Green Bond Project (post issue)
ISSUED 2017-MATURITY 2027
(ISIN XS1704789590)

March 2021

Waste to energy plant for Heat Production in Parma

Eligible Category *Energy efficiency (Cogeneration facilities)*

Full amount project	Financed amount	KPIs
219.7 mln	**Total 212.1 mln**	• 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.

ISIN XS1704789590

Waste to energy plant for Heat Production in Piacenza

Eligible Category *Energy efficiency (Cogeneration facilities)*

Full amount project	Financed amount	KPIs
14.5 mln	**Total - mln**	• 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.

ISIN XS1704789590

Development of separate waste collection services

Eligible Category *Waste management efficiency and recycling (Waste collection and sorting upgrades)*

Full amount project	Financed amount	KPIs
79.4 mln	**Total 42.1 mln**	• Total sorted waste collection [t] • Total of non sorted waste disposed [t] • Number of bins for sorted waste [N] • Volumes of bins for sorted waste [mc] • Door to door collection system [N] • Sorted waste collection hubs [N] • Volumes of waste collected in the collection hubs [t]

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. IREN has implemented a progressive transformation of waste collection services to the door-to-door model, with prodromal methods for the application of 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 a capillary computerized system used for the registration of incoming users and for the control of volumes in order to set mass balances.
With a special badge, registration is carried out, then through a guided path on the touch-screen monitor, all the information relating to the transfer operation is entered. This allows you to activate prize competitions for citizens.

ISIN XS1704789590

Accumulators district heating Bit (TO)

Eligible Category *Energy efficiency (Energy distribution and management)*

Full amount project	Financed amount	KPIs
7.9 mln	**Total 3.9 mln**	• Primary energy saving per operating year [MWh] • Avoided CO_2 emissions from fossil sources per operating year [t]

Project description

Heat accumulation system inside the thermal integration and reserve plant located in the area known as BIT, in Turin, serving the district heating network of the City of Turin. The district heating network is composed of 554 km of double pipes and about 60 million m3 of district heating volumes (at December 2016).

The system accumulates and supplies superheated water from the district heating network, with a flow temperature normally between 105° C and 120° C. The storage system has the function of storing the thermal energy produced by the thermoelectric plants in cogeneration, when the heat demand is less, to sell it in the hours of maximum load of the district heating network, reducing the use of integration boilers.

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Accumulators district heating Martinetto (TO)

Eligible Category *Energy efficiency (Energy distribution and management)*

Full amount project	Financed amount	KPIs
11.2 mln	**Total** **11.2 mln**	• Primary energy saving per operating year [MWh] • Avoided CO_2 emissions from fossil sources per operating year [t]

Project description

Heat accumulation system, inside the Martinetto industrial site, in Turin, serving the district heating network of the city of Turin. The district heating network is composed of 554 km of double pipes and about 60 million m3 of district heating volumes (at December 2016).

The system accumulates and supplies superheated water from the district heating network, with a flow temperature normally between 105° C and 120° C. The storage system has the function of storing the thermal energy produced by the thermoelectric plants in cogeneration, when the heat demand is less, to sell it in the hours of maximum load of the district heating network, reducing the use of integration boilers.

ISIN XS1704789590

Accumulators district heating Mirafiori Nord (TO)

Eligible Category *Energy efficiency (Energy distribution and management)*

Full amount project	Financed amount		KPIs
5.2 mln	**Total**	**1.9 mln**	• Primary energy saving per operating year [MWh] • Electrical energy produced from renewable non-fossil sources per operating year [MWh] • Thermal energy produced from renewable non-fossil sources per operating year [MWh] • Avoided CO_2 emissions from fossil sources per operating year [t]

Project description

Heat storage system, in the area of the former Mirafiori Nord plant, in Turin, serving the district heating network of the City of Turin. The district heating network is composed of 554 km of double pipes and about 60 million m3 of district heating volumes (at December 2016).

The storage system has the function of storing the thermal energy produced by the thermoelectric plants in cogeneration, when the heat demand is less, to sell it in the hours of maximum load of the district heating network, reducing the use of integration boilers. Inside the site are also present:

- a photovoltaic system with a nominal power of 35 kWp connected to the site's electrical system;
- a solar thermal plant with a nominal capacity of 410 kW connected to the district heating system.

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Heat exchange and pumping substation in Lucento

Eligible Category *Energy efficiency (Energy distribution and management)*

Full amount project	Financed amount	KPIs
2.2 mln	**Total - mln**	• Electrical energy produced from renewable non-fossil sources per operating year [MWh] • Avoided CO_2 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 26 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.

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Heat exchange and pumping TRM in Grugliasco and interconnection with Grugliasco and Beinasco

Eligible Category *Energy efficiency (Energy distribution and management)*

Full amount project	Financed amount	KPIs
7.3 mln	**Total 2.0 mln**	• Avoided CO_2 emissions from fossil sources per operating year [t] • Distributed thermal energy per operating year [MWh]

Project description

Heat exchange and pumping station for the district heating network serving the Beinasco and Grugliasco networks, in the province of Turin. The new plant will be built in a new building within the site of the waste-to-energy plant in Turin owned by TRM and aims to use the heat produced in the combustion of waste for the district heating service.

The project also includes the connection of the TRM waste-to-energy plant with the district heating networks of the Municipalities of Grugliasco and Beinasco and the construction of the plant interface at TRM.

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Piacenza district heating network, connection and pumping station at WTE

Eligible Category *Renewable energy (Energy network development)*

Full amount project	Financed amount	KPIs
12.5 mln	**Total 5.7 mln**	• Avoided CO_2 emissions from fossil sources per operating year [t] • Distributed thermal energy per operating year [MWh]

Project description

The project consists of 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 in the city of Piacenza.

The project also provides for the connection of the town district heating network with the waste-to-energy plant in order to use the heat produced by the combustion of waste and simultaneously allow the increase in volume connected to the district heating of about 1,000,000 m³.

Finally, the project involves the construction of the pumping station of the district heating network at the waste-to-energy plant.

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Parma district heating network

Eligible Category *Renewable energy (Energy network development)*

Full amount project	Financed amount	KPIs
28.5 mln	**Total 26.0 mln**	• Primary energy saving per operating year [MWh] • Avoided CO_2 emissions from fossil sources per operating year [t] • Distributed thermal energy per operating year [MWh]

Project description

The project consisted of the connection of new users in the city of Parma following the connection of the city network with the waste-to-energy plant (PAI) in operation since December 2013, as envisaged in the authorization documents of the PAI.

The connection with the PAI plant has allowed the increase of production efficiency thanks to the use of cogenerated heat in place of that of the boilers.

The project continues since the year 2017 with the laying of the pipes of the heat distribution network and the construction of heat exchange stations at the utilities to increase the volume connected to the service of district heating.

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District heating networks development in Torino

Eligible Category *Renewable energy (Energy network development)*

Full amount project	Financed amount	KPIs
135.0 mln	**Total 91.0 mln**	• Primary energy saving per operating year [MWh] • Avoided CO_2 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 - 2021 concerns the following areas:

- saturation network in Turin by connecting new users to the areas already served (South, Center, North-West of the city), to reach a total of 64 Mm^3 served;
- construction of a network branch of approximately 3 km that will allow the extension of district heating
- network development in San Salvario area with the construction of about 20 km of network, an accumulation system of 2,500 m^3 and the installation of 325 exchange stations thermal, in order to serve about 2.3 Mm^3 of new.

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District heating networks development in Reggio Emilia

Eligible Category *Renewable energy (Energy network development)*

Full amount project	Financed amount		KPIs
9.2 mln	**Total**	**6.8 mln**	• Primary energy saving per operating year [MWh] • Avoided CO_2 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 in the creation of heat exchange stations for the users to increase the volume connected to the service.

The estimated increase in volume connected to district heating in the period 2012-2021 for the city of Reggio Emilia is 1 Mm^3 between 31/12/2011 (about 12,670,000 m^3) and 31/12/2021 (about 13,723,465 m^3).

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Mini Hydro La Loggia (TO)

Eligible Category *Renewable energy (Mini Hydro Power)*

Full amount project	Financed amount		KPIs
4.3 mln	**Total**	**4.3 mln**	• Electrical energy produced from renewable non-fossil sources per operating year [MWh] • Avoided CO_2 emissions from fossil sources per operating year [t]

Project description

The plant, of the flowing water type, is located near the barrier cross on the Po river in the municipality of La Loggia (TO) and uses the release of the minimum vital flow on the leap existing between the reservoir upstream and the Po level downstream cross.

Next to the production plant there is a ladder for the ichthyofauna built with 27 successive tanks and equipped with a visualization and control system (fish counter).

The nominal average power of the plant is equal to 644 kW and an average annual electricity capacity of 3.5 GWh/year.

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Mini Hydro Pianchette – Noasca (TO)

Eligible Category *Renewable energy (Mini Hydro Power)*

Full amount project	Financed amount	KPIs
0.2 mln	**Total - mln**	• Electrical energy produced from renewable non-fossil sources per operating year [MWh] • Avoided CO_2 emissions from fossil sources per operating year [t]

Project description

The project involves the construction of a new 1.2 MW hydroelectric plant in the Municipality of Noasca in the province of Turin, which exploits the water of the Orco torrent (this is the reconstruction of the plant that was built in the 1920s to feed the construction site of the Ceresole dam. The plant was decommissioned in the 80s).

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Mini Hydro Giffoni plant repowering

Eligible Category *Renewable energy (Mini Hydro Power)*

Full amount project	Financed amount	KPIs
0.04 mln	**Total - mln**	• Electrical energy produced from renewable non-fossil sources per operating year [MWh] • Avoided CO_2 emissions from fossil sources per operating year [t]

Project description

The project involves the reactivation of a plant discontinued by Enel and acquired through the incorporation of Edipower in the municipality of Giffoni Valle Piana (SA) that exploits the water of the Picentino torrent.

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Enìa Solaris photovoltaic plants near Brindisi

Eligible Category *Renewable energy (Solar PV energy generation)*

Full amount project	Financed amount	KPIs
26.7 mln	**Total 18.0 mln**	• Net produced electricity from renewable non-fossil sources per operating year (kWh) • Avoided CO2 emissions from fossil sources per operating year (t)

Project description

Enìa Solaris includes 5 photovoltaic plants on the ground in Brindisi (BR), with a total installed capacity of 4.3 MW.

ISIN XS1704789590

Improvement of Genova plants

Eligible Category *Waste water treatment (Wastewater treatment plant upgrades)*

Full amount project	Financed amount	KPIs
120.0 mln	**Total 37.1 mln**	• Treated population equivalent (potential) [N] • Analytic parameters (Abb % BOD, Abb % COD, Abb % SST, Abb % Ntot, Abb % Ptot) [%]

Project description

The project includes interventions on different plants:

1. revamping of the purification plant in the Municipality of Recco and of the wastewater collecting system from the Municipalities of Camogli, Pieve and Sori;
2. construction of the sea pipeline of the Darsena purifier;
3. construction of the new water treatment plant in the central area of Genoa;
4. adjustment of the treatment plant at the service of the Municipality of S. Margherita Ligure with the construction of a modern membrane system;
5. adjustment of the treatment plant at the service of the Municipality of Rapallo with the construction of a modern membrane system;
6. rationalization of the purification system at the service of the Gulf of Tigullio and of the Val Fontanabuona, which is not provided;
7. new purification plant at the service of the capital and some neighbouring fractions of the Municipality of Torriglia.

ISIN XS1704789590

Improvement of Reggio Emilia plants

Eligible Category *Waste water treatment (Wastewater treatment plant upgrades)*

Full amount project	Financed amount	KPIs
11.6 mln	**Total 10.4 mln**	• Volumes of water destined to irrigation re-usage / Volumes of total treated water [%] • Treated population equivalent (potential) [N] • Analytic parameters (Abb % BOD, Abb % COD, Abb % SST, Abb % Ntot, Abb % Ptot) [%]

Project description

The project includes interventions on different plants:

1. construction of the advanced tertiary treatment of wastewater leaving the Mancasale treatment plant to obtain an effluent with qualitative requisites to allow its irrigation reuse;
2. upgrading of the Meletole plant;
3. construction of a new purification plant for the municipality of Cadelbosco di Sopra in an area adjacent to the existing plant whose biological sector may in the future be restructured and converted into a rainwater treatment plant;
4. expansion of the Boretto plant;
5. construction of a new water treatment line in addition to the existing line to increase its purification capacity;
6. adjustment of the treatment for the San Bernardino agglomeration through the construction of a purification plant with biological treatment with biodisk.

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Improvement of Piacenza plants

Eligible Category *Waste water treatment (Wastewater treatment plant upgrades)*

Full amount project	Financed amount	KPIs
6.9 mln	**Total 6.1 mln**	• Treated population equivalent (potential) [N] • Analytic parameters (Abb % BOD, Abb % COD, Abb % SST, Abb % Ntot, Abb % Ptot) [%]

Project description

The project includes interventions on different plants:

1. Castel San Giovanni purification plant: upgrading and/or rebuilding all the purification sectors and installation of an MBR compartment for the final filtration of wastewater, the construction of a new transformer substation, the complete reconstruction of the electrical system, the conversion of final separators to tanks for sludge storage;
2. construction of a new waste water treatment plant in the municipality of Calendasco to replace Imhoff pits;
3. reconstruction of the wastewater treatment plant at the service of the Valconasso locality, no longer able to cope with the flow rates arriving at the treatment.

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Improvement of Parma plants

Eligible Category *Waste water treatment (Wastewater treatment plant upgrades)*

Full amount project	Financed amount	KPIs
4.6 mln	**Total 2.6 mln**	• Treated population equivalent (potential) [N] • Analytic parameters (Abb % BOD, Abb % COD, Abb % SST, Abb % Ntot, Abb % Ptot) [%]

Project description

The project includes interventions on different plants:

1. Monchio purifier: replacement of two imhoff pits (I level) with a last generation MBR plant
2. Vestola purifier: replacement of an imhoff pit (I level) with a biodisk (II level) plant
3. complete revamping of the purification plant located in the Municipality of Sorbolo (PR)

ISIN XS1704789590

Cogeneration turboexpansion plant “Celsius”

Eligible Category *Energy efficiency (Cogeneration facilities)*

Full amount project	Financed amount	KPIs
3.0 mln	**Total 1.4 mln**	• Net produced electricity from renewable non-fossil sources per operating year [kWh] • Avoided CO_2 emissions from fossil sources per operating year [t]

Project description

Cogeneration turboexpansion plant for the exploitation of the pressure drop between the national and city gas distribution networks in the methane arrival cabin of Genoa Gavette. Combined electricity production (1 MW installed power) and heat. The plant, already tested, has been operation starting since 2018, on February.

ISIN XS1704789590

Hydroelectric investments

Eligible Category *Renewable energy (Mini Hydro Power)*

Full amount project	Financed amount	KPIs
9.2 mln	**Total** **9.2 mln**	• Net produced electricity from renewable non-fossil sources per operating year (kWh) • Avoided CO_2 emissions from fossil sources per operating year (t)

Project description

The project includes interventions on different plants:

1. Mignanego: replacement of turbine and generator with new production group and increase of installed power of about 450 kW;
2. Busalla: new production group for the exploitation of the flows coming from the Busalletto lake;
3. Isoverde: replacement of turbogenerators and power boards in MV and automation of MV / MV and MV / LV transformers;
4. Lavezze: replacement of turbogenerators and power boards, installation of new MV / LV transformation;
5. Campomorone: new 400 kW hydroelectric production unit for the exploitation of waterworks leaps;
6. Lavagnina: replacement of hydroelectric production groups and installation of a third group with an increase in installed power from 3 MVA to 3.2 MVA;
7. Central Campi: installation of a 80 kW hydroelectric production unit on waterworks between distribution networks;
8. Baking tray: replacement of the two turbine groups and generators and panel replacement of automation and remote control.

ISIN XS1704789590