumption for power generation in the first months of 2006; ii) the outages for environmental improvements to the coal-fired sections 1 and 2 of the Fusina power plant in the last part of the year; and iii) reduced generation in the Brindisi Sud coal-fired power plant to meet the yearly cap on sulfur dioxide emissions.

The consumption of fuel oil remained practically unaltered, in spite of the Torrevaldaliga Nord power plant outage for conversion to coal firing. The use of VLS fuel oil (whose availability suffered from the problems on the natural gas market) recorded a decrease, which was however offset by increased use of LS fuel oil.

**Fossil fuel consumption  
for thermal generation in 2006**  
Total: 16,390 ktOE



**Fuel-oil consumption  
for thermal generation in 2006**  
Total: 3,637 kt



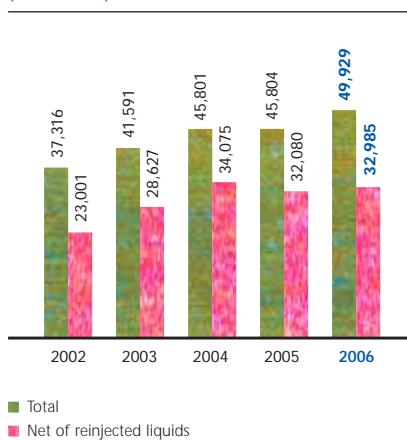
## Geothermal fluid

Geothermal fluid, in the form of steam at adequate pressure and temperature, is the energy source for geothermal generation.

If the extracted fluid has thermodynamic properties unsuitable for geothermal generation, it may be employed in non-electric uses. In the case of Enel, these uses are now limited to the supply of heat (especially for greenhousing and district heating, but also as process heat in the food industry). For the supply of heat, use is also made of the fluid which becomes available after expansion in Enel's only geothermal unit equipped with an atmospheric-exhaust turbine.

The amount of geothermal steam used for electricity generation is obviously correlated with the kWh generated.

**Consumption of geothermal fluid**  
(thousand t)



The capability of geothermal fields is mostly sustained by the reinjection of fluids into geothermal reservoirs. These fluids consist of: the water that is entrained by steam and separated from it at the well outlet; steam that is condensed after its expansion in the turbines; and the fluid remaining after non-electric uses.

The difference between the total fluid extracted and the fluids reinjected is due to: the fraction of incondensable gases that are contained in geothermal steam; the vaporization and entrainment of condensates in cooling towers (by far the largest contribution) and inevitable losses.

Reinjection and extraction of fluids into/from the deep subsoil does not jeopardize shallow aquifers which, among others, are isolated from the wells by metal pipings, cemented to the soil and between them.

## Primary electricity

Electricity is used as an energy raw material in fuel-oil storage & handling and gas distribution.

In the first case, it is used for pumping fuel oil into pipelines and for feeding the auxiliaries of the fuel-oil storage & handling facility.

In the case of gas distribution, electricity is mainly used for cathode protection of gas pipelines and for driving the water pumps of the circuits which heat natural gas upon its depressurization.

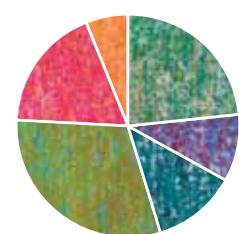
The amounts of net electricity generation and of electricity wheeled on distribution grids (see paragraph on "Processes and Products") take into account both own consumption and losses.

## Water for industrial uses

Water for industrial uses is consumed in thermal power plants (especially to make up for the amounts lost in the generation process of steam-turbine power plants

### Coverage of water requirements for industrial uses in 2006

Total: 39.9 million m<sup>3</sup>



Rivers	<b>23.6%</b>
Wells	<b>9.7%</b>
Aqueducts	<b>12.1%</b>
Sea (as-is)	<b>30.5%</b>
Sea (desalinated)	<b>18.0%</b>
Waste waters (used inside plants)	<b>6.1%</b>

and in closed-cycle wet cooling tower systems), to carry out clean-up jobs (above all of boilers) and to feed auxiliaries and desulfurizers.

To a much lesser extent, water is used:

- > in geothermal activities for the preparation of the drilling slurry; the amounts of water used in these activities are very variable, depending on the type of activity (e.g. drilling of new wells, rehabilitation or deepening of existing wells) and on the characteristics of the geological formations crossed (by contrast, the functioning of cooling towers does not require water, since it is based on re-vaporization of part of the condensates from the steam discharged by turbines);
- > in fuel-oil storage & handling, especially for preparing demineralized water; this water is used to make up for the amount lost in closed-cycle production of steam for heating and fluidifying fuel oil before its transfer to destination.

Water requirements do not include the water used for open-cycle cooling of thermal power plants, because it is returned to the original water body with negligible physico-chemical changes.

In 2006, water requirements diminished, in line with the downward trend (albeit to a variable extent) of all of their contributions.

### Expendables

Expendables, used mainly in thermal power plants and in geothermal drilling, complete the list of resources; the following are the principal ones and their most common uses.

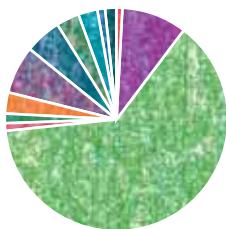
- > Resins are used to produce (via ion exchange) the high-purity water which is needed for the thermal cycle of steam-cycle power plants.
- > Hydrazine, carbohydrazide and hydrogen peroxide are used for deoxygenation and pH balancing of thermal-cycle water and steam.
- > Ammonia, too, is used to balance the pH of the thermal-cycle water, but above all as a reagent in the flue gas denitrification process.
- > Limestone is the reagent for the flue gas desulfurization process.
- > Magnesium oxide is injected into the flue gas circuits of thermal power plant boilers that are fed with vanadium-containing fuel, in order to prevent corrosion of heat-transfer surfaces due to the indirect action of vanadium.
- > Sodium hypochlorite, chlorine dioxide, ferrous sulfate, ferrous chloride and trisodium phosphate are occasionally added to the cooling waters of steam-cycle power plants to prevent deposits and fouling or to protect condenser tube surfaces from corrosion.
- > Lime, ferric chloride and polyelectrolyte are mainly used in waste water treatment, thanks to their neutralizing and/or flocculating properties.
- > Sulfuric acid, hydrochloric acid and caustic soda are most commonly used in the

regeneration of ion-exchange resins and in the clean-up of equipment, but also in waste water treatment. 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 thicken bentonite slurries, thereby improving their effectiveness when drilling into mechanically unstable rock formations.
- > Geothermal cement is used for joining the steel walls of new wells and for permanent plugging of disused wells.
- > The "other" expendables (antifouling, defouling, deoxidizing, antifoam, detergent and antifreezing agents, carbon dioxide and bottled hydrogen, etc.), just as lubricating oil and dielectric oil, come from the generality of installations.

#### Expendables in 2006

Total: 229,015 t



■ Resins, hydrazine, carbohydraz. & hydrogen peroxide	<b>0.04%</b>
■ Ammonia	<b>8.37%</b>
■ Limestone for flue gas desulfurization	<b>74.06%</b>
■ Magnesium oxide	<b>0.02%</b>
■ Sodium hypochlorite, ferrous chloride & trisodium phosphate	<b>0.45%</b>
■ Sulfuric & hydrochloric acids	<b>2.16%</b>
■ Caustic soda	<b>5.89%</b>
■ Lime, ferric chloride & polyelectrolyte	<b>4.31%</b>
■ Bentonite, barite & geothermal cement	<b>2.41%</b>
■ Lubricating oil	<b>1.76%</b>
■ Dielectric oil	<b>0.05%</b>
■ Other	<b>0.48%</b>

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.

A number of factors make it extremely difficult to interpret the trends of most of the expendables at aggregated level: plurality of activities, multiple use of many materials, variety of installation configurations and the fact that the consumption of some products is often independent of the basic operating parameters of the installations involved.

This also applies to limestone and ammonia, which play a key role among expendables. However, unlike ammonia, limestone is only used in the flue gas desulfurizers, which are installed in the coal-fired power plants of larger size. These plants suffered less than other plants from the 2006 drop in coal consumption and covered their requirements by resorting to products with an averagely higher sulfur content. This explains the increase in limestone consumption.

## Resources

		2002	2003	2004	2005	2006
<b>Fossil fuels</b>						
Thermal generation (including auxiliary boilers and emergency generating sets)						
Fuel oil	thousand t	8,241	6,487	4,905	3,705	<b>3,637</b>
HS	thousand t	6	0	25	95	<b>0</b>
MS	thousand t	2,518	83	180	163	<b>247</b>
LS	thousand t	2,458	2,309	1,956	1,016	<b>1,551</b>
VLS	thousand t	3,260	4,095	2,744	2,432	<b>1,839</b>
Orimulsion	thousand t	1,620	1,481	377	0	<b>0</b>
Gas-oil	thousand t	58	93	42	64	<b>79</b>
Natural gas	million m <sup>3</sup>	8,893	11,075	9,022	8,493	<b>7,305</b>
technologically captive use	million m <sup>3</sup>	2,407	6,555	5,813	5,137	<b>4,550</b>
of which in combined-cycle units	million m <sup>3</sup>	n.a.	n.a.	n.a.	4,266	<b>3,760</b>
non-technologically captive use	million m <sup>3</sup>	6,487	4,520	3,209	3,356	<b>2,755</b>
Coal	thousand t	11,295	10,427	12,072	11,755	<b>10,749</b>
Total	thousand toe	23,864	23,294	20,128	17,995	<b>16,390</b>
Other activities: fuel-oil storage & handling, geothermal drilling, other generating sets	thousands toe	1.7	1.8	8.2	5.5	<b>5.7</b>
<b>Grand total</b>	<b>thousands toe</b>	<b>23,865</b>	<b>23,296</b>	<b>20,136</b>	<b>18,001</b>	<b>16,396</b>
<b>Biomass and waste</b> (thermal generation)	thousands toe	-	-	-	6.8	<b>12.4</b>
<b>Geothermal fluid</b>						
Total fluid extracted	thousand t	37,316	41,591	45,801	45,804	<b>49,929</b>
Net of reinjected liquids	thousand t	23,001	28,627	34,075	32,080	<b>32,985</b>
Geothermal steam for electricity generation	thousand t	37,112	41,372	42,478	41,687	<b>43,937</b>
<b>Primary electricity</b> (fuel-oil storage & handling, gas distribution)						
	GWh	2.5	3.1	8.9	4.1	<b>5.4</b>
<b>Water for industrial uses</b>						
From rivers	million m <sup>3</sup>	8.4	9.6	14.0	10.0	<b>9.4</b>
From wells	million m <sup>3</sup>	7.0	7.2	4.5	4.1	<b>3.9</b>
From aqueducts	million m <sup>3</sup>	5.5	5.5	5.6	5.4	<b>4.8</b>
Total abstraction from inland waters	million m <sup>3</sup>	20.9	22.3	24.0	19.5	<b>18.1</b>
From the sea (as-is)	million m <sup>3</sup>	5.8	9.2	12.7	13.9	<b>12.2</b>
From the sea (desalinated)	million m <sup>3</sup>	8.4	8.6	7.2	7.3	<b>7.2</b>
From waste waters (used inside plants)	million m <sup>3</sup>	3.1	3.2	4.2	3.3	<b>2.5</b>
<b>Total requirements</b>	<b>million m<sup>3</sup></b>	<b>38.2</b>	<b>43.4</b>	<b>48.1</b>	<b>44.0</b>	<b>39.9</b>
for thermal generation	million m <sup>3</sup>	38.1	43.4	48.0	43.9	<b>39.8</b>
for geothermal drilling	million m <sup>3</sup>	0.027	0.001	0.051	0.043	<b>0.047</b>
for fuel-oil storage & handling	million m <sup>3</sup>	-	-	0.069	0.049	<b>0.045</b>

n.a.: not available.

## Resources

		2002	2003	2004	2005	2006
<b>Expendables</b>						
Resins	t	35	17	41	48	19
Hydrazine	t	51	12	5	3	1
Carbohydrazide	t	13	14	14	22	18
Hydrogen peroxide	t	n.a.	n.a.	n.a.	82	45
Ammonia	t	22,909	19,869	22,343	19,744	19,164
Limestone for flue gas desulfurization	t	327,661	254,828	211,775	162,412	169,594
Magnesium oxide	t	153	116	93	41	53
Sodium hypochlorite	t	612	888	799	477	975
Chlorine dioxide	t	28	13	31	0	0
Ferrous sulfate	t	3	1	0	1	0
Ferrous chloride	t	n.a.	n.a.	n.a.	45	61
Trisodium phosphate	t	n.a.	n.a.	n.a.	17	3
Lime	t	11,926	9,672	9,164	8,417	9,101
Ferric chloride	t	n.a.	n.a.	n.a.	779	683
Polyelectrolyte	t	n.a.	n.a.	n.a.	40	84
Sulfuric & hydrochloric acids	t	5,432	6,931	5,765	6,516	4,946
Caustic soda	t	6,314	6,722	9,904	9,193	13,489
Bentonite	t	2,045	1,853	386	1,505	1,927
Barite	t	0	0	0	0	90
Geothermal cement	t	2,520	2,691	1,521	3,676	3,506
Lubricating oil	t	n.a.	n.a.	n.a.	847	4,042
Dielectric oil	t	n.a.	n.a.	n.a.	113	106
Other	t	3,002	2,508	1,985	5,458	1,108
<b>Total</b>	<b>t</b>	<b>382,703</b>	<b>306,136</b>	<b>263,825</b>	<b>219,438</b>	<b>229,015</b>
of which:						
for thermal generation	t	374,166	297,267	253,261	205,335	210,971
for geothermal activities	t	8,537	8,869	10,221	13,936	17,846

n.a.: not available (the amounts of the expendable items that have been indicated as not available until 2004 are included among the "Other" expendables).

## Processes and products

Enel's activities are today focused on generation of electricity and distribution of electricity and gas.

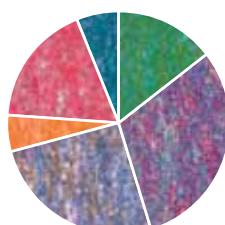
### Electricity generation

With regard to electricity generation, it is worth recalling that, in the first years of the period considered, Enel completed the change of its assets; therefore, the generating assets reported from 2003 reflect Enel's present assets.

Furthermore, it is worth mentioning that:

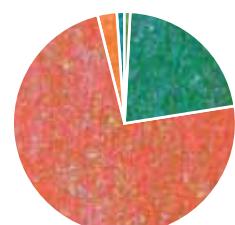
- > the various contributions are net of the electricity consumed by power plant auxiliaries and of losses in main transformers;
- > the above-defined net generation does not necessarily match the amount of electricity sold, which is generally smaller;
- > generation from RDF (refuse-derived fuel) is divided in two shares: i) the one obtained from the non-biodegradable fraction of waste; and ii) the one obtained from the biodegradable fraction of waste and regarded as generation from renewables;
- > hydro generation from pumped storage is the electricity that is produced, in peak-load hours, through the falling of water previously pumped from a lower reservoir to an upper reservoir, using electricity surpluses in low-load hours (pumped storage is the only available option for storing significant amounts of electricity, albeit indirectly);
- > actually available generation is the overall net generation, i.e. after deducting the electricity consumed for pumping.

**Net electricity generation  
by source in 2006**  
Total: 104,070 million kWh



- Fuel oil & gas-oil **14.5%**
- Natural gas **31.0%**
- Coal **25.4%**
- Geothermal, wind, solar, biomass & waste **5.4%**
- Hydro from natural flows **17.7%**
- Hydro from pumped storage **6.0%**

**Net electricity generation  
from renewables in 2006**  
Total: 24,035 million kWh



- Biomass & biodegradable fraction of waste **0.09%**
- Geothermal **21.66%**
- Hydro from natural flows **76.58%**
- Wind **1.66%**
- Solar (photovoltaic) **0.01%**
- Hydro from pumped storage **0.09%**

In 2006, overall generation further decreased, reflecting a smaller amount of fossil-fired generation. This trend is to be ascribed to power plant outages for works of conversion (Torrevaldaliga Nord and Santa Barbara) and environmental improvement (Fusina 1 and 2).

Conversely, generation from renewables – overall and basically all of its individual components – went up.

An exception was photovoltaic solar generation, which dropped sharply owing to the theft of over 20% of the panels of the Serre power plant (Salerno). The removal of these panels from 8 of the 10 subarrays of the plant had a higher impact on its expected generation.

Replacement of the panels is being assessed.

### **Fuel-oil storage & handling**

This activity is complementary to thermal generation in the Porto Tolle power plant and, as previously mentioned, is carried out at Enel's facility of Ravenna.

Fuel oil transferred to destination is the main product of this activity. A by-product – necessary for fluidifying fuel oil prior to its transfer to destination – is heat, which is generated locally by steam-producing boilers.

The amount of fuel oil transferred to destination every year obviously depends on the requirements of the Porto Tolle power plant.

In contrast, the amount of heat that is generated to keep the stored fuel oil in the fluid state cannot be directly correlated with the amount of fuel oil transferred to destination.

### **Geothermal drilling**

This activity is aimed at making available endogenous steam for geothermal generation. Enel is a worldwide leader in geothermal drilling technologies and know-how.

The extent of yearly drilling represents, in some way, the volume of activity. Nevertheless, it should be pointed out that operating conditions – and thus consumption of energy and expendables and generation of waste and residues – may vary significantly depending on the nature of the rock formations that are crossed.

### **Electricity distribution**

The data on this activity are expressed in terms of electricity wheeled on the distribution grid and own consumption of electricity.

The former is the overall electricity delivered to end users connected to the grid, i.e. the sum of the electricity wheeled for the eligible market and of the one sold on the captive market.

Own consumption is the consumption of electricity required for the operation of the distribution grid.

The rise in the electricity wheeled in 2006 reflects the increase of Italian electricity demand.

### **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 grid operation ("own consumption") is due to the combustion of one fraction of the gas that is wheeled; this fraction is used for heating of the wheeled gas, to prevent the moisture that it contains from freezing upon depressurization (passage from the high-pressure grid to the medium-pressure one and from the medium-pressure grid to the low-pressure one).

Natural gas losses from the grid are estimated on the basis of the amount of natural gas wheeled, using loss factors (% by volume) which take into account gas pressures, length and configuration of pipelines, their state of conservation, etc. The activity of estimation combines systematic and increasingly accurate in-situ measurements (based on standard methodologies) with the use of parameters from the literature.

The reduction in the natural gas wheeled in 2006 depends on two factors: the plan adopted by the then Ministry of Productive Activities to minimize energy consumption in the first months of the year and the particular weather conditions recorded in the Autumn of the same year.

## Processes and products

		2002	2003	2004	2005	2006
<b>Electricity generation (net)</b>						
From fossil fuels	million kWh	104,735	106,669	91,854	81,794	<b>73,726</b>
<i>fuel oil &amp; gas-oil</i>	<i>million kWh</i>	35,184	27,838	20,552	15,270	<b>15,070</b>
<i>natural gas</i>	<i>million kWh</i>	37,024	48,802	40,602	37,718	<b>32,183</b>
of which in combined-cycle units	million kWh	n.a.	n.a.	n.a.	22,186	<b>19,463</b>
<i>coal</i>	<i>million kWh</i>	28,038	25,978	29,659	28,805	<b>26,473</b>
<i>orimulsion</i>	<i>million kWh</i>	4,489	4,052	1,041	0	<b>0</b>
From waste (non-biodegradable fraction)	million kWh	-	-	-	16	<b>25</b>
From renewables	million kWh	24,834	23,792	26,591	23,537	<b>24,035</b>
<i>biomass and biodegradable fraction of waste</i>	<i>million kWh</i>	-	-	-	13	<b>23</b>
<i>geothermal</i>	<i>million kWh</i>	4,382	5,036	5,120	5,012	<b>5,208</b>
<i>hydro from natural flows</i>	<i>million kWh</i>	20,399	18,679	21,236	18,142	<b>18,406</b>
<i>wind</i>	<i>million kWh</i>	50	75	233	367	<b>398</b>
<i>solar (photovoltaic)</i>	<i>million kWh</i>	2.4	2.2	1.9	2.1	<b>0.5</b>
Hydro from pumped storage	million kWh	7,543	7,333	7,422	6,741	<b>6,284</b>
<b>Total</b>	<b>million kWh</b>	<b>137,112</b>	<b>137,794</b>	<b>125,867</b>	<b>112,087</b>	<b>104,070</b>
Consumption for pumping	million kWh	10,595	10,369	10,263	9,244	<b>8,704</b>
Available generation	million kWh	126,518	127,425	115,604	102,843	<b>95,366</b>
<b>Fuel-oil storage &amp; handling</b>						
Fuel oil transferred to destination	t	-	-	900,000	169,583	<b>574,091</b>
Heat generation	million kcal	-	-	53,860	51,471	<b>36,505</b>
<b>Geothermal drilling</b>						
Extent	meter	12,960	11,856	18,247	13,792	<b>10,684</b>
<b>Electricity distribution</b>						
Electricity wheeled	million kWh	258,469	244,426	250,682	251,077	<b>255,613</b>
Electricity consumption for grid operation	million kWh	n.a.	n.a.	358	401	<b>317</b>
<b>Natural gas distribution</b>						
Natural gas wheeled	million m <sup>3</sup>	3,166	3,493	3,633	3,924	<b>3,659</b>
Natural-gas consumption for grid operation	million m <sup>3</sup>	1.9	5.8	4.8	4.9	<b>5.5</b>
Losses of natural gas along the grid	million m <sup>3</sup>	11.1	12.2	12.7	25.5	<b>23.8</b>

n.a.: not available.

## 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 those of other substances contribute to the greenhouse effect.

The emissions into the atmosphere, which are quantitatively most significant and typical of Enel's industrial activities, are as follows: in the first category, sulfur dioxide ( $\text{SO}_2$ ), nitrogen oxides ( $\text{NO}_x$ ) and particulates; and, in the second category, carbon dioxide ( $\text{CO}_2$ ), sulfur hexafluoride ( $\text{SF}_6$ ) and methane ( $\text{CH}_4$ ).

>  $\text{SO}_2$ ,  $\text{NO}_x$  and particulates originate from the combustion process which commonly takes place in thermal power plants.

The amounts shown include both emissions yearly reported to the Ministry of the Environment and those from other installations.

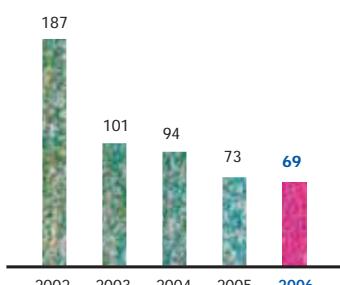
Their values are obtained by multiplying their concentrations in the flue gases (generally continuously monitored) by the volumes of the same flue gases.

$\text{NO}_x$  are expressed in terms of  $\text{NO}_2$ -equivalent.

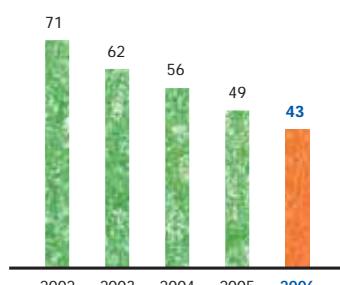
Over the years, the emissions of these pollutants from thermal power plants have fallen substantially, thanks above all to: generalized use and constant tuning of advanced combustion systems (prevention measures); installation or upgrading of flue gas abatement systems (desulfurizers in large coal- and orimulsion-fired plants; denitrification systems in the same plants or in other plants when prevention measures prove to be insufficient; particulate collection systems in almost all plants; the latter systems are usually based on electrostatic precipitators, but also on more efficient bag filters, which are suitable for coal-fired plants only); and the use of high-grade fuels.

As can be noted, reductions are considerable, even if reference is made, for the entire period considered, only to the power plants presently owned by Enel.

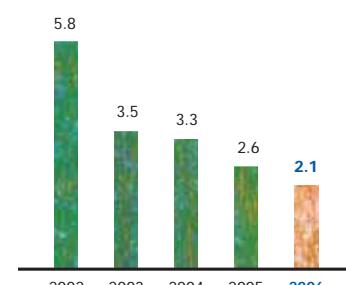
**SO<sub>2</sub> emissions from thermal generation** only power plants presently owned by Enel (thousand t)



**NO<sub>x</sub> emissions from thermal generation** only power plants presently owned by Enel (thousand t)



**Particulate emissions from thermal generation** only power plants presently owned by Enel (thousand t)



> CO<sub>2</sub> is the typical product of combustion and, as such, the near totality of it (99% of Enel's total CO<sub>2</sub> emissions in Italy) derives from thermal power plants. Small amounts – reported here in view of the attention paid to the greenhouse effect – also come from fuel-oil storage & handling (combustion of natural gas and gas-oil for generating process steam), geothermal drilling (combustion of the gas-oil which feeds the diesel engines of drilling equipment), distribution of natural gas (combustion of one fraction of the wheeled gas for heating of the gas upon depressurization) and emergency generating sets (combustion of gas-oil), which are present in the generality of Enel's installations.

CO<sub>2</sub> is also contained in the reaction products from the process of desulfurization of the flue gases outgoing from the boilers of some thermal power plants. Natural gas distribution also contributes to CO<sub>2</sub> emissions in another way: as CO<sub>2</sub> is a minor constituent of natural gas, it is also present in the losses from the distribution grid.

Until 2004 inclusive, CO<sub>2</sub> from combustion was computed by applying specific emission factors to the consumption of the various fuels. The factors had been recommended by IPCC (International Panel on Climate Change) in its 1996 Guidelines for national greenhouse gas inventories. Each of the factors was multiplied by a correction coefficient accounting for the typical fraction of unburned carbon (0.980 for solid fuels; 0.990 for liquid fuels; 0.995 for gaseous fuels). The computation considered the burned carbon fraction – whose value, as indicated above, was taken to lie below 100% – to be completely oxidized to CO<sub>2</sub>.

Today, with the implementation of Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading, a different procedure is used for calculating emissions. For the fuels and installations that are covered by the scheme and thus required to monitor and report their emissions, the calculation is based on parameters deriving from analyses (carbon content of fuel, calorific value, carbon content of ash) conducted on the individual lots of fuel.

In the other cases (fuels and installations not covered by Directive 2003/87/EC and having total emissions below 50 kt, of which nearly half come from thermal power plants), Enel uses the reference parameters of the latest national greenhouse gas inventory.

The amount of CO<sub>2</sub> from the desulfurization process is computed stoichiometrically from the amount of limestone used.

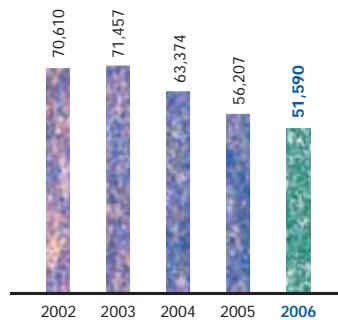
CO<sub>2</sub> emissions associated with natural gas losses are quantified on the basis of these losses, taking into account the carbon content of natural gas (average value in 2005: 0.12%) and its density (1.977 kg/m<sup>3</sup>).

Even supposing that Enel's assets remained unchanged, CO<sub>2</sub> emissions still show a downward trend in the past few years, witnessing the impressive technological

and operational efforts through which Enel responded, among others, to the challenge posed by Directive 2003/87/EC.

> SF<sub>6</sub> is used in high- and medium-voltage electrical equipment as an insulant and for electric arc extinction; in these applications, it is irreplaceable. Its emissions into the atmosphere are due to leaks from the above equipment.

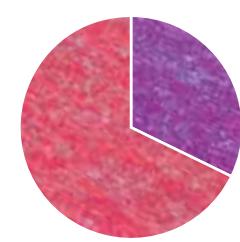
**CO<sub>2</sub> emissions from thermal generation** only power plants presently owned by Enel (thousand t)



These emissions are determined with a complex procedure, which takes into account replenishments (difference between the weights of SF<sub>6</sub> 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<sub>6</sub> contained in the bottles purchased or acquired during the year and decreased by the weight of SF<sub>6</sub> contained in the bottles transferred during the year), including those made by third parties. In the very rare event of breakage of SF<sub>6</sub>-containing equipment, its nominal SF<sub>6</sub> content is considered as leakage. Given the particular care with which SF<sub>6</sub> is removed from end-of-life equipment, the above procedure can yield fairly reliable data.

These emissions are expressed in weight of SF<sub>6</sub> and in weight of CO<sub>2</sub>-equivalent, in terms of Global Warming Potential (GWP). The 100-year GWP used in the past (23,900) was replaced by the new value (22,200) specified in the "IPCC Third Assessment Report: Climate Change 2001" (published in 2006). The new value, which was applied to the entire five-year time series, also affects the time series of relative SF<sub>6</sub> emissions (see next paragraph on "Indicators"). When expressed in CO<sub>2</sub>-equivalent, the values of SF<sub>6</sub> appear to be extremely low (in 2006, 1.8% of Enel's overall greenhouse gas emissions).

**Origin of SF<sub>6</sub> emissions in 2006**  
Total: 4.331 kg



■ Electricity generation **32.2%**  
■ Electricity distribution **67.8%**

The variability of SF<sub>6</sub> emissions from one year to the other is largely due to the occasional character of the above-mentioned replenishments.

- > CH<sub>4</sub> emissions, just as the aforesaid minor amounts of CO<sub>2</sub>, are ascribable to the losses of natural gas from the distribution grid.

These emissions are determined on the basis of grid losses, taking into account the methane content of natural gas (average value in 2004: 92.94%) and its density (0.717 kg/m<sup>3</sup>).

They are expressed both in weight of CH<sub>4</sub> and in weight of CO<sub>2</sub>-equivalent, in terms of Global Warming Potential. Also in this case, the 100-year GWP used in the past (21) was replaced by the new value (23) specified in the "IPCC Third Assessment Report: Climate Change 2001" (published in 2006). The new value, which was applied to the entire five-year time series, also affects the time series of relative CH<sub>4</sub> emissions (see next paragraph on "Indicators").

When expressed in CO<sub>2</sub>-equivalent, CH<sub>4</sub> emissions appear to be extremely low (in 2006, 7% of Enel's overall greenhouse gas emissions).

With regard to "minor" pollutants (e.g. metals), Enel conducted extensive programs of monitoring of their concentrations in the flue gases released by its thermal power plants, under different conditions of types of fuel and abatement systems. The results indicate that these concentrations comply – within wide margins – with the point-source limits of emissions established by the Ministerial Decree of July 12, 1990.

Separate considerations should be made for the gases contained in geothermal steam. As such gases are incondensable, they are emitted into the atmosphere when steam condenses after expansion in turbines. The main gases are:

- > hydrogen sulfide (H<sub>2</sub>S), the only potentially polluting substance which is present in significant amounts in geothermal fluid;
- > carbon dioxide (CO<sub>2</sub>).

A wide debate is under way on the natural or anthropogenic origin of these gaseous emissions.

The International Geothermal Association supports their natural origin: as spontaneous emissions are present in diffuse form in geothermal areas, geothermal power plants only convey them in concentrated form, thereby reducing natural ones. The IPCC Guidelines for national greenhouse inventories do not include CO<sub>2</sub> emissions from geothermal generation among those to be censused.

However, Italy included these CO<sub>2</sub> emissions in its national reports on greenhouse gas emissions.

In this Environmental Report, CO<sub>2</sub> and H<sub>2</sub>S emissions from geothermal generation are reported for information completeness.

Their values are estimated on the basis of periodical monitoring & sampling of the

composition and flow rate of geothermal steam used by power plants.

Thanks to the growing use of abatement systems, H<sub>2</sub>S emissions are lower than those that would be naturally present in geothermal areas without power plants.

In line with the aforesaid IPCC Guidelines, the Eco-Balance does not report the emissions of CO<sub>2</sub> from thermal generation obtained from solid biomass and from the biodegradable fraction of RDF (containing non-fossil carbon). Indeed, these emissions counterbalanced the CO<sub>2</sub> absorbed by biomass during its growth; such biomass may have been used on as-is basis or may have been the organic component of waste.

However, CO<sub>2</sub> emissions from combustion of the non-biodegradable fraction (containing fossil carbon) of RDF are reported.

### **Avoided CO<sub>2</sub> emissions**

Avoided CO<sub>2</sub> emissions are an indicator of the environmental benefits arising from the mix of resources used for production processes and from the efficiency of the full cycle, from utilization of the resources to end-uses of the various products.

The tables show the CO<sub>2</sub> emissions that were avoided thanks to electricity generation from renewables, rather than from the otherwise necessary fossil-fired thermal generation.

These emissions are determined by multiplying the electricity generation from each renewable source by the average specific CO<sub>2</sub> emissions from Enel's fossil-fired thermal generation in Italy.

In the case of hydro power, reference is made only to generation from natural flows, excluding the contribution of pumped-storage power plants.

The reported trends are obviously consistent with those of electricity generation. In 2006, electricity generation from renewables avoided almost 25% of the overall CO<sub>2</sub> emissions which would have been produced by Enel's electricity generation activities, failing any contribution by renewables.

### **Waste waters**

Waste waters include the residual water for industrial uses coming from thermal power plants and from the fuel-oil storage & handling facility of Ravenna as well as the meteoric waters collected from the outdoor areas of the same installations when they are susceptible to oil contamination. They are treated on a regular basis and always if they are to be returned to surface water bodies. After treatment, waste waters are in part used inside plants – thereby contributing to coverage of water requirements for industrial uses – and in part discharged into water bodies or, more infrequently, into the sewage system.

The volumes of waste waters are estimated by referring to the potential capability and utilization of water treatment systems, as well as to the modes of operation of the installations where these systems are located.

As is obvious, waste waters reflect the trend of water requirements for industrial uses, except for a few deviations due to the variability of precipitation.

### **Polluting load of waste waters**

Waste waters carry substances that alter the physico-chemical characteristics of the recipient water bodies, thus causing a potentially negative impact on ecosystems and affecting subsequent water uses (e.g. drinking, farming and bathing).

In the case of Enel, the extent of the problem is much smaller than in other industries, such as the chemical industry. Nevertheless, the applicable legislation specifies strict limits for concentration of pollutants, with which Enel complies through the use of treatment systems.

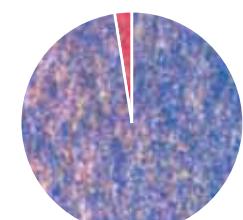
Waste waters are distinguished on the basis of their characteristics (acidic/alkaline, oily, coming from desulfurizer drains, meteoric, gray water) and separately treated. After treatment, some of their parameters (e.g. conductivity, pH, turbidity, dissolved oxygen and oil content) are continuously monitored. This activity ensures compliance with regulatory limits; indeed, when pollutant concentrations get close to regulatory limits, waste waters are treated again.

Also the waste waters that are reused inside Enel's power plants (contributing to coverage of water requirements for industrial uses) usually need a prior treatment in order to comply with the applicable specifications.

Data on all waste water releases are reported from 2003. This result was made possible by the systematic use of environmental management systems (certified or to be certified) and was preceded by the collection of waste water data on larger and larger samples of power plants in previous years. The relevant data are as follows: overall emissions of typical and quantitatively significant pollutants (metals and compounds, nitrogen and compounds, phosphorus and compounds), as well as COD (Chemical Oxygen Demand) and BOD (Biochemical Oxygen Demand). The data are obtained by multiplying concentrations by the volumes of discharged waste waters.

## Special waste in 2006

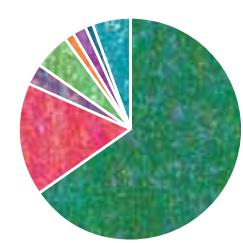
Total production: 1,580,110 t



■ Non-hazardous **97.6%**  
■ Hazardous **2.4%**

## Non-hazardous special waste in 2006

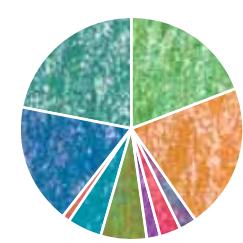
Total production: 1,542,616 t



■ Coal ash **70.5%**  
■ Gypsum from desulfurization **17.4%**  
■ Machinery & equipment **1.9%**  
■ Sludges from water treatment **4.3%**  
■ Materials removed from trashracks & alluvial sediments **0.5%**  
■ Geothermal drill cuttings **0.9%**  
■ Packaging materials **0.1%**  
■ Remaining **4.4%**

## Hazardous special waste in 2006

Total production: 37,494 t



■ Fuel-oil flyash **19.2%**  
■ Machinery & equipment **21.8%**  
■ Used oils with PCBs > 25 ppm **2.4%**  
■ Used oils free of PCBs or with PCBs ≤ 25 ppm **2.9%**  
■ Used batteries **2.2%**  
■ Asbestos-containing materials **6.6%**  
■ Sludges from geothermal cooling towers **4.9%**  
■ Waste from material contaminated by geothermal fluids **0.4%**  
■ Remaining solid **17.5%**  
■ Remaining liquid **22.1%**

## Special waste

Special waste represents the refuse from Enel's industrial activities. This refuse was regulated by Legislative Decree no. 22 of February 5, 1997, as amended, now replaced by Legislative Decree no. 152 of April 3, 2006 (Section 4: provisions on waste management and rehabilitation of polluted sites).

The above legislation classifies waste into non-hazardous and hazardous.

> **Non-hazardous waste** includes: i) the most representative items (specified in the tables): coal ash and gypsum from desulfurization; ii) "other" waste (only specified in the pie chart), including typical and "remaining" non-hazardous waste; the typical items of the latter category are individually inventoried (machinery & equipment and their parts, supports of power lines, conductors and cables, gas ducts; sludges from water treatment; materials removed by Enel from the trashracks of hydro power plant intake structures; the portion of alluvial sediments removed from hydro basins upon emptying which is not reused locally, because it is not classified as inert or classified as inert without a specified use; drill cuttings from geothermal activities; and packagings); the "remaining" waste is made up of items of a general or exceptional nature (e.g.: clothing; debris from construction and demolition) or present in very low amounts (e.g. fuel-oil bottom ash).

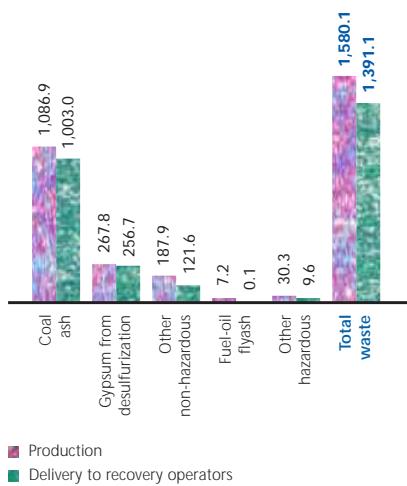
> **Hazardous waste** comprises: i) fuel-oil flyash (specified in the tables as the most representative item); ii) "other" waste (only specified in the pie chart), including typical and "remaining" hazardous waste; the typical items of the latter category are individually inventoried (PCB-containing equipment, such as transformers, capacitors and their parts; used oils; used batteries; asbestos-containing material; sludge from condensation of geothermal steam; waste from material contaminated by geothermal fluids); the "remaining solid" and "remaining liquid" waste consists of items of a general or exceptional nature (oil-stained clothing, dirt and deposits, soil from remediation works, oil-in-water emulsions, etc.).

The waste data 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 are delivered to authorized waste recovery operators.

## Main categories of special waste in 2006 (thousand t)



The results show that:

- > the production of ash is obviously correlated with fuel consumption and characteristics, but it reflects fluctuations that depend on: frequency of ash removal from flue gas ducts and from the hoppers of boilers and of particulate collectors; possible addition of water to the ash to prevent the formation of dust during its temporary storage on the plant site; combustion of flyash in the upper part of boiler furnaces in the case of dual oil-gas firing;
- > the production of gypsum naturally reflects limestone consumption in the flue gas desulfurization process;
- > the 2006 value of the "other" non-hazardous special waste from both generation and distribution of electricity is the lowest in the period; this result may be attributed to both practical completion of demolition works in power plants being converted and disposal of old meters installed at the premises of distribution customers and replaced with electronic meters;
- > conversely, the practical doubling of the 2005 value of the "other" non-hazardous special waste in the third group is consequent upon the disposal of unused materials stored in the warehouses of the gas grid;
- > the values of the "other" hazardous waste in 2006 are, in all cases, lower than in 2005; however, those pertaining to electricity distribution lie well above historical values as a consequence of the plan of replacement of PCB-contaminated equipment;
- > the high share of the "remaining solid" waste in the total hazardous special waste (see the related pie chart) is mainly due to: in the case of generation, packagings containing waste from or contaminated by hazardous substances, absorbents, filtering materials, rags and protective clothing contaminated by hazardous substances, fluorescent tubes and other mercury-containing waste; in the case of distribution, soil from clean-up of accidental oil spills;
- > the high share of the "remaining liquid" in the total hazardous special waste (see the related pie chart) is to be ascribed, above all, to meteoric waters potentially contaminated by oils and collected in the vats underlying the transformers of high-voltage/medium-voltage substations in the power distribution grid.

In the tables, the volumes of "waste delivered to recovery operators" may exceed those of "waste production", when the waste has been temporarily stored on the plant site in a given year and delivered to recovery operators only in the subsequent year.

Finally, it is worth stressing that, in 2006, 30,500 of the 30,511 tonnes of alluvial sediments removed with mechanical equipment upon emptying of hydro basins were used locally (e.g. for restoring the embankments of basins) and thus not included in waste production.

## Emissions

Source		2002	2003	2004	2005	2006
<b>Emissions into the atmosphere</b>						
SO <sub>2</sub>	thermal generation	thousand t	196	101	94	73
NO <sub>x</sub>	thermal generation	thousand t	75	62	56	49
	fuel-oil storage & handling	thousand t	-	-	0.008	0.004
	<b>Total</b>	thousand t	<b>75</b>	<b>62</b>	<b>56</b>	<b>49</b>
Particulates	thermal generation	thousand t	6.1	3.5	3.3	2.6
CO <sub>2</sub>	<i>fossil-fired thermal generation (from combustion)</i>	<i>thousand t</i>	75,246	71,345	63,281	56,124
	<i>fossil-fired thermal generation (from desulfurization)</i>	<i>thousand t</i>	144	112	93	71
	total from fossil-fired thermal generation	thousand t	75,391	71,457	63,374	56,195
	<i>non-fossil-fired thermal generation (from fossil carbon)</i>	<i>thousand t</i>	-	-	-	12
	total from thermal generation	thousand t	75,391	71,457	63,374	56,207
	geothermal drilling, fuel-oil storage & handling, gas distribution, generating sets	thousand t	9	17	30	24
	<b>Total</b>	<b>thousand t</b>	<b>75,400</b>	<b>71,474</b>	<b>63,404</b>	<b>56,232</b>
SF <sub>6</sub>	<i>electricity generation</i>	<i>kg</i>	1,040	1,430	1,373	1,530
		<i>thousand t of CO<sub>2</sub>-equivalent</i>	23	32	30	34
	<i>electricity distribution</i>	<i>kg</i>	2,384	2,033	2,818	2,700
		<i>thousand t of CO<sub>2</sub>-equivalent</i>	53	45	63	60
	<b>Total</b>	<b>kg</b>	<b>3,424</b>	<b>3,462</b>	<b>4,191</b>	<b>4,230</b>
		<i>thousand t of CO<sub>2</sub>-equivalent</i>	76	77	93	94
CH <sub>4</sub>	gas distribution	thousand t	5.7	6.3	6.6	13.0
		<i>thousand t of CO<sub>2</sub>-equivalent</i>	131	145	151	300
<b>Total greenhouse gases (CO<sub>2</sub>, SF<sub>6</sub>, CH<sub>4</sub>)</b>		<b>thousand t of CO<sub>2</sub>-equivalent</b>	<b>75,607</b>	<b>71,696</b>	<b>63,648</b>	<b>56,626</b>
H <sub>2</sub> S	geothermal generation (fluid)	thousand t	21	24	23	23
CO <sub>2</sub>	geothermal generation (fluid)	thousand t	1,809	1,958	1,893	1,838
						<b>1,946</b>

## Emissions

Source	2002	2003	2004	2005	<b>2006</b>	
<b>Avoided CO<sub>2</sub> emissions</b>						
Hydro generation from natural flows	thousand t	14,684	12,513	14,651	12,464	<b>12.875</b>
Geothermal generation	thousand t	3,154	3,373	3,533	3,444	<b>3.643</b>
Wind and solar (photovoltaic) generation	thousand t	38	52	162	254	<b>279</b>
Generation from biomass & biodegradable fraction of waste	thousand t	-	-	-	9	<b>16</b>
<b>Total</b>	<b>thousand t</b>	<b>17,876</b>	<b>15,938</b>	<b>18,346</b>	<b>16,171</b>	<b>16.813</b>
<b>Waste waters (discharged quantity)</b>						
thermal generation	million m <sup>3</sup>	16.4	12.6	12.9	14.7	<b>13.2</b>
fuel-oil storage & handling	million m <sup>3</sup>	-	-	0.1	0.1	<b>0,1</b>
<b>Total</b>	<b>million m<sup>3</sup></b>	<b>16.4</b>	<b>12.6</b>	<b>13.0</b>	<b>14.8</b>	<b>13.3</b>
<b>Polluting load of waste waters from Enel's installations</b>						
Metals and compounds (expressed as metal equivalent)	kg	n.a.	4,605	5,339	3,178	<b>2,672</b>
fuel-oil storage & handling	kg	-	-	49	40	<b>11</b>
<b>Total</b>	<b>kg</b>	<b>n.a.</b>	<b>4,605</b>	<b>5,388</b>	<b>3,218</b>	<b>2,683</b>
Total nitrogen (expressed as N)	kg	n.a.	50,696	59,683	104,881	<b>86,785</b>
fuel-oil storage & handling	kg	-	-	936	800	<b>115</b>
<b>Total</b>	<b>kg</b>	<b>n.a.</b>	<b>50,696</b>	<b>60,619</b>	<b>105,681</b>	<b>86,900</b>
Total phosphorus (expressed as P)	kg	n.a.	3,381	4,727	7,524	<b>9,268</b>
fuel-oil storage & handling	kg	-	-	508	435	<b>48</b>
<b>Total</b>	<b>kg</b>	<b>n.a.</b>	<b>3,381</b>	<b>5,235</b>	<b>7,959</b>	<b>9,316</b>
COD	kg	n.a.	408,067	422,739	384,393	<b>379,948</b>
fuel-oil storage & handling	kg	-	-	7,215	6,160	<b>1,021</b>
<b>Total</b>	<b>kg</b>	<b>n.a.</b>	<b>408,067</b>	<b>429,954</b>	<b>390,553</b>	<b>380,969</b>
BOD	kg	n.a.	62,575	70,933	76,439	<b>83,147</b>
fuel-oil storage & handling	kg	-	-	240	205	<b>314</b>
<b>Total</b>	<b>kg</b>	<b>n.a.</b>	<b>62,575</b>	<b>71,173</b>	<b>76,644</b>	<b>83,460</b>

n.a.: not available.

**Emissions**

Source		2002	2003	2004	2005	2006
<b>Non-hazardous special waste</b>						
Coal bottom ash	fossil-fired thermal generation					
production		t	58,311	35,855	14,878	30,552
delivery to recovery operators		t	58,336	35,855	14,755	29,710
Coal flyash	fossil-fired thermal generation					
production		t	1,146,320	1,043,885	1,267,438	1,157,709
delivery to recovery operators		t	1,078,017	1,029,882	1,261,586	1,161,008
Gypsum from desulfurization	fossil-fired thermal generation					
production		t	579,777	442,598	354,713	279,632
delivery to recovery operators		t	547,872	431,009	361,918	284,421
Other						
production	electricity generation & geothermal drilling	t	219,723	203,717	179,278	241,404
	electricity distribution	t	46,161	39,210	53,544	46,584
	fuel-oil storage & handling, gas distribution	t	133	175	167	175
	<b>Total</b>	t	266,017	243,101	232,989	288,163
delivery to recovery operators	electricity generation & geothermal drilling	t	99,950	95,553	115,034	99,187
	electricity distribution	t	44,358	39,432	52,819	45,723
	fuel-oil storage & handling, gas distribution	t	116	175	121	125
	<b>Total</b>	t	144,425	135,160	167,973	145,034
<b>Total</b>						
production	electricity generation & geothermal drilling	t	2,004,131	1,726,055	1,816,307	1,709,297
	electricity distribution	t	46,161	39,210	53,544	46,584
	fuel-oil storage & handling, gas distribution	t	133	175	167	175
	<b>Total</b>	t	2,050,425	1,765,440	1,870,018	1,756,056
delivery to recovery operators	electricity generation & geothermal drilling	t	1,784,175	1,592,299	1,753,293	1,574,326
	electricity distribution	t	44,358	39,432	52,819	45,723
	fuel-oil storage & handling, gas distribution	t	116	175	121	125
	<b>Total</b>	t	1,828,650	1,631,906	1,806,232	1,620,173

## Emissions

Source		2002	2003	2004	2005	2006
<b>Hazardous special waste</b>						
Oil flyash	fossil-fired thermal generation					
production	t	14,911	11,479	8,937	10,096	<b>7,212</b>
delivery to recovery operators	t	656	948	197	94	<b>133</b>
Other						
production	electricity generation & geothermal drilling	t	10,126	12,769	13,020	17,016
	electricity distribution	t	6,250	8,212	12,170	18,254
	fuel-oil storage & handling, gas distribution	t	20	6	2,106	23
	<b>Total</b>	t	<b>16,397</b>	<b>20,986</b>	<b>27,295</b>	<b>35,292</b>
delivery to recovery operators	electricity generation & geothermal drilling	t	1,414	1,085	1,348	1,330
	electricity distribution	t	4,241	5,757	4,472	7,024
	fuel-oil storage & handling, gas distribution	t	0	0	0	1
	<b>Total</b>	t	<b>5,655</b>	<b>6,842</b>	<b>5,820</b>	<b>8,355</b>
<b>Total</b>						
production	electricity generation & geothermal drilling	t	25,038	24,248	21,956	27,112
	electricity distribution	t	6,250	8,212	12,170	18,254
	fuel-oil storage & handling, gas distribution	t	20	6	2,106	23
	<b>Total</b>	t	<b>31,308</b>	<b>32,466</b>	<b>36,232</b>	<b>45,389</b>
delivery to recovery operators	electricity generation & geothermal drilling	t	2,070	2,033	1,545	1,424
	electricity distribution	t	4,241	5,757	4,472	7,024
	fuel-oil storage & handling, gas distribution	t	0	0	0	1
	<b>Total</b>	t	<b>6,311</b>	<b>7,789</b>	<b>6,017</b>	<b>8,449</b>
<b>Total special waste</b>						
production	electricity generation & geothermal drilling	t	2,029,168	1,750,303	1,838,263	1,736,410
	electricity distribution	t	52,411	47,421	65,714	64,838
	fuel-oil storage & handling, gas distribution	t	153	181	2,272	198
	<b>Total</b>	t	<b>2,081,733</b>	<b>1,797,906</b>	<b>1,906,250</b>	<b>1,801,445</b>
delivery to recovery operators	electricity generation & geothermal drilling	t	1,786,246	1,594,331	1,754,838	1,575,750
	electricity distribution	t	48,599	45,189	57,291	52,746
	fuel-oil storage & handling, gas distribution	t	116	175	121	125
	<b>Total</b>	t	<b>1,834,962</b>	<b>1,639,696</b>	<b>1,812,249</b>	<b>1,628,621</b>

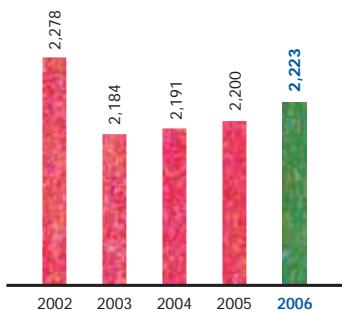
# Indicators

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 (based on processing of the data reported in the Eco-Balance) and provide comments, if any, on their trends.

## Conservation and quality of resources

**Net heat rate of thermal generation**  
(kcal/kWh)



> The **net heat rate of thermal generation** defines the average quantity of fuels which are consumed by thermal power plants to generate one kWh net. Its trend in the past few years is the result of two opposite effects: on one hand, the growing amount of electricity absorbed by power plant systems for abating emissions into the atmosphere; and, on the other hand, the entry into operation of new high-efficiency combined-cycle plants. Capacity modulation in many power plants (more marked after the start of the Power Exchange) had a pejorative effect on the trend of this indicator. To facilitate the understanding of the 2006 result, it is worth pointing out that, if the related thermal power had been generated with the 2002 net heat rate, fuel consumption would have increased by 400,000 tonnes of oil-equivalent.

> 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.

In the calculation, the energy content of the endogenous fluid is subtracted from the residual energy content of the fluid used for supply of heat (fluid becoming available after expansion in the geothermal unit equipped with an atmospheric-exhaust turbine).

Its slight increase in the past two years may be attributed to the naturally declining pressure of geothermal reservoirs over time.

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

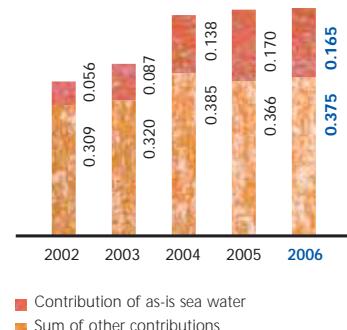
The yearly average in the reported period, weighted on hydro generation from pumped storage, is equal to 71.8%.

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

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

Their increase in the first four years of the reported period is due, above all, to the growing penetration of flue gas desulfurization systems. However, it should be stressed that the main source for covering the water requirements of desulfurizers is as-is sea water; disregarding the specific requirements of as-is sea water, the increase is much smaller.

**Net specific requirements of water for industrial uses in thermal generation (liters/kWh)**

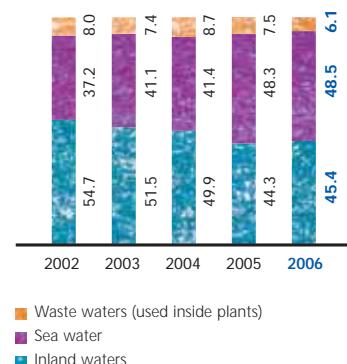


Contribution of as-is sea water  
Sum of other contributions

> In 2006, the overall contribution of inland waters (rivers, wells and aqueducts) to coverage of

requirements of water for industrial uses, although slightly up, remained well below 50%. In some cases, waste waters are unsuitable for reuse because, if they were reused, the systems using them would require more frequent clean-up and maintenance jobs. This fact limits the waste waters used inside plants to about 15% of their maximum theoretical amount.

**Coverage of requirements of water for industrial uses (%)**



Waste waters (used inside plants)  
Sea water  
Inland waters

> Fossil fuel consumption in 2006 shows that oil products increased, natural gas decreased and coal remained steady, thus ranking no. 1 among fossil fuels. For an explanation of these trends, see the paragraph on "Fuels" in "Resources" of the Eco-Balance.

The same paragraph explains the reasons for the difference in LS and VLS fuel oil consumption with respect to 2005.

The shares of technologically captive and non-technologically captive uses of natural gas basically remained unaltered with respect to 2005, as previously stated.

> The share of geothermal steam having suitable thermodynamic characteristics and thus used for electricity generation accounts for the near totality of the geothermal fluid extracted.

Its downward trend in the period is related to the considerations made about the net heat rate of geothermal generation. However, it is worth recalling that a part of this fluid not used for electricity generation is used for carrying heat.

> In 2006, generation from renewables (expressed as a percentage of total electricity generation) had the highest value of the period in all of its components.

### 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 overall production of coal ash (bottom ash and flyash) and of fuel-oil flyash per kWh net obtained with each of the two fuels.

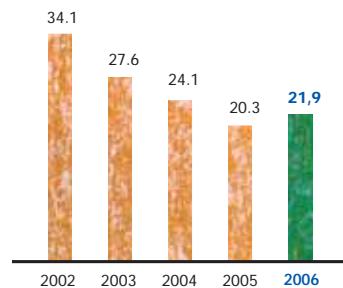
The use of better quality fuels (lower production of ash) and the generalized application of advanced particulate collection technologies (higher separation of flyash) have opposite effects which are accompanied by fluctuations that depend on contingent circumstances, as previously pointed out with reference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

In 2005, the latter circumstances (clean-up of boilers and vats in the Torrevaldaliga Nord power plant) had a major impact on production of fuel-oil ash.

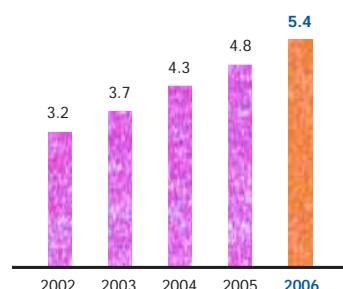
### Waste recovery

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

**Relative consumption of fuel oil**  
(% of total consumption of fossil fuels for thermal generation)



**Electricity generation from biomass & waste (biodegradable fraction), geothermal, wind & solar (photovoltaic) sources vs. total electricity generation (%)**

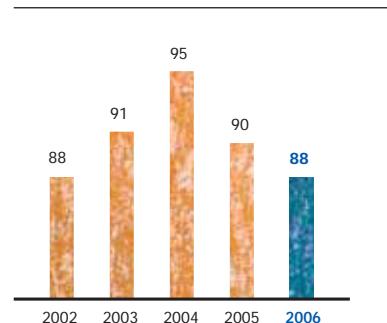


The trends infer that:

- > the value of overall special waste recovery in 2006, although largely satisfactory, is the lowest in the period; this result depends on the decrease in the amount of the most representative waste (coal flyash and gypsum) delivered to recovery operators (the Sulcis power plant had difficulties in selling it);
- > recovery of "other" non-hazardous special waste in 2006 significantly improved in all business activities and was excellent in electricity distribution (almost total recovery of high amounts of metals, packagings, glass, etc.);
- > recovery of fuel-oil ash rose significantly in 2006 even though it retains an absolutely marginal role owing to a progressively shrinking demand by the markets of recovered materials (heavy metals);
- > recovery of "other" hazardous special waste had an averagely significant growth in 2006; this item recorded a drop in the mid of the period, when a high amount of this waste was delivered to disposal facilities as the only available option.

**Total waste recovery**

(% of waste production)



### Specific emissions into the atmosphere

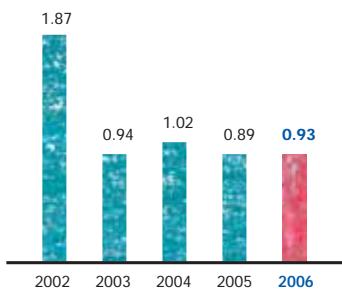
In electricity generation, they express the amounts of the typical and significant substances (see "Emissions into the atmosphere" in "Emissions" of the Eco-Balance) that are released into the atmosphere per kWh net of thermal, geothermal or total electricity generation.

The specific emissions from thermal generation represent:

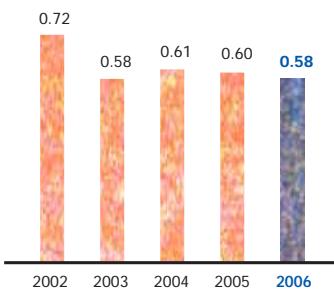
- > for SO<sub>2</sub>, NO<sub>x</sub> and particulates: the cumulated effect of the fuel mix, of the efficiency of thermal power plants and of direct prevention and abatement measures;
- > for CO<sub>2</sub>: the cumulated effect of the mix of fossil fuels (or fuels containing carbon of fossil origin) and of the efficiency of thermal power plants; the contribution due to the operation of desulfurizers is definitely marginal but included in the data.

Specific emissions of SO<sub>2</sub>, NO<sub>x</sub> and particulates have a definitely downward trend in the reported period, thanks to the combined effect of: i) advanced combustion systems; ii) flue gas emission abatement systems; iii) growing reliance on high-grade fuels; and iv) excellent average efficiency of thermal power plants. The slightly upward trend of specific SO<sub>2</sub> emissions in 2006 is due to an increased contribution of LS fuel oil.

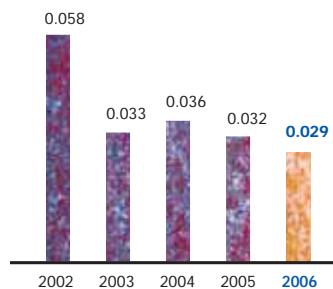
**Specific SO<sub>2</sub> emissions from thermal generation (g/kWh thermal net)**



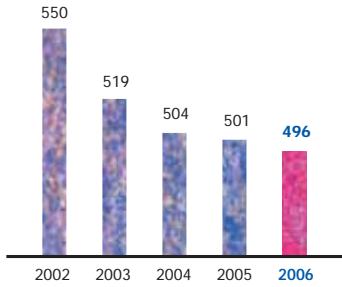
**Specific NO<sub>x</sub> emissions from thermal generation (g/kWh thermal net)**



**Specific particulate emissions from thermal generation (g/kWh thermal net)**



**Specific CO<sub>2</sub> emissions from thermal generation calculated with respect to total electricity generation (g/kWh total net)**



Specific CO<sub>2</sub> emissions from thermal generation are fairly variable in the period owing to the variability of the emission determinants. The growth recorded in 2006 is due to the increase in the heat rate and to variations of the fuel mix. Excellent results were however achieved with respect to 1990, i.e. the base year for the Kyoto Protocol targets, when 738 g/kWh net were recorded. In line with a practice adopted by many electricity companies, specific CO<sub>2</sub> emissions are also determined with reference to total generation of electricity, thereby mirroring also the effect of the overall mix of energy sources. In 2006, this item was the lowest in the period (496 g/kWh net), showing a further improvement on 1990 (618 g/kWh net), thanks above all to the high contribution of renewables to overall electricity generation.

Relative SF<sub>6</sub> emissions, which concern all electric activities, express the ratio of the yearly emissions of SF<sub>6</sub> to the year-end volume of SF<sub>6</sub> contained in in-service & in-stock equipment, as well as in the bottles used for replenishments.

The percentages of SF<sub>6</sub> over the years show small fluctuations, due above all to the occasional character of replenishments. However, they all lie below the value suggested in the 1996 IPPC Guidelines for national greenhouse gas inventories (1%).

As to natural gas distribution, the tables show the ratio of emissions of CO<sub>2</sub>-equivalent (about 97% of which are due to losses of CH<sub>4</sub> from the grid and the remaining part to CO<sub>2</sub> from losses and from own consumption of natural gas) to the total gas wheeled.

Specific emissions from geothermal generation – bearing in mind the considerations made about their origin (see “Emissions into the atmosphere” in “Emissions” of the Eco-Balance) – are entirely attributed to electricity generation, on the assumption that no steam is lost during drilling and that the fluid used in non-electric

applications is liquid (i.e. without gases, except those dissolved in it). These emissions express:

- > for H<sub>2</sub>S: the cumulated effect of the composition of geothermal steam, of the efficiency of geothermal power plants and of abatement systems;
- > for CO<sub>2</sub>: the cumulated effect of the composition of geothermal steam and of the efficiency of geothermal power plants.

Specific H<sub>2</sub>S emissions continued their gradual decrease in 2006.

In contrast, CO<sub>2</sub> emissions rose in 2006 owing to the previously mentioned decreased efficiency of geothermal power plants.

### Specific polluting load of waste waters

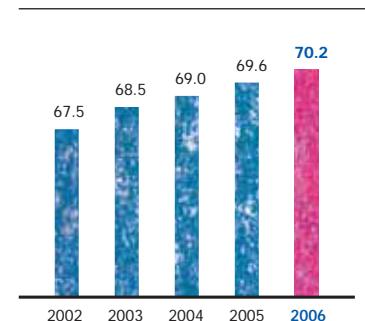
This item expresses the amount, per kWh net of thermal generation, of the typical and significant substances and other parameters of the portion of waste waters from thermal power plants that is returned to water bodies (see "Polluting load of waste waters" in "Emissions" of the Eco-Balance).

As is obvious, these emissions are chiefly dependent on the efficiency of waste water treatment systems and cannot be easily correlated with other factors concerning the power plants and their modes of operation.

### Land

With regard to landscape and land conservation, note the progressive increase in the percentage of overhead and underground cables and, accordingly, the gradual decrease of bare conductors in distribution lines.

**Overhead and underground cables in low- and medium-voltage lines**  
(% of entire LV and MV grid)



## Indicators

							%	%
		2002	2003	2004	2005	2006 ('06-'02)/'02 ('06-'05)/'05		
<b>Resource conservation and quality</b>								
Net heat rate of thermal generation	kcal/kWh	2.278	2.184	2.191	2.200	<b>2.223</b>	-2,4	1,1
Net heat rate of geothermal generation	kcal/kWh	5.413	5.246	5.309	5.313	<b>5.447</b>	0,6	2,5
Net efficiency of hydro generation from pumped storage	%	71,2	70,7	72,3	72,9	<b>72,2</b>	1,4	-1,0
Consumption of electricity for distribution grid operation	% of electricity distributed	n.a.	n.a.	0,14	0,16	<b>0,12</b>	n.d.	-22,4
Consumption of natural gas for distribution grid operation	% of natural gas distribut.	0,06	0,16	0,13	0,12	<b>0,15</b>	145,6	21,2
Losses of natural gas along the grid	% of natural gas distribut.	0,35	0,35	0,35	0,65	<b>0,65</b>	85,7	0,0
Net specific requirements of water for industrial uses in thermal generation								
including contribution of as-is sea water	liters/kWh	0,364	0,407	0,523	0,536	<b>0,539</b>	48,1	0,6
excluding contribution of as-is sea water	liters/kWh	0,309	0,320	0,385	0,366	<b>0,375</b>	21,4	2,3
Coverage of requirements of water for industrial uses								
from rivers	% of requirements	22,0	22,2	29,1	22,7	<b>23,6</b>	6,9	3,7
from wells	% of requirements	18,2	16,5	9,3	9,3	<b>9,7</b>	-46,8	4,7
from aqueducts	% of requirements	14,5	12,7	11,5	12,3	<b>12,1</b>	-16,1	-1,1
Total from inland waters	% of requirements	<b>54,7</b>	<b>51,5</b>	<b>49,9</b>	<b>44,3</b>	<b>45,4</b>	-17,1	2,6
from the sea (as-is)	% of requirements	15,3	21,3	26,3	31,6	<b>30,5</b>	99,5	-3,6
from the sea (desalinated)	% of requirements	21,9	19,8	15,0	16,7	<b>18,0</b>	-18,1	7,9
from waste waters (used inside plants)	% of requirements	8,0	7,4	8,7	7,5	<b>6,1</b>	-23,6	-17,7
Fossil fuel consumption for thermal generation								
fuel oil	% of total fuel consumpt.	34,1	27,6	24,1	20,3	<b>21,9</b>	-35,6	8,3
orimulsion	% of total fuel consumpt.	4,5	4,2	1,2	0,0	<b>0,0</b>	-100,0	-
gas-oil	% of total fuel consumpt.	0,2	0,4	0,2	0,4	<b>0,5</b>	104,8	36,1
natural gas	% of total fuel consumpt.	31,7	40,3	38,1	39,8	<b>37,8</b>	19,1	-5,0
coal	% of total fuel consumpt.	29,5	27,4	36,3	39,6	<b>39,8</b>	35,0	0,5
HS fuel oil	% of tot. fuel-oil consumpt.	0,1	0,0	0,5	2,5	<b>0,0</b>	-100,0	-100,0
MS fuel oil	% of tot. fuel-oil consumpt.	30,0	1,2	3,6	4,3	<b>6,6</b>	-78,0	53,1
LS fuel oil	% of tot. fuel-oil consumpt.	29,7	35,0	39,3	27,2	<b>42,3</b>	42,5	55,5
VLS fuel oil	% of tot. fuel-oil consumpt.	40,2	63,8	56,6	66,0	<b>51,1</b>	27,0	-22,6
natural gas, technologically captive use	% of tot. n.-gas consumpt.	27,1	59,0	64,2	60,7	<b>62,2</b>	129,7	2,5
of which in combined-cycle units	% of tot. n.-gas consumpt.	n.a.	n.a.	n.a.	50,5	<b>51,3</b>	n.a.	1,6
natural gas, non-technologically captive use	% of tot. n.-gas consumpt.	72,9	41,0	35,8	39,3	<b>37,8</b>	-48,1	-3,8
Geothermal steam for electricity generation	% of total geothermal fluid extracted	99,5	99,5	97,2	96,8	<b>96,9</b>	-2,6	0,1
Electricity generation from renewables								
thermal from biomass & biodegradable fraction of waste	% of total generation	-	-	-	0,011	<b>0,022</b>	-	91,9
geothermal	% of total generation	3,2	3,7	4,1	4,5	<b>5,0</b>	56,6	11,9
hydro from natural flows	% of total generation	14,9	13,6	16,9	16,2	<b>17,7</b>	18,9	9,3
wind & solar (photovoltaic)	% of total generation	0,038	0,056	0,187	0,330	<b>0,383</b>	895,7	16,2
Total	% of total generation	18,1	17,3	21,1	21,0	<b>23,1</b>	27,5	10,0

n.a.: not available.

## Indicators

		2002	2003	2004	2005	2006 ('06-'02)/'02	2006 ('06-'05)/'05	%	%
<b>Specific production of waste</b>									
Coal ash									
Coal ash	g/kWh net from coal	43	42	43	41	41	-4,4	-0,5	
Oil ash	g/kWh net from fuel oil & gas-oil	0.43	0.42	0.44	0.66	0.48	13.9	-27.0	
<b>Waste recovery</b>									
Coal ash									
Coal ash	% of production	94	99	100	100	92	-2.2	-7.9	
<i>bottom ash</i>	% of production	100	100	99	97	100	-0.3	2.6	
<i>flyash</i>	% of production	94	99	100	100	92	-2.1	-8.2	
Gypsum from desulfurization	% of production	94	97	102	102	96	1.4	-5.8	
Other non-hazardous special waste									
electricity generation & geothermal drilling	% of production	45	47	64	41	59	28.8	42.6	
electricity distribution	% of production	96	101	99	98	98	2.1	-0.1	
fuel-oil storage & handling, gas distribution	% of production	88	100	72	71	89	1.8	25.8	
Total	% of production	54	56	72	50	65	19.3	28.7	
Total non-hazardous special waste									
electricity generation & geothermal drilling	% of production	89	92	97	92	89	0.4	-3.0	
electricity distribution	% of production	96	101	99	98	98	2.1	-0.1	
fuel-oil storage & handling, gas distribution	% of production	88	100	72	71	89	1.8	25.8	
Total	% of production	89	92	97	92	90	0.4	-2.9	
Fuel-oil flyash									
Fuel-oil flyash	% of production	4.4	8.3	2.2	0.9	1.8	-58.1	97.6	
Other hazardous special waste									
electricity generation & geothermal drilling	% of production	14	8	10	8	10	-30.7	23.8	
electricity distribution	% of production	68	70	37	38	52	-22.7	36.2	
fuel-oil storage & handling, gas distribution	% of production	0	0	0	4	25	-	613.9	
Total	% of production	34	33	21	24	32	-7.7	34.5	
Total hazardous special waste									
electricity generation & geothermal drilling	% of production	8	8	7	5	7	-14.3	34.9	
electricity distribution	% of production	68	70	37	38	52	-22.7	36.2	
fuel-oil storage & handling, gas distribution	% of production	0	0	0	4	25	-	613.9	
Total	% of production	20	24	17	19	26	29.3	40.0	
Total special waste									
electricity generation & geothermal drilling	% of production	88	91	95	91	88	0.2	-2,8	
electricity distribution	% of production	93	95	87	81	82	-11.5	0.8	
fuel-oil storage & handling, gas distribution	% of production	76	97	5	63	87	14.5	37.5	
Total	% of production	88	91	95	90	88	-0,1	-2,6	

## Indicators

		2002	2003	2004	2005	2006 ('06-'02)/'02 ('06-'05)/'05	%	%
<b>Specific emissions into the atmosphere</b>								
<b>SO<sub>2</sub> (thermal generation)</b>								
SO <sub>2</sub> (thermal generation)	g/kWh thermal net	1.87	0.94	1.02	0.89	<b>0.93</b>	-50.1	4.5
NO <sub>x</sub> (thermal generation)	g/kWh thermal net	0.72	0.58	0.61	0.60	<b>0.58</b>	-18.9	-1.9
Particulates (thermal generation)	g/kWh thermal net	0.058	0.033	0.036	0.032	<b>0.029</b>	-50.7	-10.6
CO <sub>2</sub> (thermal generation)	g/kWh thermal net	720	670	690	687	<b>699</b>	-2.8	1.8
	g/kWh total net	550	519	504	501	<b>496</b>	-9.8	-1.1
SF <sub>6</sub> (electric activities)	% of SF <sub>6</sub> in equipment or in stock	0,9	0.9	1.0	0.9	<b>0.9</b>	4.6	1.6
CH <sub>4</sub> + CO <sub>2</sub> , as CO <sub>2</sub> equivalent (gas distribution)	g/m <sup>3</sup> of natural gas wheeled	42.7	44.7	44.0	78.9	<b>102.7</b>	140.6	30.1
H <sub>2</sub> S (geothermal fluid)	g/kWh geothermal net	4.8	4.8	4.6	4.6	<b>4.0</b>	-17.5	-13.5
CO <sub>2</sub> (geothermal fluid)	g/kWh geothermal net	413	389	370	367	<b>374</b>	-9.5	1.9
<b>Specific polluting load of waste waters (thermal generation)</b>								
Metals and compounds (expressed as metal equivalent)	mg/kWh thermal net	n.a.	0.04	0.06	0.04	<b>0.04</b>	n.a.	-6.8
Total nitrogen (expressed as N)	mg/kWh thermal net	n.a.	0.5	0.6	1.3	<b>1.2</b>	n.a.	-8.3
Total phosphorus (expressed as P)	mg/kWh thermal net	n.a.	0.03	0.05	0.09	<b>0.13</b>	n.a.	36.6
COD	mg/kWh thermal net	n.a.	3.8	4.6	4.7	<b>5.2</b>	n.a.	9.6
BOD	mg/kWh thermal net	n.a.	0.6	0.8	0.9	<b>1.1</b>	n.a.	20.6
<b>Land</b>								
LV cable lines								
overhead	% of entire LV grid	52.1	52.0	52.1	52.4	<b>52.4</b>	0.6	0.0
underground	% of entire LV grid	29.6	30.4	30.6	30.7	<b>31.3</b>	5.7	1.9
Total	% of entire LV grid	81.7	82.5	82.8	83.2	<b>83.7</b>	2.4	0.7
MV cable lines								
overhead	% of entire MV grid	1.88	2.15	2.25	2.37	<b>2.46</b>	31.3	4.0
underground	% of entire MV grid	35.2	36.1	36.7	37.3	<b>37.9</b>	7.5	1.6
Total	% of entire MV grid	37.1	38.3	39.0	39.7	<b>40.4</b>	8.7	1.7
Overhead and underground cables in HV, MV and LV distribution lines	% of total distribution grid	66.3	67.4	67.9	68.4	<b>69.0</b>	4.2	0.9

n.a.: not available.

## Domestic Sales Division

The Domestic Sales Division is primarily focused on the Italian retail electricity and gas market. Its mission is to develop integrated offerings of products and services for various types of customers, while meeting service quality standards.

The Division is organized into four support functions (Planning & Control; Personnel & Organization; Operational Excellence; Performance Management, Quality & Customer Care) and six Business Areas (Marketing, Large Customer Sales, Business and Microbusiness Customer Sales, Residential Gas Customer Sales, Operations, Installations and Franchising).

The Marketing Business Area is provided with three units (Large Customer Marketing, Business Customer Marketing, Business & Microbusiness Customer Marketing, Residential Customer Marketing) whose task is, among others, to develop offerings of products and services for the customers of the eligible market.

In 2006, the Division marketed two "green" offerings: "Green Power" and "Pure Power", both based on RECS (Renewable Energy Certificate System) certificates.

One RECS certificate is worth 1 MWh of usage of power from renewables. In the commercial offerings based on RECS certificates, customers get a guarantee of origin by paying a small extra cost that finances the development of renewables.

- > Green Power is targeted at high-usage customers (Large Customer segment).  
Customers subscribing to this offering get a "100% green power" logo combined with Enel's logo.
- > Pure Power is the first green power offering in the market that is targeted at the business & microbusiness customer segment (i.e. customers having a VAT number). This offering involves a "Green Power Package" whereby RECS certificates (giving evidence of support to power generation from renewables) are redeemed. The number of redeemed certificates is equal to the usage charged to the individual customer. Customers buying Pure Power get stickers demonstrating their commitment to environmental sustainability and advertising the offering.

### **Legislative Decree 152/2006 (“Environment Code”)**

Legislative Decree no. 152 of April 3, 2006 reorganized the national environmental legislation, by repealing, streamlining and harmonizing most of the complex and confusing previous rules.

The Decree entered into force on April 29, 2006. It consists of six sections, of which Section 1 concerns common rules. The other sections are:

- > Section 2: procedures for Strategic Environmental Assessment (SEA), Environmental Impact Assessment (EIA) and Integrated Environmental Permit; the Permit was introduced in Italy when the IPPC (Integrated Pollution Prevention and Control) Directive was transposed into the Italian legislation;
- > Section 3: soil conservation and struggle against desertification, water protection from pollution and water resource management;
- > Section 4: waste management and rehabilitation of contaminated sites;
- > Section 5: protection of air and reduction of emissions into the atmosphere;
- > Section 6: compensation for environmental damage.

The Decree is hinged upon the following principles:

- > guaranteed protection of environmental quality;
- > increased efficiency and timeliness of environmental monitoring & control actions;
- > prevention, precaution, mitigation and remediation of pollution and of environmental damage, in line with EU guidelines;
- > streamlining of environmental procedures;
- > incentives to small and medium enterprises to join environmental certification systems.

In conjunction with trade organizations, Enel took an active part in the debate that the Italian Government opened upon the drafting of the legislation and of subsequent “corrective” decrees; the latter were required to simplify and improve the legislation, as well as to respond to the EU, which challenged Italy over the incorrect transposition of its rules.

Of the corrective decrees to be issued within two years from the enforcement of Legislative Decree 152/2006, a single one was enacted. Another one is awaiting the opinion of the Italian Parliament. Both decrees involve amendments to the provisions on waters and waste.

One more piece of legislation – drafted in April 2007 – is undergoing the parliamentary procedure. This legislation will completely rewrite Section 2 (SEA, EIA, IPPC) of the Legislative Decree with a view to making the three procedures more independent and to intensify synergies between central Government and regional authorities.

## *Domestic Generation & Energy Management Division*

Domestic Generation & Energy Management is the Division that manages all activities of generation, import and supply of electricity in Italy, optimizing generation and procurement costs.

The Division purchases fuels and manages the related commodity risk (risk concerning electricity generation and electricity and gas sales and consequent upon the trends of oil product prices and euro/dollar exchange rates) on behalf of the Group, in and outside Italy, with the chief purpose of optimizing costs for thermal power plants and competitiveness in gas sales to end users.

Finally, the Division designs, develops and builds power plants in and outside Italy.

The Division consists of two support functions (Personnel & Organization, Planning & Control) and six Business Areas, including:

- > Thermal Generation, which operates and maintains thermal power plants and is responsible for their operating costs and technical performance;
- > Renewables, which develops, operates and maintains renewable-energy power plants and is responsible for their operating costs and technical performance;
- > Engineering & Construction, involving two macro areas: Engineering and Construction (project management and construction of the Group's power plants);
- > Development of Nuclear Skills, created in 2006 with the mission of recovering nuclear skills, supporting the International Division in the acquisition of nuclear power plants outside Italy and fostering the development of future nuclear projects;
- > Research, with the mission of maintaining basic skills and know-how and carrying out research on theoretical, modeling and experimental activities in areas related to electricity generation;
- > Energy Management, with the mission of: i) optimizing the costs of generation/procurement of electricity and its sale on the Power Exchange, to Acquirente Unico (i.e. the Italian "Single Buyer") and wholesalers; ii) sourcing fuels; iii) developing a strategy for securing CO<sub>2</sub> emission rights on the market; and iv) ensuring competitiveness in the sale of gas to end users.

At local level, thermal and renewable-energy power plants are grouped into 34 Business Units.

In a nutshell, the mission of the Division is to generate environmentally-sustainable electricity at competitive prices. To accomplish this mission, the Division banks on completion of the plan of conversion and modernization of its power plants.

The results of the plan will make the fuel mix more balanced, more secure and more efficient, so as to hedge risks of prices and supplies in the hydrocarbon market and cut down emissions into the atmosphere.

The development plans of the Division span over the medium term and confirm its strategies of conversion of power plants to clean coal firing and combined cycles and of deployment of renewables. This modernization program is intended to rationalize the use of resources and slash carbon dioxide emissions by enhancing energy efficiency and making more reliance on renewables.

Equally important are efficiency in the management of the generating mix, optimization of generating capacity and procurement of fuels at competitive prices. The Division is engaged in the QUASAR (Quality of Services, Assets and Resources) project, which has the purpose of introducing Total Quality in all activities and of raising the performance of the Division to meet the highest international standards. The project is becoming increasingly pervasive among operational environments and is building a culture of excellence in operating efficiency, safety and environmental sustainability.

QUASAR continues to be extended within the Division, involving a growing number of employees and power plants in Italy. So far, it has already covered about 78% of the personnel of the Thermal Generation Business Units (91% of electricity generation) and about 53% of the personnel of the Renewables Business Units (57% of electricity generation).

## Thermal Generation Business Area



### Business Unit

- Generation from coal
- Generation from fuel oil and gas
- Generation from combined cycles and gas turbines

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### Power plants

- (1) Fusina, Porto Tolle.
- (2) Sulcis, Portoscuso, Santa Gilla\*, Assemini, Codrongianos\*.
- (3) Piombino, Livorno, Portoferraio, Capraia.
- (4) Rossano, Mercure.
- (5) Termoli Imerese, Alicudi, Filicudi, Malfa, Panarea, Santa Marina Salina, Stromboli, Vulcano.
- (6) Torrevaldaliga Nord, Fiumicino\*, Ventotene.
- (7) La Casella, Alessandria, Carpi.
- (8) Pietrafitta, Camerata Picena, Campomarino, Giugliano, Larino, Maddaloni.

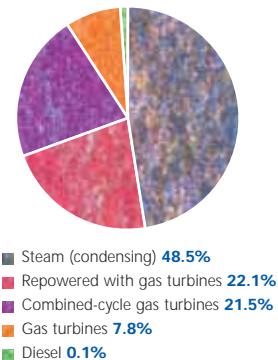
\* These plants do not contribute to the net maximum capacity as they are out of service.

### Thermal power installations

	Power plants no.	Generat. units no.	Net maximum capacity MW
Steam (condensing)	45		12,176
Repowered with gas turbines	9		5,556
Combined-cycle gas turbines	15		5,385
Gas turbines	25		1,970
Diesel	54		29
	<b>46</b>	<b>148</b>	<b>25,117</b>

### Net maximum capacity

Total: 25,117 MW



15 plants (17,873 MW) have an ISO 14001-certified environmental management system in place; 10 of them (11,489 MW) are also EMAS-registered.

### Storage and handling of fuel oil

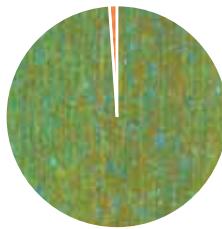
The Thermal Generation Business Area operates an integrated fuel-oil storage and handling facility in Ravenna. The facility ("IICO"), which is equipped with pumping and heating systems, supplies fuel oil via a pipeline to the Porto Tolle power plant.

Overall length of supply pipelines, from sea terminal and from AGIP dock (km)	28
Capacity of storage tanks (m <sup>3</sup> )	183,630
Length of transfer pipeline to Porto Tolle (km)	92
Delivery pumps (no.)	6
Fuel oil transferred to Porto Tolle (t)	574,091
Heat generation - 15 bar and 210°C steam (million kcal)	36,505
Electricity consumption (million kWh)	2.5

In the following pages, the other flow data (consumption of natural gas and gas-oil, expendables, water for industrial uses, waste waters, emissions into the atmosphere and into water bodies, waste) are included among the thermal generation data.

## Net electricity generation

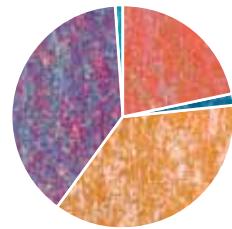
Total: 73,774 million kWh



■ From fossil fuels **99.93%** (73,726 GWh)  
 ■ From biomass and waste **0.07%** (48 GWh)

## Fuel consumption

Total: 16,406,064 t of oil-equivalent

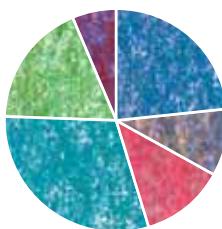


■ Fuel oil **21.92%**  
 ■ Gas-oil **0.49%**  
 ■ Natural gas **37.77%**  
 ■ Coal **39.74%**  
 ■ Biomass & waste **0.08%**

## Water for industrial uses

Total requirements: 39,844,779 m<sup>3</sup>

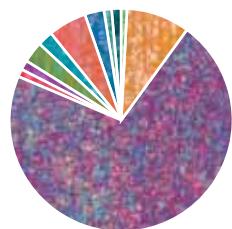
Total abstraction from inland waters: 18,064,761 m<sup>3</sup>



■ From rivers **23.4%**  
 ■ From wells **9.7%**  
 ■ From aqueducts **12.2%**  
 ■ From the sea (as-is) **30.5%**  
 ■ From the sea (desalinated) **18.0%**  
 ■ From waste waters (used inside plants) **6.2%**

## Expendables

Total: 210,972 t



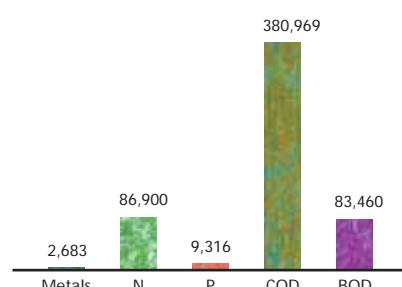
■ Resins, hydrazine, carbohydrazide & hydrogen peroxide **0.04%**  
 ■ Ammonia **9.08%**  
 ■ Limestone for flue gas desulfurization **80.38%**  
 ■ Magnesium oxide **0.03%**  
 ■ Sodium hypochlorite, ferrous chloride & trisodium phosphate **0.49%**  
 ■ Sulfuric & hydrochloric acids **2.12%**  
 ■ Caustic soda **1.06%**  
 ■ Lime, ferric chloride & polyelectrolyte **4.68%**  
 ■ Lubricating oil **1.78%**  
 ■ Dielectric oil **0.03%**  
 ■ Other **0.31%**

## Waste waters

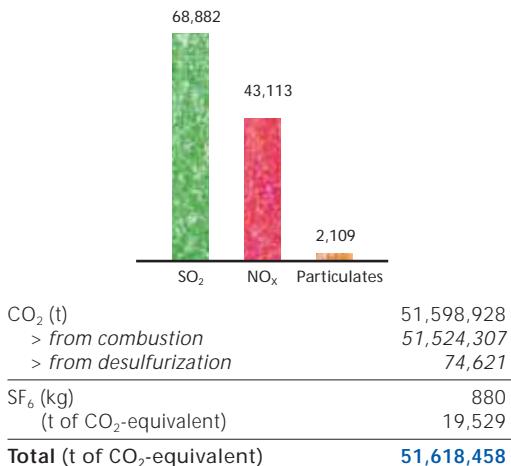
Discharged (m <sup>3</sup> )	13,265,455
Used inside plants (m <sup>3</sup> )	2,451,536

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

## Polluting load of discharged waste waters (kg)



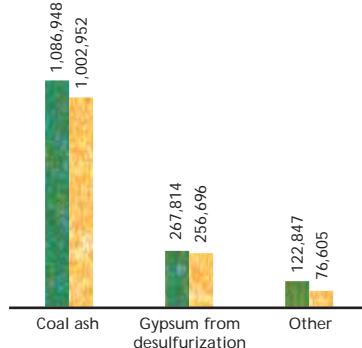
## Emissions into the atmosphere (t)



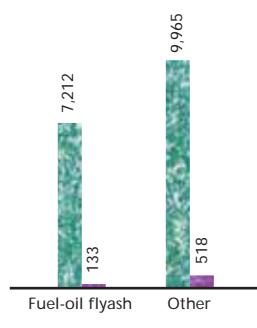
## Special Waste

Total production: 1,494,786 t  
 Total delivery to recovery operators: 1,336,904 t

Non-hazardous  
 Production: 1,477,609 t  
 Delivery to recovery operators: 1,336,252 t



Hazardous  
 Production: 17,177 t  
 Delivery to recovery operators: 652 t



■ Production  
 ■ Delivery to recovery operators

■ Production  
 ■ Delivery to recovery operators

### **Land rehabilitation**

In 2006, Enel took various initiatives of environmental rehabilitation and restoration of the industrial areas that Law 426/98 (on rehabilitation of contaminated sites) designates as of "national interest".

Site characterization was completed for the power plants of La Spezia, Fusina and Porto Marghera (Venice), Brindisi Sud, Augusta and Priolo Gargallo (Siracusa), Sulcis and Portoscuso (Cagliari) and is ongoing for the Piombino power plant (Leghorn). Additional site characterization is being conducted for the Livorno (Leghorn) power plant.

Characterization of the sites of Maddaloni (Caserta) and Giugliano (Naples) is planned for 2007.

Emergency measures were taken for groundwater safety and conservation at the sites of Porto Marghera and Fusina (Venice). The measures are part of an agreement that Enel entered into with the Ministry of the Environment and the "Magistrato delle Acque" (water magistrate) for construction of barriers to safeguard the lagoon and its canals from pollution.

Furthermore, rehabilitation of the Augusta site is being completed.

### **Energy and environmental efficiency of the thermal generating mix**

The following are the main developments which occurred in 2006.

As part of the program of environmental enhancements, the new (and only) combined-cycle unit of the Santa Barbara power plant was put into operation; works continued on unit 2 of the Termini Imerese power plant to convert it to combined cycle (thus completing Enel's 5,000 MW conversion program) and in the Torrevaldaliga Nord power plant to convert it to coal firing, according to the relevant authorization decree of December 24, 2003.

Co-firing of biomass in the Sulcis power plant was authorized by an appropriate decree. Moreover, the Province of Venice authorized Enel to start co-firing of coal and RDF in units 3 and 4 of its Fusina power plant.

The following activities are under way:

> for conversion of the Porto Tolle power plant to coal firing – the Environmental Impact Study and the application for the Integrated Environmental Permit are being assessed as part of the procedure

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whereby the Ministry of Economic Development may grant a single authorization;

- > for improvements to facilities for coal unloading from ships and road infrastructures serving the Brindisi Sud power plant – authorization is awaited from the Ministry of Economic Development after the Ministry of the Environment has excluded the Environmental Impact Assessment;
- > for environmental restoration of the mine adjoining the Santa Barbara power plant – the Ministry of the Environment and the competent local authorities are assessing the Environmental Impact Study;
- > for improvements to the condensing water system of the Trino Vercellese power plant – the Ministry of the Environment is assessing exclusion from the Environmental Impact Assessment in view of subsequent authorization;
- > for co-firing of biomass in the Genova power plant – the authorization process is ongoing;
- > for reactivation of biomass co-firing in unit 2 of the Mercure power plant – the authorization process is ongoing;
- > for all thermal power plants with a thermal capacity exceeding 50 MW – applications for Integrated Environmental Permits (pursuant to Legislative Decree no. 59 of February 18, 2005) have been submitted.

#### **Co-firing of coal with vegetal biomass and RDF**

One of the options available to develop renewables without building new plants and making large investments is co-firing of biomass and RDF in coal-fired power plants.

In legislative terms, co-firing is defined as the simultaneous combustion of non-renewable fuels and of solid, liquid or gaseous fuels obtained from renewable sources.

The current legislation defines combustible biomass as the vegetal products coming from:

- > energy crops;
- > agricultural and forest residues;
- > processing of virgin wood of various types with mechanical systems only;
- > processing of agricultural products (having the required characteristics for marketing and utilization) with mechanical systems only.

This biomass is thus free of glues, plastics and other foreign matter.

Co-firing is one of the most efficient short-term options for generating power from renewables. Indeed:

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- > the timescales for converting a power plant to co-firing are relatively short;
- > the investment is very small and limited to the system supplying the additional fuel to the power plant;
- > co-firing of biomass or of the organic fraction of RDF is a zero-carbon-emission technology, yielding an energy efficiency that is much higher than the one typical of biomass-only plants.

Enel uses biomass and RDF in its power plants of Sulcis and Fusina.

Unit 2 (350 MW with circulating fluidized bed) and unit 3 (240 MW conventional pulverized coal-fired unit) of the Sulcis power plant were authorized to co-fire biomass. The maximum allowed utilization of biomass is 15% and 5% (in energy content), respectively. The two units are designed to utilize dominantly woody biomass.

In 2006, the Province of Venice authorized Enel to initiate co-firing coal with RDF in units 3 and 4 of its Fusina power plant. The thermal capacity from the renewable source is below 5% of the thermal capacity of the individual units, for an amount of RDF not exceeding 35,000 t/year (in 2006, 27,100 t of RDF were used).

At Fusina, RDF is utilized under the highest environmental standards. The process also avoids disposal of waste by the local recovery operators (ACM, VESTA, etc.) or its transport to distant waste-to-energy facilities.

## Renewables Business Area

Hydro, geothermal, wind and photovoltaic solar generation



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(1) Including the wind power plant of Collarmele (L'Aquila).  
 (2) Including the wind power plants of Campolieto and Campolieto 2 (Campobasso), Acquaspruzza and Montarone (Isernia), Serra Cortina (Matera) and the photovoltaic solar power plant of Serre Persano (Salerno).  
 (3) Including the wind power plants of Monte Arci (Oristano), Nuova Alta Nurra, Sa Turrina Manna and Littigheddu (Sassari) and the photovoltaic solar power plant of Alta Nurra Plug (Sassari).  
 (4) Including the wind power plants of Caltabellotta (Agrigento), Serra Marrocco (Enna), Contrada Colla, Contrada Corvo-Cozzo Miturro, Cozzo Vallefondi 1, Monte Zimmara, Sclafani Bagni and Sclafani Bagni 2 (Palermo), Carletti (Siracusa) and the photovoltaic solar power plants of Vulcano and Vulcano Plug (Messina).

### Power installations

HYDRO		Net		
	Power plants no.	Head installations no.	maximum capacity MW	
Run-of-river	318		1,657.6	
Pondage/reservoir	196		5,240.4	
Pure/mixed pumped storage	20		7,481.1	
	<b>500</b>	<b>534</b>	<b>14,379.1</b>	

GEOTHERMAL		Net		
	Power plants no.	Generating units no.	maximum capacity MW	
Condensing	31		664.8	
Atmospheric exhaust	1		5.9	
	<b>31</b>	<b>32</b>	<b>670.7</b>	

WIND		Net		
	Power plants no.	maximum capacity MW		
	<b>19</b>	<b>304.5</b>		

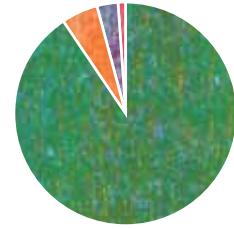
  

PHOTOVOLTAIC		Net		
	Power plants no.	maximum capacity MW		
	<b>4</b>	<b>3.6</b>		

370 plants (14,399 MW) – of which 325 hydro, 10 wind and all the geothermal and photovoltaic solar plants – have an ISO 14001-certified environmental management system in place; 131 of them (6,575 MW) are also EMAS-registered.

### Net maximum capacity

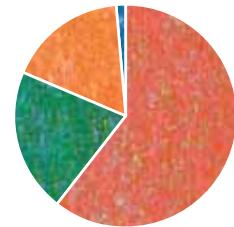
Total: 15,358 MW



■ Hydro **93.63%**  
 ■ Geothermal **4.37%**  
 ■ Wind **1.98%**  
 ■ Photovoltaic solar **0.02%**

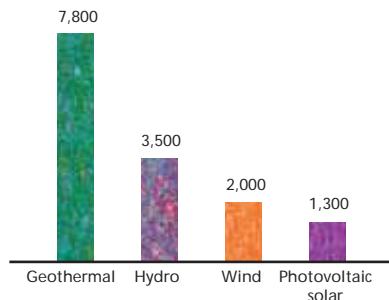
### Net electricity generation

Total: 30,296.2 million kWh



■ Hydro from natural flows **60.8%** (18,406.3 GWh)  
 ■ Hydro from pumped storage **20.7%** (6,283.6 GWh)  
 ■ Geothermal **17.2%** (5,207.5 GWh)  
 ■ Wind **1.3%** (398.3 GWh)  
 ■ Photovoltaic solar **0.5%** (0.5 GWh)

### Equivalent yearly hours of utilization\*



\* On a statistical basis: yearly generating capability/capacity ratio.

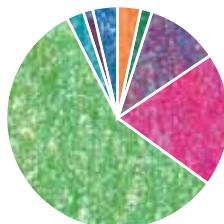
### Geothermal fluid

Total fluid extracted (t)	49,928,676
Net of reinjected liquids (t)	32,984,739
Steam for electricity generation (t)	43,937,123
Fluid used for supply of heat (t)	570,020
> directly	353,020
> after utilization for electricity generation	217,000

Geothermal fluid may not have or may have lost the thermodynamic properties that make it suitable for geothermal generation. In this instance, the fluid is used for supply of heat, especially for greenhousing and district heating.

### Expendables

Total: 18,021 t



Hydrochloric acid 2.6%  
Barite 0.5%  
Bentonite 10.7%  
Geothermal cement 19.4%  
Caustic soda 62.5%  
Lubricating oil 1.5%  
Dielectric oil 0.2%  
Other 2.6%

### Water for industrial uses (geothermal drilling)

Abstraction from inland waters, entirely from rivers (m <sup>3</sup> )	47,316
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### Gas-oil

Total consumption (toe)	1,946
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Used for driving the drilling equipment and, to a much lesser extent (about 2% of the total), for feeding emergency generating sets.

### Emissions into the atmosphere

SF <sub>6</sub> - all types of generation (kg) (t of CO <sub>2</sub> -equivalent)	514 11,411
CO <sub>2</sub> (t)	5,991
Carbon dioxide emissions from gas-oil combustion.	
H <sub>2</sub> S - from geothermal fluid (t)	20,774
CO <sub>2</sub> - from geothermal fluid (t)	1,945,845

A large debate is under way on the natural or anthropogenic origin of emissions of incondensable gases from geothermal fluid.

### Avoided CO<sub>2</sub> emissions

Hydro generation from natural flows (t)	12,875,000
Geothermal generation (t)	3,643,000
Wind and photovoltaic solar generation (t)	279,000
<b>Total (t)</b>	<b>16,797,000</b>

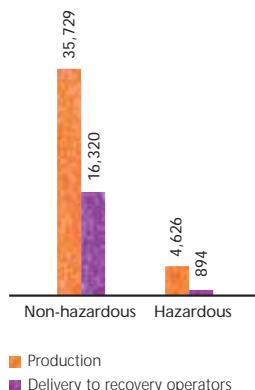
Avoided CO<sub>2</sub> emissions from the otherwise necessary fossil-fired thermal generation.

The contribution of geothermal generation has been calculated on the assumption that the related CO<sub>2</sub> emissions are of natural origin.

## Special waste

Total production: 40,354 t

Total delivery to recovery operators: 17,214 t



## Other data

### HYDRO GENERATION

Emptied reservoirs	quantity (no.)	9
alluvial sediments removed by flushing them out through bottom outlets (m <sup>3</sup> )	25,391	
alluvial sediments removed by mechanical equipment (m <sup>3</sup> )	30,511	
> reused locally (m <sup>3</sup> )	30,500	
 Fish ladders (no.)	 36	
 Fish restocking campaigns	 quantity (no.)	 81
	restocked fish individuals	1,548,000
	in addition to kg	2,600

### GEOOTHERMAL ACTIVITIES

Drilled wells	new (no.)	6
	rehabilitated (no.)	5
<hr/>		
Extent of drilling (m)		10,684
In-service wells		
	for steam production (no.)	290
	for reinjection (no.)	58
	for other uses (no.)	127
	Total (no.)	475

### WIND & PHOTOVOLTAIC SOLAR GENERATION

Wind systems	Surface area occupied by platforms, service roads and buildings (ha)	17
	Total surface area affected by the installations (ha)	20 to 100 times larger
<hr/>		
Photovoltaic solar systems	Surface area occupied by modules (ha)	7.7
	Total surface area affected by the installations (ha)	14.0

### Commitment to renewables in Italy

In 2006, Enel generated in Italy about 18,400 GWh net in hydro power plants (in addition to over 6,300 in pumped-storage hydro power plants), 5,200 in geothermal power plants, 400 in wind and photovoltaic solar power plants, 23 from biomass and the biodegradable fraction of waste, totaling over 24,000 from renewables. This generation displaced 16.8 million tonnes of CO<sub>2</sub>, thereby contributing to the country's achievement of the Kyoto Protocol targets. In the same year, Enel increased its net maximum capacity from renewables by 44 MW, divided as follows:

- > 16 MW from hydro power plants: new plant of Stramentizzo (Trento, 0.75 MW) and renovation and/or repowering of the plants of Verduno (Cuneo), Cesana and Susa I (Turin), Rovegno (Verbano-Cusio-Ossola), Venamartello (Ascoli Piceno), San Severino (Macerata), Cerbara (Pesaro-Urbino), Volturno I and II (Isernia), Montelungo and Montemaggiore (Caserta), each providing from 70 kW to 5.8 MW of new capacity;
- > 28 MW from wind facilities: new plants of Montarone 1 (Isernia, 4.25 MW) and Contrada Colla (Palermo, 17 MW); renovation of the Acquaspruzza 1 power plant (Isernia, +4.4 MW); installation of additional wind generators (0.85 MW each) at the Carlentini (Siracusa, +2.55 MW) and Sclafani Bagni 2 (Palermo, +0.85 MW) sites.

In 2006, the Geothermal Generation Unit went on with environmental efforts, by putting in place additional mercury and hydrogen sulfide abatement systems (AMIS) and by continuing its multi-year (2001-2011) plan of environmental rehabilitation of disused sites or removal of disused facilities (e.g. old asbestos-insulated geothermal fluid pipelines).

## Biodiversity conservation

### Land-based biological monitoring

Land-based biological monitoring is one of the methods used to assess the local environmental sustainability of thermal power plants over time and identify the effects that their gaseous releases into the atmosphere cause on the surrounding habitats.

Biological monitoring assumes that any disturbance or change to the environment produces effects on living organisms and on their communities: assessing these effects yields first-hand information about the possible deterioration of the quality of a given environment.

Therefore, biomonitoring provides a concise picture of the quality of the environment, which may be integrated with data obtained from conventional monitoring networks, where locally available.

The monitoring techniques that Enel most frequently uses – under the strict supervision of and by agreement with the relevant control authorities – are those that have so far proved to be the most effective:

- > epidemiological study of woods and forests (ICP Forests);
- > chemical analysis of substances bioaccumulated in the leaves of shrub or tree species;
- > collection of frequency data of lichen species (IAP - Index of Air Purity);
- > chemical analysis of substances bioaccumulated in the tissue of a common lichen in the monitoring area.

Land-based biological monitoring is conducted in accordance with the methodologies proposed by the European Union.

Monitoring sites are selected by applying models of ground depositions of gaseous effluents that thermal power plants release into the atmosphere. The modeling activity is preceded by a study of the frequency and intensity of precipitation and of dominant winds.

The activity is conducted for multiple years and in a discontinuous way. The first monitoring survey assesses the status of the environment before commissioning of the power plant or in the reference year if the plant is already in operation. The subsequent surveys have the purpose of determining whether changes have occurred with respect to the initial situation and whether such changes may be related to the activity of the thermal power plant.

Based on the findings from these surveys, the impressive environmental mitigation efforts that Enel has undertaken in its thermal power plant

>>>

sites in the past few years have been highly beneficial to local air quality.

Land-based biomonitoring surveys are under way or planned in sites where conversion works have involved or are involving thermal power plants:

- > Termini Imerese (Palermo), where the first-year monitoring has been completed;
- > Santa Barbara (Arezzo), where the first-year monitoring is in progress;
- > Torrevaldaliga Nord (Rome), where the design stage of the monitoring plan has been completed.

#### **Biological monitoring of waters**

Water bodies affected by thermal generation are also monitored. This activity is aimed at determining whether the possible temperature increase of the waters returned to their original water bodies (after having been used as cooling waters) may alter the local ecosystem and biodiversity over time (monitoring of benthos, plankton, phytoplankton, algal vegetation and *Posidonia oceanica*).

The monitoring is practically focused on primary productivity of phytoplankton, frequency of species in the macro benthos and extension of *Posidonia* sea grass beds over time. These indicators are well suited to promptly signal both ecological changes (short-term effects evidenced by primary productivity) and structural changes of the ecosystem in the medium and long term (macrobenthos and *Posidonia*).

Water monitoring usually consists of a preparation stage and of subsequent periodical monitoring stages.

In the sea area facing the Torrevaldaliga Nord power plant (Civitavecchia), *Posidonia oceanica* beds were delimited and confined; transplantations to areas without this species were also carried out.

Until now, both land-based and sea-based biomonitoring has indicated that the operation of Enel's power plants has a scarce or zero impact on terrestrial and aquatic biodiversity and ecosystems.

#### **Fish restocking**

Fish restocking is done in practically all the water bodies that are affected by hydro power generation. This practice guarantees high-quality ecosystems in these sites.

In some instances, by agreement with local authorities or agencies, Enel selects the most threatened local fish species for restocking. For instance, in Northern Italy, use is made, among others, of marble trout, a species reported in the IUCN (International Union for the Conservation of Nature and Natural Resources) Red List of Threatened Species.

## *Domestic Infrastructure & Networks Division*

In Enel's organizational model, the Domestic Infrastructure & Networks Division manages the human and material/technical resources of the power grid, of the gas grid and of public lighting.

The Division has the mission of ensuring electricity and gas distribution, optimizing the operation of grids and metering systems and complying with technical support standards.

In particular, Power Grid's regional branches, assisted by headquarters-level technical functions, manage electricity distribution in the Italian areas served by Enel.

A special case is Valle d'Aosta, which is served by Deval (51% owned by Enel).

The Gas Grid Business Area manages natural gas distribution, using the infrastructures that Enel acquired with its entry and expansion into the gas sector.

The Division's commitment to the environment translates into multiple efforts. The most perceivable ones are mitigation of the environmental impact of power grids by adopting less invasive power line routes and the use of cables in low- and medium-voltage lines. Other initiatives have the purpose of reducing grid losses and of controlling possible interferences caused by high-voltage power lines, taking into account the attention values that the Decree of the President of the Council of Ministers of July 8, 2003 specifies for electric & magnetic fields.

Also end-use energy efficiency measures testify the Division's commitment to the environment.

### End-use energy efficiency

Two Ministerial Decrees of July 2004 established a new regulatory framework which came into force on January 1, 2005. Under the scheme, electricity and gas distributors are required to achieve end-use energy efficiency targets, with reductions in primary energy consumption. In the first five years (2005 to 2009) of the scheme, the national overall primary energy-saving target is 5.5 million tonnes of oil-equivalent, with yearly contributions progressively growing up to 2.9 million tonnes in the last year.

In 2006, the national target was 312,000 tonnes of oil-equivalent. Enel played a key part in the scheme, covering 88.4% of national obligations for electricity distributors and 14.5% of those for gas distributors.

To fulfill their obligations and attain the specified energy-saving target, distributors may:

- > develop demand-side energy efficiency projects, improving technologies or usage at the customer's premises; the projects may be implemented directly, through controlled companies or ESCOs (Energy Service Companies);
- > purchase Energy Efficiency Certificates ("White Certificates") under bilateral contracts or in the regulated Energy Efficiency Certificates Market; these certificates, which are released by Gestore del Mercato Elettrico (the company vested with the organization and management of the Italian Power Exchange-IPEX), give evidence of the achieved energy savings.

Within May 31 of each year, distributors covered by the scheme must demonstrate that they have met the target assigned for the previous year, by surrendering a given number of white certificates to AEEG (the Italian electricity & gas regulator); the number and type of the surrendered certificates should be equal to the assigned target (every tonne of oil-equivalent saved entitles to one energy efficiency certificate).

To comply with its obligations for 2005 (slightly less than 100,000 toe of primary energy) and 2006 (slightly less than 200,000 toe of primary energy) in the electricity and gas sectors, Enel took direct initiatives and bought Energy Efficiency Certificates both bilaterally (direct negotiations or tendering procedures) and in the regulated market.

Among the direct initiatives that Enel took to meet its 2006 target:

- > distribution of more than 6 million compact fluorescent lamps (300,000 of which were distributed to 1,500 small municipalities, as part of a renewed initiative conducted jointly with the Legambiente environmental association); the lamps have an 8 times longer life and consume 80% less energy than conventional incandescent lamps;
- > distribution of over 1 million water economizers, which save up to 60% of water and a corresponding amount of energy for possible water heating;
- > release of a special card ("EnelClub") promoting the sale of high-efficiency household appliances;
- > actions of energy efficiency in public lighting.

## Power Grid Electricity distribution



■ Regional branch and headquarters location

For additional information, contact:  
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 Via Ombrone, 2  
 00198 Roma (Italy)  
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 anna.brogi@enel.it

### Power installations

SUBSTATIONS	no.	Installed transforming capacity MVA	LINES (km)			
			Overhead bare conductors	Overh. cables	Underg. cables	Total
HV/MV	2,034	95,587				
Satellite substations and MV units	478	-				
MV/LV	358,835	70,205				
MV/MV	53,533	-				
	<b>414,880</b>	<b>165,792</b>				
			<b>338,597</b>	<b>394,852</b>	<b>358,645</b>	<b>1,092,094</b>

Power Grid has an ISO 14001-certified environmental management system in place, which extends to its entire organization.

It also operates 108 isolated photovoltaic solar systems. With a net maximum capacity of 299 kW and a yearly generating capability of about 466,000 kWh, these systems offer a cost-effective and environmentally sustainable solution for supplying power to mountain huts, nature sanctuaries and other small isolated consumers.

### Electricity

Total electricity distributed (million kWh)	254,656
Own consumption for grid operation (million kWh)	314

### Resource consumption

Expendables (t)	21
Gas-oil (t of oil-equivalent)	19
Used for feeding emergency generating sets.	

### Emissions into the atmosphere

SF <sub>6</sub> (kg) (t of CO <sub>2</sub> -equivalent)	2,935 65,157
CO <sub>2</sub> (t)	55

Emissions from gas-oil combustion.

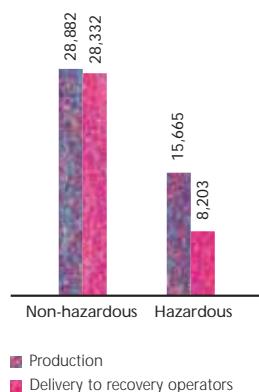
### General data

Regional branches (no.)	11
Control centers (no.)	28
Medium/low-voltage centers (no.)	128
Municipalities served (no.)	7,602
Surface area served (km <sup>2</sup> )	277,242
Customers connected to the grid (no.)	30,288,945
> supplied	29,849,934
> using the wheeling service only	439,011

### Special waste

Total production: 44,546 t

Total delivery to recovery operators: 36,535 t



## Deval SpA Electricity distribution



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### Power installations

SUBSTATIONS	no.	Installed transforming capacity MVA	LINES (km)				
			Overhead conductors	bare conductors	Overh. cables	Underg. cables	Total
HV/MV	13	388				0.1	56.6
Satellite substations and MV units	5	32					
MV/LV	887	208					
MV/MV	632	30					
	<b>1,537</b>	<b>659</b>					
			<b>857.2</b>	<b>1,886.3</b>	<b>1,461.6</b>	<b>4,205.1</b>	

Deval also operates one isolated photovoltaic solar system, which feeds an agricultural consumer (in a middle-mountain area) with a subscribed demand of 1.5 kW.

### General data

Municipalities served (no.)	68
Surface area served (km <sup>2</sup> )	3,132
Customers connected to the grid (no.)	122,600
> supplied	120,393
> using the wheeling service only	2,207

### Electricity

Total electricity distributed (million kWh)	957
Own consumption for grid operation (million kWh)	2.9

### Resource consumption

Gas-oil (t of oil-equivalent)	0.4
Used for feeding emergency generating sets.	

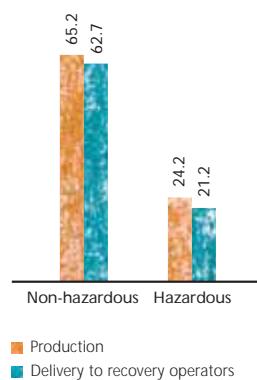
### Special waste

Total production: 89.4 t  
 Total delivery to recovery operators: 83.9 t

### Emissions into the atmosphere

SF <sub>6</sub> (kg) (t of CO <sub>2</sub> -equivalent)	2 44.4
CO <sub>2</sub> (t)	1.3

Emissions from gas-oil combustion.



### PCB plan

In the course of 2006, the Domestic Infrastructure & Networks Division continued its special project of decontamination/disposal of equipment containing oil with PCBs. The project, which began on January 1, 2005, is expected to remove all contaminated equipment by 2010, i.e. much ahead of the time limit indicated in the relevant legislation (Legislative Decree 209/99 and related amending and implementing regulations).

Decontamination/disposal of equipment containing oil with a PCB content exceeding 500 ppm will be completed by 2007 (time limit specified in the legislation: 2009), one year later than originally scheduled; the deferral is due to the acquisition of local grids not yet complying with the legislation. Similar activities on both power and measuring transformers with a PCB content of 50 to 500 ppm will be completed by 2010 (time limit specified in the legislation: end-of-life).

The project covers a total of 33,000 units (about 8% of the units owned at the start of the project), mostly power transformers, but also capacitors, bushing insulators, circuit-breakers, measuring transformers, etc.

Since the beginning of the project, contaminated equipment has dropped by about 13,000 units.

## Gas Grid Business Area Natural gas distribution



■ Regional branch and headquarters location

For additional information, contact:  
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### Gas installations

STATIONS	no.
HP/MP	638
MP/LP	8,100
<b>8,738</b>	

PIPELINES	km
HP (p > 5 bar)	191
MP (0,04 bar < p ≤ 5 bar)	11,615
LP (p ≤ 0,04 bar)	18,794
<b>30,600</b>	

### General data

Municipalities served (no.)	1,243
Surface area served (km <sup>2</sup> )	38,200
Customers connected to the grid (no.)	2,023,193

### Natural gas

Total natural gas distributed (million m <sup>3</sup> )	3,659
Own consumption (million m <sup>3</sup> )	5.5
Losses along the grid (million m <sup>3</sup> )	23.8

### Resource consumption

Electricity (million kWh)	2.9
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Used for cathode protection of pipelines, for powering gas-heating circuit water pumps and for lighting the installations.

### Special waste

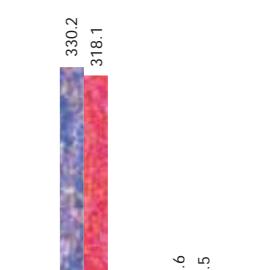
Total production: 332.8 t  
 Total delivery to recovery operators: 320.6 t

### Emissions into the atmosphere

CH <sub>4</sub> (t) (t of CO <sub>2</sub> -equivalent)	15,858
CO <sub>2</sub> (t)	364,727
<b>Total (t of CO<sub>2</sub>-equivalent)</b>	<b>375,605</b>

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

The carbon dioxide emissions are due to the share of this gas which is present in the natural gas lost along the grid and to the combustion of natural gas for own consumption.





Italy, Rome  
Enel Auditorium – award ceremony for “Energia in Gioco” competition

## **Environmental results** - Non-Italian operations

## *International Division*

The International Division has the mission of developing Enel's presence and activities in electricity and gas markets outside Italy, conducting and optimizing international operational activities and conceiving Enel's strategy for a balanced development of production capacity in foreign regional markets.

The Division is organized into four support functions (Business Development/Mergers & Acquisitions, Operations & Integration, Planning & Auditing, Personnel & Organization) and relies on six Country Managers, who are charged with strategic, operational and market activities, as well as with integration with the rest of the Group in the areas falling under their responsibility.

Within Operations & Integration, the Safety & Environment unit has the task of transferring environmental guidelines, policies and procedures to Enel's non-Italian operations, monitoring their progress and providing support to the Country Managers in implementing environmental management programs and best practices.

Enel operates outside Italy with various percentages of holdings in electricity generation, distribution and retailing companies. In the course of 2006, Enel continued its international positioning. Its power plants reached a net maximum capacity of 9,350 MW and generated over 29 billion kWh and its power lines (roughly 83,000 km) distributed about 13.5 billion kWh to over 2 million customers.

Among the highlights of Enel's power generation abroad:

- > nuclear generation in Slovakia;
- > high reliance on renewables (about 21%: hydro, wind and biomass); in this sector, through Enel North America and Enel Latina America, Enel stands as one of the leading independent operators of the American continent;
- > almost exclusive use of indigenous fuels (coal and brown coal by Viesgo Generación in Spain; brown coal by Maritza in Bulgaria; brown coal and coal by Slovenské elektrárne in Slovakia);
- > combined heat & power generation in Slovakia (thermal and nuclear power plants), North America (one biomass power plant) and Spain (small high-efficiency systems owned by Enel Unión Fenosa Renovables).

In the near future, the QUASAR (Quality of Services, Assets and Resources) project will be extended to Enel's non-Italian operations. The project has the goal of

introducing Total Quality in all the activities of Enel and of raising its performance to meet the highest worldwide standards. The project has already taken off at Enel Viesgo Generación and Slovenské elektrárne.

The following is a review of the distinctive features and activities of the various companies by geographic area.

### Spain

In Spain, Enel is engaged in the following business sectors: hydro and thermal power generation through Enel Viesgo Generación; hydro, wind and combined heat & power through Enel Unión Fenosa Renovables; and electricity distribution through Electra de Viesgo Distribución.

Enel Viesgo Generación has a comprehensive investment plan to revamp its power plants, while abiding by environmental legislation. Among the planned activities, it is worth mentioning:

- > conversion of its power plant of Escatron (pressurized fluidized bed combustion of coal) to combined cycle and increase of its installed capacity; the new plant will go into commercial operation by the end of 2007;
- > environmental enhancement of the Puente Nuevo power plant by installing a flue gas desulfurizer and low nitrogen oxide emission burners and by upgrading its electrostatic precipitators; the project is scheduled to be completed by 2008;
- > conversion of the thermal power plant of the Bay of Algeciras to combined cycle (commercial operation will begin by the end of 2009); the project represents a significant environmental enhancement: higher efficiency and cutting-edge combustion technologies will curb nitrogen oxide emissions; utilization of natural gas will practically zero emissions of sulfur oxide and particulates; and the heat in the condenser cooling waters discharged into the sea will diminish.

Enel Unión Fenosa Renovables certified the following wind power plants under ISO 14001: Castelo and Careón (in 2002), Os Corvos and Coucepenido (in 2003), Peña Forcada and Do Vilán (in 2004), Peña Armada, Corzán, Aldeavieja and Coriscada (in 2005), Silvaredonda, Sierra de la Oliva, La Losilla and Pemalsa (in 2006). As of December 31, 2006 the overall certified capacity equaled 289 MW.

In 2007, the Company plans to certify the following plants: wind power plants of Manzanal, San Pedro and Valdepero; hydro power plants of Anillo and Arroíbar; and combined heat & power plant of Eneralco.

Among the most significant environmental activities in 2006, it is worth recalling the training & education courses in bird fauna and hazardous waste management

that the Company organized for the personnel of its wind farms of Careón, Peña Armada and San Andrés.

### **Slovakia**

At the end of April 2006, Enel acquired a 66% holding in Slovenské elektrárne, which ranks no. 1 among the electricity producers of Slovakia and no. 2 among those of Central-Eastern Europe. The Company's generating capacity (about 4,800 MW) is balanced between nuclear, thermal and hydro. Its power plants are ISO 14001-certified.

### **Bulgaria**

In Bulgaria, Enel acquired a controlling stake in Enel Maritza East 3 and, through it, in one of the country's principal thermal power plants, Maritza East III (brown coal-fired).

For this plant, Enel planned a major environmental enhancement project to be completed within 2009. The project (overall investment: 600 million euro) involves the installation of desulfurizers (one is already in service on one of the plant's four units) and of low nitrogen oxide emission burners.

The plant makes multiple uses of its process water: as an example, it is equipped with a closed-cycle cooling tower system whose drains feed a desulfurizer.

### **Romania**

In April 2005, Enel acquired 51% ownership of two electricity distributors (Enel Electrica Banat and Enel Electrica Dobrogea) in Romania.

The power grid of Enel Electrica Banat serves the south-western part of the country, whereas the one of Enel Electrica Dobrogea is based in the Danube delta area, one of the most important wetlands in Europe: particular care is thus taken to integrate the infrastructure into the environment.

The companies are conducting the following environmental programs:

- > removal of asbestos-containing components (to be completed by 2007);
- > removal of condensers containing oil with PCBs (to be completed by 2010);
- > replacement of acid-containing batteries with sealed ones;
- > conservation of biodiversity in the Danube delta area by installing bird nests and taking various measures to protect the wild fauna from electrocution.

The two companies are ISO 14001-certified.

## North America

Enel North America (ENA) is one of the leaders in renewables in North America. Its power plants are located in sixteen states of the US and in one of the Canadian provinces. ENA owns hydro, wind and biomass power plants and is engaged in geothermal development.

Worth of mention is the Company's combined heat & power plant of Saint-Félicien, (Québec), which has been successfully operating since October 2001. The solid biomass fueling the plant is dominantly composed of saw-mill refuse (e.g. bark and unusable fragments of wood). The ash produced by the plant (having the appearance of coarse-grained sand) is marketed as a fertilizer or used in the maintenance of agricultural roads. Emissions into the atmosphere are continuously monitored. A significant environmental enhancement activity that the Company carried out in 2006 was the increase of the generating efficiency of its La Chute Project hydro power plants (New York State).

ENA also funded initiatives of local communities and promoted the role of renewables. Moreover, it actively participated in the energy and environment communications initiatives taken by the Fenner Renewable Energy & Education Center (based on the positive operating experience of the Fenner wind farm, New York State) and in the organization of guided tours of renewable-energy power plants.

Among the latter, the tour of the Lawrence Hydro Project (Lawrence, Massachusetts) is remarkable. The power plant, served by an imposing dam, is located in the city centre and at the start point of fish migration routes. The site has a fishway (fish elevator), facilitating migration from the ocean, and a glass-walled fish viewing room for visitors. In 2006, more than 300 people, including youngsters, journalists, representatives of public administrations and environmental agencies, visited the Project. The highest attendance was recorded in May and June, i.e. during the fish migration season.

## Latin America

Enel Latin America (ELA) generates electricity from renewables in Central and South America. Its hydro power plants of Don Pedro and Rio Volcán and its wind power plant of Tierras Morenas, all in Costa Rica, gained the ISO 14001 certification. ELA plans to certify its remaining plants in Chile and Guatemala in the course of 2007. Among the most significant environmental enhancements, mention is to be made of a system treating process and biological waters from the Panguipulli power plant (Chile).

In 2006, ELA completed two new acquisitions in the hydro power sector: the Fortuna power plant in Panama (300 MW) and the twenty plants of Grupo Rede in Brazil, with a total capacity of 82 MW.

In El Salvador, Enel has a holding in the Berlin geothermal plant.

In Chile, Nicaragua and Guatemala, ELA is engaged in geothermal exploration.

In the following pages, tables and fact sheets provide data on Enel's non-Italian operations and individual companies.

In particular,

- > the "Overall Data" table shows the totals of the main status and flow data that are common to multiple companies;
- > the fact sheets give more detailed status and flow data on each company;
- > the "Performance" table compares the performance of the individual companies and the average performance of Enel's non-Italian operations in each area of business activity; use is made of appropriate indicators (ratios between homogeneous or heterogeneous quantities), which are independent of the volume of activity of each company and in each year.

For a better understanding of the data and of their mode of collection, processing and reporting, the reader is referred to "Eco-Balance" and "Indicators" in "Environmental Performance - Italian operations". For information completeness, the data on nuclear generation, which only concern non-Italian operations, are reported in this section.

### Nuclear fuel

Enriched natural uranium, which is improperly called "fuel", is the energy source for nuclear generation.

The uranium that is found in nature is practically composed of two isotopes: uranium 238 (99.3%) and uranium 235 (0.7% only), as uranium 234 only accounts for 0.056%. Uranium enrichment – usually obtained by diffusion or centrifugation of a gaseous uranium compound (hexafluoride,  $UF_6$ ) – raises the U235 content to values lying in the typical range of 3-5%.

U235 is the only fissile isotope. Therefore, when the nucleus of a U235 atom is hit by a slow neutron, it splits up into two smaller nuclei (fission), releasing energy and other (fast) neutrons. These neutrons are slowed by the water that is contained in light-water reactors and that acts as a "moderator" (the water also carries the heat produced by the fission process) and hit other nuclei, inducing a chain reaction.

Nuclear fuel may generate an amount of energy 50,000 times higher than the one released upon combustion of an equal amount of fuel oil.

In a nuclear power plant, nuclear fuel management consists of three stages:

- > procurement of fresh fuel;
- > transport to and storage of fresh fuel on the power plant site (dry storage containers in the reactor building), preparation of recharge, recharge, start-up tests, monitoring of operation, discharge from the reactor and storage in the reactor pools (for at least two years and a half);
- > organization of the transfer of the spent fuel to the pools of the temporary storage site (where available; the storage site may be on-site or off-site) or to reprocessing facilities; the spent fuel must be transferred to a temporary storage site or to reprocessing facilities after a given number of years of operation, in order to avoid saturation of the storage capacity of reactor pools.

Recharge is needed when, after being utilized in the reactor for a few years, the fuel loses its efficiency (i.e. its U235 content diminishes) owing to the fission process. Recharge is usually carried out on a yearly basis, but only on a fraction of the fuel. It is followed by shuffling of part of the fuel (the

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part that has not been discharged) inside the reactor to optimize fuel utilization and the overall efficiency of the plant.

The content of fission products (regarded as high-activity and long-lived radioactive waste) in the spent fuel is as little as 3%. The remaining components are: unused uranium (96%), which is recovered via reprocessing and used for generating new fuel; and plutonium (1%), which is a by-product arising from nuclear reactions and radioactive decays of U238. The plutonium isotopes (Pu239 and Pu241) are fissile.

#### **Radioactive emissions into the atmosphere**

Nuclear fission produces unstable (radioactive) isotopes, which turn into stable isotopes – also through subsequent decays – and release energy in the form of radiation with different properties and penetrating power. Alpha and beta radiation (consisting of electrically charged particles) and gamma radiation (consisting of electromagnetic waves) are also produced naturally.

Alpha particles (helium nuclei) are relatively heavy and slow and have a low penetrating power, so that they can be blocked in less than 10 cm of air or merely by a sheet of paper.

Beta particles (electrons) are lighter and faster and their penetrating power is higher than the one of alpha particles; however, it is so small that the particles can be blocked by a thin metal sheet: a few millimeters can stop them, whereas in air a few meters would be needed.

Gamma radiation is more penetrating and energetic and is stopped by a thick layer of concrete, lead or steel.

Under normal operating conditions, the emissions into the atmosphere of a nuclear power plant come from the reactor containment ventilation system and flow into the stack.

The total "activity" of the gamma rays emitted by the discharged noble gases, iodine 131 and radioactive aerosols is continuously monitored.

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Samples are collected to measure the activity of nuclides, which have radiotoxicological implications. The following isotopes are measured:

- > Noble gases: Ar41, Kr85, Kr85m, Kr87, Kr88, Xe133, Xe133m, Xe135;
- > Iodine 131;
- > Alpha aerosols (alpha emitters): Pu238, Pu239+Pu240, Am241;
- > Beta aerosols (beta emitters): Sr89, Sr90;
- > Gamma aerosols (gamma emitters): Cr51, Mn54, Fe59, Co57, Co58, Co60 (only for the power plant of Bohunice), Zn65, Nb95, Zr95, Ru103, Rh106, Ag110m, Sb124, Cs134, Cs137, Ce141, Ce144;
- > Strontium 89 and 90;
- > Tritium and C14 (only for the power plant of Bohunice).

"Activity" is defined as the number of disintegrations of a given amount of radioactive material per unit time. It is measured in Becquerel (Bq): 1 Bq=1 disintegration per second.

When activity refers to contamination on a given surface, it is expressed in Bq per unit surface area (Bq/cm<sup>2</sup>). When it refers to a volume (e.g. contamination of air or water), it is expressed in Bq per unit volume (Bq/cm<sup>3</sup>). Likewise, in the case of contamination of matrices, such as soil, food, etc., reference is made to activity per unit mass (Bq/kg).

As Becquerel is a very small unit of measurement, radioactivity is very often indicated in multiples of Becquerel.

In this section of the Report, radioactive emissions into the atmosphere are reported in absolute values in the Slovenské elektrárne fact sheet (i.e. using the most appropriate multiples of Becquerel) and in specific values (i.e. per unit of generated power) in the "Performance" table (using either multiples or submultiples of Becquerel).

### **Radionuclides in waste waters**

The most common sources of radionuclide-containing waste waters are laundries, decontamination areas, drains or losses from primary loop components. Before being discharged, radioactive waste waters are mixed with conventional waste waters. If radionuclide concentrations

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(corrosion and fission products and tritium) exceed the limits mandated by the applicable legislation or specified in the authorizations for releases into water bodies, then radioactive waste waters are conveyed to a vaporization treatment system. Given its low level of radioactivity, the vaporized water may, after condensing, be reused or rejoin waste waters, while the remaining concentrated solution flows into liquid radioactive waste.

The following radioactive isotopes are monitored:

- > corrosion and fission products: the same radionuclides as those measured in aerosols (alpha, beta and gamma emitters);
- > tritium.

In this Section of the Report, the activity of radionuclides contained in waste waters is reported in absolute values in the Slovenské elektrárne fact sheet and in specific values in the "Performance" table (using either multiples or submultiples of Becquerel).

### **Radioactive waste**

Both liquid and solid radioactive waste is classified into the following categories (liquid waste is expressed in m<sup>3</sup> and solid waste is usually expressed in tonnes):

- > low-level (e.g. clothing, paper towels, laboratory equipment used in areas where radioactive material is handled) and intermediate-level (e.g. contaminated equipment, sludges and resins from various treatments): this waste releases less than 2 kW/m<sup>3</sup> of residual heat and may be further distinguished into:
  - short-lived: the waste that, after conditioning, qualifies under the requirements for off-site surface or subsurface storage (specified average concentration of alpha-emitting nuclides: below 400 Bq/g after 300 years);
  - long-lived: the waste that, after conditioning, qualifies under the requirements for off-site surface or subsurface storage (specified

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average concentration of alpha-emitting nuclides: equal to or greater than 400 Bq/g after 300 years);

> high-level: waste releasing more than 2 kW/m<sup>3</sup> of residual heat; it does not qualify under the requirements for off-site surface or subsurface storage. Production of this waste is very small under the normal operating conditions of a power plant (e.g. metal waste and corrosion products removed during clean-up of the reactor core).

Solid waste is sorted on the basis of its activity and classified as follows:

- > burnable process waste;
- > compactable process waste;
- > suitable for other treatment, such as fragmentation and cementing.

The waste is characterized and, depending on its type, it may be decontaminated, dried, cut, low-pressure compacted and finally packaged in drums or plastic bags.

These drums or bags are temporarily segregated in shielded enclosures and then fed to treatment systems. The waste that cannot be stored in off-site surface or subsurface sites and remains on the plant site is placed into stainless steel containers.

Another category of solid waste, whose activity decreases rapidly (e.g. filters of the reactor ventilation system), may be discharged as special waste (that from normal industrial activities) immediately or after an adequate period of decay within the plant.

Liquid waste mostly consists of concentrated solutions arising from the treatment of waste waters via vaporization (see above) and of drainage waters from systems, pipings and floors of the reactor building. The treated waters generally qualify for being discharged into water bodies in accordance with applicable legislation or the prescriptions of the relevant authorizations.

Other contaminated liquid waste includes used oils, oils separated from waters, solvents, etc.

In this section of the Report, the fact sheet of Slovenské elektrárne provides the most significant absolute data on radioactive waste (share of

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waste produced since the beginning of operation of the plants and stored inside the same plants and production of low/intermediate and high-level waste in the year, distinguishing in both cases between liquid and solid waste). Conversely, the "Performance" table displays two typical indicators of sustainable development that are used in the sector:

- > production of waste (distinguished by activity and state of aggregation) per unit energy generated in the year;
- > ratio of the amount of liquid and solid radioactive waste stored on the plant site to the overall amount of the same waste produced since the beginning of operation of the plant.

Furthermore, in 2006:

- > 98% of the solid radioactive waste and all of the liquid radioactive waste of Slovenské elektrárne proved to be of low and intermediate level;
- > all of the low- and intermediate-level waste proved to be suitable for being stored in off-site surface or subsurface sites;
- > an amount of waste equal to twice the waste classified as low- and intermediate-level was discharged as special waste immediately or after an adequate period of decay.

## Overall data of 2006

### Electricity generation

Power plants (no.)	190
> thermal	7
> hydro	155
> wind	28
Net maximum capacity (MW)	5,930
> thermal	2,355
> hydro	2,876
> wind	699

### Combined heat & power generation

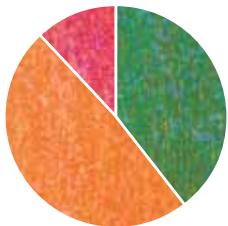
Power plants (no.)	18
> thermal	16
> nuclear	2
Net maximum electrical capacity (MW)	3,420
> thermal	1,780
> nuclear	1,640
Useful thermal capacity ( $10^6$ kcal/h)	731
> thermal	370
> nuclear	361

### Power lines (circuit-length - km)

Total	82,980
> high voltage	6,161
> medium voltage	33,050
> low voltage	43,769

#### Net maximum capacity

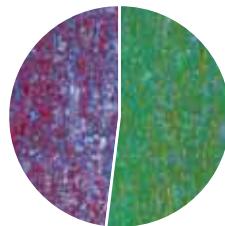
Total: 5,930 MW



■ Thermal **39.7%**  
■ Hydro **48.5%**  
■ Wind **11.8%**

#### Net maximum electrical capacity

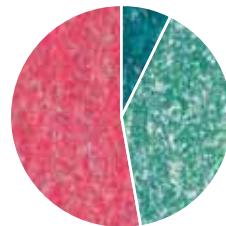
Total: 3,420 MW



■ Thermal **52.0%**  
■ Nuclear **48.0%**

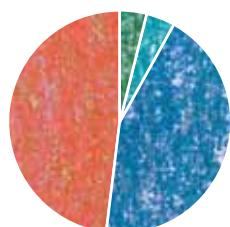
#### Length of lines

Total: 82,980 km



■ High voltage **7.4%**  
■ Medium voltage **39.8%**  
■ Low voltage **52.7%**

**Fossil fuel consumption  
for simple generation and  
combined heat & power generation**  
Total: 3,453 ktoe



- Fuel oil and gas-oil **4.0%**
- Natural gas **4.1%**
- Coal **43.9%**
- Brown coal **48.0%**

**Fuels**

**Utilization**

**Fossil fuels**

Thermal Generation  
(including auxiliary boilers  
and emergency generating sets)

Fuel oil	thousand t	53
Gas-oil	thousand t	2
Natural gas	million m <sup>3</sup>	38
Coal	thousand t	1,788
Brown coal	thousand t	6,763
<b>Total</b>	<b>thousand toe</b>	<b>2,103</b>

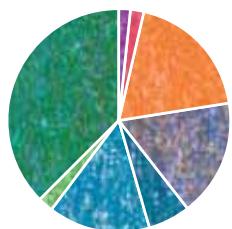
Combined Heat & Power Generation  
(including auxiliary boilers  
and emergency generating sets)

Fuel oil	thousand t	88
Natural gas	million m <sup>3</sup>	120
Coal	thousand t	1,093
Brown coal	thousand t	2,036
<b>Total</b>	<b>thousand toe</b>	<b>1,350</b>
<b>Grand total</b>	<b>thousand toe</b>	<b>3,453</b>

<b>Solid biomass</b>	Combined Heat & Power Generation	<b>thousand toe</b>	<b>90</b>
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**Net electricity generation  
(simple and combined) by source**

Total: 29,260 million kWh



- Fuel oil and gas-oil **1.9%**
- Natural gas **1.8%**
- Coal **19.0%**
- Brown coal **17.0%**
- Wind and biomass **6.0%**
- Hydro from natural flows **14.7%**
- Hydro from pumped storage **2.4%**
- Nuclear **37.2%**

**Processes and products**

**Net electricity generation (million kWh)**

From fossil fuels	11,611
simple	7,251
fuel oil & gas-oil	188
natural gas	121
coal	3,365
brown coal	3,577
combined with heat generation	4,360
fuel oil & gas-oil	360
natural gas	411
coal	2,192
brown coal	1,397
From renewables	6,035
biomass (for CHP)	171
hydro from natural flows	4,291
wind	1,573
Hydro from pumped storage	712
Nuclear (combined with heat generation)	10,902
<b>Total</b>	<b>29,260</b>
Consumption for pumping	1,108
Available generation	28,152

**Useful heat output**

(CHP - 10<sup>6</sup> kcal)

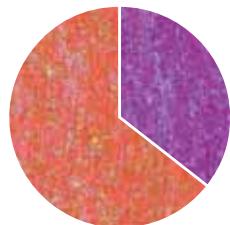
In thermal power plants	895,680
fossil fuels	863,465
biomass	32,215
In nuclear power plants	397,752
<b>Total</b>	<b>1,293,433</b>

**Electricity distribution (million kWh)**

Electricity wheeled	13,516
Electricity consumption for grid operation	31
Grid losses	1,545

### Avoided CO<sub>2</sub> emissions

Total: 20,044 thousand t



■ Generation from renewables **35.6%**  
■ Nuclear generation **64.4%**

### Emissions

#### Source

#### Conventional emissions into the atmosphere (thousand t)

SO <sub>2</sub>	thermal generation (simple and combined, excluding EUFER)	<b>291</b>
NO <sub>x</sub>	thermal generation (simple and combined, excluding EUFER)	<b>31</b>
Particulates	thermal generation (simple and combined, excluding EUFER)	<b>15</b>
CO <sub>2</sub>	thermal generation (simple and combined)	<b>13,699</b>

#### Avoided CO<sub>2</sub> emissions <sup>(1)</sup> (thousand t)

Hydro from natural flows	<b>5,079</b>
Wind	<b>1,862</b>
Biomass	<b>202</b>
<b>Total - generation from renewables</b>	<b>7,143</b>
<b>Total - nuclear generation</b>	<b>12,902</b>
<b>Total</b>	<b>20,044</b>

(1) Product between the electricity generated from the sources considered and the average specific CO<sub>2</sub> emissions from Enel's fossil-fired thermal generation outside Italy.

## Enel Viesgo Generación SL <sup>(1)</sup> Thermal and hydro generation



- Hydro generation area
- Coal- and/or brown coal-fired thermal power plant
- Fuel-oil/gas-fired thermal power plant
- Headquarters

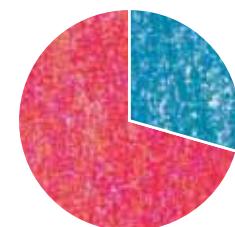
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 Tel no. +34 91 4184423  
 TNappi@VIESGO.ES

(1) Including the data of the (hydro) power plants of Barras Eléctricas Generación SL.

### Power installations

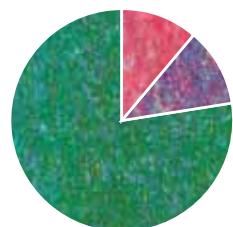
HYDRO	Power plants no.	Head installations no.	maximum capacity MW	THERMAL		
				Power plants no.	Gener. units no.	Net maximum capacity MW
Run-of-river		6	5	Steam (condensing)	6	1,527
Pondage/reservoir		11	307	Pressurized fluidized bed with flue-gas-recovery turbine	1	65
Pure/mixed pumped storage		1	361			
	<b>18</b>	<b>18</b>	<b>672</b>		<b>6</b>	<b>1,592</b>
Fish ladders (no.)		2				

**Net maximum capacity**  
 Total: 2,264 MW



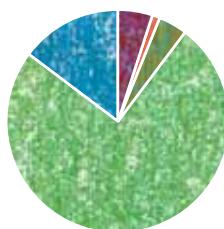
- Hydro **29.7%**
- Thermal **70.3%**

**Net electricity generation**  
 Total: 5,408 million kWh



- Hydro from natural flows **11.2%** (607 GWh)
- Hydro from pumped storage **11.4%** (615 GWh)
- Thermal (fossil-fired) **77.4%** (4,186 GWh)

**Fuel consumption (thermal generation)**  
Total: 1,096,605 t of oil-equivalent



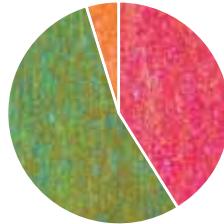
■ Fuel oil **4.0%**  
■ Gas-oil **0.2%**  
■ Natural gas **3.2%**  
■ Coal **78.1%**  
■ Brown coal **14.5%**

**Expendables**  
Total: 2,823 t



■ Resins & hydrazine **0.6%**  
■ Ammonia **0.1%**  
■ Sodium hypochlorite & trisodium phosphate **16.1%**  
■ Sulfuric & hydrochloric acids **44.9%**  
■ Caustic soda **13.6%**  
■ Lime, ferric chloride & polyelectrolyte **7.5%**  
■ Lubricating oil **1.8%**  
■ Dielectric oil **0.5%**  
■ Other **14.9%**

**Water for industrial uses (thermal generation)**  
Total requirements: 6,145,056 m<sup>3</sup>

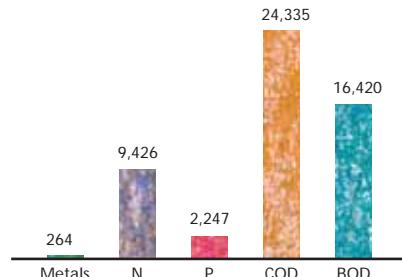


■ From rivers **41.3%**  
■ From wells **54.0%**  
■ From aqueducts **4.7%**

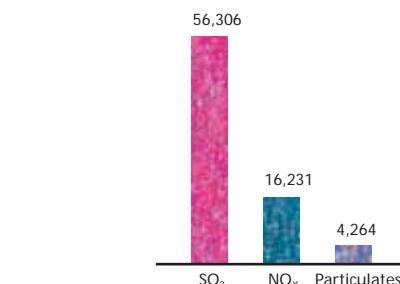
**Waste waters**  
Total discharged quantity: 1,043,707 m<sup>3</sup>

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

**Polluting load of discharged waste waters (kg)**



### Emissions into the atmosphere (t)



CO<sub>2</sub> 4,157,539

### Avoided CO<sub>2</sub> emissions (t)

From hydro generation 603,000

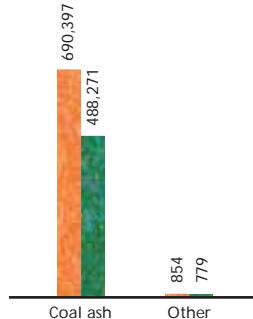
Emissions from the otherwise necessary conventional thermal generation. This computation refers to the average specific CO<sub>2</sub> emissions from Viesgo's thermal generation.

### Special waste

Total production: 691,629 t  
Total delivery to recovery operators: 489,422 t

#### Non-hazardous

Production: 691,251 t  
Delivery to recovery operators: 489,050 t



■ Production  
■ Delivery to recovery operators

#### Hazardous

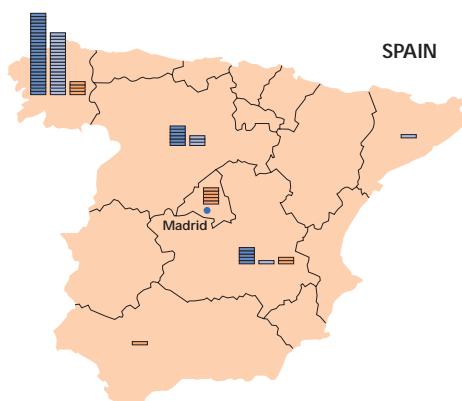


■ Production  
■ Delivery to recovery operators

In 2006, no fuel-oil flyash was produced.

# Enel Unión Fenosa Renovables SA <sup>(1)</sup>

## Hydro, wind and combined heat & power generation



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 jcastillo@unionfenosa.es

### Distribution of power plants over the country

- 1 hydro power plant
- 1 wind power plant
- 1 combined heat & power plant
- Headquarters

(1) Including data on the (hydro) power plants owned by its subsidiary Energías Especiales del Noroeste SA.

### Power installations

#### HYDRO

	Power plants no.	Head installations no.	Net maximum capacity MW
Run-of-river	34	86	
Pondage/reservoir	2	26	
	<b>36</b>	<b>36</b>	<b>112</b>

#### WIND

	Power plants no.	Net maximum capacity MW
	<b>24</b>	<b>608</b>

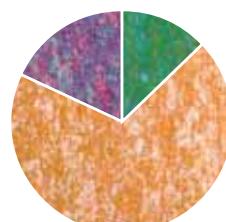
Starting in 2002, 13 of the 24 wind power plants (totaling 289 MW) gained the ISO 14001 certification for their environmental management systems.

#### COMBINED HEAT & POWER GENERATION

	Power plants no.	Gener. units no.	Net maximum electrical capacity MW	Useful thermal capacity 10 <sup>6</sup> kcal/h
Gas turbines:				
> combined-cycle	1	14	5	
> simple-cycle	1	22	16	
Alternative engines	29	122	80	
	<b>12</b>	<b>31</b>	<b>158</b>	<b>101</b>

#### Net maximum electrical capacity

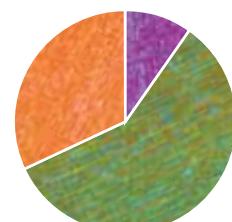
Total: 878 MW



- Hydro 12.8%
- Wind 69.2%
- CHP 18.0%

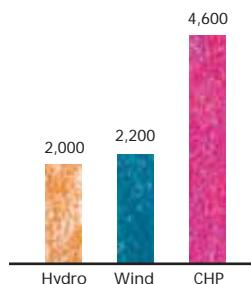
#### Net electricity generation

Total: 2,272 million kWh



- Hydro from natural flows 9.9% (226 GWh)
- Wind 58.1% (1,319 GWh)
- Thermal 32.0% (727 GWh)

### Equivalent yearly average hours of utilization <sup>(1)</sup>



(1) Electricity generation/maximum electrical capacity ratio.

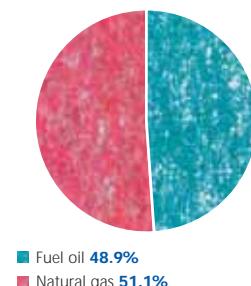
### Useful heat output (combined with thermal power generation)

Total: 496,101 million kcal  
equal to 577 million kWh

The heat is used by food, chemical, pharmaceutical, textile and building material industries.

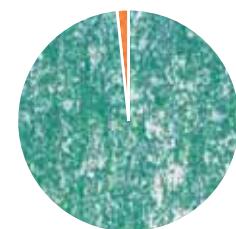
### Fuel consumption (CHP)

Total: 161,449 t of oil-equivalent



### Expendables (wind generation)

Total: 13 t



### Emissions into the atmosphere (CHP) (t)

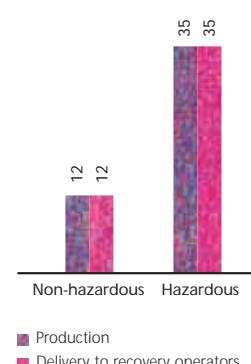
CO<sub>2</sub>

446,002

### Special waste (hydro and wind generation)

Total production: 47 t

Total delivery to recovery operators: 47 t



### Avoided CO<sub>2</sub> emissions (t)

Hydro generation	267,000
Wind generation	1,561,000
<b>Total</b>	<b>1,828,000</b>

Emissions from the otherwise necessary conventional thermal generation. This computation refers to average specific CO<sub>2</sub> emissions from Enel's fossil-fired thermal generation outside Italy.

### Other data

Wind power plants	Surface area occupied by platforms, service roads and buildings (ha)	25
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## Electra de Viesgo Distribución SL <sup>(1)</sup> Electricity Distribution



For additional information, contact:  
 Iñigo Malo Badía  
 Electra de Viesgo Distribución  
 c/Medio 12  
 39012 Santander (Spain)  
 Tel no. +34 942 246017  
 imalo@viesgo.es

### High-voltage distribution grid perimeter

- Electra de Viesgo Distribución
- BEGASA
- Headquarters

(1) Including data on installations owned by its subsidiary Barras Eléctricas Galaico Asturianas SA (BEGASA).

### Power installations

SUBSTATIONS	no.	Installed transforming capacity MVA	LINES (km)				
			Overhead bare conductors	Overh. cables	Underg. cables	Total	
HV/MV	89	3,763	2,026	-	24	2,049	
Satellite substations and MV units	6	-	8,505	0	1,197	9,703	
MV/LV	10,227	1,976	0	16,261	1,995	18,257	
MV/MV	320	-					
	<b>10,642</b>	<b>5,739</b>	<b>10,531</b>	<b>16,261</b>	<b>3,216</b>	<b>30,008</b>	

### General data

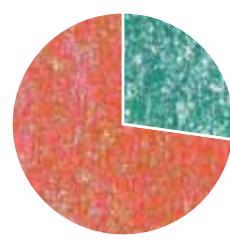
Surface area served (km <sup>2</sup> )	16,519
Customers connected to the grid (no.)	638,183

### Electricity

Total electricity distributed (million kWh)	6,256
Own consumption for grid operation (million kWh)	7
Grid losses (million kWh)	391

### Special waste

Total production: 303 t



■ Non-hazardous **27.4%**  
 ■ Hazardous **72.6%**

Total delivery to recovery operators: 0 t

### Emissions into the atmosphere

SF <sub>6</sub> (kg) (t of CO <sub>2</sub> -equivalent)	45 989
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# Slovenské elektrárne, a.s.

Hydro generation and combined heat & power generation in conventional and nuclear power plants



For additional information, contact:

Jozef Tomek  
Slovenské elektrárne  
Hraničná 12  
827 36 Bratislava (Slovakia)  
Tel no. +421 2 5866 3214  
tomek.jozef@hq.seas.sk

## Power installations

### HYDRO

	Power plants no.	Head installations no.	maximum	Net capacity MW
Run-of-river	27		306	
Pondage/reservoir	31		282	
Pure/mixed pumped storage	15		1,017	
	<b>30</b>	<b>73</b>	<b>1,606</b>	

### THERMAL

	Power plants no.	Gener. units no.	electrical capacity MW	Net maximum capacity 10 <sup>6</sup> kcal/h	Useful thermal capacity
Steam (condensing) with intermediate fluid extraction	18		1,582		84
Steam (back-pressure)	1		18		178
	<b>3</b>	<b>19</b>	<b>1,600</b>	<b>262</b>	

### NUCLEAR

	Power plants no.	Gener. units no.	electrical capacity MW	Net maximum capacity 10 <sup>6</sup> kcal/h	Useful thermal capacity
Steam (condensing) with intermediate fluid extraction	2	4	1,640	<b>361</b>	

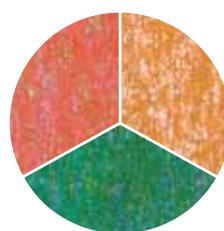
Nuclear power plants are equipped with enriched-uranium pressurized-water reactors WWER 440/V 213.

In 2002, 2003 and 2004, the Company certified the environmental management systems of all of its thermal and nuclear power plants and of its entire hydro generation business activity under the ISO 14001 standard. Where needed, the certifications were renewed upon their three-year expiration.

In 2005 and 2006, the Company also obtained the ISO 14001 certification for the environmental management systems that it adopted for the activities preceding the construction of units 3 and 4 of its nuclear power plant of Mochovce and in its headquarters.

### Net maximum electrical capacity

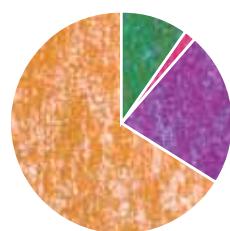
Total: 4,846 MW



Hydro 33.1%  
Thermal 33.0%  
Nuclear 33.9%

### Net electricity generation

Total: 16,238 million kWh



Hydro from natural flows 9.9% (1,607 GWh)  
Hydro from pumped storage 0.6% (97 GWh)  
Thermal 22.4% (3,633 GWh)  
Nuclear 67.1% (10,902 GWh)

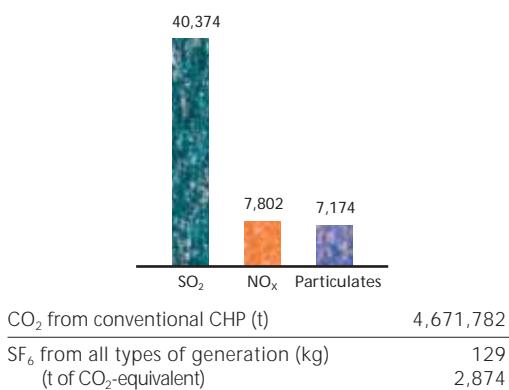
**Useful heat output  
(combined with power generation)**  
Total: 765,117 million kcal  
*equal to 890 million kWh*

The heat is supplied to district heating systems and to industrial consumers.

**Expendables**

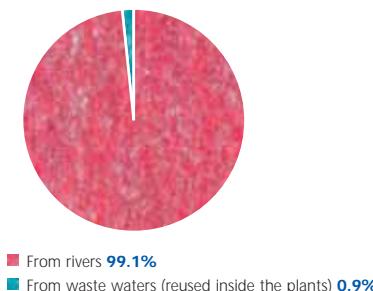
Mainly limestone for flue gas desulfurization (t) 95,600

**Conventional emissions into the atmosphere (t)**



**Water for industrial uses  
(nuclear combined heat & power generation)**

Total requirements: 35,298,550 m<sup>3</sup>  
Abstraction from inland waters: 34,994,034 m<sup>3</sup>

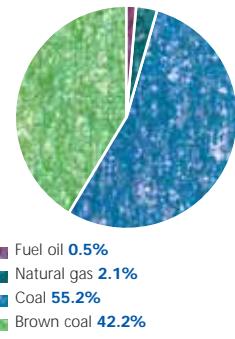


**Waste waters  
(nuclear combined heat & power generation)**

Total discharged quantity (m<sup>3</sup>) 39,633,207  
Used inside the plants (m<sup>3</sup>) 304,516

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

**Fuel consumption  
(conventional CHP)**  
Total: 1,188,506 t of oil-equivalent



**Avoided CO<sub>2</sub> emissions (t)**

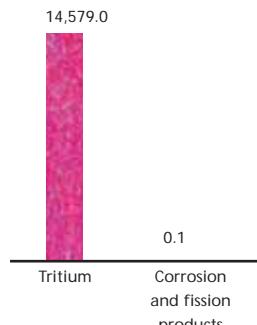
Source	Emissions (t)
Hydro generation from natural flows	1,901,000
Nuclear generation	12,902,000
<b>Total</b>	<b>14,803,000</b>

Emissions from the otherwise necessary conventional thermal generation. This computation refers to average specific CO<sub>2</sub> emissions from Enel's fossil-fired thermal generation outside Italy.

**Radioactive emissions into the atmosphere**

Emissions	Value
Noble gases (TBq)	13
Iodine 131 (MBq)	21
Aerosol $\beta$ and $\gamma$ (MBq)	35
Aerosol $\alpha$ (kBq)	108
Strontium 89 and 90 (kBq)	201

**Radionuclides in discharged waste waters (GBq)**

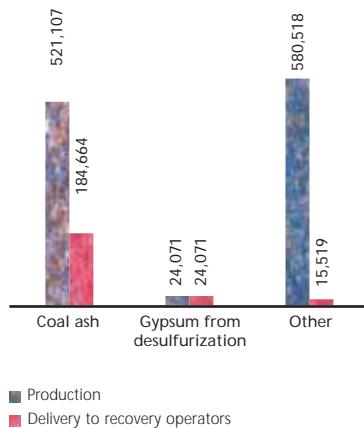


## Special waste

Total production: 1,132,904 t  
Total delivery to recovery operators: 226,347 t

### Non-hazardous

Production: 1,125,696 t  
Delivery to recovery operators: 224,255 t



### Hazardous

7,208

2,092

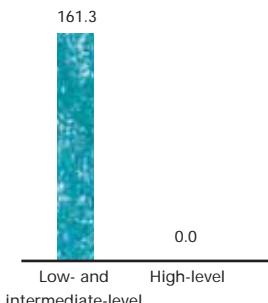
■ Production  
■ Delivery to recovery operators

The "Other" non-hazardous special waste mainly consists of ash and gypsum, which are blended and deposited into a stabilization tank.

## Radioactive waste

### Liquid

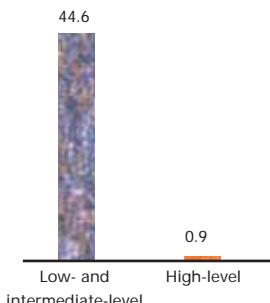
Production in the year (m<sup>3</sup>)



Part of low-, intermediate- and high-level radioactive waste produced from the start of operation of the power plants, which is stored inside the same plants: 3,054 m<sup>3</sup>

### Solid

Production in the year (t)



Part of low-, intermediate- and high-level radioactive waste produced from the start of operation of the power plants, which is stored inside the same plants: 441 t

## Other data (hydro generation)

Fish ladders (no.)

5

## Enel Maritza East 3 AD Thermal Generation



■ Brown coal-fired thermal power plant

For additional information, contact:  
Teodor Dimov  
Enel Operations AD  
6294 Mednitsa  
Galabovo Municipality  
Stara Zagora District (Bulgaria)  
Tel no. +359 42663494  
Teodor.Dimov@me3power.com

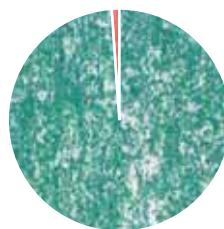
### Power plant data

	Net Gener. units no.	maximum capacity MW
Steam (condensing)	4	763

**Net electricity generation**  
3,065 million kWh

### Fuel consumption

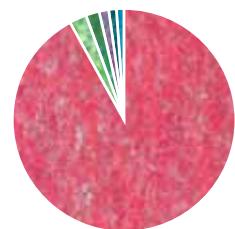
Total: 1,006,814 t of oil-equivalent



■ Brown coal **99.2%**  
■ Fuel oil **0.8%**

### Expendables

Total: 71,622 t

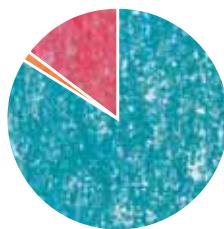


■ Limestone for flue gas desulfurization **97.2%**  
■ Sulfuric & hydrochloric acids **1.3%**  
■ Caustic soda **1.1%**  
■ Lime & ferric chloride **0.2%**  
■ Lubricating oil **0.1%**  
■ Other **0.1%**

## Water for industrial uses

Total requirements: 24,511,487 m<sup>3</sup>

Total abstraction from inland waters: 20,920,787 m<sup>3</sup>



■ From rivers **85.0%**  
 ■ From wells **0.3%**  
 ■ From waste waters (used inside the plants) **14.6%**

## Waste waters

Discharged (m<sup>3</sup>)

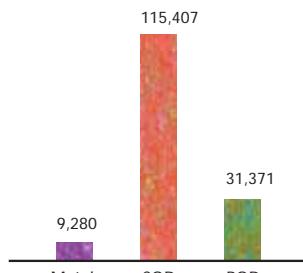
5,680,860

Used inside the plants (m<sup>3</sup>)

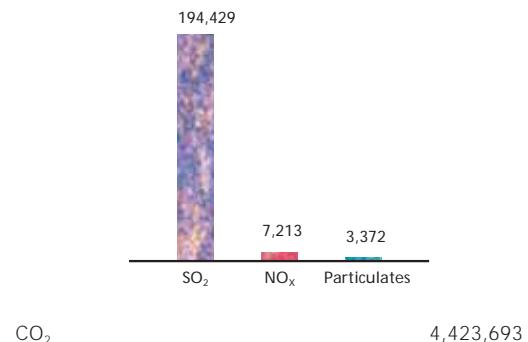
3,590,700

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

## Polluting load of discharged waste waters (kg)



## Emissions into the atmosphere (t)



CO<sub>2</sub> 4,423,693

## Special waste

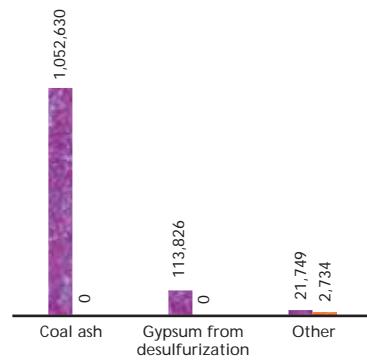
Total production: 1,188,467 t

Total delivery to recovery operators: 2,751 t

### Non-hazardous

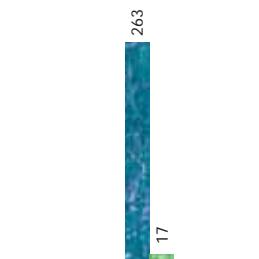
Production: 1,188,204 t

Delivery to recovery operators: 2,734 t



■ Production  
 ■ Delivery to recovery operators

### Hazardous



■ Production  
 ■ Delivery to recovery operators

# Enel Electrica Banat SA / Enel Electrica Dobrogea SA

## Electricity distribution



For additional information, contact:  
 Carmen Pana  
 Enel Electrica Banat  
 str. Pestalozzi 3-5  
 Timisoara (Romania)  
 Tel no. +40 256405055  
 cpana@electricabanat.ro

### Counties (and corresponding Company districts) served

- Enel Electrica Banat
- Enel Electrica Dobrogea
- Headquarters

Enel Electrica Banat and Enel Electrica Dobrogea are ISO 14001-certified at company level.

### Power installations

SUBSTATIONS		LINES (km)				
	no.	Installed transforming capacity MVA	Overhead bare conductors	Overh. cables	Underg. cables	Total
HV/MV	215	8,847	4,078	-	34	4,112
Satellite substations and MV units	188	905	19,467	0	3,880	23,347
MV/LV	12,190	4,646	15,721	3,990	5,801	25,513
	<b>12,593</b>	<b>14,398</b>	<b>39,267</b>	<b>3,990</b>	<b>9,715</b>	<b>52,972</b>

### General data

Districts (no.)	8
Municipalities, towns and communes served (no.)	2,035
Surface area served (km <sup>2</sup> )	57,144
Customers connected to the grid (no.)	1,437,920

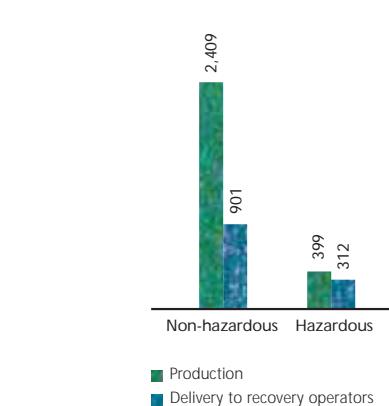
### Special waste

Total production: 2,808 t

Total delivery to recovery operators: 1,214 t

### Electricity

Total electricity distributed (million kWh)	7,259
Own consumption for grid operation (million kWh)	24
Grid losses (million kWh)	1,153

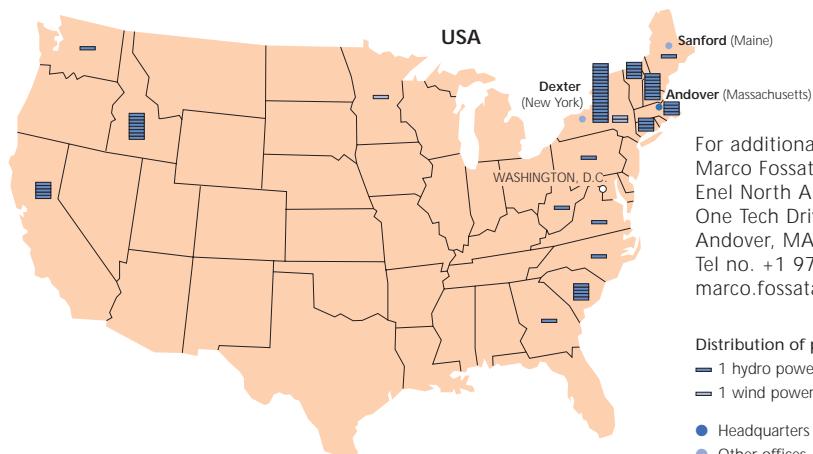


### Emissions into the atmosphere

SF <sub>6</sub> (kg)	0
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# Enel North America Inc.

Hydro, wind and combined heat & power generation



Enel North America also owns a combined heat & power plant (Saint Félicien) in the Canadian province of Québec.

## Power installations

### HYDRO

	Power plants no.	Head installations no.	Net maximum capacity MW
Run-of-river	70		196
Pondage/reservoir		7	109
	<b>64</b>	<b>77</b>	<b>305</b>

### WIND

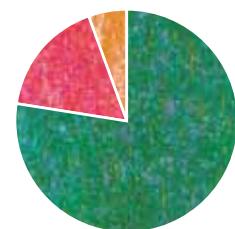
	Power plants no.	Net maximum capacity MW
	<b>3</b>	<b>67</b>

### COMBINED HEAT & POWER GENERATION

	Power plants no.	Gener. units no.	Net maximum electrical capacity MW	Useful thermal capacity 10 <sup>6</sup> kcal/h
Steam (condensing) with intermediate steam extraction	<b>1</b>	<b>1</b>	<b>21</b>	<b>7.357</b>

### Net maximum electrical capacity

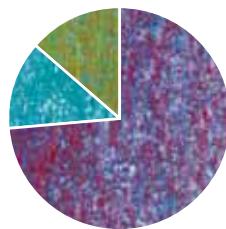
Total: 393 MW



■ Hydro **77.6%**  
 ■ Wind **17.0%**  
 ■ CHP **5.4%**

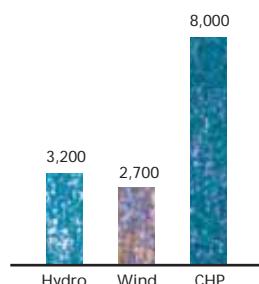
### Net electricity generation

Total: 1,332 million kWh



■ Hydro (from natural flows) **73.7%** (981 GWh)  
■ Wind **13.5%** (180 GWh)  
■ Thermal **12.8%** (171 GWh)

### Equivalent yearly average hours of utilization <sup>(1)</sup>



(1) Electricity generation/maximum electrical capacity ratio.

### Useful heat output

#### (combined with power generation)

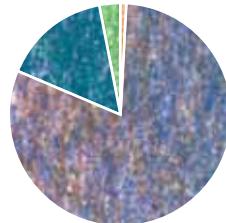
Total: 32,215 million kcal

*equal to 37.5 million kWh*

The heat, which is generated by the Saint Félicien power plant and supplied to a nearby factory, uses steam (12 bar and 300°C) as carrier fluid.

### Expendables (CHP)

Total: 67 t



■ Resins **1.0%**  
■ Sulfuric & hydrochloric acids **80.5%**  
■ Sodium hypochlorite **15.7%**  
■ Lubricating oil **2.8%**

### Fuel consumption (CHP)

Total: 89,948 t of oil-equivalent

Heat & power are generated from biomass, especially tree bark residue from the local wood processing industry.

### Water for industrial uses (CHP)

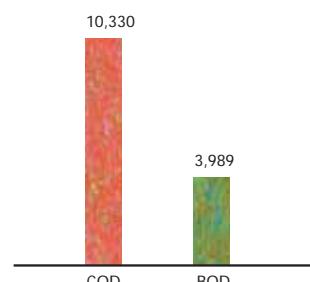
Abstraction from inland waters, entirely from aqueducts:  
704,230 m<sup>3</sup>

### Waste waters (CHP)

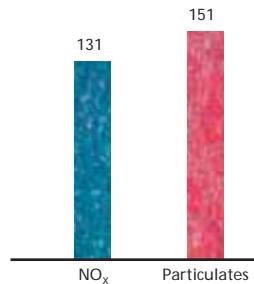
Total discharged quantity: 281,230 m<sup>3</sup>

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

### Polluting load of discharged waste waters (CHP) (kg)



### Emissions into the atmosphere (CHP) (t)



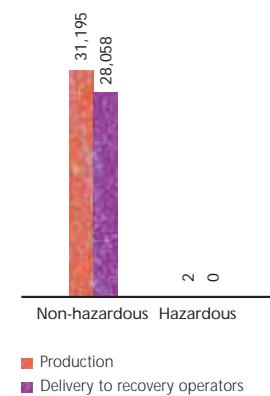
### Avoided CO<sub>2</sub> emissions (t)

Hydro generation	1,161,000
Wind generation	213,000
Electricity generation from biomass	202,000
<b>Total</b>	<b>1,576,000</b>

Emissions from the otherwise necessary conventional thermal generation. This computation refers to average specific CO<sub>2</sub> emissions from Enel's fossil-fired thermal generation outside Italy.

### Special waste (CHP and hydro)

Total production: 31,197 t  
Total delivery to recovery operators: 28,058 t



Non-hazardous waste essentially consists of biomass ash. Over 80% of this waste (the heaviest portion) is recovered as agricultural fertilizer.

### Other data

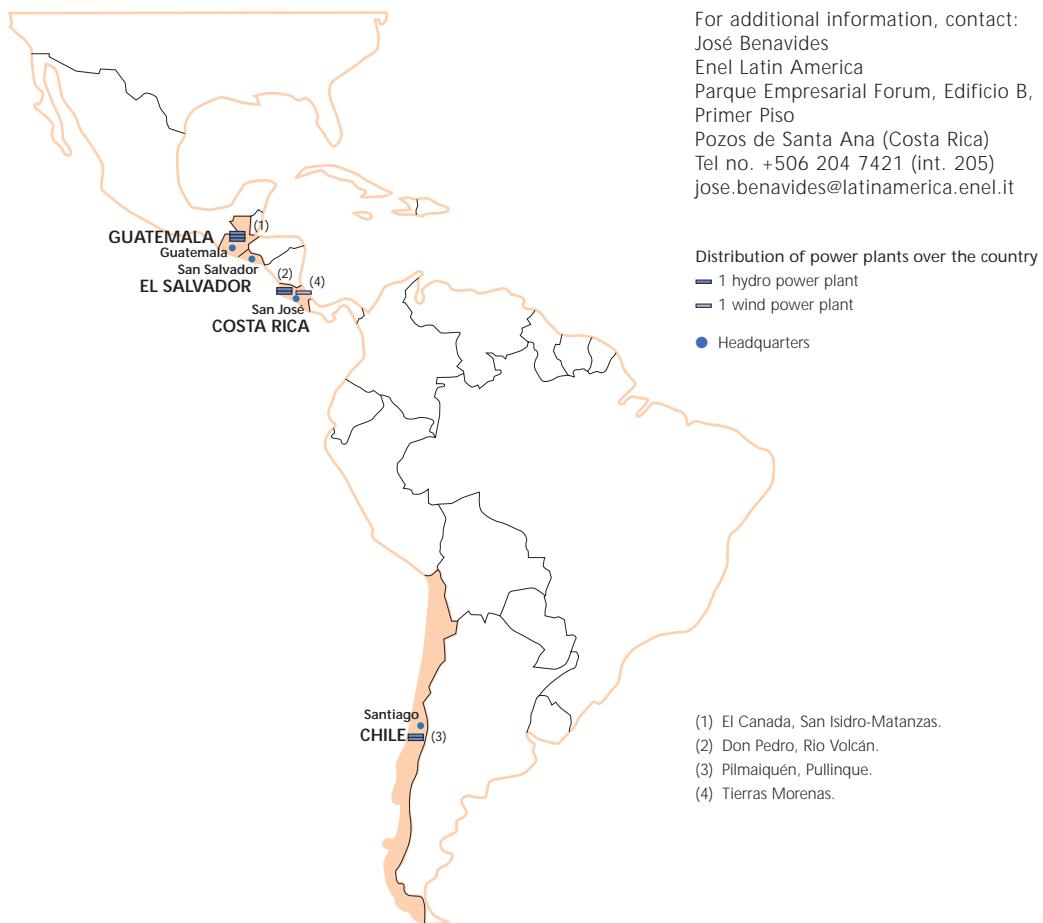
#### HYDRO GENERATION

Emptied reservoirs	quantity (no.)	3
alluvial sediments removed by flushing them out through bottom outlets (m <sup>3</sup> )	50	
alluvial sediments removed by mechanical equipment (m <sup>3</sup> )	30	
> reused locally (m <sup>3</sup> )	30	
Fish ladders and elevators (no.)		11
Fish restocking campaigns	quantity (no.)	3
restocked fish individuals	1,066,000	

#### WIND GENERATION

Wind systems	surface area occupied by platforms, service roads and buildings (ha)	30
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## Enel Latin America LLC Hydro and wind generation



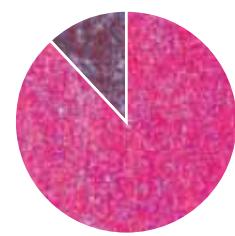
### Power installations

#### HYDRO

	Power plants no.	Head installations no.	maximum capacity MW	Net
Run-of-river		1	4	
Pondage/reservoir		7	178	
	<b>7</b>	<b>8</b>	<b>182</b>	

#### Net maximum capacity

Total: 206 MW



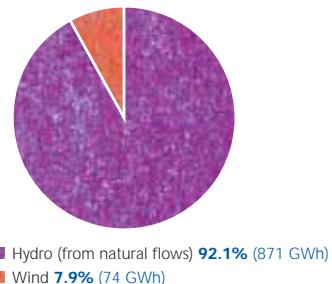
#### WIND

	Power plants no.	Net maximum capacity MW
	<b>1</b>	<b>24</b>

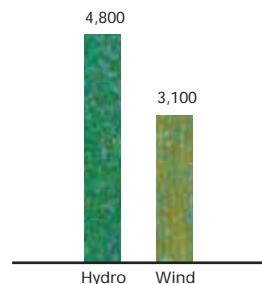
The hydro power plants of Don Pedro and Rio Volcán (totaling 31 MW) and the wind power plant of Tierras Morenas are ISO 14001-certified.

## Net electricity generation

Total: 946 million kWh



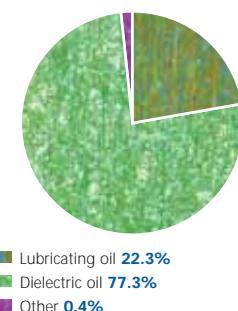
## Equivalent yearly average hours of utilization <sup>(1)</sup>



(1) Electricity generation/maximum power capacity ratio.

## Expendables

Total: 9.9 t



## Emissions into the atmosphere

SF <sub>6</sub> (kg) (t of CO <sub>2</sub> -equivalent)	15 333.0
CO <sub>2</sub> (t)	9.4

Emissions from gas-oil combustion.

## Gas-oil

Total consumption (t of oil-equivalent)	3.2
Used for feeding emergency generating sets.	

## Avoided CO<sub>2</sub> emissions (t)

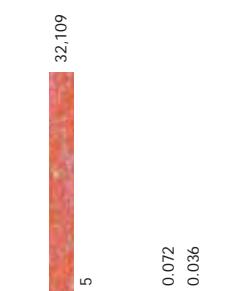
Hydro generation	1,031,000
Wind generation	88,000
<b>Total</b>	<b>1,119,000</b>

Emissions from the otherwise necessary conventional thermal generation. This computation refers to average specific CO<sub>2</sub> emissions from Enel's fossil-fired thermal generation outside Italy.

## Special waste

Total production: 32,109 t

Total delivery to recovery operators: 5 t



■ Production  
■ Delivery to recovery operators

## Other data

### HYDRO GENERATION

Emptied reservoirs	quantity (no.)	3
alluvial sediments removed by flushing them out through bottom outlets (m <sup>3</sup> )	29,100	
alluvial sediments removed by mechanical equipment (m <sup>3</sup> )	32,000	
> reused locally (m <sup>3</sup> )	0	

### WIND GENERATION

Wind systems	surface area occupied by platforms, service roads and buildings (ha)	4
--------------	--	---

## Performance

Environmental performance of Enel's non-Italian operations.

			2003	2004	2005	2006
<b>Electricity generation from renewables</b>						
Share	% of total generation	Viesgo Generación <sup>(1)</sup>	n.a.	9.5	7.0	11.2
		EUFER <sup>(2)</sup>	66.6	57.3	61.1	68.0
		Maritza	0.0	0.0	0.0	0.0
		Slovenské elektrárne	-	-	-	9.9
		ENA	100.0	100.0	100.0	100.0
		ELA	100.0	100.0	100.0	100.0
		Enel's average outside Italy	n.a.	29.9	27.8	20.6
Generation by source						
biomass	%	Viesgo Generación	0.0	0.0	0.0	0.0
		EUFER	0.0	0.0	0.0	0.0
		Slovenské elektrárne	-	-	-	0.0
		ENA	13.5	13.5	12.6	12.8
		ELA	0.0	0.0	0.0	0.0
		Enel's average outside Italy	n.a.	4.1	3.9	2.8
hydro (from natural flows)	%	Viesgo Generación <sup>(1)</sup>	n.a.	100.0	100.0	100.0
		EUFER <sup>(2)</sup>	32.6	17.0	10.0	14.6
		Slovenské elektrárne	-	-	-	100.0
		ENA	73.1	72.6	74.4	73.7
		ELA	92.3	92.4	93.7	92.1
		Enel's average outside Italy	n.a.	62.4	58.5	71.1
wind	%	Viesgo Generación	n.a.	0.0	0.0	0.0
		EUFER	67.4	83.0	90.0	85.4
		Slovenské elektrárne	-	-	-	0.0
		ENA	13.4	13.9	13.0	13.5
		ELA	7.7	7.6	6.3	7.9
		Enel's average outside Italy	n.a.	33.5	37.6	26.1

(1) with Barras Eléctricas Generación.

(2) with Energías Especiales del Noroeste.

n.a.: not available.

- : in the reference year, the Company was not yet owned by Enel.

			2004	2005	2006
<b>Hydro generation</b>					
by type					
from natural flows	% of total hydro generation	Viesgo Generación <sup>(1)</sup>	52.7	46.9	49.7
		EUFER <sup>(2)</sup>	100.0	100.0	100.0
		Slovenské elektrárne	-	-	94.3
		ENA	100.0	100.0	100.0
		ELA	100.0	100.0	100.0
		Enel's average outside Italy	83.3	80.7	85.8
from pumped storage	% of total hydro generation	Viesgo Generación	47.3	53.1	50.3
		EUFER <sup>(2)</sup>	0.0	0.0	0.0
		Slovenské elektrárne	-	-	5.7
		ENA	0.0	0.0	0.0
		ELA	0.0	0.0	0.0
		Enel's average outside Italy	16.7	19.3	14.2
Efficiency of hydro generation from pumped storage (net generation/electricity absorbed by pumps)	%	Viesgo Generación	70.8	69.9	70.0
		Slovenské elektrárne	-	-	42.5
		Enel's average outside Italy	70.8	69.9	64.3
Special-waste recovery	% of waste production	Viesgo Generación <sup>(1)</sup>	100.0	100.0	100.0
		EUFER <sup>(2)</sup>	n.a.	n.a.	100.0
		Slovenské elektrárne	-	-	8.7
		ENA	n.a.	n.a.	n.a.
		ELA	n.a.	n.a.	0.0
<b>Wind generation</b>					
Special-waste recovery	% of waste production	EUFER	0.0	0.0	100.0
		ENA	n.a.	n.a.	n.a.
		ELA	n.a.	4.2	0.0

(1) with Barras Eléctricas Generación

(2) with Energías Especiales del Noroeste

n.a.: not available.

- : in the reference year, the Company was not yet owned by Enel.

			2003	2004	2005	2006
<b>Thermal generation</b>						
Net heat rate	kcal/kWh	Viesgo Generación	n.a.	2,642	2,605	<b>2,620</b>
		Maritza	n.a.	3,050	3,224	<b>3,285</b>
		Enel's average outside Italy	n.a.	3,082	2,804	<b>2,901</b>
Abstraction from inland waters (for industrial uses)	% of water requirements	Viesgo Generación	n.a.	100,0	100,0	<b>100,0</b>
		Maritza	n.a.	n.a.	100,0	<b>85,4</b>
		Enel's average outside Italy	n.a.	n.a.	100,0	<b>88,3</b>
Overall, by source						
fossil fuels	% of total thermal generation	Viesgo Generación	n.a.	100,0	100,0	<b>100,0</b>
		Maritza	n.a.	100,0	100,0	<b>100,0</b>
		Enel's average outside Italy	n.a.	100,0	100,0	<b>100,0</b>
other fuels	% of total thermal generation	Viesgo Generación	n.a.	0,0	0,0	<b>0,0</b>
		Maritza	n.a.	0,0	0,0	<b>0,0</b>
		Enel's average outside Italy	n.a.	0,0	0,0	<b>0,0</b>
Fossil-fired, by source						
fuel oil and gas-oil	% of fossil-fired generation	Viesgo Generación	n.a.	7,6	9,6	<b>3,9</b>
		Maritza	n.a.	0,0	0,0	<b>0,8</b>
		Enel's average outside Italy	n.a.	4,6	6,5	<b>2,6</b>
natural gas	% of fossil-fired generation	Viesgo Generación	n.a.	6,5	7,2	<b>2,9</b>
		Maritza	n.a.	0,0	0,0	<b>0,0</b>
		Enel's average outside Italy	n.a.	4,0	4,9	<b>1,7</b>
coal	% of fossil-fired generation	Viesgo Generación	n.a.	72,5	73,6	<b>80,4</b>
		Maritza	n.a.	0,0	0,0	<b>0,0</b>
		Enel's average outside Italy	n.a.	44,1	49,9	<b>46,4</b>
brown coal	% of fossil-fired generation	Viesgo Generación	n.a.	13,4	9,5	<b>12,8</b>
		Maritza	n.a.	100,0	100,0	<b>99,2</b>
		Enel's average outside Italy	n.a.	47,3	38,7	<b>49,3</b>
Net specific SO <sub>2</sub> emissions	g/kWh	Viesgo Generación	11,5	13,1	11,6	<b>13,5</b>
		Maritza	62,5	71,7	70,4	<b>63,4</b>
		Enel's average outside Italy	29,0	36,1	30,5	<b>34,6</b>
Net specific NO <sub>x</sub> emissions	g/kWh	Viesgo Generación	2,3	4,0	3,3	<b>3,9</b>
		Maritza	1,1	2,3	2,3	<b>2,4</b>
		Enel's average outside Italy	1,8	3,3	3,0	<b>3,2</b>
Net specific particulate emissions	g/kWh	Viesgo Generación	0,77	0,89	0,79	<b>1,02</b>
		Maritza	1,45	1,15	1,11	<b>1,10</b>
		Enel's average outside Italy	0,98	0,99	0,89	<b>1,05</b>
Net specific CO <sub>2</sub> emissions	g/kWh	Viesgo Generación	1,058	1,004	957	<b>993</b>
		Maritza	1,208	1,266	1,452	<b>1,443</b>
		Enel's average outside Italy	1,062	1,184	1,116	<b>1,183</b>
Special-waste recovery	% of waste production	Viesgo Generación	n.a.	80,3	69,8	<b>70,8</b>
		Maritza	n.a.	n.a.	0,9	<b>0,2</b>
		Enel's average outside Italy	n.a.	n.a.	36,5	<b>26,2</b>

n.a.: not available.

			2004	2005	2006
<b>Conventional combined heat &amp; power generation</b>					
Net heat rate	kcal/kWh <sub>eq</sub>	EUFER	1,382	1,367	1,238
		Slovenské elektrárne	-	-	2,927
		ENA	n.a.	4,010	4,324
		Enel's average outside Italy	n.a.	1,614	2,584
Ratio of heat generation to total (heat & power) generation	%	EUFER	38.3	40.6	44.2
		Slovenské elektrárne	-	-	10.5
		ENA	n.a.	2.6	18.0
		Enel's average outside Italy	n.a.	37.0	18.7
Abstraction from inland waters (for industrial uses)	% of water requirements	EUFER	n.a.	n.a.	n.a.
		Slovenské elektrárne	-	-	100.0
		ENA	100.0	100.0	100.0
<b>Thermal generation by source</b>					
fossil fuels	% of total thermal generation	EUFER	100.0	100.0	100.0
		Slovenské elektrárne	-	-	100.0
		ENA	0.0	0.0	0.0
		Enel's average outside Italy	85.8	85.6	96.2
other fuels	% of total thermal generation	EUFER	0.0	0.0	0.0
		Slovenské elektrárne	-	-	0.0
		ENA (solid biomass)	100.0	100.0	100.0
		Enel's average outside Italy	14.2	14.4	3.8
<b>Fossil-fired thermal generation by source</b>					
fuel oil and gas-oil	% of fossil-fired generation	EUFER	49.1	48.7	49.5
		Slovenské elektrárne	-	-	0.0
		Enel's average outside Italy	49.1	48.7	8.2
natural gas	% of fossil-fired generation	EUFER	50.9	51.3	50.5
		Slovenské elektrárne	-	-	1.2
		Enel's average outside Italy	50.9	51.3	9.4
coal	% of fossil-fired generation	EUFER	0.0	0.0	0.0
		Slovenské elektrárne	-	-	60.4
		Enel's average outside Italy	0.0	0.0	50.3
brown coal	% of fossil-fired generation	EUFER	0.0	0.0	0.0
		Slovenské elektrárne	-	-	38.4
		Enel's average outside Italy	0.0	0.0	32.0
Net specific SO <sub>2</sub> emissions	g/kWh <sub>eq</sub>	EUFER	n.a.	n.a.	n.a.
		Slovenské elektrárne	-	-	9.9
Net specific NO <sub>x</sub> emissions	g/kWh <sub>eq</sub>	EUFER	n.a.	n.a.	n.a.
		Slovenské elektrárne	-	-	1.9
		ENA	n.a.	-	0.6
Net specific particulate emissions	g/kWh <sub>eq</sub>	EUFER	n.a.	n.a.	n.a.
		Slovenské elektrárne	-	-	1.8
		ENA	n.a.	0.1	0.7
Net specific CO <sub>2</sub> emissions	g/kWh <sub>eq</sub>	EUFER	379	347	342
		Slovenské elektrárne	-	-	1,151
		Enel's average outside Italy	n.a.	314	918
Special-waste recovery	% of waste production	EUFER	n.a.	n.a.	n.a.
		Slovenské elektrárne	-	-	19.4
		ENA	100.0	80.9	89.9

n.a. : not available.

- : in the reference year, the Company was not yet owned by Enel.

kWh<sub>eq</sub>: kWh obtained from generation of both electricity and heat: the quantity of heat is made homogenous with the quantity of electricity through the heat-work equivalence.

			2004	2005	2006
<b>Nuclear combined heat &amp; power generation</b>	Slovenské elektrárne				
Ratio of heat generation to total (heat & power) generation	%		-	-	4.1
Abstraction from inland waters (for industrial uses)	% of water requirements		-	-	99.1
Net specific radioactive emissions into the atmosphere					
Noble gases	kBq/kWh <sub>eq</sub>		-	-	1.2
Iodine 131	mBq/kWh <sub>eq</sub>		-	-	1.8
Aerosol $\beta$ and $\gamma$	mBq/kWh <sub>eq</sub>		-	-	3.0
Aerosol $\alpha$	$\mu$ Bq/kWh <sub>eq</sub>		-	-	9.5
Strontium 89 and 90	$\mu$ Bq/kWh <sub>eq</sub>		-	-	17.7
Net specific radionuclide emissions into water bodies					
Tritium	kBq/kWh <sub>eq</sub>		-	-	1.3
Corrosion and fission products	mBq/kWh <sub>eq</sub>		-	-	5.9
Special-waste recovery	% of waste production		-	-	41.4
Net specific production of radioactive waste					
low- and intermediate-level					
liquid	mm <sup>3</sup> /kWh <sub>eq</sub>		-	-	14.2
solid	mg/kWh <sub>eq</sub>		-	-	3.9
high-level					
liquid	mm <sup>3</sup> /kWh <sub>eq</sub>		-	-	0.000
solid	mg/kWh <sub>eq</sub>		-	-	0.079
Low-, intermediate- and high-level radioactive waste stored inside the power plants					
liquid	% (by volume) of production from the start of operation		-	-	73.8
solid	% (by volume) of production from the start of operation		-	-	55.8
<b>Electricity distribution</b>					
Grid losses	% of electricity demand (consumption + losses)	Viesgo Distribución <sup>(1)</sup> Enel Electrica <sup>(2)</sup> Enel's average outside Italy	6.7 - 6.7	7.0 14.4 11.3	5.9 13.7 10.3
Relative SF <sub>6</sub> emissions	% of SF <sub>6</sub> in equipment or in stock	Viesgo Distribución <sup>(1)</sup> Enel Electrica <sup>(2)</sup> Enel's average outside Italy	0.00 - 0.00	1.18 0.04 0.67	0.66 0.00 0.33
Special-waste recovery	% of waste production	Viesgo Distribución <sup>(1)</sup> Enel Electrica <sup>(2)</sup> Enel's average outside Italy	0.0 - 0.0	0.0 53.0 40.7	0.0 43.2 39.0
Overhead and underground cables in LV and MV lines	% of entire LV and MV grid	Viesgo Distribución <sup>(1)</sup> Enel Electrica <sup>(2)</sup> Enel's average outside Italy	68.0 - 68.0	68.8 27.9 42.1	69.6 28.0 43.1

(1) With Barras Eléctricas Galaico Asturianas.

(2) Banat e Dobrogea.

- : in the reference year, the Company was not yet owned by Enel.

kWh<sub>eq</sub>: kWh obtained from generation of both electricity and heat: the quantity of heat is made homogenous with the quantity of electricity through the heat-work equivalence.





Slovakia, Cierny Vah  
hydroelectric plant

## **Occupational health & safety**

## *Occupational health & safety*

The commitment of Enel to occupational health & safety in workplaces is enshrined in its Code of Ethics: " 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" , a concept that the Top Management has been reiterating and supporting and that Enel has been vigorously pursuing for many years.

Protection of workers' health & safety is central to the Group's strategic targets and activities, both internally and externally, as emphasized by the Chief Executive Officer during Enel's Convention " Let's Build the Future - Think International. Be Enel" : "[...] I would add working under safe conditions, but I will only be satisfied when we achieve the zero-injury target" .

Health & safety at work are thus an integral part of Enel's culture and industrial policies and each worker plays a crucial role in their implementation.

To fulfill its commitment to occupational health & safety, Enel is engaged on many fronts, including:

- > organizational efforts and constant awareness-building initiatives;
- > coordination and integration;
- > personnel training & education and investments;
- > in-depth analysis of occupational injuries;
- > drafting and updating of risk assessment documents;
- > health surveillance;
- > application of occupational health & safety management systems conforming to international standards (OHSAS 18001);
- > communication.

## Organization

The "Corporate" Personnel & Organization embodies the Industrial Relations, Regulations and Safety unit. The unit has, among others, the mission of issuing appropriate guidelines so that Enel's Divisions and companies (each having a Health & Safety unit) may apply workers' health & safety regulations, practices and processes in homogeneous ways.

The Chief Executive Officer's guidelines (no. 49 of 2004, superseding previous versions of the documents produced in 1997 and 2000) govern the organization of these activities. The guidelines are a reference tool for all of Enel's health & safety units, which are called to identify adequate "Processes and Procedures" for enhancing health & safety in their own workplaces.

In 2006, all the Divisions and companies of the Group revised their occupational health & safety management systems in order to strengthen the organization, streamline processes, define roles and responsibilities and work out operational procedures.

In particular, the following organizational procedures were issued in 2006.

### Domestic Infrastructure & Networks Division

- > Processes and Procedures no. 2, concerning Enel Distribuzione SpA;
- > Processes and Procedures no. 3, concerning Enel Rete Gas SpA.

### Domestic Generation & Energy Management Division

- > Processes and Procedures no. 55, updating the two procedures issued in 2006.

### Domestic Sales Division

- > Processes and Procedures no. 2, concerning Iridea Srl;
- > Processes and Procedures no. 3, concerning Enel Energia SpA;
- > Processes and Procedures no. 2, concerning Enel Gas SpA.

### Enel Servizi (Enel's services)

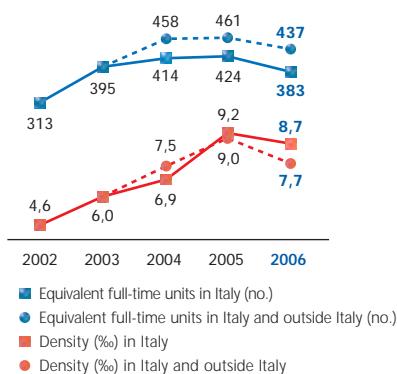
- > Processes and Procedures no. 5.

In each of its Italian sites, Enel identified the so-called "Production Units", their hierarchical and functional organization and the individuals in charge of enforcing the relevant legislation (Employer and Manager). In each of the Production Units so identified, Enel set up a Prevention & Protection Service, appointing its Manager and, where necessary, the Physician in charge of health surveillance of workers exposed to the risks that are typical of the individual Production Unit.

Whenever an organizational change occurs in Enel's sites, this complex system is updated.

Non-Italian sites have teams of workers and specialists that are responsible for health & safety, i.e. for prevention, monitoring and mitigation of risks in workplaces.

#### Personnel dedicated to occupational health & safety



As of December 31, 2006, Enel's overall human resources assigned to health & safety in workplaces amounted to 437 equivalent full-time units, i.e. about 9 every 1,000 workers. This means that, at Enel, substantial human resources have roles and responsibilities – and thus help raise awareness and good practices – in the area of health & safety in workplaces.

Additional human resources (over 9,000 units) are involved in emergency response or first aid.

In 2006, as many as 23,000 workers underwent medical examinations in accordance with the relevant health surveillance protocols.

#### Awareness, training & education

Training & education efforts were significant also in 2006, evidencing the strong commitment of the Group, at all levels, to constant and periodical education on occupational health & safety matters.

Enel delivered over 526,000 hours of courses (more than 9 hours per worker) on health & safety at work, confirming its keen emphasis on this activity.

The course topics ranged from general aspects to job-specific risks (electrical risks), first aid or emergency (training of in-house personnel for first-aid or emergency coordinator positions) and fire prevention.

As regards office work, employees participate in periodical programs making them aware of specific sources of risks, as well as of emergency plans and procedures adopted in their respective sites. A major coordination effort was needed to plan, implement and manage these schemes, so as to trigger a cross-cutting, pro-active and active common process.

In Italy, courses were also organized for the positions of responsibility and representation specified in Legislative Decree 626/94 and for the safety coordinators referred to in Legislative Decree 494/96.

Courses for the positions of Prevention & Protection Manager and Coordinator

#### Training & education hours per worker



were begun in September 2006 (in compliance with Article 8 bis of Legislative Decree 626/94 and with the obligations laid down in Article 3 of Legislative Decree 195/2003 transposing European Directives). In 2006, these courses (over 6,550 hours) were attended by as many as 190 workers and involved a sizeable number of qualified in-house teachers.

### Expenditure

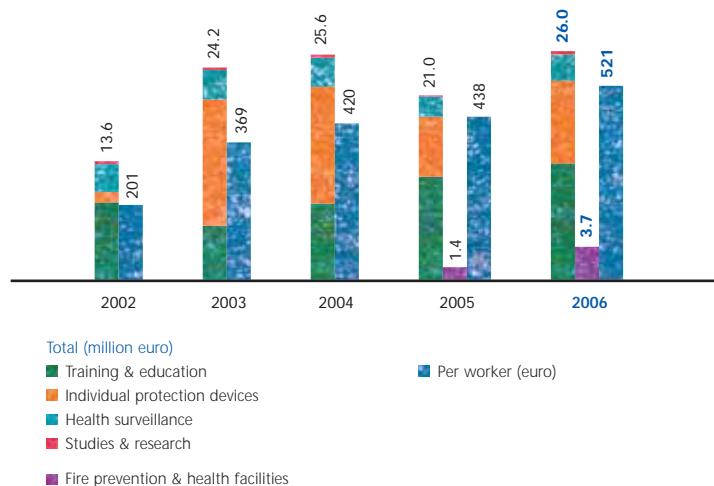
Enel's expenditure on occupational health & safety falls under the following macro categories:

- > awareness, training & education;
- > individual protection systems;
- > health surveillance (physician in charge, health facilities, periodical medical examinations, etc.);
- > specialist studies and research (participation in national and international projects concerning health & safety, epidemiological studies, analysis of the trend of occupational injuries, monitoring of industrial hygiene).

In 2006, Enel spent 26 million euro (about 521 euro per worker), over 50% of which were allocated to training & education.

It is worth noting that, in 2006, Enel started separate collection of data on fire prevention teams and health facilities (specifically identified in the graph), which are present in the Group's main sites.

### Expenditure



The 2006 overall expenditure rises to 50 million euro, if the cost of the health & safety personnel is included.

Needless to say, this expenditure adds to investments in occupational health & safety enhancements – which are part of projects of reorganization, renovation or alignment of offices and/or plant sites with the relevant legislation. The cross-cutting nature of these projects makes it difficult to identify them among overall investments. Nonetheless, they express the Group's major commitment and attention to workplaces and respect of laws, regulations and technical standards.

## Initiatives

### Steering Committee

In 2006, the second Steering Committee on occupational health & safety was convened. The Committee retained its target of involving all managers in the occupational health & safety issues that Enel is addressing.

The chief aim of the event was to favor the exchange of data on the progress of Enel's health & safety activities and on the related performance indicators, so as to share data and criticalities and gather clues for launching new initiatives or pursuing the ones already under way on cross-cutting issues (e.g. occupational injuries, non-Italian operations, roles, relations with companies and agencies, information manuals, awareness, training & education).

Within the Steering Committee, projects and initiatives adopted by the Group's Divisions and companies were presented.

### Occupational safety manual

An information manual ("Safety at Enel"), whose preparation was started in 2005, was published in November 2006. The manual is the result of the work of an inter-divisional/inter-company task force, including representatives from the Group's Safety units and coordinated by the "Corporate" Safety unit.

The manual (updating a version produced more than two decades ago) takes stock of new developments in hygiene, health and safety at work, in terms not only of legislation but, above all, of practices and methodologies.

The manual makes a general review of occupational safety, providing recommendations on how to cope with general and job-specific risks and hazards, so that workers may protect themselves, but also their colleagues and third parties within the scope of their work. It is a precious reference tool which adds to the Group's awareness, training & education actions.

Thanks to the contribution of Enel's Communication Department, the manual is graphically attractive, reader-friendly and easy to understand and its images

highlight the key points of the covered topics, as well as correct actions and behaviors.

In early 2007, the manual will be circulated among all of Enel's workers in Italy, starting with newly hired ones, so that health & safety in workplaces may, from the start, become part of the job of each worker and of a culture common to all workers. Versions of the manual for Enel's workers outside Italy are also planned with a view to providing them with a useful informational resource to perform their work under safe conditions.

### **Courses for Prevention & Protection Managers and Coordinators**

As pointed out above in the paragraph on "Awareness, training & education", courses for the positions of Prevention & Protection Managers and Coordinators have begun. The courses are part of a process of compliance with the obligations arising from Article 8 bis of Legislative Decree 626/94 and Article 3 of Legislative Decree 195/2003, as well as from the provisions of the State-Regions Conference agreement of January 26, 2006. For implementing the scheme, Enel resorted to Sfera, a company of the Enel Group that is accredited for education activities.

The following courses were planned, organized and delivered, as set forth in the applicable legislation:

- > module A (28 hours) - basic general course on safety at work, intended for prevention & protection managers and coordinators;
- > module B (48 hours) - specialization course on job-specific risks, also intended for prevention & protection managers and coordinators;
- > module C (24 hours) - specialization course on prevention of and protection from ergonomic and psycho-social risks, organization and management of technical-administrative tasks, internal communication skills and industrial relations, intended for prevention & protection managers only;
- > update courses - 28-hour courses for prevention & protection coordinators and 60-hour courses for prevention & protection managers.

The courses were held initially at the Specialist Training center of Lecco and then (from December 2006) also at the one of Civitavecchia. They will be delivered on a regular basis from 2007.

### **Universities**

In 2006, Enel continued its cooperation with universities and, namely, with the University of Rome "La Sapienza". In June and November 2006, the "Corporate" Safety unit held two risk analysis courses for students of "La Sapienza". After successful completion of the courses, the students obtained academic credits.

## **Nuclear power**

Recovery of skills and know-how in the nuclear power sector was made necessary by Enel's acquisition of nuclear plants and other initiatives launched in this sector outside Italy.

On July 5, 2006, Enel issued notice no. 151 ("Management of Enel's workers having an Italian contract of employment and potentially exposed to ionizing radiation"). The notice, incorporating the provisions of Legislative Decree 230/95, has the explicit goal of ensuring high safety standards to workers exposed to the risk of ionizing radiation.

The document describes measures and provisions to be put in place when Enel's workers (with an Italian contract of employment) have access to areas, sites or installations (in or outside Italy, whether operated by Enel or by other parties) where they may be exposed to ionizing radiation.

## **Notices on occupational injuries**

During 2006, considerable impetus was given to the process of monitoring, control and mitigation of occupational injuries, with a view to responding to the "zero-injury" challenge.

Two fundamental notices were issued:

- > notice by Enel's Chief Executive Officer no. 138 of January 24, 2006 ("Reporting and analysis of serious or fatal occupational injuries"), aiming to simplify the flow of communication and data in the event of a serious or fatal injury (or an injury without a final prognosis) and to refine the analysis of its causal factors;
- > notice by Enel's Chief Executive Officer no. 155 of November 3, 2006 ("Definition of occupational injury indicators"), aiming to harmonize the measuring of injury rates (under univocal definitions) and their assessment (under a classification based on their main causal factors) within the Group.

Both documents have the purpose of improving the monitoring and control of injuries over time and, above all, of identifying processes of ex-post analysis. By so doing, the causes of injuries will be pinpointed and corrective measures will be taken to avoid recurrence of the injuries or of their causes.

## **Identification badge**

Enel's personnel working on construction sites (as defined by Legislative Decree 494/96) bears a special badge, with the photograph and identification data of the worker and the reference data of the employer. This requirement, applicable from October 1, 2006, arises from Article 36 bis of Law-Decree 223/2006 (the so-called "Bersani Decree") concerning "Urgent measures to counter illegal labor and promote safety in workplaces"; the Decree was amended and then converted to Law 248/2006.

Enel promptly met this obligation and also enforced compliance by its contractors.

## **Fire prevention teams and coordination of evacuation drills in large buildings**

In 2006, as many as 1,044 evacuation drills took place in Enel's sites.

Particular attention was paid to large buildings, where evacuation points and emergency plans called for strong coordination and communication efforts and where fire prevention teams (such as those active in Cagliari, Turin, Bologna, Rome and Naples) ensure continuous supervision.

## **Occupational health & safety management systems and OHSAS 18001 standards**

In 2006, Enel continued to introduce occupational health & safety management systems, conforming to the international OHSAS 18001:1999 standards, in its Divisions and companies.

In 2006, the certifying body completed the audit of the Domestic Generation & Energy Management Division pilot units. The remaining installations/construction sites and central functions of the Division will be certified in the period from 2007 to 2008, thereby completing the phasing-in of the occupational health & safety management system within the Division.

The Domestic Infrastructure & Networks Division maintains the certification (leading back to 2001) of over 90% of its workplaces.

## **Operating rules concerning connection points between high-voltage power grids**

In October 2005, Enel's Divisions of Domestic Infrastructure & Networks and of Domestic Generation & Energy Management, together with Rete Ferroviaria Italiana (Italian railway company) and Terna jointly drafted operating rules and signed the related agreement for coordinating safety provisions in boundary areas between power grids.

The rules were applied on an experimental basis, confirming their rationale and viability. As a result, in October 2006, the rules were updated and placed in a technical annex of the agreement.

## **Activities outside Italy**

With its growing internationalization, especially in the past few years, Enel's presence has been extended to different geographic areas – from Europe to North America and Latin America – with different political, social and economic contexts. The need thus arose to include occupational health & safety matters in the harmonization process involving the countries where Enel is present.

To meet this requirement, the International Division issued notice no. 2 of December 15, 2006: "Health & Safety Policy". The notice was prepared by the "Corporate" Personnel & Organization/Industrial Relations, Regulations and Health & Safety

unit, jointly with the International Division.

The document provides the basic guidelines for protecting the health & safety of Enel's workers in foreign countries. Although the legislation and value system of each country originate from a different industrial and cultural development process, Enel's policy document is designed to create a strong common vision of health & safety at work, high-profile standards and commitment to abiding by national laws and regulations.

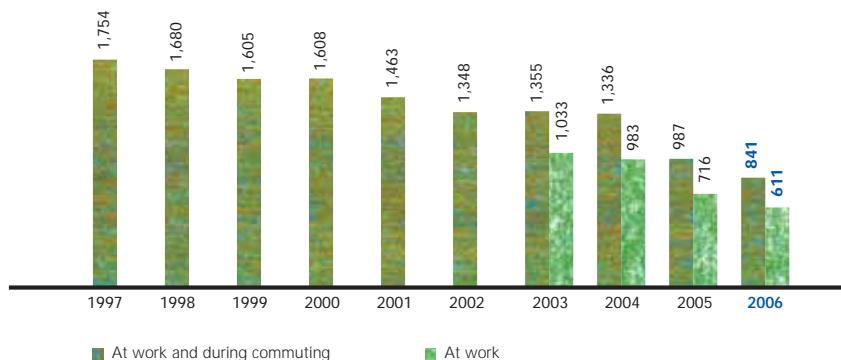
The document lists the criteria to be followed when assessing occupational risks, the activities to be conducted for managing, monitoring and controlling injuries, the indicators to be adopted for assessing health & safety performance, as well as the measures to be taken for managing emergencies (injuries, fires, etc.).

The "Health & Safety Policy" adds to the initiative of producing an English version of notice no. 138 on occupational injuries ("Reporting and analysis of accidents at work with serious or fatal outcomes"). These efforts testify Enel's intent to disseminate its safety culture in all the countries where it operates and to place workers' health & safety among the values characterizing Enel's model in the world.

## Injuries

The total number of occupational injuries (involving at least one day of absence from work), in and outside Italy, continued to drop (611 in 2006 vs. 716 in 2005). The graph shows the total injuries occurred among Enel's workers over the years and, from 2003, it also highlights injuries during commuting (journey from home to work and back again).

**Injuries to Enel's personnel\* (no.)**

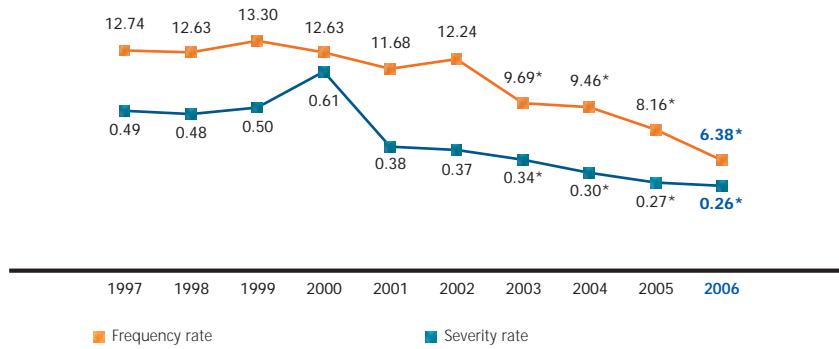


\* In the period considered, Enel's personnel numbers recorded significant variations.

Two indicators measure Enel's safety performance: the frequency rate (number of injuries per million hours of work) and the severity rate (number of workdays lost owing to injuries per thousand hours of work). These indicators continued their declining trend: within the Group as a whole, the frequency rate passed from 9.46

in 2004 to 8.16 in 2005 and to 6.38 in 2006, whilst the severity rate dropped from 0.30 in 2004 to 0.27 in 2005 and to 0.26 in 2006.

#### Frequency and severity rates

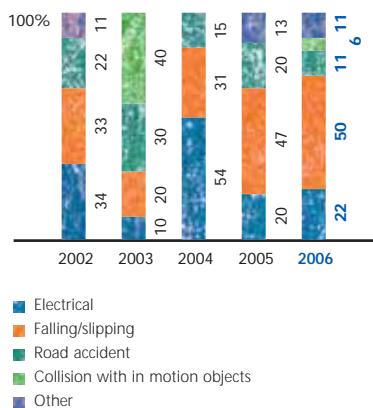


\* Value not including injuries during commuting.

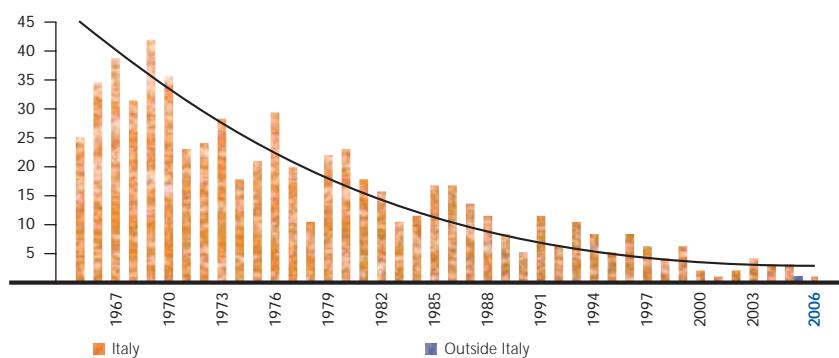
#### Monitoring of serious and fatal injuries

In 2006, Enel recorded 17 serious injuries (first prognosis: more than 30 days) and a single fatal injury (in Italy, due to electrocution). None of Enel's workers abroad had serious or fatal injuries.

#### Serious and fatal injuries to Enel's personnel by type (%)



#### Fatal injuries to Enel's personnel\* (no.)



\* In the period considered, Enel's personnel numbers recorded significant variations.

The causes of the 17 serious injuries and of the single fatal injury in 2006 are distributed as follows: 50% due to falling or slipping, 22% to electrical injuries, 11% to road accidents, 6% to collision with, tear, abrasion or cut caused by objects in motion (e.g. moving parts of equipment or machines), while the remaining percentage is attributable to other factors.

Injuries to contractors' personnel stood steady at their 2005 levels, reflecting a sharp decrease in serious and fatal injuries (38 in 2004, 19 in 2005 and 22 in 2006), thanks to constant supervision of workplaces and selection of increasingly qualified contractors.

Finally, Enel's sensitivity to safety is also expressed by a project that began some years ago: monitoring of adverse events in which third parties may come into contact with Enel's infrastructure (road accidents, contacts of public works' vehicles and equipment with power lines, etc.).

In 2006, 94 of such events occurred, 48 of which were fatal. None of them involved customers or visitors to Enel's installations and no evidence of liability was ever found on the part of Enel.

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For additional information on the topics covered in this section, contact:  
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Panama, Chiriquí  
hydroelectric plant

## **Environmental Report verification**



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San Donato Milanese, May 16, 2007

### **Verification of Enel SpA's Environmental Report 2006**

The IT Group Infrastructure & Environmental Italia Srl verified Enel SpA's Environmental Report 2006. This statement provides the reader with the results of our verification.

Our approach to the verification activity was largely based on the guidelines arising from the *"Forum on Certification of Environmental Reports"*, which was organized by the Fondazione Eni Enrico Mattei of Milan. Reliance was also made on the ASTM E-1527-00 standard and on the most innovative international reporting guidelines.

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

- the Report was complete and included all the aspects and significant impacts of Enel's activities;
- all the reported data and information were understandable and clear;
- the procedures and system used for the collection and aggregation of data and information were adequate and reliable.

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

#### **A – Domestic Generation and Energy Management Division**

##### **Headquarters (Rome)**

##### **Thermal Generation Business Area**

- BARI Business Unit
- BASTARDO Business Unit
- BRINDISI Business Unit
- GENOVA Business Unit
- LA SPEZIA Business Unit
- LERI CAVOUR Business Unit
- PIETRAFITTA Business Unit – power plants of Pietrafitta, Campomarino, Giugliano, Maddaloni, Larino and Camerata Picena
- PIOMBINO Business Unit – power plants of Piombino, Livorno, Portoferraio and Capraia

**Renewables Business Area**

- BOLOGNA Business Unit
- CUNEO Business Unit
- DOMODOSSOLA Business Unit
- MONTORIO Business Unit

**B – Domestic Infrastructure and Networks Division**

- Headquarters (Rome)
- Emilia Romagna Power Grid Regional Unit - Bologna

**C - International Division**

- Slovenské elektrárne - Headquarters (Bratislava)
- Slovenské elektrárne – Thermal power plant of Novaky
- Slovenské elektrárne - Nuclear power plant of Bohunice

At Enel SpA's Regulatory Affairs and Corporate Strategy/Environmental Policies unit, which is responsible for the preparation of the Report, we carried out general verifications on data management and assessed the reliability of the data collection system. We also sample-checked the reported data for reliability and consistency.

At the peripheral sites of the various Divisions and Companies, we conducted our audits in accordance with ASTM E 1527 – 00 standards, i.e. through document analysis, interviews with the personnel in charge of the various activities and collection of visual evidence.

The data were gathered in a uniform way throughout Enel according to standard formats for presentation in the Report.

Enel's reporting system was further refined, especially in terms of collection of data concerning non-Italian operations and checking of their consistency. As in previous years, the system proved to be reliable and accurate in consolidating the data, thereby facilitating the verifier's work.

With particular regard to data collection, we welcomed the efforts made to develop systems for reporting data on nuclear power generation by the Slovak subsidiary Slovenské elektrárne.

For the future, we reiterate the recommendation that we made in 2006, i.e. to adopt certified Environmental Management Systems in all of Enel's field sites. As largely demonstrated, these systems can help monitor and manage environmental issues on a day-to-day basis, making the implementation of the Group's policies more effective.

The format of the Report is reader-friendly and we can state that it is in line with the most advanced and innovative international standards.

The Report is comprehensive, clear and understandable. The performance indicators and the data are correctly reported.

In our opinion, Enel SpA's Environmental Report 2006 is complete, understandable and reliable.



Domenico Prestia

Chief Executive Officer



Gianfranco Zanoni

Senior Consultant



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