



Green Bond Project (post issue)
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February 2018

Waste to energy plant for Heat Production in Parma

Eligible Category

Energy efficiency (Cogeneration facilities)

Full amount project

212.1 mln

Financed amount

Total 212.1 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

Eligible Category

Energy efficiency (Cogeneration facilities)

Full amount project

7.3 mln

Financed amount

Total - 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.

Eligible Category

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

Full amount project

49.4 mln

Financed amount

Total 42.1 mln

KPIs

- 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 separate collection system in Turin with the extension of home collection to about an additional 150,000 inhabitants compared to the 404,000 inhabitants served in 2012; in the Emilia Area, anticipating the regional planning, 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.
- 2) collecting centers in Emilia area, a capillary computerized system used to register inputs, through a personal badge, and to check the volumes of waste conferred. This allows to activate competitions with prizes for citizens.

Eligible Category

Energy efficiency (Energy distribution and management)

Full amount project
3.9 mln

Financed amount	
Total	3.9 mln

KPIs
<ul style="list-style-type: none"> • Primary energy saving per operating year [MWh] • Avoided CO₂ 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.



Eligible Category

Energy efficiency (Energy distribution and management)

Full amount project

11.3 mln

Financed amount

Total 11.3 mln

KPIs

- Primary energy saving per operating year [MWh]
- Avoided CO₂ 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.

Eligible Category

Energy efficiency (Energy distribution and management)

Full amount project

9.6 mln

Financed amount

Total 1.9 mln

KPIs

- 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 CO₂ 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 450 kW connected to the district heating system.

Heat exchange and pumping substation in Lucento

Eligible Category

Energy efficiency (Energy distribution and management)

Full amount project

6.6 mln

Financed amount

Total - 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 14 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.

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

8 ENERGY BU

Eligible Category

Energy efficiency (Energy distribution and management)

Full amount project

8.4 mln

Financed amount

Total 2.0 mln

KPIs

- Avoided CO₂ 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.

Piacenza district heating network, connection and pumping station at WTE

9 ENERGY BU

Eligible Category

Renewable energy (Energy network development)

Full amount project

9.9 mln

Financed amount

Total 5.7 mln

KPIs

- Avoided CO₂ 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.

Eligible Category

Renewable energy (Energy network development)

Full amount project

27.5 mln

Financed amount

Total 26.0 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 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 from 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.

Eligible Category

Renewable energy (Energy network development)

Full amount project

171.3 mln

Financed amount

Total 91.0 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 - 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 Mm³ 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 m³ and the installation of 325 exchange stations thermal, in order to serve about 2.3 Mm³ of new.

Eligible Category

Renewable energy (Energy network development)

Full amount project

9.9 mln

Financed amount

Total 6.8 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 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 Mm³ between 31/12/2011 (about 12,670,000 m³) and 31/12/2021 (about 13,723,465 m³).

Eligible Category

Renewable energy (Mini Hydro Power)

Full amount project

4.3 mln

Financed amount

Total 4.3 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

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.

Eligible Category		Renewable energy (Mini Hydro Power)		KPIs	
Full amount project		Financed amount		<ul style="list-style-type: none"> • Electrical energy produced from renewable non-fossil sources per operating year [MWh] • Avoided CO₂ emissions from fossil sources per operating year [t] 	
1.6 mln		Total - mln			

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).

Eligible Category

Renewable energy (Mini Hydro Power)

Full amount project

0.9 mln

Financed amount

Total - 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

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.

Eligible Category

Renewable energy (Solar PV energy generation)

Full amount project

26.7 mln

Financed amount

Total 18.0 mln

KPIs

- Net produced electricity from renewable non-fossil sources per operating year (kWh)
- Avoided CO2 emissions from fossil sources per operating year (t)

Project description

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

Eligible Category

Waste water treatment (Wastewater treatment plant upgrades)

Full amount project

213.6 mln

Financed amount

Total 37.1 mln

KPIs

- 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.

Eligible Category

Waste water treatment (Wastewater treatment plant upgrades)

Full amount project

10.3 mln

Financed amount

Total 10.3 mln

KPIs

- 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.

Eligible Category

Waste water treatment (Wastewater treatment plant upgrades)

Full amount project

6.1 mln

Financed amount

Total 6.1 mln

KPIs

- 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.

Eligible Category

Waste water treatment (Wastewater treatment plant upgrades)

Full amount project

4.3 mln

Financed amount

Total 2.6 mln

KPIs

- 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)

Cogeneration turboexpansion plant “Celsius”

Eligible Category	<i>Energy efficiency (Cogeneration facilities)</i>		KPIs
Full amount project 3.0 mln	Financed amount Total 1.4 mln		<ul style="list-style-type: none">• Net produced electricity from renewable non-fossil sources per operating year [kWh]• Avoided CO₂ emissions from fossil sources per operating year [t]
Project description			
<p>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.</p> <p>Combined electricity production (1 MW installed power) and heat.</p> <p>The plant, already tested, will be in continuous operation starting from 2-Q 2018.</p>			



Eligible Category

Renewable energy (Mini Hydro Power)

Full amount project

9.2 mln

Financed amount

Total 9.2 mln

KPIs

- Net produced electricity from renewable non-fossil sources per operating year (kWh)
- Avoided CO₂ 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 Busallegto 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.