



Green Bond Project (post issue)
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March 2023

Waste to energy plant for heat production in Parma

1 WASTE MANAGEMENT BU

Ref.: project 1-ISIN XS1704789590

Ref.: project 1-ISIN XS2065601937



Eligible Category

Energy efficiency (Cogeneration facilities)

Full amount project

227.5 mln

Financed amount

Total 5.2 mln

KPIs

- PES Primary Energy Saving Indicator per operating year [%]
- Renewable energy share in percent on total [%]
- Thermal energy recovered from waste to Parma DH network in MWh per operating year [GWh]

Project description

The waste-to-energy plant (WTE) for municipal and special solid waste in Parma was built between 2009 and 2013, the year in which it entered service. The site, called PAI, located in the Municipality of Parma also provides for the construction of other waste treatment plants, including an urban waste pre-treatment plant.

The waste-to-energy plant, made up of two 35.7 MW combustion lines, can supply a nominal electric power of 22.25 MW and a thermal power of 43.5 MW.

The thermal energy produced is transferred to the city district heating network, to which the plant is directly connected.

Waste to energy plant for heat production in Piacenza

2 WASTE MANAGEMENT BU

Ref.: project 2-ISIN XS1704789590

Ref.: project 2-ISIN XS2065601937



Eligible Category

Energy efficiency (Cogeneration facilities)

Full amount project

21.0 mln

Financed amount

Total 4.6 mln

KPIs

- PES Primary Energy Saving Indicator per operating year [%]
- Renewable energy share in percent on total [%]
- Thermal energy recovered from waste to Piacenza DH network in MWh per operating year [GWh]

Project description

The project involves the construction of a cogeneration section at the existing solid waste-to-energy plant located in Piacenza. The current state consists of two combustion lines (input 22.7 MW each) that feed a steam cycle with a 11.6 MW condensing type turbine.

In order to strengthen the urban district heating in the city of Piacenza, the city network is expected to be extended and connected to the existing waste-to-energy plant with its consequent modification in order to recover the thermal energy necessary for heat distribution.

The plant started permanent production and cogeneration in autumn 2021.

Development of separate waste collection services

3 WASTE MANAGEMENT BU

Ref.: project 3-ISIN XS1704789590

Ref.: project 3-ISIN XS2065601937

Ref.: project 5-ISIN XS2275029085



Eligible Category

Waste management efficiency and recycling (Waste collection and sorting upgrades)

Full amount project

101.0 mln

Financed amount

Total 16.2 mln

KPIs

- Total sorted waste collection [t]
- Total of non sorted waste disposed [t]
- Sorted waste collection [%]

Project description

The project concerns the development of separate waste collection through:

1) TRANSFORMATION OF THE SORTED WASTE COLLECTION SYSTEM

- TORINO: transformation of the separate collection system in Torino with the extension of home collection. The enhancement is realized through traditional internalized door-to-door models, with small-sized containers placed on private property, or through the use of large-sized smart containers placed on the public road, prodromal to the application of the punctual pricing
- EMILIA: Anticipating the regional planning, in the territories of the Emilian municipalities served by Iren, the Group has implemented a progressive transformation of waste collection services from the road model to the door-to-door model, with prodromal methods for the application of punctual pricing. The situation of the interventions is diversified in the 3 provinces

2) COLLECTION HUBS IN THE EMILIA AREA

It is the progressive extension to all collection hubs of a computerized system used for the registration of incoming users and for the control of delivered volumes in order to the application of a discount system. Following the identification by the user, a special device is used to input all the information relating to the contribution operation.



Eligible Category

Waste management efficiency and recycling (Waste collection and sorting upgrades)

Full amount project

27.8 mln

Financed amount

Total 14.6 mln

KPIs

- Plastics treated [t]
- Card and cardboard treated [t]
- Ratio of unsorted plastics (% of plastics treated) [%]
- Ratio of unsorted paper (% of paper treated) [%]
- Ratio of unsorted cardboard (% of cardboard treated) [%]

Project description

The aim of this project is to increase the waste treatment capacity of IREN AMBIENTE. In particular, with this project, IAM will select waste as plastics, card and cardboard with a completely automated plant. The referring area is Emilia Romagna region in particular the waste collected in the Province of Piacenza, Parma and Reggio Emilia.

In this way IREN AMBIENTE will growth the quality of the material sent to the "consorzio di filiera" as COMIECO and COREPLA. To follow the changing of the market, the plant projected will assure the possibility to modify easily the selection of the material. Is possible to reach this achievement with an highly automatic selection plant.

The start of the works took place in 2022.

The plant started commercial operation according to normal rump up in the first quarter of 2022 and its capacity is 36,000 t/y for plastic and 100,000 t/y for paper and cardboard.

Eligible Category

Waste management efficiency and recycling (Waste collection and sorting upgrades)

Full amount project

25.5 mln

Financed amount

Total 6.2 mln

KPIs

- Production of compost (% on organic fraction in input) [%]
- Production of biomethane [Msm³]
- Avoided CO₂ emissions from fossil sources per operating year [t]
- Primary energy saving per operating year [Toe]

Project description

The second of July 2019, Iren Ambiente acquired the whole property of FERRANIA ECOLOGIA, owner of an existing plant. The total cost of the acquisition is around 8.8 million Euros.

The plant actually treats 30,000 t/y of bio-waste municipal waste which are turned into compost.

In 2018, the local authority approved to increase the total amount of waste from 30,000 t/y to 60,000 t/y, to which 20,000 t/y of compostable waste are added for a total of 80,000 t/y. In meantime approved the production of Biomethane.

The aim of the project is the construction of a bio-waste treatment plant exploiting the organic and green waste collected in the Liguria region, in particular in the provinces of Savona and Genoa, and for remaining part the bio-waste available on the market.

The proposed plant falls into the category of projects identified in Annex IV, Part Two of Legislative Decree 152/2006.

The Biomethane is produced in accord to the incentivisation law of the biofuel and biomethane, D.M. 2018/03/02.

The plant started commercial operation in July 2021

Eligible Category

Waste management efficiency and recycling (Waste collection and sorting upgrades)

Full amount project

25.9 mln

Financed amount

Total 6.3 mln

KPIs

- Production of compost (% on organic fraction in input) [%]
- Production of biomethane [Msm³]
- Avoided CO₂ emissions from fossil sources per operating year [t]
- Primary energy saving per operating year [Toe]

Project description

In the month of July 2019, Iren Ambiente acquired the whole property of the company TERRITORIO E RISORSE, owner of an existing plant. The total cost of the acquisition is around 6.5 million Euros. The plant actually is authorized to treat 36,000 t/y of bio-waste municipal waste (26,000 t/y Bio-waste and 10,000 t/y Green waste) which are turned into compost.

In 2019, the local authority approved to increase the total amount of waste treated to 60.000 t/y of which 50,000 t/a (consisting of: 40,000 t/a of organic waste and 10.000 t / a of vegetable waste and ashes) and 10,000 t/a of organic waste storage. In meantime the production of Biomethane.

In July 2021 Authorities issued increase of capacity of biowaste to 68,000 t/y added to 10,000 t/y of green waste and 5,000 t/y of of fal

The aim of the project is the construction of a bio-waste treatment plant exploiting the biowaste and green waste collected in the Piemonte region, in particular in the provinces of Vercelli, Novara, Verbano Cusio Ossola and Alessandria, and for remaining part the bio-waste available on the market. The proposed plant falls into the category of projects identified in Annex IV, Part Two of Legislative Decree 152/2006.

The Biomethane is produced in accord to the incentivisation law of the biofuel and biomethane, D.M. 2018/03/02.

Commercial operation of the 40,000 t/y capacity phase started at the end of 2021.

Commercial operation of the expansion (to 68,000 t/y) is planned to start at the end of next summer.

Eligible Category

Energy efficiency (Energy distribution and management)

Full amount project

41.5 mln

Financed amount

Total 2.5 mln

KPIs

- Primary energy saving per operating year [MWh]
- Electrical energy produced from renewable non-fossil sources per operating year [MWh]
- Avoided CO₂ emissions from fossil sources per operating year [t]
- Avoided CO₂ emissions from fossil sources per operating year by photovoltaic plant [t]

Project description

Heat accumulation system, located in the San Salvario area of Turin, serving the district heating network of the Turin metropolitan area. The district heating network is made up of approximately 743 km of double pipelines and heats approximately 75,5 million m³ (figures from December 2022).

The project makes it possible to increase the connected volume by 2.3 million m³, corresponding to approximately 350 new users.

The project consists of:

- a heat accumulation system for superheated water made up of 3 pressurised tanks above ground, with a total capacity of 2,500 m³;
- a system for pumping and re-pumping the superheated water in the district heating network;
- auxiliary systems: a filling/emptying and level restoration system, an electrical power system, a regulation system, a control and supervision system, an HVAC system, a fire safety system, a lighting and motive power system, a CCTV system, a video surveillance system - anti-intrusion and access control, etc.;
- a district heating network building and all of the civil works necessary for the construction of the plant;
- a photovoltaic plant, with a nominal power to about 10 kWp, connected to the site's electric power system.

Heat exchange and pumping substation in Lucento

8 ENERGY BU

Ref.: project 7-ISIN XS1704789590



Eligible Category

Energy efficiency (Energy distribution and management)

Full amount project

7.7 mln

Financed amount

Total 3.2 mln

KPIs

- Electrical energy produced from renewable non-fossil sources per operating year [MWh]
- Avoided CO₂ emissions from fossil sources per operating year [t]

Project description

Substation of heat exchange and pumping of the district heating network, called "Lucento", located in the homonymous district of Turin to feed the current 90° C network.

The project consists in the construction of a new heat exchange and pumping substation and the installation of a photovoltaic system with a nominal power of 30 kWp connected to the site's electrical system.

The new configuration of the district heating network of the Vallette district will allow, in particular, to save primary sources and reduce greenhouse gas emissions, thanks also to the contribution of electricity (photovoltaic) produced from renewable sources.



Eligible Category

Renewable energy (Energy network development)

Full amount project

174.9 mln

Financed amount

Total 9.1 mln

KPIs

- Primary energy saving per operating year [MWh]
- Avoided CO₂ emissions from fossil sources per operating year [t]
- Distributed thermal energy per operating year [MWh]

Project description

The project consists in laying the pipes of the heat distribution network and creating heat exchange stations for users to increase the volume connected to the district heating service. The development of the project, in the period 2014 - 2022 concerns the following areas:

- Turin DH network saturation: about 1.0 million cubic metres of volume were connected in 2022, reaching the progressive value of 10.7 million cubic metres compared to the project forecast of 8 million
- Extension of the DH Torino Nord network: about 0.37 million cubic metres were connected in 2022, reaching a cumulative value of 2.3 million cubic metres
- Development of the San Salvario area network: in 2022, work continued on the laying of the distribution network and the connections of the utilities in the San Salvario district. In addition, the works for the construction of the storage system were completed and the start-up and operational tests of the system began. The progressive value of 1.2 million cubic metres was reached thanks to the 0.53 million cubic metres connected in 2022.
- Borgata Lesna and Gerbido network development: in 2022, connection activities continued in the Lesna and Gerbido suburbs in Grugliasco, thanks to the acquisition of an important large customer, totalling about 0.3 million cubic metres.
- Network development Grugliasco, Rivoli, Collegno, Beinasco: in 2022, connection activities continued within the municipalities, for a total of 0.07 million cubic metres.

The design and authorisation activities for the Torino Nord Est project continued.

Eligible Category

Energy efficiency (Cogeneration facilities)

Full amount project

165.2 mln

Financed amount

Total 0.4 mln

KPIs

- Electrical energy produced per operating year [MWh]
- Thermal energy produced per operating year [MWh]
- Primary energy saving per operating year [MWh]
- Avoided CO₂ emissions from fossil sources per operating year [t]

Project description

The second combined-cycle thermoelectric group (called RPW 2GT) was built from a pre-existing plant for the conventional-cycle production of electrical and thermal energy (2GT) and made up of a conventional combustion vapour generator (CSG) which fed a condensation vapour turbine.

The project consisted of converting the conventional-cycle 2GT into the combined-cycle RPW 2GT.

The second closed-cycle thermoelectric group is made up of:

- an electric-powered gas turbine of approximately 260 MW, powered by methane gas, with an air-cooled electric generator;
- a heat RVG, with chimney, into which the gases discharged from the gas turbine are piped;
- an electric-powered condensation vapour turbine of approximately 138 MW, with the related air-cooled electric generator, with low-pressure vapour intake for the production of superheated water for the district heating system, complete with a vapour bypass system;
- a condensation system for the vapour turbine, using cooling water taken from the diversion channel;
- system of exchangers for producing heat for the district heating system, using the low-pressure vapour taken from the vapour turbine;
- a gas decompression and fiscal measurement station.

The single-camshaft and single-body gas turbine (GT) in use, which has a multistage axial compressor and a multistage turbine, is equipped with:

- a discharge gas collector;
- a natural gas intake and regulation system;
- a turbine and generator lubrication systems;
- a system for filtering the air drawn into the turbine, complete with silencers;
- expansion joints, connecting ducts and accessories;
- acoustic cabins for protecting and soundproofing the GT and alternator, complete with ventilation and fire detection and extinction systems (the latter for the GT area).

Eligible Category

Energy efficiency (Energy distribution and management)

Full amount project

46.3 mln

Financed amount

Total 0.1 mln

KPIs

- Avoided CO₂ emissions from fossil sources per operating year [t]
- Primary energy saving per operating year [Toe]

Project description

The energy efficiency project produces positive impacts in terms of reducing electricity and thermal consumption, thanks to the activities developed in 3 areas of intervention:

- 1) **Public lighting Municipality of Fidenza:** redevelopment and energy efficiency interventions of the city's public lighting system with the replacement of 6,174 lighting fixtures with new LED technology fixtures; refurbishment of switchboards; implementation of remote control on switchboards and in the luminaires in the city centre; smart city interventions: digital screens to promote events, city access points, wi-fi, etc;
- 2) **Technological renewal of thermal power stations of municipal buildings in Turin:** energy pre-intervention redevelopment diagnoses and Energy Performance Certificates; installation of high efficiency boilers in 224 municipal buildings; EPC contracts to guarantee efficiency gains.
- 3) **Interventions to improve the energy efficiency of technological systems**
 - **Teatro Regio:** replacement of 10 AHU fan motors; centralized cooling and heat recovery with the installation of 4 latest-generation refrigeration units and replacement of the cooling towers. installation of an energy recovery system consisting of a heat pump for heat recovery from tower water; redevelopment of the water plant by installing two new boilers served by two newly installed exchangers; thermal power plant requalification; installation of 6 condensing thermal groups of 840 kW; building management system with the implementation of a new automation system of the BACS type. Thermal power plant requalification of the **Scenography Warehouse Strada Settimo:** installation of 2 condensing thermal groups of 900 kW
 - **Municipality of Grugliasco:** insulation of the opaque building envelope; replacement of windows and doors; installation of a new heat recovery building air conditioning system; installation of an energy supervision system; local re-lamping (replacement of existing lamps with LED technology elements); installation of a new photovoltaic system.

Investments in drainage and purification (La Spezia - Liguria)

12 NETWORKS BU
Ref.: project 15-ISIN XS2065601937
Ref.: project 17-ISIN XS2275029085



Eligible Category

Waste water treatment (Wastewater treatment plant upgrades)

Full amount project

53.8 mln

Financed amount

Total 10.9 mln

KPIs

- Treated population equivalent (potential) [N]

Project description

The project aims to extend the drainage networks and build new purification plants aimed at increasing the level of collection service coverage and reducing pollution deriving from untreated discharges in the La Spezia territory.

The amount of this project is determined starting from the year of acquisition by IREN Group.

Eligible Category

Energy efficiency (Energy distribution and management)

Full amount project

110.3 mln

Financed amount

Total 46.1 mln

KPIs

- Smart meters installed [n]
- Percentage of smart meters on the total [%]

Project description

IRETI GAS is the company of Iren Group that manages the gas distribution and metering services in several north western cities of Italy (for example Genoa, Reggio Emilia, Parma), providing gas to more than 780.000 supply points (PDRs or Points of Delivery).

Promoted by Del. n. 575/2012 of ARERA (Authority for Regulation of Energy, Networks and Environment), the present project consists in the replacement of the traditional mechanical meters with a new generation of meters (smart meters), enabled for both the functions of remote reading and remote management. Such metering system allows collecting a much higher amount of measurement data, guaranteeing the billing of due payments based on the actual values of their gas consumption, and improving the management of payment delay, as well as the service transfer or switching procedures, based on the actual measurement data, as well as remotely deactivate the supply due to customer arrears.

A greater availability of real measures provides to the end users a higher awareness of their own gas consumptions (see Directive 2012/27/EU), supporting virtuous behaviours which lead to an energy consumption reduction, with consequent environmental benefits.

Another related environmental effect is the reduction of measurement data collected "in the field" by operators, with a reduction in consumption of fossil fuels and related CO₂ and other harmful emissions.

Eligible Category

Energy efficiency (Energy distribution and management)

Full amount project

316.4 mln

Financed amount

Total 34.8 mln

KPIs

- Average network leaks (underground network measured with planned inspection) [n]

Project description

Network maintenance and replacement in Emilia and Liguria: it is a continuous project developed by IRETI that consists in replacing and doing systematic maintenance of the gas distribution network's lines in order to improve the qualitative and technical levels of the network structure. Through the project it will be possible to:

- Avoid greenhouse gas emissions, in particular CH₄;
- Diminish the number of vehicles used for operative activities (such as P.I.);
- Mitigate the excavations made in order to repair the distribution pipelines.
- Improve the quality and continuity of the service, as required by ARERA [the Italian Regulatory Authority for Electricity Gas and Water];
- Improve the safety of the grid;
- Make the grid hydrogen ready.



Eligible Category

Transport (Electric vehicles)

| Full amount project |
|---------------------|
| 39.1 mln |

| Financed amount | |
|-----------------|---------|
| Total | 2.5 mln |

| KPIs |
|---|
| <ul style="list-style-type: none"> • Avoided CO₂ emissions from fossil sources per operating year [t] |

Project description

The objective of this project is to replace some in the company transport fleet with new electric vehicles and to build the necessary infrastructure to support the project on the various sites. In particular, the project can be divided into 3 main activities:

- Environmental vehicle replacement: replacing the current electric quadricycles (most of which are currently in operation in Turin) with new vehicles, and replacing 100% of the current heat-powered quadricycles and obsolete cars – 354 waste vehicle.
- Group vehicle replacement: approximately 593 vehicles from all of the company's main sites (cars used for short distances and small vans)
- Installation of infrastructure: installing Wallbox branded charging posts and wall boxes for charging vehicles at the various sites distributed throughout the territories, in parallel with the replacement plan in place for both environmental and other vehicles.



Investments in sewage and waste water plants (Emilia and Liguria)

16 NETWORKS BU
Ref.: project 15-ISIN XS1881533563
Ref.: project 14-ISIN XS2065601937



Eligible Category

Waste water treatment (Wastewater treatment plant upgrades)

Full amount project

282.7 mln

Financed amount

Total 27.2 mln

KPIs

- Water Treatment plants [N]
- Sewage systems [km]

Project description

The project aims to extend the drainage networks and build new purification plants aimed at increasing the level of collection service coverage and reducing pollution deriving from untreated discharges in the Emilia and Genoa territories.