Sustainable resources

RELEVANT TOPICS	
Emissions	
Sustainable use of water resources	
Circular economy: management, sorted waste collection and reuse of waste	
Energy efficiency, renewable sources and district heating	
Biodiversity	

POLICIES FOR THE ENVIRONMENT

When it comes to environmental protection and the rational use of natural resources, sustainable development has always been at the centre of Iren Group's attention, both because of the nature of its business and because of the orientation of its mission and growth strategy.

This commitment is made clear in the Integrated System Policy, which is distributed and shared by all Group personnel and Companies, and made concrete by the Business Plan to 2025, which launched the concept of the "multicircle economy", the long-term industrial vision focused on the Group's multi-business approach, in which various activities contribute to the objective of responsible use of resources.

In pursuit of its mission and strategy, the Group has developed Environmental Management Systems such as ISO 14001, ISO 50001, UNI CEI 11352 certifications, F-GAS certification and EMAS registration. In addition to the involvement of personnel, through specific information and training activities, the Group has also developed tools to monitor performance, such as the environmental impact/aspects assessment, analytical checks, internal audits and controls to check legislative compliance, which also aim to monitor performance in terms of sustainability and environmental protection.

PRODUCTION PROCESSES AND ENVIRONMENTAL IMPACTS

Iren Group activities that lead to environmental impacts include:

- **production of hydroelectric and thermoelectric energy** (co-generation and traditional plants, supplementary and reserve plants) and solar energy;
- management of **electricity distribution** networks (high, medium and low voltage and transformer substations), and **natural gas** distribution networks;
- management of the **integrated water service**;
- **waste collection, recovery and disposal** services;
- **other customer services** (including energy efficiency products and services, electric mobility);
- **environmental practices** of contractors, subcontractors and other suppliers of the Group.

Resources are used in these operating areas for the management of operating activities and outputs and impacts are generated, as illustrated in the following diagram.

DIRECT AND INDIRECT ENERGY CONSUMPTION

The **direct energy consumption** of the Group concerns the use of fuels for the production of electricity and heat at the plants (co-generation plants, thermal plants, boilers, waste-to-energy plants and landfills), as well as the non-renewable primary energy flows not directly associated with the production of energy (i.e. site heating, fuel for the Group's vehicle fleet, etc.), used in carrying out its activities.

In 2020, direct energy consumption showed a 3% reduction compared to 2019, related to the overall lower electricity and heat production driven by climate effects and domestic energy consumption contraction associated with the Covid-19 crisis.

Indirect energy consumption (electricity purchased and consumed by the Group) refers to the sites and production plants. The electricity used by the energy production plants is partially self-produced and the relevant figures are included in the direct fuel consumptions. If the electricity used exceeds the amount self-produced, electricity is purchased from third parties and accounted for under the indirect energy consumption of the Group, which, in 2020, amounted to 337 GWh, equal to 62,999 TOE (2,637,121 GJ), with an almost constant trend compared to 2019.

Direct energy consumption by energy source	u.m.	2020	2019	2018
Total direct energy consumption (1)	**TOE**	**1,463,262**	**1,509,743**	**1,264,807**
Total direct energy consumption (1)	**GJ**	**61,252,146**	**63,197,819**	**52,944,833**
Natural gas (1)	$sm^3/000$	1,723,470	1,779,273	1,492,759
	TOE	1,440,821	1,487,472	1,247,874
Diesel	t	44	36	76
	TOE	45	37	78
Biogas from landfills, treatment plants and biodigesters (2)	$sm^3/000$	30,443	28,399	27,792
	TOE	11,497	10,475	10,047
Fuel for motor vehicles	t	10,643	11,481	6,681
	TOE	10,900	11,759	6,808

(1) The data for 2019 and 2018 were restated.
(2) The 2020 data shows an increase due to the entire year consolidation of production from the Cairo Montenotte biodigestion plant, which was considered for only 6 months in 2019 following the acquisition.

WATER WITHDRAWALS

The water supply to the Group's sites is made by withdrawing water from surface water bodies (reservoirs, rivers), from the sea and from groundwater pumped from wells and water mains.

In 2020, the Group's water withdrawals were reduced by approximately 4% compared to 2019.

WATER WITHDRAWAL BY SOURCE (m³) (1)

Withdrawal sources	2020	2019	2018
Water mains	2,449,820	2,842,846	2,212,067
Surface water	535,074,260	557,654,704	496,254,950
Seawater	9,751,104	10,872,000	(in surface water)
Ground water	7,417,101	6,484,966	5,829,269
TOTAL	**554,692,285**	**577,854,516**	**504,296,286**

(1) Since 2019, the new source classification established by the 303-3 GRI 2018 standard has been adopted. The seawater withdrawal for 2018 is included in the surface water. The data for 2018 and 2019 were restated. All withdrawal sources (except seawater) are composed of freshwater (≤1,000 mg/L of total dissolved solids).

Most Group companies have implemented a certified environmental management system (ISO 14001) and the main production sites have EMAS registrations; therefore, they have adopted various procedures for the management of water resources, which represent an operating tool for the management of withdrawals and discharges. The procedures apply to:

- the various types of production processes and/or supplies of services, which require the use of the "water" resource, even for a secondary purpose;
- water withdrawal of any kind and purpose;
- treatments and qualitative modifications of the resource water made for any reason;
- water discharges of any kind, purpose and origin to soil, subsoil, surface water bodies and sewers.

Iren Group pays particular attention to the implementation of initiatives to reduce water withdrawal for industrial and civil use in all of its activities.

In **waste-to-energy** plants, priority is given to the recovery and recycling of water for combustion slag shut-down and plant cooling.

In **energy production**, each activity regarding the use of water sources is regulated by legal provisions of the law or authorisations with the responsibility laying in the hands of the Legal Representative of the company or managers, provided with specific powers of attorney and proxies, who have the task of managing and supervising the correct performance of the activities and the correct application of the procedures. Moreover, the "environmental analysis" document, prepared for each site/plant, allows for the identification of the environmental aspects related to water resources and the obligations foreseen by environmental legislations. The analysis also identifies the applicability of the legislation to the Group's plants as well as the compliance with the regulations in force. The Torino Nord co-generation plant, for example, is equipped with recovery systems for rainwater and condensation produced by the turbine's air input refrigeration system. The industrial water produced is stored in a tank and used for firefighting purposes, to supply the demineralised water production installation and for plant-related services.

Within the **integrated water service**, the supply of drinking water is organised on the basis of effectiveness and efficiency criteria and in compliance with the law and resulting concessions. The criteria for the use of resources take into account: authorised quantities, the size of the reserves in the main reservoirs, the quality of the surface water available, the hydrological features of the basins, the data relating to the previous year and data relating to the current year. The supply plan can be modified, reviewed or updated on a monthly basis following an analysis of the data collected during the measurement and monitoring activities in the phases of the process.

WATER DISCHARGES

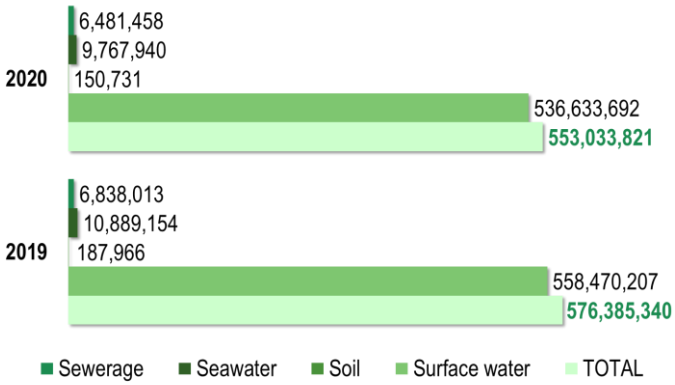
The activities carried out by Iren Group generate water discharges, whose management is regulated by the Integrated Environmental Authorisations, the Consolidated Environmental Authorisations and existing legislation:

- industrial discharges (including water used for the cooling of plants);
- integrated water service (in addition to the wastewater treated in the purification service, includes process water from production and purification systems, which do not contain particular pollutants);
- waste management and treatment;
- washing vehicles and industrial areas;
- discharge of domestic water at non-industrial sites.

Most water discharges are composed of water used in the cooling process at thermoelectric plants, which is discharged to surface water (rivers).

Discharges, like withdrawals, are also 4% lower than in 2019.

WATER DISCHARGES (m³) (1)



(1) Data report the 2019-2020 biennium because the new classification required by 303-4 GRI 2018 standard was adopted from 2019. All discharges (except seawater) are composed of freshwater (≤1,000 mg/L of total dissolved solids). Volumes of water passing through for hydroelectric production are excluded, while for treatment plants, only process water is considered, excluding treated wastewater (see page 83). The data for 2019 has been restated.

Water withdrawn for all processes is almost entirely returned to the environment. Approximately 0.3% of water withdrawn, equal to 1.7 million cubic metres, is consumed in industrial processes. Predominantly water evaporated during production processes (WTE and thermoelectric plants) and used for the district heating networks.

WASTE PRODUCTION

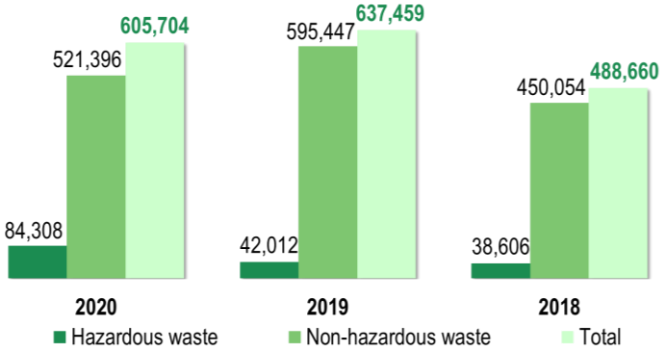
Environmental protection is also achieved through the responsible management of waste produced by the Group during its activities, following the principle of prevention aimed at reducing production as much as possible and using the waste produced as a material or energy. The figures of waste produced are communicated on a yearly basis to the Chamber of Commerce through the environmental declaration form.

The Group's main waste-generating activities are:

- the **treatment and processing of** urban and special **waste** that the Group manages for communities and private bodies (e.g. leachate generated at landfills, ash and slag from waste-to-energy plants, etc.);
- the **treatment and purification of water** in the management of the integrated water service for the municipalities served by the Group (e.g. sludge, sand);
- operation and maintenance of heat and **energy production plants** and **electricity and gas distribution networks**.

Systems of sorted waste collection, aiming to increase material recycling, have been installed in all Group sites. Policies limiting the use of paper have also been drawn up and implemented through dematerialisation projects and computerisation of processes.

WASTE PRODUCED BY GROUP PROCESSES (t)



In 2020, the Group produced 605,704 tons of waste, of which 521,396 tons was non-hazardous, an overall reduction of 5% compared to 2019.

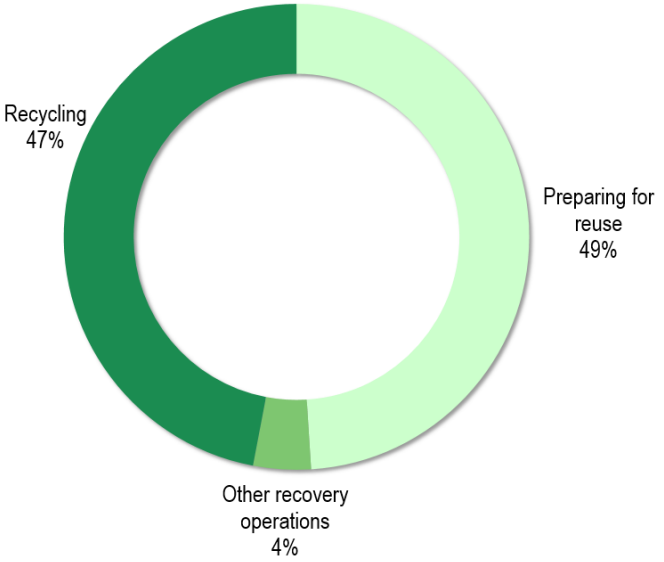
Waste generated by business and main materials (t) [1]	2020
Environmental Services	**437,406**
of which non-hazardous	*353,433*
- slags	*173,558*
- leachate	*71,536*
- sludge	*7,534*
- sands	*4,548*
- metals	*8,238*
- other waste	*88,019*
of which hazardous	*83,973*
Water treatment and purification service	**167,185**
of which non-hazardous	*167,072*
- sludge	*143,727*
- sands	*5,762*
- sieve/muddle	*5,637*
- other waste	*11,946*
of which hazardous	*113*
Energy production	**892**
of which hazardous	*188*
Other non-hazardous waste	**187**
Other hazardous waste	**34**
TOTAL	**605,704**

[1] The difference between waste produced and their destination (next tables) is due to temporary storage. As of 2020, the breakdown of waste generated required by the new GRI 306 standard has been adopted, so it is not possible to provide a comparison with the three years.

In addition to complying with the legislative framework, the waste cycle is closed with a particular focus on the enhancement of the waste resource (recycling, material recovery and preparation for re-use) as opposed to disposal, where priority is given to the energy recovery of waste that the Group cannot usefully recover, and only as a last resort to landfill.

In 2020, approximately 59% of the Group's waste was diverted from disposal and sent to the material recovery chain.

WASTE DIVERTED FROM DISPOSAL



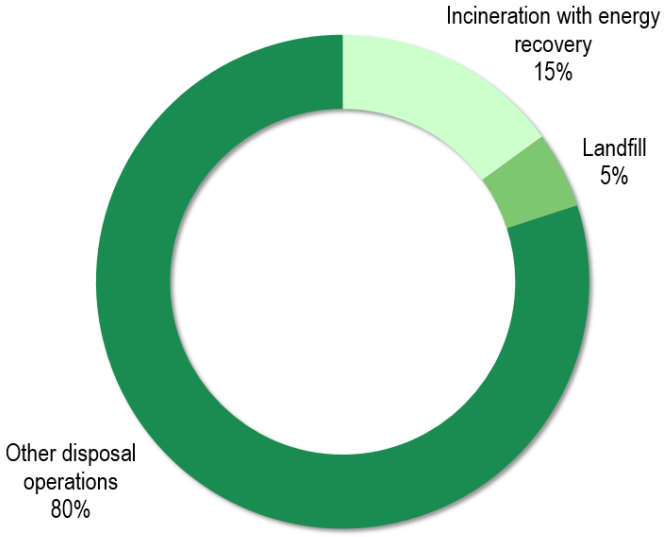
Details of waste diverted from disposal, thanks to treatment in Group or third-party plants, are given in the table below.

Waste diverted from disposal (t) [1]	Group plants	Third-party plants
Preparing for reuse	46,311	128,108
of which hazardous	*48*	*23,708*
Recycling	192	168,792
of which hazardous	-	*24,543*
Other recovery operations	47	13,123
of which hazardous	*13*	*275*
TOTAL	**46,550**	**310,023**

[1] As of 2020, the breakdown of waste generated required by the new GRI 306 standard has been adopted; therefore, a comparison with the three years is not possible.

The remainder of the waste produced by the Group (approximately 41% of the total) was disposed of in the manner and the quantities indicated in the following graph and table.

WASTE DISPOSED



All waste intended for incineration has been disposed of in plants with energy recovery.

Waste disposed (t) [1]	Group plants	Third-party plants
Incineration with energy recovery	36,301	828
of which hazardous	*4*	-
Landfill	7,725	4,864
of which hazardous	-	-
Other disposal operations	124,832	74,692
of which hazardous	*8,616*	*27,112*
Total	**168,858**	**80,384**

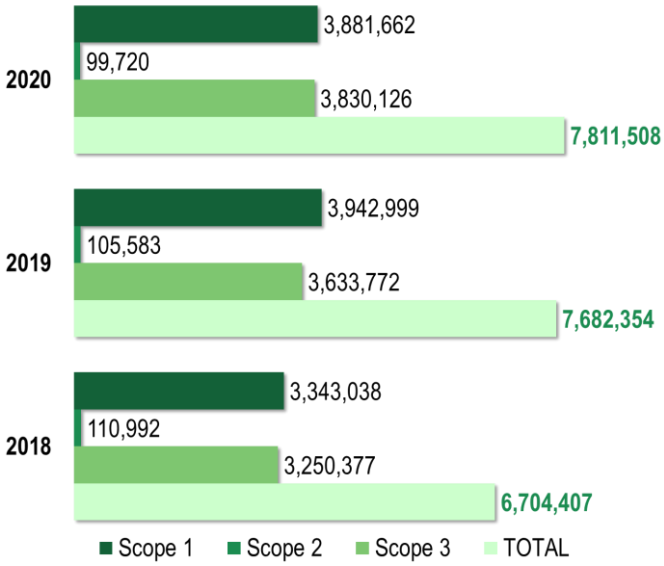
[1] As of 2020, the breakdown of waste generated required by the new GRI 306 standard has been adopted; therefore, a comparison with the three years is not possible.

ATMOSPHERIC EMISSIONS

Iren Group activities generate atmospheric emissions both directly, concerning production processes, and indirectly, from the supply of electricity from third parties. Reporting will therefore consider:

- **scope 1**: all direct emissions from sources owned by the Group, i.e. CO_2 emissions generated from fuels burned at the plants for the production of energy and heat, those originating from the company fleet and those deriving from natural gas consumption to produce heat for the heating systems of the various office buildings and/or for other activities in support of production;
- **scope 2**: CO_2 emissions from indirect consumption of the Group; i.e. emissions generated from the purchase of electricity consumed in the Group's plants and offices from third-party suppliers;
- **scope 3**: all emissions that, albeit related to core and business activities, are not directly controlled by the Group.

TOTAL CO_2 EMISSIONS (t)



SCOPE 1 EMISSIONS

Direct CO_2 emissions – Scope 1 (t)	2020	2019	2018
Direct emissions from production plants	**3,856,284**	**3,917,267**	**3,325,895**
- of which from cogeneration, thermal and thermoelectric power plants	3,418,020	3,484,516	2,911,546
- of which from waste-to-energy plants (non-biogenic portion)	438,232	432,720	414,305
- of which other combustion reactions for process uses or services	32	31	44
Other direct emissions	**6,922**	**5,215**	**5,938**
Emissions from company vehicles	**18,456**	**20,517**	**11,205**
TOTAL	**3,881,662**	**3,942,999**	**3,343,038**

Direct emissions of biogenic CO_2 from production plants (t)	2020	2019	2018
Waste-to-energy plants (biogenic portion)	456,119	450,383	431,216
Landfills and treatment plants	24,915	21,444	22,224
TOTAL	**481,034**	**471,827**	**453,440**

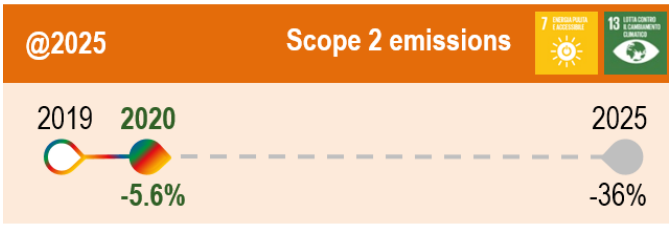
In 2020, direct emissions showed a decrease compared to the previous year that is affected by the overall reduction in energy production, due to climate effects and lower national consumption concerning the Covid-19 emergency, and by the improvement in emissions linked to the traffic of the company vehicles due to the progressive electrification of the vehicle fleet and lower mileage, also in this case related to the pandemic.

SCOPE 2 EMISSIONS

CO_2 emissions – Scope 2 (t) [1]	2020	2019	2018
Emissions from electricity purchased for process activities	93,819	99,016	103,977
Emissions from electricity purchased for office activities	5,901	6,567	7,015
TOTAL	**99,720**	**105,583**	**110,992**

[1] Emissions are calculated by multiplying the electricity purchased from third parties by the emission factor of the national electricity mix, which for 2020 was 296 g CO_2/kWh, for 2019 was 316 g CO_2/kWh and for 2018 was 321 g CO_2/kWh (Source: NIR2020_ITALY). This factor accounts for the mix of various production sources for the electricity purchased.

In 2020, there was a slight reduction in scope 2 emissions compared to the previous year. The Group has set a target in its Business Plan to reduce these emissions by 36% by 2025 and achieve net-zero scope 2 emissions in 2035.



The plan will achieve a result both through the purchase of certified green electricity for the Group's processes and activities and the installation of new photovoltaic systems on the Company's premises that will help reduce the amount of energy purchased from third parties.

In 2020, the Group set a target of reducing scope 2 emissions by 2025

SCOPE 3 EMISSIONS

The Group is indirectly responsible for emissions produced by its suppliers and customers and by the entire value chain.
For this reason, each year, the Group aims to extend its emissions reporting boundary, analysing in greater depth the categories proposed by the GHG Protocol methodology.

In 2020, the analysis of scope 3 emissions was further refined

Overall, in 2020, scope 3 emissions are up compared to 2019 due to the refinement of calculation methodologies that broadened the boundary of emissions reported. In particular, the most significant increase is recorded for emissions from purchased goods and services, calculated on orders to suppliers in the year; this is due both to the rise in total orders of approximately 46% compared to 2019 and the expansion of the coverage of the analysis from about 75% of orders in 2019 to over 95% in 2020.

CO_2 emissions – Scope 3 (t) [1]	2020	2019	2018
Goods and services purchased [1]	844,572	549,970	466,814
Capital assets (plants and machinery)	3,256	38	773
Use of fuel and energy (not included in Scope 1 and 2 emissions) [2]	480,459	499,719	422,142
Upstream transport and distribution services [3]	3,998	636	550
Transport of waste produced [4]	1,426	1,492	1,367
Business trips [5]	137	52	428
Employee commutes [6]	12,750	12,750	12,750
Use of products sold [7]	2,464,655	2,519,909	2,297,380
Downstream leased assets [8]	8,602	7,806	8,700
Investments [9]	10,271	41,400	39,473
TOTAL	**3,830,126**	**3,633,772**	**3,250,377**

[1] Supplier orders in the year have been analysed and the emissions deriving from the production of each type of goods and services purchased were estimated.
[2] All direct and indirect consumption (natural gas, diesel, electricity and vehicle fuels) was calculated and Well-to-Tank (WTT) emission factors were used in order to quantify total emissions due to the extraction, processing and transport of the fuels used.
[3] It is calculated from the total orders to suppliers for transportation services.
[4] The weight of waste produced and diverted from disposal (then sent for recovery/recycling) was multiplied by the emission factor 4 kg CO_2/t waste.
[5] The emissions were calculated by analysing orders placed in 2020 for trains, planes, hotels, etc.
[6] Data estimated on the basis of the average number of employees (between 5,000 and 10,000).
[7] The volumes of gas sold to end customers, which are not produced by the Group and therefore not relevant to Scope 1 emissions, were considered and multiplied by the emission factor (1.972 t CO_2/1000 sm^3).
[8] Data calculated on the basis of revenues from active leases and rental agreements.
[9] Direct and indirect emissions of certain non-consolidated companies multiplied by the percentage equity held by the Group. The company Gaia continues to be considered in 2020, while the OLT company sold by the Group at the beginning of the year is no longer included.

Other atmospheric emissions from production plants concern sulphur oxides (SO_X), nitrogen oxides (NO_X), particulates and methane (CH_4).

Atmospheric emissions (t)	2020	2019	2018
SO_X (1)	62.91	25.36	9.80
NO_X	1,030.25	996.11	809.65
Particulates	10.64	9.96	17.70
CH_4	5,929.47	5,763.08	5,867.79

(1) The data is calculated from the flue gas volume at the stack and the concentration measured by the emission analysis performed by an accredited external laboratory. The determined parameter, which describes the condition of a short period, is then extended to the whole year. This method of calculation may lead to significant differences from one year to the next.
(2) The change in CH_4 emissions is related to increased biogas production from landfills.

OZONE-DEPLETING EMISSIONS

Ozone-depleting substances are normally contained in the refrigerants of air conditioning systems. The only harmful substance used by Iren Group is R22 (monochlorofluoromethane), which is present in plants either owned by the Group or managed for third parties (e.g. air-conditioner cooling circuits). Emissions of this substance are monitored on the basis of the quantities of coolant added following periodic maintenance checks (topping up). In order to avoid any dispersions from the Company's air conditioning equipment, all the initiatives envisaged by the Italian Presidential Decree 147/06 have been activated. All equipment was registered, indicating the gases contained and the respective quantities, and subjected to periodic checks to ensure that there are no leaks, as well as to check its correct functioning and cleanliness. In 2020, the Group replaced all split air conditioners with R22 gas in the Emilia area, which will continue in 2021 in the Liguria and Piedmont areas.

PCB MANAGEMENT

Polychlorinated biphenyls (PCBs) are aromatic compounds – consisting of toxic chlorinated molecules that are persistent organic pollutants with bio-accumulative properties – found in transformers and other electrical equipment. To avoid forms of pollution or dispersion of these substances, Iren Group regularly and continuously updates the number of machines containing insulating oil and the quantity contained in them, in accordance with registration and cataloguing procedures. The environmental performance improvement programme in the field of electricity distribution provides for the gradual decommissioning of electrical devices containing PCB/PCT contaminated oil. The goal is to keep the disposal trend steady until the elimination of all the contaminated devices.

In 2020, 16 electrical and electronic equipment containing oil contaminated with PCBs at concentrations between 50 and 500 ppm were sent for disposal, in the quantities indicated in the table.

Oil containing PCB disposed of (kg) (1)	2020	2019	2018
with PCB content of over 0.05%	0	0	0
with PCB content between 0.005% and 0.05%	3,560	3,043	2,197
TOTAL	**3,560**	**3,043**	**2,197**

(1) The total amount of oil containing PCB in transformers and other equipment as at 31/12/2020 is approximately 54,966 kg.

MEASURES TAKEN TO REDUCE ACOUSTIC IMPACT

Iren Group takes steps to monitor, evaluate and mitigate noise emissions throughout the life cycle of its plants and infrastructure, supported by specialist technicians, and dedicates time and resources to limit the acoustic impact of its activities, including through mitigation measures (e.g. soundproofing panels, silencers). In order to verify that the limits laid down by current legislation are respected, specific Acoustic Impact Assessments are carried out at each **energy production** site, either as a preventive measure or on existing situations, whenever:

- it is decided to build, modify or upgrade a construction project;
- it is intended to start a new business;
- an application is made for the issuance of permits for the construction of new plants, the infrastructure of productive activities or commercial services;
- a public body or a municipality requests it.

In cases where the specified limits were exceeded, acoustic decontamination measures were taken on the most significant sources to bring the noise emitted within the legal limit. Periodic phonometric tests are also carried out at the perimeters of the sites or in proximity of the sensitive receptors; moreover, upon receiving reports or complaints from citizens, we implement appropriate measurements to assess the need for specific mitigation measures.

At **gas distribution** plants, campaigns to measure the effects of noise produced on the surrounding environment in 2020 found no critical issues.

In the **distribution of electricity**, the Group found a primary substation to be marginally over the permitted noise emission limits, for which the design of the necessary mitigation works has commenced.

The subject of reducing the acoustic impact is normally not particularly relevant for the **integrated water service**. Despite this, machinery and equipment (compressors, grills, etc.) are replaced during the unscheduled maintenance interventions with models producing lower levels of acoustic impact or greater degree of soundproofing.

Lastly, regarding **environmental services**, phonometric tests are periodically carried out on waste collection, street sweeping and collection centres. In particular, in the waste collection sector, the Group is adopting new methods with vehicles with low acoustic impacts, such as electric vehicles. For waste-to-energy plants periodic acoustic monitoring campaigns are carried out. To date, the results of the investigations conducted show that the limits have been respected.

ELECTROMAGNETIC FIELDS

For several years now, Iren Group has been measuring electromagnetic fields, which involve:

- primary electricity power plants and stations;
- overhead and underground HV power lines;
- MV/MV and MV/LV electricity substations installed in schools, hospitals, parks, or with specific load characteristics;
- MV/LV electricity substations with a higher capacity;
- office buildings of Group Companies.

During inspections, the location of the substation is checked, as well as the electrical equipment it contains with respect to any sensitive adjacent buildings and any potentially hazardous situations found in the substation that are environmental and electrical. In 2020, the design and construction of new MV/LV substations continued to reduce the population's exposure to emissions from electromagnetic fields (EMF).

MATERIALS USED

The Group's production and service activities involve the use of materials acquired from external suppliers, including, for example, products for cooling and lubricating plants and machinery, substances for treating water, and reagents for waste treatment and waste-to-energy processes. In 2020, the Group used 212,098 tons of process materials in total, with a marginal proportion of renewable materials, considering the type of processes managed.

As part of the Group's supplier certification process, certain qualitative information is specifically requested regarding the use of materials with low emissions, low energy consumption, of recycled or recyclable material and the eventual adoption of procedures for the storage and collection of recyclable materials in order to guarantee recycling.

REDUCTION OF EMISSIONS AND ENVIRONMENTAL IMPACTS

INVESTMENTS FOR THE ENVIRONMENT

Iren Group has a responsible commitment to reduce its impacts and protect the environment, which it undertakes through the use of human and financial resources. The expenses and investments incurred in 2020 for environmental protection amount to approximately 490 million Euro, allocated as follows:

- 56% to the improvement and efficiency of the gas and electricity distribution networks, the upgrading and renewal of water networks, sewerage and water purification systems and smart metering;
- 40% to optimise sorted waste collection systems in order to pursue the waste recovery objectives defined in the local area plans;
- 3% to the efficiency of electricity and thermal energy production plants through flexibilisation interventions, installation of heat and electricity storage systems and development of production from renewable sources (photovoltaic and hydroelectric);
- 1% to implement services and products with positive environmental impacts for customers (e.g. Iren Plus and IrenGO).

REDUCTION OF EMISSIONS

The Group carefully monitors atmospheric emissions (measurements on chimneys, indirect calculations, number of leaks, etc.) in order to identify specific measures to reduce them and verify the results achieved on a regular basis.

The generation of electricity from renewable sources creates significant positive effects on the reduction of emissions and the predominant cogeneration framework (production of electricity and thermal energy that feeds the district heating networks in different cities) of the Group's thermoelectric plants significantly contributes to containing specific greenhouse gas emissions.

More than 2.7 million tons of CO_2 avoided by eco-friendly energy production, sorted waste collection, material recovery and numerous other initiatives

All power plants use renewable energy sources, waste or natural gas, for their power supply and adopt low-emission and pollutant-reducing combustion technologies (catalysts to reduce CO and NO_X). Continuous emission monitoring systems make it possible to detect in real time the main pollutants and the improvement of the efficiency of the combustion process of cogeneration plants, larger thermal plants and waste-to-energy plants. The latter are also required, pursuant to the relevant Integrated Environmental Authorisations (IEA), to comply with stricter emission limits than those contained in national legislation.

Pursuant to the IPPC environmental legislation and relevant IEAs, it is mandatory for power plants with a capacity exceeding 50 MW to continually improve environmental services, by updating to the best available technology in order to continually reduce the pollution for the different environmental compartments, including atmospheric emissions.

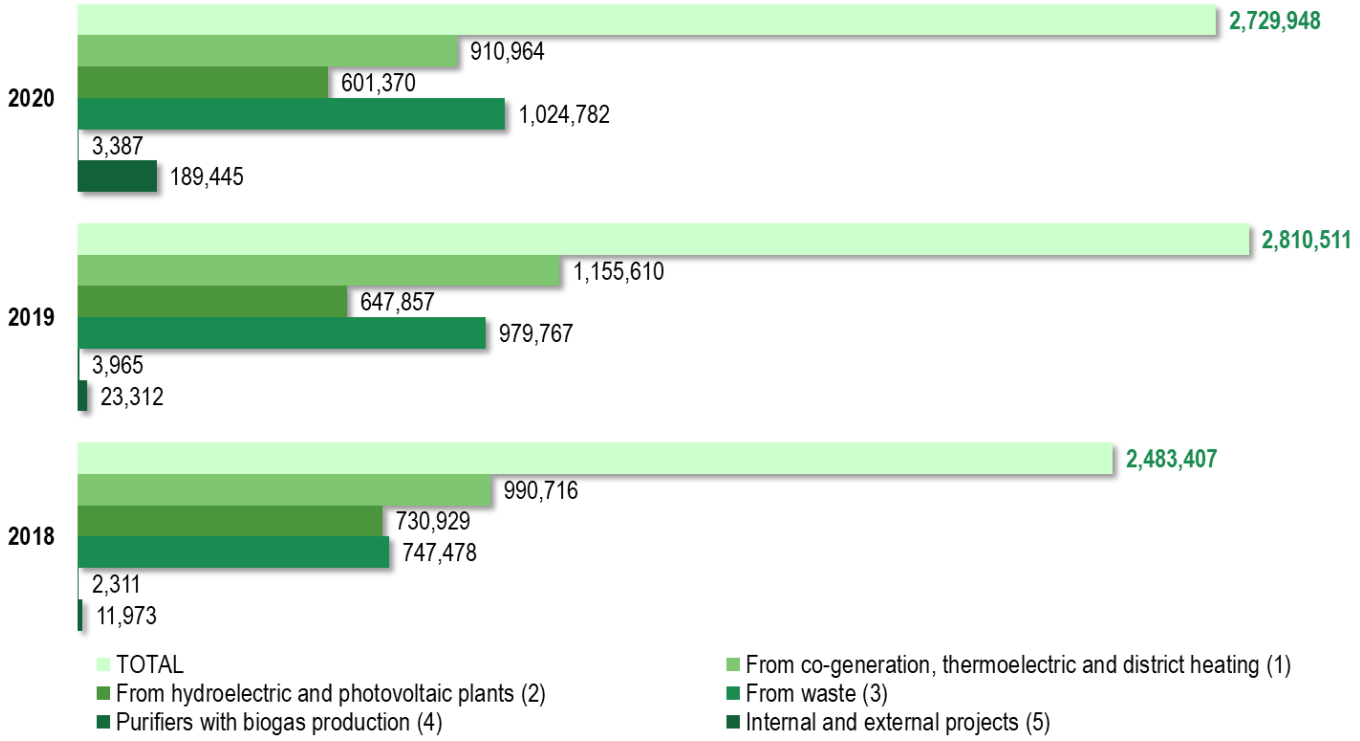
The combustion of the biogas produced in landfills produces the maximum reduction of methane and other greenhouse gas emissions, although its conversion into CO_2 has a potential greenhouse effect 21 times lower than natural gas (Source: UNI ISO 14064).

In addition to monitoring and limiting emissions from its power plants, Iren Group is increasingly contributing to reducing CO_2 emissions through specific investments and projects, such as:

- **district heating** that uses heat produced in cogeneration, replacing traditional condominium boilers and reducing the natural gas consumption;
- **heat storage systems** that absorb the production capacity of plants during periods of low demand and reuse it to efficiently manage peak demand;
- **sorted waste collection**, which avoids the emissions that materials would have produced if sent for disposal;
- **material recovery from waste**, which has a positive impact on the environment, for example, through the reuse of plastics and the production of compost and biomethane from organic waste;
- **sustainable mobility** and reduction of employee travel through smart working and agile ways of working;
- the offer of **products and services for energy efficiency** and the reduction of environmental impacts by customers.

The emissions avoided by adopting the listed initiatives are summarized in the graph below:

CO_2 EMISSIONS AVOIDED (t)



(1) The calculation considers as a benchmark the emissions of the national thermoelectric system equal to 457.059 kg CO_2/MWh in 2020, 479.01 kg CO_2/MWh in 2019 and 478.224 kg CO_2/MWh in 2018 (Terna and PNA data). Avoided emissions decreased due to the reduction in the emission factor, reflecting the gradual improvement in the national production mix. The data also includes emission reductions from heat storage systems.
(2) The calculation considers emission reductions from hydroelectric and photovoltaic plants, compared with the conventional thermoelectric mix.
(3) CO_2 avoided from waste takes into account: - production from biogenic sources: landfills and biodigester with the production of electricity from biogas, electricity and heat produced by WTE, assuming 51% of the total output of WTE as a renewable source (Source: GSE) and, in case there is also the production of thermal energy, converting thermal energy into electricity (for PAI=1/6.88, for TRM=1/4.5) and applying the national benchmark (see footnote 1); - sorted waste collection: the calculation is based on the correlation between the most relevant tons of recycled waste (paper and cardboard, plastic, organic and green, wood, iron, glass) and the tons of CO_2 equivalent saved (Source: Waste management options and climate change EC-AEA 2001); - material recovery: the emissions avoided by the primary materials recovered in Group plants that have been diverted from incineration (plastic, durable goods, other materials) or by the secondary raw material produced by their recovery (compost, bluair).
(4) The calculation takes into account the amount of biogas from the treatment plants from which electricity was produced.
(5) Specific projects include both internal Group initiatives (e.g. energy efficiency of plants/processes, electric mobility) and external ones (energy efficiency services, innovative *Iren Plus* products, sale of certified green electricity, not calculated in previous years).

Emissions of NO_X and SO_X avoided (1) (t)	2020	2019	2018
Nitrogen oxides (NO_X)	467	690	812
Sulphur oxides (SO_X)	271	435	489

(1) The calculation considers emissions that, for the same amount of energy produced, would have been generated by domestic heating systems and the national electricity production network, subtracting the emissions effectively produced by the Group's plants.

INITIATIVES TO MITIGATE ENVIRONMENTAL IMPACTS

The Group has undertaken many initiatives to reduce the environmental impact of its activities in the various business sectors.

ENVIRONMENTAL SERVICES

All the Group's **waste-to-energy** plants are equipped with monitoring systems that guarantee continuous measurement of emissions and verification of compliance with the regulations and the Integrated Environmental Authorisation with control of the substances indicated. In order to make even more timely adjustments to the combustion parameters and to optimise the reduction of mercury, in 2020, the activities that equipped the three plant lines with a backup system for dosing activated carbon were completed on the Turin waste-to-energy plant.

In regard to the containment of the biogas emissions from **landfills**, cycles of internal control are carried out for the regulation of the valves at the top of the biogas collector wells with measurement of the capturing efficiency of the plant.

Another initiative regarded the **replacement of** diesel-powered **roll on/roll off compactors** with electronic equivalents. In 2020, 7 new devices were purchased, which contribute to the reduction of atmospheric and acoustic emissions.

INTEGRATED WATER SERVICE

The initiatives aimed at reducing the environmental impacts mainly concern:

- the reduction of energy consumption by adapting wastewater treatment processes and replacing old machinery with the latest generation equipment that consumes less energy;
- the replacement of submersed electric pumps of the pumping stations with new pumps fitted with inverters;

- the reduction of water procurement through the reduction of leaks from water mains;
- the improvement of the quality of the water that leaves the treatment plants and the connection of stretches of untreated sewage to final treatment systems;
- the abatement and containment of odorous emissions from treatment plants by confining them to secure rooms during the process in order to allow the air to be aspirated and treated.

The public water dispensers for the free distribution of drinking water (chilled and sparkling) to residents has considerably reduced the use of plastic bottles (approximately 17 million 1.5 litre bottles in 2020) and, therefore, the production of waste (588 t of PET avoided). Savings of 1,530 tons of CO_2 are estimated for 2020, thanks to the non-consumption of 1,116 tons of oil equivalent for the production of the bottles.

Public water dispensers have allowed approximately 1,530 tons of CO_2 to be avoided, equal to 1,116 TOE

GAS DISTRIBUTION

The main environmental impact from the gas distribution network is the leakage of methane gas into the atmosphere. To guarantee the safety, quality and continuity of service levels, the Group has adopted distribution monitoring systems (for example, remote control) and intrusion detection systems, as well as ongoing scheduled research and ordinary and extraordinary maintenance of networks and substations.

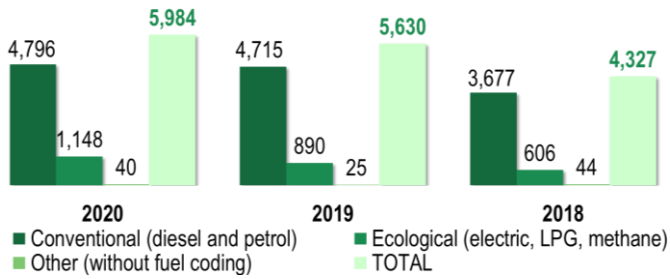
OTHER INITIATIVES

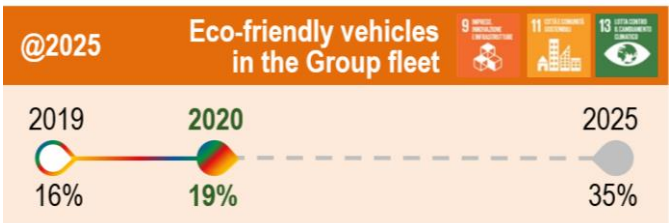
LED lighting: this involves the installation of new public street lighting fixtures and traffic lights with LED technology. In 2020, the initiative led to savings of approximately 17,300 tons of CO_2 (see page 89).

MOBILITY MANAGEMENT

The Group is committed to reducing atmospheric emissions from road traffic through the progressive electrification of its fleet, the systematic renewal of vehicles and the promotion of initiatives for employees.

OWNED AND LEASED COMPANY VEHICLES AS OF 31/12/2020 (no.)





ATMOSPHERIC EMISSIONS OF COMPANY VEHICLES (t)

Types of emissions (t) (1)	2020	2019	2018
NO_X	54.56	91.81	45.01
VOC	3.38	4.72	1.78
CO	24.67	33.34	13.95
PM10	3.93	5.13	2.58
CO_2	18,456.33	20,516.89	11,204.85

(1) The emissions are calculated multiplying the km travelled by the vehicles (broken down into different Euro categories, type of fuel and vehicle) by the more recent emission coefficients (Source: INEMAR - ARPA Lombardia 2018).Travel distance data were taken from the management software in use. The distances are measured using the final data of the files of the companies supplying the fuel with relevant controls on evident anomalies.

In 2020, there was a significant decrease in atmospheric emissions from company vehicles, particularly a 10% reduction in CO_2 emissions, despite the growth in the number of vehicles in the company fleet. The positive trend is, in part, due to lower distances travelled related to the reduction in employee travel, but also, and above all, to the progressive efficiency and improvement of the car fleet: in 2020, the percentage of environmentally friendly vehicles in the total company fleet has further increased, exceeding 19% (16% in 2019) and the campaign to replace obsolete vehicles has continued (at the end of 2020, 62% of diesel and gasoline vehicles belong to Euro 5 and 6 categories, +12% compared to 2019).

The management of vehicles is performed pursuant to the corporate guidelines that define levels of safety, maximum distances travelled and levels of replacement in relation to total distances travelled, the age of the vehicle and level of wear and tear, together with the changing operating needs or the management synergies between the different areas of operation.

The Business Plan to 2025 confirms, once again, the initiative towards sustainable mobility: the objective is to reach 35% of environmentally friendly vehicles in the total company fleet by 2025 and 50% in the long term by 2035.

This will be possible by continuing the **IrenGo** project, which involves purchasing full-electric vehicles – cars, vans, vehicles for sorted waste collection and heavy vehicles – and the installation of recharging infrastructures (recharging units and wall boxes) at the company's premises. At the end of 2020, more than 720 vehicles were already on the road (cars, vans and waste collection quadricycles) and there were more than 700 operational recharging points.

The new vehicles help to improve the air quality in the urban environments in which they work every day. In 2020, the IrenGo project avoided around 1,100 tons of CO_2 and over 260 TOE.

The Group also promotes initiatives to encourage employees to use public transport (purchase of season tickets at a discounted price, in instalments or charged to their salary) and alternative methods of transportation to get to work, such as the "Ecoviaggio Smart" app, which offers employees the possibility of organising car-sharing journeys for work.

Working from home in 2020 had a positive environmental impact: 2,000 tons of CO_2 avoided and nearly 1,000 TOE saved.

Also, the Group has been activating remote working methods (teleworking and "smart-working") for several years now, which, in 2020, due to the Covid-19 emergency, were significantly extended, involving 3,166 employees. This has generated a significant positive environmental impact: in fact, thanks to the reduction in travel estimated at almost 14 million km, more than 2,000 tons of CO_2 have been avoided, and nearly 1,000 TOE have been saved.

INTEGRATED WATER SERVICE

WATER PRODUCTION AND DISTRIBUTION

The supply of water for the distribution of drinking water is carried out in compliance with regulations and concessions and according to effectiveness and efficiency criteria.

The criteria for using resources consider several factors (authorised quantities, size of reserves in the main reservoirs, the quality of available surface water, the hydrological features of the basins, final data relating to the previous year and the current year).

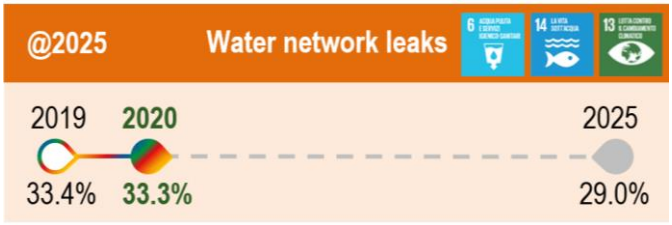
Modern automation and remote-control equipment ensure the water catchment, purification, and lifting systems' best operation.

The total volume of water fed into the network in 2020 is down compared to last year.

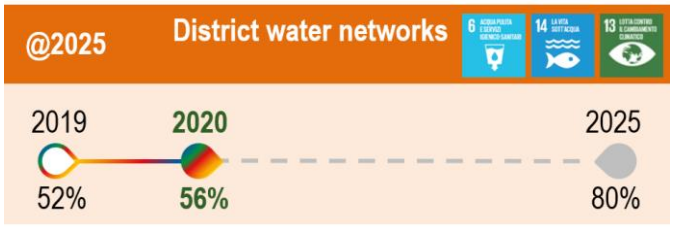
Water fed into the network (thousands of m³)	2020	2019	2018
Piacenza	31,041	32,239	32,122
Parma	38,095	38,156	38,024
Reggio Emilia	45,818	46,159	44,982
Vercelli	8,916	8,744	8,819
Genoa	90,605	95,719	99,045
Savona	19,093	19,057	19,752
Imperia	3,080	3,462	3,515
La Spezia (1)	38,002	40,296	30,865
Other provinces (2)	4,956	6,638	15,826
TOTAL	**279,606**	**290,470**	**292,950**

(1) In 2018, Acam Acque is only considered for the period of consolidation (from April 1).
(2) The significant reduction compared to 2018 is due to the termination of service in the provinces of Alessandria, Aosta, Novara, Brescia, Pavia and Verona. The provinces of Asti, Cuneo, Mantua remain included.

The percentage of network leaks stands at 33.3%, compared to a national average of 43.7% (ISTAT 2019 data).



Among the initiatives for the reduction of dispersions in water networks, the Group is developing district planning. This technique involves dividing the networks into small homogeneous areas, the so-called "districts", which allow daily monitoring and constant analysis of hydraulic parameters. In this way, the instrumental leak detection campaigns are punctual and targeted only to the districts on which the monitoring has detected hidden leaks. Currently, 56% of the total managed network has been associated to a district in progression according to the objectives defined by 2025. District planning also produces a benefit in terms of reducing energy consumption: it saved 523 TOE in 2020.

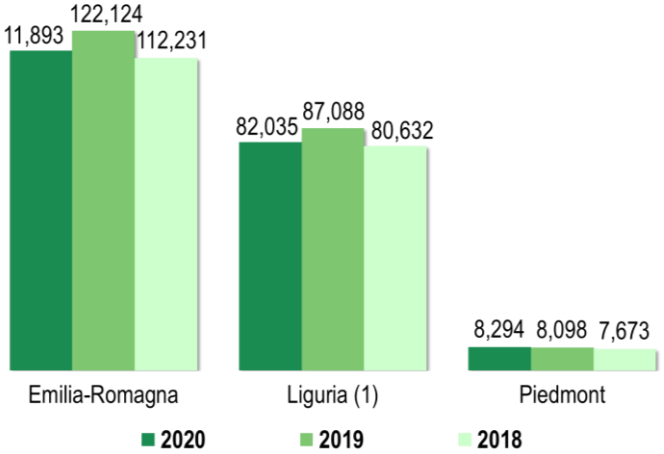


SEWERAGE AND TREATMENT QUALITY

Urban wastewater from public sewers is treated at 1,356 treatment plants of varying capacity and type. In the central plants, pre-treatments are carried out to remove coarse matter, sand and oils, primary treatments to remove settleable solids and traditional secondary and tertiary treatments for nitrogen removal.

The Group also manages several phyto-purification plants that use plants' treatment activity and are used both for the purification of sewage (sub-surface flow system) and for the refinement of water treated in traditional treatment plants (surface flow systems).

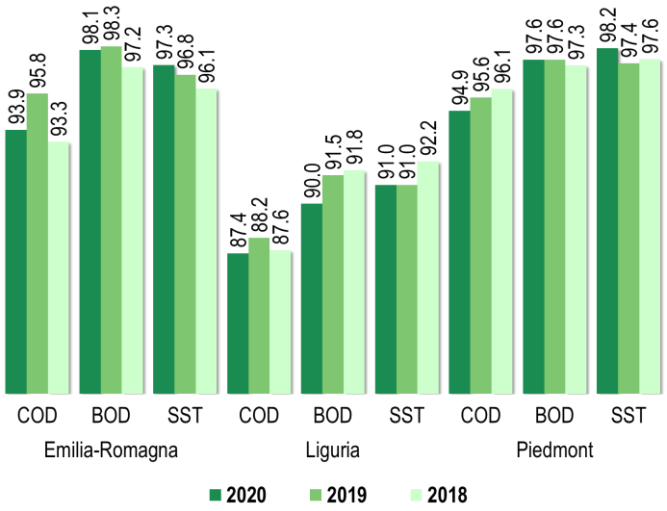
WASTEWATER TREATED (thousand m³)



(1) In Liguria, the Group does not manage the sewerage and treatment service in the Savona and Imperia areas.

For the volumes of water treated and the calculation of pollutant reduction, all the Group's treatment plants with a capacity of more than 2,000 residents equivalent are considered.

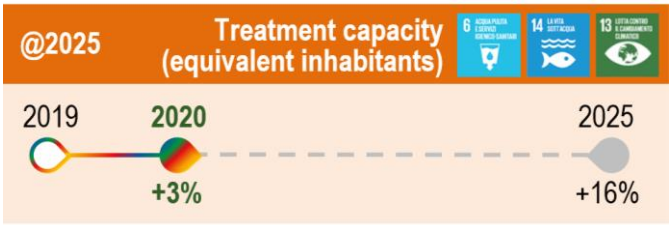
POLLUTANT REDUCTION – GEOGRAPHICAL AREA (%)



1,356 treatment plants operated by the Group that contribute to improving the conditions of rivers, streams and seas

The Group's objectives are to increase purification capacity, increasing the plants' potential to ensure increasingly efficient service and improving wastewater management's environmental impact.

Investments made in 2020 in this direction also contribute to the achievement of the set objectives.



RECEIVING BODIES OF TREATED WASTEWATER

All the water bodies that receive wastewater treated by the Group in the Emilia and Piedmont regions fall within the Po river basin.

The land lies within an area declared as sensitive so the plants, depending on their size, are subject to the application of the strictest nitrogen and phosphorus limits.

The wastewater treated by the treatment plants in Liguria's served areas is discharged into the Ligurian Sea (mainly the Gulf of Genoa, the Gulf of Tigullio and the Gulf of La Spezia).

ENVIRONMENTAL SERVICES

WASTE COLLECTION

Iren Group operates in the waste collection sector in a number of different capacities, depending on the agreements in place with service providers:

- as an operator, based on long-term service contracts, in 166 municipalities in the provinces of La Spezia (Acam Ambiente), Parma, Piacenza, Reggio Emilia (Iren Ambiente), Vercelli (ASM Vercelli) and in the city of Turin (Amiat). In these contexts, the Group collaborates with the Regulatory Bodies to define targets and plan the collection systems;
- as a contractor, in the case of San Germano, with operational support to local authorities or other operators, in 141 other municipalities.

In 2020, the Group provided urban waste collection services in a catchment area of more than 3 million residents, where the Group handled almost 2.2 million tons of urban waste (approximately 325,900 tons collected by San Germano).

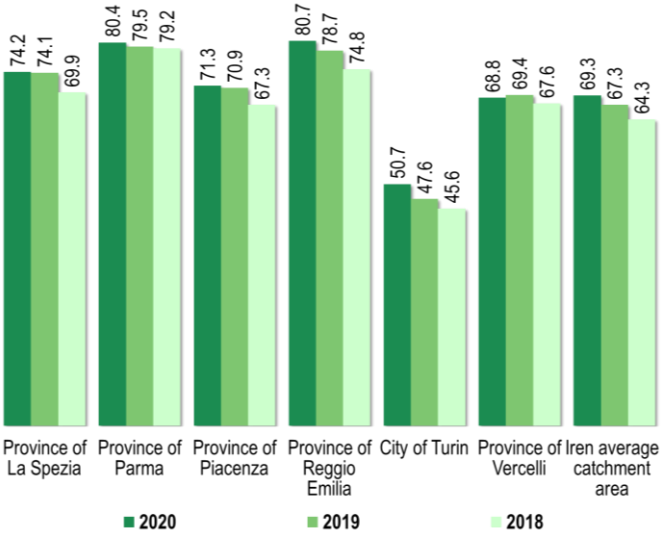
The Covid-19 emergency has required the Group to reorganise the collection service by adopting specific methods, in line with the provisions of the local authorities: in Liguria, a dedicated collection of waste produced by households where there were cases of contagion or quarantine has been set up; in Piedmont and Emilia-Romagna, on the other hand, in the presence of cases of infection or quarantine, the sorting of waste has been suspended, to send it all for disposal by waste-to-energy, which is considered the most suitable method for guaranteeing health and safety.

Preventing waste generation, increasing sorted waste collection levels, and recycling waste are critical objectives of waste management policies, as they reduce disposal requirements and thus the overall environmental impact. In addition to specific communication and information campaigns aimed at raising awareness among citizens to reduce waste production, Iren Group adopts **advanced collection systems** (door-to-door, ecostation with user recognition), which contribute to achieving high levels of sorted waste collection: in 2020, the Group reached 69.3% of sorted waste collection (67.3% in 2019), compared to a national average of 61.3%, once again exceeding the target of 65% by 2035 of the European Union's Circular Economy package.

In the system offered to residents to increase the results of sorted waste collection, the presence of 195 **Waste Collection Centres** (of which 32 in the San Germano operation area) is particularly relevant, enabling residents to freely deposit waste in large containers. The range of services is completed by collecting bulky waste at home and services dedicated to companies for the management of waste assimilated to urban waste.

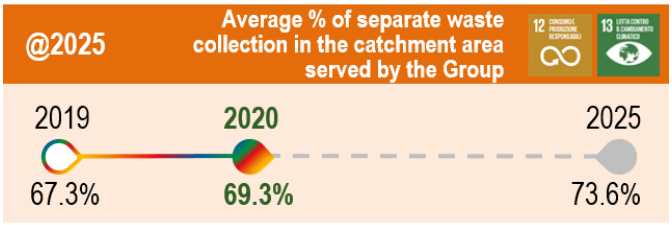
Of the 1,335,891 tons of urban waste collected in the areas where the Group acts as operator, 922,933 tons referred to sorted waste. The municipalities served by San Germano also achieved positive results with around 217,555 tons of sorted waste collected.

SORTED WASTE COLLECTION BY REGION (%)

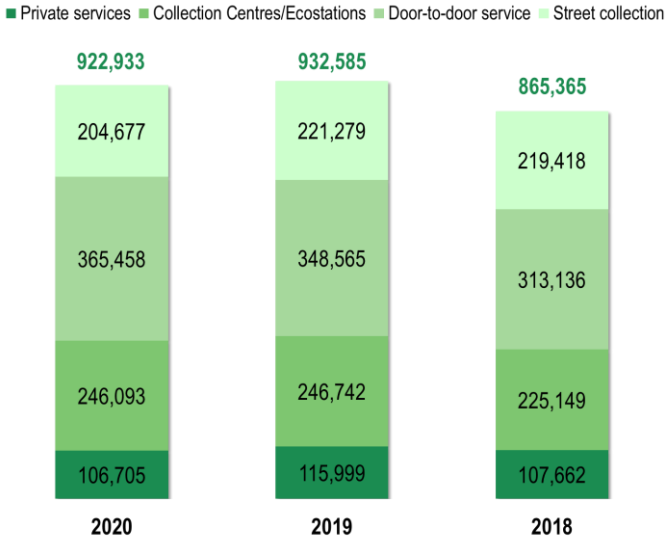


The percentages of sorted waste collection achieved in 2020 show a very positive trend: in Parma and Reggio Emilia, the results exceed 80%, and in the city of Turin, they go beyond 50%.

The Group has planned investments to bring all the regions to excellence: the Business Plan sets the objective of further growth in the sorted waste collection (73.6% by 2025 and approximately 80% by 2035).

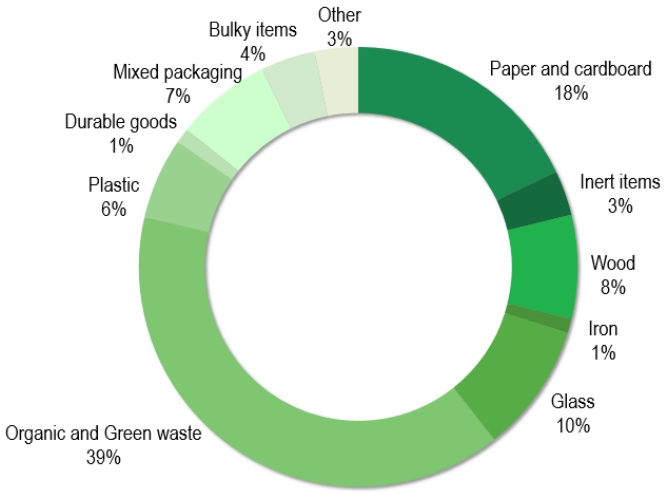


SORTED WASTE COLLECTION BY METHOD (t)



In 2020, sorted waste collection, which will be 1% less than in 2019 due to the already highlighted suspension of sorted waste collection due to cases of quarantine or Covid-19 infection, is sent for recovery through specialised platforms and sector supply chains, thanks to the agreements in place with the Consortia belonging to Conai (National Packaging Consortium), or through private operators.

SORTED WASTE RECOVERED BY TYPE



WASTE RECOVERY, TREATMENT AND DISPOSAL

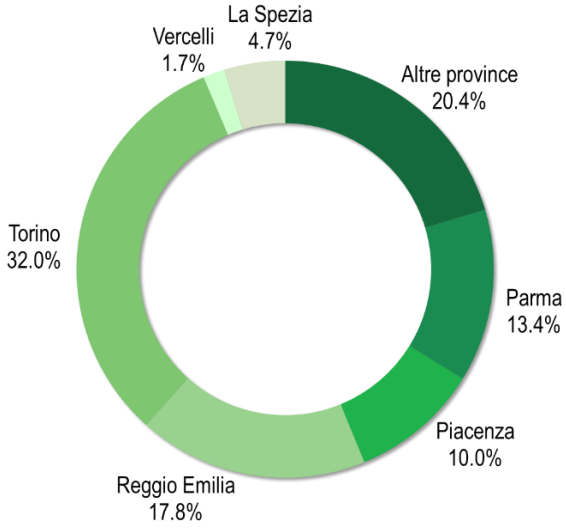
In order to guarantee an effective management of the entire cycle, the Group is also committed to the treatment and disposal of waste, the recovery of material and the exploitation of the resource waste for the generation of electricity, heat and biogas through a structured system of plants.

The plants owned by Iren Group are summarised in the table:

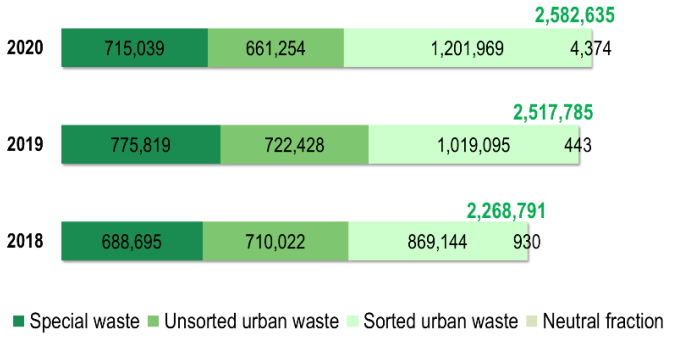
Plants	Number
Waste-to-energy plants	3
Operating landfills	2
Storage and transfer	18
Liquid waste treatment	4
Material recovery	13
Organic waste treatment and recovery	3
Mechanical-biological treatment with SSF production	1

In 2020, a total of 2.9 million tons of waste was managed, including 328,794 tons collected by San Germano (these quantities are not included in the breakdowns below).

WASTE MANAGED BY AREA (%)



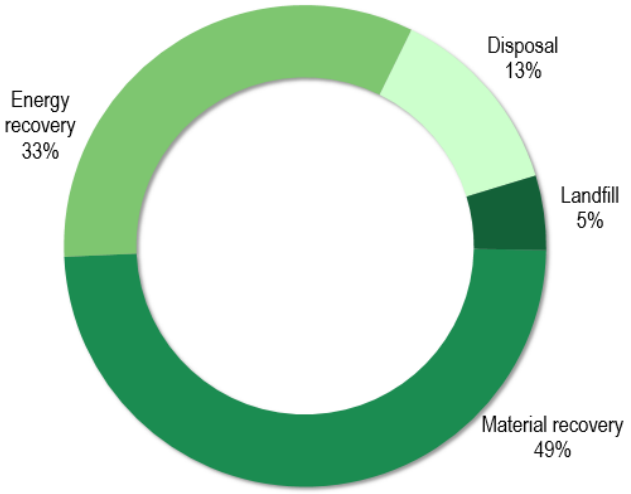
WASTE MANAGED BY TYPE (t)



The sorted component of the waste can be sent directly for recovery or transit through Group plants or storage areas, where it is sorted and/or treated before its final destination.

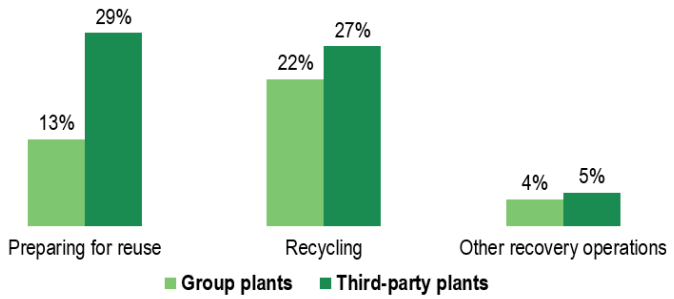
The unsorted component of the waste collected is destined for various disposal methods searching for the best use of the waste resource that sees energy recovery, through waste-to-energy, as the most effective solution from an environmental point of view. The Group has structured some plants for the preventive mechanical sorting process with the goal of intercepting a wet fraction of waste that is rich in organic material and which can be stabilised biologically.

DESTINATION OF MANAGED WASTE (%)



49% of the waste managed by the Group in 2020 was destined for the material recovery chain in Group and third-party plants.

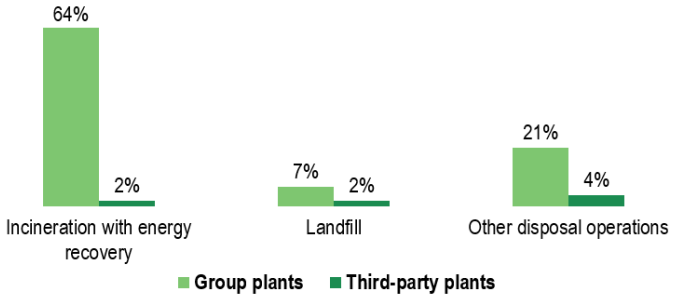
WASTE SENT FOR MATERIAL RECOVERY (%) (1)



(1) Approximately 2,640 tons consist of hazardous waste, equal to 0.2% of the total.

66% of the portion of the waste that could not be recovered as a material was sent for energy recovery, and the remainder – representing 17.7% of the total waste managed – for disposal.

WASTE DISPOSED (%) (1)



(1) Approximately 37,970 tons consist of hazardous waste, equal to 3% of the total. No waste has been sent for incineration without energy recovery.

In its Business Plan to 2025, the Group has demonstrated its growing commitment to closing the circular economy cycle, conceiving investments in several new plants for the recovery of the organic fraction, with the production of compost and biomethane, for the recovery of paper, plastic and wood, with the production of materials that are reintroduced onto the market.

PLASTIC RECOVERY WITH I.BLU

I.Blu, through its plants in Costa di Rovigo and in San Giorgio di Nogaro (UD) (expected to be operational by 2021), transforms mixed plastics deriving from the sorted waste collection into *Blupolymer*® and the secondary reducing agent *Bluair*®: the former consists of a recycled plastic granule with multiple uses, such as the construction of buildings and resistant infrastructures, containers and bags for sorted waste collection and many other objects; the latter is a *techno-polymer* designed for the steel industry, which acts as a reducing agent, replacing fossil fuel and significantly improving efficiency and environmental impact.

One of the Group's primary medium and long-term objectives is to increase waste recovery capacity in its own plants: this is expected to reach 1.6 million tons in 2025 and around 2 million tons in 2035. In 2020, thanks to the acquisition of the I.Blu plants and the complete consolidation of the operations that took place during 2019 (CMT and Ferrania Ecologia), the amount of waste treated in Group plants increased by 62% compared to 2019.

2020 was also the year of the launch of Just Iren, a digitalisation project that will make the management of waste collection services increasingly efficient. The project started in the City of Turin and will be progressively extended to all the other areas.

ENERGY PRODUCTION AND SERVICES

RENEWABLE AND SIMILAR SOURCES

The Group's power production plants consist mainly of hydroelectric and photovoltaic plants that use renewable sources and cogeneration thermoelectric plants that produce energy via combined cycles, which are some of the most efficient technologies currently available on the market. Furthermore, cogeneration is connected to the urban district heating network, which, compared to traditional heating systems, allows for reductions in energy consumption and improves environmental performance.

In 2020, Iren Group produced 10,110 GWh of electricity, more than 73% from renewable sources (water, solar, biomass or waste) and high-efficiency cogeneration.

The Group's three waste-to-energy plants produced 598 GWh of electricity, in line with the previous year, as was the quantity of waste treated; the significant change compared to 2019 is in the production of thermal energy, which, thanks to the connection of the Turin waste-to-energy plant to the district heating network, increased by over 27%.

In order to increase hydroelectric production, which in 2020 amounted to approximately 1,295 GWh, projects continue for the reactivation of the Noasca (TO) and Giffoni (SA) plants and the installation of the San Mauro (TO) weir generator unit.

Producing energy from hydroelectric, photovoltaic and co-generation plants reduces environmental impact

As for the development of district heating, the following projects set forth in the Business Plan were continued in 2020:

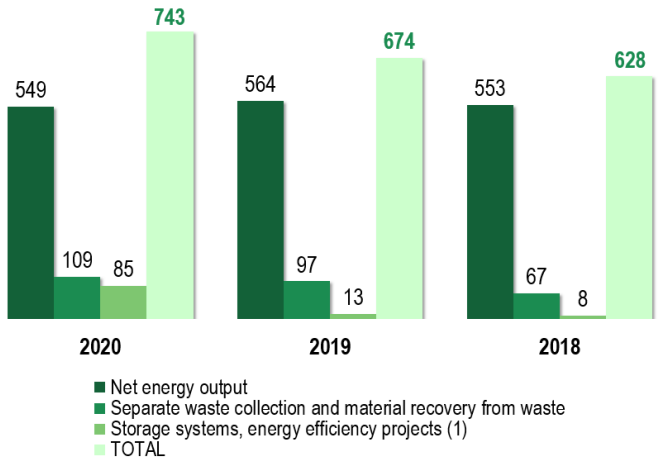
Project	Project description	Progress in 2020
Saturation of the Turin network	extension of the connections that will bring the Turin area to a volume of 64 million cubic metres and saturation of the district heating system's capacity, without the construction of new production sites	approximately 1.1 million cubic metres of volume connected and 5.6 km of network laid, reaching 8.7 million cubic metres
Torino Nord extension phase 1	approximately 5 million cubic metres of new district heating volumes to saturate the residual capacity of the district heating system by optimising the storage systems	connected 170,000 cubic metres (progressive value reached 1.4 million) and laid 4.4 km of network
Torino San Salvario	extension of the district heating volumes (about 3.5 million cubic metres) and construction of a new storage system entirely concealed by a system of green surfaces and trees (*Giardino del Calore*)	connected about 90,000 cubic metres of new volumes and laid about 4.6 km of network
Turin waste-to-energy plant for district heating	connection of the Turin waste-to-energy plant with the district heating networks of Beinasco and Grugliasco to increase the volume served without the construction of new plants	the plant went into operation with 30 thousand cubic metres of volume in Beinasco; 800 m of network were laid in Grugliasco
Piacenza waste-to-energy plant for district heating	the district heating network's connection with the Piacenza waste-to-energy plant increases the volume of district heating by about 1 million cubic metres	connected about 140,000 cubic metres and laid 500 m of network

EFFICIENCY AND ENERGY SAVINGS

The efficient use and saving of energy resources are among the main objectives of the medium and long-term Business Plan of Iren Group, pursued across all business units with increasing efficiency in processes and services, through solutions to guarantee stakeholders a reduction in energy consumption and the use of technological systems, monitoring and guidance of correct behaviour.

The total energy savings generated by the Group in 2020 stood at 742,885 TOE, with contributions from various areas of operation.

TOTAL ENERGY SAVINGS IN 2020 (KTOE)



(1) As well as the energy savings projects described on pages 88-89, the savings obtained through the division of the networks into districts, the public water dispensers, the projects to reduce the impacts of employee mobility (IrenGO, Ecoviaggio, smart working and remote working) and the energy efficiency certificates obtained through the implementation of particular projects and, in addition to previous years, the positive impact deriving from the sale of green certified electricity have been included.

ENERGY SAVINGS FROM PRODUCTION

Energy production and saving [1] [2]	u.m.	2020	2019	2018
Production from hydroelectric and photovoltaic plants				
Electricity produced	GWh	1,316	1,352	1,528
Energy saved	TOE/000	228	235	264
Energy saved	GJ	9,555,816	9,822,759	11,068,510
Production from cogeneration plants, boilers and thermoelectric plants				
Electricity produced	GWh	8,161	8,392	6,875
Thermal energy produced	GWh	2,763	2,853	2,799
Energy saved	TOE/000	253	255	220
Energy saved	GJ	10,594,244	10,676,558	9,195,890
Production from waste-to-energy plants and landfills				
Electricity produced	GWh	626	634	599
Thermal energy produced	GWh	181	142	133
Energy saved	TOE/000	65	65	62
Energy saved	GJ	2,725,300	2,734,936	2,589,899
Biogas plant production				
Electricity produced	GWh	6.9	4.02	0.03
Energy saved	TOE/000	2.8	1.7	0.9
Energy saved	GJ	118,533	70,357	41,002

[1] The data are calculated according to the following criteria:
- hydroelectric and photovoltaic production: the calculation was based on the assumption that there was zero fuel consumption and compared the consumption recorded by the national electricity grid for the production of the same quantities of electricity;
- cogeneration, boilers and thermoelectric: the comparison between gross production and actual fuel consumption of the Group with the consumption that the national electricity grid and the "national average" production system would have recorded to produce the same quantities of electricity and heat;
- waste-to-energy plants and landfills: amount of electricity and thermal energy production (for the Parma PAI the conversion coefficient for thermal energy into electricity is 6.88, while for the TRM waste-to-energy plant in Turin is 4.5) multiplied by the electricity coefficient (187 TOE/GWh);
- biogas plants: by multiplying the cubic metres of natural gas produced (60% of biogas) by the sm^3/TOE conversion factor 0.836.

In some cases, the energy saved may increase/decrease in a manner that is not directly proportional to the increase/decrease in production, due to an increase of the specific consumptions used for calculations.

[2] Energy saved is also expressed in GJ by using a conversion factor of 1 TOE = 41.86 GJ.

ENERGY EFFICIENCY PROJECTS

Iren Group is investing more and more in **energy-saving** projects and initiatives, both internally, in terms of energy efficiency of production processes, and externally, by offering products and services that allow customers and citizens to reduce their environmental impact. The projects are described in the table below.

Through projects launched in 2020, Iren Group achieved an energy savings of over 15,000 TOE/year

ENERGY COMMUNITIES

In 2020, the Group launched a project to develop Energy Communities and Collective Self-Consumption systems to promote renewable source plants' diffusion on condominiums, small and medium-sized enterprises, and public administration properties. Through Energy Communities, several users can share the electricity produced by one or more photovoltaic systems, with immediate benefits in economic and environmental terms.

Project	Description	Savings obtained
External impacts		
Smart thermostat	The sale of thermostats for energy efficiency that ensure the boiler is only on for the minimum time required to maintain the desired temperature. Energy savings are calculated by estimating average gas consumption per household and applying a 22% reduction in consumption from the use of the smart thermostat	370 TOE
Condensing boilers	Sale of latest generation condensing boilers, offering savings of up to 25% compare to current consumption. By recovering some of the heat from steam and, consequently, using less fuel, the boilers save energy and cause less environmental pollution	173 TOE
Photovoltaic plants	Design, construction and installation of turnkey solar panels for customers. The energy produced is clean and sustainable and can be stored in storage systems until needed. Energy savings are calculated estimating the kWh produced by the photovoltaic plants sold	128 TOE
Fixtures and fittings	Replacement of fixtures and fittings for customers. The energy saved is calculated by estimating the difference in transmittance between windows and doors replaced with the new high-performance elements	11 TOE

Project	Description	Savings obtained
Heat pumps	Latest generation heat pumps allow to manage gas better and save up to 40% compared to current consumption	13 TOE
Heating systems in municipal buildings	Continuation of redevelopment works (revamping 2 and 3) on heating systems of buildings in the Municipality of Turin	784 TOE
LED public street lighting	Replacement of traditional lamps in the city's public lighting systems with LED fixtures. The new lamps' efficiency and reliability guarantee a reduction in energy consumption of more than 50%. The main project concerns the City of Turin; activities were also carried out in the Municipalities of Alba, Asti, Biella, Fidenza, Vercelli and other small municipalities	7,096 TOE
Thermostatic valves and heat allocators	Installation of about 520 thermostatic valves and allocators in condominium contexts reduces consumption in individual flats. The savings are calculated on the basis of the historical data of the apartment buildings, compared with pre and post-intervention consumption	9 TOE
Domestic heat management	Replacement of 306 traditional and diesel boilers with high-efficiency condensing boilers in apartment buildings. Savings are calculated by comparing the replaced boiler's rating plate data with that of the high-efficiency boiler, and the Group took measurements before or after installation under the same conditions of use and weather conditions.	1,538 TOE
Energy upgrading in buildings	Energy requalification interventions in 20 buildings (thermal insulation, insufflation, insulation) and start of numerous worksites that will generate savings from 2021 onwards.	27 TOE
Internal impacts		
Energy efficiency of production plants	Energy efficiency measures at Group plants (e.g. purifiers, transformers, voltage stabilisers), with a savings of 377 TOE, and at the Parma and Piacenza waste-to-energy plants to reduce energy consumption, with a savings of about 2,000 TOE.	2,376 TOE
Dematerialisation of bills and reminders	The strong push towards the bill dematerialisation, thanks to the progressive shift to digital communication and payment tools, allows a significant reduction in paper use	7 TOE
UNI EN ISO 50001 Certification	Energy efficiency interventions planned as part of the ISO 50001 Certification for power plants: in 2020, the savings achieved amount to 2,350 TOE. The value expected when fully operational (from 2021) is 3,000 TOE/year	2,350 TOE

SMARTFLOWER: A NEW PHOTOVOLTAIC

In 2020, Iren Group installed a new and innovative photovoltaic system in Turin that recalls the idea of a sunflower in its shape and movements. This is the Smartflower, the latest generation system that tracks the sun throughout the day, from east to west, and during the seasons: in summer, it is arranged on an almost horizontal plane and in winter on a nearly vertical plane. This makes it possible to produce 40% more energy than a conventional photovoltaic system with the same characteristics and positioned on a south-facing roof. The system is equipped with monocrystalline photovoltaic cells positioned on its petals for a nominal power of 2.3 kW and an annual energy production of 4,500 kWh.

ENERGY EFFICIENCY CERTIFICATES (EECS)

Thanks to the high-efficiency cogeneration plant of Torino Nord, 104,640 energy efficiency certificates (EECs) were obtained in 2020 (equivalent to an equal amount of TOE of energy savings). Furthermore, Iren Group has implemented other projects that resulted in 11 EECs in 2020.

The requirement to produce (or purchase on the market) and supply Energy Efficiency Certificates to the GSE (Electricity Services Provider) is the sole responsibility of Ireti (distributor) and is valid for 2020 (with maturity 31 May 2021).

Approximately 28,084 Energy Efficiency Certificates were also purchased at the average price of 259.71 Euro/EEC in order to meet the annulment obligations provided annually for the distributor.

During the year, around 3.23 million CO_2 allowances (EUAs) were purchased to meet the obligations provided for in the Emissions Trading Scheme (ETS) legislation related to emissions generated by Iren Group's plants.

In 2020, Iren Group obtained Energy Efficiency Certificates equivalent to 104,640 TOE

ENERGY SAVINGS INCENTIVES

Green Certificates were replaced by equivalent incentives which, in 2020, Iren Group matured in the amounts indicated in the table below.

Incentives by plant (no.)	2020
Hydroelectric	**259,757**
Bardonetto	16,186
Valsoera, Telessio, Eugio, Ceresole, Rosone	209,172
Tanagro	13,193
Canate	21,206
Waste-to-energy plants (TRM)	**238,436**
TOTAL	**498,193**

BIODIVERSITY

Protecting biodiversity from the continuous deterioration of natural habitats and threats to certain species is one of the main issues considered by the European Union in its environmental policy which attempts to ensure biodiversity through the conservation of natural and semi-natural habitats and of wild flora and fauna within the territory of member states.

To this end, a network of special protected areas was established at European level under the Directive "Natura 2000", involving various Italian regions and areas. The network also includes certain environments transformed by man over time which represent important areas for the survival of numerous species of plants and animals. The protection of Natura 2000 sites is mandatory (Italian Presidential Decree 357/97 "Regulation implementing Directive 92/43/EEC on the conservation of natural habitats, and of wild flora and fauna" and Italian Presidential Decree 120/2003).

The law states that the territorial planning and scheduling must take into account the naturalistic and environmental importance of the Sites of Community Importance (SCI) and the Special Protection Areas (SPA) and that any plan or project, internal or external to the sites, which could in any way affect the conservation of habitats or species that have been identified as protected should be subjected to an appropriate impact assessment for the affected sites. Prior to the implementation stage of new measures, the development of new networks and significant maintenance activities (revamping/repowering), which may lead to environmental impacts for the "Natura 2000" protected areas, they must be submitted for prior assessment in order to protect the areas. It is also necessary to verify that machinery, plants and equipment subject to the measures possess the environmental requirements necessary and to assess the potential impacts resulting from the use of hazardous substances and the adoption of appropriate management measures. In particular, the Impact Assessment (Italian Presidential Decree 357/1997 in Art. 5) is the procedure implemented in cases where an intervention may significantly affect an SCI or an SPA in the "Natura 2000" network. The Italian Ministry of the Environment and the Protection of the Land and Sea publishes decrees which list the Italian SCIs.

The construction and management of plants, activities and projects must be carried out under the provisions of Italian law and environmental regulations (Italian Legislative Decree 152/2006), which provide for the integration of environmental aspects into the development of plans and programmes and the Environmental Impact Assessment (EIA), to identify and assess in advance the environmental effects of specific public or private projects – in their start-up phase or the case of significant changes to existing projects – and to identify measures to prevent, eliminate or minimise adverse impacts on the environment, before they occur, analysing the impact in terms of atmospheric emissions, water withdrawals and discharges, waste, noise, odours.

GROUP POLICY AND PRINCIPLES

In 2020, Iren Group formalised, in its Biodiversity Policy, its commitment to the conservation of biodiversity in the areas in which it operates, which is based on the adoption of an effective management model, consistent with the National Strategy for Biodiversity, with European strategic objectives (European Green Deal and EU Biodiversity Strategy to 2030) and with the United Nations Sustainable Development Goals (SDGs).

The principles on which the Group's Policy is based are:

- **conservation** of the biodiversity of ecosystems, in particular for the activities carried out in vulnerable or protected natural areas;
- **monitoring** and **mitigation** of the impacts of the activities on biodiversity;
- **promotion of** environmental **improvement** through actions aimed at protecting areas of high ecological value and disseminating a culture of biodiversity;
- raising **awareness** and **knowledge** about biodiversity, its protection and conservation, encouraging best practice and passing it on internally and externally;
- **collaboration** with local associations and communities in actions and projects designed to increase stakeholders' awareness of the importance of protecting biodiversity.

ACTIVITIES IN PROTECTED AREAS OR AREAS OF ENVIRONMENTAL INTEREST

The Group's activities, by their very nature, have a direct or indirect impact on the air, water resources, soil, ecosystems and the species that inhabit them. This is why Iren, aware that the preservation of the natural ecosystem is essential for long-term global sustainability, promotes the sustainable development of its activities.

The Group's **electricity generation** activities in protected areas mainly concern hydroelectric plants and their impact on water resources and in terms of acoustic emissions. Water withdrawals and releases are managed in accordance with the concessions issued by the Competent Authorities and the legislation in force. Management Plans have been prepared for all the reservoirs managed (pursuant to Italian Ministerial Decree 152) with the relevant impact studies for those affecting SCI areas. The main water sources involved in water withdrawals at the Group's production plants are the Ligurian Sea, the Po river, the Naviglio Grande canal and withdrawals from groundwater through wells for industrial use. The complete framework of withdrawn water (dams and weirs) for the production of hydroelectric energy concerns the Orco, Dora Riparia, Po, Maira, Brugneto, Secchia, Bussento, Tanagro, Tusciano, Calore, Picentino and Terza rivers.

Water discharges flow into the Ligurian sea, the basin of the Po, Ticino, Dora Riparia and Secchia rivers, lake Pian Telessio in Piedmont, the Chisola and Piantonetto streams, and the Naviglio Grande canal in Lombardy. All discharges, authorised and in compliance with the law, are made up of cooling water from the plants or water from the treatment processes of the water used in production sites. The measures to improve efficiency of hydroelectric plants,

carried out by the Group in the past, had positive repercussions on the entire system, as they reduce the need to produce energy from fossil sources and help to reduce atmospheric emissions. For all the redevelopment work carried out, the plant IAFR certification (certifying that it is powered by renewable sources) was obtained, which identifies the environmental benefits expected in terms of reductions in SO_2, CO_2, NO_x, particulate and natural gas emissions.

In relation to the acoustic impact, all plants are soundproofed appropriately to minimise the impact on the surrounding area.

The development of the **electricity distribution network** in the city of Turin may directly involve or be in the immediate vicinity of various areas of the "Nature 2000" network, including: Collina di Superga (SCI), Meisino (SPA), Stupinigi (SCI), Lama del Badiotto (SPA) and Garzaia della Brarola (SPA). The electricity distribution network of Parma does not affect SCIs or SPAs in the "Natura 2000" network.

Waste management and environmental health activities that the Group carries out do not affect protected areas in the Emilia area. Plants with greater capacity (waste-to-energy plants and landfills) are equipped with a green system, in harmony with the vegetation climax in which they are situated, with visual and environmental mitigation functions. Every year, the impacts related to the activities carried out at the sites are examined with the aim of verifying the results of the measures carried out and having available all the elements necessary to confirm/modify the implemented system, so as to assess compliance with the regulations and authorisations required by environmental legislation and to verify the state of progress and define/update improvement plans for management systems, including those related to environmental performance.

The **Parma Integrated Environmental Centre (PAI)** operates in a largely industrial area and has a "green system" that, in addition to complying with the mitigation of particulates, also restores some habitats and acts as an ecological bridge between different biotopes that will lead to the creation of a surface ecosystem that could be an important resource for the overall recovery of the landscape and ecological value of the area. Every year, a monitoring campaign is carried out on the content of the particulates collected from the plants based at the PAI, in order to estimate the environmental benefits in terms of the atmospheric particulate matter removed.

The area of the **Piacenza waste-to-energy plant** is not subject to any urban, landscape, hydro-geological, seismic or territorial restrictions and there are no protected parks, oases or other areas protected by law.

The **Turin waste-to-energy plant (TRM)** obtained a positive environmental compatibility assessment via a process that included an Environmental Impact Study, the conclusions of which, in terms of vegetation, flora, fauna and ecosystems, demonstrated that the site is located within a highly developed area where no specific natural value has been detected in regard to vegetation and wildlife. Despite being in the middle of an EIA phase, the introduction of the plant does not indicate the appearance of significant symptoms of stress on the ecosystems that already suffer from human impact; the emissions do not cause any harm to the local fauna present across a vast area, including the areas of particular naturalistic interest represented by the Stupinigi Natural Park and the system of protected areas of the Po river belt.

The activities related to the **gas distribution** service do not have any particular impact on biodiversity. Infrastructure development, maintenance and management activities rigorously comply with the regulatory framework relevant to environmental impact. Annual walking inspections are carried out within the natural areas where plants are present and at the end of the winter season to not damage the vegetation.

Regarding the **integrated water service**, all the water bodies receiving wastewater treated by the Group in the Emilia and Piedmont regions are located in the basin of the Po river. The land lies within an area declared as sensitive so the plants, depending on their size, are subject to the application of the strictest nitrogen and phosphorus limits. The wastewater treated by the treatment plants situated in the Liguria area is drained into the Ligurian Sea from the coast (mainly the Gulf of Genoa, the Gulf of Tigullio and the Gulf of La Spezia). By nature, the activities conducted are aimed at maintaining optimal environmental conditions. Specifically, protecting the areas in which sources of water withdrawal are found is of the utmost importance for the management of the integrated water service. Likewise, the main objective of the treatment activity is to ensure that discharges are appropriately treated so that they are compatible with the natural habitats of the receiving bodies of water. Screenings and environmental impact assessments are carried out within the timeframe required by current regulations, both for water treatment plants and water withdrawals.

In 2020, activities to restore the full purification structure of the Sturla plant in the Liguria area, which was damaged by the 2018 storm surge, were completed. In addition, the new Rapallo water treatment plant was activated. Both activities contributed to the improvement of environmental conditions near the discharge points.

The Genoese plants of the Brugneto Dam lie within Antola Regional Park (Genoa), while the Gorzente lakes lie within the Regional Park of Capanne di Marcarolo, partly within the Province of Alessandria. In the Province of Piacenza, the Group owns a lowland forest within the protected area of Conoide del Nure and Bosco di Fornace Vecchia (SCI). The treatment plants managed in the province of La Spezia are located near the Cinque Terre National Park/Cinque Terre Marine Protected Area, the Porto Venere Regional Nature Park, the Regional Nature Park of Montemarcello-Magra-Vara and the Regional Islands of Portovenere Marine Protection area.

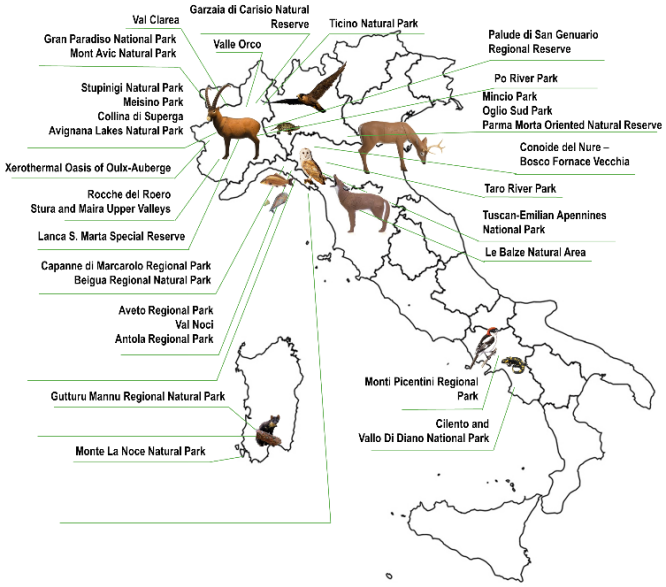
No natural habitats were offset during the reporting period.

MAIN AREAS AND SPECIES PROTECTED

Iren Group constantly collaborates with the management bodies of the protected areas in which it works to safeguard the ecosystem and protected species.

It also undertakes to increasingly extend the mapping and location of plants and networks to identify the potential interference they generate with the protected areas they are located or in their vicinity.

The map shows the main Sites of Community Importance and Special Protection Areas where plants and/or networks managed by Iren Group are located. There are approximately 305 protected species listed on the national and international IUCN Red Lists (of those cited in the documentation available online). Approximately 25% of these species are among the following IUCN List categories: regional extinction (RE), vulnerable (VU), endangered (EN), critical risk (CR) and nearly threatened (NT).



COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS AND REPORTING MECHANISMS

Iren Group adopts an Environmental Management System that complies with the ISO 14001 standard: all employees are required, as part of their duties, to participate in the process of risk prevention, protection of the environment and of their own health and safety, and that of their colleagues and third parties.

All processes are carried out in full compliance with applicable environmental legislations, and the Group contributes to the research and development of advanced technologies aimed at protecting the resources and at reducing the environmental impact and their related risks. Furthermore, the activities of Iren Group are managed in compliance with the regulations relevant to the prevention and protection from accidents and occupational health and safety.

There are many instruments at the disposal of the stakeholders to report an environmental breach: these methods include written communications via post, e-mail, fax and social media channels. All communications are considered and sent to the competent offices, which carry out to the appropriate checks, and, lastly, each stakeholder receives a response in relations to their reports.

During the qualification process, suppliers are required to hold an environmental certificate or, in any case, to have taken on substantial elements interlinked with the environmental system (see page 120).

The **production and distribution of electricity** services are certified by standards of quality and environmental management, and are, therefore, subject to internal and external audits with regard to the processes and obligations relevant to environmental legislation. Also, in order to ensure a path of sustainable corporate growth based on the principle of continuous improvement, resources are committed to the development of energy production from renewable sources (hydroelectric, solar and biomass), sources similar to renewables (waste) and high-efficiency resources (co-generation) and the promotion of district heating, as well as the adoption of the best plant technologies available on the market, to ensure a lower environmental impact.

With regard to the **environmental services**, residents and public authorities have access to an environmental contact centre where it is possible to report any breaches and/or critical situations pertinent to the environment. Moreover, “Environmental Inspectors” operate in the Provinces of Piacenza, Parma and Reggio Emilia, who patrol the areas of competence in order to identify illegal landfills and abandoned waste, including those hazardous to the environment. Once a report is received, the environmental inspectors organise the verification activities and the necessary treatment for the resolution of the problems identified, pursuant to the proper procedures. In addition to this type of reporting, the inspectors also provide information to residents about correct waste separating methods and the use of the collection service. Furthermore, specific procedures provide guidelines for operators concerning the processes to be implemented for the solution and/or limitation of any environmental emergencies that may arise during the performance of services.

In relation to **waste-to-energy plants**, emission data are released to the supervisory authorities in real time. These figures are public and can be viewed daily on the websites. To ensure IEA provisions on communication anomalies are adhered to, a 24-hour technician service has been established.

In the **integrated water service**, the entire cycle is subjected to constant monitoring of operating parameters, also through remote control systems of the plants, providing for the execution of tens of thousands of laboratory analytical determinations and the continuous improvement of the use of water resources, both in terms of withdrawal and use, and of release and discharge. In addition, urban wastewater treatment plants are being renovated by researching the best available technologies to improve effluent water quality and minimise emissions. The water service is also subject to controls pursuant to the law by local regulatory authorities. The optimisation of the corrective measures put in place to minimise possible negative effects of problems identified, is often carried out through the involvement of other bodies, including through specific operational protocols.

In 2020, the Group received and paid 51 fines and penalties, for a total value of around 150,358 Euro, for non-compliance with environmental laws and regulations (Italian Legislative Decree 152/2006) and municipal regulations or rules of the road code in the management of construction sites. Breaches mainly related to the absence of discharge permits at certain wastewater treatment plants, the exceeding of limits set out in the tables for wastewater discharge, and non-compliance with permits or delays in the execution of certain works.