





Environmental accounts

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Environmental accounts

THE BOUNDARIES

The 2012 boundaries include Acea SpA, Acea Distribuzione, Acea Reti e Servizi Energetici, Acea Produzione, Acea Energy, Local Unit 3 of San Vittore del Lazio and Local Unit 1 of Terni, both of A.R.I.A., LaboratoRI, Acea Ato 2, Acea Ato 5, Acque, Gori, Acquedotto del Fiora, Publiacqua and Umbra Acque.

Since 2011 the electricity generation plants, using traditional and renewable sources, have been wholly-owned by Acea SpA, via the companies Acea Produzione, Acea Reti e Servizi Energetici and A.R.I.A.

With regard to the water sector, besides the information relating to the "historic" company Acea Ato 2, the account items relating to the other companies indicated above are also provided, as highlighted in the tables, as and when appropriate.

Note that the water figures are considered globally, irrespective of the holding of the parent company, because Acea represents the industrial entity responsible for the management activities within each of the companies considered.

The Environmental Accounts, an integral part of the *Sustainability Report*, bring together and systematically present the information and data on Acea Group's environmental performance in an in-depth manner.

Figures are separated into "product systems" for the energy, environment and water sectors according to the Life Cycle Assessment approach¹ (ISO standard 14040 series), which assesses the entire life cycle of the 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, and the items of the Environmental Accounts (indicated in the tables and in the text by a number in brackets) are accompanied by a brief illustrative description.

¹ LCA is a method used to analyze a series of interactions that a product or service has with the environment, considering its entire life cycle, which includes pre-production (therefore material extraction and production), production, distribution, use (therefore reuse and maintenance), recycling and final disposal.

Product systems

ENERGY	ENVIRONMENT	WATER
<ul style="list-style-type: none">• Energy generation (thermoelectric + hydroelectric + photovoltaic + waste-to-energy)• Electricity distribution• Heat production and distribution• Public lighting• Tests and Inspections	<ul style="list-style-type: none">• Compost production	<ul style="list-style-type: none">• Drinking water supply• Non-drinking water supply• Water distribution• Waste water transportation/treatment• Analysis and research laboratory

The figures are provided for the three-year period 2010-2012 and are grouped together in three similar categories:

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

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



The products - Energy

Electricity generation figures refer to Acea Produzione (AP) (100% Acea SpA), A.R.I.A (100% Acea SpA) and Acea Reti e Servizi Energetici (100% Acea SpA).

ELECTRICITY – GENERATION	unit of measurement	2010	2011	2012	Δ % 2012/2011
Summarized figures					
Total gross electricity produced (1) = (3+11+16)	GWh	822.65	544.35	651.76	19.7
Total net electricity produced (2) = (10+15+18)	GWh	767.57	504.19	604.59	19.9
<i>From fossil sources (thermoelectric) (5+0,49x12_{San Vittore})</i>	<i>GWh</i>	<i>218.42</i>	<i>95.66</i>	<i>119.94</i>	<i>25.4</i>
<i>From renewable sources (hydroelectric, solar, biodegradable fraction of waste) (4+0,51x12_{San Vittore}+16)</i>	<i>GWh</i>	<i>604.23</i>	<i>448.69</i>	<i>532.54</i>	<i>18.7</i>
Acea Produzione (100% Acea)					
Total gross electricity produced (3) = (4+5)	GWh	678.85	343.36	373.09	8.7
Total gross hydroelectric energy (4)	GWh	499.71	320.92	360.80	12.4
<i>A. Volta Castel Madama</i>	<i>GWh</i>	<i>30.26</i>	<i>23.48</i>	<i>15.55</i>	<i>-33.8</i>
<i>G. Ferraris Mandela</i>	<i>GWh</i>	<i>22.91</i>	<i>15.31</i>	<i>10.26</i>	<i>-33.0</i>
<i>G. Marconi Orte</i>	<i>GWh</i>	<i>80.06</i>	<i>67.24</i>	<i>48.07</i>	<i>-28.5</i>
<i>Sant'Angelo</i>	<i>GWh</i>	<i>185.56</i>	<i>153.72</i>	<i>108.77</i>	<i>-29.2</i>
<i>Salisano</i>	<i>GWh</i>	<i>179.04</i>	<i>58.24</i>	<i>175.94</i>	<i>202.1</i>
<i>Other minor plants</i>	<i>GWh</i>	<i>1.89</i>	<i>2.93</i>	<i>2.21</i>	<i>-24.6</i>
Total gross thermoelectric energy (5)	GWh	179.14	22.44	12.29	-45.2
<i>From gas oil</i>					
<i>Montemartini Plant (*)</i>	<i>GWh</i>	<i>2.81</i>	<i>4.68</i>	<i>1.94</i>	<i>-58.5</i>
<i>From natural gas</i>					
<i>Tor di Valle combined cycle</i>	<i>GWh</i>	<i>166.00</i>	<i>9.71</i>	<i>1.09</i>	<i>-88.8</i>
<i>Tor di Valle co-generation plant</i>	<i>GWh</i>	<i>10.33</i>	<i>8.05</i>	<i>9.25</i>	<i>14.9</i>
Total electricity losses (6) = (7+8+9)	GWh	40.47	16.34	13.29	-18.7
<i>Internal consumption - hydroelectric plants (7)</i>	<i>GWh</i>	<i>2.28</i>	<i>2.17</i>	<i>2.49</i>	<i>14.7</i>
<i>Internal consumption - heat plants (Tor di Valle, Montemartini) (8)</i>	<i>GWh</i>	<i>12.21</i>	<i>7.51</i>	<i>6.04</i>	<i>-19.6</i>
<i>Initial transformation losses (9)</i>	<i>GWh</i>	<i>25.98</i>	<i>6.66</i>	<i>4.76</i>	<i>-28.5</i>
Total net electricity produced by Acea Produzione (10) = (3-6)	GWh	638.38	327.01	359.80	10.0
A.R.I.A. (waste-to-energy) (100% Acea)					
Total gross energy produced (11) = (12+13)	GWh	125.64	149.43	218.24	46.0
<i>San Vittore del Lazio plant (12)</i>	<i>GWh</i>	<i>80.17</i>	<i>149.43</i>	<i>218.24</i>	<i>46.0</i>
<i>Terni plant (13) (**)</i>	<i>GWh</i>	<i>45.47</i>	<i>n.a.</i>	<i>n.a.</i>	<i>-</i>
Total electricity losses (14)	GWh	14.41	21.34	29.59	38.7
<i>San Vittore del Lazio internal consumption</i>	<i>GWh</i>	<i>9.57</i>	<i>21.34</i>	<i>29.59</i>	<i>38.7</i>
<i>Terni internal consumption</i>	<i>GWh</i>	<i>4.84</i>	<i>n.a.</i>	<i>n.a.</i>	<i>-</i>
Total net electricity produced (15) = (11-14)	GWh	111.23	128.09	188.65	47.3

ELECTRICITY – GENERATION	unit of measurement	2010	2011	2012	Δ % 2012/2011
Acea Reti e Servizi Energetici (100% Acea)					
Gross photovoltaic energy (16)	GWh	18.16	51.56	60.43	17.2
Total electricity losses (17)	GWh	0.19	2.46	4.29	74.4
Net photovoltaic energy (18) = (16-17)	GWh	17.97	49.10	56.14	14.3

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

(**) As from August 9th 2010, the Terni plant was shutdown for revamping work, still underway in 2012.

THERMAL ENERGY – GENERATION	unit of measurement	2010	2011	2012	Δ % 2012/2011
Acea Produzione (100% Acea)					
Gross thermal energy produced Tor di Valle plant (19)	GWh_t	84.77	84.64	87.96	3.9
Total thermal electricity losses (20)	GWh _t	21.65	16.40	11.62	-29.1
<i>Distribution losses</i>	GWh _t	18.76	13.90	9.35	-32.7
<i>Production losses</i>	GWh _t	2.89	2.50	2.27	-9.2
Net thermal energy sold (21) = (19-20)	GWh_t	63.12	68.24	76.34	11.9

ELECTRICITY – TRANSPORT AND SALE	unit of measurement	2010	2011	2012	Δ % 2012/2011
to Rome and Formello - Summarized figures					
Supply from Acea Group (22)	GWh	1.57	2.93	2.18	-25.6
Electricity from the market (23)	GWh	11,899.15	11,869.00	11,861.09	-0.1
<i>from Sole Buyer</i>	GWh	4,093.54	3,493.75	3,327.25	-4.8
<i>from imports</i>	GWh	432.38	432.38	433.56	0.3
<i>from third party producers interconnected to the Acea Distribuzione network (*)</i>	GWh	25.06	20.14	0.00	-
<i>from wholesalers + other producers</i>	GWh	7,348.17	7,922.74	8,100.28	2.2
Electricity demand on the network (24) = (22+23) = (25+26+27+28+29)	GWh	11,900.72	11,871.93	11,863.27	-0.1
Distribution, transport and commercial losses (25)	GWh	717.57 6.03% of (24)	733.10 6.18% of (24)	757.12 6.38% of (24)	3.3
Internal transmission and distribution (26)	GWh	30.55	27.90	30.61	9.7
Net electricity sold to third parties (27)	GWh	2.85	2.86	2.54	-11.2
Net electricity conveyed by Acea to free market customer (28)	GWh	6,935.05	7,461.57	7,636.13	2.3
<i>Net electricity sold by Acea Elettricità to free market customers on Acea Distribuzione network</i>	GWh	3,745.02	3,974.33	4,627.90	16.4
<i>Net electricity sold by Other Sellers to free market customers on Acea Distribuzione network</i>	GWh	3,190.03	3,487.24	3,008.23	-13.7
Electricity sold to protected customers (29)	GWh	4,214.70	3,646.50	3,436.87	-5.7

ELECTRICITY – TRANSPORT AND SALE	unit of measurement	2010	2011	2012	Δ % 2012/2011
Sale in Italy - Summarized figures					
Net electricity sold by Acea on the free market - including sale on Rome (30)	GWh	15,400	12,891	9,960	-22.7
<i>Acea Elettricità</i>	<i>GWh</i>	<i>12,400</i>	<i>10,139</i>	<i>9,050</i>	<i>-10.7</i>
<i>Other investee companies</i>	<i>GWh</i>	<i>3,000</i>	<i>2,752</i>	<i>910</i>	<i>-66.9</i>
Net electricity sold by Acea in Italy (free market + protected customers) (29+30)	GWh	19,615	16,537	13,397	-19.0

(* In 2012 a thermoelectric production plant located at Malagrotta was temporarily suspended. In 2011 it produced 20.14 GWh.

PUBLIC LIGHTING	unit of measurement	2010	2011	2012	Δ % 2012/2011
Lighting flux in Rome (31)	Mlumen	2,925	3,057	3,148	3.0

MONITORING AND GAUGING	unit of measurement	2010	2011	2012	Δ % 2012/2011
Monitoring and gauging activities (32)	No.	373	339	488	44.0
<i>Electromagnetic field measures</i>	<i>No.</i>	<i>31</i>	<i>7</i>	<i>42</i>	<i>500.0</i>
<i>Noise monitoring</i>	<i>No.</i>	<i>7</i>	<i>3</i>	<i>39</i>	<i>1,200.0</i>
<i>Chemical analysis of PCB</i>	<i>No.</i>	<i>50</i>	<i>103</i>	<i>151</i>	<i>46.6</i>
<i>Waste classification</i>	<i>No.</i>	<i>40</i>	<i>13</i>	<i>16</i>	<i>23.1</i>
<i>Transformer diagnostics</i>	<i>No.</i>	<i>231</i>	<i>196</i>	<i>213</i>	<i>8.7</i>
<i>Other</i>	<i>No.</i>	<i>14</i>	<i>17</i>	<i>27</i>	<i>58.8</i>

The products - Environment

Data refer to the companies Kyklos and Solemme, both in Aquaser Srl (100% Acea SpA)

PRODUCTION OF COMPOST	unit of measurement	2010	2011	2012	Δ % 2012/2011
High Quality Compost (32A)	t	10,077.26	19,473.92	11,652.66	-40.2
<i>Kyklos</i>	<i>t</i>	<i>7,320.42</i>	<i>16,438.22</i>	<i>9,295.66</i>	<i>-43.5</i>
<i>Solemme</i>	<i>t</i>	<i>2,756.84</i>	<i>3,035.70</i>	<i>2,357.00</i>	<i>-22.4</i>

The products - Water

Summarized water figures include the main water companies in the Acea Group - Acea Ato 2, Acea Ato 5, Gori, Acque, Publiacqua, Acquedotto del Fiora and Umbra Acque, calculated at 100%. This in consideration of the role of industrial entity responsible for management, covered by Acea in the shareholding structures of the service providers.

GROUP WATER BALANCE IN ITALY	unit of measurement	2010	2011	2012	Δ % 2012/2011
Summarized figures					
Total drinking water withdrawn from the environment or from other systems (33)	Mm³	1,383.9	1,401.5	1,399.1	-0.2
Total drinking water introduced onto the network (34)	Mm³	1,251.5	1,254.6	1,263.0	0.7
Total drinking water supplied (35)	Mm³	672.0	668.7	655.7	-1.9

WATER BALANCE OF THE COMPANIES OPERATING IN THE REGIONS OF LAZIO AND CAMPANIA	unit of measurement	2010	2011	2012	Δ % 2012/2011
Acea Ato 2 for Rome historic network					
Drinking water withdrawn from the environment (36)	Mm³	594.0	612.8	609.8	-0.5
<i>from Lake Bracciano, treated</i>	<i>Mm³</i>	<i>2.1</i>	<i>13.9</i>	<i>21.9</i>	<i>57.6</i>
<i>from wells</i>	<i>Mm³</i>	<i>8.9</i>	<i>16.2</i>	<i>27.2</i>	<i>67.9</i>
<i>from springs</i>	<i>Mm³</i>	<i>583.0</i>	<i>582.6</i>	<i>560.7</i>	<i>-3.8</i>
Drinking water sold to municipal retailers (37)	Mm ³	73.7	89.8	92.4	2.9
Drinking water introduced onto non-drinking water network (38)	Mm ³	17.7	14.8	16.1	8.8
Drinking water returned to the environment /technical operating volumes (39)	Mm ³	32.8	37.4	28.5	-23.8
Drinking water introduced onto the Rome historic network (40) = (36) - (37+38+39)	Mm³	469.8	470.8	472.7	0.4
Drinking water supplied via the Rome historic network (41)	Mm³	300.4	300.3	298.0	-0.8
Assessment of losses according to Italian Ministerial Decree No. 99/97					
Overall losses (parameter A17 MD 99/97) (42)	Mm ³	154.0	155.1	159.3	2.7
Effective losses (parameter A15 MD 99/97) (43)	Mm ³	116.4	117.5	122.1	3.8
		24.8% of (40)	25.0% of (40)	25.8% of (40)	

**WATER BALANCE OF THE COMPANIES OPERATING
IN THE REGIONS OF LAZIO AND CAMPANIA**
Water balance - Rome non-drinking water network

	unit of measurement	2010	2011	2012	Δ % 2012/2011
Non-drinking water withdrawn from the environment (44)	Mm³	24.8	23.7	29.7	25.3
<i>from the River Tiber, treated (Grottarossa plant)</i>	<i>Mm³</i>	<i>0.2</i>	<i>0.0</i>	<i>4.7</i>	<i>-</i>
<i>from springs</i>	<i>Mm³</i>	<i>6.1</i>	<i>8.9</i>	<i>8.9</i>	<i>0.0</i>
<i>drinking water introduced onto non-drinking network</i>	<i>Mm³</i>	<i>18.5</i>	<i>14.8</i>	<i>16.1</i>	<i>8.8</i>
Non-drinking water supplied to the Municipality of Rome (45)	Mm³	14.5	13.8	14.1	2.2
Non-drinking water supplied to other Municipalities (46)	Mm³	0.03	0.03	0.03	0.0

Acea Ato 2 for ATO 2 – Central Lazio (Rome + 73 municipalities acquired as of 31 Dec. 2012)

Drinking water withdrawn from the environment (47)	Mm³	701.5	718.1	715.4	-0.4
<i>from Lake Bracciano, treated</i>	<i>Mm³</i>	<i>2.1</i>	<i>13.9</i>	<i>21.9</i>	<i>57.6</i>
<i>from wells</i>	<i>Mm³</i>	<i>69.6</i>	<i>76.9</i>	<i>89.6</i>	<i>16.5</i>
<i>from springs</i>	<i>Mm³</i>	<i>628.1</i>	<i>625.6</i>	<i>602.3</i>	<i>-3.7</i>
<i>from other aqueduct systems</i>	<i>Mm³</i>	<i>1.7</i>	<i>1.6</i>	<i>1.6</i>	<i>0.0</i>
Drinking water sold to municipal retailers (48)	Mm ³	53.2	64.5	68.2	5.7
Drinking water introduced onto non-drinking water network (49)	Mm ³	17.7	14.8	16.1	8.8
Drinking water returned to the environment /technical operating volumes (50)	Mm ³	34.1	40.1	28.50	-28.9
Drinking water introduced onto the ATO 2 network (51) = (47) - (48+49+50)	Mm³	596.6	598.7	602.5	0.6
Total drinking water supplied to the ATO 2 network (52)	Mm³	358.9	359.6	349.7	-2.8
Assessment of losses according to Italian Ministerial Decree No. 99/97					
Overall losses (parameter A17 MD 99/97) (53)	Mm ³	215.4	216.6	229.5	6.0
Effective losses (parameter A15 MD 99/97) (54)	Mm ³	160.2	161.2	177.6	10.2
		26.9% of (51)	26.9% of (51)	29.5% of (51)	

Acea Ato 5 for ATO 5 –Southern Lazio - Frosinone (85 municipalities)

Drinking water withdrawn from the environment (55)	Mm³	103.9	103.9	98.8	-4.9
<i>from lakes/rivers</i>	<i>Mm³</i>	<i>0</i>	<i>0</i>	<i>0.0</i>	
<i>from wells</i>	<i>Mm³</i>	<i>73.8</i>	<i>73.8</i>	<i>68.6</i>	<i>-7.0</i>
<i>from springs</i>	<i>Mm³</i>	<i>30.1</i>	<i>30.1</i>	<i>30.2</i>	<i>0.3</i>
Drinking water introduced onto network (56)	Mm³	93.8	93.5	93.7	0.2
Drinking water supplied (57)	Mm³	21.3	20.4	20.7	1.5
Assessment of losses according to Italian Ministerial Decree No. 99/97					
Overall losses (parameter A17 MD 99/97) (58)	Mm ³	70.00	70.50	70.41	-0.1
Effective losses (parameter A15 MD 99/97) (59)	Mm ³	56.00	56.80	56.60	-0.4
		59.7% of (56)	60.7% of (56)	60.4% of (56)	

Gori for ATO 3 - Sarnese Vesuviano (76 municipalities)

Drinking water withdrawn from the environment (60)	Mm³	40.07	41.17	38.83	-5.7
<i>from lakes/rivers</i>	<i>Mm³</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>-</i>
<i>from wells</i>	<i>Mm³</i>	<i>36.55</i>	<i>38.56</i>	<i>36.19</i>	<i>-6.1</i>
<i>from springs</i>	<i>Mm³</i>	<i>3.52</i>	<i>2.61</i>	<i>2.64</i>	<i>1.1</i>
Water withdrawn from other aqueduct systems (61)	Mm³	169.2	170.4	175.8	3.2
Drinking water introduced onto the network (62) = (60) + (61)	Mm³	209.3	211.57	214.63	1.4
Drinking water supplied (63)	Mm³	93.95	91.12	91.12	0.0
Assessment of losses according to Italian Ministerial Decree No. 99/97					
Overall losses (parameter A17 MD 99/97) (64)	Mm ³	114.28	119.33	123.49	3.5
Effective losses (parameter A15 MD 99/97) (65)	Mm ³	92.97	94.62	94.62	0.0
		44.4% of (62)	44.7% of (62)	44.1% of (62)	

WATER BALANCE OF THE COMPANIES OPERATING IN THE REGIONS OF TUSCANY AND UMBRIA	unit of measurement	2010	2011	2012	Δ % 2012/2011
Publiacqua per ATO 3 – Medio Valdarno (52 comuni)					
Drinking water withdrawn from the environment (66)	Mm³	166.2	163.6	167.6	2.4
<i>from lakes/rivers</i>	<i>Mm³</i>	109.80	108.1	110.7	2.4
<i>from wells</i>	<i>Mm³</i>	44.1	43.6	44.6	2.3
<i>from springs</i>	<i>Mm³</i>	12.3	11.9	12.2	2.5
Drinking water introduced onto the network (67)	Mm³	151.0	148.8	151.6	1.9
Drinking water supplied (68)	Mm³	86.0	86.0	86.0	0.0
Assessment of losses according to Italian Ministerial Decree No. 99/97					
Overall losses (parameter A17 MD 99/97) (69)	Mm ³	57.0	55.0	57.4	4.4
					4.5
Effective losses (parameter A15 MD 99/97) (70)	Mm ³	46.6	44.5	46.5	
		30.9% of (67)	29.9% of (67)	30.7% of (67)	
Acque for ATO 2 – Basso Valdarno (57 municipalities)					
Drinking water withdrawn from the environment (71)	Mm³	75.38	76.98	74.55	3.2
<i>from lakes/rivers</i>	<i>Mm³</i>	3.26	3.32	3.63	9.3
<i>from wells</i>	<i>Mm³</i>	65.26	66.90	65.53	-2.0
<i>from springs</i>	<i>Mm³</i>	6.85	6.76	5.39	-20.3
Water withdrawn from other aqueduct systems (72)	Mm³	6.65	5.98	6.09	1.8
Drinking water introduced onto the network (73)	Mm³	82.02	82.96	80.63	-2.8
Drinking water supplied (74)	Mm³	49.48	49.48	45.70	-7.6
Assessment of losses according to Italian Ministerial Decree No. 99/97					
Overall losses (parameter A17 MD 99/97) (75)	Mm ³	27.52	27.55	26.61	-3.4
Effective losses (parameter A15 MD 99/97) (76)	Mm ³	18.83	18.79	18.08	-3.8
		23.0% of (73)	22.6% of (73)	22.4% of (73)	
Acquedotto del Fiora for ATO 6 – Ombrone (56 municipalities)					
Drinking water withdrawn from the environment (77)	Mm³	61.86	62.43	62.75	0.51
<i>from lakes/rivers</i>	<i>Mm³</i>	0.85	0.85	n.d.	-
<i>from wells</i>	<i>Mm³</i>	21.97	21.97	n.d.	-
<i>from springs</i>	<i>Mm³</i>	39.04	39.04	n.d.	-
Drinking water introduced onto the network (78)	Mm³	59.89	60.33	60.93	1.0
Drinking water supplied (79)	Mm³	31.45	31.45	31.4	-0.2
Assessment of losses according to Italian Ministerial Decree No. 99/97					
Overall losses (parameter A17 MD 99/97) (80)	Mm ³	27.84	28.18	n.d.	-
Effective losses (parameter A15 MD 99/97) (81)	Mm ³	22.76	22.85	n.d.	-
		38.0% of (78)	37.8% of (78)		
Umbra Acque for ATOs 1 and 2 – Umbria (38 municipalities)					
Drinking water withdrawn from the environment (82)	Mm³	59.15	58.96	59.30	0.6
<i>from lakes/rivers</i>	<i>Mm³</i>	0.77	0.98	1.18	20.4
<i>from wells</i>	<i>Mm³</i>	44.35	44.62	45.27	1.5
<i>from springs</i>	<i>Mm³</i>	14.03	13.36	12.85	-3.8
Drinking water introduced onto the network (83)	Mm³	58.91	58.72	59.07	0.6
Drinking water supplied (84)	Mm³	30.91	30.63	31.09	1.5
Assessment of losses according to Italian Ministerial Decree No. 99/97					
Overall losses (parameter A17 MD 99/97) (85)	Mm ³	23.68	23.90	23.50	-1.7
Effective losses (parameter A15 MD 99/97) (86)	Mm ³	22.08	22.30	21.9	-1.8
		(37.5% of 83)	(37.9% of 83)	(37.1% of 83)	

TOTAL WASTE WATER TREATED BY THE GROUP COMPANIES, IN ITALY	unit of measurement	2010	2011	2012	Δ % 2012/2011
Waste water treated in main purification plants of the Group companies in Italy (87)	Mm³	929.0	935.6	851.9	-8.9

WASTE WATER TREATED BY ACEA ATO 2	unit of measurement	2010	2011	2012	Δ % 2012/2011
Waste water treated in main purification plants (88)	Mm³	587.2	598.6	522.1	-12.8
<i>Rome South</i>	<i>Mm³</i>	<i>334.6</i>	<i>353.3</i>	<i>300.2</i>	<i>-15.0</i>
<i>Rome North</i>	<i>Mm³</i>	<i>112.4</i>	<i>104.7</i>	<i>96.7</i>	<i>-7.6</i>
<i>Rome East</i>	<i>Mm³</i>	<i>98.9</i>	<i>100.2</i>	<i>87.8</i>	<i>-12.4</i>
<i>Rome Ostia</i>	<i>Mm³</i>	<i>27.8</i>	<i>26.7</i>	<i>24.5</i>	<i>-8.2</i>
<i>CoBIS</i>	<i>Mm³</i>	<i>7.8</i>	<i>7.9</i>	<i>7.4</i>	<i>-6.3</i>
<i>Fregene</i>	<i>Mm³</i>	<i>5.7</i>	<i>5.8</i>	<i>5.5</i>	<i>-5.2</i>
Other – municipality of Rome	Mm³	13.9	13.4	14.4	7.5
Other – outside Municipality of Rome	Mm³	58.5	60.8	63.0	3.6
Total waste water treated by Acea Ato 2 (89)	Mm³	659.6	672.8	599.5	-10.9

ANALYTICAL CONTROLS ON DRINKING WATER AND WASTE WATER FOR ACEA GROUP IN ITALY	unit of measurement	2010	2011	2012	Δ % 2012/2011
Group total analytical checks on drinking water (90) (*)	No.	1,081,141	1,102,737	1,169,201	6.0
<i>Acea Ato 2</i>	<i>No.</i>	<i>330,269</i>	<i>337,529</i>	<i>328,202</i>	<i>-2.8</i>
<i>Acea Ato 5</i>	<i>No.</i>	<i>74,309</i>	<i>94,327</i>	<i>79,953</i>	<i>-15.2</i>
<i>Gori</i>	<i>No.</i>	<i>82,801</i>	<i>82,193</i>	<i>70,488</i>	<i>-14.2</i>
<i>Acque</i>	<i>No.</i>	<i>228,485</i>	<i>254,297</i>	<i>330,569</i>	<i>30.0</i>
<i>Publiacqua</i>	<i>No.</i>	<i>209,334</i>	<i>189,508</i>	<i>192,653</i>	<i>1.7</i>
<i>Acquedotto del Fiora</i>	<i>No.</i>	<i>61,001</i>	<i>65,007</i>	<i>87,079</i>	<i>34.0</i>
<i>Umbra Acque</i>	<i>No.</i>	<i>94,942</i>	<i>79,876</i>	<i>80,257</i>	<i>0.5</i>
Group total analytical checks on waste water (91)	No.	351,205	358,320	412,461	15.1
<i>Acea Ato 2</i>	<i>No.</i>	<i>98,150</i>	<i>95,527</i>	<i>122,231</i>	<i>28.0</i>
<i>Acea Ato 5</i>	<i>No.</i>	<i>28,383</i>	<i>17,786</i>	<i>23,816</i>	<i>33.9</i>
<i>Gori</i>	<i>No.</i>	<i>15,979</i>	<i>14,986</i>	<i>9,821</i>	<i>-34.5</i>
<i>Acque</i>	<i>No.</i>	<i>103,239</i>	<i>105,076</i>	<i>125,546</i>	<i>19.5</i>
<i>Publiacqua</i>	<i>No.</i>	<i>33,497</i>	<i>34,405</i>	<i>37,664</i>	<i>9.5</i>
<i>Acquedotto del Fiora</i>	<i>No.</i>	<i>31,699</i>	<i>42,902</i>	<i>48,259</i>	<i>12.5</i>
<i>Umbra Acque</i>	<i>No.</i>	<i>40,258</i>	<i>47,638</i>	<i>45,124</i>	<i>-5.3</i>

(*) the number includes the controls carried out independently by each Company, and those carried out by LaboratoRI in-house.

The resources used - Energy

The figures of the resources used refer to Acea Produzione (AP) (100% Acea SpA), A.R.I.A. (100% Acea SpA) and Acea Distribuzione (100% Acea SpA).

GENERATION, TRANSPORT AND SALE OF ELECTRICITY, HEAT AND PUBLIC LIGHTING	unit of measurement	2010	2011	2012	Δ % 2012/2011
Natural gas					
Electricity and heat generation (92) = (93+94)	Nm³ x 1,000	48,217	15,377	14,408	-6.3
Natural gas for thermoelectric and heat production AP (93)	Nm³ x 1,000	42,837	12,664	11,352	-10.4
<i>Tor di Valle reserve boilers - for district heating</i>	<i>Nm³ x 1,000</i>	<i>2,291</i>	<i>7,419</i>	<i>7,615</i>	<i>2.6</i>
<i>Tor di Valle co-generation plant</i>	<i>Nm³ x 1,000</i>	<i>3,873</i>	<i>2,956</i>	<i>3,328</i>	<i>12.6</i>
<i>Tor di Valle combined cycle</i>	<i>Nm³ x 1,000</i>	<i>36,673</i>	<i>2,289</i>	<i>408</i>	<i>-82.2</i>
Waste to energy (94)	Nm³ x 1,000	5,380	2,713	3,056	12.6
<i>San Vittore del Lazio waste-to-energy plant</i>	<i>Nm³ x 1,000</i>	<i>2,051</i>	<i>2,713</i>	<i>3,056</i>	<i>12.6</i>
<i>Terni waste-to-energy plant (*)</i>	<i>Nm³ x 1,000</i>	<i>3,329</i>	<i>n. a.</i>	<i>n. a.</i>	<i>-</i>
Gas oil for thermoelectric generation					
Montemartini Plant (95)	l x 1,000	1,097	1,815	758	-58.2
Waste derived fuel (WDF) burnt					
San Vittore del Lazio waste-to-energy plant (96)	t x 1,000	92.799	158.451	218.256	37.7
Pulper from paper industry waste burnt					
Impianto di termovalorizzazione di Terni (97) (*)	t x 1,000	54.925	n. a.	n. a.	-
Water					
Cooling of thermoelectric plants AP (98) = (147)	Mm³	34.70	6.69	0.80	-88.0
Offtake for hydroelectric production (99)	Mm³	4,381.64	3,400.50	2,740.50	-19.4
Process water (100)	Mm³	0.1392	0.1549	0.1380	-10.9
Domestic/sanitary uses (101)	Mm³	0.2198	0.2609	0.3776	44.7
Sundry materials					
Dielectric mineral oil (102)	t	6.0	28.0	24.2	-13.6
SF₆ (103)	t	0.52	0.62	0.44	-29
Replacement/recovery refrigerating fluids (HCFC type) (104)	t	0.05	0.22	0.02	-90.9
Sundry chemicals (105)	kg	440,370	3,611,579	4,765,055	31.9
<i>Acidity corrector</i>	<i>kg</i>	<i>2,860</i>	<i>7,200</i>	<i>2,340</i>	<i>-67.5</i>
<i>Deoxygenating substances</i>	<i>kg</i>	<i>3,080</i>	<i>660</i>	<i>0.0</i>	<i>-</i>
<i>Stabilizers and bio-dispersing agents</i>	<i>kg</i>	<i>20,200</i>	<i>2,700</i>	<i>1,300</i>	<i>-51.9</i>
<i>Sodium chloride</i>	<i>kg</i>	<i>80,000</i>	<i>76,500</i>	<i>78,000</i>	<i>2.0</i>
<i>Caustic soda</i>	<i>kg</i>	<i>119,630</i>	<i>109,080</i>	<i>71,990</i>	<i>-34.0</i>
<i>Sodium hypochlorite</i>	<i>kg</i>	<i>79,020</i>	<i>4,800</i>	<i>3,390</i>	<i>-29.4</i>
<i>Sodium bicarbonate</i>	<i>kg</i>	<i>0</i>	<i>2,910,380</i>	<i>3,982,720</i>	<i>36.8</i>
<i>Hydrochloric acid</i>	<i>kg</i>	<i>135,580</i>	<i>119,320</i>	<i>68,675</i>	<i>-42.4</i>
<i>Ammoniacal solution</i>	<i>kg</i>	<i>n.d.</i>	<i>380.939</i>	<i>556,640</i>	<i>46.1</i>
Oil and greases / lubricants	kg	6,461	10,576	4,986	-52.9
Electricity					
Consumed for electricity distribution (106) = (25)	GWh	717.57	733.10	757.12	3.3
Consumed for electricity generation (107) = (1)-(2)	GWh	55.07	40.16	47.17	17.5
Consumed for offices (50% of the electricity consumed by the Parent Company) (108)	GWh	5.16	5.21	5.20	-0.2
Other internal uses (109)	GWh	30.55	27.90	30.61	9.7
Total (110) = (106+107+108+109)	GWh	808.35	806.37	840.10	4.2
Public lighting					
Consumption for public lighting (111)	GWh	157.75	161.66	162.16	0.3

(*) Terni plant was shutdown for revamping work from August 2010.

The resources used - Environment

The figures of the resources used refer to Kyklos and Solemme both of Aquaser Srl (100% Acea SpA).

PRODUCTION OF COMPOST	unit of measurement	2010	2011	2012	Δ % 2012/2011
Sludges	t	7,554.72	14,369.46	16,249.88	13.1
<i>Kyklos</i>	<i>t</i>	<i>4,291.52</i>	<i>11,817.80</i>	<i>12,151.68</i>	<i>2.8</i>
<i>Solemme</i>	<i>t</i>	<i>3,263.20</i>	<i>2,551.66</i>	<i>4,098.20</i>	<i>60.6</i>
Green matter	t	10,649.70	7,696.28	6,236.96	-19.0
<i>Kyklos</i>	<i>t</i>	<i>6,658.96</i>	<i>5,468.26</i>	<i>4,522.86</i>	<i>-17.3</i>
<i>Solemme</i>	<i>t</i>	<i>3,990.74</i>	<i>2,228.02</i>	<i>1,714.10</i>	<i>-23.1</i>
Organic fraction from waste collection	t	43,037.72	37,286.06	37,023.91	-0.7
<i>Kyklos</i>	<i>t</i>	<i>43,037.72</i>	<i>37,286.06</i>	<i>37,023.91</i>	<i>-0.7</i>

The resources used - Water

The figures of the resources used refer to the main Group water companies: Acea Ato 2, Acea Ato 5, Gori, Acque, Pubblica, Acquedotto del Fiora and Umbra Acque.

COLLECTION, TRANSPORTATION AND DISTRIBUTION OF DRINKING AND NON-DRINKING WATER	unit of measurement	2010	2011	2012	Δ % 2012/2011
Sundry materials and natural resources					
Reagents for purification and disinfection (112)	t	12.222,1	11.213,7	11.585,67	3.3
Reagents used in chemical analyses (113)	t	1.30	1.30	1.7	30.8
Gas used in chemical analyses (114)	MNm³	3.08	3.11	3.13	0.6
Replacement/recovery refrigerating fluids (HCFC type) (115)	t	0.05	0.22	0.02	-90.9
Electricity					
Water pumping plants (116)	GWh	463.61	481.17	489.07	1.6
Offices /internal use (50% of energy consumed by the Parent Company) (117) = (108)	GWh	5.16	5.21	5.20	-0.2
Chemical laboratory (118)	GWh	1.16	1.14	1.25	9.6
Total electricity consumed (119) = (116+117+118)	GWh	469.93	487.52	495.52	1.6
Drinking water					
Domestic/sanitary uses (120)	Mm ³	0.84	0.87	1.36	56.3
Offices (50% of drinking water consumed by Parent Company) (121)	Mm ³	0.13	0.17	0.23	35.3
Total drinking water consumed (122) = (120+121)	Mm³	0.96	1.02	1.57	53.9

WASTE WATER TREATMENT	unit of measurement	2010	2011	2012	Δ % 2012/2011
Sundry materials and natural resources used					
Reagents used in waste water treatment (123)	t	6,544	8,430	9,897	17.4
<i>Polyelectrolytes used to dehydrate sludge</i>	<i>t</i>	<i>1,388</i>	<i>1,692</i>	<i>1,781</i>	<i>5.3</i>
<i>Sodium hypochlorite for final disinfection</i>	<i>t</i>	<i>3,763</i>	<i>3,794</i>	<i>3,201</i>	<i>-15.6</i>
<i>Ferric chloride used to dehydrate sludge</i>	<i>t</i>	<i>233</i>	<i>571</i>	<i>1,040</i>	<i>82.1</i>
<i>Lime, Formic acid, aluminium polychloride</i>	<i>t</i>	<i>270</i>	<i>338</i>	<i>1,889</i>	<i>458.9</i>
<i>Peracetic acid</i>	<i>t</i>	<i>–</i>	<i>1,720</i>	<i>1,739</i>	<i>1.1</i>
<i>Others (anti-foaming agents, etc.)</i>	<i>t</i>	<i>890</i>	<i>315</i>	<i>248</i>	<i>-21.3</i>
Mineral oil and grease (124)	t	8.83	2.05	1.1	-46.3
Electricity					
Sewage and purification systems (125)	GWh	299.1	296.3	297.0	0.2

Fuels used by the Group companies for automotive and heating purposes

The figures concerning the Vehicle Pool refer to the main Group companies: Acea Ato 2, Acea Ato 5, Acea Distribuzione, Acea Spa, Laboratori, Acea Reti e Servizi Energetici.

The figures concerning heating purposes refer to Acea SpA, Acea Ato 2, Acea Distribuzione and Acea Produzione.

FUEL TYPE	unit of measurement	2010	2011	2012	Δ % 2012/2011
Automotive (Group Vehicle Pool)					
Gasoline (126)	litres x 1,000	980.8	639.2	831.6	30.1
Diesel (127)	litres x 1,000	788.8	566.1	848.3	49.8
Heating					
Gas oil (128)	litres x 1,000	9.4	6.5	8.7	33.8
Natural gas (129)	Nm³ x 1,000	562.8	690.3	690.3	0.0
GPL (130)	litres x 1,000	18.2	23.2	24.5	5.6

Emissions and waste - Energy

The figures concerning emissions and waste refer to Acea Produzione (AP) (100% Acea SpA) and A.R.I.A. (100% Acea SpA).

EMISSIONS INTO THE ATMOSPHERE

	unit of measurement	2010	2011	2012	Δ % 2012/2011
CO₂ (131) = (132+133)	t	116.644	30.851	126.364	309,6
<i>Acea Produzione (132)</i>	<i>t</i>	<i>90.891</i>	<i>30.851</i>	<i>25.364</i>	<i>-17,8</i>
<i>A.R.I.A. (133)</i>	<i>t</i>	<i>25.753</i>	<i>n.a.</i>	<i>101.000</i>	<i>-</i>
NO_x (134) = (135+136)	t	217,89	95,79	96,76	1,0
<i>Acea Produzione (135)</i>	<i>t</i>	<i>85,24</i>	<i>62,26</i>	<i>51,34</i>	<i>-17,5</i>
<i>A.R.I.A. (136)</i>	<i>t</i>	<i>132,65</i>	<i>33,53</i>	<i>45,42</i>	<i>35,5</i>
CO (137) = (138+139)	t	16,54	6,74	10,12	50,2
<i>Acea Produzione (138)</i>	<i>t</i>	<i>11,72</i>	<i>3,23</i>	<i>4,16</i>	<i>28,8</i>
<i>A.R.I.A. (139)</i>	<i>t</i>	<i>4,82</i>	<i>3,51</i>	<i>5,96</i>	<i>69,8</i>
SO₂ (140) = (141+142)	t	6,70	0,69	0,04	-94,2
<i>Acea Produzione (141)</i>	<i>t</i>	<i>0,05</i>	<i>0,07</i>	<i>0,03</i>	<i>-57,1</i>
<i>A.R.I.A. (142)</i>	<i>t</i>	<i>6,65</i>	<i>0,64</i>	<i>0,01</i>	<i>-98,4</i>
Dust (143) = (144+145)	t	3,04	0,32	0,05	-84,4
<i>Acea Produzione (144)</i>	<i>t</i>	<i>0,06</i>	<i>0,09</i>	<i>0,04</i>	<i>-55,6</i>
<i>A.R.I.A. (145)</i>	<i>t</i>	<i>2,98</i>	<i>0,23</i>	<i>0,01</i>	<i>-95,7</i>

OTHER EMISSIONS AND WASTE

	unit of measurement	2010	2011	2012	Δ % 2012/2011
Waste water treated (146)	Mm³	0.007	0.001	0.0001	-90.0
Cooling water returned (147) = (98)	Mm³	34.695	6.694	0.803	-88.0
50 Hz electric fields	kV		Monitored		
			Commitment to keep within the legal limits		
50 Hz magnetic fields	μT		Monitored		
			Commitment to keep within the legal limits		
Noise	dB		Monitored		
			Commitment to keep within the legal limits		
Dispersed luminous flux	Mlumen		Commitment to design the plants in order to limit to the maximum the percentage of emissions dispersed towards the sky		

WASTE (ITALIAN LEGISLATIVE DECREE NO. 152/06)

	unit of measurement	2010	2011	2012	Δ % 2012/2011
Hazardous waste excluding waste-to-energy sector and Aquaser's waste (148)	t	579.9	604.3	665.57	10.1
<i>Energy sector production</i>	<i>t</i>	<i>577.7</i>	<i>598.0</i>	<i>663.50</i>	<i>11.0</i>
<i>Portion deriving from activities carried out by Parent Company (*)</i>	<i>t</i>	<i>2.2</i>	<i>6.3</i>	<i>2.1</i>	<i>-66.7</i>
Hazardous waste of A.R.I.A. (149)	t	8,991.0	23,122.5	39,354.0	70.2
Non-hazardous waste excluding waste-to-energy sector and Aquaser's waste (150)	t	1,109.5	1,071.9	1,316.5	22.8
<i>Energy sector production</i>	<i>t</i>	<i>1.093.9</i>	<i>1.062,2</i>	<i>1,303.3</i>	<i>22.7</i>
<i>Portion deriving from activities carried out by Parent Company (*)</i>	<i>t</i>	<i>15.6</i>	<i>9.7</i>	<i>13.2</i>	<i>36.1</i>
Non-hazardous waste of A.R.I.A. (151)	t	27.818,0	2.814,2	1.684,9	-40.1

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

Emissions and waste - Environment

The figures refer to Kyklos and Solemme both of Aquaser Srl (100% Acea SpA).

WASTE (ITALIAN LEGISLATIVE DECREE NO. 152/06)	unit of measurement	2010	2011	2012	Δ % 2012/2011
Hazardous waste of Kyklos + Solemme	t	12.2	1.5	1.6	8.8
Non-hazardous waste of Kyklos + Solemme	t	16,497.6	13,500.6	15,205.6	12.6

Emissions and waste - Water

The figures refer to the main water companies in the Acea Group: Acea Ato 2, Acea Ato 5, Gori, Acque, Publiacqua, Acquedotto del Fiora and Umbra Acque.

ACEA ATO 2	unit of measurement	2010	2011	2012	Δ % 2012/2011
Specific waste from waste water treatment					
Treatment sludge (152)	t	126,666	140,880	136,831	-2,9
Sand and sediment from treatment (153)	t	10,184	10,008	9,332	-6.8
Waste (Italian Legislative Decree No. 152/06)					
Hazardous waste (154)	t	188.2	55.5	55.6	0.2
<i>Own production in water sector</i>	<i>t</i>	<i>186.1</i>	<i>49.2</i>	<i>53.5</i>	<i>8.7</i>
<i>Portion deriving from activities carried out by Parent Company (*)</i>	<i>t</i>	<i>2.2</i>	<i>6.3</i>	<i>2.1</i>	<i>-66.7</i>
Non-hazardous waste (155)	t	4,175.4	1,674.9	1,046.0	-37.5
<i>Own production in water sector</i>	<i>t</i>	<i>3,284.3</i>	<i>1,188.3</i>	<i>325.1</i>	<i>-72.6</i>
<i>Portion deriving from activities carried out by Parent Company (*)</i>	<i>t</i>	<i>15.6</i>	<i>9.7</i>	<i>13.2</i>	<i>36.1</i>
<i>Inert material</i>	<i>t</i>	<i>875.6</i>	<i>477.0</i>	<i>707.7</i>	<i>48.4</i>
Other emissions and waste					
Noise	dB	Monitored Commitment to keep within the legal limits			
Smells		Monitored Commitment to keep within the limit of perception in areas nearby treatment plants			

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

OTHER WATER COMPANIES (*)	unit of measurement	2010	2011	2012	Δ % 2012/2011
Specific waste from waste water treatment					
Treatment sludge (156)	t	130,827	129,337	144,047	11.4
Sand and sediment (157)	t	7,557	6,652	6,835	2.8
Waste (Italian Legislative Decree No. 152/06)					
Hazardous waste (158)	t	201,0	247,9	100.6	-59.4
Non-hazardous waste (159)	t	61,084.1	48,538.4	77,426.3	59.5

(*) 2012 waste figures are estimated. Data from previous years are annually confirmed or rectified.

Emissions from vehicles and air-conditioning

The figures concerning the Car Pool refer to the main companies of the Group: Acea Ato 2, Acea Ato 5, Acea Distribuzione, Acea Spa, Laboratori, Acea Reti e Servizi Energetici.

The figures concerning heating purposes refer to Acea SpA, Acea Ato 2, Acea Distribuzione and Acea Produzione.

GROUP COMPANIES	unit of measurement	2010	2011	2012	Δ % 2012/2011
Vehicles					
CO ₂ (160)	t	4,871	2,699	3,993	47.9
NO _x (161)	t	8.4	4.8	7.9	64.6
CO (162)	t	50.8	28.0	39.5	41.1
SO ₂ (163)	t	n.d.	n.d.	n.d.	-
Heating					
CO ₂ (164)	t	1,425	1,758	1,766	0.5

Environmental sustainability performance – Energy

Key environmental performance indicators (Key Performance Indicators).

INDICATOR	unit of measurement	2010	2011	2012
ENERGY USED IN PROCESSES				
A Consumption for electricity distribution	TJoules (GWh)	1,491.1 (414.2))	1,692.4 (470.1)	1,377.4 (382.6)
B Consumption for electricity production (item 107)	TJoules (GWh)	198.4 (55.1)	144.7 (40.2)	169.8 (47.17)
C Heat loss on district heating network (item 20)	TJoules (GWh)	77.8 (21.6)	59.0 (16.4)	41.8 (11.6)
D Consumption for public lighting (item 111)	TJoules (GWh)	567.9 (157.7)	582.0 (161.7)	583.9 (162.2)
E Water distribution (item 119 – 117)	TJoules (GWh)	1,673.3 (464.8)	1,736.3 (482.3)	1,765.1 (490.3)
F Waste water treatment (item 125)	TJoules (GWh)	1,086.84 (301.9)	1,066.7 (296.3)	1,069.2 (297.0)
G Electricity for offices (item 108 + 117)	TJoules (GWh)	37.2 (10.3)	37.4 (10.4)	37.4 (10.4)
H Consumption for office heating	TJoules (GWh)	20.1 (5.6)	24.5 (6.8)	24.6 (6.8)
I Vehicles (item 126 + 127)	TJoules (GWh)	59.3 (16.5)	40.4 (11.2)	56.5 (15.7)
Indirect consumption + consumption from vehicles + heating	TJoules (GWh)	5,211.9 (1,447.7)	5,383.4 (1,495.4)	5,125.6 (1,423.8)
L - Energy losses when converting from primary sources to electricity	TJoules (GWh)	2,508.1 (696.7)	2,237.15 (621.43)	2,884.6 (801.3)
Total energy use (sum A : L)	TJoules (GWh)	7,720.0 (2,144.4)	7,620.5 (2,116.8)	8,010.1 (2,225.1)
EMISSIONS, EFFLUENT, AND WASTE				
Greenhouse gas emissions (CO₂) (item 131) + (item 160) + (item 164)	t	122,940	35,308	132,123
Emissions of SO₂, NO_x and other significant gases by type				
NO_x (item 134) + (item 161)	t	226.30	100.59	104.66
CO (item 137) + (item 162)	t	67.34	34.73	49.62
SO₂ (item 140) + (item 163)	t	6.70	0.71	0.04
Acea Produzione emission/production indicators (*)				
NO_x/thermoelectric production	g/kWh	0.48	2.78	n.a
CO/thermoelectric production	g/kWh	0.07	0.14	n.a
CO₂/thermoelectric production	g/kWh	507	1,375	n.a
CO₂/total gross production	g/kWh	134	90	n.a
SO₂/thermoelectric production	g/kWh	0.00028	0.00312	n.a
Indicatori di emissione/produzione Acea (Acea Produzione e A.R.I.A.)				
NO_x/thermoelectric production	g/kWh	0.87	0.99	0.80
CO₂/thermoelectric production	g/kWh	333	180	548
CO₂/total gross production	g/kWh	141.8	56.7	193.9
SO₂/thermoelectric production	g/kWh	0.0	0.0	0.0

(*) having registered a very low level of thermoelectric production in 2012 at Tor Di Valle combined cycle plant, the emission indicators are not sufficiently representative.

INDICATOR	unit of measurement	2010	2011	2012
PRODUCTS AND SERVICES: ELECTRICITY				
Electricity production process efficiency (solely Acea Produzione figures) (*)				
Gross average efficiency of thermoelectric production (calculation 1)	%	40.8	30.8	26.3
Tor di Valle plant (combined cycle)	%	42.8	40.69	25.2
Tor di Valle plant (co-generation – solely electricity efficiency)	%	25.3	25.9	26.5
Montemartini plant	%	25.9	26.1	26.0
Gross average efficiency of thermoelectric production including recovered thermal energy (calculation 2)	%	43.9	46.1	55.3
Gross average efficiency of hydroelectric production (calculation 3)	%	84.8	84.3	82.7
Gross average efficiency of total production (calculation 4)	%	73.2	80.8	80.8
Gross average efficiency of total production including recovered heat (calculation 5)	%	84.1	82.9	81.8
Electricity generation process efficiency – Waste to energy plants				
San Vittore del Lazio plant				
Gross efficiency of WTE conversion in electricity (calculation 6)	kWh /kg CDR	0.86	0.94	1.00
Electric net efficiency (calculation 7)	%	20.7	22.6	24.0
Terni plant				
Gross efficiency of Pulper conversion in electricity (calculation 8)	kWh /kg pulper	0.83	n.a.	n.a.
Electric net efficiency (calculation 9)	%	17.4	n.a.	n.a.
Electricity generation process efficiency – photovoltaic plants				
Average efficiency of photovoltaic units	%	n.d.	14.0	14.0
Other indicators (surroundings, public lighting, controls, water leaks)				
Specific production of waste	g/kWh	0.40	0.46	0.58
Protection of the surrounding areas (total length of HV lines in cables / length of overhead HV lines) x 100	%	64.78	64.78	64.78
Public lighting flux efficiency (item 31) / (item 111)	Lumen/kWh	18.5	18.9	19.4
Average efficiency of installed lamps (item 31 / wattage)	Lumen/W	78.6 (37,200 kW)	79.8 (38,300 kW)	80.5 (39,000 kW)
Specific consumption per lighting unit (item 111/No. of lighting units)	kWh/lighting unit (No. lighting units x year)	899.6 (175,352)	888.3 (181,991)	870.7 (186,238)
No. of operating and laboratory checks /GWh net electricity sold (item 32) / (item 29)	n./GWh	0.09	0.09	0.14
Total electricity losses (item 25) / (item 24)	% energy requested	6.0	6.2	6.4
- internal consumption				
- initial transformation				
- transport				
- technical and commercial				

(*) The thermoelectricity generation efficiencies, calculated using computation as described before the explanatory notes at the end of the document, are strongly affected by the low level of production recorded in 2012 at the combined cycle power plant of Tor di Valle. Such calculations therefore have to be evaluated cautiously because not complying with typical values of the plant technologies used.

Environmental sustainability performance – Water

Key environmental performance indicators (Key Performance Indicators).

INDICATOR	unit of measurement	2010	2011	2012
Carbon footprint				
WATER SERVICE IN ITALY				
Total CO ₂ /m ³ of water supplied (integrated water service) (*)	kgCO ₂ /m ³	0.60	0.61	0.63
CO ₂ /m ³ of water supplied (distribution process)	kgCO ₂ /m ³	0.36	0.38	0.39
CO ₂ /m ³ of treated water (treatment process)	kgCO ₂ /m ³	0.17	0.16	0.18
DRINKING WATER SERVICE				
(Assessment parameters as per Italian Ministerial Decree No. 99/97)				
Acea Ato 2 network				
Primary efficiency (R1): (item 52) / (item 51)	%	60.2	60.1	58.04
Efficiency at consumption level (R2): (item 52 + A 11) / (item 51) A11 = 2,2% of (item 52)	%	61.5	61.4	58.1
Net efficiency (R3): (item 52 + A 11 + A 12) / (item 51) A12 = 2,0% of (item 51)	%	63.9	63.8	58.2
"Historic" network (Rome + Fiumicino)				
Primary efficiency (R1): "historic" network (item 41) / (item 40)	%	63.9	63.8	63.0
Efficiency at consumption level (R2): (item 41 + A 11) / (item 40) A11 = 2,0% of (item 41)	%	65.2	65.1	63.2
Net efficiency (R3): (item 41 + A 11 + A 12) / (item 40) A12 = around 2,0% of (item 40)	%	67.2	67.1	63.3
PRODUCT: DRINKING WATER				
Acea Ato 2 network				
Linear index of overall drinking water losses (as per MD No. 99/97) (item 53) / (km network) (**)	Mm ³ /1,000 km	20.8 (10,367.1 km)	20.7 (10,444.9 km)	21.8 (10,508.5 km)
Linear index of effective distribution losses (as per MD No. 99/97) Ato 2 network (item 54)/(km network) (**)	Mm ³ /1,000 km	15.5 (10,367.1 km)	15.4 (10,444.9 km)	16.9 (10,508.5 km)
Specific electricity consumption for water network (Ato 2 energy network consumption)/(item 51)	kWh/m ³	0.204	0.221	0.259
No. of checks on drinking water distributed (item 91- drinking water Ato 2)/(item 51)	n./Mm ³	554	564	545
Drinking water additive process index (item 112 - only Acea Ato 2 network) / (item 51)	g/m ³	1.9	1.9	2.8
"Historic" network (Rome + Fiumicino)				
Linear index of overall drinking water losses (as per MD No. 99/97: A 17 / km network) (item 42) / (km network) (**)	Mm ³ /1,000 km	21.7 (7,098.5 km)	21.7 (7,161.7 km)	22.1 (7,207.3 km)
Indice lineare delle perdite reali acqua potabile (as per MD No. 99/97: A15 / km network) (item 43) / (km network) (**)	Mm ³ /1,000 km	16.4 (7,098.5 km)	16.4 (7,161.7 km)	16.9 (7,207.3 km)

INDICATOR	unit of measurement	2010	2011	2012
SERVICE: WASTE WATER TREATMENT				
Total sludge disposed of (152)	t	126,666	140,880	136,831
Sand and sediment removed (153)	t	10,184	10,008	9,332
COD removed	t	126,029	149,055	133,210
Total Suspended Solids (TSS) removed	t	90,831	86,202	69,657
Additive process index	g/m ³	7.60	9.81	10.44
Specific electricity consumption for treatment process	kWh/m ³	0.245	0.237	0.273
Intensity of checks on waste water	n./Mm ³	148.8	140.5	195.9
COMPLIANCE				
Penalty paid for non-compliance with environmental regulations/agreements	euro	228,406	473,731	544,132

(*) "Scope 2" emissions, arising from electricity consumption of the Group.

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



Description of the calculations used to determine electricity generation efficiency

CALCULATION 1

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

where:

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

$$\text{Energy}_{\text{diesel oil}} \text{ (kWh)} = \frac{\text{diesel oil (l)} \cdot 0.835 \cdot \text{NCV}_d \text{ (kcal/kg)}}{860 \text{ (kcal/kWh)}} \quad \text{Energy equivalent to diesel oil consumed (95)}$$

$$\text{Energy}_{\text{natural gas}} \text{ (kWh)} = \frac{\text{natural gas (Nm}^3\text{)} \cdot \text{NCV}_m \text{ (kcal/Nm}^3\text{)}}{860 \text{ (kcal/kWh)}} \quad \text{Energy equivalent to natural gas consumed (93)}$$

NCV_m = 8,500 kcal/Nm³ (net calorific value of natural gas)

NCV_d = 10,000 kcal/kg (net calorific value of diesel oil)

860 = energy conversion factor from kcal to kWh

0.835 = specific weight of diesel oil (kg/l)

NB: between 2010 - 2012, the calorific values used for Acea Produzione were the effective ones taken from the gaugings of the natural gas and diesel oil suppliers

CALCULATION 2

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

where:

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

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

$$\text{Energy}_{\text{diesel oil}} \text{ (kWh)} = \frac{\text{diesel oil (l)} \cdot 0.835 \cdot \text{NCV}_d \text{ (kcal/kg)}}{860 \text{ (kcal/kWh)}} \quad \text{Energy equivalent to diesel oil consumed (95)}$$

$$\text{Energy}_{\text{natural gas}} \text{ (kWh)} = \frac{\text{natural gas (Nm}^3\text{)} \cdot \text{NCV}_n \text{ (kcal/Nm}^3\text{)}}{860 \text{ (kcal/kWh)}} \quad \text{Energy equivalent to natural gas consumed (93)}$$

NCV_n = 8,500 kcal/Nm³ (net calorific value of natural gas)

NCV_d = 10,000 kcal/kg (net calorific value of diesel oil)

860 = energy conversion factor from kcal to kWh

0.835 = specific weight of diesel oil (kg/l)

NB: the calorific values used for Acea Produzione were the effective ones taken from the gaugings of the gas and diesel oil suppliers

CALCULATION 3

$$\text{efficiency (hydroelectric)} = \frac{\text{Energy}_{\text{hydroelectric}} (\text{MWh}) \cdot 3.6 \cdot 10^9}{[m(\text{kg}) \cdot 9.8(\text{m/s}^2) \cdot h(\text{m})] (\text{joule})}$$

where:

- 3.6×10^9 = water energy conversion factor from Joules to MWh
- m = offtake water for hydroelectric production
- 9.8 = gravitation acceleration at sea level
- h = height of water drop (free surface reservoir– turbine)
- $\text{Energy}_{\text{hydroelectric}}$ = energy produced in the hydroelectric cycle

CALCULATION 4

$$\frac{(E_i)}{(E_i + E_t)} \cdot \epsilon_i + \frac{(E_t)}{(E_i + E_t)} \cdot \epsilon_t = \epsilon_{\text{average}}$$

where:

- E_i = total hydroelectricity produced
- E_t = total thermoelectricity produced
- ϵ_i = hydroelectric efficiency
- ϵ_t = thermoelectric efficiency
- $\epsilon_{\text{average}}$ = average production efficiency

CALCULATION 5

$$\frac{(E_i)}{(E_i + E_t)} \cdot \epsilon_i + \frac{(E_t)}{(E_i + E_t)} \cdot \epsilon_t = \epsilon_{\text{average}}$$

where:

- E_i = total hydroelectricity produced
- E_t = sum of total energy (thermoelectric and thermal) produced
- ϵ_i = hydroelectric efficiency
- ϵ_t = efficiency (thermoelectric + thermal)
- $\epsilon_{\text{average}}$ = average production efficiency

CALCULATION 6

$$\text{recovery efficiency} = \left(\frac{\text{kWh}}{\text{kg}} \right) = \frac{\text{Gross electricity produced (kWh)}}{\text{CDR (kg)}}$$

$\text{Energy}_{\text{gross electricity produced}} (\text{kWh}) = \text{Gross electricity produced at S. Vittore} = (\text{item 12})$

CALCULATION 7

$$\text{electric efficiency (\%)} = \frac{\text{Net electricity produced (kWh)}}{\text{WDF internal energy (kWh)} + \text{Natural gas internal energy (kWh)}}$$

where:

Net electricity produced at S. Vittore (item 12 - internal consumptions)

$$\text{Natural gas internal energy} = \frac{\text{Natural gas Sm}^3 \cdot \text{NCV}_n (\text{kcal/Sm}^3)}{860 (\text{kcal/kWh})}$$

NCV_n = about 8,500 kCal/Sm³ (net calorific value of natural gas)
860 = energy conversion factor from kcal to kWh

$$\text{WDF internal energy (kWh)} = \frac{\text{WDF (kg)} \cdot \text{NCV}_w (\text{kcal/kg})}{860 (\text{kcal/kWh})}$$

NCV_w = 3,583 kCal/kg (15,000 kJ/kg) – WDF average net calorific value
860 = energy conversion factor from kCal to kWh

CALCULATION 8

$$\text{recovery efficiency} = \left(\frac{\text{kWh}}{\text{kg}} \right) = \frac{\text{Gross electricity produced (kWh) at Terni}}{\text{pulper (kg)}}$$

Gross electricity produced at Terni (kWh) = (item 13)

CALCULATION 9

$$\text{electric efficiency (\%)} = \frac{\text{Net electricity produced (kWh)}}{\text{pulper internal energy (kWh) + Natural gas internal energy (kWh)}}$$

where:

Net electricity produced at Terni (item 13 – internal consumptions)

$$\text{Natural gas internal energy} = \frac{\text{Natural gas (Sm}^3\text{) x NCV}_n\text{(kCal/Sm}^3\text{)}}{860 \text{ (kcal/kWh)}}$$

NCV_n = about 8,500 kCal/Sm³ (net calorific value of natural gas)
860 = energy conversion factor from kCal to kWh

$$\text{Pulper internal energy (kWh)} = \frac{\text{pulper (kg) • NCV}_p \text{ (kcal/kg)}}{860 \text{ (kcal/kWh)}}$$

NCV_p = 3,635 kCal/kg 15,216 kJ/kg - Pulper average net calorific value (year 2010)
860 = energy conversion factor from kCal to kWh

Explanatory notes to the *Environmental accounts*

The figures presented in the *Environmental Accounts* have been produced and audited by the pertinent divisions.

Responsibility for the correct formation of the figures has been maintained within the individual production units, pending the implementation of a standardized Environmental Management System, capable of coding the procedures for obtaining a regular flow of numeric information.

Before final acceptance, however, the official figures have been subject to a validation process which anticipated four control procedures:

1. comparison with the historical data in order to highlight and justify any significant discrepancies;
2. repetition at least twice of the acquisition process;
3. feedback to the divisions responsible for the final validation of the figures;
4. sample audit carried out by an external specialised firm.

The figures have been divided up into three categories:

- estimated;
- calculated;
- measured.

In the event of estimated data, the greatest of attention was paid to checking the reasonableness of the underlying criteria used, with the aim of resorting as little as possible, in the future, to this form of measurement of the environmental parameters.

When the figures are the result of calculation, the algorithm used has been concisely specified in order to permit the full comprehension of the mathematical result.

When, lastly, the data has been measured, an estimate of the uncertainty to be associated with the number is provided.

Additional information on figures provided in the *Environmental accounts*

ENERGY SECTOR PRODUCTS

ITEM NO.	EXPLANATION – COMMENT
1	Total gross energy produced by the Group. This figure is calculated.
2	Electricity produced net of losses due to just the production phase. This figure is calculated.
3 = 4+5	Total electricity produced by the Acea Produzione plants, gross of losses. It includes thermoelectric and hydroelectric energy. The production increase registered at the Salisano plant is due to return to operation after repowering work. The figure is measured with uncertainty of less than $\pm 0.5\%$.
6 = 7+8+9	Electricity losses attributable to just the production phase of the Acea Production plants. Includes: internal consumption (thermo and hydro) and initial transformation losses. The figure is measured with uncertainty of less than $\pm 0.5\%$.
10	Electricity produced by the Acea Produzione plants, net of losses. This figure is calculated.
11 = 12+13	Electricity produced by the waste-to-energy plants: San Vittore del Lazio plant and Terni plant belonging to A.R.I.A. Note that the fuel used by the two plants (WDR- Waste derived fuel - for San Vittore and industry pulper for the Terni plant) comprises both biodegradable organic material, therefore neutral with regard to the CO ₂ balance, and non-biodegradable organic substances (plastic, resins, etc.). The Terni plant was stopped through all 2012 for revamping works and was reactivated at the end of December 2012.
14	Internal consumption of the two waste-to-energy plants at S. Vittore and Terni. It does not include the energy withdrawn from the network. The figure is measured with uncertainty of less than $\pm 0.5\%$.
15	Electricity produced by the two waste-to-energy plants at S. Vittore and Terni, net of internal consumption. This figure is calculated.
16	Gross energy produced by photovoltaic plants. The figure is measured with uncertainty of less than $\pm 0.5\%$.
17	Total losses in photovoltaic generation phase, due above all else to the Joule effect (dissipation with heating) in the equipment. Estimated figure.
18	Net photovoltaic energy made available by the generation plants. The figure is measured with uncertainty of less than 0.5%.
19	Thermal energy produced at the Tor di Valle co-generation plant, gross of losses. The item is measured with uncertainty of $\pm 2\%$ in correspondence with the delivery pipes of the boilers. The thermal energy is produced by the co-generation plant, comprising a turbogas unit and superheated water regeneration generator powered by the hot exhaust fumes of the turbogas units, with the possibility of integration via Galleri-type auxiliary boilers.
20	Thermal energy losses of the district heating system, due to: heat dispersion, losses on the network, technical emissions due to maintenance work, thermal recoveries of the heat accumulation systems. The item is calculated as the difference between the thermal energy produced and that effectively supplied to the customers (billed).
21	Net thermal energy supplied to end customers. The item, calculated, was obtained from the reading of the billed consumption.
22	Electricity supplied by Acea Produzione to Acea Energy SpA involving infra-Group exchange. The item is marginal due to the decision made by the Acea Group to sell the electricity produced on the electricity exchange or by means of bilateral agreements.

ENERGY SECTOR PRODUCTS

ITEM NO.	EXPLANATION – COMMENT
23	<p>Net electricity acquired on the market by:</p> <ul style="list-style-type: none">• Sole Buyer for 3,327.25 GWh• Imports for 433.56 GWh• Market for 8,100.28 GWh. <p>In 2012 the "Colari" plant" of Malagrotta (waste Gasifier) didn't work. In 2011 had produced and marketed in the Acea distribution network 20.14 GWh. The item is measured with uncertainty of $\pm 0.5\%$.</p>
24	<p>Energy requested on the Rome and Formello distribution network by all the connected customers (free + protected). This item is estimated.</p>
25	<p>Electricity losses which take place during the distribution and transmission phase. These are attributable to: transformation and transport losses, fraud and erroneous measurements. This item is estimated.</p>
26	<p>Internal uses of electricity for the performance of distribution activities. The 2012 item is estimated.</p>
27	<p>Electricity transferred to third parties. This involves exchanges of energy between distribution companies. The item is measured with uncertainty of $\pm 0.5\%$.</p>
28	<p>Total net electricity conveyed to customers in free market connected to the Rome and Formello electricity distribution network. This includes both the portion of electricity sold by Acea Energy and that sold by other operators active on the free market. The item is measured with uncertainty of $\pm 5\%$. (CEI 13-4 standard).The considerable increase in the item over the last few years is the direct consequence of the process for deregulating the electricity market underway in Italy since 1999 (Italian Legislative Decree No. 79/99).</p>
29	<p>Net electricity sold to customers in enhanced protection market. The downwards trend is the consequence of the progressive changeover of protected customers to the deregulated market, in other words it is the direct consequence of the process for de-regulating the electricity market underway in Italy since 1999 (Italian Legislative Decree No. 79/99). The item is estimated on the basis of the readings of billed consumption.</p>
30	<p>Net electricity sold by Acea on the free market at Italian national level. The item is measured with uncertainty of $\pm 5\%$. (CEI 13-4 standard). Includes the sold on Rome and Formello (item 28). Total sales on the free and the protected market is obtained by summing the items (29) and (30). The figure is estimated.</p>
31	<p>Lighting flux supplied by the public lighting system in Rome. The item, calculated, represents the product between the number of lamps installed and the related value of "rated" lighting flux. As a result of the overestimation introduced by:</p> <ol style="list-style-type: none">1. abatement of efficiency due to the ageing of the lamps;2. shutdown due to faults;3. shutdown due to maintenance; <p>it is believed that a more realistic supplied lighting flux figure equates to the item provided, decreased by 20%.</p>
32	<p>Total number of gaugings/checks carried out benefiting the energy area. The item is calculated as the sum of the individual calculations made in 2012 by the pertinent laboratories.</p>
32A	<p>High Quality Compost produced by Aquaser plants: Kyklos (Latina) and Solemme (Grosseto). The item is measured with an uncertainty of $\pm 1\%$.</p>

WATER SECTOR PRODUCTS

ITEM NO.	EXPLANATION – COMMENT
33	Total drinking water withdrawn from the environment or from other systems. This is the sum of the water withdrawn by the Group companies: Acea Ato 2 (Rome), Acea Ato 5 (Frosinone); Gori (Sarnese Vesuviano); Acque (Pisa); Publiacqua (Florence); Acquedotto del Fiora (Grosseto); Umbra Acque (Umbria).
34	Total drinking water delivered to the distribution networks of the companies listed under item 33 net of losses due to the water supply at sources. The figure is estimated.
35	Total drinking water supplied to the respective customers of the companies listed in item 33. The figure represents estimated consumption due to the entire territories served. Includes consumptions due to users, fountains, pipe washing activities, etc. The figure is estimated.
36	Total drinking water withdrawn from the sources except the high drains, by the company Acea Ato 2 and introduced into the aqueduct system of the Rome historic network. It includes the water withdrawn from Lake Bracciano, treated. The item is measured with uncertainty of $\pm 3\%$.
37	Total drinking water sold to Municipalities located along the route of the aqueducts, in turn retailers of the resource, who are not Acea Ato 2 customers. The item is measured and is affected by a systematic error estimated as around - 5%.
38	Drinking water introduced onto non-drinking water network. These are events which take place in the case of maintenance or extraordinary measures which make the dedicated non-drinking water resource insufficient. The item is estimated.
39	Drinking water returned to the environment / technical operating volumes with reference to the Rome "historic" distribution network (Rome + Fiumicino). This figure is calculated.
40	Total drinking water transported to the Rome "historic" distribution network (Rome + Fiumicino), net of the losses due to the water supply at sources. The item is estimated.
41	Total drinking water supplied in the Municipality of Rome on the "historic" network (Rome + Fiumicino). The figure represents estimated consumption due to the entire territory served. It includes the consumption due to users, drinking fountains, pipe washing activities, etc. The item is estimated.
42	Overall distribution losses – Rome "historic" network. This is the parameter A17 of the Italian MD No. 99/97 defined as the quantity of water lost during distribution. $A17 = A9 - (A10 + A11 + A12) = (A13 + A14 + A15 + A16)$, where: Parameter A9 of MD 99/97 – total volume of water introduced onto the network; Parameter A10 of MD 99/97 – gauged volume of water supplied to the end user; Parameter A11 of MD 99/97 – authorized and unrecorded uses, totalling around 2% of total water supplied to end users; Parameter A12 of MD 99/97 – maintenance and cleaning, totalling around 2% of total introduced onto the network; Parameter A13 of MD 99/97 – inefficiencies, estimated at 3 million m ³ per year; Parameter A14 of MD 99/97 – frauds, totalling 1.0% of total water supplied to end users (item 20) x 1.0/100; Parameter A15 - volume lost in distribution (effective losses); Parameter A16 of MD 99/97 – gauging errors, totaling 10% of total water supplied to end users - (item 41) x 10.0/100; Parameter A17 of MD 99/97 – overall distribution losses.
43	Effective distribution losses - Rome "historic" network (Rome + Fiumicino). This is the parameter A15 of the Italian MD No. 99/97 and represents the nearest value to the true estimate of the volume of water lost along the distribution network for reasons linked to the state of maintenance of the assets.

WATER SECTOR PRODUCTS

ITEM NO.	EXPLANATION – COMMENT
44	Total non-drinking water taken from the environment, gross of losses. This item is estimated.
45	Total non-drinking water supplied to Rome and Fiumicino. The item, calculated, corresponds with total water billed.
46	Total non-drinking water supplied to municipalities other than the Municipality of Rome and Fiumicino. This is a small estimated quantity.
47	Total drinking water withdrawn from the sources except the high drains, by the company Acea Ato 2 and introduced into the Central Lazio Optimum Area of Operations ATO 2 (Rome "historic" network + municipalities acquired) aqueduct system. The item is measured with uncertainty of $\pm 3\%$.
48	Total drinking water sold to Municipalities located along the route of the aqueducts, in turn retailers of the resource, who are not Acea Ato 2 customers. The item is measured and is affected by a systematic error estimated as around - 5%.
49	Drinking water introduced onto non-drinking water network. These are events which take place in the case of maintenance or extraordinary measures which make the dedicated non-drinking water resource insufficient. This item is estimated.
50	Drinking water returned to the environment / technical operating volumes with reference to the Ato 2 distribution network (Rome and Fiumicino + municipalities acquired as of 31 December 2012). This figure is calculated.
51	Total drinking water transported to the Ato 2 distribution network (Rome and Fiumicino + municipalities acquired as of 31 December 2012). The item is gauged with uncertainty of $\pm 3\%$. This item was estimated for 2012.
52	Total drinking water supplied (i.e. gauged at the metres, where present) to the customers connected to the Ato 2 network (Rome and Fiumicino + municipalities acquired as of 31 December 2012). The figure represents estimated consumption due to the entire territory served. It includes the consumption due to users, drinking fountains, pipe washing activities, etc.
53	Overall distribution losses – Ato 2 network (Rome and Fiumicino + municipalities acquired as of 31 December 2012). This is the parameter A17 of the Italian MD No. 99/97 defined as the quantity of water lost during distribution. See item 42 for details.
54	Effective distribution losses - Ato 2 network (Rome and Fiumicino + municipalities acquired as of 31 December 2012). This is the parameter A15 of the Italian MD No. 99/97. See item 43.
55, 56, 57	Respectively: quantity of water withdrawn from the environment, introduced onto the distribution network and supplied to its customers by Acea Ato 5 (Frosinone).
58	Overall distribution losses of Acea Ato 5 (Frosinone). This is the parameter A17 of the Italian MD No. 99/97 defined as the quantity of water lost during distribution. See item 42 for details.
59	Effective distribution losses of Acea Ato 5 (Frosinone). This is the parameter A15 of the Italian MD No. 99/97. See item 43.
60, 62, 63	Respectively: quantity of water withdrawn from the environment, introduced onto the distribution network and supplied to its customers by Gori (Sarnese Vesuviano).
61	Water withdrawn from other aqueduct systems to satisfy excess demand; if added to the water withdrawn from the environment (60), the quantity introduced onto the network is obtained (62).
64	Overall distribution losses of Gori (Sarnese Vesuviano). This is the parameter A17 of the Italian MD No. 99/97 defined as the quantity of water lost during distribution. See item 42 for details.
65	Effective distribution losses of Gori (Sarnese Vesuviano). This is the parameter A15 of the Italian MD No. 99/97. See item 43 for details.
66, 67, 68	Respectively: quantity of water withdrawn from the environment, introduced onto the distribution network and supplied to its customers by Publiacqua (Florence). 2. Estimated figures.

WATER SECTOR PRODUCTS

ITEM NO.	EXPLANATION – COMMENT
69	Overall distribution losses of Publiacqua (Florence). This is the parameter A17 of the Italian MD No. 99/97 defined as the quantity of water lost during distribution. See item 42 for details.
70	Effective distribution losses of Publiacqua (Florence). This is the parameter A15 of the Italian MD No. 99/97. See item 43.
71, 73, 74	Respectively: quantity of water withdrawn from the environment, introduced onto the distribution network and supplied to its customers by Acque (Pisa). Estimated figures.
72	Water withdrawn from other aqueduct systems to satisfy excess demand; if added to the water withdrawn from the environment (71), the quantity introduced onto the network is obtained (73).
75	Overall distribution losses of Acque (Pisa). This is the parameter A17 of the Italian MD No. 99/97 defined as the quantity of water lost during distribution. See item 42 for details.
76	Effective distribution losses of Acque (Pisa). This is the parameter A15 of the Italian MD No. 99/97. See item 43.
77, 78, 79	Respectively: quantity of water withdrawn from the environment, introduced onto the distribution network and supplied to its customers by Acquedotto del Fiora (Grosseto). Estimated figures.
80	Overall distribution losses of Acquedotto del Fiora (Grosseto). This is the parameter A17 of the Italian MD No. 99/97 defined as the quantity of water lost during distribution. See item 42 for details.
81	Effective distribution losses of Acquedotto del Fiora (Grosseto). This is the parameter A15 of the Italian MD No. 99/97. See item 43.
82, 83, 84	Respectively: quantity of water withdrawn, introduced and supplied by Umbra Acque (Umbria). Estimated figures.
85	Overall distribution losses of Umbra Acque (Umbria). This is the parameter A17 of the Italian MD No. 99/97 defined as the quantity of water lost during distribution. See item 42 for details.
86	Effective distribution losses of Umbra Acque (Umbria). This is the parameter A15 of the Italian MD No. 99/97. See item 43.
87	Total waste water conveyed to main treatment plants of Acea Ato 2 and treated. For the remarkable change of the item if compared with 2011, see item 88, that represents the most sensitive variation. This figure is calculated.
88	Total waste water conveyed to the main treatment plants of Acea Ato 2 and treated. The reduction amount is mainly due to exchanged flowmeter re-calibration of Roma Sud, decreasing. This figure is calculated.
89	Total waste water conveyed to the treatment plants of Acea Ato 2 and treated, including the quantities treated in the minor plants of the Municipality of Rome and in those outside the Municipality of Rome. This figure is calculated.
90	Overall number of analytical controls carried out on drinking water by the Acea Group. The item includes the analysis carried out by LaboratoRI and the analysis carried out independently by the companies. This figure is calculated.
91	Overall number of analytical controls carried out on waste water by the Acea Group. The item includes the analysis carried out by LaboratoRI and the analysis carried out independently by the companies. This figure is calculated.

RESOURCES USED – ENERGY SECTOR

ITEM NO.	EXPLANATION – COMMENT
92 = 93+94	Total quantity of natural gas used for the generation of electricity and heat at the Acea Produzione and A.R.I.A. production plants. The item, expressed in normal cubic metres (volume at 0°C and 1 Atm), is measured with uncertainty of $\pm 0.5\%$. The figure is estimated.
95	Total quantity of coal used for the generation of electricity at the Acea Produzione Montemartini (turbogas) plant. This item is measured with uncertainty of $\pm 2\%$.
96	Quantity of WDF (waste derived fuel) sent to the waste-to-energy process at the San Vittore plant in Lazio. The item is measured with uncertainty of $\pm 1\%$.
97	Quantity of Pulper sent to the waste-to-energy process at the Terni plant. The item is measured with uncertainty of $\pm 1\%$.
98	Total cooling water in the thermoelectric plants. This item is estimated.
99	Total water taken from surface resources and from aqueducts (Salisano hydroelectric plant) for the production of hydroelectricity. This figure is calculated.
100	Total quantity of water used in the industrial processes. The various contributions were due to: - Replenishment of the losses in the thermal cycles at the Acea Produzione plants. This is drinking water; - Replenishment of losses on the district heating network. This is drinking water; - Various uses in the San Vittore and Terni waste-to-energy plants. This figure is calculated.
101	Quantity of drinking water used by the companies included in the energy sector for civil/sanitary use. The item, calculated, refers to billed consumption.
102	This represents the total quantity of new dielectric mineral oil introduced into the production circuit (transformers, condensers, storage deposits, etc.). It includes the figure for Acea Distribuzione and Acea Produzione. This item is gauged with uncertainty of $\pm 0.5\%$. The total quantity of dielectric mineral oil present in the electro-technical equipment of Acea Distribuzione comes to 4,586.94 t as of 31 December 2012. This item is estimated.
103	Total quantity of new gaseous insulator (SF6) added to the production circuit (armoured sub-stations). This item is gauged with uncertainty of $\pm 0.5\%$.
104	Quantity of refrigerating fluids used during maintenance of air-conditioning equipment, when the old gas is recovered and replaced with new gas. Note that the R22 gas, still present as refrigerating fluid, can no longer be purchased (European regulation No. 2037/2000 concerning hazardous substances for the ozone stratosphere) but is still recycled (until 31 December 2014); the replenishments are made using a different gas, R422 D. The item is calculated allocating the total gases purveyed by the Parent Company in equal parts (50%) to the energy area and the water area. This item coincides with item 115.
105	Total chemicals used in the electricity and heat generation process at the plants of Acea Produzione and A.R.I.A. (waste-to-energy plants). During 2011, having introduced a change in the process for combating the fumes from the chimney emissions of San Vittore (A.R.I.A.), for the first time sodium bicarbonate was used (2,900 tons) which led to a sharp increase in quantities consumed with respect to 2010. This figure is calculated.
106	This item coincides with item 25.
107	Coincides with the difference between the items 1 and 2.
108	Electricity consumed by the processes not directly linked with the production phases (offices). The item is calculated to an extent equating to 50% of the overall electricity consumed by the Parent Company. The remaining portion of 50% is assigned to the water sector as consumption.

RESOURCES USED – ENERGY SECTOR

ITEM NO.	EXPLANATION – COMMENT
109	Other uses of electricity in the energy sector. This figure is calculated.
110	Total electricity consumed by the product systems included in the energy sector. This figure is calculated.
111	Total electricity consumed for public lighting in the Municipality of Rome. This figure is calculated.

RESOURCES USED – WATER SECTOR

ITEM NO.	EXPLANATION – COMMENT
112	The figure represents the sum of the consumption of reagents for drinking water and disinfection of the water in Group water companies. In detail this includes: sodium hypochlorite - used as a disinfectant upon the request of the Health Authorities -, aluminium polychloride, caustic soda and ozone. This figure is calculated.
113	Total quantity of chemical reagents used by LaboratoRI for the performance of its duties, in other words the performance of analytical checks benefiting Acea Group companies. The item is measured.
114	Total volume of pure gas for analyses used by LaboratoRI. The item is measured.
115	Quantity of refrigerating fluids used during maintenance of air-conditioning equipment, when the old gas is recovered and replaced with new gas. The item is calculated allocating the total gases purveyed by the Parent Company in equal parts (50%) to the energy area and the water area. This item coincides with item 106.
116	Electricity used for the drinking and non-drinking water pumping plants. The item is measured with uncertainty of $\pm 1\%$.
117	Electricity consumed by the processes not directly linked with the production phases (offices). The figure, equal to item 108, is calculated to an extent equating to 50% of the total electricity consumed by the Parent Company.
118	Electricity used by LaboratoRI. It includes all the energy relating to the various fields of activities of LaboratoRI, not only the laboratory analysis activities. This item is measured with uncertainty of $\pm 0.5\%$, with the exclusion of 2011 when consumption was estimated.
119	Total electricity consumed in the water sector. This figure is calculated.
120	Quantity of drinking water used by the companies included in the water sector for civil/sanitary use. The item, calculated, refers to billed consumption.
121	Quantity of water consumed for civil/sanitary uses within the installations not directly linked with the production phases (offices). The item is calculated to an extent equating to 50% of the overall water consumed by the Parent Company.
122	Total drinking water consumed by the companies included in the water sector. The item, calculated, refers to billed consumption.
123	Total quantity of chemicals used in the waste water treatment process. This is obtained from the sum of the consumption registered for the following substances: polyelectrolytes, sodium hypochlorite, ferric chloride, lime. This figure is calculated.
124	Total quantity of lubricant oil and grease used for the apparatus of the water sector (pumps, centrifuges, engines, etc). This figure is calculated.
125	Electricity used for the running of the waste water treatment plants and for the running of the sewage network. The item is measured with uncertainty of $\pm 1\%$.

FUELS USED BY THE GROUP (VEHICLE FLEET AND CONDITIONING)

ITEM NO.	EXPLANATION – COMMENT
126	Total quantity of petrol used for the Acea Group's vehicle pool. 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 $\pm 0.5\%$.
127	Total quantity of diesel used by Acea Group's vehicle 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 $\pm 0.5\%$.
128	Total quantity of gas 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 $\pm 0.5\%$.
129	Total quantity of natural gas used for heating working environments. The 2012 figure was estimated equal to 2011 one, because of consumption billing difficulties from behalf of the seller.
130	Total quantity of LPG (liquid petroleum gas) used for heating working environments. 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 $\pm 0.5\%$.

SPILLS AND WASTE – ENERGY SECTOR

ITEM NO.	EXPLANATION – COMMENT
131	Total quantity of carbon dioxide emitted into the atmosphere as a consequence of the generation of thermoelectric energy from fossil fuels and from the waste-to-energy treatment of WDF and pulper. This is a "physiological" product deriving from combustion. The item is calculated as the sum of the items 132 and 133.
132	Quantity of carbon dioxide emitted into the atmosphere by the Acea Produzione plants. This item is calculated according to current legislation.
133	Quantity of carbon dioxide emitted into the atmosphere by the A.R.I.A. waste-to-energy plants. This item is calculated according to current legislation.
134	Total quantity of nitric oxides ($\text{NO} + \text{NO}_2$) emitted into the atmosphere as a consequence of the generation of thermoelectric energy from fossil fuels and from the waste-to-energy treatment of WDF and pulper. Their presence in trace form in the emissions is due to the secondary undesirable reactions which take place at a high temperature between the nitrogen and the oxygen in the air. This figure is calculated.
135	Quantity of nitric oxides ($\text{NO} + \text{NO}_2$) emitted into the atmosphere as a consequence of the generation of thermoelectric energy from fossil fuels in the Acea Produzione plants. This figure is calculated.
136	Quantity of nitric oxides ($\text{NO} + \text{NO}_2$) emitted into the atmosphere by the A.R.I.A. waste-to-energy plants. This figure is calculated.
137	Total quantity of carbon monoxide (CO) emitted into the atmosphere as a consequence of the generation of thermoelectric energy from fossil fuels and waste-to-energy process. The presence of this pollutant in the emissions is due to incomplete combustion reactions and represents a symptom of decline in the combustion reaction efficiency. This figure is calculated.
138	Total quantity of carbon monoxide (CO) emitted into the atmosphere as a consequence of the generation of thermoelectric energy from fossil fuels in the Acea Produzione plants. This figure is calculated.
139	Quantity of carbon monoxide (CO) emitted into the atmosphere by the A.R.I.A. waste-to-energy plants. This figure is calculated.
140	Total quantity of sulphur dioxide (SO_2) emitted into the atmosphere as a consequence of the generation of thermoelectric energy from fossil fuels and from the waste-to-energy treatment of WDF and pulper. The use of natural gas and gas oil with a low sulphur content in the plants made it possible to sharply contain this type of emission. This figure is calculated.

SPILLS AND WASTE – ENERGY SECTOR

ITEM NO.	EXPLANATION – COMMENT
141	Quantity of sulphur dioxide (SO ₂) emitted into the atmosphere as a consequence of the generation of thermoelectric energy from fossil fuels in the Acea Produzione plants. This figure is calculated.
142	Quantity of sulphur dioxide (SO ₂) emitted into the atmosphere by the A.R.I.A. waste-to-energy plants. This figure is calculated.
143	Total quantity of dust (microscopic particles with an average aerodynamic diameter equal to or less than 10 thousandths of a millimetre) emitted into the air as a consequence of the generation of thermoelectric energy using fossil fuels and from the waste-to-energy treatment of WDF and pulper. This mainly involves unburnt amorphous carbon, with traces of other compounds of a mixed composition obtained as a by-product of the combustion when this does not take place completely.
144	Quantity of dust emitted into the atmosphere as a consequence of the generation of thermoelectric energy from fossil fuels in the Acea Produzione plants. This figure is calculated.
145	Quantity of dust emitted into the atmosphere by the A.R.I.A. waste-to-energy plants. The strong reduction in 2012 depends on the pollutant abatement system made even more efficient and using an electrostatic filter and bag filter. This figure is calculated.
146	Total quantity of waste water treated, deriving from thermoelectric production activities. This item is gauged with uncertainty of ± 2%.
147	This item coincides with item 98.
148	Total quantity of hazardous waste (pursuant to Italian Legislative Decree No. 152/06) disposed of by Acea Group companies with the exclusion of the waste-to-energy sector. The item is measured with uncertainty of ± 2%.
149	Hazardous waste (pursuant to Italian Legislative Decree No. 152/06) disposed of from the waste-to-energy sector. This basically involves light ash and slag deriving from incineration. The considerable increase in 2011 was due to the change in the CER code of the slag following the amendments introduced to the environmental consolidation act, as well as the activation of the two new lines. The item is measured with uncertainty of ± 2%.
150	Total quantity of non-hazardous waste (pursuant to Italian Legislative Decree 152/06) disposed of by the Acea Group companies with the exclusion of the waste-to-energy sector. The item is measured with uncertainty of ± 2%.
151	Non-hazardous waste (pursuant to Italian Legislative Decree No. 152/06) disposed of from the waste-to-energy sector. This is essentially heavy ash and slag, deriving from incineration. The item is measured with uncertainty of ± 2%.

SPILLS AND WASTE – WATER SECTOR

ITEM NO.	EXPLANATION – COMMENT
152	Total quantity of sludge disposed of by Acea Ato 2. This sludge is non-hazardous waste. The item is measured with uncertainty of $\pm 2\%$.
153	Total quantity of sand and sediment disposed of by Acea Ato 2. The item is measured with uncertainty of $\pm 2\%$.
154	Total quantity of hazardous waste (pursuant to Italian Legislative Decree No. 152/06) disposed of by Acea Ato 2 plus a portion produced by the Parent Company ascribed in equal parts to the two areas of activities, energy and water. The figure is measured with uncertainty of less than $\pm 2\%$.
155	Total quantity of non-hazardous waste (pursuant to Italian Legislative Decree 152/06) disposed of plus a portion produced by the Parent Company ascribed in equal parts to the two areas of activities, energy and water. In 2010, the figure was higher than the average since extraordinary work was carried out which generated waste essentially comprising earth and sundry material. The item is measured with uncertainty of $\pm 2\%$.
156	Total quantity of sludge disposed of by all the water companies in the Acea Group, excluding Acea Ato 2. This sludge is non-hazardous waste. This figure is calculated.
157	Total quantity of sand and sediment disposed of by all the water companies in the Acea Group, excluding Acea Ato 2. This figure is calculated.
158	Total quantity of hazardous waste (pursuant to Italian Legislative Decree No. 152/06) disposed of by all the water companies in the Acea Group, excluding Acea Ato 2. This figure is calculated.
159	Total quantity of non-hazardous waste (pursuant to Italian Legislative Decree 152/06) disposed of by all the water companies in the Acea Group, excluding Acea Ato 2. Inert material is also included. This figure is calculated.

ACEA GROUP SPILLS AND WASTE - EMISSIONS FROM VEHICLES

ITEM NO.	EXPLANATION – COMMENT
160	Total quantity of carbon dioxide emitted by the Acea Group vehicle fleet. The item was calculated, in 2012, using Sinanet emission factors (www.sinanet.isprambiente.it). In previous years the item was calculated using the COPERT IV programme. The increase in 2012 compared with 2011 depends on an expanding perimeter.
161	Total quantity of nitric oxides emitted by the Acea Group vehicle fleet. The item was calculated, in 2012, using Sinanet emission factors (www.sinanet.isprambiente.it). In previous years the item was calculated using the COPERT IV programme. The increase in 2012 compared with 2011 depends on an expanding perimeter.
162	Total quantity of carbon monoxide emitted by the Acea Group vehicle fleet. The item was calculated, in 2012, using Sinanet emission factors (www.sinanet.isprambiente.it). In previous years the item was calculated using the COPERT IV programme. The increase in 2012 compared with 2011 depends on an expanding perimeter.
163	Sulphur dioxide emissions by vehicles were not calculated, as they were extremely small amounts deriving from combustion of modest quantities of sulphur found in latest-generation fuels.
164	Total quantity of carbon dioxide emitted by the air-conditioning systems in the work environments. This item is calculated under the assumption that each toe of fuel used creates 3 tons of CO ₂ .

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Sustainability Report 2012

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