



2009 SUSTAINABILITY REPORT

Environmental Accounts



Summary

Environmental Accounts

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Environmental Accounts

Reference scope

In addition to Acea SpA, Acea Distribuzione, LaboratoRI, AceaElectrabel Produzione and AceaElectrabel Elettricità, the reference scope for 2009 includes Terni En.A and EALL from the A.R.I.A. Group, Tirreno Power, Acea Ato 2 and the following other water companies: Acea Ato 5, Acque, Gori, Acquedotto del Fiora, Publiacqua and Umbra Acque.

Figures concerning the energy sector do not refer to all activities under management, but take into account Acea SpA's shareholdings in the operational companies (more specifically, 30%¹ of AceaElectrabel Produzione and 15% of Tirreno Power, whereas the other companies – A.R.I.A. Group, Acea Reti e Servizi Energetici, Acea Distribuzione – are all 100% owned). According to this procedure adopted in 2008 and to ensure that figures for all three years can be compared, the **figures concerning 2007 were recalculated, although the only figures with the same scope were those referring to 2008-2009.**

Regarding the **water sector** in addition to figures concerning the “traditional” company Acea Ato 2, figures from the Environmental Accounts concerning the other aforementioned companies are provided in tables, as indicated case by case. Figures concerning the water sector were taken into consideration **globally** despite the shareholding of the Mother Company, as Acea is the **industrial subject responsible for management** in each of the companies in question. Further information concerning water companies can be found in the fact sheets in *Company Fact Sheets Italy-Overseas*.

Environmental Accounts – attached to the *Sustainability Report* on a CD – are an important management tool, as they join and systematically present the information and figures concerning interaction between the company and the environment; they are also a more complete means of communicating Acea Group's environmental performance.

Figures are separated into “product systems” for the energy and water sectors according to the *Life Cycle Assessment*² approach (Standard ISO 14040 series), which has been adopted for years and assesses the entire life cycle of systems.

Additional information is provided in the *Explanatory Notes* concerning the quality of the figures presented herein, especially when such are measured, estimated or calculated, in which the key items in the *Environmental Accounts* (providing a number between brackets in the text) include a brief description.

¹ AceaElectrabel Produzione companies Voghera Energia and Longano Eolica have to be distinguished with Acea SpA shareholdings of 24% and 1.5% respectively.

² LCA is a method used to analyze a group of interactions that a product or service has with the environment throughout its entire life cycle, including pre-production (therefore material extraction and production), distribution, use (therefore reuse and maintenance), recycling and final disposal.

Product systems

Energy sector

- › Energy generation
(thermoelectric + hydroelectric
+ wind + WTE + photovoltaic)
- › Electricity distribution
- › Heat production and distribution
- › Public lighting
- › Tests

Environmental – Water sector

- › Drinking water supply
- › Non-drinking water supply
- › Water distribution
- › Wastewater transportation/purification
- › Analyses and research

Figures concerning 2007, 2008 and 2009 were aggregated into three categories:

- › **product supplied;**
- › **resources used;**
- › **waste produced.**

The performance indicators – the key environmental performance indicators – are illustrated for each sector below.

The figures presented concerning waste – divided into the categories of “hazardous” and “non-hazardous” – refer to the energy sector and the environmental-water sector, with the waste produced by the Parent Company equally attributed to each.

Products

Energy Sector

Electricity generation figures refer to AceaElectrabel Produzione and - as of 2008 – Tirreno Power and Waste To Energy figures (A.R.I.A. Group companies) and – as of 2009 - Acea Reti e Servizi Energetici (photovoltaic energy).

Figures are weighted - by way of ensuring consolidation – according to the relative shareholding of Acea SpA:

AceaElectrabel Produzione SpA (AE) (30% Acea)

Tirreno Power SpA (TP) (15% Acea)

A.R.I.A. SpA Group (100% Acea)

Acea Reti e Servizi Energetici SpA (100% Acea)

ELECTRICITY – GENERATION	u. m.	2007 reclassified	2008 reclassified	2009 reclassified	% 2009/2008
Summarized figures					
Overall gross electricity produced (1) = (AE1 + TP1 + A.R.I.A.1 + PV)	GWh	1,333.99	3,578.51	3,233.95	-9.6
Overall net electricity produced (2) = (AE6 + TP5 + A.R.I.A.3 + PV)	GWh	1,303.40	3,426.06	3,090.00	-9.8
From fossil sources (thermoelectric) (AE3 + TP3 + 0.50 x A.R.I.A.1Eall + 0.56 x A.R.I.A.1Terni)/(1)	%	94.2	94.0	91.4	-2.7
From renewable sources (hydroelectric, wind, solar, biodegradable fraction of waste) (AE2 + AE4 + TP2 + 0.50 x A.R.I.A.1Eall + 0.44 x A.R.I.A.1Terni + PV)/(1)	%	5.8	6.0	8.6	42.1
AE Produzione (30% Acea)					
Overall gross electricity produced (AE1) = (AE2 + AE3 + AE4)	GWh	1,333.99	1,423.41	1,339.90	-5.9
Overall gross hydroelectric energy (AE2)	GWh	74.61	111.09	146.43	31.8
A. Volta Castel Madama	GWh	3.20	6.21	7.98	28.4
G. Ferraris Mandela	GWh	2.38	4.33	5.64	30.4
G. Marconi Orte	GWh	13.25	13.99	17.32	23.9
San' Angelo	GWh	20.12	33.07	61.12	84.8
Salisano	GWh	34.61	52.90	53.55	1.2
Other minor plants	GWh	1.05	0.59	0.83	38.9
Overall gross thermoelectric energy (AE3)	GWh	1,256.68	1,301.54	1,175.81	-9.7
from diesel					
Montemartini Station (*)	GWh	5.61	2.71	0.92	-66.1
from natural gas					
Voghera plant	GWh	1,251.06	1,298.82	1,174.89	-9.5
Roselectra plant	GWh	344.50	177.94	276.30	55.3
Leinì plant	GWh	592.77	541.54	465.39	-14.1
Tor di Valle combined cycle plant (**)	GWh	194.83	488.13	379.26	-22.3
Tor di Valle co-generation plant	GWh	108.29	81.14	46.61	-42.6
Tor di Valle co-generation plant	GWh	10.68	10.07	7.33	-27.3
Gross electricity from wind power (AE4)	GWh	2.71	10.79	17.65	63.6
Energy consumed (AE5)	GWh	30.59	32.56	31.41	-3.5
Internal consumption hydroelectric plants	GWh	0.55	0.58	0.63	8.5
Internal consumption thermoelectric plants	GWh	23.69	24.53	23.93	-2.5
AceaElectrabel Produzione traditional	GWh	3.63	3.41	3.13	-8.2
Voghera	GWh	5.85	3.71	4.94	33.2
Roselectra	GWh	10.54	9.79	9.24	-5.6
Leinì	GWh	3.67	7.62	6.61	-13.2
Losses through initial transformation	GWh	6.34	7.40	6.76	-8.6
Internal consumption wind power plants	GWh	0.02	0.05	0.09	71.8
Overall net electricity produced by AE Produzione (AE6) = (AE2 + AE3 + AE4) – AE5	GWh	1,303.40	1,390.85	1,308.48	-5.9

(*) The Montemartini plant remains operational but only as standby.

(**) Tor di Valle production (combined cycle) decreased due to a fault causing the Station to stop in May and June 2009.

(continues) ELECTRICITY – GENERATION	u. m.	2007 reclassified	2008 reclassified	2009 reclassified	% 2009/2008 reclassified
Tirreno Power (15% Acea)					
Overall gross energy produced (TP1) = (TP2 + TP3)	GWh	-	1,995.45	1,732.63	-13.2
Overall gross hydroelectric energy (TP2)	GWh	-	28.18	35.95	27.5
Overall gross thermoelectric energy (TP3)	GWh	-	1,967.26	1,696.68	-13.8
Torrevaldaliga plant	GWh	-	942.35	645.50	-31.5
Vado Ligure plant	GWh	-	1,020.93	865.33	-15.2
Naples plant (*)	GWh	-	3.99	185.85	-
Energy consumed (TP4)	GWh	-	103.29	95.34	-7.7
Internal consumption	GWh	-	81.69	90.07	10.3
Losses through initial transformation	GWh	-	21.60	5.27	-75.6
Overall net electricity produced (TP5) = (TP2 + TP3 - TP4)	GWh	-	1,892.16	1,637.29	-13.5
A.R.I.A. Group (Waste-To-Energy) (100% Acea)					
Overall gross energy produced (A.R.I.A.1)	GWh	-	159.65	157.94	-1.1
Eall S. Vittore plant	GWh	-	78.49	79.93	1.8
Terni EnA plant	GWh	-	81.16	78.02	-3.9
Internal consumption (A.R.I.A.2)	GWh	-	16.60	17.20	3.6
Eall S. Vittore internal consumption	GWh	-	8.42	9.28	10.2
Terni EnA internal consumption	GWh	-	8.18	7.92	-3.2
Overall net electricity produced (A.R.I.A.3) = (A.R.I.A.1 - A.R.I.A.2)	GWh	-	143.05	140.75	-1.6
ARSE (photovoltaic)	GWh	0	n.d.	3.49	-

(*) The Napoli Levante plant stopped operating in 2008 due to works to install a combined cycle and commenced production at the end of April 2009.

THERMAL ENERGY – GENERATION	u. m.	2007	2008 reclassified	2009 reclassified	% 2009/2008 reclassified
AE Produzione (30% Acea)					
Gross thermal energy produced (1A) = (AE7 + AE8)	GWh_t	19.05	26.34	35.54	34.9
Thermal energy Tor Di Valle) (AE 7)	GWh _t	19.05	19.51	23.32	19.5
Thermal energy Leini) (AE 8)	GWh _t	-	6.83	12.22	78.9
Losses in production and distribution (AE9)	GWh_t	2.43	4.02	4.83	20.1
Distribution losses	GWh _t	1.66	3.42	4.16	21.5
Production losses	GWh _t	0.76	0.60	0.67	11.7
Net thermal energy sold (2A) = (1A - AE9)	GWh_t	16.63	22.32	30.72	37.6

ELECTRICITY – TRANSPORTATION AND SALES	u.m.	2007	2008	2009	% 2009-2008
in Rome and Formello summarized figures					
Supplies from Acea Group (3)	GWh	3.46	1.83	2.73	49.2
Electricity from the market (4) = (4 A + 4 B + 4C +4D)	GWh	11,743.65	12,010.65	11,980.13	-0.3
From Single Wholesale Buyer (4 A)	GWh	5,700.24	4,878.33	4,465.09	-8.5
Imported (4 B)	GWh	432.38	433.49	432.38	-0.3
From other producers connected to ACEA					
Distribuzione network (4C)	GWh	13.30	0	20.41	-
From wholesalers + other producers (4D)	GWh	5,597.73	6,698.83	7,062.25	5.4
Electricity demand on the network (5) = (3 + 4)	GWh	11,747.11	12,012.48	11,982.86	-0.2
Losses in distribution, transportation and marketing (6) = (5) - (6A + 7 + 8 + 9)	GWh	743.97 6.33% of (5)	772.81 6.43% of (5)	746.70 6.23% of (5)	-3.4
In-house consumption transmission and distribution (6A)	GWh	11.38	13.20	53.36	304.2
Net electricity sold to other parties (7)	GWh	2.13	2.39	2.71	13.4
Net electricity conveyed by Acea to customers on deregulated market (8)	GWh	5,243.37	6,320.85	6,673.98	5.6
Net electricity sold by AceaElectrabel Elettricità to customers on the deregulated market through Acea Distribuzione network	GWh	2,282.28	3,154.79	3,786.22	20.0
Net electricity sold by other companies to customers on the deregulated market through the Acea Distribuzione network	GWh	2,961.09	3,166.06	2,887.76	-8.8
Net electricity sold to protected customers (former restricted customers) (9)	GWh	5,746.26	4,903.23	4,506.11	-8.1
Electricity – Sales in Italy					
Net electricity sold by Acea on deregulated market (8A)	GWh	10,917	12,273	12,550	2.3
AceaElectrabel Elettricità	GWh	9,070	9,970	9,945	-0.3
Other subsidiaries	GWh	1,847	2,303	2,605	13.1



PUBLIC LIGHTING	u.m.	2007	2008	2009	% 2009-2008
Luminous flux in Rome (13)	Mlumen	2,359	2,573	2,766	7.5
Luminous flux in Naples (13 A)	Mlumen	907	982	-	-

MONITORING AND GAUGING	u.m.	2007	2008	2009	% 2009-2008
Monitoring and gauging (14)	no.	457	597	417	-30,2
Electromagnetic field gauging	no.	14	27	47	74.1
Noise monitoring	no.	4	3	1	-66.7
Chemical analyses of asbestos	no.	5	211 (*)	0	-100
Chemical analysis of PCB	no.	188	105	96	-8.6
Waste classification	no.	48	52	63	21.2
Diagnostics on transformers	no.	146	174	206	18.4
Other	no.	52	25	4	-84.0



(*) The considerable increase in samples and analyses on asbestos in 2008 was due to renovation in a number of company offices (extraordinary maintenance).

Products

Environmental-water Sector

Summarized water figures cover the more important water companies in Acea Group - Acea Ato 2, Acea Ato 5, Gori, Acque, Publiacqua, Acquedotto del Fiora and Umbra Acque – calculated at 100%. This is due to Acea's role as industrial entity responsible for the management of these service providers.

GROUP WATER BALANCE – ITALY (*)	u.m.	2007	2008	2009	% 2009/2008
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Summarized figures

Overall drinking water withdrawn from the environment (15 bis) (**)	Mm ³	1,352.1	1,353.2	1,381.7	2.1
Overall drinking water introduced to network (18 bis) (**)	Mm ³	1,203.9	1,236.3	1,248.5	1.0
Overall drinking water supplied (20 bis)(**)	Mm ³	674.3	669.5	665.7	-0.6

DRINKING WATER WITHDRAWN BY ACEA ATO 2 SPA FOR ROME'S HISTORICAL NETWORK	u.m.	2007	2008	2009	% 2009/2008
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Drinking water withdrawn from the environment (15)	Mm ³	600.9	595.9	608.2	2.1
from Bracciano - treated	Mm ³	16.9	10.5	15.8	5.7
from wells	Mm ³	20.5	24.9	12.9	-48.2
from springs	Mm ³	563.5	560.5	593.8	5.9
Drinking water sold to municipal retailers (16)	Mm ³	67.2	67.5	71.6	6.1
Drinking water introduced to the non-drinking water network (17)	Mm ³	17.3	16.0	16.7	4.4
Drinking water returned to the environment / technical operating volumes (19)	Mm ³	33.7	29.5	45.6	54.6
Drinking water introduced to Rome's historical network (18 A)	Mm ³	482.7	482.9	474.2	-1.8
Drinking water supplied via Rome's historical network (20)	Mm ³	312.0	309.4	303.4	-1.9
Assessment of losses according to Italian Ministerial Decree no. 99/97					
(21) = Overall losses (parameter A17 MD 99/97)	Mm ³	158.7	157.7	155.2	-1.5
(21A) = Effective losses (parameter A15 MD 99/97)	Mm ³	121.4	119.1	117.4	-1.4
		(25,1% of 18A)	(24,6% of 18 A)	(24,7% of 18 A)	

Water introduced to Rome's non-drinking water network

Non-drinking water withdrawn from the environment (24)	Mm ³	26.3	22.4	24.2	8.0
from River Tiber – treated (Grottarossa plant)	Mm ³	4.6	2.8	3.9	39.3
from springs	Mm ³	4.4	3.6	3.6	-
drinking water introduced to non-drinking water network (17)	Mm ³	17.3	16.0	16.7	4.4
Non-drinking water supplied to Rome municipality (27)	Mm ³	13.0	14.0	14.5	3.6
Non-drinking water supplied to Municipalities (28)	Mm ³	0.03	0.03	0.03	-

(*) Details on individual water balances for Group companies are provided further below. Additional information concerning individual water companies can be found in Company Fact Sheets Italy-Overseas.

(**) A number of 2008 items were adjusted with respect to that published in the previous Sustainability Report.

OVERALL DRINKING WATER DERIVED FROM ACEA ATO 2 FOR THE ATO 2 NETWORK (*)					
	u. m.	2007	2008	2009	% 2009/2008
Drinking water withdrawn from the environment (15 A)	Mm³	719.6	702.8	710.4	1.1
from Bracciano – treated	Mm ³	16.9	10.5	1.5	-85.7
from wells	Mm ³	97.5	87.3	74.6	-14.6
from springs	Mm ³	602.8	602.0	632.7	5.1
from other aqueduct systems	Mm ³	2.4	3.0	1.7	-44.1
Drinking water sold to municipal retailers (16 A)	Mm ³	56.5	47.8	47.4	-0.8
Drinking water introduced to non-drinking water network (17)	Mm ³	17.3	16.0	16.7	4.4
Drinking water returned to the environment / technical operating volumes (19 A)	Mm ³	51.7	31.9	47.3	48.3
Drinking water introduced to Ato 2 network (18)	Mm³	594.1	607.1	599.1	-1.3
Overall drinking water supplied to Ato 2 network (23)	Mm³	359.9	360.9	355.8	-1.4
Assessment of losses according to Italian Ministerial Decree no. 99/97					
(22) = Overall losses (parameter A17 MD 99/97)	Mm ³	219.2	223.7	220.8	-1.3
(22 A) = Effective losses (parameter A15 MD 99/97)	Mm ³	162.6	164.4	161.8	-1.6
		(27.4 % of 18)	(27.1% of 18)	(27.0 % of 18)	

DRINKING WATER DERIVED FROM COMPANIES IN LAZIO-CAMPANIA					
	u. m.	2007	2008	2009	% 2009/2008
Acea Ato 5					
Drinking water withdrawn from the environment	Mm³	83.90	90.80	95.40	5.1
from lakes/ivers	Mm ³	0	0	0	-
from wells	Mm ³	50.70	60.50	65.70	8.6
from springs	Mm ³	33.20	30.30	29.7	-2.0
Drinking water introduced to network	Mm³	83.90	87.50	86.4	-1.3
Drinking water supplied	Mm³	32.00	20.90	21.0	0.5
Assessment of losses according to Italian Ministerial Decree no.99/97					
Overall losses (parameter A17 MD 99/97)	Mm ³	n.d.	63.70	63.10	-0.9
Effective losses (parameter A15 MD 99/97)	Mm ³	n.d.	59.00	50.20	-14.9
Gori					
Drinking water withdrawn from the environment	Mm³	31.47	31.02	40.78	31,5
from lakes/ivers	Mm ³	0	0	0	-
from wells	Mm ³	29.92	25.82	36.41	41.0
from springs	Mm ³	1.55	5.20	4.37	-16.0
Water withdrawn from other aqueduct systems	Mm³	144.23	158.89	168.30	5.9
Drinking water introduced to the network	Mm³	175.70	189.91	209.08	10.1
Drinking water supplied	Mm³	85.60	91.91	94.33	2.6
Assessment of losses according to Italian Ministerial Decree no. 99/97					
Overall losses (parameter A17 MD 99/97)	Mm ³	89.31	97.20	113.74	17.0
Effective losses (parameter A15 MD 99/97)	Mm ³	78.59	80.77	92.82	14.9

(*) Rome's historical network + municipalities acquired as at 31.12.09.

Products

Environmental-water Sector

DRINKING WATER WITHDRAWN BY COMPANIES IN TUSCANY					
u.m.	2007	2008	2009	% 2009/2008	
Publiacqua					
Drinking water withdrawn from the environment (*)	Mm³	170.10	170.00	168.90	-0.6
from lakes/rivers	Mm ³	113.40	110.20	111.50	1.2
from wells	Mm ³	48.10	46.50	44.60	-4.1
from springs	Mm ³	8.60	13.60	12.8	-5.9
Drinking water introduced to network (*)	Mm³	154.60	154.30	153.30	-0.6
Drinking water supplied (*)	Mm³	86.70	86.00	86.00	-
Assessment of losses according to Italian Ministerial Decree no. 99/97					
Overall losses (parameter A17 MD 99/97)	Mm ³	58.30	59.30	59.30	-
Effective losses (parameter A15 MD 99/97)	Mm ³	48.20	48.70	48.80	0.2
Acque					
Drinking water withdrawn from the environment	Mm³	74.70	73.57	75.61	2.8
from lakes/rivers	Mm ³	3.54	3.41	3.26	-4.4
from wells	Mm ³	63.78	62.56	65.67	5.0
from springs	Mm ³	7.38	7.60	6.68	-12.1
Volumes of water withdrawn from other aqueduct systems	Mm ³	6.51	6.16	6.42	4.2
Drinking water introduced to network	Mm³	81.21	79.73	82.03	2.9
Drinking water supplied (*)	Mm³	46.09	45.97	47.03	2.31
Assessment of losses according to Italian Ministerial Decree no. 99/97					
Overall losses (parameter A17 MD 99/97)	Mm ³	28.29	26.99	27.75	2.8
Effective losses (parameter A15 MD 99/97)	Mm ³	20.39	19.25	19.92	3.5
Acquedotto del Fiora					
Drinking water withdrawn from the environment (**)	Mm³	61.40	61.60	63.24	2.7
from lakes/rivers	Mm ³	0.90	0.90	0.78	-13.3
from wells	Mm ³	28.50	32.10	27.86	-13.2
from springs	Mm ³	32.0	28.60	34.60	20.9
Drinking water introduced to network (**)	Mm³	59.30	59.40	59.68	0.5
Drinking water supplied (**)	Mm³	31.70	31.60	30.59	-3.2
Assessment of losses according to Italian Ministerial Decree no. 99/97					
Overall losses (parameter A17 MD 99/97) (**)	Mm ³	25.80	27.20	29.09	6.9
Effective losses (parameter A15 MD 99/97) (**)	Mm ³	23.00	24.50	25.84	5.5
Umbra Acque					
Drinking water withdrawn from the environment	Mm³	60.20	58.40	59.13	1.3
from lakes/rivers	Mm ³	0.90	1.10	1.07	-2.9
from wells	Mm ³	39.90	45.90	44.34	-3.4
from springs	Mm ³	19.40	11.40	13.72	20.4
Drinking water introduced to network	Mm³	60.05	58.40	58.89	0.8
Drinking water supplied	Mm³	32.30	32.30	30.97	-4.1
Assessment of losses according to Italian Ministerial Decree no. 99/97					
Overall losses (parameter A17 MD 99/97)	Mm ³	24.10	22.80	23.70	3.9
Effective losses (parameter A15 MD 99/97)	Mm ³	22.50	21.20	22.10	4.2

(*) A number of 2008 figures were adjusted with respect to those published previously according to a more precise procedure for calculations adopted in 2009.

(**) Figures concerning 2008 differ slightly from those published in the previous Sustainability Report further to prompt review by the Operations Division.

WASTEWATER TREATED BY ACEA ATO 2	u.m.	2007	2008	2009	% 2009/2008
Wastewater treated in key purification stations (29)	Mm³	475.9	493.7	527.2	6.8
Rome South	Mm ³	258.6	266.1	288.1	8.3
Rome North	Mm ³	96.6	103.7	110.2	6.3
Rome East	Mm ³	88.9	88.6	94.3	6.4
Rome Ostia	Mm ³	21.6	23.4	23.1	-1.3
CoBIS	Mm ³	5.7	6.5	6.4	-1.5
Fregene	Mm ³	4.5	5.4	5.1	-5.6
Others – Rome municipality	Mm ³	13.5	12.4	12.04	-2.9
Others – outside Rome municipality	Mm ³	69.8	59.2	56.58	-4.4
Overall wastewater treated	Mm³	559.2	565.3	595.8	5.4

WASTEWATER TREATED BY OTHER COMPANIES	u.m.	2007	2008	2009	% 2009/2008
Wastewater treated in Company's key purification stations excluding Ato 2 (29 bis)	Mm³	233.4	253.6	254.9	0.5

Products

Environmental-water Sector

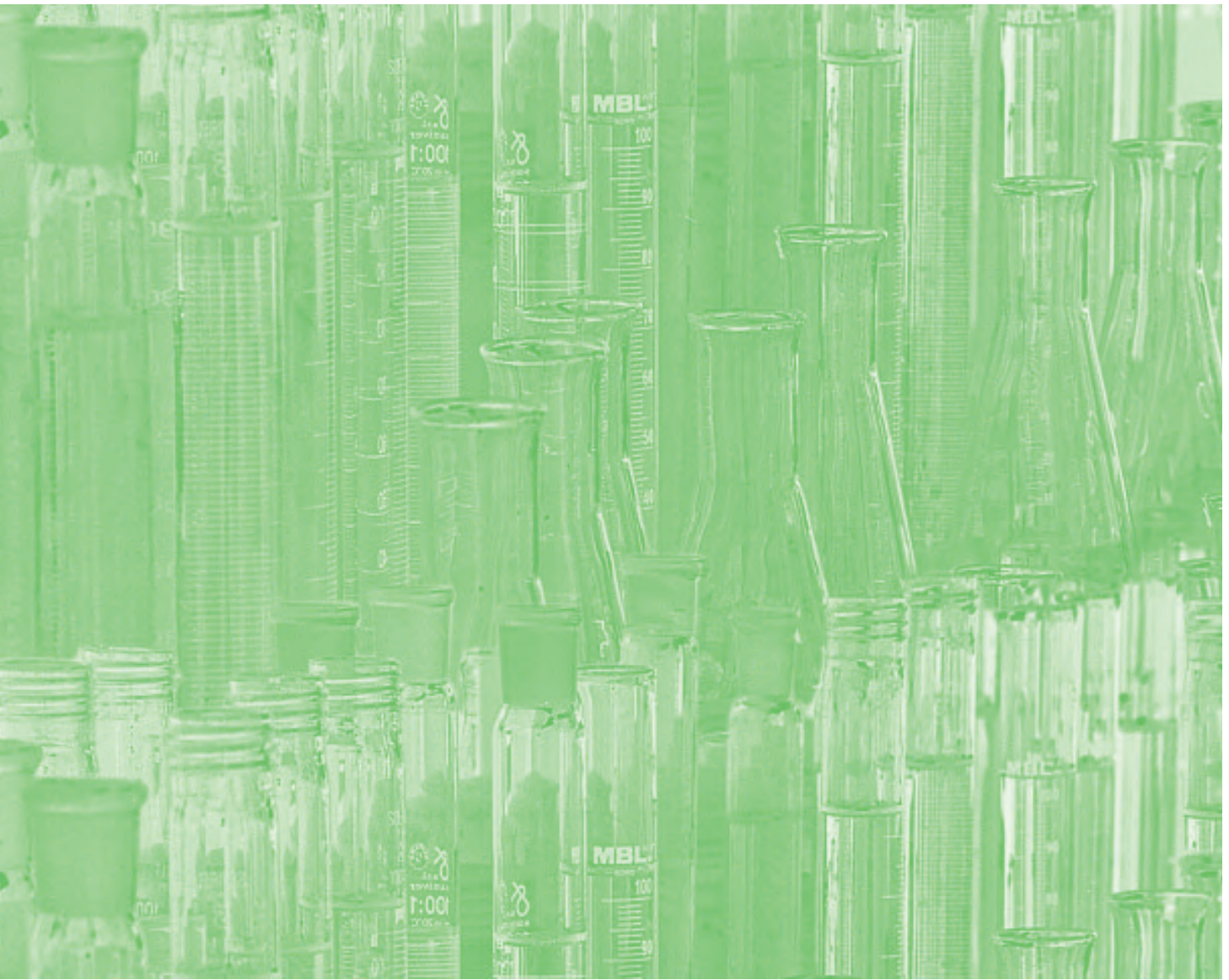
ANALYSES CARRIED OUT BY LABORATORI SPA ON BEHALF OF ACEA GROUP		u.m.	2007	2008	2009	% 2009/2008
Analyses carried out on behalf of Acea Group (30)	no.		508,109	552,832	578,231	4.6
Analyses carried out on behalf of Acea Ato2 Lazio (30 A)	no.		465,123	479,343	461,950	-3.6
drinking water analyses	no.		355,237	354,412	338,974	-4.4
wastewater analyses	no.		76,944	96,214	87,056	-9.5
surface water analyses	no.		32,942	28,717	35,920	25.1
Analyses on behalf of Acea Ato 5 Lazio (30 B)	no.		42,227	71,550	73,862	3.2
drinking water analyses	no.		36,139	6,088	71,550	73,862
wastewater analyses	no.		6,088	0	0	-
Analyses on behalf of other Group companies (30 C)	no.		759	1,939	42,419 (*)	2,087.7

OVERALL DRINKING WATER AND WASTEWATER ANALYSES CARRIED OUT FOR ACEA GROUP AND BY COMPANY (**)		u.m.	2007	2008	2009	% 2009/2008
Overall drinking water analyses on behalf of Group (30 D) (***)	no.		960,643	1,049,749	1,021,183	-2.7
Acea Ato 2	no.		355,237	369,184	348,255	-5.7
Acea Ato 5	no.		41,000	76,653	74,396	-2.9
Gori	no.		2,189	2,816	2,410	-14.4
Acque	no.		219,087	233,159	240,998	3.4
Publiacqua	no.		246,850	249,600	234,560	-6.0
Acquedotto del Fiora	no.		4,050	3,290	3,795	15.4
Umbra Acque	no.		92,230	115,047	116,769	1.5
Overall wastewater analyses on behalf of Group (30 E)	no.		233,382	278,525	290,966	4.5
Acea Ato 2	no.		76,944	97,138	87,056	-10.4
Acea Ato 5	no.		7,014	18,210	27,358	50.2
Gori	no.		302	284	210	-26.1
Acque	no.		73,864	81,195	94,395	16.3
Publiacqua	no.		32,215	34,776	34,826	0.1
Acquedotto del Fiora	no.		6,235	5,492	5,489	-0.1
Umbra Acque	no.		36,808	41,430	41,632	0.5

(*) Analyses were carried out on behalf of AE Produzione SpA and Gori SpA in 2009, whereas previously they were only carried out on behalf of AE Produzione SpA.

(**) Analyses include those carried out independently by each company as well as those carried out by Laboratori.

(***) The overall number of drinking water analyses for 2007 and 2008 differ from the number published in previous reports – 885,237 and 961,248 respectively – further to adjustment to figures previously forwarded by Acque and Umbra Acque.



Resources used

Energy Sector

ELECTRICITY, HEAT AND PUBLIC LIGHTING GENERATION, TRANSPORTATION AND SALE	u. m.	2007 reclassified	2008 reclassified	2009 reclassified	% 2009/2008
Natural resources - Summarized figures					
Overall amount of natural gas used to generate electricity and heat (31)	Nm³ in mlns	227.374	493.933	447.328	-9.4
Natural gas for thermoelectric production (AE)	Nm³ in mlns	227.374	235.417	216.923	-8.5
Voghera	Nm ³ in mlns	60.350	32.357	49.969	35.2
Roselectra	Nm ³ in mlns	99.927	91.726	81.935	-11.9
Leini	Nm ³ in mlns	38.592	89.163	69.575	-28.2
Tor di Valle co-generation	Nm ³ in mlns	5.326	4.633	3.731	-24.2
Tor di Valle combined cycle	Nm ³ in mlns	23.178	17.539	11.712	-49.8
Natural gas for thermoelectric production (TP)	Nm³ in mlns	-	253.827	224.840	-12.9
Natural gas Vado Ligure	Nm ³ in mlns	-	73.552	65.144	-12.9
Natural gas Torrevadliga	Nm ³ in mlns	-	178.459	126.821	-40.7
Natural gas Naples	Nm ³ in mlns	-	1.816	32.876	94.5
Natural gas for Waste-To-Energy process (A.R.I.A.)	Nm³ in mlns	-	4.662 (*)	5.565	19.4
Natural gas Eall	Nm ³ in mlns	-	0.874	2.052	134.8
Natural gas Terni EnA	Nm ³ in mlns	-	3.788 (*) (*)	3.513	-7.3
Diesel oil for thermoelectric production (32) = (AE + TP)	litres in mlns	-	1.354	0.907	-33.0
Diesel oil for thermoelectric production (AE)	litres in mlns	2.197	1.069	0.354	-202.0
Diesel oil Tor di Valle	litres in mlns	0.000	0.000	0.000	-
Diesel oil Montemartini	litres in mlns	2.197	1.069	0.354	-202.0
Diesel oil for thermoelectric production (TP)	litres in mlns	-	0.285	0.553	93.6
Diesel oil Vado Ligure	Nm ³ in mlns	-	0.261	0.426	63.2
Diesel oil Torrevadliga	Nm ³ in mlns	-	0.024	0.126	418.5
Diesel oil Naples	Nm ³ in mlns	-	0.000	0.000	-
Fuel oil for thermoelectric production (32 bis)	kt	-	2.519	3.132	24.3
Fuel oil for Vado Ligure TP	kt	-	2.519	3.132	24.3
Coal for thermoelectric production (32 ter)	kt	-	219.372	182.133	-17.0
Coal for Vado Ligure TP	kt	-	219.372	182.133	-17.0
WDF for WTE process (32 I)	kt	-	72.675	77.601	6.8
Pulper for WTE process (32 II)	kt	-	95.801	97.154	1.4
Water used to cool thermoelectric stations (34)= (75)	Mm³	14.47	305.90	288.32	-5.7
Water used to cool AEP plants	Mm ³	14.47	14.30	11.77	-17.7
Water used to cool TP plants	Mm ³	-	291.60	276.55	-5.2
Water used for purposes other than cooling					
Water deriving for hydroelectric production (33)	Mm³	679.87	823.28	1,075.57	30.6
Process-derived water (35)	Mm³	0.0477	0.3759	0.3860	2.7
Water for domestic/sanitary purposes (36)	Mm³	0.2528	0.4543	0.5241	15.3

(*) Officially correct figure with respect to that published in the previous Report.

ELECTRICITY, HEAT AND PUBLIC LIGHTING GENERATION, TRANSPORTATION AND SALE	u. m.	2007	2008	2009	% 2009/2008
Sundry materials					
Dielectric and lubricant oil (37)	t	110.80	171.10	0.0	-
SF ₆ (38)	t	0.44	0.45	0.52	13.5
Replacement/recovered cooling fluids (HCFC type) (39)	t	0.07	0.04	n.d.	-

ELECTRICITY, HEAT AND PUBLIC LIGHTING GENERATION, TRANSPORTATION AND SALE	u. m.	2007 reclassified	2008 reclassified	2009 reclassified	% 2009/2008
Electricity					
Electricity consumed to distribute electricity (40) = (6)	GWh	743.97	772.81	746.70	-3.4
Electricity consumed to produce electricity (41) = (1)-(2)	GWh	30.59	152.45	147.43	-3.3
Electricity consumed in offices (50% of electricity consumed by Parent Company) (42)	GWh	5.05	5.37	5.84	8.8
Other in-house uses for electricity (43)	GWh	11.40	13.20	53.36	304.2
Overall electricity consumed (44) = (40 + 41 + 42 + 43)	GWh	791.01	943.83	953.34	1.0
Sundry materials					
Chemicals (47) (*)	kg	216,031	452,179	394,261	-12.8
Acidity corrector	kg	792	6,394	7,587	18.6
Deoxygenating substances	kg	3,498	3,305	3,115	-5.8
Stabilizers and biodispersing agents	kg	7,944	19,371	22,533	16.3
Sodium chloride	kg	20,423	23,430	15,698	-33.0
Caustic soda	kg	32,418	144,805	120,919	-16.5
Sodium hypochlorite	kg	99,279	75,002	63,656	-15.1
Hydrochloric acid	kg	46,734	161,554	129,985	-19.5
Sundry oil and greases / lubricants	kg	3,816	17,794	30,214	69.8
Dielectric oil	kg	1,128	525	555	5.7

PUBLIC LIGHTING	u. m.	2007	2008	2009	% 2009/2008
Electricity					
Electricity consumed for public lighting (48)	GWh	152.85	143.22	150.85	5.3
Wattage installed (48 A)	MW	33.70	34.70	35.50	2.3

(*) The chemicals used by AE Produzione (Acea shareholding 30%) and Tirreno Power (Acea shareholding 15%) have been added together since 2008.

Resources used

Environmental-water Sector

Figures up to 2007 solely refer to Acea Ato2, whereas from 2008 figures concerning the other key water companies in the Group - Acea Ato 5, Gori, Acque, Publiacqua, Acquedotto del Fiora and Umbra Acque – are included.

COLLECTION, TRANSPORTATION AND DISTRIBUTION OF DRINKING AND NON-DRINKING WATER	u.m.	2007	2008	2009	% 2009/2008
Sundry materials and natural resources					
Reagents for purification and disinfection (49)	t	1,600.61	11,366.92 (*)	11,809.14	3.9
Reagents used in chemical analyses (50)	t	1.30	1.44	1.20	-16.7
Gas used in chemical analyses (51)	Nm ³ in mlns	2.80	3.04	3.04	-
Replacement/recovered cooling fluids (HCFC type) (52) = (39)	t	0.07	0.04	n.d.	-
Electricity					
Electricity used for water pumping systems (53)	GWh	164.30	504.71	484.77	-4.0
Electricity for office/in-house use (50% energy consumed by Parent Company) (54)= (42)	GWh	5.05	5.37	5.84	8.8
Electricity used in chemical laboratory (55)	GWh	0.96	1.01	1.17	15.8
Overall electricity consumed (56) = (53 + 54 + 55)	GWh	170.31	511.09	491.78	-3.8
Drinking water					
Water used for domestic/sanitary purposes (57)	Mm ³	0.77	0.93	1.03	10.1
Water consumed in offices (50% of drinking water consumed by Parent Company) (58)	Mm ³	0.15	0.30	0.36	20.0
Overall drinking water consumed (59) = (57 + 58)	Mm³	0.92	1.23	1.39	12.5
WASTEWATER TREATMENT					
Sundry materials and natural resources					
Reagents used in wastewater treatment (60)	t	6,563	5,510	5,937	7.7
Polyelectrolytes used to dehydrate sludge	t	956	1,347	1,469	9.1
Emulsion	t	942	1,303	1,370	5.2
Powder	t	14	44	13	-70.5
Sodium hypochlorite used in final disinfection	t	5,280	3,832	4,174	8.9
Ferric chloride used to dehydrate sludge	t	11	36	17	-53.1
Lime, Formic acid, aluminium polychloride	t	316	295	228	-22.8
Others (anti-foaming agents, etc.)	t	n.d.	n.d.	49	-
Mineral oil and grease (61)	t	7.40	17.18	16.40	-4.5
Electricity					
Electricity used in sewage and purification systems (62)	GWh	125.8	289.7(*)	294.5	1.7

(*) Figure adjusted with respect to that published in 2008.

Fuels used by Group companies for vehicles and heating

FUEL TYPE	u.m.	2007	2008	2009	% 2009/2008
Vehicles (Group fleet)					
Petrol (64)	litres in mlns	0.9454	1.0025	0.9131	-8.9
Diesel fuel (65)	litres in mlns	0.8459	1.0260	0.9547	-6.9
Heating (*)					
Diesel oil (66)	litres in mlns	0.0302	0.0117	0.0092	-26.3
Natural gas (67)	Nm ³ in mlns	0.5760	0.6288	0.5379	-16.9
LPG (68)	litres in mlns	0.0242	0.0235	0.0367	36.0



(*) Figures refer to Acea SpA, Acea Ato 2 SpA and, as of 2008, AceaElectrabel Produzione.

Emissions and waste
Energy Sector

EMISSION INTO THE ATMOSPHERE	u. m.	2007	2008 reclassified	2009 reclassified	% 2009/2008 reclassified
Summarized figures					
CO ₂ (69) = (69A + 69B + 69C)	t	476,879	1,679,454	1,416,286	-15.7
NO _x (70) = (70A + 70B)	t	287.07	939.46	748.58	-20.3
CO (71) = (71A + 71B)	t	28.52	328.60	300.23	-8.6
SO ₂ (72) = (72A + 72B)	t	0.09	768.95	622.95	-19.0
Powders (72 bis) = (72 bisA + 72 bisB)	t	0.12	39.21	30.86	-21.3
AE Produzione (30% Acea)					
CO ₂ (69A)	t	476,879	513,084	456,094	-8.1
AE Produzione (historical plants)	t	64,568	48,869	32,650	-33.2
Voghera	t	124,796	83,494	104,021	24.6
Roselectra	t	214,577	196,487	174,335	-11.3
Leini(*)	t	72,938	184,234	145,088	-21.2
NO _x (70A)	t	287.08	282.31	220.58	-21.9
AE Produzione historical stations	t	88.43	65.54	45.56	-30.5
Voghera	t	72.05	42.13	57.63	36.8
Roselectra	t	106.66	89.24	65.07	-27.1
Leini(*)	t	19.94	85.40	52.33	-38.7
CO (71A)	t	28.52	48.40	70.43	45.5
AE Produzione historical stations	t	4.71	7.02	3.84	-45.3
Voghera	t	13.45	15.41	50.04	224.7
Roselectra	t	9.08	8.37	10.69	27.7
Leini(*)	t	1.28	17.59	5.86	-66.7
SO ₂ (72A)	t	0.09	0.05	0.02	-63.2
Powders (72 bisA)	t	0.12	0.06	0.02	-63.2
Tirreno Power (15% Acea)					
CO ₂ (69B)	t	-	1,040,501	894,550	-14.0
Torrevaldaliga	t	-	385,564	272,767	-29.3
Vado Ligure	t	-	651,163	550,986	-15.4
Naples (**)	t	-	3,774	70,797	-
NO _x (70B)	t	-	657.15	528.00	-19.7
Torrevaldaliga	t	-	172.50	124.65	-27.7
Vado Ligure	t	-	482.40	382.80	-20.6
Naples (**)	t	-	2.25	20.55	-
CO (71B)	t	-	280.20	229.80	-18.0
Torrevaldaliga	t	-	23.40	27.00	15.4
Vado Ligure	t	-	255.15	201.30	-21.1
Naples (**)	t	-	1.65	1.50	-9.1
SO ₂ (72B)	t	-	768.90	622.94	-19.0
Powders (72 bisB)	t	-	39.15	30.84	-21.2
Torrevaldaliga	t	-	0.45	0.24	-46.7
Vado Ligure	t	-	38.70	30.60	-20.9
A.R.I.A. (100% Acea)					
CO ₂ (69C)	t	-	125,869	65,642	-47.8

(*) Leini plant did not commence operating in 2007 until September. This explains the considerable increase in emissions in 2008.

(**) The Napoli Levante plant stopped operating in 2008 due to works to install a combined cycle and commenced production at the end of April 2009. This explains the considerable increase in emissions in 2009.

OTHER EMISSIONS AND WASTE	u. m.	2007 reclassified	2008 reclassified	2009 reclassified	% 2009/2008
Wastewater treated (73)	Mm ³	0.006	0.241	0.204	-15.4
Screened sludge and other (74)	t	-	248.1	0.0	-
Cooling water returned (75) = (34)	Mm ³	14.47	305.90	288.32	-5.7
50 Hz electric fields (76)	kV				Monitored Commitment to keep within the legal limit
50 Hz magnetic fields (77)	µT				Monitored Commitment to keep within the legal limit
Noise (78)	dB				Monitored Commitment to keep within the legal limit
Dispersed luminous flux (79)	Mlumen				Commitment to design systems to keep emissions into the sky as low as possible

WASTE (LEG. DECREE 152/06)	u. m.	2007 reclassified	2008 reclassified	2009 reclassified	% 2009/2008
Hazardous waste excluding Waste-To-Energy (80) = (80A + 80B)	t	555.02	734.40	936.73	27.6
Energy sector production (80 A)	t	548.11	732.75	931.78	27.2
Part deriving from activities by Parent Company (80 B) (*)	t	6.91	1.65	4.95	200.1
Hazardous waste – Waste-To-Energy (80 bis)	t	-	10,723.00	12,271.18	14.4
Non-hazardous waste excluding Waste-To-Energy (81) = (81A + 81B)	t	1,361.54	3,025.60	7,665.82	153.4
Energy sector production (81 A)(**)	t	1,266.94	2,921.53	7,641.44	161.6
Part deriving from activities by Parent Company (81 B) (*)	t	94.60	104.07	24.38	-76.6
Non-hazardous waste - Waste-To-Energy (81 bis)	t	-	31,609.70	30,544.25	-3.4



(*) 50% of waste produced by Parent Company.

(**) The increased amount of waste with respect to 2008 is mainly due to removal of the worksite at the Tirreno Power Napoli Levante plant.

Emissions and waste
Environmental-water Sector

ACEA ATO 2 SPA	u.m.	2007	2008	2009	%2009/2008
Specific waste from wastewater treatment					
Sludge deriving from treatment (82)	t	125,242	125,174	143,082	14.3
Sand and sediment deriving from treatment (83)	t	9,367	15,715	9,806	-37.6
Waste (Italian Leg. Decree no. 152/06)					
Hazardous waste (86) = (86A + 86B) (*)	t	81.3	36.0	789.9	-
Production from environmental-water sector (86 A)	t	74.4	34.4	784.9	-
Part deriving from activities by Parent Company (86 B) (**)	t	6.9	1.7	5.0	200.0
Non-hazardous waste (87) = (87A + 87B + 87C)	t	2,846.7	2,028.3	2,165.4	6.8
Production from environmental-water sector (87 A)	t	611.0	702.0	620.3	-11.6
Part deriving from activities by Parent Company (87 B) (**)	t	94.6	104.1	24.4	-76.6
Inert materials (87 C)	t	2,141.1	1,222.2	1,520.7	24.4
Other emissions and waste					
Noise (84)	dB				Monitored Commitment to keep within the legal limits
Smells (85)					Monitored Commitment to keep within the limit of perception in areas nearby treatment plants

OTHER WATER COMPANIES	u.m.	2007	2008	2009	%2009/2008
Specific waste from wastewater treatment					
Sludge deriving from treatment (82 bis)	t	108,197	102,251	110,689	8.3
Sand and sediment (83 bis)	t	5,326	4,226	6,961	64.7
Waste (Leg. Decree 152/06)					
Hazardous waste (86 bis)	t	194.2	265.1	880.2	232.0
Non-hazardous waste (87 bis)	t	100,036.0	102,426.2	107,602.7	5.1

(*) The considerable increase in 2009 is due to 630 tons of earth containing hazardous substances.

(**) 50% of waste produced by Parent Company.

Emissions from vehicles and air-conditioning

GROUP COMPANIES	u.m.	2007	2008	2009	%2009/2008
Vehicles (*)					
CO ₂ (88)	t	4,790	5,316	4,708	-11.4
NO _x (89)	t	9.0	9.3	9.4	1.1
CO (90)	t	50	48	52	8.2
SO ₂ (91)	t	n.d.	n.d.	n.d.	-
Heating (**)					
CO ₂ (88A)	t	1,543	1,614	1,408	-12.8



(*) The COPERT IV programme was used to calculate NO_x, CO and SO₂ emissions. Calculation of CO₂ emissions up to the end of 2007 was carried out by multiplying the fuel consumption expressed in toe (tons of oil equivalent) by 3, while they were calculated using COPERT IV software as of 2008.

(**) Deriving from fuel consumption expressed in toe, calculating the corresponding CO₂ as three times such consumption.

Key environmental performance indicators

INDICATOR	u. m.	2007	2008	2009
Energy directly used in processes:				
A - Electricity distribution (item 6)	TJoules (GWh)	2,678.4 (744.0)	2,782.1 (772.8)	2,688.1 (746.7)
B - Electricity production (item 41)	TJoules (GWh)	110.1 (30.59)	548.3 (152.3)	530.6 (147.4)
C - Heat loss on district heating network. (item AE9)	TJoules (GWh)	8.6 (2.4)	14.4 (4.0)	17.3 (4.8)
D - Public lighting (item 48)	TJoules (GWh)	550.1 (152.8)	515.5 (143.2)	543.06 (150.85)
E - Water distribution (item 56 - 54)	TJoules (GWh)	594.7 (165.2)	1,820.6 (505.7)	1,749.4 (485.9)
F - Water purification (item 62)	TJoules (GWh)	452.9 (125.8)	952.9 (264.7)	1.080.2 (294.5)
G - Services (item 42 + 54 + 66 + 67 + 68) (*)	TJoules (GWh)	58.5 (16.3)	62.0 (17.2)	62.5 (17.4)
H - Mobility (item 64 + 65)	TJoules (GWh)	72.5 (20.1)	68.2 (19.0)	62.9 (17.5)
Overall consumption of the Company	TJoules (GWh)	4,525.8 (1,257.2)	6,736.9 (1,878.9)	6,714.0 (1,865.0)
I - Loss of energy during conversion from raw source into electricity (**)	TJoules (GWh)	3,869.8 (1,074.9)	13,740.8 (3,816.9)	11,996.6 (3,332.4)
Overall direct energy use (sum A : I)	TJoules (GWh)	8,395.6 (2,332.1)	20,504.7 (5,695.8)	18,710.6 (5,197.4)

EMISSIONS, EFFLUENTS AND WASTE	u. m.	2007 reclassified	2008 reclassified	2009 reclassified
Greenhouse emissions				
CO ₂ (item 69 + 88 + 88A)	t	483,212	1,686,384	1,422,402
SO₂ NO_x and other important gas emissions by type				
NO _x (item 70 + 89)	t	296.1	948.8	758.0
CO (item 71 + 90)	t	78.5	376.6	352.2
SO ₂ (item 72 + 91)	t	0.1	768.9	623.0

(*) Transformation from volume unit to energy unit was carried out using the formulas described on page 26 for calculations 1 and 2.

(**) Until 2007, the indicator only concerned AE Produzione; as of 2008 – in compliance with all the other figures provided – losses by companies in A.R.I.A. Group and Tirreno Power are also included.

Key environmental performance indicators

INDICATOR	u. m.	2007	2008	2009
AE Produzione emission/production indicators				
NO _x /thermoelectric production	g/kWh	0.23	0.22	0.19
CO/ thermoelectric production	g/kWh	0.02	0.04	0.20
CO ₂ / thermoelectric production	g/kWh	378	381	388
CO ₂ /overall gross production	g/kWh	358	360	341
SO ₂ /thermoelectric production	g/kWh	0.0001	0.00003	0.00001
Tirreno Power emission/production indicators				
NO _x / thermoelectric production	g/kWh	-	0.33	0.31
CO/ thermoelectric production	g/kWh	-	0.14	0.14
CO ₂ / thermoelectric production	g/kWh	-	529	527
CO ₂ /overall gross production	g/kWh	-	521	516
SO ₂ / thermoelectric production	g/kWh	-	0.39	0.37

Key environmental performance indicators

INDICATOR	u. m.	2007	2008	2009
PRODUCTS AND SERVICES: ELECTRICITY				
Electricity production process efficiency (solely AE Produzione figures)(*)				
Gross average efficiency in thermoelectric production (calculation 1)	%	52.9	53.2	52.4
Voghera plant (combined cycle)	%	55.4	53.5	53.5
Roselectra plant (combined cycle)	%	56.2	56.0	54.2
Leinì plant (combined cycle)	%	49.5	53.5	52.9
Tor di Valle plant (combined cycle)	%	44.2	43.8	38.2
Tor di Valle plant (co-generation – solely electricity efficiency)	%	23.2	24.0	24.9
Tor di Valle plant (co-generation –electricity + heat recovery efficiency)	%	74.4	56.9	68.6
Montemartini plant	%	25.8	25.7	26.3
Gross average efficiency thermoelectric production including recovered heat (calculation 2)	%	53.4	53.5	52.8
Gross average efficiency hydroelectric production (calculation 3)	%	85.6	86.8	83.9
Gross average efficiency overall production (calculation 4)	%	54.7	55.7	55.7
Gross average efficiency overall production including recovered heat (calculation 5)	%	55.0	56.0	56.1
Tirreno Power electricity production process efficiency				
Gross average efficiency thermoelectric production (calculation 1)	%	-	46.9	46.6
Torrevaldaliga plant	%	-	49.9	48.2
Vado Ligure plant	%	-	44.1	43.8
Naples plant	%	-	51.0	53.5
Gross average efficiency hydroelectric production – Hydroelectric Group in Genoa (calculation 3)	%	-	86.3	92.0
Gross average efficiency overall production (calculation 4)	%	-	47.4	47.5
Specific waste production (item 80 + 81)/ (item 9)	g/kWh	0.40	0.77	1.91
Protection of surrounding area (overall length of HV cables / length of HV overhead lines) x 100	%	57.80	63.12	64.78
Luminous flux efficiency in public lighting (item 13 / item 48)	Lumen/kWh	15.4	18.0	18.3
Average efficiency of installed lamps (item 13 / item 48 A)	Lumen/W	70.0	74.1	77.9
Specific consumption per light (item 48) / no. lights	kWh/light (no. lights)	958 (159,588)	866.8 (165,218)	888.2 (169,841)
No. operating and laboratory checks/net GWh electricity sold (item 14) / (item 9)	n./GWh	0.08	0.12	0.09
Overall electricity losses (6)/(5)	% energy required	6.3	6.4	6.2
- internal consumption				
- initial transformation				
- transportation				
- technical and commercial				

(*) Calculations used to establish electricity generation efficiency are described as of page 32.

Key environmental performance indicators

INDICATOR	u. m.	2007	2008	2009
PRODUCTS AND SERVICES: ELECTRICITY				
Waste-To-Energy plant electricity production process efficiency				
Gross average efficiency electricity production - S. Vittore plant (Calculation 6)	kWh /kg WDF sent to incinerator		1.080	1.030
Gross average efficiency electricity production - Terni Plant (Calculation 7)	kWh /kg pulper sent to incinerator		0.847	0.803



Environmental sustainability performance

Environmental-water Sector

Key environmental performance indicators

INDICATOR	u. m.	2007	2008	2009
SERVICE: DRINKING WATER				
Assessment parameters according to Italian Ministerial Decree no. 99/97				
Acea Ato 2 network				
Primary efficiency (R1): (item 23) / (item 18)	%	60.6	59.4	59.4
Efficiency at consumption level (R2): (item 23 + A11) / (item 18) A 11 = 2,1% di (dato 23)	%	61.5	60.7	60.7
Net efficiency (R3): (item 23 + A11 + A12) / (item 18) A 12 = 2.4% of (item 18)	%	63.0	63.2	63.1
Historical network (Rome + Fiumicino)				
Primary efficiency (R1) historical network: (item 20) / (item 18 A)	%	64.6	64.1	64.0
Efficiency at consumption level (R2): (item 20 + A11) / (item 18 A) A 11 = 2.0% of (item 20)	%	65.6	65.4	65.3
Net efficiency (R3): (item 20 + A 11 + A 12) / (item 18 A) A 12 = around 2.0% of (item 18 A)	%	67.1	67.4	67.3
PRODUCT: DRINKING WATER				
Acea Ato 2 network				
Linear index for overall drinking water losses (according to MD 99/97) (item 22) / (km network) (*)	Mm ³ /1,000 km	21.7 (10,097.0 km)	22.0 (10,163.8 km)	21.5 (10,266.5 km)
Linear index for effective losses during distribution (according to MD 99/97) Ato 2 Network (item 22 A) / (km network) (*)	Mm ³ /1,000 km	16.1 (10,097.0 km)	16.2 (10,163.8 km)	15.8 (10,266.5 km)
Specific electricity consumption on water network (energy item Ato 2 network) / (item 18)	kWh/m ³	0.238	0.226	0.209
No. checks on distributed drinking water (item 30 A – drinking water) / (item 18)	n./Mm ³	598	584	566
Index for additives to drinking water (item 49 – solely Ato2 network) / (item 18)	g/m ³	2.7	3.2	2.7
Historical network (Rome + Fiumicino)				
Linear index for overall losses of drinking water (according to MD 99/97: A17/km network) (item 21) / (km network) (*)	Mm ³ /1.000 km	23.1 (6,886.2 km)	22.6 (6,971.1 km)	22.1 (7,021.1 km)
Linear index for effective losses of drinking water (According to MD 99/97: A15/km network) (item 21A) / (km network) (*)	Mm ³ /1.000 km	17.6 (6,886.2 km)	17.1 (6,971.1 km)	16.7 (7,021.1 km)

(*) These are the kilometres of distribution and transportation networks.

Key environmental performance indicators

INDICATOR	u. m.	2007	2008	2009
SERVICE: WASTEWATER TREATMENT (*)				
Overall sludge disposed of	t	125,242	125,174	143,082
Sand and sediment removed	t	9,367	15,715	9,806
COD removed (**)	t	141,311	134,926	138,968
Overall Total Suspended Solids (TSS) removed (**)	t	87,719	91,237	94,778
Index for additives	t/Mm ³	13.79	8.95	9.22
Specific electricity consumption for treatment process	kWh/m ³	0.264	0.302	0.296
No. checks on wastewater	no./Mm ³	161.7	194.9	165.1
COMPLIANCE				
Fines paid for failure to comply with regulations/agreements concerning the environment	euro	121,238	121,834	248,368 (***)
GENERAL				
Environmental costs	euro in mlns	21.13	15.39	24.64

(*) Values and indicators solely refer to Acea Ato 2.

(**) Figures also include estimated COD and TSS values concerning the municipalities acquired as at 31.12.09 – solely Ato2 network.

(***) This is the overall amount of fines received by Acea Ato 2, as accounted in previous years. The amount of 92,308 euro concerning overall fines paid in 2009 by water companies Acea Ato 5, Acque and Publiacqua should be added to this amount.

Description of calculations used to establish electricity generation efficiency

calculation

1

$$\text{efficiency (thermoelectric)} = \frac{\text{Energy}_{\text{thermoelectric}} \text{ (kWh)}}{\text{Energy}_{\text{diesel oil}} \text{ (kWh)} + \text{Energy}_{\text{natural gas}} \text{ (kWh)}}$$

whereby:

$\text{Energy}_{\text{thermoelectric}}$ = gross electricity produced through thermoelectric cycle

$$\text{Energy}_{\text{diesel oil}} \text{ (kWh)} = \frac{\text{diesel oil (l)} \times 0,835 \times \text{PCI}_d \text{ (kcal/kg)}}{860 \text{ (kcal/kWh)}} \quad \text{Energy equivalent to diesel oil consumed: (32)}$$

$$\text{Energy}_{\text{natural gas}} \text{ (kWh)} = \frac{\text{natural gas (Nm}^3\text{)} \times \text{PCI}_n \text{ (kcal/Nm}^3\text{)}}{860 \text{ (kcal/kWh)}} \quad \text{Energy equivalent to natural gas consumed: (31)}$$

PCI_d = 10,000 kcal/kg (low heat value of diesel oil)

PCI_n = 8,500 kcal/Nm³ (low heat value of natural gas)

860 = coefficient to convert energy from kcal to kWh

0,835 = specific weight of diesel (kg/l)

NB: in years 2007 – 2009, the calorific values used for AE Produzione were the effective values deriving from readings by gas and diesel oil suppliers.

calculation

2

$$\text{efficiency (thermoelectric)} = \frac{\text{Energy}_{\text{thermoelectric}} \text{ (kWh)} + \text{Energy}_{\text{thermal}} \text{ (kWh)}}{\text{Energy}_{\text{diesel oil}} \text{ (kWh)} + \text{Energy}_{\text{natural gas}} \text{ (kWh)}}$$

$\text{Energy}_{\text{thermal}}$ = Gross thermal energy produced

$\text{Energy}_{\text{thermoelectric}}$ = Gross thermoelectric energy produced

$$\text{Energy}_{\text{diesel oil}} \text{ (kWh)} = \frac{\text{diesel oil (l)} \times 0,835 \times \text{PCI}_d \text{ (kcal/kg)}}{860 \text{ (kcal/kWh)}} \quad \text{Energy equivalent to diesel oil consumed: (32)}$$

$$\text{Energy}_{\text{natural gas}} \text{ (kWh)} = \frac{\text{natural gas (Nm}^3\text{)} \times \text{PCI}_n \text{ (kcal/Nm}^3\text{)}}{860 \text{ (kcal/kWh)}} \quad \text{Energy equivalent to natural gas consumed: (31)}$$

PCI_d = 10,000 kcal/kg (low heat value of diesel oil)

PCI_n = 8,500 kcal/Nm³ (low heat value of natural gas)

860 = coefficient used to convert energy from kcal to kWh

0,835 = specific weight of diesel oil (kg/l)

NB: the calorific values used for AE Produzione are the effective values deriving from readings by gas and diesel oil suppliers.

calculation

3

$$\text{efficiency (hydroelectric)} = \frac{\text{Energy}_{\text{hydroelectric}} (\text{MWh}) \times 3,6 \times 10^9}{[m(\text{kg}) \times 9,8(\text{m/s}^2) \times h(\text{m})] (\text{Joule})}$$

whereby:

- $3,6 \times 10^9$ = factor used to convert water energy from joules to MWh
- m = offtake water used for hydroelectric production
- $9,8$ = acceleration in gravity at sea level
- h = height of water drop (free surface reservoir – turbine)
- $\text{Energy}_{\text{hydroelectric}}$ = energy produced in the hydroelectric cycle

calculation

4

$$\frac{(E_i)}{(E_i + E_t)} \times \varepsilon_i + \frac{(E_t)}{(E_i + E_t)} \times \varepsilon_t = \varepsilon_{\text{average}}$$

whereby:

- E_i = overall hydroelectric energy produced
- E_t = overall thermoelectric energy produced
- ε_i = hydroelectric efficiency
- ε_t = thermoelectric efficiency
- $\varepsilon_{\text{average}}$ = average production efficiency

calculation

5

$$\frac{(E_i)}{(E_i + E_\tau)} \times \varepsilon_i + \frac{(E_\tau)}{(E_i + E_\tau)} \times \varepsilon_\tau = \varepsilon_{\text{average}}$$

whereby:

- E_i = overall hydroelectric energy produced
- E_τ = overall energy (thermoelectric and thermal) produced
- ε_i = hydroelectric efficiency
- ε_τ = efficiency (thermoelectric + thermal)
- $\varepsilon_{\text{average}}$ = average production efficiency

calculation

6

$$\text{efficiency (electricityEall)}(\text{kWh/kg}) = \frac{\text{Energy}_{\text{electric}} \text{Eall}(\text{kWh})}{\text{WDF}_{\text{incinerated}}(\text{kg})}$$

$$\text{Energy}_{\text{electric oil}} \text{Eall} (\text{kWh}) = \text{electricity produced} = (\text{A.R.I.A. } 1_{\text{Eall}})$$

PCI_m = 8,500 kcal/Nm³ (low heat value of natural gas)
860 = coefficient used to convert energy from kcal to kWh

calculation

7

$$\text{efficiency (electricTerni)}(\text{kWh/kg}) = \frac{\text{Energy}_{\text{electric}} \text{Terni}(\text{kWh})}{\text{pulper}_{\text{incinerated}}(\text{kg})}$$

$$\text{Energy}_{\text{electric}} \text{Terni} (\text{kWh}) = \text{electricity produced} = (\text{A.R.I.A. } 1_{\text{Terni}})$$

PCI_m = 8,500 kcal/Nm³ (low heat value of natural gas)
860 = coefficient used to convert energy from kcal to kWh

Explanatory notes to the *Environmental Accounts*

The figures provided in these *Environmental Accounts* were produced and certified by the divisions directly responsible for such.

Each production unit is responsible for the correct nature of the figures herein until a standard Environmental Management System is implemented to provide codes to the relative procedures to ensure a regular flow of numeric information.

Official figures were subject to a validation process involving the following four steps prior to final acceptance:

1. current figures were compared with past figures to highlight and justify any considerable differences;
2. the acquisition process was repeated at least twice;
3. feed-back was given to the responsible divisions for final validation of figures;
4. figures were audited by an outside company specialized in environmental matters, as well as others.

Figures were divided into three categories:

- estimated;
- calculated;
- measured.

The highest possible attention was paid to estimated figures to check the reasonable nature of basic criteria used, while the objective is to use this method to calculate environmental parameters as little as possible in the future.

When figures derive from calculation, the algorithm used is explained briefly to ensure full understanding of the mathematical result.

Finally, when figures derive from measurements, an estimate of the uncertainty to associate thereto is provided.

PRODUCTS – ENERGY SECTOR

Item no **explanation – comment**

It must be remembered that the figures for the energy sector were calculated according to Acea SpA's shareholdings as of 2008.

1 Overall gross energy produced by Group. Accounting of this item changed as of 2008 to comprise a number of sub-items:

AE1=AE2+AE3+AE4: Overall electricity produced by AceaElectrabel Produzione plants, inclusive of losses. This includes thermoelectric, hydroelectric and wind energy. There was a considerable decrease in production by the Voghera Thermoelectric plant in 2008 due to a halt in operations that lasted for the first six months of the year, while the previous trend continued in 2009. Production at the Tor di Valle combined cycle plant decreased in 2009 due to a fault that caused the plant to halt production in May and June. This item is provided with uncertainty below $\pm 0.5\%$.

TP1=TP2+TP3: overall electricity produced by Tirreno Power plants, inclusive of losses. This includes thermoelectric and hydroelectric energy generated by the Hydroelectric Group in Genoa. The Napoli Levante plant halted production in 2008 due to works to install a combined cycle and became operational at the end of April 2009; this explains the increased production in 2009.

A.R.I.A.1: Electricity produced by Waste-To-Energy plants: EALL in S. Vittore and A.R.I.A. Group's Terni EnA of the A.R.I.A. Group. It must be pointed out that the fuel used in these two plants (WDF – Waste Derived Fuel – at S. Vittore and pulper from the paper industry at the Terni plant) comprises both biodegradable organic substances – therefore neutral in terms of CO₂ – and non-biodegradable organic substances (plastic, resins, etc).

AE5: Losses of electricity due solely to production in AceaElectrabel Produzione plants. This comprises: internal consumption, amounting to around 24.6 GWh, and losses during initial transformation, amounting to around 6.8 GWh. This item is provided with uncertainty below $\pm 0.5\%$.

TP4: Losses of electricity due solely to production in Tirreno Power plants. This comprised - in 2009 – 90.1 GWh in internal consumption and 5.3 GWh in losses during initial transformation. This item is provided with uncertainty below $\pm 0.5\%$.

A.R.I.A.2: Internal consumption at the two Waste-To-Energy plants in S.Vittore and Terni. This figure does not comprise energy taken from the grid. This item is provided with uncertainty below $\pm 0,5\%$.

2 Electricity produced net of losses due to production stage. This item is calculated.

A.R.I.A.3: Electricity produced by the two Waste-To-Energy plants in S.Vittore and Terni, net of internal consumption. This item is calculated.

AE6: Electricity produced by AceaElectrabel Produzione plants net of losses. This item is calculated.

TP5: Electricity produced by Tirreno Power Plants net of losses. This item is calculated.

1A Thermal energy produced in the Tor di Valle and Leinì co-generation plants (the latter solely as of October 2008) inclusive of losses. This item is measured in correspondence with boiler delivery pipes with uncertainty of $\pm 2\%$. Thermal energy is produced by co-generation systems comprising a gas turbine and superheated water regeneration generator powered by hot fumes from the gas turbine drainpipes.

continues **PRODUCTS – ENERGY SECTOR**

Item no. **explanation – comment**

AE9: District heating thermal energy losses due to: heat dispersion, network leaks, technical leaks due to maintenance work, reintegration to heat accumulation systems. This item is calculated as the difference between thermal energy produced and that effectively supplied to customers (billed).

- 2 A Net thermal energy supplied to end customers. This item is calculated according to billed consumption.
- 3 Electricity supplied to AceaElettrabel Elettricità SpA for consumption on the market served. This item has been almost zero since 2005 further to Acea Group’s decision to sell the electricity produced on the Exchange or through bilateral agreements.
- 4 Net electricity acquired on the market from:
- Single Wholesale Buyer – 4,465.09 GWh (4A)
 - Imports – 432.38 GWh (4B)
 - Other producers connected to the Acea Distribuzione network – 20.41 GWh (4C). As of 1st January 2008, electricity produced by other parties connected to the Acea Distribuzione network – generally photovoltaic producers – is withdrawn by the GSE (Electricity Services Operator) and no longer by the local distributor.
 - Market – 7,062.25 (4D)
- This item is provided with uncertainty of $\pm 0.5\%$.
- 5 Energy demand from all connected customers (deregulated + protected + safeguarded).
This item is estimated.
- 6 Losses of electricity during distribution and transmission. These are due to: losses during transformation and transportation, fraud and mistaken readings. This item is estimated.
- 6A:** Internal use for transmission and distribution.
- 7 Electricity transferred to other companies. This involves exchanges of energy between distribution companies.
This item is measured with uncertainty of $\pm 0.5\%$.
- 8 Overall net electricity conveyed to end customers on the deregulated market in Rome and Formello. This item is measured with uncertainty of $\pm 1\%$.
The considerable increase in this figure over the last few years is a direct consequence of deregulation on the electricity market underway in Italy since 1999 (Italian Legislative Decree no. 79/99).
- 8A Net electricity sold by Acea on deregulated market throughout Italy.
This item is measured with uncertainty of $\pm 1\%$.
- 9 Net electricity sold to end customers on the protected market (formerly restricted market).
The downward trend in this area is due to protected customers (formerly restricted) swapping to the deregulated market, in other words a direct consequence of deregulation on the electricity market underway in Italy since 1999 (Italian Legislative Decree no. 79/99).
This item is estimated according to billed consumption figures.
- 13 Luminous flux supplied by public lighting system in Rome. This item is calculated and is the result of the product between the number of lamps installed and relative “rated” luminous flux. In view of over-estimates caused through:

continues PRODUCTS – ENERGY SECTOR

Item no. explanation – comment

1. reduced efficiency due to lamps ageing;
 2. shutdown due to faults;
 3. shutdown due to maintenance
- a more realistic figure for supplied luminous flux is considered to be the figure provided minus 20%.

- 13A Luminous flux supplied by public lighting system in Naples. This item is calculated and is the result of the product between the number of lamps installed and relative “rated” luminous flux. In view of over-estimates caused through:
1. reduced efficiency due to lamps ageing;
 2. shutdown due to faults;
 3. shutdown due to maintenance
- a more realistic figure for supplied luminous flux is considered to be the figure provided minus 20%.
On 18 November 2008, Temporary Business Association “Aceca-Graded-Alfano” returned I.P. stations to Naples City Council, which in turn hand these over to the new operator.
- 14 Overall number of measurements/checks carried out to the benefit of the energy sector.
This item is calculated as the overall number of calculations carried out by relative laboratories in 2009.

PRODUCTS – ENVIRONMENTAL-WATER SECTOR

Item no. explanation – comment

- 15 Overall drinking water withdrawn from sources by Acea Ato 2 – excluding high drains – and introduced into the aqueduct system in the historical network of Rome. The amount withdrawn from Bracciano Lake considerably increased in 2007 – around + 70% with respect to previous years as the Peschiera aqueduct was taken out of service on request by AceaElectrabel for the purposes of extraordinary maintenance at the Salisano plant. Withdrawal from the lake decreased in 2009 due to increased availability from springs. This item is measured with uncertainty of $\pm 3\%$.
- 15 A Overall drinking water withdrawn from sources by Acea Ato 2 – excluding high drains – and introduced into the aqueduct system in ATO 2 – central Lazio (Rome historical network + acquired municipalities). This item is measured with uncertainty of $\pm 3\%$.
- 15 bis Overall drinking water withdrawn from the environment by the following companies: Acea Ato2, Acea Ato 5 (Lazio); Gori (Campania); Acque, Publiacqua and Acquedotto del Fiora (Tuscany); Umbra Acque (Umbria). This item is estimated.
- 16 Overall drinking water sold to municipalities along the aqueduct route, which in turn sell the resource to consumers who are not customers of Acea Ato 2. This item is measured and affected by a systematic error, which can be estimated as around - 5%.
- 17 Drinking water introduced to the non-drinking water network. This occurs in the event of maintenance or extraordinary operations that make the relative non-drinking resource insufficient. This item is estimated.
- 18 Overall drinking water transported to the ATO 2 distribution network (Rome + municipalities acquired as at 31.12.09). This item is measured with uncertainty of $\pm 3\%$.
- 18 A Overall drinking water transported to the Rome historical network (Rome + Fiumicino), net of losses due to transport phase at sources.
- 18 bis Overall drinking water introduced to the distribution networks of the companies listed in item 15 bis.
- 19 Drinking water returned to the environment / technical operating volumes in relation to the Rome historical distribution network (Rome + Fiumicino). This item is calculated.
- 19 A Drinking water returned to the environment / technical operating volumes in relation to the Ato 2 distribution network (Rome + municipalities acquired as at 31.12.09). This item is calculated.
- 20 Overall drinking water supplied throughout Rome municipality via the Rome historical network (Rome + Fiumicino). This item represents estimated consumption for the entire area served and includes consumption by customers, drinking fountains, pipeline cleaning operations, etc.
- 20 bis Overall drinking water supplied through the networks of the companies listed in item 15 bis.

continues **PRODUCTS – ENVIRONMENTAL-WATER SECTOR**

Item no. explanation – comment

- 21 Overall losses in distribution – historical network in Rome. This is parameter A17 in Italian Ministerial Decree no.99/97, defined as the amount of water lost during distribution.
 $A17 = A9 - (A10+A11+A12) = (A13 + A14 + A15 + A16)$
 Parameter A9 in MD 99/97 – overall amount of water introduced to network
 Parameter A10 in MD 99/97 – measured amount of water supplied to customers
 Parameter A11 in MD 99/97 – use authorized and not counted, amounting to around 2% of overall water supplied to customers;
 Parameter A12 in MD 99/97 – maintenance and cleaning, amounting to around 2% of overall water introduced to network;
 Parameter A13 in MD 99/97 – inefficiencies, estimated at around 3 million m³/year;
 Parameter A14 in MD 99/97 – fraud, amounting to around 1.0% of overall water supplied to customers (item 20) x 1.0/100;
 Parameter A 15 - Volume lost during distribution (effective losses).
 Parameter A16 in MD 99/97 – mistaken readings, amounting to around 10% of overall water supplied to customers - (item 20) x 10.0/100;
 Parameter A17 in MD 99/97 – overall losses during distribution.
- 21 A Effective losses through distribution – Rome historical network. This is parameter A15 in MD 99/97 and represents the figure nearest to the effective estimate of volume of water lost by distribution network.
- 22 Overall losses through distribution - Ato 2 network (Rome + municipalities acquired as at 31.12. 09). This is parameter A17 in MD 99/97, established as the amount of water lost during distribution.
- 22 A Effective losses during distribution - Ato 2 network (Rome + municipalities acquired as at 31.12. 09). This is parameter A15 in MD 99/97 and represents the figure nearest to the effective estimate of volume of water lost by distribution network.
- 23 Overall drinking water supplied (in other words meter readings, when available) through Ato 2 network (Rome + municipalities acquired as at 31.12. 09). This figure represents estimated consumption for the entire area served, including consumption by customers, drinking fountains, pipeline cleaning, etc.
- 24 Overall non-drinking water derived from the environment inclusive of losses. This item is estimated.
- 27 Overall non-drinking water supplied in Rome. This item is calculated and represents the overall amount of billed water.
- 28 Overall non-drinking water supplied to municipalities other than Rome. This is a small estimated amount.
- 29 Overall wastewater transported to main purification plants and treated. This item is calculated.
- 30 Overall number of measurements/analyses carried out by LaboratoRI SpA on behalf of Group companies at the Grottarossa Laboratory.
 This item is calculated as the total of individual analyses carried out in 2009.
 As occurred in 2009, analyses were carried out on water networks in the municipalities acquired by Acea Ato 2 and Acea Ato 5 (Frosinone) as well as in Rome; finally, 42,419 analyses were carried out on wastewater on behalf of other Group companies.
- 30 A Number of analyses carried out on behalf of Acea Ato 2 – central Lazio. Acea Ato2 in 2009 carried out additional analyses to those described. Therefore the analyses carried out on drinking water amounted to 348,255 (instead of 338,974).
- 30 B Number of analyses carried out on behalf of Acea Ato 5 – southern Lazio.

RESOURCES USED IN ENERGY SECTOR

Item no. explanation – comment

- 30 C Number of analyses carried out on wastewater on behalf of AceaElectrabel Produzione and, as of 2009, Gori.
- 31 Overall natural gas used to generate electricity and heat at AceaElectrabel Produzione, Tirreno Power, and A.R.I.A. Group production stations. This item is expressed in normal cubic metres (at 0°C and 1 Atm) and measured with uncertainty of $\pm 0.5\%$.
- 32 Overall diesel oil used to generate electricity at production plants. This item is measured with uncertainty of $\pm 2\%$. A density value of 0.835 kg/l was used to convert from mass (kg) to volume (litres).
- 32 bis Overall fuel oil used to generate electricity at Tirreno Power Torrevaldaliga and Vado Ligure plants. Fuel oil was only used at Vado Ligure in 2008 and 2009. This item is measured with uncertainty of $\pm 0.5\%$.
- 32 ter Overall coal used to generate electricity at Tirreno Power Vado Ligure plant. This item is measured with uncertainty of $\pm 1\%$.
- 32 I Amount of WDF (Waste-Derived Fuel) sent to undergo Waste-To-Energy process at the San Vittore nel Lazio Plant. This item is measured with uncertainty of $\pm 1\%$.
- 32 II Amount of pulper sent to undergo Waste-To-Energy process at the Terni plant. This item is measured with uncertainty of $\pm 1\%$.
- 33 Overall water derived from surface resources and aqueducts to produce hydroelectric energy. This item is calculated.
- 34 Overall cooling water used in thermoelectric stations. In 2009, the contribution from cooling water (according to Acea's shareholdings in the companies that own the plants) for TdV amounted to 11.12 Mm³ and for Roselectra amounted to 0.65 Mm³ (Acea share). The remaining amount – 276.6 Mm³ – is cooling water for Tirreno Power plants. This item is estimated.
- 35 Overall amount of water used in industrial processes. The various contributions – as of 2008 – were as follows:
 - water used to integrate that lost in thermal processes at AE Produzione plants. This involves aqueduct water;
 - water used to integrate district heating water. This involves aqueduct water;
 - water used in Tirreno Power plants. This involves a combination of water from aqueducts, rainwater and water used in cleaning processes that is collected and treated (oil extraction is carried out prior to its use as industrial water). Water used in Waste-To-Energy processes at Eall and Terni EnA plants.
 This item is calculated.
- 36 Amount of drinking water used by the companies in the energy sector for civil/sanitary purposes. Billed consumption for Tirreno Power has been included since 2008. This item is calculated and refers to billed consumption.
- 37 Overall amount of new dielectric mineral oil in the production circuit (transformers, condensers, storage deposit, etc.). This item is measured with uncertainty of $\pm 0.5\%$. As at 31.12.09, the overall amount of dielectric mineral oil in Acea Distribuzione electro technical equipment amounted to 4,537.18 tons, in other words 77.42 tons less than the year before, due to the fact that a number of transformers were removed that year. This item is estimated.
- 38 Overall amount of new insulating gas (SF₆) added to the production circuit (armoured sub-stations). This item is measured with uncertainty of $\pm 0.5\%$.

continues RESOURCES USED IN ENERGY SECTOR**Item no. explanation – comment**

- 39 Amount of cooling liquid used during maintenance of air-conditioning equipment, during which the operating gas is recovered and replaced with new gas. This item is calculated and the overall amount of gas procured by Parent Company is equally attributed (50%) to the energy and water sectors. Consumption to replenish gas in small split units was not monitored in 2008, which explains the considerable reduction in this item with respect to 2007. This item coincides with item 52.
- 40 This item coincides with item 6.
- 41 This item coincides with the difference between items 1 and 2.
- 42 Electricity consumed by processes not directly linked with production (offices). This item is calculated as 50% of the overall electricity consumed by Parent Company. The remaining 50% is attributed to consumption by the environmental-water sector.
- 43 Other used for electricity in the energy sector. This item is calculated.
- 44 Overall electricity consumed by product systems in the energy sector. This item is calculated.
- 45 Natural gas consumed to produce thermal energy (district heating) with traditional integration and reserve boilers. This item is measured with uncertainty of $\pm 0.5\%$.
- 47 Overall chemical substances used in electricity and thermal energy generation in plants.
The values from 2008 onwards include chemicals used in Tirreno Power plants and Waste-To-Energy plants.
This item is calculated.
- 48 Overall electricity consumed for the public lighting service in Rome municipality. This item is calculated.
- 48 A Installed capacity for the product system: public lighting in Rome municipality. This item is calculated as the overall amount of power of installed lamps.

RESOURCES USED IN ENVIRONMENTAL-WATER SECTOR

Item no. explanation – comment

As of 2008, figures also include key water companies in the Group in addition to Acea Ato2.

- 49 This item represents the overall consumption of sodium hypochlorite– for the purpose of disinfection on request from the Health Authorities -, aluminium polychloride, caustic soda and ozone. This item is calculated.
- 50 Overall amount of chemical reactants used in the Grottarossa chemical laboratory’s product system: Analysis and Research Laboratory.
This item is measured.
- 51 Overall volume of pure gas used for analyses in the Grottarossa chemical laboratory’s product system: Analysis and Research Laboratory.
This item is measured.
- 52 Amount of cooling liquid used during maintenance of air-conditioning equipment, during which the operating gas is recovered and replaced with new gas. This item is calculated and the overall amount of gas procured by Parent Company is equally attributed (50%) to the energy and water sectors. Consumption to replenish gas in small split units was not monitored in 2008, which explains the considerable reduction in this item with respect to 2007. This item coincides with item 39.
- 53 Electricity used for drinking water and non-drinking water pumping systems. This item is measured with uncertainty of $\pm 1\%$.
- 54 Electricity consumed in processes not directly linked to production (offices). This item is the same as item 43 and is calculated as 50% of the overall electricity consumed by Parent Company.
- 55 Electricity used in Grottarossa chemical laboratory’s product system: Analysis and Research Laboratory and includes all the energy relating to the various activities carried out by LaboratoRI and not just analyses.
This item is measured with uncertainty of $\pm 0.5\%$.
- 56 Overall electricity consumed in the environmental-water sector.
This item is calculated.
- 57 Amount of drinking water used by companies in the environmental-water sector for civil/sanitary purposes.
This item is calculated and refers to billed consumption.
- 58 Amount of water consumed for civil/sanitary purposes on premises not directly related to production (offices).
This item is calculated as 50% of the overall water consumed by the Parent Company
- 59 Overall drinking water consumed by companies in the environmental-water sector. This item is calculated and refers to billed consumption.
- 60 Overall amount of chemicals used in wastewater treatment process. This item derives from the recorded consumption of the following substances: polyelectrolytes, sodium hypochlorite, ferric chloride, lime.
This item is calculated.
- 61 Overall amount of lubricant oil and grease used for equipment in the environmental-water sector (pumps, centrifuges, engines, etc.). This item is calculated.
- 62 Electricity used to operate wastewater treatment plants and the sewage network.
This item is measured with uncertainty of $\pm 1\%$.

FUELS USED BY GROUP

Item no. explanation – comment

- 64 Overall amount of petrol used by Acea Group's fleet. A density value of 0.735 kg/l was used to convert from volume (litres) to mass (kg).
This item is measured with uncertainty of $\pm 0.5\%$.
- 65 Overall amount of diesel fuel used by Acea Group's fleet. A density value of 0.835 kg/l was used to convert from volume (litres) to mass (kg).
This item is measured with uncertainty of $\pm 0.5\%$.
- 66 Overall amount of diesel oil used to heat Acea and Acea Ato 2 workplaces and to power generators. A density value of 0.835 kg/l was used to convert from volume (litres) to mass (kg).
This item is measured with uncertainty of $\pm 0.5\%$.
- 67 Overall amount of natural gas used to heat Acea and Acea Ato 2 workplaces. This item is measured with uncertainty of $\pm 0.5\%$.
- 68 Overall amount of LPG (liquid petroleum gas) used to heat Group premises in Acea, Acea Ato 2, AceaElectrabel Produzione. A density value of 0.550 kg/l was used to convert from volume (litres) to mass (kg).
This item is measured with uncertainty of $\pm 0.5\%$.

EMISSIONS AND WASTE – ENERGY SECTOR

Item no. explanation – comment

- 69 Overall amount of carbon dioxide emitted into the atmosphere further to generation of thermoelectric energy using fossil fuels. This is a “physiological” product deriving from combustion. Emissions by Tirreno Power and A.R.I.A. Group plants have been included since 2008, according to Acea’s shareholdings. The contribution from A.R.I.A. Group derives from the waste undergoing the Waste-To-Energy process at the Terni EnA plant (paper industry pulper), which comprises a non-biodegradable fraction. This item is calculated according to current legislation.
- 70 Overall amount of nitrogen oxide (NO + NO₂) emitted into the atmosphere further to generation of thermoelectric energy using fossil fuels. Traces of these substances in emissions are due to secondary involuntary reactions between nitrogen and oxygen in the air that occur at high temperatures. Emissions by Tirreno Power have been included since 2008, according to Acea’s shareholding. This item is calculated.
- 71 Overall amount of carbon monoxide (CO) emitted into the atmosphere further to generation of thermoelectric energy using fossil fuels. The presence of this pollutant in emissions is due to incomplete combustion and is a symptom of decline in combustion efficiency. This item is calculated.
- 72 Overall amount of sulphur dioxide (SO₂) emitted into the atmosphere further to generation of thermoelectric energy using fossil fuels. Using natural gas and diesel oil with low sulphur content ensured that this type of emission was extremely limited until 2007. Further to inclusion of the Tirreno Power Vado Ligure (SV) thermoelectric plant as of 2008 led to a considerable increase in this item, which is however in line with the values expected for the technology used. This item is calculated.
- 72 bis Overall amount of powders (microscopic particles with aerodynamic diameter of 10 thousandths of a millimetre or less) emitted into the atmosphere further to generation of thermoelectric energy using fossil fuels. This is basically unburnt amorphous carbon with traces of other compounds of various compositions deriving from incomplete combustion. Inclusion of the coal sections at the Tirreno Power Vado Ligure thermoelectric plant (SV) in 2008 caused a considerable increase in this item, which however complies with expected values for the technology used. This item is calculated.
- 73 Overall amount of treated wastewater deriving from thermoelectric energy production. This item also includes Tirreno Power as of 2008. This item is measured with uncertainty of ± 2%.
- 74 Overall amount of solid materials deriving from electricity production (thermo and hydro). This item is estimated.
- 75 This item coincides with item 34.
- 76 The electricity field is constantly monitored at electricity distribution stations located near built-up areas. The average figure for this item is well below legal limits.
- 77 The magnetic field is constantly monitored at electricity distribution stations located near built-up areas. The average figure for this item – expressed in units of magnetic induction - is well below legal limits.

continues EMISSIONS AND WASTE – ENERGY SECTOR**Item no. explanation – comment**

- 78 The sound emissions produced by electricity generation and distribution stations are monitored and there is commitment to keep their level below legal limits.
- 79 Light dispersion towards the sky is kept as low as possible through careful design of public lighting systems.
- 80 Overall amount of hazardous waste (Italian Legislative Decree no. 152/06) disposed of. This item comprises an amount attributed to the Parent Company and equally divided between the energy and environmental-water sectors. Hazardous waste from Waste-To-Energy processes is excluded.
This item is measured with uncertainty of $\pm 2\%$.
- 80 bis Hazardous waste (Italian Legislative Decree no. 152/06) from Waste-To-Energy processes disposed of.
This basically involves light ash deriving from incineration.
This item is measured with uncertainty of $\pm 2\%$.
- 81 Overall amount of non-hazardous waste (Italian Legislative Decree no. 152/06) disposed of. This item comprises an amount attributed to the Parent Company and equally divided between the energy and environmental-water sectors. Non-hazardous waste from Waste-To-Energy processes is excluded.
This item is measured with uncertainty of $\pm 2\%$.
- 81 bis Non-hazardous waste (Italian Legislative Decree no. 152/06) from Waste-To-Energy processes disposed of.
This basically involves heavy ash and slag deriving from incineration.
This item is measured with uncertainty of $\pm 2\%$.

EMISSIONS AND WASTE – ENVIRONMENTAL-WATER SECTOR**Item no. explanation – comment**

- 82 Overall amount of sludge disposed of by Acea Ato 2. This sludge is non-hazardous waste. This item is measured with uncertainty of $\pm 2\%$.
- 82 bis Overall amount of sludge disposed of by water companies, excluding Acea Ato 2. This sludge is non-hazardous waste. This item is calculated.
- 83 Overall amount of sand and sediment disposed of by Acea Ato 2. This item is measured with uncertainty of $\pm 2\%$.
- 83 bis Overall amount of sand and sediment disposed of by water companies, excluding Acea Ato 2. This item is calculated.
- 84 Sound emissions produced by treatment plants and pumping stations are monitored and there is commitment to keep these below legal limits.
- 85 Smells produced by treatment plants are monitored and there is commitment to keep these below limits of perception.
- 86 Overall amount of hazardous waste (Italian Legislative Decree no. 152/06) disposed of by Parent Company and Acea Ato 2. This item comprises an amount produced by Parent Company equally shared between the energy and environmental-water sectors. This item is measured with uncertainty below $\pm 2\%$.
- 86 bis Overall amount of hazardous waste (Italian Legislative Decree no. 152/06) disposed of by water companies, excluding Acea Ato 2. This item is calculated.
- 87 Overall amount of non-hazardous waste (Italian Legislative Decree no. 152/06) disposed of by Holding Company and Acea Ato 2. This item comprises an amount produced by Parent Company equally shared between the energy and environmental-water sectors. This item is measured with uncertainty of $\pm 2\%$.
- 87 bis Overall amount of non-hazardous waste (Italian Legislative Decree no. 152/06) disposed of by water companies, excluding Acea Ato 2. This item includes inert materials. This item is calculated.

EMISSIONS AND WASTE ACEA GROUP – EMISSIONS FROM VEHICLES

Item no. explanation – comment

- 88 Overall amount of carbon dioxide emitted by Acea Group's fleet of vehicles. Until 2007 this item was calculated under the assumption that each toe of fuel used creates 3 tons of CO₂. From 2008 his item has been calculated using the COPERT IV Programme.
- 88 A: Overall amount of carbon dioxide emitted by air-conditioning systems used in workplaces. This item is calculated under the assumption that each toe of fuel used creates 3 tons of CO₂.
- 89 Overall amount of nitric oxides emitted by Acea Group's fleet of vehicles.
This item is calculated using the COPERT IV Programme.
- 90 Overall amount of carbon monoxide emitted by Acea Group's fleet of vehicles.
This item is calculated using the COPERT IV Programme.
- 91 Sulphur dioxide emissions by vehicles were not calculated, as they were extremely small amounts deriving from combustion of modest quantity of sulphur found in latest-generation fuels.

Acea
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