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Green Bond projects

Photovoltaic plant: Bologna

Environmental green projects category

X	Increase of energy production by non-fossil fuels		Improvement of wastewater treatment plants
	Increase of energy efficiency		Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
	Improvement of WTE plants for waste treatment		

Environmental criteria

X	Fight against climate change		Clean Water
	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
GHG01	Photovoltaic plants for electrical energy production	- Net produced electricity from renewable non-fossil sources per operating year - Avoided CO_2 emissions from fossil sources per operating year

Value of the project

Total value	11,416,248 euro	
of wich financed by Green Bond	11,416,248 euro	

Project description

The Hera Group has built four photovoltaic plants on the roofs of the Magazzini Generali in the Bologna Interport zone between 2007 and 2011. Monocrystalline and polycrystalline silicon technologies were used for the panels of plants 1, 2 and 4, and the new cadmium telluride film was used for plant 3.

The total panelled surface of the four plants is approximately 30,000 m2 and their total developed capacity is 3.2 MWp.

Plants 2, 3 and 4 were inaugurated on 21 October 2011.

After the start-up of first photovoltaic plant in 2007, the Hera Group built two new photovoltaic plants in 2010 on the roofs of the Magazzini Generali in Area 7 of Bologna Interport. The installation covers a total area of 42,000 m2, the equivalent of six football pitches (panelled surface 17,000 m2). The two photovoltaic plants have an overall capacity of 2 MWp, resulting in annual production of around 2,400 MWh, the equivalent energy consumption of approximately 1,000 apartments.

One of the two plants uses traditional polycrystalline silicon technology (the same as that used in the first plant in 2007, Interport 1), while the other uses the new cadmium telluride film. For Hera, the joint development of two plants with the same capacity and in the same geographical location represents an excellent chance to compare the performances of the two different technologies used for the panels (silicon/cadmium).

Finally, the last plant – Interport 4 – was built in 2011 using monocrystalline silicon technology on a panelled surface of 7,100 m2, with potential developed capacity of 995.40 kWp.

At the end of 2015, the controlling shareholding in Hera Energie Rinnovabili, owner of the plant, was sold and, at the same time, a shareholder loan was granted to the company itself; again at the end of 2015, the company changed its name to Aloe Spa. At the end of 2017, Hera Spa held a 10% stake in the company Aloe Spa.

Performance indicators

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Net produced electricity from renewable non-fossil sources per operating year (MWh)	-	229	250	245	1,443	3,267	3,801	3,621	3,628	3,849	3,599	3,959
Avoided CO_2 emissions from fossil sources per operating year * (t)	-	125	133	128	741	1,679	1,953	1,861	1,864	1,978	1,850	2,035

*Coefficient used: 0.514 kg/kWh.

Photovoltaic plant: Alfianello (BS)

Environmental green projects category

X	Increase of energy production by non-fossil fuels		Improvement of wastewater treatment plants
	Increase of energy efficiency		Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
	Improvement of WTE plants for waste treatment		

Environmental criteria

X	Fight against climate change		Clean Water
	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
GHG01	Photovoltaic plants for electrical energy production	- Net produced electricity from renewable non-fossil sources per operating year - Avoided CO_2 emissions from fossil sources per operating year

Value of the project

Total value	3,839,000 euro	
of wich financed by Green Bond	943,242 euro	Net of the portion financed by financial leasing

Project description

At the beginning of 2012 Hera Group acquired a photovoltaic field with an installed capacity of 1 MW. At the end of 2015, the controlling shareholding in Hera Energie Rinnovabili, owner of the plant, was sold and, at the same time, a shareholder loan was granted to the company itself; again at the end of 2015, the company changed its name to Aloe Spa. At the end of 2017, Hera Spa held a 10% stake in the company Aloe Spa.

Performance indicators

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Net produced electricity from renewable non-fossil sources per operating year (MWh)	-	-	-	-	-	-	1,186	1,205	1,163	1,180	1,143	1,269
Avoided CO_2 emissions from fossil sources per operating year * (t)	-	-	-	-	-	-	610	619	598	606	587	652

*Coefficient used: 0.514 kg/kWh.

Photovoltaic plant: Copparo (FE)

Environmental green projects category

X	Increase of energy production by non-fossil fuels		Improvement of wastewater treatment plants
	Increase of energy efficiency		Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
	Improvement of WTE plants for waste treatment		

Environmental criteria

X	Fight against climate change		Clean Water
	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
GHG01	Photovoltaic plants for electrical energy production	- Net produced electricity from renewable non-fossil sources per operating year - Avoided CO_2 emissions from fossil sources per operating year

Value of the project

Total value	3,893,000 euro	
of wich financed by Green Bond	956,510 euro	Net of the portion financed by financial leasing

Project description

At the beginning of 2012 Hera Group acquired a photovoltaic field with an installed capacity of 1 MW. At the end of 2015, the controlling shareholding in Hera Energie Rinnovabili, owner of the plant, was sold and, at the same time, a shareholder loan was granted to the company itself; again at the end of 2015, the company changed its name to Aloe Spa. At the end of 2017, Hera Spa held a 10% stake in the company Aloe Spa.

Performance indicators

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Net produced electricity from renewable non-fossil sources per operating year (MWh)	-	-	-	-	-	-	1,328	1,241	1,215	1,351	911	1,167
Avoided CO_2 emissions from fossil sources per operating year * (t)	-	-	-	-	-	-	682	638	624	694	468	600

*Coefficient used: 0.514 kg/kWh.

Photovoltaic plant: Faenza (RA)

Environmental green projects category

X	Increase of energy production by non-fossil fuels		Improvement of wastewater treatment plants
	Increase of energy efficiency		Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
	Improvement of WTE plants for waste treatment		

Environmental criteria

X	Fight against climate change		Clean Water
	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
GHG01	Photovoltaic plants for electrical energy production	- Net produced electricity from renewable non-fossil sources per operating year - Avoided CO_2 emissions from fossil sources per operating year

Value of the project

Total value	3,400,000 euro	
of wich financed by Green Bond	835,380 euro	Net of the portion financed by financial leasing

Project description

At the beginning of 2012 Hera Group acquired a photovoltaic field with an installed capacity of 1 MW. At the end of 2015, the controlling shareholding in Hera Energie Rinnovabili, owner of the plant, was sold and, at the same time, a shareholder loan was granted to the company itself; again at the end of 2015, the company changed its name to Aloe Spa. At the end of 2017, Hera Spa held a 10% stake in the company Aloe Spa.

Performance indicators

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Net produced electricity from renewable non-fossil sources per operating year (MWh)	-	-	-	-	-	-	1,394	1,338	1,343	1,396	1,344	1,503
Avoided CO_2 emissions from fossil sources per operating year * (t)	-	-	-	-	-	-	716	688	690	717	691	773

*Coefficient used: 0.514 kg/kWh.

Photovoltaic plant: Petriolo (MC)

Environmental green projects category

X	Increase of energy production by non-fossil fuels		Improvement of wastewater treatment plants
	Increase of energy efficiency		Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
	Improvement of WTE plants for waste treatment		

Environmental criteria

X	Fight against climate change		Clean Water
	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
GHG01	Photovoltaic plants for electrical energy production	- Net produced electricity from renewable non-fossil sources per operating year - Avoided CO_2 emissions from fossil sources per operating year

Value of the project

Total value	3,110,000 euro	
of wich financed by Green Bond	764,127 euro	Net of the portion financed by financial leasing

Project description

At the beginning of 2012 Hera Group acquired a photovoltaic field with an installed capacity of 1 MW. At the end of 2015, the controlling shareholding in Hera Energie Rinnovabili, owner of the plant, was sold and, at the same time, a shareholder loan was granted to the company itself; again at the end of 2015, the company changed its name to Aloe Spa. At the end of 2017, Hera Spa held a 10% stake in the company Aloe Spa.

Performance indicators

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Net produced electricity from renewable non-fossil sources per operating year (MWh)	-	-	-	-	-	-	1,410	1,311	1,282	1,341	1,262	1,432
Avoided CO_2 emissions from fossil sources per operating year * (t)	-	-	-	-	-	-	724	674	659	689	649	736

*Coefficient used: 0.514 kg/kWh.

Biogas plants

Environmental green projects category

X	Increase of energy production by non-fossil fuels		Improvement of wastewater treatment plants
	Increase of energy efficiency		Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
	Improvement of WTE plants for waste treatment		

Environmental criteria

X	Fight against climate change		Clean Water
	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
GHG02	Biogas from landfills for electrical energy production	- Net produced electricity from renewable non-fossil sources per operating year - Avoided CO_2 emissions from fossil sources per operating year

Value of the project

Total value	4,930,908 euro	
of wich financed by Green Bond	4,930,908 euro	

Project description

The biogas exploitation plants at 9 landfills are still active.

Performance indicators

	2006	2007	2008	2009	2010	2011	2012	2013
Energia elettrica netta prodotta (MWh)	5,887	6,773	34,449	46,539	40,042	51,710	55,475	51,889
Emissioni di CO_2 non fossile evitate da produzione di energia elettrica* (t)	3,300	3,699	18,389	24,321	20,574	26,569	28,503	26,661

	2014	2015	2016	2017
Energia elettrica netta prodotta (MWh)	42,026	30,603	40,261	45,009
Emissioni di CO_2 non fossile evitate da produzione di energia elettrica* (t)	21,601	15,729	20,694	23,135

*Coefficient used: 0.514 kg/kWh.

Anaerobic digestion plant: Cesena

Environmental green projects category

X	Increase of energy production by non-fossil fuels		Improvement of wastewater treatment plants
	Increase of energy efficiency		Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
	Improvement of WTE plants for waste treatment		

Environmental criteria

X	Fight against climate change		Clean Water
	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
GHG03	Biogas from composting plants for electrical energy production	- Net produced electricity from renewable non-fossil sources per operating year - Avoided CO_2 emissions from fossil sources per operating year

Value of the project

Total value	10,864,019 euro	
of wich financed by Green Bond	10,864,019 euro	

Project description

The plant is dedicated to the storage and recovery of municipal waste and non-hazardous special waste through a virtuous anaerobic-aerobic type process which, as well as producing high-quality compost, also produces energy from renewable sources.

Plant description

Performance indicators

	2006	2007	2008	2009	2010	2011	2012	2013
Net produced electricity from renewable non-fossil sources per operating year (MWh)	-	-	-	120	5,389	6,160	6,801	6,989
Avoided CO_2 emissions from fossil sources per operating year * (t)	-	-	-	63	2,769	3,165	3,494	3,591

	2014	2015	2016	2017
Net produced electricity from renewable non-fossil sources per operating year (MWh)	6,879	6,428	6,858	6,129
Avoided CO_2 emissions from fossil sources per operating year * (t)	3,536	3,304	3,525	3,150

*Coefficient used: 0.514 kg/kWh.

Anaerobic digestion plant: Lugo (RA)

Environmental green projects category

X	Increase of energy production by non-fossil fuels		Improvement of wastewater treatment plants
	Increase of energy efficiency		Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
	Improvement of WTE plants for waste treatment		

Environmental criteria

X	Fight against climate change		Clean Water
	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
GHG03	Biogas from composting plants for electrical energy production	- Net produced electricity from renewable non-fossil sources per operating year - Avoided CO_2 emissions from fossil sources per operating year

Value of the project

Total value	12,437,360 euro	
of wich financed by Green Bond	12,437,360 euro	

Project description

The plant forms part of the "Integrated Waste Centre", which also comprises a plant selecting the dry fraction of waste, a transhipment area, and a landfill for municipal waste and can be assimilated to special waste. The plant is dedicated to the storage and recovery of municipal and non-hazardous special waste through a virtuous anaerobic-aerobic type process which, as well as producing high-quality compost, also produces energy from renewable sources.

Plant description

Performance indicators

	2012	2013	2014	2015	2016	2017
Net produced electricity from renewable non-fossil sources per operating year (MWh)	199	5,491	7,465	7,002	7,373	7,475
Avoided CO_2 emissions from fossil sources per operating year * (t)	102	2,821	3,837	3,599	3,790	3,842

*Coefficient used: 0.514 kg/kWh.

Anaerobic digestion plant: Rimini

Environmental green projects category

X	Increase of energy production by non-fossil fuels		Improvement of wastewater treatment plants
	Increase of energy efficiency		Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
	Improvement of WTE plants for waste treatment		

Environmental criteria

X	Fight against climate change		Clean Water
	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
GHG03	Biogas from composting plants for electrical energy production	- Net produced electricity from renewable non-fossil sources per operating year - Avoided CO_2 emissions from fossil sources per operating year

Value of the project

Total value	13,173,225 euro	
of wich financed by Green Bond	13,173,225 euro	

Project description

The plant is dedicated to the storage and recovery of municipal waste and non-hazardous special waste through a virtuous anaerobic-aerobic type process which, as well as producing high-quality compost, also produces energy from renewable sources.

Plant description

Performance indicators

	2012	2013	2014	2015	2016	2017
Net produced electricity from renewable non-fossil sources per operating year (MWh)	57	5,064	6,817	7, 502	7,504	6,363
Avoided CO_2 emissions from fossil sources per operating year * (t)	29	2,602	3,503	3,856	3,857	3,271

*Coefficient used: 0.514 kg/kWh.

Anaerobic digestion plant: Sant'Agata Bolognese (BO)

Environmental green projects category

X	Increase of energy production by non-fossil fuels		Improvement of wastewater treatment plants
	Increase of energy efficiency		Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
	Improvement of WTE plants for waste treatment		

Environmental criteria

X	Fight against climate change		Clean Water
	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
GHG03	Biogas from composting plants for electrical energy production	- Net produced electricity from renewable non-fossil sources per operating year - Avoided CO_2 emissions from fossil sources per operating year

Value of the project

Total value	1,062,796 euro	
of wich financed by Green Bond	1,062,796 euro	

Project description

From organic waste to biomethane that can directly reach homes after being fed into distribution networks. The project consists in producing methane from renewable sources, specifically by anaerobically biodegrading the organic fraction of separated waste, to be done at the Sant'Agata Bolognese composting plant.

Hera has already been producing biogas for years, using biodigesters and landfills, to produce electricity; the next big step is to refine it to make biomethane like the gas that flows in household pipes. And this system is an initial embodiment that will use the organic fraction of the separated municipal waste as raw material to obtain biomethane and will also become fuel for methane-powered vehicles for local public transport.

The process begins with a semi-dry, continuous flow anaerobic biodigester where the organic waste is anaerobicically digested, producing biogas and the digestate. The digestate is then sent to the subsequent composting step that comprises oxidation and final screening, to obtain high quality compost. The biogas is sent to an upgrading section to remove undesired components and obtain methane gas that it meets the specifications to make it suitable for being fed into the network. This process is the foundation of a perfect circular economy in which food waste makes natural gas that can be used to cook more food or possibly be used for heating and for vehicles.

The biodigester will be able to process 100,000 tonnes per year of organic waste and 35,000 tonnes of green waste from separated waste collection, and starting in 2018 it will produce about 7.5 million m3 per year of biomethane and about 20,000 tonnes of compost. The total investment is expected to be just under Euro 30 million.

The construction phase of the plant started in March 2017 and is progressing rapidly. The plant is therefore expected to start up and feed the first biomethane into the grid by the end of 2018.

The project was included among best practices in the SDG Industry Matrix report published by the Global Compact and KPMG in 2017, which reports the business opportunities linked to the Sustainability Development Golas of the UN Agenda.

Plant description

Cogeneration plant: Imola

Environmental green projects category

	Increase of energy production by non-fossil fuels		Improvement of wastewater treatment plants
X	Increase of energy efficiency		Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
	Improvement of WTE plants for waste treatment		

Environmental criteria

X	Fight against climate change		Clean Water
	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
GHG05	High Efficiency Cogeneration, combined production of heat and power (CHP)	- PES Primary Energy Saving Indicator per operating year [%] - RISP Primary Energy Saving per operating year [MWh]

Value of the project

Total value	95,470,566 euro	
Of wich financed by Green Bond	95,470,566 euro	

Project description

The new 80 MWe Imola (Bologna) Cogeneration Plant was completed in 2009. It is the most recent project completed in Italy. It is a very technically and architecturally modern plant built within an urban area. The plant, with power of up to 80 Megawatts of electricity and just as many thermal Megawatts, will become the principal hub for the production of the heat required for the city's district heating network and will make the city of Imola energy independent, allowing for its separation from the domestic network and the isolated functioning of the plant even in the case of blackouts, creating a "system" with unique features within the national context.

Externally, the plant is integrated within the landscape so as to mitigate its impact. Internally, the colours and design enhance its technical functions and the full exploitation of space.

Again in 2017, the absolute specific emissions of the Imola cogeneration plant remained extremely low: However, in 2017, a small increase in NOx and CO emissions was noted due to some problems with the combustion of a gas turbine (which were promptly solved), while still remaining within the authorized emission limits. It should also be noted that the environmental authorization for the Imola plant requires limits that are 75%/80% lower than national regulations for the pollutants most present in the fumes (NOx and CO).

In 2017, 202,789 m3 of water were used to replenish the cooling tower, in compliance with the 220,000 m3 authorized by the IEA for that year, saving 3.6% compared to the previous year.

The Imola plant, used for district heating, not only confirms its excellent performance in terms of energy production but also from an environmental perspective since its low atmospheric emissions have been achieved with significant energy savings.

In 2017 the energy saving index was 21.1%, while the primary energy saved was 109,125 MWh, with a 9.5% worsening compared to the previous year.

Plant description

Performance indicators

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
PES Primary Energy Saving Indicator per operating year (%)	-	-	-	-	20%	19%	19%	19%
RISP Primary Energy Saving per operating year (MWh)	-	-	-	-	155,107	134,530	123,840	113,770
Net electrical energy produced (MWh)	-	-	-	239,751	338,284	333,534	332,372	276,889
Thermal energy produced (MWh)	-	-	-	37,099	106,990	99,607	103,946	101,028

	2014	**2015**	**2016**	**2017**
PES Primary Energy Saving Indicator per operating year (%)	18%	19%	19%	21%
RISP Primary Energy Saving per operating year (MWh)	79,100	118,719	120,550	109,125
Net electrical energy produced (MWh)	175,897	294,218	274,809	283,900
Thermal energy produced (MWh)	71,204	98,657	101,904	100,248

Development of industrial cogeneration

Environmental green projects category

	Increase of energy production by non-fossil fuels			Improvement of wastewater treatment plants
X	Increase of energy efficiency			Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
	Improvement of WTE plants for waste treatment			

Environmental criteria

X	Fight against climate change		Clean Water
	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
GHG05	High Efficiency Cogeneration, combined production of heat and power (CHP)	- PES Primary Energy Saving Indicator per operating year (%) - RISP Primary Energy Saving per operating year (MWh)

Value of the project

Total value	5,642,925 euro	
Of wich financed by Green Bond	5,642,925 euro	

Project description

In the industrial cogeneration sector, Hera offers multi-year energy supply contracts through the development and management of electricity and thermal energy production plants dedicated to meeting all the energy needs of top customers. The main product sectors in which the energy service is particularly effective are plastics, food, pharmaceuticals, ceramics and large-scale services such as museums, shopping centres, spas and condominiums.

With cogeneration and tri-generation (production of electricity and thermal energy at the same plant plus cooling services) primary energy is saved with respect to traditional consumption, emissions are reduced, energy efficiency is increased and supply costs are reduced.

HSE and ASE offer a full range of all energy carriers, making it inexpensive and easy for the customers to manage. HSE and ASE identify, in terms of the customer's energy requirements, the characteristics of the technology plant, manage the preparation of all authorisation documents, operate and manage the plant.

At the end of 2017, 14 cogeneration plants run by HSE were operational, 3 of witch are trigeneration plants.

The environmental benefits achieved in 2017 by these plants include 14,418 tonnes lower CO2 emissions and primary energy savings of approx. 6,162 toe.

Performance indicators: PES Primary Energy Saving (%)

	2014	2015	2016	2017
Cogenerazione Molino Rosso (IF)	9.1%	13.2%	11.8%	12.1%
Safta	17.8%	18.5%	18.7%	18.8%
Orogel	17.9%	18.0%	17.9%	18.6%
Cerindustries	20.8%	20.9%	22.5%	20.7%
Magema	15.7%	15.4%	16.4%	17.2%
Covalpa	15.2%	13.9%	13.9%	14.1%
Centroplast	15.2%	14.6%	14.7%	15.7%
Cafar	15.0%	15.3%	14.7%	15.1%
Palazzo Pepoli	0.0%	6.1%	5.6%	5.1%
Terme di Riolo	19.9%	8.4%	8.4%	9.8%
Villani	15.6%	16.0%	16.2%	17.3%
MB Mangimi	-	15.0%	15.3%	15.4%
Ducati	-	21.2%	17.7%	18.2%

Performance indicators: RISP Primary Energy Saving per operating year (MWh)

	2014	2015	2016	2017
Cogenerazione Molino Rosso (IF)	88	586	489	690
Safta	16,236	14,992	13,933	18,518
Orogel	9,845	10,279	11,128	9,951
Cerindustries	11,544	13,120	15,529	11,641
Magema	6,097	5,291	7,417	8,126
Covalpa	4,521	3,975	3,480	3,906
Centroplast	2,080	2,568	2,873	3,342
Cafar	2,182	2,044	2,544	2,785
Palazzo Pepoli	0	153	135	73
Terme di Riolo	654	201	404	473
Villani	2,461	4,421	5,163	5,634
MB Mangimi	-	2,047	3,726	3,686
Ducati	-	808	5,502	8,911

Development of district heating network: Area Bologna

Environmental green projects category

	Increase of energy production by non-fossil fuels			Improvement of wastewater treatment plants
X	Increase of energy efficiency			Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
	Improvement of WTE plants for waste treatment			

Environmental criteria

X	Fight against climate change		Clean Water
	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
GHG04	District heating grids partly connected to cogeneration and/or thermal energy production plants from non-fossil fuels	- Distributed thermal energy per operating year - Mix of fuels used for district heating grids per operating year

Value of the project

Total value	52,916,864 euro	
of wich financed by Green Bond	19,314,901 euro	

Project description

District heating is a service involving the sale of heat for customer home heating and domestic hot water. It is an alternative system to traditional autonomous or condominium-based boilers which makes it possible to concentrate the production of heat in central installations, which are more efficient and better controlled than home boilers. From these installations, the heat, in the form of hot water, is brought to customer homes through a distribution network made of insulated piping. The heat then feeds the heating systems of homes via non-polluting heat exchangers.

District heating provides a solution to air pollution problems in cities by replacing home boilers, which are sometimes fuelled by gas-oil or fuel oil, with high-efficiency heat production methods that use renewable energy, or energy recovered from other production processes. Besides providing an advantage for the environment, district heating allows customers to have greater safety and lower operation and maintenance costs, while maintaining the freedom to independently adjust the temperature of their home.

Furthermore, by continuing to replace fossil fuels with renewable energy or recovered energy, significant energy-environmental improvements have been achieved in the Group's district heating plants.

Plant description

Performance indicators

	2006	2007	2008	2009	2010	2011	2012	2013
Distributed thermal energy per operating year (MWh)	164,401	150,283	160,670	178,099	194,189	179,160	183,376	179,941
Primary energy saved (toe)	6,839	5,363	5,117	6,547	5,272	4,710	5,944	6,094
Mix of fuels used for district heating grids per operating year	46%	47%	48%	48%	42%	47%	41%	47%

	2014	2015	2016	2017
Distributed thermal energy per operating year (MWh)	143,035	160,902	155,559	167,919
Primary energy saved (toe)	3,908	6,798	5,853	7,150
Mix of fuels used for district heating grids per operating year	46%	49%	42%	52%

Development of district heating network: Area Ferrara

Environmental green projects category

	Increase of energy production by non-fossil fuels			Improvement of wastewater treatment plants
X	Increase of energy efficiency			Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
	Improvement of WTE plants for waste treatment			

Environmental criteria

X	Fight against climate change		Clean Water
	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
GHG04	District heating grids partly connected to cogeneration and/or thermal energy production plants from non-fossil fuels	- Distributed thermal energy per operating year - Mix of fuels used for district heating grids per operating year

Value of the project

Total value	21,922,525 euro	
Of wich financed by Green Bond	21,922,525 euro	

Project description

District heating is a service involving the sale of heat for customer home heating and domestic hot water. It is an alternative system to traditional autonomous or condominium-based boilers which makes it possible to concentrate the production of heat in central installations, which are more efficient and better controlled than home boilers. From these installations, the heat, in the form of hot water, is brought to customer homes through a distribution network made of insulated piping. The heat then feeds the heating systems of homes via non-polluting heat exchangers.

District heating provides a solution to air pollution problems in cities by replacing home boilers, which are sometimes fuelled by gas-oil or fuel oil, with high-efficiency heat production methods that use renewable energy, or energy recovered from other production processes. Besides providing an advantage for the environment, district heating allows customers to have greater safety and lower operation and maintenance costs, while maintaining the freedom to independently adjust the temperature of their home.

Furthermore, by continuing to replace fossil fuels with renewable energy or recovered energy, significant energy-environmental improvements have been achieved in the Group's district heating plants.

Plant description

Performance indicators

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Distributed thermal energy per operating year (MWh)	141,763	128,070	142,264	154,815	166,801	155,922	163,279	159,695
Primary energy saved (toe)	7,202	5,865	8,100	10,483	11,996	14,698	14,266	15,355
Mix of fuels used for district heating grids per operating year	46%	42%	52%	59%	63%	83%	77%	84%

	2014	**2015**	**2016**	**2017**
Distributed thermal energy per operating year (MWh)	121,626	143,788	142,652	141,224
Primary energy saved (toe)	12,954	12,444	12,824	13,167
Mix of fuels used for district heating grids per operating year	93%	75%	84%	88%

Development of district heating network: Area Forlì-Cesena

Environmental green projects category

	Increase of energy production by non-fossil fuels			Improvement of wastewater treatment plants
X	Increase of energy efficiency			Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
	Improvement of WTE plants for waste treatment			

Environmental criteria

X	Fight against climate change		Clean Water
	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
GHG04	District heating grids partly connected to cogeneration and/or thermal energy production plants from non-fossil fuels	- Distributed thermal energy per operating year - Mix of fuels used for district heating grids per operating year

Value of the project

Total value	34,504,140 euro	
Of wich financed by Green Bond	34,504,140 euro	

Project description

District heating is a service involving the sale of heat for customer home heating and domestic hot water. It is an alternative system to traditional autonomous or condominium-based boilers which makes it possible to concentrate the production of heat in central installations, which are more efficient and better controlled than home boilers. From these installations, the heat, in the form of hot water, is brought to customer homes through a distribution network made of insulated piping. The heat then feeds the heating systems of homes via non-polluting heat exchangers.

District heating provides a solution to air pollution problems in cities by replacing home boilers, which are sometimes fuelled by gas-oil or fuel oil, with high-efficiency heat production methods that use renewable energy, or energy recovered from other production processes. Besides providing an advantage for the environment, district heating allows customers to have greater safety and lower operation and maintenance costs, while maintaining the freedom to independently adjust the temperature of their home.

Furthermore, by continuing to replace fossil fuels with renewable energy or recovered energy, significant energy-environmental improvements have been achieved in the Group's district heating plants.

Plant description

Performance indicators

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Distributed thermal energy per operating year (MWh)	13,283	13,106	14,108	21,747	29,876	29,746	46,396	50,449
Primary energy saved (toe)	-31	-72	-203	197	187	190	1,089	1,137
Mix of fuels used for district heating grids per operating year	16%	23%	19%	29%	23%	18%	40%	34%

	2014	**2015**	**2016**	**2017**
Distributed thermal energy per operating year (MWh)	44,949	54,449	55,441	57,893
Primary energy saved (toe)	745	1,401	1,668	1,477
Mix of fuels used for district heating grids per operating year	44%	41%	45%	49%

Development of district heating network: Area Imola-Faenza

Environmental green projects category

	Increase of energy production by non-fossil fuels			Improvement of wastewater treatment plants
X	Increase of energy efficiency			Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
	Improvement of WTE plants for waste treatment			

Environmental criteria

X	Fight against climate change			Water quality
	Air quality			Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
GHG04	District heating grids partly connected to cogeneration and/or thermal energy production plants from non-fossil fuels	- Distributed thermal energy per operating year - Mix of fuels used for district heating grids per operating year

Value of the project

Total value	34,701,122 euro	
Of wich financed by Green Bond	34,701,122 euro	

Project description

District heating is a service involving the sale of heat for customer home heating and domestic hot water. It is an alternative system to traditional autonomous or condominium-based boilers which makes it possible to concentrate the production of heat in central installations, which are more efficient and better controlled than home boilers. From these installations, the heat, in the form of hot water, is brought to customer homes through a distribution network made of insulated piping. The heat then feeds the heating systems of homes via non-polluting heat exchangers.

District heating provides a solution to air pollution problems in cities by replacing home boilers, which are sometimes fuelled by gas-oil or fuel oil, with high-efficiency heat production methods that use renewable energy, or energy recovered from other production processes. Besides providing an advantage for the environment, district heating allows customers to have greater safety and lower operation and maintenance costs, while maintaining the freedom to independently adjust the temperature of their home.

Furthermore, by continuing to replace fossil fuels with renewable energy or recovered energy, significant energy-environmental improvements have been achieved in the Group's district heating plants.

Plant description

Performance indicators

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Distributed thermal energy per operating year (MWh)	75,207	73,708	74,713	87,149	109,259	100,582	104,207	102,537
Primary energy saved (toe)	1,710	1,378	88	3,142	11,478	8,474	12,019	10,331
Mix of fuels used for district heating grids per operating year	67%	52%	33%	71%	94%	94%	92%	94%

	2014	**2015**	**2016**	**2017**
Distributed thermal energy per operating year (MWh)	83,446	101,115	102,888	102,889
Primary energy saved (toe)	6,215	11,212	12,460	14,955
Mix of fuels used for district heating grids per operating year	94%	95%	97%	95%

Development of district heating network: Area Modena

Environmental green projects category

	Increase of energy production by non-fossil fuels			Improvement of wastewater treatment plants
X	Increase of energy efficiency			Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
	Improvement of WTE plants for waste treatment			

Environmental criteria

X	Fight against climate change			Clean Water
	Air quality			Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
GHG04	District heating grids partly connected to cogeneration and/or thermal energy production plants from non-fossil fuels	- Distributed thermal energy per operating year - Mix of fuels used for district heating grids per operating year

Value of the project

Total value	11,872,976 euro	
Of wich financed by Green Bond	11,872,976 euro	

Project description

District heating is a service involving the sale of heat for customer home heating and domestic hot water. It is an alternative system to traditional autonomous or condominium-based boilers which makes it possible to concentrate the production of heat in central installations, which are more efficient and better controlled than home boilers. From these installations, the heat, in the form of hot water, is brought to customer homes through a distribution network made of insulated piping. The heat then feeds the heating systems of homes via non-polluting heat exchangers.

District heating provides a solution to air pollution problems in cities by replacing home boilers, which are sometimes fuelled by gas-oil or fuel oil, with high-efficiency heat production methods that use renewable energy, or energy recovered from other production processes. Besides providing an advantage for the environment, district heating allows customers to have greater safety and lower operation and maintenance costs, while maintaining the freedom to independently adjust the temperature of their home.

Furthermore, by continuing to replace fossil fuels with renewable energy or recovered energy, significant energy-environmental improvements have been achieved in the Group's district heating plants.

Plant description

Performance indicators

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Distributed thermal energy per operating year (MWh)	31,047	25,032	28,881	30,102	30,978	30,412	29,759	31,452
Primary energy saved (toe)	92	24	18	99	545	1,285	1,550	1,554
Mix of fuels used for district heating grids per operating year	0%	0%	0%	0%	0%	41%	45%	44%

	2014	**2015**	**2016**	**2017**
Distributed thermal energy per operating year (MWh)	23,368	26,777	28,256	26,479
Primary energy saved (toe)	1,080	1,228	990	850
Mix of fuels used for district heating grids per operating year	50%	44%	45%	40%

Improvement of WTE plants for waste treatment: Ferrara

Environmental green projects category

	Increase of energy production by non-fossil fuels			Improvement of wastewater treatment plants
X	Increase of energy efficiency			Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
X	Improvement of WTE plants for waste treatment			

Environmental criteria

X	Fight against climate change		Clean Water
X	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
GHG06	Improve WTE plants efficiency to increase electrical energy production from waste treatment	- Net electrical energy produced per treated waste unit per operating year
AIR01	Improve WTE plants efficiency to reduce air pollution from waste treatment	- Quality of air emissions per treated waste unit per operating year

Value of the project

Total value	85,769,836 euro	
Of wich financed by Green Bond	42,884,918 euro	Considered only the portion of the total investment relating to the fume-purification plant and the energy production section

Project description

The plant is equipped with fume treatment and process and emission control systems, designed and built so as to attain:

- elevated fume treatment performances in all process conditions;
- elevated management versatility;
- elevated reliability of emission control systems.

In order to meet these goals, the plant is equipped with the following systems:

- double reaction and filtration system to lower the concentrations of particulate, hydrochloric acid, hydrofluoric acid, sulphur dioxide, heavy metals, dioxins and furans and aromatic polycyclic hydrocarbons;
- double reaction system (catalytic and non-catalytic) to reduce concentrations of nitrogen oxides;
- double fume monitoring system for process control: the two systems measure the concentrations of the main pollutants emanating from the oven and downstream of the first reaction and filtration phase,

on the basis of which a calculation is made of the volume of reactants required to ensure treatment levels that guarantee respect for legal emission limits and which are, on average, 80-90% below these;

- continuous double monitoring system for chimney emissions: one as a reserve for the other in order to guarantee the continuity of the analysis of concentrations in atmospheric emissions.

The possibility of using double treatment and monitoring systems in series (in parallel as regards chimney monitoring) allows the above objectives to be successfully pursued.

Plant description

Performance indicators

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Electricity generated in relation to waste disposed of (KWh/t)	288	251	592	526	438	466	378	397
Compliance of waste-to-energy plant atmospheric emissions with regulations - (optimal values <100%)	21.3%	14.5%	9.7%	8.5%	7.3%	7.5%	7.6%	7.2%

	2014	**2015**	**2016**	**2017**
Electricity generated in relation to waste disposed of (KWh/t)	482	486	484	395
Compliance of waste-to-energy plant atmospheric emissions with regulations - (optimal values <100%)	7.8%	9.0%	9.5%	9.4%

Improvement of WTE plants for waste treatment: Forlì

Environmental green projects category

	Increase of energy production by non-fossil fuels			Improvement of wastewater treatment plants
X	Increase of energy efficiency			Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
X	Improvement of WTE plants for waste treatment			

Environmental criteria

X	Fight against climate change		Clean Water
X	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
GHG06	Improve WTE plants efficiency to increase electrical energy production from waste treatment	- Net electrical energy produced per treated waste unit per operating year
AIR01	Improve WTE plants efficiency to reduce air pollution from waste treatment	- Quality of air emissions per treated waste unit per operating year

Value of the project

Total value	78,244,506 euro	
Of wich financed by Green Bond	39,122,253 euro	Considered only the portion of the total investment relating to the fume-purification plant and the energy production section

Project description

The plant is equipped with fume treatment and process and emission control systems, designed and built so as to attain:

- elevated fume treatment performances in all process conditions;
- elevated management versatility;
- elevated reliability of emission control systems.

In order to meet these goals, the plant is equipped with the following systems:

- double reaction and filtration system to lower the concentrations of particulate, hydrochloric acid, hydrofluoric acid, sulphur dioxide, heavy metals, dioxins and furans and aromatic polycyclic hydrocarbons;
- double reaction system (catalytic and non-catalytic) to reduce concentrations of nitrogen oxides;
- double fume monitoring system for process control: the two systems measure the concentrations of the main pollutants emanating from the oven and downstream of the first reaction and filtration phase,

on the basis of which a calculation is made of the volume of reactants required to ensure treatment levels that guarantee respect for legal emission limits and which are, on average, 80-90% below these;

- continuous double monitoring system for chimney emissions: one as a reserve for the other in order to guarantee the continuity of the analysis of concentrations in atmospheric emissions.

The possibility of using double treatment and monitoring systems in series (in parallel as regards chimney monitoring) allows the above objectives to be successfully pursued.

Plant description

Performance indicators

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Electricity generated in relation to waste disposed of (KWh/t)	243	295	449	567	475	428	469	483
Compliance of waste-to-energy plant atmospheric emissions with regulations - (optimal values <100%)	30.3%	31.3%	22.7%	8.5%	10.2%	7.9%	7.7%	9.4%

	2014	**2015**	**2016**	**2017**
Electricity generated in relation to waste disposed of (KWh/t)	510	553	528	513
Compliance of waste-to-energy plant atmospheric emissions with regulations - (optimal values <100%)	10.1%	10.9%	11.3%	11.7%

Improvement of WTE plants for waste treatment: Modena

Environmental green projects category

	Increase of energy production by non-fossil fuels			Improvement of wastewater treatment plants
X	Increase of energy efficiency			Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
X	Improvement of WTE plants for waste treatment			

Environmental criteria

X	Fight against climate change		Clean Water
X	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
GHG06	Improve WTE plants efficiency to increase electrical energy production from waste treatment	- Net electrical energy produced per treated waste unit per operating year
AIR01	Improve WTE plants efficiency to reduce air pollution from waste treatment	- Quality of air emissions per treated waste unit per operating year

Value of the project

Total value	93,506,843 euro	
Of wich financed by Green Bond	46,753,421 euro	Considered only the portion of the total investment relating to the fume-purification plant and the energy production section

Project description

The plant is equipped with fume treatment and process and emission control systems, designed and built so as to attain:

- elevated fume treatment performances in all process conditions;
- elevated management versatility;
- elevated reliability of emission control systems.

In order to meet these goals, the plant is equipped with the following systems:

- double reaction and filtration system to lower the concentrations of particulate, hydrochloric acid, hydrofluoric acid, sulphur dioxide, heavy metals, dioxins and furans and aromatic polycyclic hydrocarbons;
- double reaction system (catalytic and non-catalytic) to reduce concentrations of nitrogen oxides;
- double fume monitoring system for process control: the two systems measure the concentrations of the main pollutants emanating from the oven and downstream of the first reaction and filtration phase,

on the basis of which a calculation is made of the volume of reactants required to ensure treatment levels that guarantee respect for legal emission limits and which are, on average, 80-90% below these;

- continuous double monitoring system for chimney emissions: one as a reserve for the other in order to guarantee the continuity of the analysis of concentrations in atmospheric emissions.

The possibility of using double treatment and monitoring systems in series (in parallel as regards chimney monitoring) allows the above objectives to be successfully pursued.

Plant description

Performance indicators

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Electricity generated in relation to waste disposed of (KWh/t)	260	253	282	349	605	596	636	624
Compliance of waste-to-energy plant atmospheric emissions with regulations - (optimal values <100%)	19.3%	22.0%	21.6%	16.9%	15.6%	16.2%	14.2%	12.8%

	2014	**2015**	**2016**	**2017**
Electricity generated in relation to waste disposed of (KWh/t)	629	642	542	588
Compliance of waste-to-energy plant atmospheric emissions with regulations - (optimal values <100%)	14.8%	15.3%	14.2%	13.9%

Improvement of WTE plants for waste treatment: Rimini

Environmental green projects category

	Increase of energy production by non-fossil fuels		Improvement of wastewater treatment plants
X	Increase of energy efficiency		Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
X	Improvement of WTE plants for waste treatment		

Environmental criteria

X	Fight against climate change		Clean Water
X	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
GHG06	Improve WTE plants efficiency to increase electrical energy production from waste treatment	- Net electrical energy produced per treated waste unit per operating year
AIR01	Improve WTE plants efficiency to reduce air pollution from waste treatment	- Quality of air emissions per treated waste unit per operating year

Value of the project

Total value	88,820,743 euro	
Of wich financed by Green Bond	44,410,371 euro	Considered only the portion of the total investment relating to the fume-purification plant and the energy production section

Project description

The plant is equipped with fume treatment and process and emission control systems, designed and built so as to attain:

- elevated fume treatment performances in all process conditions;
- elevated management versatility;
- elevated reliability of emission control systems.

In order to meet these goals, the plant is equipped with the following systems:

- double reaction and filtration system to lower the concentrations of particulate, hydrochloric acid, hydrofluoric acid, sulphur dioxide, heavy metals, dioxins and furans and aromatic polycyclic hydrocarbons;
- double reaction system (catalytic and non-catalytic) to reduce concentrations of nitrogen oxides;
- double fume monitoring system for process control: the two systems measure the concentrations of the main pollutants emanating from the oven and downstream of the first reaction and filtration phase,

on the basis of which a calculation is made of the volume of reactants required to ensure treatment levels that guarantee respect for legal emission limits and which are, on average, 80-90% below these;

- continuous double monitoring system for chimney emissions: one as a reserve for the other in order to guarantee the continuity of the analysis of concentrations in atmospheric emissions.

The possibility of using double treatment and monitoring systems in series (in parallel as regards chimney monitoring) allows the above objectives to be successfully pursued.

Plant description

Performance indicators

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Electricity generated in relation to waste disposed of (KWh/t)	399	353	351	339	301	503	579	567
Compliance of waste-to-energy plant atmospheric emissions with regulations - (optimal values <100%)	26.5%	24.7%	23.0%	18.6%	13.1%	7.8%	9.0%	10.1%

	2014	**2015**	**2016**	**2017**
Electricity generated in relation to waste disposed of (KWh/t)	563	590	478	468
Compliance of waste-to-energy plant atmospheric emissions with regulations - (optimal values <100%)	12.1%	12.5%	11.8%	13.8%

Improvement of waste and water treatment plants: Bologna

Environmental green projects category

	Increase of energy production by non-fossil fuels	X	Improvement of wastewater treatment plants
	Increase of energy efficiency		Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
	Improvement of WTE plants for waste treatment		

Environmental criteria

	Fight against climate change	X	Clean Water
	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
WAT01	Improve wastewater treatment plants efficiency	- Inhabitants Equivalent - Quality of discharged water per treated water unit per operating year

Value of the project

Total value	5,224,543 euro	
Of wich financed by Green Bond	5,224,543 euro	

Project description

General improvement of the plant.

Performance indicators

	Before project (jul-set 2011)	After project (jul-set 2012)	Improvement
Population equivalents (population equivalents)	900,000	900,000	0.0%
COD (mg/l)	28.0	27.4	-2.1%
BOD5 (mg/l)	14.0	5.8	-58.6%
SST (mg/l)	7.0	13.1	87.1%
Ammoniacal nitrogen (mg/l)	4.7	1.5	-68.1%
Total nitrogen (mg/l)	12.0	9.5	-20.8%
Total phospfor (mg/l)	1.00	0.6	-40.0%

	2006	2007	2008	2009	2010	2011	2012	2013
COD (mg/l)	45.1	56.0	36.2	33.7	51.9	41.8	40.8	30.0
BOD5 (mg/l)	11.2	20.1	7.0	7.3	13.8	15.7	13.4	6.8
SST (mg/l)	19.8	16.9	10.6	10.7	19.8	16.3	13.6	8.9
Ammoniacal nitrogen (mg/l)	10.2	10.7	11.2	11	10	6.0	10.8	4.8
Total nitrogen (mg/l)	-	-	-	-	-	13	17.6	11.7
Total phospfor (mg/l)	-	-	-	-	-	1.1	1.3	0.9

	2014	2015	2016	2017
COD (mg/l)	30.7	32.4	31.6	28.2
BOD5 (mg/l)	6.8	10.4	11.0	6.3
SST (mg/l)	10.1	9.8	8.3	8.3
Ammoniacal nitrogen (mg/l)	2.2	5.5	5.3	0.0
Total nitrogen (mg/l)	10	9.3	9.6	9.4
Total phospfor (mg/l)	0.9	0.9	0.9	0.9

Improvement of waste and water treatment plants: Lugo (RA)

Environmental green projects category

	Increase of energy production by non-fossil fuels	X	Improvement of wastewater treatment plants
	Increase of energy efficiency		Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
	Improvement of WTE plants for waste treatment		

Environmental criteria

	Fight against climate change	X	Clean Water
	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
WAT01	Improve wastewater treatment plants efficiency	- Inhabitants Equivalent - Quality of discharged water per treated water unit per operating year

Value of the project

Total value	4,450,969 euro	
Of wich financed by Green Bond	4,450,969 euro	

Project description

General improvement of the plant.

Performance indicators

	Before project (oct-dec 2011)	After project (oct-dec 2012)	Improvement
Population equivalents (population equivalents)	270,000	270,000	0.0%
COD (mg/l)	52.3	44.8	-14.3%
BOD5 (mg/l)	7.7	5.5	-29.0%
SST (mg/l)	16.0	8.2	-48.8%
Ammoniacal nitrogen (mg/l)	8.6	1.0	-88.7%
Total nitrogen (mg/l)	28.3	8.8	-69.0%
Total phospfor (mg/l)	0.9	0.4	-60.7%

	2006	2007	2008	2009	2010	2011	2012	2013
COD (mg/l)	51.8	50.2	50.6	41.0	40.4	39.8	52.2	39.1
BOD5 (mg/l)	8.8	7.6	10.0	4.9	4.6	5.7	16.4	7.4
SST (mg/l)	11.9	11.9	9.6	7.4	7.1	10.1	13.3	11.3
Ammoniacal nitrogen (mg/l)	1.4	1.8	3.7	3	2	3.8	3.8	1.4
Total nitrogen (mg/l)						15	12.1	9.2
Total phospfor (mg/l)						0.9	0.4	0.5

	2014	2015	2016	2017
COD (mg/l)	27.6	41.9	37.0	35.9
BOD5 (mg/l)	7.7	10.6	9.8	10.6
SST (mg/l)	8.7	11.6	10.3	9.2
Ammoniacal nitrogen (mg/l)	6.1	2.7	2.1	1.8
Total nitrogen (mg/l)	9.3	11.9	8.0	6.9
Total phospfor (mg/l)	0.5	0.9	0.5	0.6

Improvement of waste and water treatment plants: Forlì

Environmental green projects category

	Increase of energy production by non-fossil fuels	X	Improvement of wastewater treatment plants
	Increase of energy efficiency		Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
	Improvement of WTE plants for waste treatment		

Environmental criteria

	Fight against climate change	X	Clean Water
	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
WAT01	Improve wastewater treatment plants efficiency	- Inhabitants Equivalent - Quality of discharged water per treated water unit per operating year

Value of the project

Total value	7,175,756 euro	
Of wich financed by Green Bond	7,175,756 euro	

Project description

General improvement of the plant.

Performance indicators

	Before project (oct-dec 2012)	After project (oct-dec 2013)	Improvement
Population equivalents (population equivalents)	250,000	250,000	0.0%
COD (mg/l)	23.50	24.05	2.3%
BOD5 (mg/l)	5.20	5.00	-3.8%
SST (mg/l)	7.00	8.05	15.0%
Ammoniacal nitrogen (mg/l)	1.90	3.54	86.3%
Total nitrogen (mg/l)	15.30	12.65	-17.3%
Total phospfor (mg/l)	0.30	0.13	-56.7%

	2006	2007	2008	2009	2010	2011	2012	2013
COD (mg/l)	34.7	33.9	29.7	30.7	25.2	24.7	23.5	22.7
BOD5 (mg/l)	14.0	13.3	7.6	5.1	5.3	5.1	5.2	5.2
SST (mg/l)	10.3	12.3	11.8	11.6	8.5	10.5	7.0	8.8
Ammoniacal nitrogen (mg/l)	3.2	3.3	4.5	2	1	1.7	1.9	2.1
Total nitrogen (mg/l)						16	15.3	13.7
Total phospfor (mg/l)						0.4	0.3	0.2

	2014	2015	2016	2017
COD (mg/l)	24.5	25.4	25.5	24.4
BOD5 (mg/l)	5.8	10.0	8.3	10.0
SST (mg/l)	8.4	7.1	6.4	6.8
Ammoniacal nitrogen (mg/l)	0.7	1.1	1.2	1.9
Total nitrogen (mg/l)	9.1	8.5	9.6	10.7
Total phospfor (mg/l)	0.2	0.3	0.3	0.5

Improvement of waste and water treatment plants: Rimini Seawater Protection Plan continues

Environmental green projects category

	Increase of energy production by non-fossil fuels	X	Improvement of wastewater treatment plants
	Increase of energy efficiency		Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
	Improvement of WTE plants for waste treatment		

Environmental criteria

	Fight against climate change	X	Clean Water
	Air quality		Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
WAT01	Improve wastewater treatment plants efficiency	- Inhabitants Equivalent - Quality of discharged water per treated water unit per operating year

Value of the project

Total value	30,000,000 euro	Importo di competenza Hera
of wich financed by Green Bond	17,181,436 euro	

Project description

The Seawater Protection Plan aims to eliminate swimming bans and reduce the pollution measured in terms of COD by 90% by 2020, through structural measures on the sewerage – treatment system of the City of Rimini.

The numerical modelling of the sewerage – treatment system already started in 2014, and led to further optimization of the measures already planned for the system of tanks that serves the southern area of Rimini and the identification of 3 additional measures. The optimization of the tanks, introducing a different way to manage rainwater, together with additional measures that involve the construction of the works called the Ausa backbone sewage collector, Mavone spillway and the sewerage pumping system in via Santa Chiara are able to determine synergies that significantly reduce the risk of flooding in most of the built-up area where this problem often occurs and thus expand the objectives of the plan to include a mitigation of hydrological risks. In this regard, it should be noted that the preliminary investigation is also under-way for these additional works, aimed at obtaining further public funding in the so-called "Italia Sicura" sector.

The Plan is currently essentially made up of the 10 measures originally planned, plus the filling of the Ausa Canal, added in 2015, and the additional measures mentioned above, for a total of 14 measures amounting to over Euro 160 million.

At the same time, the Plan's optimization process is making progress; aimed at identifying, through numerical modelling of the system, especially in terms of cost/benefit ratio, any additional measures capable of further improving the city's sewerage – treatment system overall, in terms of both further structural improvements and refinement of management methods.

The situation of the 14 measures is as follows:

Measure	Progress at 31 December 2016	Expected/actual year of completion	Motivation/benefits
1. Doubling of the Santa Giustina waste-water treatment plant	Completed	2016	Treatment process improvement
2. Conversion of the Rimini Marecchiese treatment plant into a collection tank	Construction in progress (first portion completed)	2018	Treatment process improvement
3. Construction of the Dorsale Nord backbone, for drainage of the Bellaria waste-water treatment plant into the S. Giustina WWTP	Completed	2016	Treatment process improvement
4. Completion of the separation of sewer networks in the northern area of Rimini	Construction of first portion, second lot in progress Design of second lot in progress (first portion, second lot concluded)	2021	Conversion of 5 sewer drains into the sea into rainwater drains (including 2 in 2016)
5. Construction of the Dorsale Sud backbone	Construction in progress of second portion Design of third lot in progress (first portion completed)	2020	Reduction in the number of openings of the Ausa and Colonnella drains into the sea
6. Completion of the separation in the Roncasso and Pradella basins	Design in progress	2021	Conversion of 2 sewer drains into the sea into 2 rainwater drains
7. Construction of subsea pipeline and pumping station for the Ausa basin and reservoirs	Construction of first portion in progress Second portion to be designed	2020	Reduction in the number of openings of the Ausa drains into the sea
8. Construction of hospital detention reservoir	Completed	2016	Reduction in the number of openings of the Colonnella I drains into the sea
9. Construction of connecting conduit between Fossa Colonnella I and Fossa Colonella II; Vasca Colonella II and Vasca Rodella and subsea discharge conduit	Design in progress	2022	Reduction in the number of openings of the Colonnella I, Colonnella II and Rodella drains into the sea
10. Isola sewer decontamination	Completed	2014	Optimization of the sewer system

Measure	Progress at 31 December 2016	Expected/actual year of completion	Motivation/benefits
11. Filling the Ausa beach stretch	Completed	2016	Improvement of the usability of the area and of its environmental conditions
12. Sewage collector of Ausa backbone	Design in progress	2021	Reduction of hydrological risks
13. Mavone spillway	Construction in progress	2018	Reduction of hydrological risks
14. Sewer pumping in via Santa Chiara	Design in progress	2019	Reduction of hydrological risks

The completion of the works described above have made it possible to enjoy the first significant environmental benefits, reducing the amounts of COD/BOD disposed of at sea.

The progress of the construction work does not lead us to expect any significant issues and makes us expect to achieve our quality objectives, while the date of completion of the measures has not been significantly postponed, also due to the advisability of revising the plan mentioned above.

Rimini Seawater Protection Plan was included among the best practices in the SDG Industry Matrix report published by the Global Compact and KPMG in 2017, which reports on business opportunities linked to the objectives of the UN 2030 Agenda.

Performance indicators: Rimini Santa Giustina plant

	2013	2014	2015	2016	2017
COD (mg/l)	24.3	25.5	27.9	22.4	24.1
BOD5 (mg/l)	5.7	5.3	10.0	10.3	10.0
SST (mg/l)	11.4	10.0	8.8	6.5	7.6
Azoto Ammoniacale (mg/l)	2.4	1.4	1.4	1.5	3.1
Azoto totale (mg/l)	9.5	6.4	7.4	8.2	8.0
Fosforo totale (mg/l)	0.6	0.7	1.3	1.2	1.0
Volumi trattati (migliaia di mc)	14,739	15,627	29,642	34,598	30,622
Potenzialità dell'impianto (abitanti equivalenti)	220,000	220,000	560,000	560,000	560,000

Development of sorted waste collection services

Environmental green projects category

	Increase of energy production by non-fossil fuels		Improvement of wastewater treatment plants
	Increase of energy efficiency	X	Increase of sorted waste collection and disposal and reduction of waste disposed in landfills
	Improvement of WTE plants for waste treatment		

Environmental criteria

	Fight against climate change		Clean Water
	Air quality	X	Sustainable Waste management

Admissibility criteria and performance indicators

Id.	Definition of criteria for projects admissibility	Performance indicators
WAS01	Community recycling depot	- Sorted waste collection for inhabitant per operational year - Sorted waste collection per operational year - Ratio of sorted waste to overall managed waste per operational year - New community recycling depots installed on territory per operational year

Value of the project

Total value	13,742,184 euro	
Of wich financed by Green Bond	13,742,184 euro	

Project description

The area served by the Hera Group has a very well-structured collection system that makes it possible to separately collect many different types of municipal waste, primarily for material recovery, reconciling the needs of the Municipalities with management efficiency and effectiveness.

Hera's Waste Management System (WMS) is characterized by three main services:

- **local collection:** these are widespread collections throughout the territory, primarily targeted at residential users and small, non-residential users and can be carried out using;
  - roadside bins, set up according to the Basic Drop-Off Points (IEB) model which groups the main collection chains into individual stations; in recent years, electronic traceability systems for disposal monitoring (e.g. the "lid" model for non-separated waste or lock for separated waste collection chains) are becoming increasingly widespread in combination with road containers;
  - door-to-door collection, carried out at the users' premises, where residents set out the waste on fixed days and times for collection.
- **residential collection** for "target", non-domestic users that produce specific waste similar to urban waste (cardboard in shops, glass or tins in bars, organic waste in canteens or restaurants, etc.);

- **Waste collection centres**: also known as Drop-Off Points, these infrastructures are present in almost all the municipalities served by Hera and complete the range of services offered to residents for dropping off separated urban waste. The use of waste collection centres is becoming a real habit for residents: a wide range of categories of urban waste (including certain hazardous waste) can be safely disposed of; bulky and heavy waste can be disposed of; in many areas there is a discount system that rewards the disposal of many categories of differentiated waste.

Performance indicators

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Sorted waste collection (%)	-	-	-	45.3%	48.5%	51.0%	51.9%	54.0%
Sorted waste collection for inhabitant (kg)	-	-	-	317	349	357	353	366
Portion of urban waste collected for disposal via landfill (%)	-	-	-	27%	22%	20%	19%	16%
Sorted waste collection (thousands of t)	-	-	-	796	883	901	888	925
New Waste collection centres	-	-	-	7	7	3	6	2
Number of Waste collection centres	-	-	-	135	135	138	137	139

	2014	**2015**	**2016**	**2017**
Sorted waste collection (%)	55.3%	56.7%	57.4%	58.1%
Sorted waste collection for inhabitant (kg)	373	382	391	392
Portion of urban waste collected for disposal via landfill (%)	12%	6.4%	5.5%	5.2
Sorted waste collection (thousands of t)	958	982	1,005	1,009
New Waste collection centres	3	-	-	-
Number of Waste collection centres	142	142	139	139