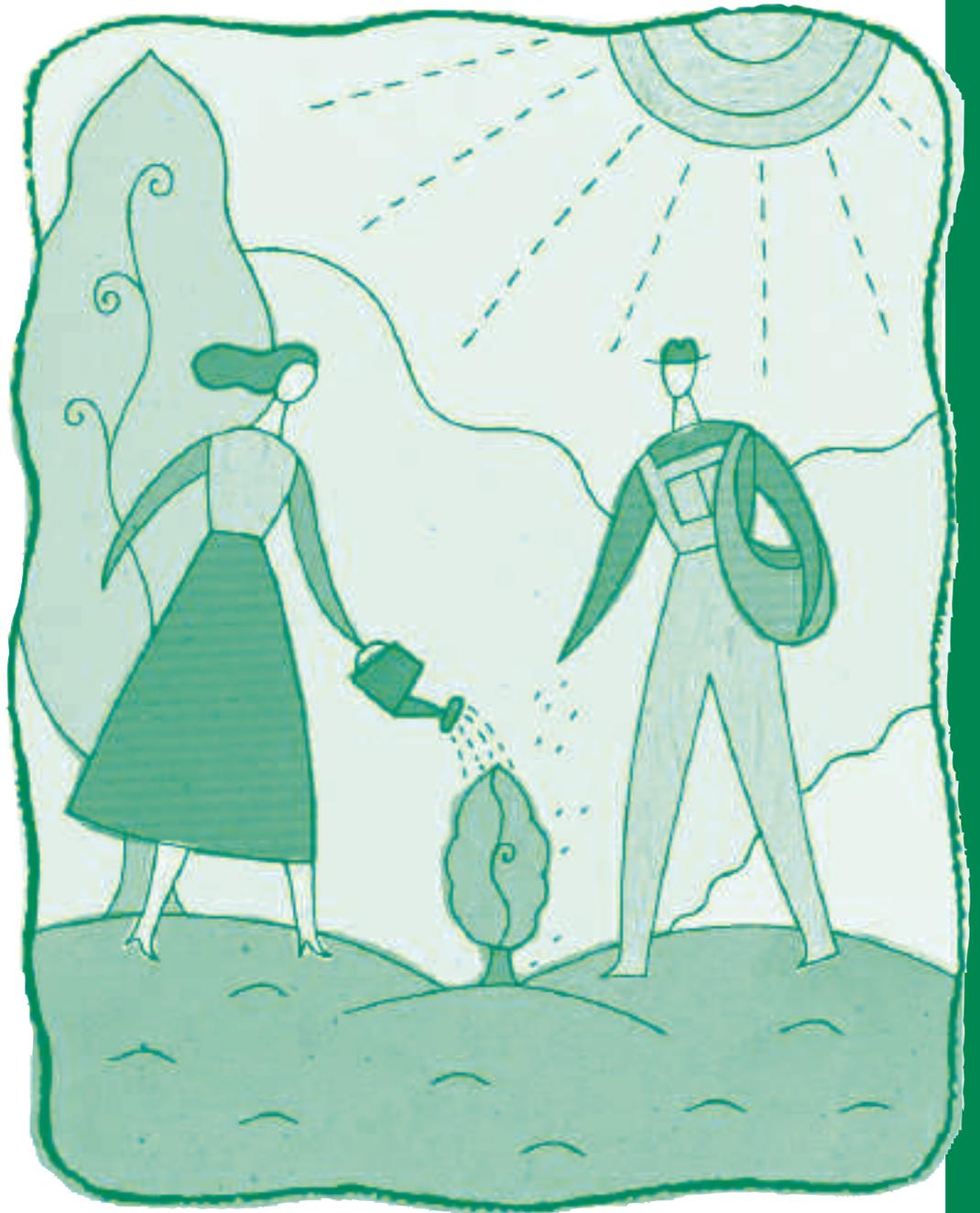




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Corporate Identity

Economic Section

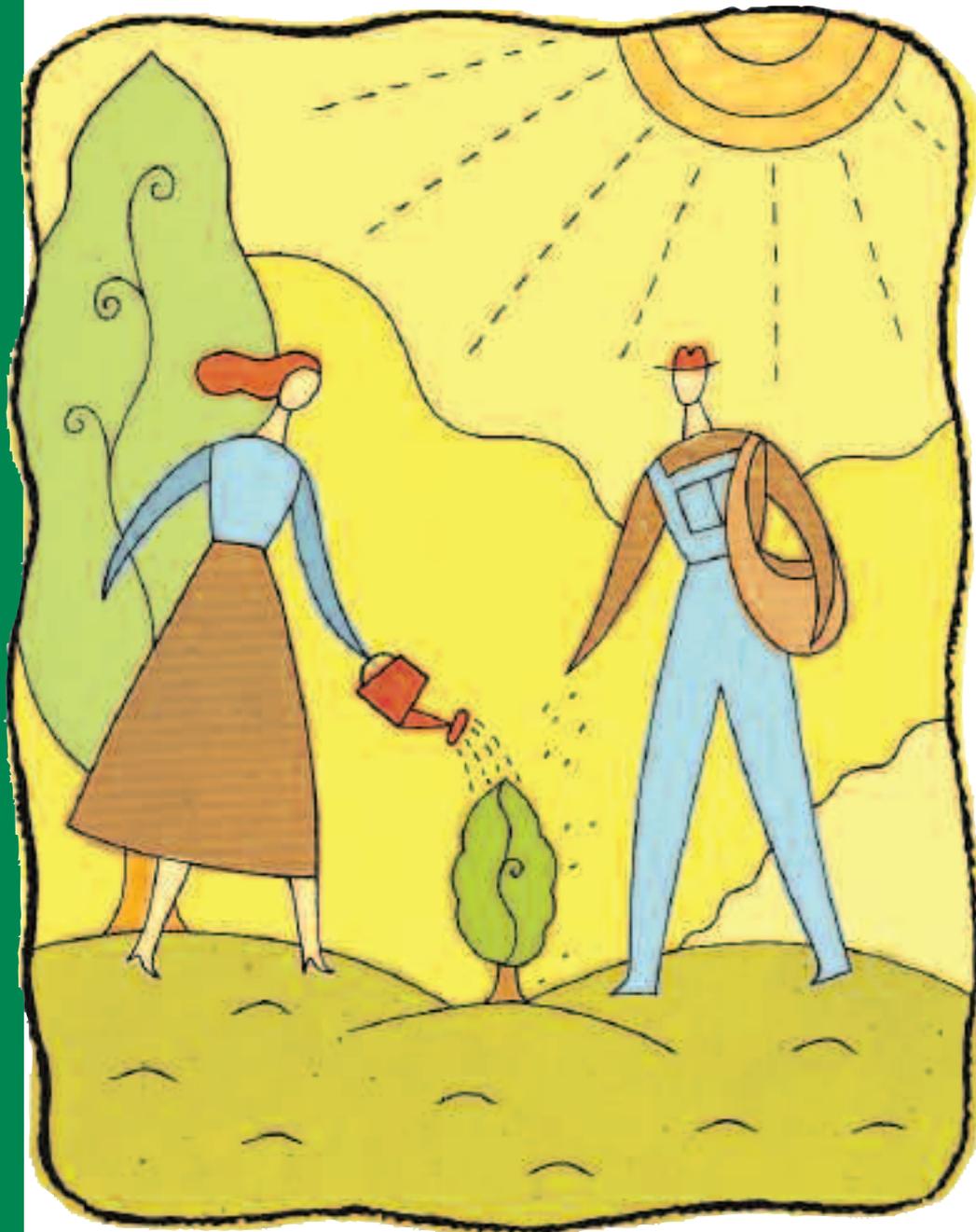
Social Section

Environmental Section

Attachments on CD-ROM

# 2005 Sustainability Report

## Environmental Section



# 2005 Sustainability Report



## Corporate Identity

Vision and strategy  
Group profile  
Corporate governance  
and management systems  
Stakeholders



## Social Section

Social responsibility  
Customers and the Community  
Suppliers  
Human resources  
Shareholders  
Institutions and the Company  
GRI social performance indicators



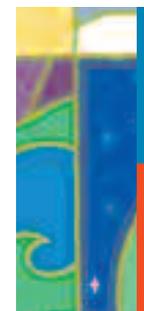
## Economic Section

Economic responsibility  
Creation of Added Value  
Distribution of Added Value  
GRI economic performance indicators



## Environmental Section

The Acea Group and the environment  
Energy area: aware management  
Water area: attention towards quality  
Use of the resources  
Emissions into the atmosphere, effluent and waste  
Attention towards biodiversity and the air quality  
Research  
Environmental investments  
GRI environmental performance indicators  
Attachment: Fact Sheets - Italian Companies



*on attached CD-ROM*

Environmental Accounts  
Fact Sheets - Foreign Companies  
Glossary

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5	› Energy production
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11	Water area: attention towards quality
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# The Acea Group and the environment

## The boundaries

*The reference area of the Environmental Section includes the spun-off companies, as defined in the Corporate Identity, Reference period and boundaries of the report, page 5. The data referring to AceaElectrabel Produzione concerns all the activities handled, irrespective of the shareholding held by Acea SpA (approximately 30%). For the first time, information relating to Acea Ato 5 (Frosinone), Acque SpA and Gori SpA is presented for the water area.*

Aspiring to the principles of corporate social responsibility, the Acea Group exercises constant control over the interaction between production activities and the environment, aware of the considerable impact which can be generated. In the water sector, all the phases are taken care of: from the withdrawal of water from the springs to the transportation and distribution of drinking water, and the treatment of waste water before returning it to the environment. In the energy sector, it handles the electricity generation and distribution phases up until its sale to the end customer. Care of the environmental aspects stems from the activities for the regular monitoring of the physical variables involved, to then translate, as stated by the first principle of the *Environmental Policy*<sup>1</sup>, into an operative approach aimed at «sustainably managing the natural resources and the energy, valorizing the use, paying particular attention to the reduction of waste and the rational use by the consumer and increasing recourse to renewable sources».

An aspect which Acea pays particular attention to is the dialogue with the communities affected by the activities. The

seventh principle laid down by the *Environmental Policy*, in fact, commits the Group to «establishing and maintaining dialogue, supported by the commitment towards maximum collaboration, with the local bodies, with the representative entities, with the corporate structures and with any other party concerned, both internal and external, by means of systematic disclosure reporting and periodic, clear and transparent communication of the corporate strategies and the results achieved with regards to safety, health and protection of the environment ».

Moreover, “environmental matters” have a consolidated presence within Acea – in fact the first edition of the *Environmental Report* dates back to 1998 – and today it is an integral part of the management of all activities: the Group is increasingly inclined towards «maintaining and supporting the commitments towards on-going improvement of the results in the field of environmental protection and management, defining environmental objectives and adopting improvement programmes aimed in particular at optimizing the efficiency of the collection, distribution and treatment of the water resource, the minimization of the

<sup>1</sup> The Acea Group's Environmental Policy is available on the company website: [www.aceaspa.it](http://www.aceaspa.it).

smells emitted, the control and the reduction of the atmospheric and electromagnetic emissions, the containment of the waste on the energy distribution network and the minimization of the visual and acoustic impact caused by the company plants, the reduction, recovery and re-use of waste produced» (third principle of the *Environmental Policy*).

The products supplied by Acea: electricity, heat, drinking water, treated water and public lighting do not produce significant environmental impacts (EN14), in fact they do not give rise to either pollution or harmful emissions. Only public lighting could cause so-called "light pollution", if it is not handled appropriately. This could happen, for example, if the street lamps were not correctly oriented, so that the beam of light goes above the horizon line. Acea is extremely sensitive with regards to this problem and shows preference for the use of innovative technologies which render the phenomenon negligible, in full compliance with current regional legislation (Lazio Regional Law no. 23/2000).

The environmental impacts which the Group keeps under control, therefore, are those generated during the phases for the production and distribution of the products throughout the territory. In this connection, the analysis of the life cycle of the products is described in the *Environmental Accounts* (attached in cd rom format), which in fact follows the logic of the *Life Cycle Assessment* (LCA - international standard ISO 14040).

Furthermore, in 2005, the Group did not report any significant spills into the environment of polluting substances such as mineral oils, fuels or chemical products. (EN13)



# Energy area: aware management

As from 2000, the Group has progressively adopted Environmental Management Systems (EMSs) in order to improve its performances, starting off with the electricity generation plants. This made it possible to comply efficiently and on a timely basis with the legislative evolution of the sector and to contain the environmental impacts generated by the energy production activities to a minimum.

The first environmental certification, in accordance with the UNI EN ISO 14001 standard, was obtained in 2000 by the Tor di Valle thermoelectric plant. Since then, Acea has pursued the objective of gradually certifying all the plants: in 2004, the Salisano hydroelectric plant achieved compliance with the ISO 14001 standard; in 2005, it was the turn of the Montemartini thermoelectric plant and Initial Environmental Analysis for the G. Marconi (Orte) plant commenced, leading to the initial drafting of the basic document.

For the new plants envisaged by the strategic plan (see *Corporate Identity*), the Group aims to directly obtain EMAS registration (Eco-Management and Audit Scheme, EC regulation no. 761/2001 of the European Parliament and Council), in other words EMS certification, recognized at European level, which complies with the most stringent obligations and requisites and challenges for the Company.

The first "Emas registration" envisaged, by the end of 2007, concerns the Voghera plant<sup>2</sup>, in the province of Pavia.

The importance of what has been achieved to-date, in EMS terms, and future prospects, lies in the contribution towards the divulgation of a culture of respect for the environment capable of translating into tangible action. Adopting Environmental Management Systems in fact involves the commitment of:

- › checking and minimizing the impacts of the production processes;
- › handling the natural resources in an optimum manner;
- › reducing the environmental risks;
- › planning measures for containing the impacts;
- › constantly monitoring the policy and the environmental objectives established;
- › monitoring compliance with the applicable environmental legislation.

Furthermore, so as to optimize the operating skills, targeted training courses were held: in 2005, all the staff operative in the Tor di Valle, Montemartini, Salisano and G. Marconi plants were involved in a training session for raising awareness with regards to the handling of waste. (LA17)

<sup>2</sup> The Plant's activities, which in 2005 generated around 880 GWh of electricity benefiting the Acea Group, are not yet considered to be an integral part of the Environmental Section.

## Energy production

The generation of electricity, amounting to approximately 1,130 GWh in 2005 (- 4 % when compared with 2004), is entrusted to a pool of thermoelectric and hydroelectric plants run by AceaElectrabel Produzione<sup>3</sup>.

### ACEA THERMOELECTRIC AND HYDROELECTRIC PLANTS

thermoelectric plants	hydroelectric plants
Tor di Valle plant : combined cycle section (Rome)	A. Volta di Castel Madama plant (Rome)
Tor di Valle plant: co-generation section (Rome)	G. Ferraris di Mandela plant (Rome)
Montemartini plant (Rome)	Salisano plant (Rieti)
Voghera plant (*): combined cycle (Pavia)	G. Marconi di Orte plant (Viterbo)
	Sant'Angelo plant (Chieti)
	Cecchina plant (Rome)
	Madonna del Rosario plant (Rome)

(\* ) The monitoring of the data is envisaged as from 2006; therefore the plant is not included within the scope of reporting of this Report.

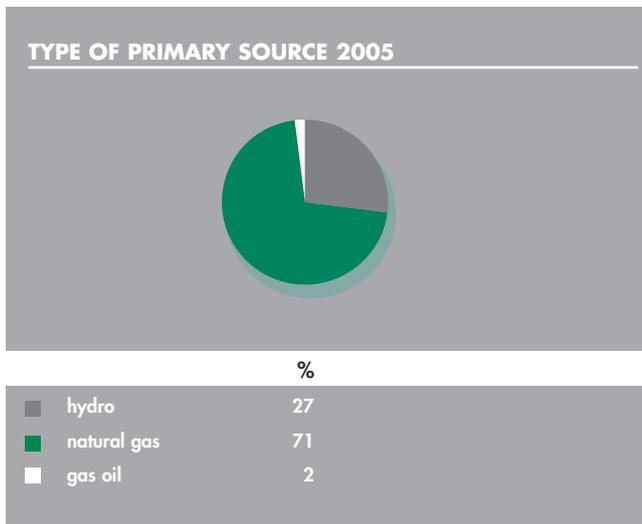
The consumption of primary sources for electricity generation, described in the table below, discloses a trend

aligned with the previous year, with the gas oil decreasing even further when compared with the total.

PRIMARY SOURCES USED FOR THE GENERATION OF ELECTRICITY				
	unit of measurement	2003	2004	2005
hydro	TJoule	1,965	2,080	1,988
	(GWh)	(546)	(578)	(552)
oil by-products (diesel)	TJoule	569	458	143
	(GWh)	(158)	(127)	(40)
natural gas	TJoule	5,357	5,178	5,099
	(GWh)	(1,488)	(1,438)	(1,416)
<b>total (indicator EN4)</b>	<b>TJoule</b>	<b>7,891</b>	<b>7,716</b>	<b>7,230</b>
	<b>(GWh)</b>	<b>(2,192)</b>	<b>(2,143)</b>	<b>(2,008)</b>

<sup>3</sup> For technical details see the attached AceaElectrabel Produzione fact sheet.





Acea produced a total of 4,076 TJ (1,132.2 GWh) from the use of primary sources. Also taking into account the thermal energy produced, in other words just over 250 TJ (69 GWh), the average conversion yield came to 61.8%, up slightly with respect to the previous year.

ENERGY CONVERSION EFFICIENCY (%)			
	2003	2004	2005
hydroelectric production efficiency	79.5	83.8	83.8
thermoelectric + thermal production efficiency	47.8	48.9	46.8
total production efficiency	59.0	61.7	61.8

GROSS ENERGY PRODUCED - TJoule (GWh)			
	2003	2004	2005
hydroelectric energy	1,561	1,743	1,666
	(433.5)	(484.3)	(462.7)
thermoelectric + thermal energy	2,829	2,756	2,660
	(786.1)	(765.7)	(738.9)
<b>total</b>	<b>4,390</b>	<b>4,499</b>	<b>4,326</b>
	<b>(1,219.6)</b>	<b>(1,250.0)</b>	<b>(1,201.6)</b>

Acea has the objective of managing to independently produce, as from 2008, the entire quantity of energy necessary for supplying its customers, thanks to the start-up of three new combined cycle stations powered by natural gas which should come onto stream over the next three years. Estimated production comes to around 7 TWh. During 2005, the Voghera plant came onto stream; the plant, which was shut down (between August and September 2005) due to an administrative irregularity promptly overcome, will cover 0.7% of national electricity production. During the second half of 2006, the Rosignano plant in Tuscany will be able to provide its contribution, and during the second half of 2007 the Leinì plant in Piedmont is expected to come onto stream. In all three cases, these are turbogas plants, with a nominal output of around 380 MW<sub>e</sub> each.

The wind farm project in the provinces of Avellino and Salerno, involving an output of around 50 MW of electricity, falls within an outlook for the enhancement of energy production from a mix of particularly clean sources (natural gas, hydroelectric, wind power). The sites chosen for the construction of the wind farms (commencement of work during the second half of 2006) comply with the most advanced criteria for the protection of the environment and have their basis in the choices made by the region to avail itself of renewable energy sources. (EN17) The production plant will be ready in 2007 and production when fully up and running will be around 100 GWh<sub>e</sub> a year, considering a target of 2,200 hours running a year.

## Box - Voghera: a cutting-edge plant

The Voghera plant, which started to operate in 2005, is a 380 MW combined cycle thermoelectric plant, with the possibility of the combined production of electricity and steam. It was designed envisaging the use of the best technologies, in order to satisfy the energy requests of the national market, as well as the requirements of the associate ASM Voghera SpA, of the adjacent paper mill (Smurfit) and

of other companies present in the area where the plant is located (province of Pavia). The site is also in the immediate vicinity of the High Voltage long-distance power line and the Snam Rete Gas pipeline and this has made it possible to minimize the connecting infrastructural works. From an energy point of view, the combined cycle plant uses the energy contained in the natural gas in an extremely efficient manner, with an

efficiency value for conversion into electricity of close to 54%. The reduction in the consumption of fuel, together with the low carbon content characteristic of natural gas, make it possible to considerably reduce the CO<sub>2</sub> emissions into the atmosphere, when compared with other electricity generation technologies. The combustion of natural gas, furthermore, does not generate dust particles or sulphur dioxide (SO<sub>2</sub>), while the

use of technologically advanced burners limits the emissions of nitrogen oxide (NO<sub>x</sub>) to the maximum. In conclusion, its placement within the area was seen to also from a careful architectonic aspect, with the planting of vegetation in harmony with the surrounding environment and the organization of works aimed at mitigating the visual and acoustic impact. (EN7)

## Box - The Kyoto protocol: the quotas assigned to the Acea plants

By means of the Kyoto Protocol, signed in 1997 during the COP3 Conference of the Outline Agreement of the United Nations on Climatic Changes, industrialized countries have pledged by the end of 2012 to reduce greenhouse gas emissions by 5.2% when compared with 1990.

The initial signing by the adhering companies was supposed to have only been formally ratified subsequently: the agreement, in fact, envisages that the Protocol would come into force on the 90<sup>th</sup> day after the ratification of the 55<sup>th</sup> country from among the 194 original signees, provided that the latter, overall, had covered at least 55% of the global greenhouse gas emissions.

The absence of Russia and the United States for many years penalized the operative start-up of the agreement, which

remained suspended for a long time. Only after the ratification of Russia, in September 2004, was the minimum envisaged limit of 55% finally surmounted and it became possible to apply the Protocol.

The Protocol thus entered into force on 16 February 2005, whilst as from January 2005 the European market of the carbon dioxide quotas (EU Emission Trading Scheme - ETS) was launched.

In accordance with the matters envisaged, Italy has a reduction objective of 6.5%, when compared with the 1990 values, to be achieved in the period 2010-2012. In reality, to-date, the emissions have increased, emerging as 12% greater than those in 1990.

In order to be able to access the ETS, each European Union member state has developed its

own National Allocation Plan (NAP) for the period 2005-2007. The Italian plan was approved by the European Commission at the end of May 2005, after Italy agreed to make a number of substantial changes to the original NAP. In particular, according to the DEC/RAS/074/06 decree the allowances were reduced by 25.8 million tons of CO<sub>2</sub>, and are now equal to 225.5 million tons of CO<sub>2</sub> (no longer 255.5 Mt, as initially anticipated). The Italian plan concerns 1,240 plants, which can therefore take part in the emissions market.

With regards to the Acea Group, the plants affected by the Plan are the Montemartini plant, which was allocated 17,112 allowances a year (in other words 17,112 tons of CO<sub>2</sub>) for the three year and the Tor di Valle plant, which was allocated

321,265 allowances for 2005, 292,392 for 2006 and 275,892 for 2007 (MD of the Italian Environmental Ministry dated February 2006).

In January 2006, the European Commission published the Guidelines for the creation of the new NAPs for the period 2008-2012. The member nations must ensure, by means of the new plans, the achievement of the objectives anticipated by the Kyoto Protocol. The new NAP must be forwarded to the Commission by 30 June 2006.

Other information can be found on the following websites:  
[www.europa.eu.int/comm/environment/climat/emission.htm](http://www.europa.eu.int/comm/environment/climat/emission.htm)  
[www.europa.eu.int/comm/environment/climat/pdf/nap\\_2\\_guidance\\_en.pdf](http://www.europa.eu.int/comm/environment/climat/pdf/nap_2_guidance_en.pdf) (Guidelines for the drafting of the NAP)

<sup>4</sup> European Directive No. 2003/87/CE, which came into force in October 2003.



## The renewable energy plants

### The Salisano plant and the other hydroelectric plants

Among the Acea Group hydroelectric plants, the Salisano plant, located in the province of Rieti, stands out due to a technical peculiarity: it is in fact a run-of-the-river plant and uses the head of the drinking water transported to Rome via the Peschiera and Le Capore aqueducts, with a maximum derivable delivery of 15 m<sup>3</sup> a second. The plant, equipped with horizontal-axis turbines, has an output of 42.2 MW and in 2005 produced around 644 TJ (179 GWh) of electricity (around + 4% when compared with 2004). In 2004, the plant obtained certification of its environmental management system in accordance with UNI EN ISO 14001 international standard. The importance of the resource used for the production of energy, drinking water to be precise, makes the plant a genuine gem of advanced technology.

Other Acea Group plants which use the renewable water resource are located in Lazio and in Abruzzo: these include the hydroelectric plants of Castel Madama, Mandela, Orte and Sant'Angelo. The latter is Acea's main plant, constructed in the 1950's, and comprises two basins created by the dams Bomba and Casoli, with a total useful regulation volume of 84 million m<sup>3</sup>. The water, by means of derivation tunnels and two forced pipes, arrives at two vertical-axis turbines, with 58.4 MW of installed power. A characteristic element of the plant is the difference in height of 23 metres between the turbine level and the alternators' level, due to space restrictions which made extremely advanced engineering solutions necessary. For further information and technical data relating to the Group plants, see the attached fact sheet for AceaElectrabel Produzione.

### Box - Green energy of the Rome Municipality (EN17)

AceaElectrabel and the Municipal Authority of Rome signed an agreement in 2005 for the supply of "green energy" for a total of 105 GWh RECS (Renewable Energy Certification System<sup>5</sup>) certificates.

In the Capital, the public structures which will consume "green energy" will number in total 5,500, including 950 scholastic institutions, 500 offices and more than 1,000 traffic light systems.

The Municipal Authority of Rome's choice to supply itself with energy produced from renewable sources, is equivalent to a sharp reduction in the emissions into the atmosphere, equating to around 53,000 tons

of carbon dioxide less. Furthermore, during 2005 the city of Rome emerged as having the greatest level of installed photovoltaic panel power (around 180 kW) in public structures.

On the subject of renewable resources and incentives for their use, what is more, the Acea Group made its technical skills available, providing, for example, maximum

collaboration to the citizens who intend to install a photovoltaic system interconnected with the electricity network managed.

### Box - Incentives for the use of renewable energy sources

The MD dated 28 July 2005 refers to the production of energy by photovoltaic plants with a capacity of between 1 kW and 1,000 kW, and divides the incentive tariffs up into three incentive categories on the basis of their output:

- plants with an output of between 1 kWp and 20 kWp: tariff equal to Euro 0.445 per kWh
- plants with an output of between 20 kWp and 50 kWp: tariff equal to Euro 0.460 per kWh

- plants with an output of between 50 kWp and 1MWp: tariff equal to Euro 0.490 per kWh

In reality, for the third type of plant it is necessary to take into account a tender mechanism: whomever asks less will have the

possibility of seeing themselves acknowledged the incentive tariff, which at the utmost could be Euro 0.490 per kWh. The incentive is valid for a period of 20 consecutive years for all the types of plant.

<sup>5</sup> The RECS are specific certificates issued as part of an international system which involves 18 European countries, set up to provide incentive, on a voluntary basis, for the production of green energy. With a value of 1 MWh each, the RECS can be used within the support programmes by the Governments or Authorities, in voluntary green energy incentive programmes, providing the customer with the guarantee that the quantity

## Box - Public lighting contributes towards energy saving

Between 2001 and 2005, Acea took steps to transform and adapt plants involving around 40,000 street lamps, changing over from mercury to the more efficient sodium vapour lamps. This initiative involved a considerable energy saving, equating to

around 20%, and the doubling of the lighting efficiency: from the 44 lumen/Watt of the mercury powered lamps to 100

lumen/Watt of the high pressure sodium vapour lamps.

## Electricity and heat distribution

Acea is the second leading national operator with regards to the distribution of electricity, with approximately 3,000,000 inhabitants served in the Rome area. It also runs an important district heating network powered by a co-generation plant, serving two districts located in the south-west of the Capital, covering an approximate total of 25,000 inhabitants.

During 2005, the total quantity of electricity introduced onto all the Acea networks came to 11,153 GWh, involving an increase of 3% when compared with the previous year, while thermal energy stood at constant values of around 50 GWh. The growth levels registered over the last few years are, on the one hand, the expression of a positive economic growth indicator for the area served, and on the other hand, draw attention to the need to maintain the environmental impacts under strict control, by means of management improvements.

Following the acquisition by Acea of the Rome business segment belonging to Enel Distribuzione, which took place on 1<sup>st</sup> July 2001, the need to draw up a *new Regulatory Plan for the medium voltage (MV) electricity network for the city of Rome*<sup>6</sup> emerged, and was completed in 2003.

This document to-date represents the general reference project for the development of the networks for the next 10-15 years, and its strategic objectives also include:

- › the definition of consolidated technical solutions;
- › the standardization of the voltage network to 20 kV, progressively leaving behind the 8.4 kV networks;
- › the co-ordination of the new MV networks with the high voltage (HV) ones.

Some network adaptation work concerned historic districts and those with a high population density, as well as important traffic junctions. In these areas, over time overlappings and stratifications of the network structures have occurred; for this reason, Acea has decided to use trenchless technology for the laying of the cables, in other words a "horizontal guided perforation", with a low impact on the territory, which permitted rapid and safe execution of the work. This cutting edge technology can in fact be used as an alternative to the traditional trenches necessary for the laying of infrastructures and has the advantage of minor invasiveness, quicker execution and a consequent reduction in the inconveniences caused to the urban surroundings.

## Energy services: Acea Reti e Servizi Energetici (EN17)

Acea Reti e Servizi Energetici SpA (Acea RSE) is the Acea Group company which carries out, on behalf of Acea Distribuzione SpA, activities directed towards the achievement of the energy saving objectives in end uses, on the basis of the matters laid down by the Ministerial Decrees dated 20 July 2004.

The company, qualified as a Energy Service Company (ESCO) by the Electricity and Gas Authority, has been operative since April 2005.

The energy saving initiatives achieved during 2005 were mainly concentrated in the public lighting sector, including the underground transport stations, cemetery lighting and electric workings. The initiatives achieved in collaboration with other Group companies, aimed at raising the awareness of the customers/citizens with regards to energy saving, included the forwarding to all the customers of the Rome restricted market of vouchers for the free allocation of high efficiency energy saving light bulbs (see box ).

<sup>6</sup> Illustrated in the 2003 edition of the Sustainability Report, page 139.



## Box - Communication campaign: "Sorprendente, fluorescente"

Raising the awareness of the community with regards to energy-environmental matters is one of the Acea Group's traditional commitments. The last important initiative put together dates back to 2005 when electricity users in Rome (approximately 1,200,000) were sent two vouchers valid for the free allocation of two compact

low consumption fluorescent light bulbs, as part of an initiative developed by AceaElectrabel Elettricità together with Acea Reti e Servizi Energetici. These are light bulbs with a modern design which last between 5 and 15 times longer than normal white heat light bulbs and make it possible to obtain an energy saving of 70%

on consumption due to lighting. The two vouchers were sent together with a letter of presentation accompanied by an informative brochure containing a number of technical and practical indications for an improved use of the light bulbs. The initiative, known as "Sorprendente, fluorescente", will contribute towards keeping the emissions

down to a minimum extent of at least 55,000 tons of CO<sub>2</sub> over the next five years, within the more general framework of action aimed at furthering energy efficiency for greater environmental protection. Acea's campaign was supported by the WWF Italy.



At the same time as the Roman operation, Acea RSE set up similar initiatives with Gori SpA, which runs the ATO 3 - Sarnese Vesuviano, and with Acque SpA, which runs the ATO 2 - Basso Valdarno. In this case, the customers reached came to 300 thousand per ATO and each one of these were given three vouchers, for the free allocation of the same number of light bulbs.

Acea RSE expects to put together various initiatives aimed at achieving overall, during the first five years of application of the Decrees (2005-2009), around 180,000 toe (tons of oil equivalent) in savings, against an objective imposed to Acea equating to 120,000 toe. Within the framework of the mechanisms resolved by the MD dated 20 July 2004, Acea RSE therefore hopes to be able to avail of around 60,000 toe in excess, which can be sold on the "white certificates" market, which will soon be launched by the Electricity Market Operator.

Other energy saving initiatives are underway with EUR SpA, Aeroporti di Roma, Rete Ferrovie Italia, Opera di Roma, and Rome's "La Sapienza" University, directed towards energy saving measures in the respective structures. The project for the creation of a tri-generation system (electricity, thermal and refrigerant energy) is also being developed, in collaboration with AceaElectrabel Produzione SpA, as part of the renovation of the former Abattoir, and similar constructions are being evaluated at the City University, the residential establishments of Porta di Roma-Bufalotta and the imminent City of Sport at Tor Vergata. In conclusion, the Italian Ministry of Education, Universities and Research recently agreed the project idea presented by Acea RSE together with the National Institute of Geophysics and Volcanology for the funding application availing of the Call pursuant to the MD dated 18 July 2005, aimed to experimenting the creation of plants for the supply of energy services which use geothermal sources.

# Water area: attention towards quality

Acea, historic operator in Rome for the integrated water service, is today the leading operator in the sector, with around 8,000,000 inhabitants served in Italy (when fully up and running).

The Group companies are present directly or indirectly with regards to the integrated water services in the regions of Tuscany, Lazio and Campania<sup>7</sup>.

In Lazio, Acea manages the entire integrated water cycle in the Optimum Area of Operation 2 (Central Lazio) and 5 (Southern Lazio). In Tuscany, it participates in the management activities of ATO 2 - Basso Valdarno, and 6 (Ombrone), in Campania it takes part in the management of ATO 3 - Sarnese Vesuviano.

The Municipalities served by Acea in Italy will number 437<sup>8</sup> when fully on stream:

## MUNICIPALITIES SERVED BY ACEA IN ITALY

<b>Optimum Area of Operation managed by Acea - Company</b>	<b>no. of municipalities run when fully on stream</b>
ATO 2 - Central Lazio - Acea Ato 2 SpA	112
ATO 5 - Lazio meridionale - Acea Ato 5 SpA	86
ATO 2 - Basso Valdarno - Acque SpA	57
ATO 6 - Ombrone - Acquedotto del Fiora SpA	56
ATO 3 - Medio Valdarno - Publiacqua SpA	50
ATO 3 - Sarnese Vesuviano - Gori SpA	76
<b>total</b>	<b>437</b>

## Integrated water management in ATO 2 - Central Lazio

Via the company Acea Ato 2, the Acea Group manages the entire water cycle in the Optimum Area of Operation 2 - Central Lazio: from collection at the springs, to transportation and distribution, and collection at the treatment plants and treatment processes which precede its return to the receiving water body.

The municipalities served, when fully up and running, will number 112 (including Rome), for a total population of around 3.6 million inhabitants. During 2005, acquisitions continued for the management of the municipalities, which, as of 31 December 2005, came to 31, equating to 83% of

the total inhabitants, or around 3 million (also see *Corporate Identity*).

Acea Ato 2 introduced around 530 million m<sup>3</sup> of water onto the network deriving from ten supply sources: the Peschiera, Le Capore, Acqua Marcia, Acquoria, Acqua Felice and the Pertuso springs, the well fields Pantano Borghese, Finocchio, Torre Angela, Torre Spaccata, as well as lake Bracciano, used as a reserve in the event of emergency subject to clariflocculation treatment and disinfection. The figure, increasing considerably for some

<sup>7</sup> During the second half of 2005, the equity investments in Liguria were sold off.

<sup>8</sup> Excluding the municipalities deriving from the acquisition of Sigesa, formalized in January 2006.



years now (+ 3.4 % with respect to 2004), reflects the progress underway in the acquisition of the municipalities included in the Optimum Area of Operation.

Aware of the value of the water resource distributed and with the aim of maximum respect for the environment in which it operates, Acea makes the maximum commitment so that the on-going withdrawal of water for the supply of the aqueducts does not generate direct impacts on the eco-

systems of the springs and also intervenes in protected areas adopting opportune precautionary measures for the surrounding environment. (EN20)

The sensitive areas in which Acea operates include the supply sources already listed, including the area of the Pertuso springs, run by Acea as from the acquisition of the Simbrivio aqueduct in 2003, which is resorted to in the event of droughts<sup>9</sup>.

#### THE SPRINGS UNDER PROTECTION (EN23)

sensitive area	location	surface areas (m <sup>2</sup> )
Peschiera Springs	municipality of Cittaducale (Rieti, Lazio)	598,530
Le Capore Springs	municipalities of Frasso and Casaprota (Rieti, Lazio)	586,600
Acqua Marcia Spring	municipalities of Agosta, Arsoli and Marano Equo (Rome)	2,679,600
Acquoria Spring	municipality of Tivoli (Rome)	10,050
Acqua Felice - Pantano Springs	municipality of Zagarolo (Rome)	385,468
Pertuso Springs	municipalities of Trevi and Filettino (Lazio)	77,740

### Quality of the derived water

Acea keeps a complex monitoring and control system active, realized by means of equipment positioned at the springs and along the route of the aqueducts, capable of detecting even the smallest shifts in the main chemical-physical parameters.

Despite the high quality of the available resource, Acea carries out checks on the Rome water system to a higher extent than prescribed by the law, both with regards to the number of samples withdrawn and the parameters analyzed. The monitoring is entrusted to the Group company LaboratoRI.

With regards to the municipalities acquired by Acea Ato 2, the situation, which is surveyed as and when at the time of

the changeover of the operational responsibility, has revealed a number of gaps to be filled so as to bring the qualitative parameters of the water distributed to a level equivalent to that guaranteed in the rest of the ATO.

Following the routine checks carried out on the water distributed in certain municipalities acquired, in fact, non-conformities emerged in a number of parameters, which required the drawing up of a plan of action, via which it was possible to get the values to return within the legal limits. (PR7)

For the quality parameters of the water distributed in Rome, see the following table.

<sup>9</sup> Under normal conditions, the Pertuso springs are used by Enel for the production of electricity, while the springs in the Municipality of Vallepietra and that of Ceraso contribute towards feeding the Simbrivio aqueduct network. In the event of seasonal drought, it is also necessary to draw from Pertuso, interrupting the generation of electricity. This procedure is disciplined by a decree issued by the Commissioner for the Simbrivio water shortage.

AVERAGE CHEMICAL AND MICROBIOLOGICAL FEATURES OF THE DERIVED WATER IN ROME DURING 2005

parameter	unit of measurement	average value	parameter value (It. Leg. Decree No. 31/01)
turbidity	NTU	0.58	acceptable for consumers and without anomalous variations
temperature	°C	13	(*)
concentration of hydrogen ions	pH units	7.5	6.5-9.5
electrical conductivity	µS/cm at 20 °C	544	2,500
chlorides (Cl)	mg/l	6.6	250
sulphates (SO <sub>4</sub> )	mg/l	14.6	250
calcium (Ca)	mg/l	97.2	(*)
magnesium (Mg)	mg/l	19.1	(*)
sodium (Na)	mg/l	5.8	200
potassium	mg/l	3.5	(*)
total water hardness	°F	32.2	(1)
fixed residual calculated	mg/l	389	1,500
nitrates (NO <sub>3</sub> )	mg/l	4.1	50
nitrites (NO <sub>2</sub> )	mg/l	<0.01	0.5
ammonia (NH <sub>4</sub> )	mg/l	<0.03	0.5
fluorides (F)	mg/l	0.20	1.50
total organic carbon (C)	mg/l	0.6	without anomalous changes
iron (Fe)	µg/l	6.4	200
copper (Cu)	mg/l	0.003	1.0
lead (Pb)	µg/l	0.4	10
manganese (Mn)	µg/l	0.42	50
cadmium (Cd)	µg/l	<0.2	5
chromium (Cr)	µg/l	<5.0	50
nickel (Ni)	µg/l	<2.0	20
benzene	µg/l	<0.10	1.0
total trihalomethanes	µg/l	1.12	30
trichlorethylene+tetrachlorethylene	µg/l	i.l.r.(**)	10
1-2 dichloroethane	µg/l	<1.0	3.0
benzopyrene	µg/l	<0.003	0.010
coliform bacteria at 37°C	MPN/100ml (***)	0	0
escherichia coli	MPN/100ml	0	0
enterococcus	UFC/100ml (****)	0	0

(\*) Value not provided for under the Decree.

(\*\*) Lower than gaugeable limit - the values detected per individual component are lower than the gaugeable limits of the method used and significantly lower than the maximum concentrations permitted.

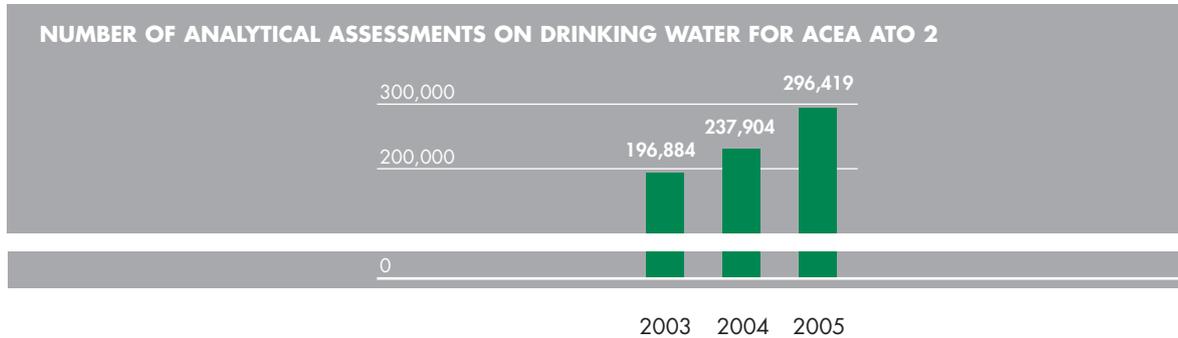
(1) Recommended value: 15-50 °F.

(\*\*\*) Most Probable Number.

(\*\*\*\*) Unit Forming Colony.



Analytical assessments carried out by Laboratori in Lazio, on behalf of Acea Ato 2, are made on the drinking water (see graph), on waste water and on surface water (for the analysis of the assessments see the *Environmental Accounts* attached in CD-ROM format).



The figures for the last three-year period essentially confirm the elevated level of control which the water cycle in Rome and in the ATO 2 municipalities is subject to.

2005 - ANALYSIS OF DRINKING WATER (breakdown by sample source)  
ON BEHALF OF ACEA ATO 2

sample point	no. of samples	no. of analytical assessments
supply sources	1,294	82,049
water network	7,965	214,370
<b>total</b>	<b>9,259</b>	<b>296,419</b>

### Modernization of the water network and plants

During 2005, the work programme, drawn up by Acea Ato 2 and by the Municipality of Rome, continued; its aim is the modernization of the water network, the sewerage network and the Capital's treatment system. The measures envisaged include:

- › the extension of the water network for supplying new users;
- › the creation of new infrastructures for the water networks;
- › the extension of the sewerage works for the elimination of abusive drains;
- › the enhancement of the treatment plants.

The plan of measures will serve 25 thousand Romans still not reached by the water network, adding around 140 kilometres of new pipes to the existing network.

## Loss detection

With regards to the water losses in Rome, during 2005 the figure came to around 25% of the total introduced onto the network, in line with average national values (MD no. 99 dated 1997, parameter A 15). Even if the figure is still high, it is appropriate to underline the downwards trend seen for some years now; the slight increase registered in 2005 should be placed in relation to the extension of the network and does not indicate a negative sign of a reversal

in the trend (see box). The “technical and commercial losses”, which include the apparent losses, in other words the water supplied by the drinking fountains, the consumption for maintenance and cleaning of the pipes, fraud, etc., would come to around 35% of the amount introduced onto the network (see the *Environmental Accounts*, attached in CD-ROM format).

### Box - The reduction of the water losses

So as to more easily locate the losses of the distribution network, since 2001 Acea has divided the Rome water network up into districts. This makes it possible to identify the areas where the losses occur the most with greater precision and therefore where the measures should be

concentrated. A technology has been adopted which uses 400 pressure gauging points, via which it is possible to identify even small losses especially in relation to nighttime functioning, in other words under conditions of minimum disbursement. To-date a total of 52 meters have been

connected. Another strategy adopted by Acea in order to reduce losses regards the progressive replacement, launched in the 1970s, of gauged hydrant utilities with meters. The effective disbursement in the gauged hydrant utilities is often greater

with respect to the needs of the user; this leads to the overflow from the collecting skips during times of scant use, in particular at night and for the tertiary sector where usage is discontinuous. At present, steps have been taken to replace two thirds of the gauged hydrant utilities.

## The Acea Ato 2 sewerage network and treatment system

The Acea Group manages a sewerage network extending around 4,400 kilometres (4,100 km in 2004) via which urban waste water is collected and sent to the treatment plants.

In 2005, approximately 473 million m<sup>3</sup> of urban waste was treated, involving a considerable increase with respect to 2004 (+3.1%) mainly as a result of the greater flows treated at the Rome South purification plant following an intense period of extraordinary maintenance.

Over the last few years, the principal measures taken for improving the plants concerned various aspects, including the enhancement of the structures for the treatment of waste. In this connection, the following work was carried out:

- › bio-filtration at the Rome South Treatment plant;
- › the doubling of the CoBIS (Bracciano lake) treatment plant, completed in 2005;
- › the enhancement of the sludge drying lines.

At present, new measures are being carried out and other are being studied, with the aim of reducing the environmental impacts in the areas adjacent to the main plants and increasing the flows treated when raining. Work concluded involved, by way of example, the construction at the Rome South treatment plant, of three primary sedimentation units concluded in 2004, taking the number

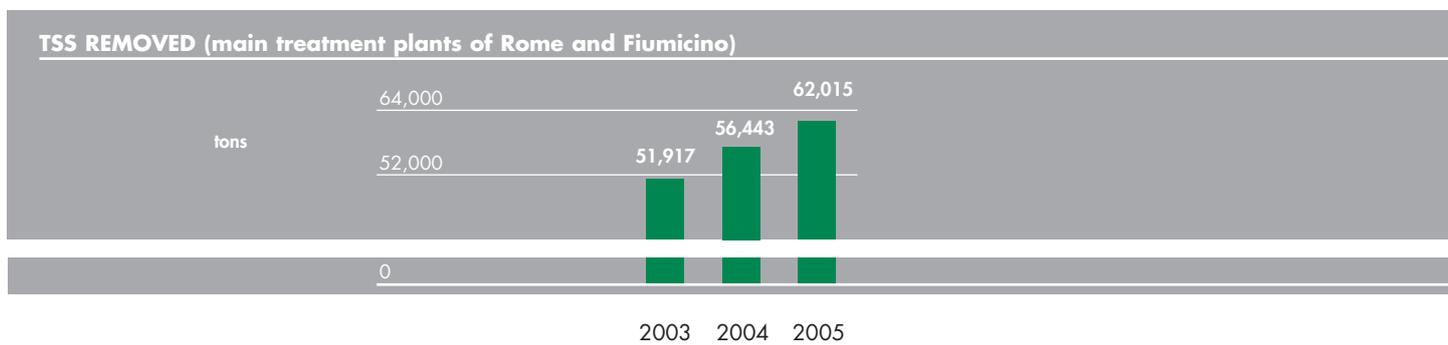
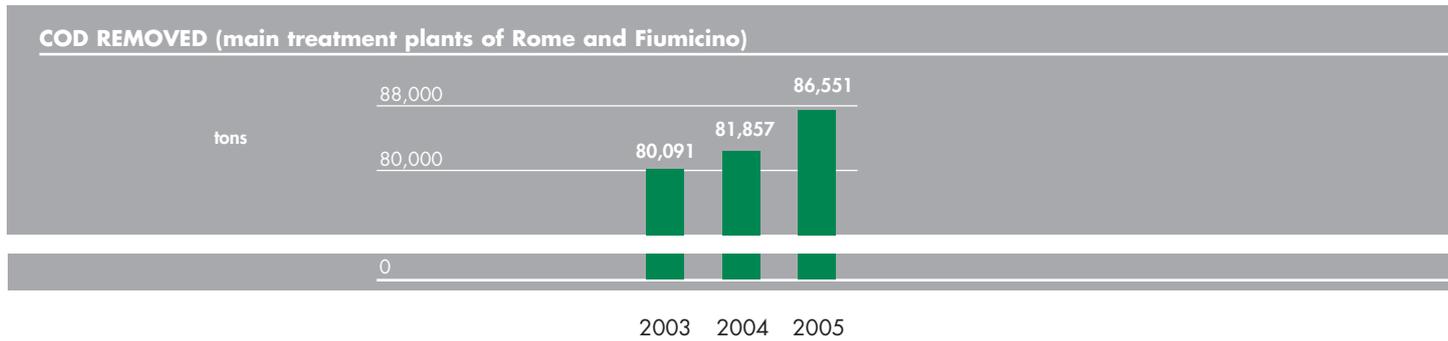
present in the plant to seven, thereby permitting the treatment of the increased flows caused by periods of more intense rainfall. Furthermore, during 2005, the installation work for another three high performance centrifuges (taking the total to six) was completed within the new sludge drying structure; this permits an improved management of the entire sludge line. In conclusion, work continued aimed at reducing the environmental impact of smells and noise for the inhabitants in the districts neighbouring the plant: specifically, a treatment system was activated with a bio-scrubber (a particular filter which uses biomass) for the mists deriving from the sludge drying structure and a treatment system for those deriving from the pre and post inspissation tanks, which uses filtering cartridges which the mists are made to pass through.

The “treatment efficiency”, in other words the efficiency by means of which the main polluting agents have been removed, remained at satisfactory levels in 2005, with COD (Chemical Oxygen Demand) values and TSS (Total Suspended Solids) values exiting the plants within the limits envisaged by the law (Italian Legislative Decree no. 152/99). Despite this, during the year, malfunctions occurred at a number of provisional plants, which Acea took steps to limit on a timely basis, having been sanctioned



by the supervisory authority with small fines (for a total of Euro 7,000). (EN16)

The trend in the treatment cycle functioning parameters disclosed a situation of on-going improvement in the last three years.



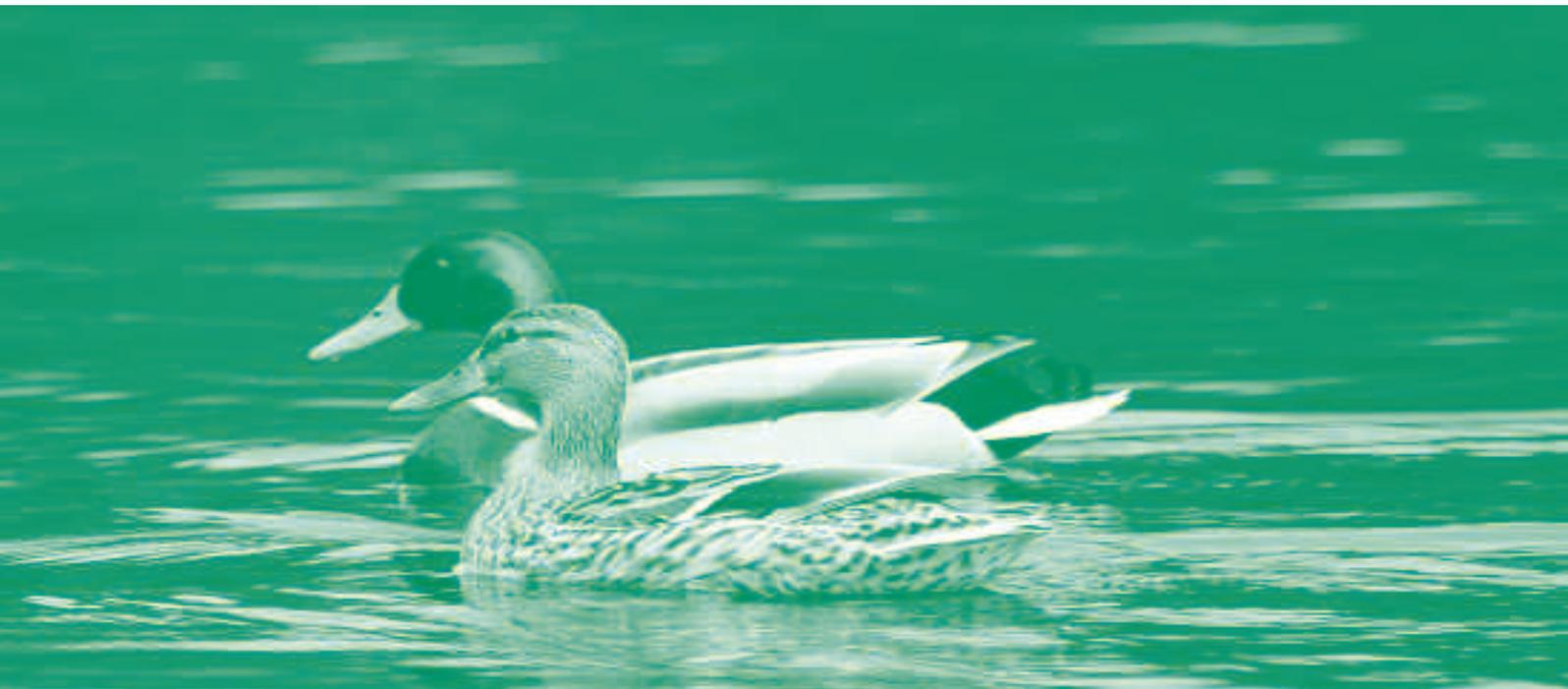
**Box - How a treatment plant works: the example of the Rome North treatment plant**

On the left bank of the River Tiber, at km 9.200 via Flaminia, the Rome North treatment plant is located, immersed in a vast area of greenery, the destination of various winged species throughout the entire year. (EN6) The management of the plant by Acea staff is sensitive to the subject of environmental sustainability and the daily work does not have a negative influence on the animal and vegetal species present. The treatment plant gathers the sewage deriving from the northern area of Rome and part of that deriving from the east of the city. The sewage, once brought together in the divider sump, is sent to the two sections of the plant, constructed in

different periods: the "first" section, built in the mid 1970s, and the new section, which came onto stream in 1992. The sludge treatment system is the same for the two sections. As a rule, the plant treats between 4 and 6 m<sup>3</sup>/s. The maximum capacity envisaged is 16.4 m<sup>3</sup>/s. The first stage is the raising of the sewage to the plant by means of Archimedean screw pumps, supplemented by submersible pumps. The pre-treatments, for each section, comprise screening, sand-collecting and oil extraction. The material withheld by the screens is evacuated via cleaning combs, stored and then transported to the dump.

The screening is followed by sand collecting and oil extraction. In one part the sand sediments, and is then sucked into the deepest point of the channel, in the other part the light substances, including oils and grease, are pushed aside, thanks to the turbulence created via air insufflation, and then collected in tanks alongside the sand-collecting ones, before being transported to the dump. Four 60 metre diameter circular tanks, two for each section, make up the primary sedimentation tanks. The principle phase follows, or rather the biological treatment in the oxidation tanks. The two tanks of the first section are equipped with external horizontal

rotors (not submerged), which will soon be replaced by the oxygen micro-bubble system insufflated from the bottom of the basin, as already takes place for the section. It is during this phase that the biological oxidation, the demolition of the organic substances and the transformation of the ammonia nitrogen into nitric nitrogen takes place, thanks to the presence of particular colonies of microscopic organisms. The aerated mixture at this point is conveyed into two dividing sumps to then go and feed the four circular secondary sedimentation tanks. The clarification of the effluent takes place during this stage: the extraneous substances suspended



in the sewage in the form of flakes of sludge deposit on the bottom of the tanks, from where they are removed by means of mobile scraper bridges and sent partly once again to the biological oxidation section as re-circulation sludge, and in part to the sludge treatment line before final disposal. The clarified sewage is then sent to the final dump. Here it is first of all pre-ispissated, by means of a thickening process which uses mere gravity, then it is sent to the anaerobic digestion sector (two 18,000 m<sup>3</sup> cylinders in total) where complex chemical transformation phenomena produced by specific bacterial flora make the sludge more easily dehydratable.

The digested sludge is first sent to the post-ispissator to be further thickened, then to the press filter. The percentage of dry matter exiting the press filter ranges

between 20 and 30%.

The sludge is finally sent, via a conveyor belt and Archimedean screw system, to seal-proof drums and then transported to the dump.



## The management of the other Optimum Areas of Operation

**Acea Ato 5 SpA** has been active since 2003 in the Optimum Area of Operation 5 - Southern Lazio, which includes 86 municipalities. The acquisition of the municipalities, involving the start-up of the management of the integrated water service, is to-date more or less completed, according to the programme agreed with the Operational Technical Secretariat, and the water services are guaranteed to a total population of more than 430,000 inhabitants, equating to around 93% of the total. Over the next two years, the company envisages implementing a number of projects aimed at identifying and reducing the water losses on the distribution networks. The analytical control activities on the distributed water resource are entrusted by Acea Ato 5 to Laboratori SpA: in 2005, 46,463 checks were carried out, of which 41,220 on drinking water and 5,243 on waste water. Over the next few years, further enhancement of the monitoring is anticipated.

**Gori SpA**, which operates in the Campania region, acquired 61 of the 76 municipalities of the ATO 3 - Sarnese Vesuviano. Again in this case, mention is made of the priority objective of containing the water losses on the distribution network and in order to achieve this priority work was started for detecting and mapping the networks managed.

With reference to the quality of the water, the main measures carried out concerned:

- › the enhancement of the controls on the quality of the drinking water distributed;
- › the acquisition of new sources;
- › the programming of measures on the aqueducts in order to diversify the use of the sources, avoiding the impoverishment and the wells and water tables;
- › the starting of protection work, in accordance with Italian Legislative Decree no.152/99.

An increase in the waste water treatment efficiency is also envisaged, which will contribute towards protecting the ecosystem of the River Sarno and its deltas.

Furthermore, over the next two years Gori will make a particular effort to complete the sewage networks it is responsible for, in particular in the area of the Sarno basin.

**Acque SpA** sees to the management of the integrated water service in ATO 2 - Basso Valdarno (mainly in the province of Pisa), which comprises 57 municipalities. The activities which the greatest efforts are concentrated on are aimed at not only reducing the losses (see box), but also rationalizing the uses of the water resource, containing consumption; so as to guarantee the rising quality of the drinking water distributed and to improve the purification efficiency of the plants.

### Box - Loss detection within Acque SpA

Acque has launched a systematic plan for the reduction of the water losses, understood as the difference between the water introduced onto the network and the water registered by the meters. The containment strategy, after an initial organizational

phase which envisaged the creation of a Loss Detection Operating Structure, made it possible to reveal the hidden losses by means of widespread detection activities throughout the area, based on the analysis of the local systems and on the

monitoring of the pressure levels within the distribution networks. The work already carried out on the networks of Cascina, Fucecchio, Pisa, Pontedera and, partially, Vecchiano, Montelupo and Capannori and, on a widespread basis, in certain

municipalities of the Val Fievole, has led to significant results: the comparison with 2003 indicates an estimate of the reduction in the flows disbursed of around 2,200,000 m<sup>3</sup>.

# Use of the resources

In order to be able to carry out its activities, Acea must use natural and artificial resources<sup>10</sup>. Those most commonly used in the energy area include natural gas and gas oil (for thermoelectric production), certain mineral oils, electricity, water, but also acidity correctors, stabilizers, caustic soda, and sodium hypochlorite. In the water sector, the reagents for the disinfection of the drinking water and the treatment of the waste water, the reagents and the gases for chemical

analysis, electricity and water take on considerable importance. Consideration should also be taken of the fuels used, at Group level, for automotive and heating purposes: unleaded petrol, gas oil, natural gas and LPG.

Particular importance from an environmental point of view is taken on by electricity and water from among all the resources.

## THE ACEA GROUP'S ENERGY CONSUMPTION

	unit of measurement	2003	2004	2005
<b>energy consumption (EN3, EN18)</b>	<b>TJoule</b>	<b>7,997.5</b>	<b>6,919.2</b>	<b>6,890.6</b>
	<b>(GWh)</b>	<b>(2,221.5)</b>	<b>(1,922.0)</b>	<b>(1,914.0)</b>
electricity losses	TJoule	3,117.4	2,429.3	2,489.1
on the distribution and transport networks (6)	(GWh)	(865.9)	(674.8)	(691.4)
losses and internal consumption	TJoule	72.3	133.9	106.6
when generating electricity (2)	(GWh)	(20.1)	(37.2)	(29.6)
losses of energy when converting from primary	TJoule	3,312.0	3,116.0	2,831.5
sources to electricity	(GWh)	(920.0)	(865.6)	(786.5)
loss of heat on the district heating network (11)	TJoule	32.8	37.8	72.1
	(GWh)	(9.1)	(10.5)	(20.0)
consumption of public lighting (48)	TJoule	561.8	570.6	590.3
	(GWh)	(156.1)	(158.5)	(164.0)
consumption due to distribution	TJoule	127.7	115.7	305.0
of drinking and non-drinking water (56-54)	(GWh)	(35.5)	(32.1)	(84.7)
consumption for waste water treatment (62) (*)	TJoule	432.0	388.8	353.2
	(GWh)	(120.0)	(108.1)	(98.1)
consumption for sundry services (43+54+66+67+68)	TJoule	80.3	74.7	77.0
	(GWh)	(22.3)	(20.7)	(21.4)
consumption of fuel for employee travel	TJoule	73.2	52.5	65.8
and commuting (EN34, EN19)	(GWh)	(20.3)	(14.6)	(18.3)

(\*) Up until 2003 this was an estimated figure, while since 2004 it is a gauged figure.

NB: The numbers in brackets, apart from the EN that refer to the GRI indicators, correspond with the captions in the Environmental Accounts, attached in CD-ROM format.

<sup>10</sup> A quantitative description is presented in the attached Environmental Accounts.



## THE ACEA GROUP'S WATER CONSUMPTION – BREAKDOWN BY USE (EN5)

	unit of measurement	2003	2004	2005
<b>total water consumption</b>	<b>Mm<sup>3</sup></b>	<b>45.80</b>	<b>48.30</b>	<b>49.90</b>
district heating process (47)	Mm <sup>3</sup>	0.04	0.05	0.04
thermoelectric generation process (35)	Mm <sup>3</sup>	0.02	0.03	0.03
civil/sanitary (36+37+59)	Mm <sup>3</sup>	1.99	1.88	1.65
cooling (34)	Mm <sup>3</sup>	43.79	46.40	48.19
irrigation	Mm <sup>3</sup>	0	0	0

NB: The numbers in brackets correspond with the captions in the Environmental Accounts, attached in CD-ROM format.

The item "civil/sanitary", shown in the table, represents the genuine discharge water sent to the system of the Rome Treatment Plants<sup>11</sup>. It should also be kept in mind that for the process for cooling down the Tor di Valle thermoelectric plant treated water is used, taken from the nearby Rome South treatment plant (approximately 48 million m<sup>3</sup> in

2005); this opportunity contributes towards determining a net containment of the impacts on the eco-system.

According to the approach described in the *Water Protocol of the Global Reporting Initiative*, the consumption described can also be interpreted as represented below (EN12):

## THE ACEA GROUP'S WATER CONSUMPTION – 2005 ANALYSIS

use	withdrawn (m <sup>3</sup> per year)	reserve	consumption (m <sup>3</sup> per year)	discharge (m <sup>3</sup> per year)
district heating process (47)	35,889	0	35,889	0
thermoelectric generation process (35)	30,985	0	30,985	0
civil/sanitary (36+37+59)	1,649,000	0	0	1,649,000
cooling (34) (EN22)	48,187,980 (*)	0	0	48,187,980 (*)
irrigation	0	0	0	0
<b>total</b>	<b>49,903,854</b>	<b>0</b>	<b>62,382</b>	<b>49,836,980</b>
	(EN5a)	(EN5b)	(EN5c)	(EN12a)

(\*) Re-utilized water deriving from the Rome South treatment plant.

NB: The numbers in brackets, apart from the EN that refer to the GRI indicators, correspond with the captions in the Environmental Accounts, attached in CD-ROM format.

The quantities of polluting substances transported by the

discharges shows a stable situation of low impact on the receiving water body (the River Tiber).

## QUALITY OF THE ACEA GROUP'S WATER DISCHARGES - 2005

use	discharge (m <sup>3</sup> per year)	% sent to treatment plant	BOD <sub>5</sub> (kg per year)	TSS (Total Suspended Solids) (kg per year)	COD (kg per year)	nitrogen (kg per year)	phosphorus (kg per year)
civil/sanitary	1,649,000	100	263,840	357,833	524,382	42,874	6,596
cooling	48,187,980	0	1,108,324	1,542,015	2,698,527	467,423	178,296
	(EN12a)	(EN12b)	(EN12c)	(EN12d)	(EN12e)	(EN12f)	(EN12g)

<sup>11</sup> The technical figures of the treatment plants run by Acea in the municipality of Rome are shown on the information fact sheet relating to the company Acea Ato 2, attached to the present Section.

# Emissions into the atmosphere, effluent and waste

## Emissions into the atmosphere

Acea keeps under control the substances emitted during the combustion processes which use fossil fuels: sulphur dioxide (SO<sub>2</sub>), nitrogen oxide (NO<sub>x</sub>), sulphur oxide (SO<sub>x</sub>), carbon

dioxide (CO<sub>2</sub>); while the first three are polluting substances, carbon dioxide cannot be defined as such, however it does contribute towards the so-called "greenhouse effect".

TOTAL EMISSIONS				
	unit of measurement	2003	2004	2005
CO <sub>2</sub>	t	474,076	344,525	313,670
CO	t	170.5	127.0	97.0
NO <sub>x</sub>	t	596.3	557.4	416.6
SO <sub>2</sub>	t	1.4	0.5	0.2

All the values of the emissions monitored reflect a situation of on-going improvement, thanks to the policies adopted for safeguarding the environment.

The significant decrease in total emissions of carbon dioxide (CO<sub>2</sub>), ascertained as from 2004, partly reflect the reduction in thermoelectric production, and is partly attributable to the changeover from a CO<sub>2</sub> gauging method, used up until 2003, to a method of calculation established

by the European Community (Decision of the European Commission dated 29 January 2004 which establishes the *Guidelines for the monitoring and the communication of greenhouse effect gases*, in accordance with Directive 2003/87/CE of the European Parliament and Council). For greater details, see the comments accompanying (datum 69) of the *Environment Accounts*.



## EMISSIONS – ANALYSIS

parameter	unit of measurement	2003	2004	2005
<b>emissions of carbon dioxide (EN8)</b>	†	<b>474,076</b>	<b>344,525</b>	<b>313,670</b>
thermoelectricity generation (69)		466,295	338,438	306,356
employee travel and commuting (88) (*)		5,429	4,198	5,244
air-conditioning (88 A) (**)		2,352	1,889	2,070
<b>emission of carbon oxides</b>	†	<b>170.5</b>	<b>127.0</b>	<b>97.0</b>
thermoelectricity generation (71)		35.7	33.4	27.0
employee travel and commuting (90) (***)		134.5	93.6	70.0
<b>emissions of nitric oxides</b>	†	<b>596.3</b>	<b>557.4</b>	<b>416.6</b>
thermoelectricity generation (70)		586.8	550.8	405.6
employee travel and commuting (89) (***)		9.5	6.6	11.0
<b>emissions of sulphuric oxides</b>	†	<b>1.4</b>	<b>0.5</b>	<b>0.2</b>
thermoelectricity generation (72)		1.4	0.5	0.2
employee travel and commuting (91)		-	-	-

(\*) 1,748 toe of fuel (unleaded petrol and diesel) were consumed for motor propulsion, corresponding to a quantity of CO<sub>2</sub> equal to approximately (3 x 1,748) = 5,244 tons

(\*\*) Around 690 toe of various fuels (natural gas, LPG, diesel) were consumed for air-conditioning, corresponding to a quantity of CO<sub>2</sub> equal to approximately (3 x 689.9) = 2,070 tons.

(\*\*\*) The emission figures have been calculated using the COPERT III programme (November 2000 version).

NB: The numbers in brackets correspond to the captions of the Environmental Accounts, attached in CD-ROM format.

No appreciable quantities of other substances responsible for the thinning of the ozone layer were emitted. (EN9)

### Box - System for controlling the emissions of CO<sub>2</sub> for thermoelectric plants

Emissions of greenhouse gas are kept constantly under control.

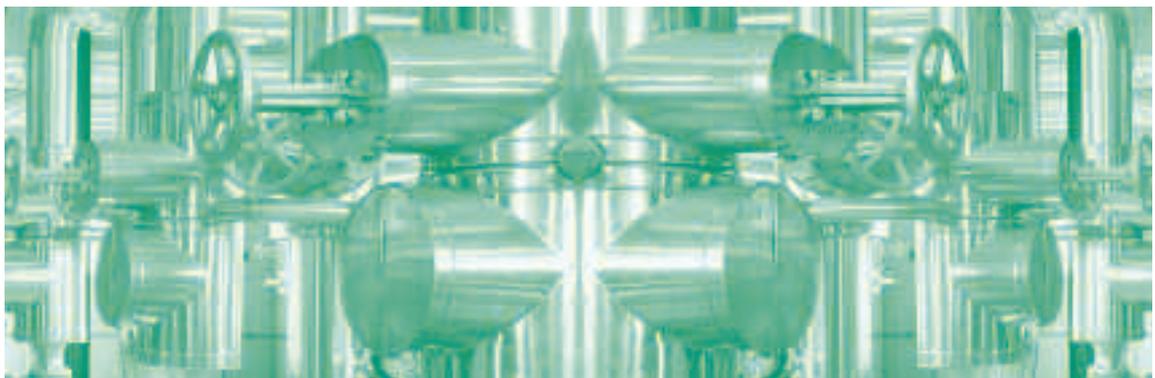
With regards to carbon dioxide (CO<sub>2</sub>) emissions, all the Group's thermoelectric plants have developed and maintained a specific monitoring procedure, based on the *Guidelines for the*

*monitoring and communication of emissions of greenhouse effect gases*, in accordance with Directive 2003/87/CE of the European Parliament and Council (Decision of the European Council dated 29 January 2004) and on subsequent reference

legislation, both European and Italian.

The procedure is reviewed and validated annually, as envisaged by the Environmental Management System of each plant: the plants in question, in fact, almost all have a certified

EMS (Environmental certification UNI EN ISO 14001) or intend to implement one before long, as does the Voghera Plant, for which EMAS registration is anticipated by the end of 2007.



## Box - CO<sub>2</sub> emissions in the city of Rome: the results of the CCP campaign

The emissions of greenhouse gases mainly derive from the combustion of traditional energy sources (fossil fuels) and are calculated considering the value of the CO<sub>2</sub> equivalent to the particular fuel used: every ton of gas oil, for example, corresponds to around 2.8 tons of CO<sub>2</sub>. The balance of the emissions for the city of Rome,

calculated by sector and by energy carrier, has been created by the "RomaEnergia" Agency as part of the second phase of the Campaign "Cities for Climate Protection - CCP Italia". The analysis of the data, relating to the years 1994-2001, has disclosed an overall increase in the climate-altering gas emissions equating to 18%; the most

consistent increase with respect to the first year of reference relates to the tertiary (36%) and transport sectors (28%).

Analyzing the balances of the emissions by energy source, the most significant increases refer to electricity and gas intended for heating and lighting purposes, and to all the types of fuel for traction.

The afore-mentioned data shows that Rome, in line with the trend confirmed at national level, is still unfortunately a long way off from the objectives of the Kyoto Protocol, which establish the reduction of the greenhouse gas emissions in the period 2008-2012 at 6.5% when compared with the 1990 levels.

Source: Roma Energia Agency - Municipality of Rome - Presentation of the Update of the Environmental Plan of Action for 2005.

## Acea Group waste (EN11)

The waste produced by the Group (see graph) amounted in total to around 6,500 tons, divided up into 574 tons of hazardous waste and 5,927 tons of non-hazardous waste, which also include 4,299 tons of inert material, i.e. debris. In the *Environmental Accounts* (attached in CD-ROM format) the quantities corresponding to the two fields, energy and water, are described in detail, including the portion produced by the Parent Company, attributed in equal

portions to the two areas of activities. In the water sector, sludge, sand and screened material deriving from the treatment of the waste water in Rome and neighbouring Municipalities are accounted for separately, since they do not represent waste produced by Acea.

The production of sludge came to 122,000 tons, involving a reduction of 7.5% with respect to 2004.



<sup>12</sup> Roma Energia is the Agency for Rome Energy Saving, set up by Acea, Ama, Atac-Cotral, Iacp, Italgas and the Municipal Authority of Rome as part of the European Union SAVE Programme, which anticipates the creation of local and regional agencies for the purpose of the management of the energy efficiency and the use of renewable energies. For further information see the website: [www.romaenergia.org](http://www.romaenergia.org).



# Attention towards biodiversity (EN6, EN7) and the air quality

The Acea Group carries out its activities in observance of the biodiversity present in the natural areas concerned. In particular, with regards to the drinking water springs (see the table on page 12 concerning springs) and the areas where the main water plants are located, monitoring of the

reference parameters is always carried out, so as to guarantee that negative impacts are not produced on the environment.

The same degree of attention is paid to the areas surrounding the hydro and thermoelectric plants.

## Box - Collaboration between Acea and Ornithologica (EN26)

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The protection of the biodiversity and the care of certain particular species is witnessed by close collaboration between Acea and the Ornithologica association,

which for six years now has been carried out. 42 nesting boxes have been installed (30 on electricity pylons and 12 on the water tanks of Rome, Ostia

and Fiumicino), and the researchers have the opportunity of gathering data, usually difficult to obtain, relating to the reproductive biology and the

conduct-related ecology of the birds which have chosen to nest in the boxes.

## Box - The River Tiber's ecosystem cleaned up (EN27)

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The initiative was instigated by Acea Ato 2 and the Municipality of Rome, with the priority aim of redeveloping the River Tiber. Thanks to the use of an equipped catamaran, the river's waters are cleaned by removing floating objectives such as plastic bottles

and bags, twigs, branches and other rubbish. The catamaran is equipped with a roomy container, a mechanical arm and hooked grappling irons for picking up the rubbish: the rubbish is thus removed from the water, packed inside the boat

and then disposed of in a waste dump.

Between June and September 2005, the eco-boat collected around 32 tons of waste, which was then sent to the waste dump, and in 2006 the first benefits were seen in terms of

biodiversity: the presence of around 300 pairs of herring-gulls was in fact estimated, a species which generally does not live in urban areas, along the section of the river which flows through the city.

## Quality of the urban air

### Mobility (EN34)

The policy of renewing the Group's vehicle fleet continued once again in 2005, with the aim of reducing the emissions<sup>13</sup> of polluting agents deriving from the circulation

of vehicles. Over the past year, out of a total of around 2,300 vehicles, approximately 50 were disposed of and replaced with the latest generation vehicles (Euro 4).

<sup>13</sup> For greater details on the emissions' data, see the section Emissions into the atmosphere, effluent and waste, as well as the matters illustrated in the Environmental Accounts attached in CD-ROM format.

## Sanacaldaia and Caldaie Sicure

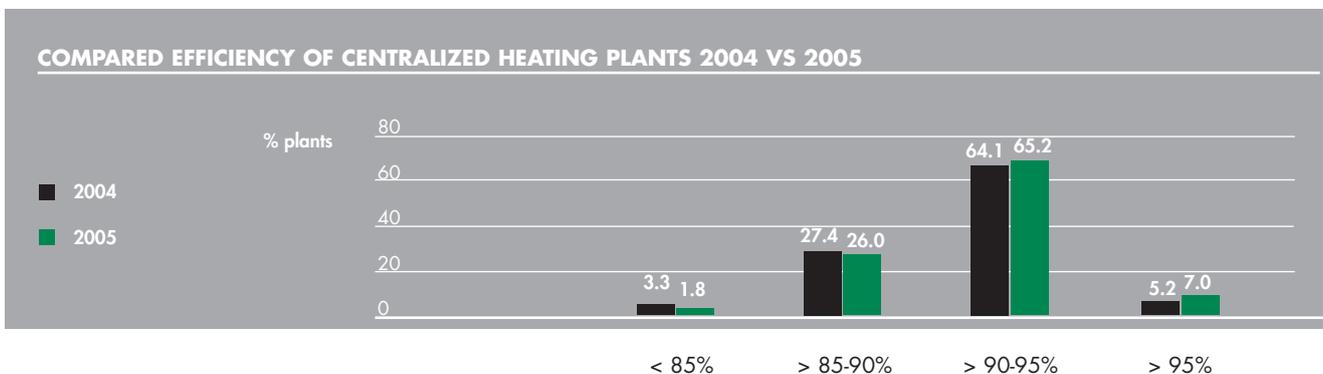
Both the initiatives aim to improve the functioning of heating plants present throughout the municipal area of Rome. Sanacaldaia concerns systems with thermal power higher than 35 kW, typically installed in apartment blocks with centralized heating systems. Caldaie Sicure by contrast concerns smaller (power lower than 35 kW) serving individual homes (independent systems).

By means of its technical staff, during 2005 Acea Reti e Servizi Energetici inspected around 11,000 centralized systems and 15,000 independent systems, with the purpose of checking the minimum safety conditions and the maintenance of the efficiency levels of the plants.

This type of control, constant and repeated over the years (Acea has carried out such activities under various forms since 1997) has essentially led to:

- › an increase in the average fuel efficiency;
- › an improvement in the safety levels and, consequently, a lower number of incidents.

In particular, the comparison between the performances of the centralized heating plants in 2004 and in 2005 disclosed an improved distribution of the efficiency of the plants, in favour of the high performance brackets:



The distribution of centralized heating plants in the Municipality of Rome (thermal power greater than 35 kW), by type of fuel used (see table), confirms the increasingly dominant presence of natural gas: 78% of the plants.

As far as independent systems are concerned, with a thermal power of less than 35 kW, they amount to around 540,000 and all use natural gas as fuel.



CENTRALIZED HEATING PLANTS (thermal power over 35 kW)

fuel used	no. of plants	%
coal	835	3.3
gas oil	4,597	18.1
natural gas	19,887	78.4
other fuels	33	0.1
<b>total plants</b>	<b>25,352</b>	<b>100.0</b>

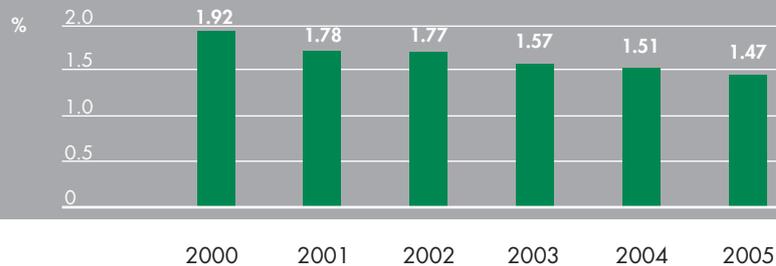
**Bollino Blu**

During 2005, the “Bollino Blu” operation, aimed at verifying the correct tuning of the engine by means of a chemical analysis of the emissions, involved around 1,450,000 motor vehicles and approximately 100,000 motorcycles, leading to an improvement in the vehicle fleet on the roads and the consequent reduction of the polluting emissions. Between 2000 and 2005, in fact, a sharp decrease was registered in carbon monoxide (CO) in the

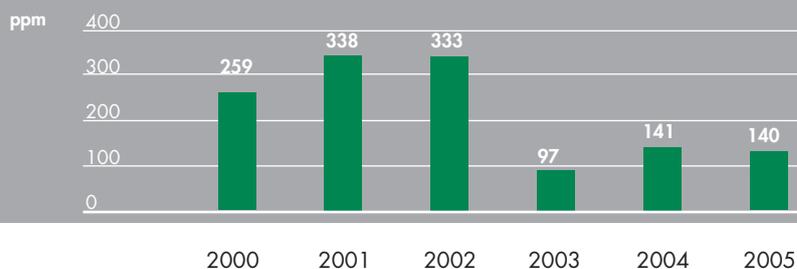
exhaust gases of non-catalytic petrol-driven vehicles, of more than 60%.

Unburnt hydrocarbons, in the same reference period, also reported heavy reductions; the slight increase reported with respect to last year (see table) indicates a probable adjustment in the emission values at around 140 ppm.

**AVERAGE CONCENTRATION OF CO IN THE EXHAUST FUMES OF UNCATALYZED PETROL-DRIVEN VEHICLES CIRCULATING IN ROME**



**AVERAGE CONCENTRATION OF UNBURNED HYDROCARBONS IN THE EXHAUST FUMES OF UNCATALYZED PETROL-DRIVEN VEHICLES CIRCULATING IN ROME**



NB: the graphs show the situations post-Bollino Blu check

# Research

On a consistent basis with previous years, Acea confirmed its membership of important research centres and standardization bodies during 2005.

## Box - 2005 memberships

Acea is a member of important research centres, standardization bodies and other associations active in the area of corporate interest, including:

- › the Economics of Energy Sources Institute, IEFE - Bocconi
- › the Research Institute for Economics and Finance (REF)
- › the Italian Electrotechnics and Electronics Association (AEI)
- › the Italian Electrotechnics Committee (CEI)
- › the Italian Unification Institute (UNI)
- › the Italian Illumination Association (AIDI)
- › the Amici della Luiss Association
- › the Einaudi Foundation
- › the Italian Association for Trenchless Technology (IATT)
- › the WEC - World Energy Council



Furthermore, via its subsidiary companies Acea carries out research activities concerning, in particular, certain aspects of the water sector: from the protection of the resource to optimization of its use, from treatment of the waste water to the economic-financial aspects of the management activities.

SUMMARY OF THE RESEARCH AND ADVISORY ACTIVITIES CARRIED OUT BY LABORATORI FOR ACEA SPA<sup>14</sup>

Project Title	Period	Description
<b>WATER RESOURCES</b>		
Drinking water supply in ATO 2 - Central Lazio	2005	An analysis was carried out of the supply system in ATO 2 first of all identifying the territorial basins supplied by the various aqueducts, and subsequently assessing the requirements, both current and future, with respect to the flow and the quality of the water of the existing local resources and those not collected present throughout the area, so as to establish critical points and opportunities. Flow gaugings were also carried out, on a regular basis, at the Peschiera, Le Capore and Acquoria springs and gaugings at the stem of the River Aniene between the springs and Subiaco.
Specialist and sector-based studies	2005	These comprise the reconnaissance of the local springs, as part of the assessments which are preparatory to the acquisition of the municipalities, relating to the qualitative/quantitative parameters of the water, as well as the plant structures, for the purpose of an assessment of the compliance of the drinking water resource with operating standards.
Main water resource protection areas in the ATO 2 - Central Lazio pursuant to Italian Legislative Decree no. 152/99, Italian Presidential Decree no. 236/88, Regional Council Decree no. 5817/1999 Lazio Region	2005	The proposal for the definition of protection areas for the Pertuso spring has been drafted, the land registry map completed in relation to the proposed protection area of the Acquoria spring and studies are currently being carried out for the protection areas of the Simbrivio, Ceraso and Valga delle Rosce springs. (EN7, EN29)
<b>PROCESSES</b>		
Peracetic acid: an alternative in the processes for the disinfection of water intended for human consumption- Bracciano purification plant	2003-2005	For the purpose of evaluating the application potential of peracetic acid in processes for the disinfection of water intended for human consumption, Laboratori has carried out surveys together with the Higher Institute of Health. In particular, a work group looked into: the disinfection efficacy of peracetic acid when compared with other disinfectants; undesirable by-products, tastes and smells which might potentially be generated under different dynamic and stagnation conditions; stability of the stagnation residues; influence of the materials used for distribution purposes.
Removal of arsenic and fluoride in a pilot plant, transfer and study on individual sites, implementation on real scale.	2005	The project represents a continuation of the activities carried out on a batch scale in 2004, which anticipated the execution of experimental trials in a pilot area (batch tests) of various absorbent materials for the removal of arsenic and fluorides. Therefore, the application of an innovative technology for the removal of arsenic on a pilot scale at various springs was carried out. Experimental campaigns were carried out at pilot plants in the Finocchio; Cecchina - Pozzo Via Rufelli; Ciampino districts. In conclusion, the design of an in-house pilot project was carried out, installing it in the Cecchina-Spagna district, involving assessment of the functioning of the prototype and the improvement necessary for its optimization.
Support for the optimization and management of the treatment processes	2005	Support was provided to Acea Ato 2 for the analysis and preparations of specifications for the installation of plants for the removal of arsenic and fluoride on a real scale, to be positioned in critical areas, with assessment of the technical-economic implications.

<sup>14</sup> The research was carried out together with Acea Ato 2 SpA.

Project Title	Period	Description
<b>PROCESSES</b>		
Study of the efficiency of the treatments for reducing smells (reduction filters)	2005	Monitoring campaigns have been carried out, aimed at checking the efficiency in the reduction of the emission of smells of systems using filters, following specific adjustments of the device used, by means of the analysis of the hydrogen sulphide and the volatile organic substances.
Disinfection of the waste water with UV – preliminary application at Fregene plant	2005	A pilot study was carried out at the Fregene treatment plant with the use of a pilot plant for the disinfection of the waste water by means of an ultra-violet rays system; a comparative analysis was carried out with disinfection using hypochlorite.
<b>ENVIRONMENTAL MONITORING</b>		
River Tiber/Aniene: quality status, installation of integrated monitoring stations, characterization of suburban stretch and study of flood events	2005	Project developed over 4 lines which, starting off from the classification in accordance with Italian Legislative Decree No. 152/99, envisaged: the validation and management of a control unit for the on-going monitoring of chemical-physical parameters, installed on a section of the Tiber, in-depth analysis by means of campaigns for monitoring flood events and the start-up of a study into the qualitative-quantitative characterization of the urban stretch.
Environmental impacts: activities for the periodic monitoring of the hydrogen sulphide (H <sub>2</sub> S) at the waste treatment plants (Rome South, East, North, Ostia, CoBIS –Bracciano)	2005	Detailed temporal and spatial representation of the hydrogen sulphide distribution at the large plants, by means of internal monitoring campaigns and those in neighbouring areas. Creation of a historic archive of the campaigns carried out over the years.
Safety project: activities for the chemical and biological monitoring of gaseous substances at the waste treatment plants (Rome South, East, North, Ostia, CoBIS )	2005	Drawing up of documents for the evaluation of the chemical risk for employees at the management laboratories and of the biological risk at the waste water treatment plants, drawn up by means of campaigns for the chemical- biological monitoring of the aerosol, the H <sub>2</sub> S, the noise and the volatile organic substances.
<b>DRINKING WATER NETWORKS</b>		
Study of the water networks and identification of the losses (Municipalities of Grottaferrata, Monterotondo, Albano, Ciampino and Castel Madama)	2005-2006	Study of the networks and control of the losses in the municipalities whose management activities have been acquired or are being acquired. The objective of the project is to identify the most significant losses present on the distribution networks, permit the elimination or reduction and then develop a monitoring system for keeping the level of losses reached under control. The losses detected are of two different types: 1 losses in manmade structures: in the moving parts and joints (identified by means of the direct inspection of the manmade structures); 2 losses along the underground pipes (identified by means of the study of the network and the use of co-examiners and acoustic instrumentation).
Loss detection in manmade structures (Municipality of Rome, IV Municipal Area)	2005-2006	The aim of the project is to identify the losses present in the manmade structures of the distribution network (IV Municipal area of Rome). The choice of the IV Municipal area was made in order to create territorial continuity with the areas of the municipality of Rome studied in previous years and to obtain a useful element of analysis for the studies into sewerage systems being developed on the same Municipal area. The method proposed has made it possible to identify and eliminate a considerable number of losses in the manmade structures and to update/validate the manmade structure fact sheets present in the IT system supporting management.



Project Title	Period	Description
<b>SEWERAGE NETWORKS</b>		
Urban drainage model for the Rome North sewerage basin. Reconstruction of the flows (drought and flood) with definition on the scale of the feeders and the collectors	2004-2005	<p>The research has made it possible to reconstruct the physical characteristics of the drainage system for waste and rain water, relating to the Rome East treatment basin, so as to create a gauged and assessed mathematical model, capable of simulating the functioning of the urban drainage system under various conditions. This model was drawn up in order to assess:</p> <ul style="list-style-type: none"> <li>- the response of the system in relation to significant "historic rain fall";</li> <li>- the frequency of the functioning of the flood drains with respect to historic series.</li> </ul> <p>It was also possible to improve the simulation system further, so as to overcome the difficulties come across in the registration of the rainfall, useful for the adjustment of the model.</p>
Inflow/Run-off model for the Rome East sewerage basin. Reconstruction of the flows (drought and flood) with definition on the scale of the feeders and the collectors	2005-2006	<p>The research was aimed at reconstructing the physical characteristics of the waste water and rain water drainage system, relating to the Rome East treatment plant basin, so as to create a gauged and assessed mathematical model, capable of simulating the functioning of the urban drainage system under various conditions. This model was drawn up in order to assess:</p> <ul style="list-style-type: none"> <li>- the response of the system in relation to significant "historic rain fall";</li> <li>- the frequency of the functioning of the flood drains with respect to historic series (events which cause flood drain discharges but not floods).</li> </ul> <p>The model, once adjusted, will be able to offer support for the "planning" of structural and/or operational events aimed at improving the system performances.</p>
Inflow/Run-off model for the CoBIS circumlacustral sewerage basin	2004-2005	<p>Study with the purpose of reconstructing the current and future functioning of the waste and rain water drainage system, relating to the system of collectors serving the municipalities falling within the Lake Bracciano basin. For the definition of the future conditions, the developments envisaged by the town planning instruments of the Municipalities of Bracciano, Anguillara Sabazia, Manziana, Trevignano, Oriolo Romano and Cesano were taken into consideration.</p> <p>The results represent an important aid for the preliminary planning of the measures for restoring the optimum running of the CoBIS circumlacustral collector.</p>

## Research activities carried out by Acque SpA

For some years now, Acque SpA has developed various forms of collaboration with the University of Pisa and other research centres present throughout the area, availing itself of advanced scientific expertise.

Research underway includes the development, and subsequent field assessment, dynamic simulation models of the networks and research into the optimum methods for the creation and management of remote control networks.

Within this sphere, Acque SpA pays increasing attention towards the achievement of the results with regards to energy savings.

As part of the exploitation of the surface water resources and the conservation of the receiving water bodies, Acque

has optimized the use of hydraulic and hydro-geological models for the study of the watercourses.

With regards to the protection of the environmental quality, collaboration continued with the regional Agency for the protection of the environment in Pistoia. The information obtained makes it possible to optimize the plans for reorganizing the treatment systems being used in the area served.

Furthermore, with reference to the new waste water treatment technologies, several study and research openings have been made, with particular attention to the applications, with a view to the optimization of the service and containment of the operating costs.

### Box - Collaboration agreement between Acea and the University of Rome for reducing the environmental impact

During 2005, an important agreement was entered into between Acea and the "La Sapienza" University of Rome which envisages the following as its fundamental elements of collaboration:

- ▶ joint research projects for development and technological innovation in the energy sector;
- ▶ planning of the activities aimed at the training of new professional figures specialized in the environmental energy sector;

- ▶ rationalization of the consumption and uses of electricity within the university city and the secondary locations.

During the start-up phase, a number of projects will be defined which aim, for example, at optimizing the management of the lighting systems inside the university city. Furthermore, the creation of co-generation systems is envisaged for the air-conditioning of the buildings and equipment for the micro-

generation of energy. The general objective is to launch a process for the rationalization of the consumption, increasing energy efficiency. The projects anticipated include: the replacement of old motors - for example those commonly used for goods lifts or for elevators - with new high energy efficiency machines; the use of low consumption fluorescent light bulbs for lighting; measures aimed at improving the heat

insulation of the buildings. The Roman university will benefit from the initiative from an economic point of view - thanks to greater efficiency of the internal network - and with regards to the environmental impact, reducing the quantity of harmful emissions for the production of energy. Acea may be able to benefit from energy efficiency certificates (TEE) in accordance with the Ministerial Decree dated 20 July 2004.



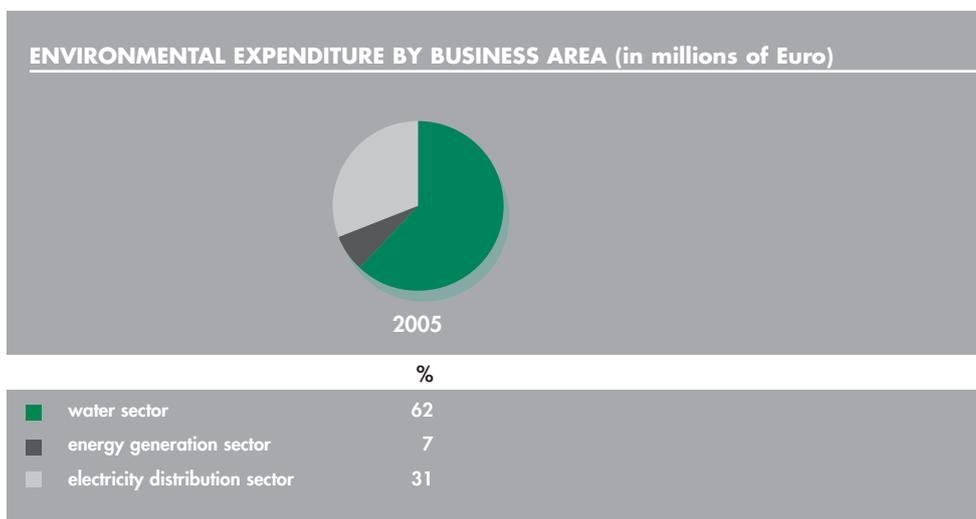
# Environmental investments (EN35)

Expenses incurred for environmental investments, which are not legally compulsory, amounted to Euro 18.08 million (+ 21% when compared with 2004) and represent 5.3% of the total outlay for investments at consolidated level.

Acea Ato 2 absorbs the majority of the resources intended for measures safeguarding the environment and this is due to the particular nature of the company which has one of the mainstays of its policies in the protection of the territory.

## ENVIRONMENTAL INVESTMENTS IN 2005

group companies	in millions of Euro
Acea Ato 2 SpA	11.06
AceaElectrabel Produzione SpA	1.34
Acea Distribuzione SpA	5.68
<b>total</b>	<b>18.08</b>



During the latter part of 2005, a project was launched in collaboration with Bocconi University for the implementation of a systematic and structured system for the reporting of the environmental expenditure with the Group.

# GRI environmental performance indicators

<b>CORE</b>		<b>ADDITIONAL</b>	
<b>Materials</b>			
EN1 Total materials used other than water, by type.	<i>Environmental Accounts</i> (attachment on cd rom), pages 8 -11		
EN2 Percentage of raw materials used by the company which represent waste (subject to treatment or similar) deriving from parties outside the company.	the current management systems do not permit the reporting of these figures; Such information is expected to be available, at least partly, within one year		
<b>Energy</b>			
EN3 Direct energy used by the Company.	page 19	EN17 Initiatives to use renewable energy sources and to increase energy efficiency.	pages 6, 8, 9
EN4 Indirect energy used by the Company.	page 5	EN18 Energy consumed in the life cycle of the main products supplied.  EN19 Other indirect energy uses (travel, management of the product life cycle, use of energy-intensive materials, etc.).	page 19  page 19 (limited to fuel for motor propulsion)
<b>Water</b>			
EN5 Total quantity of water used.	page 20	EN20 Water sources and related ecosystems significantly affected by use of water. (see Ramsar list of humid area).	page 12
		EN21 Annual withdrawal of water from water basin as a percentage of annual renewable quantity of water.	the current management systems do not anticipate the monitoring of the item
		EN22 Total quantity of recycled or re-used water.	page 20 (limited to the cooling process of the Tor di Valle plant)



<b>CORE</b>		<b>ADDITIONAL</b>	
<b>Biodiversity</b>			
EN6 Location and size of land owned, leased or managed in biodiversity-rich natural habitats.	pages 16, 24	EN23 Amount of land owned or managed for production or extraction activities.	page 12
EN7 Description of the major impacts on biodiversity associated with activities carried out in terrestrial or marine environments.	pages 7, 24, 28	<p>EN24 Amount of impermeable surface area as a percentage of the land owned or leased.</p> <p>EN25 Impact of activities and operations on protected or sensitive areas.</p> <p>EN26 Changes to natural habitats resulting from activities and operations carried out. Percentage of habitat protected or restored.</p> <p>EN27 Objectives and programmes for protecting and restoring native ecosystems in degraded areas.</p> <p>EN28 Number of protected species (IUCN red list) habitats in the areas affected by the plants.</p> <p>EN29 Business units currently operating or planning operations in or around protected areas.</p>	<p>the datum is complicated to detect; a study is currently underway for its quantification; envisaged timescale: 2-3 years.</p> <p>no activities have a significant impact on sensitive areas.</p> <p>page 24</p> <p>page 24</p> <p>not applicable (*)</p> <p>page 28</p>
<b>Emissioni, Effluenti e Rifiuti</b>			
<p>EN8 Greenhouse gas emissions:</p> <ul style="list-style-type: none"> <li>› direct emissions from sources owned or controlled;</li> <li>› indirect emissions for imported electricity or heat (see WRI - Greenhouse gas Protocol).</li> </ul>	page 22	EN30 Other significant indirect greenhouse gas emissions.	no significant emissions to report

(\*) The IUCN (International Union for the Conservation of Nature) list, to which the EN28 indicator refers, concerns endangered species ([www.iucn.org](http://www.iucn.org))

CORE		ADDITIONAL	
<b>Emissions, Effluents and Waste</b>			
EN9 Use and emission of ozone-depleting substances.	page 22	EN31 Production, transport, import or export of waste classified as “hazardous” under the terms of the Basel Convention annexes I, II, III and VIII.	the current management systems do not anticipate the monitoring of the item
EN10 NO <sub>x</sub> and SO <sub>x</sub> emissions and substances subject to regulation.	page 21	EN32 SWater sources and related ecosystems significantly affected by discharges in water.	no discharges to report.
EN11 Total amount of waste produced by type and destination.	page 23		
EN12 Significant discharges to water by type.	page 20		
EN13 Significant spills of oils, fuels and chemicals in terms of total number and total volume.	page 3		
<b>Suppliers</b>			
		EN33 Performance of suppliers relating to application of environmental programmes and procedures established by the Company.	no procedures currently exist which guide the purchases according to the application of specific environmental procedures.
<b>Products and services</b>			
EN14 Significant environmental impacts of principle products and services.	page 3		
EN15 Percentage of the weight of products sold that is recyclable at the end of the products’ useful life and percentage that is actually recycled.	not applicable		
EN16 Accidents caused by, and fines received for, non-compliance with current environmental legislation.	page 16		
<b>Transport</b>			
		EN34 Significant impacts due to transport used for logistical purposes.	pages 19, 24
<b>General</b>			
		EN35 Total environmental expenditure broken down by type.	page 32



## Fact Sheets - Italian Companies

The summary fact sheets relating to the main Acea Group Companies (by plant engineering equipment), are presented below.

The fact sheets provide a brief description of the activities and the corporate assets, and disclose the staff numbers and the main economic results for the year.

The figures shown refer to 31 December 2005.



Acea Distribuzione SpA

Acea Distribuzione was established in 1999 in response to the dictates of the Bersani Decree (Italian Legislative Decree no. 79/99) which obliged accounting and administrative separation for companies involved in the distribution of electricity. During 2004, Acea Distribuzione launched a ten-year investment plan for the upgrading of the civic electricity network, continued, according to schedule, during 2005.

STAFF EMPLOYED	1,696 human resources
TURNOVER	Euro 381.3 million
NET RESULT FOR THE PERIOD	Euro 59.8 million

#### PLANT COMPOSITION

type	unit of measurement	composition as of 31 December 2005
receiver stations	no.	3
HV/HV primary sub-stations	no.	64
HV/HV and HV/MV transformers	no.	174
power transformation	MVA	7,236
HV network - overhead lines	km	432
HV network - cables	km	228
MV network - overhead lines	km	717
MV network - cables	km	8,842
LV network - overhead lines	km	1,735
LV network - cables	km	16,253
secondary sub-stations running	no.	12,301
MV/LV transformers	no.	11,978
transformation capacity	MVA	4,287



AceaElectrabel Produzione SpA was formed following the agreement signed in 2002 between Acea SpA and the Belgian Company Electrabel (Suez Group), for electricity and heat production activities.

The overall installed power of the production plants comes to 362 MW, plus 380 MW from the Voghera plant, which started production in 2005:

- › 223 MW of thermoelectric power capable of producing approximately 900 GWh of electricity per year (location of plants: Municipality of Rome);
- › 139 MW of hydroelectric power capable of producing approximately 500 GWh of electricity per year (location of plants: provinces of Rome, Terni, Rieti and Chieti);
- › 380 MW of thermoelectric power from the Voghera plant (province of Pavia).

As from 1 October 2005, the merger by incorporation within AceaElectrabel Produzione SpA of three Project Companies became operative, giving rise to the following projects:

- › Leinì Plant project;
- › Wind park project;
- › Pontinia Plant project.

STAFF EMPLOYED	127 human resources
TURNOVER	Euro 87.3 million
NET RESULT FOR THE PERIOD	Euro 4.8 million

The Tor di Valle thermoelectric plant obtained its first environmental certification under the ISO 14001 standard in 2000, renewed over the years up to the present day. During May 2004, the Salisano hydroelectric plant obtained ISO 14001 certification for its environmental management system. In June 2005, the Montemartini thermoelectric plant also obtained the same certification and attainment of ISO certification is also anticipated for the G. Marconi hydroelectric plant; the draft of the Initial Environmental Analysis was developed during 2005 for the latter.

AceaEletrabel Produzione SpA produced a total of 1,132 GWh, of which around 670 GWh of gross thermoelectric energy and approximately 463 GWh of gross hydroelectric energy, introducing onto the network around 1,103 GWh of net electricity.

It also guaranteed the production of 69 GWh of heat, distributed to around 25,000 inhabitants in the two Roman districts of Torrino and Mostacciano.

## A. VOLTA PLANT AT CASTEL MADAMA (ROME)

plant type	run-of-river water
type of use of energy produced	coverage of basic needs
rated output	9.4 MW
capacity of the basin or reservoirs interlocked	100,000 m <sup>3</sup>
available head	41 m
maximum derivable delivery	25 m <sup>3</sup> /s
gross electricity produced in 2005	28.35 GWh

## G. FERRARIS PLANT AT MANDELA (ROME)

plant type	run-of-river water
type of use of energy produced	coverage of basic needs
rated output	8.5 MW
available head	27 m
maximum derivable delivery	28 m <sup>3</sup> /s
gross electricity produced in 2005	14.22 GWh

## SALISANO PLANT (RIETI)

plant type	run-of-river water
type of use of energy produced	coverage of basic needs
rated output	42.2 MW (18 MW of reserve)
available head	83 m Capore 250 m Peschiera
maximum derivable delivery	5.5 m <sup>3</sup> /s Capore 9.5 m <sup>3</sup> /s Peschiera
gross electricity produced in 2005	178.53 GWh

## G. MARCONI PLANT AT ORTE (VITERBO)

plant type	reservoir
type of use of energy produced	coverage of peak needs
rated output	20 MW
capacity of basin or reservoirs interlocked	1.2 million m <sup>3</sup>
available head	11.5 m
maximum derivable delivery	200 m <sup>3</sup> /s
gross electricity produced in 2005	54.46 GWh



## Hydroelectric production

### SANT'ANGELO PLANT (CHIETI)

plant type	reservoir
type of use of energy produced	coverage of peak needs
rated output	58.4 MW
capacity of basin or reservoirs interlocked	84 million m <sup>3</sup>
available head (average)	152.3 m
maximum derivable delivery	42 m <sup>3</sup> /s
gross electricity produced in 2005	183.50 GWh

### MINOR PLANTS

#### CECCHINA (ROME)

plant type	run-of-river water
type of use of energy produced	coverage of basic needs
rated output	0.4 MW
maximum derivable delivery	0.95 m <sup>3</sup> /s
gross electricity produced in 2005	1.68 GWh

#### MADONNA DEL ROSARIO (ROME)

plant type	run-of-river water
type of use of energy produced	coverage of basic needs
rated output	0.4 MW
maximum derivable delivery	0.97 m <sup>3</sup> /s
gross electricity produced in 2005	1.98 GWh

## Thermoelectric production

### TOR DI VALLE (COMBINED CYCLE) PLANT

fuel type	natural gas
type of use of energy produced	coverage of basic needs
rated output of a.c. generators	41.04 MW Turbogas no. 1 41.04 MW Turbogas no. 2 43.6 MW Steam unit
plant surface area	35,000 m <sup>2</sup>
height of chimney stacks	30 m
quantity of fuel consumed in 2005	122.162 MNm <sup>3</sup>
gross electricity produced in 2005	606.16 GWh
total gross efficiency of combined cycle	50.2%

## Thermoelectric production

### MONTEMARTINI PLANT

fuel type	gas oil (diesel) with low sulphur content
type of use of energy produced	coverage of peak needs
rated output of a.c. generators	26.1 MW Turbogas no. 1 26.1 MW Turbogas no. 2 26.1 MW Turbogas no. 3
height of chimney stacks	13.35 m
quantity of fuel consumed in 2005	3,413 t
gross electricity produced in 2005	10.85 GWh
total gross efficiency	27.3%

### TOR DI VALLE (CO-GENERATION) PLANT

fuel type	natural gas or gas oil (diesel) with low sulphur content (for emergencies)
type of use of energy produced	coverage of semi-peak and district heating requirements
rated output of a.c. generators	19.32 MW <sub>e</sub>
height of chimney stacks	20 m
quantity of fuel consumed in 2005	21.137 MNm <sup>3</sup>
gross electricity produced in 2005	52.46 GWh
total gross efficiency	25.1% only electricity 58.4% with heat recovery





UdB ILLUMINAZIONE PUBBLICA

(PUBLIC LIGHTING BUSINESS UNIT)

Via its Public Lighting Business Unit, Acea Distribuzione SpA<sup>1</sup> manages the public lighting service for the whole area of the Municipality of Rome, involving more than 153,000 lighting units and 175,000 lamps; an installed capacity of 32.8 MW provides a light flux of approximately 2,271 Mlumen.

The service is also provided for street and residential consortiums who own private roads for public transit.

Acea has acquired leading experience in the artistic and monumental lighting sector (approximately 10,500 dedicated lighting units).

#### LIGHTING FIGURES FOR 2005

total capacity of lamp system	MW	32.8
lighting flux	Mlumen	2,271
average luminous efficiency	lumen/W	69.1

#### PLANT FIGURES (\*)

power supply stations for public lighting circuits no.		2,947
network	km	7,050
lamp posts	no.	153,672
total lamps	no.	175,659

(\*) Fiumicino excluded from 2003 onwards.

<sup>1</sup> During the first half of 2005, the business segment relating to public lighting was transferred from Acea SpA to Acea Distribuzione SpA.

In Naples, the public lighting service is managed by Luce Napoli Scarl, the consortium formed by Acea and Graded SpA, who were awarded the service under joint venture during 2004.

The main lighting and plant figures for the second year under Acea management are presented in the table<sup>2</sup>.

#### LIGHTING FIGURES FOR 2005

total capacity of lamp system	MW	12.22
lighting flux	Mlumen	897.00
light efficiency	Mlumen/GWh	17.9
average luminous efficiency	lumen/W	73.4

#### PLANT FIGURES

power supply stations of public lighting circuits	no.	53 (sequence, with around 300 transformers 5000V/20A)
	no.	11 (branch)
network	km	3,388
lamp posts	no.	52,540 <sup>3</sup>
total lamps	no.	58,943
mercury	no.	8,203
sodium	no.	42,091
iodide	no.	4,618
other	no.	4,031

<sup>2</sup> It is not relevant to present the economic figures and the number of staff, since this is a consortium which operates by availing itself mainly of the human and financial resources of the consortia companies.

<sup>3</sup> Including 4,387 for artistic lighting.





## Acea Ato 2 SpA

STAFF EMPLOYED	1,364 human resources
TURNOVER	Euro 365.0 million
NET RESULT FOR THE PERIOD	Euro 62.8 million

Acea Ato 2 SpA represents one of the leading operators in Italy involved in the integrated water service; it also handles the related water services, such as irrigation systems, ornamental fountains, drinking fountains, wells and fire hydrants.

In pursuance of the Galli Law, as from 1 January 2003 Acea Ato 2 SpA started up the management of the integrated water service for the Optimum Area of Operation (ATO) 2 - Central Lazio, in 112 municipalities (Rome included) situated in the provinces of Rome, Viterbo and Frosinone. The complete undertaking of the management of the service will take place gradually reaching a consumer base of around 3,600,000

inhabitants. During 2005, in particular, the management of the municipalities of Arcinazzo Romano (excluding the consortium CO.RE.CALT.), Gavignano, Gorga, Cervara di Roma, Subiaco, Castel Gandolfo, Vicovaro, Artena, Trevignano Romano, Santa Marinella, Pisoniano, Rocca S. Stefano, Montelanico, Albano Laziale, Casape, Carpineto Romano, Sambuci and Affile was acquired, in addition to the management of the aqueduct system of the former Cassa per il Mezzogiorno consortium, first of all managed by the Lazio Regional authority, for the water supply in the municipalities of Pomezia, Ardea and Lanuvio. In total, as of 31 December 2005 the municipalities acquired came to 31, equivalent to 3,063,147 inhabitants, around 83% of the total.

### WATER SYSTEM MANAGED BY ACEA ATO 2 SPA IN FIGURES (2005)

	drinking water system	non-drinking water system
maximum derivable delivery (m <sup>3</sup> /s)	21	1.3
volume of water provided to Rome and Fiumicino (Mm <sup>3</sup> /year)	478.1	26.2
volume of water delivered outside municipality (Mm <sup>3</sup> /year)	63.0	0.03
aqueducts (km)	208	102
transportation network (km)	1,259.1	1.8
distribution network and transfer to customer base (km) (*)	7,050.3	271.6
pumping stations (no.) (*)	89	24
Piezometres (no.) (*)	9	0
Reservoirs (no.) (*)	142	8
Treatment plants (no.) (*)	1	1

(\*) The figures include the consistent data of the municipalities with acquired integrated water services.

GENERAL COMPOSITION OF MUNICIPAL WATER NETWORKS MANAGED BY ACEA ATO 2 SPA (2005) – EXCLUDING ROME AND FIUMICINO

	network (km)	maximum total delivery available (l/s)	reservoirs (no./vol. total in m <sup>3</sup> )	pumping plants (no.)	piezometres (no.)	resident population (inhabitants)
Fonte Nuova	70.0	90	4/2,200	2	-	22,573
Marcellina	32.4	20	2/300	2	-	5,393
Ciciliano	11.6	10	2/380	2	-	1,147
San Gregorio da Sassola	15.9	7	3/305	1	-	1,529
Guidonia	171.1	225	4/1,560	3	-	65,775
Monterotondo	164.0	130	4/4,660	2	1	32,831
Tivoli	76.7	260	6/2,080	6	-	52,732
Grottaferrata	35.0	132.2	4/5,560	3	-	17,641
Ciampino	118.2	145	5/1,857	7	-	36,464
Castel Madama	24.9	31	4/1,170	1	-	6,666
Mentana	57.6	65	5/490	3	-	16,288
Pisoniano	9.5	7	2/120	1	-	810
Rocca S. Stefano	7.2	6	2/140	-	-	1,014
Albano Laziale	128.8	170	5/4,630	2	-	31,399
Ex Cassa Mezz. Regione Lazio			4/7,750	1	1	-
Casape	4.1	10	3/320	-	-	812
Carpineto Romano	28.5	20	2/1,600	-	-	5,189
Montelanico	31.6	10.4	3/580	1	1	1,878
Gavignano	24.0	12.0	2/430	1	-	1,760
Gorga	11.0	3.0	3/130	-	-	764
Sambuci	8.7	12.5	3/378	2	-	891
Affile	14.7	8.0	4/500	-	-	1,644
Arcinazzo Romano	18.1	16.0	5/468	-	-	1,334
Cervara di Roma	8.8	13.5	8/715	1	-	486
Subiaco	117.5	76.0	13/4,705	2	-	9,130
Castel Gandolfo	26.0	80.3	4/1,640	2	-	7,850

NB: The figures of the municipalities of Vicovaro, Artena, Trevignano Romano and Santa Marinella are missing, acquired in December 2005 and up and running as from 1° January 2006.



TREATMENT CAPACITY OF THE PURIFICATION PLANTS  
MANAGED BY ACEA ATO 2 SPA MUNICIPALITY OF ROME

treatment plant	average treated capacity 2005 (m <sup>3</sup> /s)
Rome North	2.74
Rome South	8.41
Rome East	2.86
Ostia	0.67
CoBIS	0.17 (*)
minor plants	1.59 (**)
<b>total</b>	<b>15.44</b>
other municipalities	1.56 (**)

(\*) Mainly sewage from outside municipalities treated.

(\*\*) Potential

COMPOSITION OF TREATMENT AND SEWERAGE PLANTS  
MANAGED BY ACEA ATO 2 SPA (2005)

treatment plants (no.)	112
sewage raisers (no.)	274
sewage abstractors (km)	45
sewerage network (km)	4,403
	(around 300 km more than in 2004)

OUTGOING PARAMETERS OF THE MAIN TREATMENT PLANTS MANAGED BY ACEA ATO 2 SPA (2005)  
MUNICIPALITY OF ROME - (EN12)

parameter	Roma South plant	Roma North plant	Roma East plant I Section	Roma East plant II Section	Ostia Plant
BOD <sub>5</sub>	23	15	14	17	6
COD	56	21	19	21	10
SST	32	28	33	36	53
nitrogen	9.7	8.8	10.6	10.4	11.9
phosphorus	3.7	1.2	0.7	0.6	1.5

STAFF EMPLOYED	120 human resources
TURNOVER	Euro 14.7 million
NET RESULT FOR THE PERIOD	Euro 1.8 million

LaboratoRI SpA is an Acea Group Company active in the sector of laboratory, research and consultancy services, associated with environmental matters and the entire water cycle: from protection of the water resources to optimization of their use. It performs its services both within the Group and on behalf of third parties.

Since 2003, LaboratoRI also sees to the activities for the planning and supervision of the works necessary for the management of the integrated water cycle as well as providing specialist services in the geological-geo-technical field; as well as, since 2004, the analytical and technical services of the commodities chemical laboratory provided by the Services and Technologies Division of Acea SpA.

The Company operates under quality systems, in particular:

- › The Planning Unit and the Construction Unit operate under quality standards certified in accordance with the UNI EN ISO 9000 international standards;
- › The Analytical Services unit is SINAL accredited and operates by means of a system certified in accordance with the UNI EN 17025 standard.

The laboratory can also claim the following acknowledgements:

- › validation of the Experimental Institute for the Nutrition of Plants for the analysis carried out on terrain and foliage;
- › validation of the Experimental Institute for Vegetal Pathology for the analysis carried out on pesticide residues on fruit and vegetable matrixes.

The analytical laboratory activities concern in particular:

- › assessments of the supply sources;
- › analysis of the water, drinking and waste, in the Rome water mains;
- › analytical assessments of a specialist nature on waste, terrain, contaminated sites, fruit and vegetable products and other matrixes of environmental interest.

During 2005, more than 452,000 analytical assessments were carried out, of which 95% benefiting Acea Ato 2 SpA and Acea Ato 5 SpA.

Activities in the research and consultancy sector (in the water area) concerned the various aspects of the entire water cycle: protection of the water resources, optimization of the distribution networks, optimization of the urban waste water and drinking water treatment processes, assessment and reduction of the collateral impacts of the purification plants, sewerage networks (see *Environmental Section, Research*).





STAFF EMPLOYED	443 human resources
TURNOVER	Euro 92.3 million
NET RESULT FOR THE PERIOD	Euro 4.4 million

The Acque Group (comprising the Parent Company Acque SpA, Acque Industriali SpA, Acque Ingegneria SpA and Acque Servizi SpA) has been operative since 1st January 2002 when the Area Authority of ATO 2 - Basso Valdarno (Tuscany) entrusted Acque SpA with the twenty-year concession for the management of the integrated water service. The service covers a population of over 750,000 inhabitants, distributed throughout 57 municipalities in the provinces of Florence, Lucca, Pisa, Pistoia and Siena. The Acque Group aims at achieving its objectives (see Corporate Identity) in observance of the social and

environmental purposes defined with the Local Authorities involved, paying particular attention to the quality of the service, the safeguarding of the environment and the sustainable growth of the area (see Social section, Customers and the Community).

Acque SpA, which in 2004 had obtained certification for its quality management system (ISO 9001), obtained the environmental certification from RINA in accordance with ISO 14001:2004 and OHSAS 18001:1999 standards during 2005.

#### WATER SYSTEM MANAGED BY ACQUE SPA (2005)

maximum derivable delivery (Mm <sup>3</sup> /year)	78.259
volume of water provided (Mm <sup>3</sup> /year)	78.622 <sup>4</sup>
aqueducts (km)	5,644
transportation network (km)	847
distribution network (km)	4,797
catchment works wells (no.)	557
catchment works springs (no.)	288
catchment works rivers (no.)	19
catchment works lakes (no.)	4
pumping stations (no.)	359
piezometres (no.)	0
reservoirs (no.)	559
treatment plants (no.)	261

#### TREATMENT CAPACITY OF THE PURIFICATION PLANTS (2005)

treatment plant	average treated capacity (m <sup>3</sup> /s)
total	1.25

#### COMPOSITION OF THE TREATMENT AND SEWERAGE PLANTS MANAGED BY ACQUE SPA

treatment plants (no.)	150
sewage raisers (no.)	445
sewage network (km)	3,216

<sup>4</sup> The volume provided exceeds the maximum derivable delivery since part of the water resource is acquired by other companies.

GORI SpA manages the Integrated Water Service in the Optimum Area of Operation (ATO) 3 of the Campania Region, known as "Sarnese Vesuviano".

It is a joint-stock Company with a predominantly public-owned share capital, where the private minority shareholder has been identified in relation to its technical-industrial and management abilities. The latter is Sarnese Vesuviano Srl, a subsidiary company of Acea SpA. GORI has established the strategic elements of its activities on the public-private interaction, flanking the skills and the experience of the special companies operating throughout the area with the know-how and the modern technologies of the private shareholder.

ATO 3 - Sarnese Vesuviano comprises 76 municipalities (59 in the province of Naples and 17 in the province of Salerno), involving 1,500,000 inhabitants; a water network which covers nearly 4,000 km and a sewerage network 2,200 km long. The annual water consumption comes to 100 million cubic metres, for a served user base of around 480,000 units.

As of 31 December 2005, GORI managed the integrated water service in 61 municipalities and completion of the acquisitions is envisaged by the end of 2006. Management systems are currently being adopted for Safety and Quality in compliance with the UNI EN ISO 9001:2000 standard.

STAFF EMPLOYED	564 human resources
TURNOVER (*)	Euro 76.4 million
NET RESULT FOR THE PERIOD (*)	Euro 0.9 million

(\*) Figures communicated by Gori SpA, taken from 2005 Financial Statements.

#### WATER SYSTEM MANAGED BY GORI SPA (2005)

volume of water provided (Mm <sup>3</sup> /year)- drinking water system	147.81
transportation network (km)	208.5
distribution network (km)	3,033.7
pumping stations (no.)	81
reservoirs (no.)	140
treatment plants - only disinfection (no.)	20

#### COMPOSITION OF THE TREATMENT AND SEWERAGE PLANTS MANAGED BY GORI SPA (2005)

treatment plants (no.)	18
sewage raisers (no.)	123
sewerage network (km)	1,768





**Acea**  
**2005 Sustainability Report**

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