Green Bond Project (post issue)
ISSUED 2019-MATURITY 2029
(ISIN XS2065601937)

March 2023

Waste to energy plant for heat production in Parma

1 WASTE MANAGEMENT BU
Ref.: project 1-ISIN XS1704789590

Eligible Category *Energy efficiency (Cogeneration facilities)*

Full amount project	Financed amount		KPIs
227.5 mln	Total	4.4 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 XS2065601937

Waste to energy plant for heat production in Piacenza

Eligible Category	*Energy efficiency (Cogeneration facilities)*

Full amount project	Financed amount		KPIs
21.0 mln	Total	8.9 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.

The plant started permanent production and cogeneration in autumn 2021.

ISIN XS2065601937

Development of separate waste collection services

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

Full amount project	Financed amount	KPIs
101.0 mln	Total 19.7 mln	• 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.

ISIN XS2065601937

Biowaste recovery to produce compost and biomethane - Ferrania (SV)

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

Full amount project	Financed amount		KPIs
25.5 mln	Total	8.8 mln	• Production of compost (% on organic fraction in input) [%] • Production of biomethane [Msm^3] • Avoided CO_2 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

ISIN XS2065601937

Biowaste recovery to produce compost and biomethane – Santhìa (TO)

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

Full amount project	Financed amount		KPIs
25.9 mln	Total	6.9 mln	• Production of compost (% on organic fraction in input) [%] • Production of biomethane [Msm^3] • Avoided CO_2 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 offal
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.

ISIN XS2065601937

Cogeneration plant Torino Nord

Eligible Category *Energy efficiency (Cogeneration facilities)*

Full amount project	Financed amount		KPIs
351.9 mln	Total	40.1 mln	• Electrical energy produced per operating year [MWhe] • Thermal energy produced per operating year [MWht] • Primary energy saving per operating year [MWh] • Avoided CO_2 emissions from fossil sources per operating year [t]

Project description

The Turin North Plant is an important electrical energy and heat production plant within the Turin metropolitan area and, together with the Moncalieri Plant, it forms the basis of the district heating system in the Turin metropolitan area.

The start dates for the Plant's construction and operation are provided below.
- 2010: start of construction of the Turin North Plant;
- 30 April 2012: start of commercial operation.

The Plant is made up of the following production groups, functioning on natural gas only:
- 1 Combined-cycle cogeneration thermoelectric group (CCTG);
- 3 Supplementary and reserve boilers;
- 1 Auxiliary boiler for starting the combined cycle;
- 6 Heat accumulators;
- 1 Electrical energy storage system.

ISIN XS2065601937

VDE hydroelectric plant (Chiomonte-Susa) Repowering project

Eligible Category	*Renewable energy (Mini hydro power)*

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

Project description

The upgrade entails modernising the two plants located in Valle Dora, specifically:
- the upstream plant with intake in the Municipality of Salbertrand and the hydroelectric station in Chiomonte;
- the plant with intake in Chiomonte and the station in Susa.

The project has been divided into three consecutive phases:
- an initial authorisation phase;
- a second executive design phase;
- a third site preparation and construction phase.

ISIN XS2065601937

Cogeneration plant Moncalieri–GT2 RPW

Eligible Category *Energy efficiency (Cogeneration facilities)*

Full amount project	Financed amount	
165.2 mln	Total	57.0 mln

KPIs

- Electrical energy produced per operating year [MWhe]
- Thermal energy produced per operating year [MWht]
- Primary energy saving per operating year [MWh]
- Avoided CO_2 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 lubrification 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).

ISIN XS2065601937

Torino LED (I and II phases)

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

Full amount project	Financed amount		KPIs
22.1 mln	Total	13.0 mln	• Primary energy saving per operating year [MWh] • Avoided CO_2 emissions from fossil sources per operating year [t]

Project description

Since 1986, Turin's public lighting service is operated by the Iren Group: the installations consist of approximately 98,500 lighting points, the total luminous flux is 1,530 million lumens. The electricity grid extension is over 2,800 km, the total electrical power is 11.118 MW. The project consisted of two phases. Phase 1, started in 2015 and ended in 2017, led to the replacement of approximately 54,000 public lighting points, or 54% of the city's lighting fixtures, with LED lights, with important benefits on the economic and environmental front; its main objectives were to achieve significant energy and economic savings, as well as important benefits on the environmental front. Phase 2, called 'Light Changes the City', was the natural continuation of the TO LED 1 project initiated in 2015 with the City of Turin. In the second phase of the project, work was carried out on the lighting fixtures of the city's main subpass and high-power lighting fixtures (formerly 400 W lamps). The project included the replacement of around 900 high-powered lighting devices and 6,000 lighting devices in the city's subpass (Bramante, Lingotto, Mortara, Oddone, Repubblica, Rivoli, Spezia).

The efficiency and reliability of the new LED lighting, in addition to night dimming, ensured a reduction of approximately 64% in the electricity consumption of the public lighting installations affected by the intervention.

The new LED lights installed in the public lighting systems emit a pleasant white light (neutral white or warm white, depending on the urban context of use) and also have greater control in the emission of the luminous flux, directed only to the area to be illuminated: they guarantee greater luminous coverage of the streets, increasing the perception of safety for the citizens who cross them and reducing light pollution at night. Phase 3 of the Torino LED Project is currently being evaluated and will involve the remaining lighting fixtures (historical, street furniture, globes, light towers, street lighting for series installations).

ISIN XS2065601937

Smart solutions

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

Full amount project	Financed amount	KPIs
46.3 mln	Total 19.8 mln	• Avoided CO_2 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.

ISIN XS2065601937

Improvement of Genova plants

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

Full amount project	Financed amount		KPIs
156.2 mln	Total	18.4 mln	• Treated population equivalent (potential) [N]

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 in Chiavari and Ramaia;
7. new purification plant at the service of the capital and some neighbouring fractions of the Municipality of Torriglia.

ISIN XS2065601937

Improvement of Parma plants

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

Full amount project	Financed amount	KPIs
4.6 mln	Total 0.7 mln	• Treated population equivalent (potential) [N]

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 XS2065601937

Cogeneration turboexpansion plant “Celsius”

Eligible Category	*Energy efficiency (Cogeneration facilities)*

Full amount project	Financed amount		KPIs
3.0 mln	Total	1.5 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 power production) and heat.

ISIN XS2065601937

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

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

Full amount project	Financed amount	KPIs
282.7 mln	Total 29.3 mln	• 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.

ISIN XS2065601937

Investments in drainage and purification (La Spezia - Liguria)

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

Full amount project	Financed amount	KPIs
53.8 mln	Total 13.1 mln	• 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.

ISIN XS2065601937

Electricity distribution investments

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

Full amount project	Financed amount	KPIs
185.1 mln	Total 55.9 mln	• Network leaks [%] • Electricity fed into the network [GWh]

Project description

Territori di Torino e Parma

MV Underground Cables: project to renew the electricity distribution network's MV lines to improve the qualitative and technical levels of the network structure. In particular, through the renewal of the MV backbone cables and the laying of 22 kV MV cabling (approximately 400 km), the project will make it possible to:

- Renew network assets that finish their useful operating life or are inadequate compared with the required level of operation;
- Rationalise the layout and structure of existing networks;
- Reduce the energy losses in the network;
- Improve the quality of the service, as instructed by ARERA [the Italian Regulatory Authority for Electricity Gas and Water], in terms of both number (therefore reducing the failure rate) and duration.

During the course of 2022, approximately 55 km of MV cables were laid.

LV Network: project to renew the electricity distribution network's LV lines to improve the qualitative and technical levels of the network structure. In particular, the project will make it possible to:

- Resolve the critical issues present in the LV distribution network;
- Adapt the lines that are no longer suitable for the load that they have to support;
- Electrify new areas in order to adapt the network at the request of new users.

During 2022, 32 km of LV network cabling were laid.

ISIN XS2065601937

Water distribution Smart Metering (Emilia, Liguria and Piemonte)

Eligible Category	*Adaptation (Water efficiency)*

Full amount project	Financed amount		KPIs
16.2 mln	Total	4.7 mln	• Smart meters installed [n] • Percentage of smart meters on the total [%]

Project description

IRETI is the company of the Iren Group which, also through its subsidiary companies manage the water distribution and metering services in several north western cities of Italy (for example Genoa, Savona, Imperia, Reggio Emilia, Parma, Piacenza, La Spezia, Vercelli), providing water to about 880.000 supply points (PDFs).
The present project consists in the replacement of the traditional mechanical meters with a new generation of meters (smart meters), enabled for the functions of remote reading. 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 water consumption, therefore making less use of advance payment invoices, which are more likely to be error-prone, since they are based on estimated measures.
A greater availability of real measures provides to the end users a higher awareness of their own water consumptions, supporting virtuous behaviours which lead to a water consumption reduction, with consequent environmental benefits, in terms of efficient utilisation of water resource, and also lower energy consumptions.
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 CO_2 and other harmful emissions.

ISIN XS2065601937

Gas distribution Smart Metering (Emilia and Liguria)

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

Full amount project	Financed amount	KPIs
110.3 mln	Total 45.9 mln	• 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 CO_2 and other harmful emissions.

ISIN XS2065601937

Electricity distribution Smart Metering 1G+2G (Torino and Parma)

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

Full amount project	Financed amount		KPIs
59.5 mln	Total	40.1 mln	• 1G Smart meters installed [1] [n] • 2G Smart meters installed [n] • Percentage of smart meters on the total [%]

Project description

IRETI is the company of the Iren Group that manages the electrical energy distribution and metering services in the cities of Turin and Parma, providing electricity to more than 720.000 supply points (PODs - Points of Delivery), approx. 570.000 of which located in Turin and approx. 150.000 in Parma.

Promoted by Resolution no. 292/06 and extended by Resolution no. 87/16 of ARERA (Authority for Regulation of Energy, Networks and Environment), the present project consisted in the replacement of the traditional electromechanical 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 electricity consumption, and simplifying several activities such as the activation/deactivation of a supply contract, the increase/decrease of the committed power capacity, as well as the service transfer or switching procedures, based on the actual measurement data.

Both a greater availability of reliable measurements (the smart meter allows energy consumption to be recorded) and an increasing ability to attribute the hourly cost of energy to the customer's actual consumption profile help to make the end customer more aware of the effects of their consumption style (ref. Directive 2012/27/EU), favouring virtuous behaviour aimed at a reduction in energy consumption, a better use of the energy commodity with consequent benefits also in environmental terms.

For instance, a pilot project promoted by ARERA (Del. ARG/elt n. 39/10) showed that the availability of a larger amount of actual measures, achieved through the installation of the smart meters, contributed to increase the end users awareness of their consumptions, resulting in an average energy saving of approx. 7%

[1] The project to install 1G smart meters ended in 2020 and the project to gradually replace 1G smart meters with next-generation 2G smart meters has begun.

ISIN XS2065601937

Replacement of gas distribution networks

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

Full amount project	Financed amount	KPIs
316.4 mln	Total 100.7 mln	• 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 CH_4;
- 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.

ISIN XS2065601937

E-mobility initiatives in the Iren offices

Eligible Category	*Transport (Electric vehicles)*

Full amount project	Financed amount		KPIs
39.1 mln	Total	3.3 mln	• Avoided CO_2 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.

ISIN XS2065601937