ENVIRONMENT REPORT 2024

BANCA D'ITALIA
EUROSISTEMA

For this edition of the Environment Report, we have chosen images of glaciers as a tribute to the crucial role that the cryosphere plays in the Earth's climate system: ice reflects sunlight, reducing the amount of energy absorbed by the Earth's surface. The melting of glaciers, driven by climate change, can cause sea levels to rise, leading to risks of coastal flooding and damage to ecosystems.

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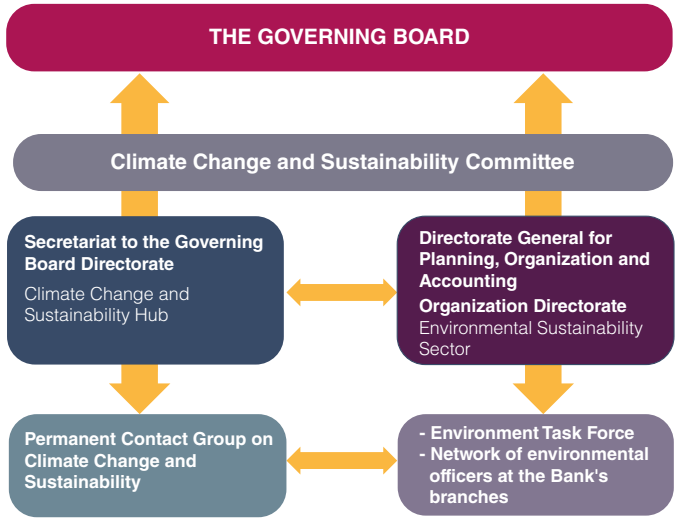
introduction

The environmental goals of the UN 2030 Agenda, the Paris Climate Agreement, and European and national strategies for the environment call for the firm commitment of all areas of society, with institutions at the forefront.

The Bank of Italy is committed to making a contribution, by taking these goals into account in the performance of its institutional functions and by steadily reducing its ecological and carbon footprint. One of the objectives of the Bank's Strategic Plan is to increase its environmental commitment over the years 2023-25. Among the various activities under way in this area, the Bank is committed to defining a clear path beyond the three-year period towards a long-term net zero target.

The Governing Board of the Bank of Italy, consisting of the Governor, the Senior Deputy Governor and three Deputy Governors, draws up the Bank's environmental and sustainability strategy. The Climate Change and Sustainability Committee, set up in 2022 and chaired by a member of the Governing Board, steers the Bank's strategy in this area and coordinates actions on various fronts. The Climate Change and Sustainability Hub ensures the coordination of operational efforts on the institutional side, including through a permanent team of experts from the economic research, financial stability, markets and financial investment, supervision and financial education functions. The Environmental Sustainability Sector, which is part of the Organization Directorate, coordinates the projects aimed at reducing the carbon footprint of the Bank's internal operations. This sector draws on the input of an Environmental Task Force of staff members involved in the management of the Bank's property, logistics, IT, banknote production, tenders, human resources and communications, and of the Network of environmental officers at the Bank's branches in Italy.



The Environment Report, published by the Bank of Italy for the first time in 2010, illustrates the impact of the Bank's operations on the environment and the measures taken to reduce it. The report also provides general information on the greenhouse gas (GHG) emissions of its financial investments – which are outside the scope for the calculation of the Bank's carbon footprint – and on its economic research, supervision and customer protection, as well as statistical tables with quantitative indicators and methodological notes explaining how the environmental indicators are calculated. Methodological choices are based on current best practices and available databases; they are therefore subject to continuous scrutiny and may evolve in line with any new developments.

Looking ahead, the Bank wants to improve its sustainability reporting by creating an integrated environmental, social and governance (ESG) framework and by developing performance indicators based on European standards.

at a glance

The Bank of Italy's overall environmental footprint improved compared with the previous year and with 2019, the last year before the pandemic.

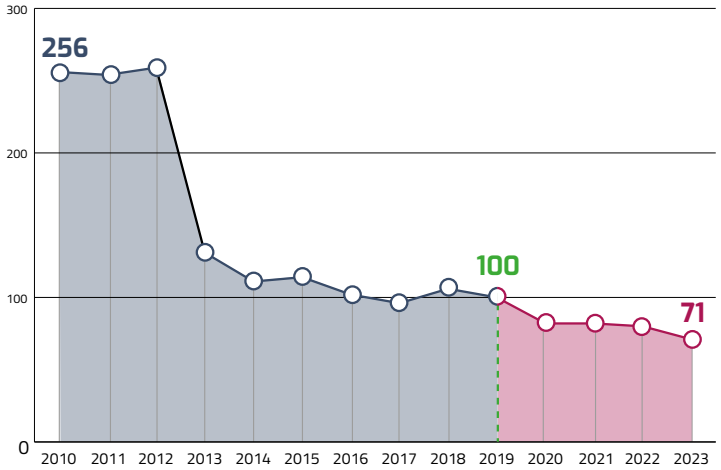
The Bank's carbon footprint

The Bank has been calculating its GHG emissions since 2010. Emissions fell by 61 per cent between 2010 and 2019, mainly owing to electricity being purchased exclusively from renewable sources since 2013 (Figure 1). Since the Environment Report published in 2022, the scope of calculation of the Bank's carbon footprint has been further extended: GHG emissions have been calculated with a new methodology since 2019, which was chosen as the baseline year.

In 2023, total GHG emissions were down by 11 per cent compared with the previous year, remaining about 29 per cent lower than in 2019, the last year before the pandemic (Figure 2; Table a2). This was achieved despite the 2023 increase in both the number of employees (by the end of 2023, there were 6,968 staff, 128 more than in the previous year; Table a1) and in on-site work (63 per cent of total work compared with 58 per cent in 2022). Specifically, there was a reduction in the consumption of heating fuels and their emissions compared with 2022, partly due to energy saving measures introduced by external rules and adopted by the Bank on a voluntary basis, including beyond the mandatory period. To reduce energy consumption, the Bank decided to deviate from the temperature requirements for public buildings in 2024, specifically by setting temperatures 1°C higher in

CARBON FOOTPRINT - BANK OF ITALY FIGURE 1

CO_2 equivalent emissions 2010-2023 (1)
(index numbers, 2019=100)



(1) The Bank's carbon dioxide equivalent emissions series is interrupted in the year 2019; the figure shows two series of values for the years 2010-2019 and 2019-2023, expressed in index numbers, with 2019=100 for each series. The data from 2010 to 2019 refer to the reporting of direct emissions from the use of fossil fuels (Scope 1) and indirect ones resulting from the use of electricity and district heating (Scope 2), the purchase of paper, and business travel (Scope 3). The data from 2019 onwards also include emissions from fluorinated gas leakages (Scope 1), centralized heating (Scope 2), purchase of products, goods and services, commuting by employees and external staff, working from home, and the life cycle of banknotes (Scope 3). For further details, see 'GHG emissions' in the Methodological Notes.

summer 2023 and 1 °C lower in winter (see the section 'Energy'). Unforeseen leakages of fluorinated gases from cooling plants, which contribute to the Bank's carbon footprint due to their high climate-altering impact, were also recorded in 2023 (310 kg; see Table a3).

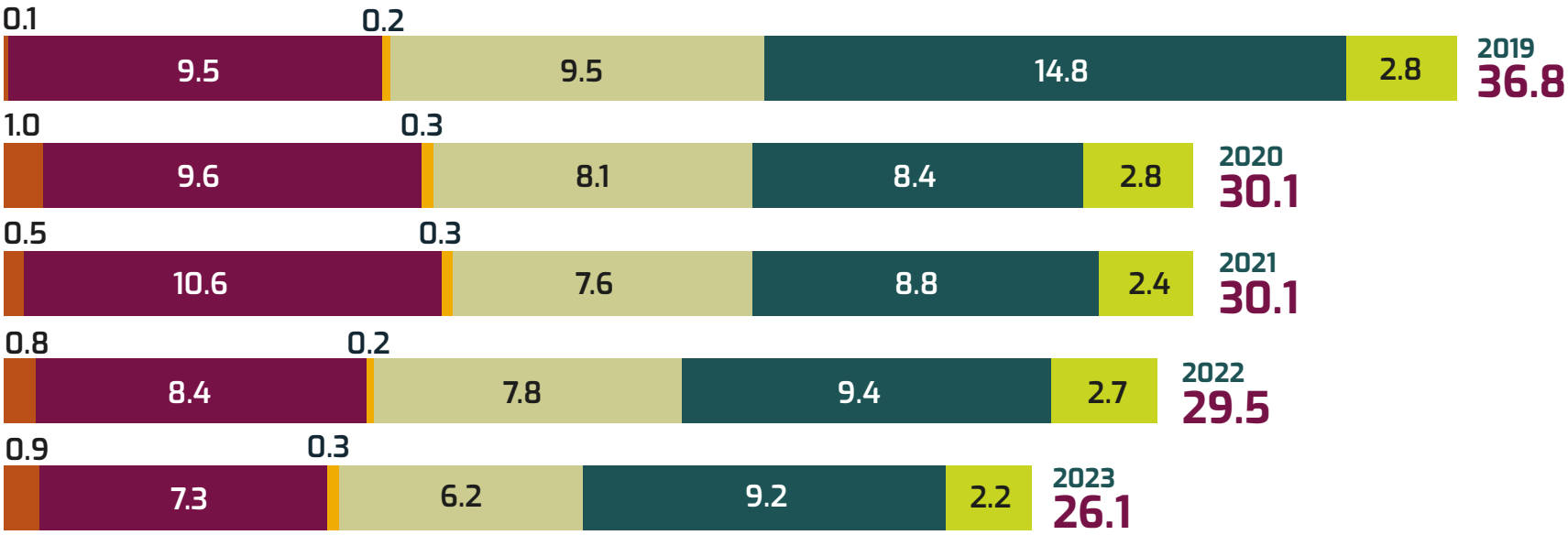
Emissions from the purchase of products, goods and services declined (Table a2). Those relating to business travel rose by slightly less than 15 per cent compared with the previous year, but remained much lower than in the pre-pandemic period (-58 per cent compared with 2019).

Despite the increase in on-site work compared with 2022, the use of less polluting means of transport led to a reduction in emissions linked to staff

CARBON FOOTPRINT - BANK OF ITALY

FIGURE 2

CO_2 equivalent emissions 2019-2023 (1) (2) (3)
(thousands of tonnes of CO_2 equivalent)



(1) Due to methodological updates, the data from 2019 to 2022 have been partially recalculated in order to make them comparable with those for 2023; For the definitions of Scope 1, Scope 2 and Scope 3, see the item 'GHG emissions' in the Methodological Notes. – (2) Emissions from electricity consumption were considered to be zero as the electricity purchased only comes from renewable sources (market-based approach; see the sub-item on 'Indirect GHG emissions from imported energy' in the item 'GHG emissions' in the Methodological Notes). – (3) Any mismatches are due to the rounding of decimals.

commuting. In this edition of the Environment Report the calculations for data from 2019 onwards have been extended to include an estimate of the emissions from energy consumption for heating and cooling in remote workplaces, which edged down from the previous year (see the section 'Sustainable mobility').

-29%
Reduction in the Bank's GHG emissions compared with the pre-pandemic period (2019)

Emissions relating to the life-cycle of banknotes declined – despite the increase in the number of notes produced (925 million versus 807 million in 2022) – partly thanks to the use of stocks of raw materials already purchased and accounted for in previous years to calculate emissions. Since 2023, all waste consisting of shredded worn banknotes, which are downstream products in the cash-handling process, has been sent to waste-to-energy plants, in line with the decisions taken by the Eurosystem (see the section 'Banknotes').

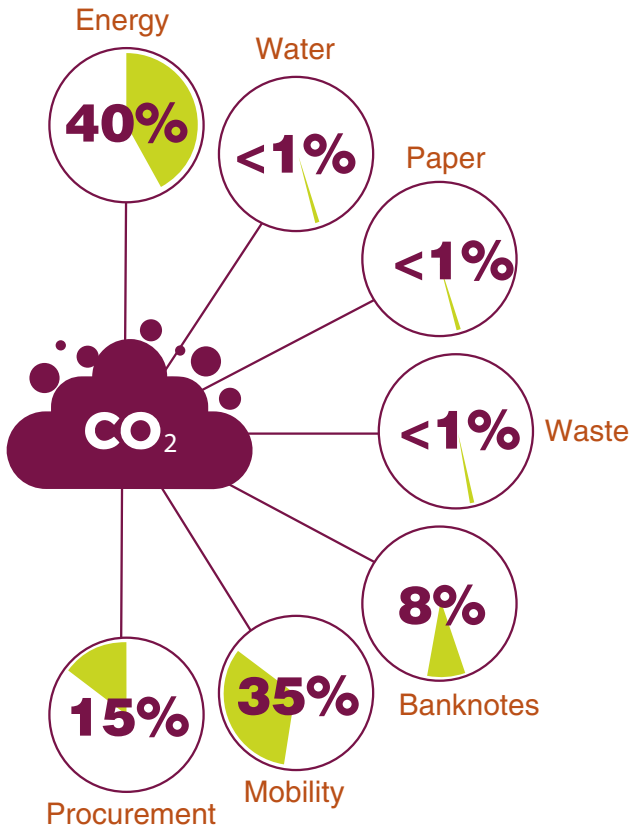
3.9
Tonnes of CO_2 equivalent per employee

Figure 3 shows 2023 GHG emissions aggregated by the theme sections of the Environment Report.

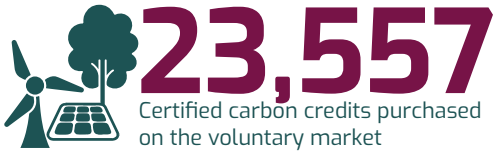
The scope of calculation for indirect GHG emissions, extended since the Environment Report published in 2022 for data from 2019 onwards, does not yet include all the Bank's purchases of goods and services. The missing data are estimated by multiplying the cost of acquired goods and services (net of VAT and inflation) by spend-based emission factors selected from

CARBON FOOTPRINT - BANK OF ITALY FIGURE 3

GHG emissions in 2023 aggregated by section of the Environment Report (percentage)



international databases. These factors are expressed in kilogrammes of carbon dioxide (CO_2) equivalent per euro spent and provide an estimate, albeit an approximate one, of the missing amounts. This calculation, which is still ongoing for the years 2019 onwards, will be explained in more detail in the Bank's forthcoming environmental reporting documents: the new scope for calculating GHG emissions will also be taken into account in defining the future decarbonization path towards net zero, as set out in the Bank's Strategic Plan for 2023-25 (see the box 'Strategic Plan for 2023-25').



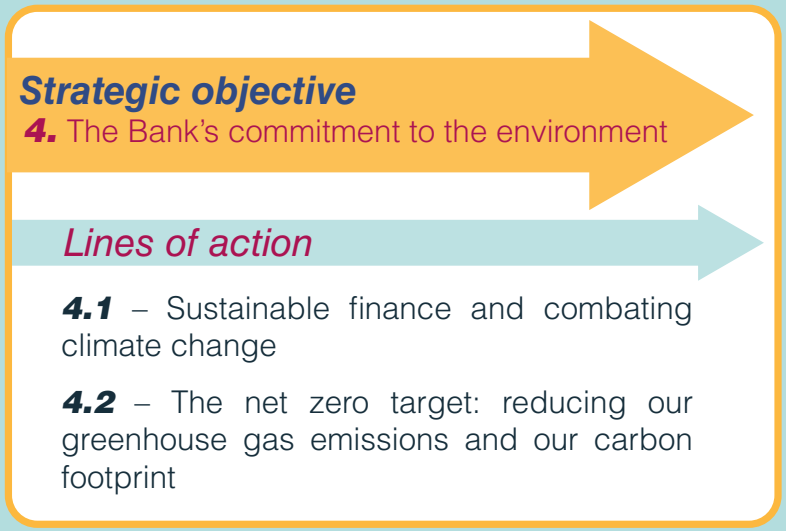
Alongside its endeavours to reduce its own environmental footprint, the Bank co-financed a number of reforestation and renewable energy production projects in 2023 by purchasing, for the first time and on a trial basis, certified carbon credits amounting to 23,557 tonnes of CO_2 equivalent (approximately 90 per cent of its current emissions). By buying these carbon credits, the Bank of Italy supported projects to plant trees in Uruguay, install a small run-of-the-river hydroelectric plant in Colombia and build two wind farms in Nicaragua and Uruguay. Co-financing these projects helps to promote the social and economic development of local communities, in line with the Sustainable Development Goals of the 2030 Agenda.

In Italy, the Bank partnered with the Forestry, Environment and Agri-Food Unit of Carabinieri police to carry out a tree planting project in four areas to help remove carbon dioxide, improve air quality and the urban environment, create green spaces for citizens to enjoy, and protect local biodiversity. Specifically, 4,500 trees were planted over a total area of 4.5 hectares (see the section 'Biodiversity and reforestation').

Over the past year, the Bank has made further progress in the area of sustainable investment – especially in terms of its portfolios' carbon intensity (see the section 'Sustainable investment') – and stepped up its efforts in sustainable finance issues (see the section 'Eco-friendly culture').

STRATEGIC PLAN FOR 2023-25

The Bank's Strategic Plan for 2023-25, sets out an innovation-oriented work programme comprising a large number of projects.



One of the five objectives of the Plan is to increase environmental stewardship through two action plans. The first one is intended to strengthen sustainable finance initiatives and combat climate change by: a) boosting research on ecological transition issues; b) improving investment sustainability; c) encouraging banks to incorporate climate and environmental risk assessments into their risk management e) taking on a leading role in relations with external stakeholders. With its action plan on 'The net zero target', the Bank aims to reduce its environmental and carbon footprint by: (a) cutting fossil fuel consumption; (b) promoting the self-generation of electricity from renewable sources; (c) improving the energy performance of Bank buildings and systems; (d) encouraging e-mobility; (e) reducing the environmental impact of business travel; (f) offsetting GHG emissions; (g) launching staff training and awareness programmes; (h) extending partnerships with other public institutions to address environmental issues. At the same time, the Bank has launched a longer-term transition plan detailing the goals, actions, viable GHG reduction targets, and any offsetting initiatives to achieve net zero emissions for internal operations.

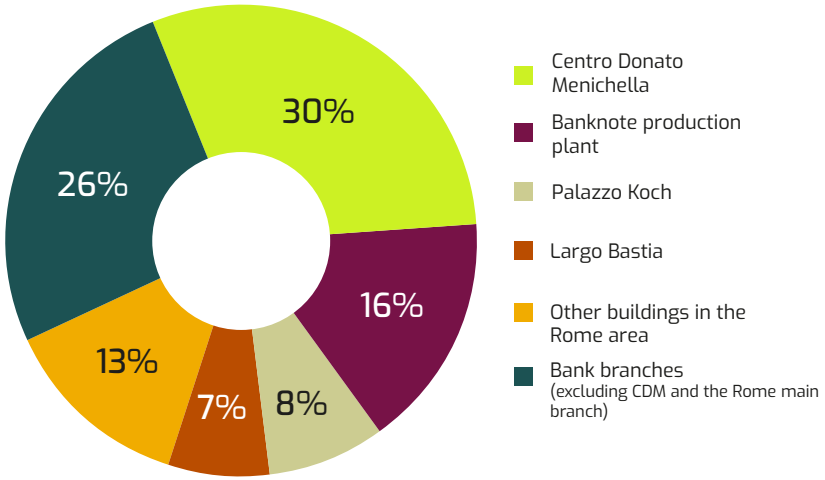
energy

Energy consumption accounts for 40 per cent of the Bank's GHG emissions.
The Bank is committed to: progressively reducing its energy consumption and use of fossil fuels; achieving greater energy efficiency by upgrading its buildings and technological installations and adopting better management measures; and steadily increasing the share of energy produced by its own photovoltaic (PV) systems. The electricity that is purchased comes exclusively from renewable sources.

The Bank's operations are carried out across more than 60 buildings countrywide. Its four main operational sites (Centro Donato Menichella in Frascati, Palazzo Koch, the Bank's head office in Rome, the banknote production plant and the building in Largo Bastia, Rome) account for more than 60 per cent of the Bank's electricity and heating requirements (Figure 4; Table a7).

ENERGY - BANK OF ITALY
Energy consumption (per cent)

FIGURE 4



Use of renewable resources

Since 2013, the Bank has purchased electricity exclusively from certified renewable sources. Over 90 per cent of the renewable energy bought in 2023 came from hydroelectric plants and the rest from solar power (Table a5).

The Bank's own photovoltaic (PV) systems at the banknote production plant and at the Catania and Catanzaro branches produced around 59,000 kWh of electricity, i.e. just under 0.1 per cent of total annual electricity consumption, marking an 11 per cent decrease in production compared with 2022, with the same number of PV panels (Table a4).

Two PV systems are being completed at the Sassari branch and solar canopies are being installed over the car parks of Centro Donato Menichella, with a capacity of 150 and 316 kilowatt peak (kWp) respectively,[1] which will produce more than 550,000 kW per year (around 0.8 per cent of the Bank's electricity consumption); by the end of 2024, the installed capacity of the Catanzaro PV system will be increased from 12 to 20 kWp. The planning of three PV systems with a total capacity of around 130 kWp has been completed for the Milan and Reggio Calabria branches – where the local authorities have already approved their construction – and for the Forlì branch. Feasibility studies have also been completed for the installation of PV systems on a number of buildings at the Centro Donato Menichella

1 The kilowatt-hour (kWh) measures the amount of energy that a plant actually generates, whereas the kilowatt peak (kWp) describes the maximum output that a PV system can produce in standard conditions of temperature and incident irradiance.

and on most of the Bank's buildings in the historic centre of Rome. These systems could provide a total maximum output of more than 600 kWp, subject to the necessary approvals from the relevant authorities. Further installations are planned for ten more branches over the two-year period 2024-25.

Energy efficiency upgrades

The Bank is gradually replacing traditional light bulbs in all its buildings with LED light fittings, which consume less energy and last longer.

The Centro Donato Menichella (CDM), a building complex certified under the international standard ISO 50001, is the site that consumes the most energy, partly because it houses one of the Bank's data processing centres (see Table a7). The four newly installed cooling towers (which disperse the heat produced by the air-conditioning systems) have become operational and will reduce annual electricity consumption by 400,000 kWh (equivalent to 0.5 per cent of total consumption) and non-drinking water consumption by about 15,000 cubic metres (8 per cent of the total). The replacement of outdoor lighting and lighting in the corridors connecting the CDM's buildings with LED systems is under way, with energy savings estimated at more than 500,000 kWh per year. Furthermore, one of the CDM's buildings is currently being retrofitted with a sensor system being tested that automatically switches off the air conditioning and lights in unoccupied work areas and adjusts artificial lighting based on the amount of natural light detected. We will consider gradually installing this equipment in the other buildings in the complex after a period of observation.

Having completed the installation of LED lighting in offices, corridors and the canteen at the banknote production plant, we are now replacing the lighting fixtures in the printing hall with state-of-the-art systems that modulate the light intensity according to the external light.

In the Palazzo Koch complex, we are currently installing new high-efficiency cooling towers: these will be flanked by a heat pump capable of producing hot water using part of the condensation heat from the cooling units, with benefits in terms of energy efficiency and water consumption. A new high-efficiency uninterruptible power supply (UPS) for the electrical systems was installed to replace the previous one, and a monitoring system was introduced to optimize consumption.

-5%

Reduction in energy consumption compared with the previous year

For the buildings in the historic centre of Rome, a multi-year action plan was drawn up based on the analysis of advanced energy audits. In the other buildings in Rome and at the branches, a number of energy efficiency upgrades are under way, including the renovation of heating and cooling systems; the replacement of windows and, where possible, building insulation; the installation of switchboard monitoring systems for targeted energy-saving interventions; and the installation of smart temperature regulation systems that can be integrated with occupancy sensors. Looking ahead, the new systems will be designed so that the heating and cooling are automatically turned off when the spaces they serve are not occupied by staff.

Electrification of the heating systems

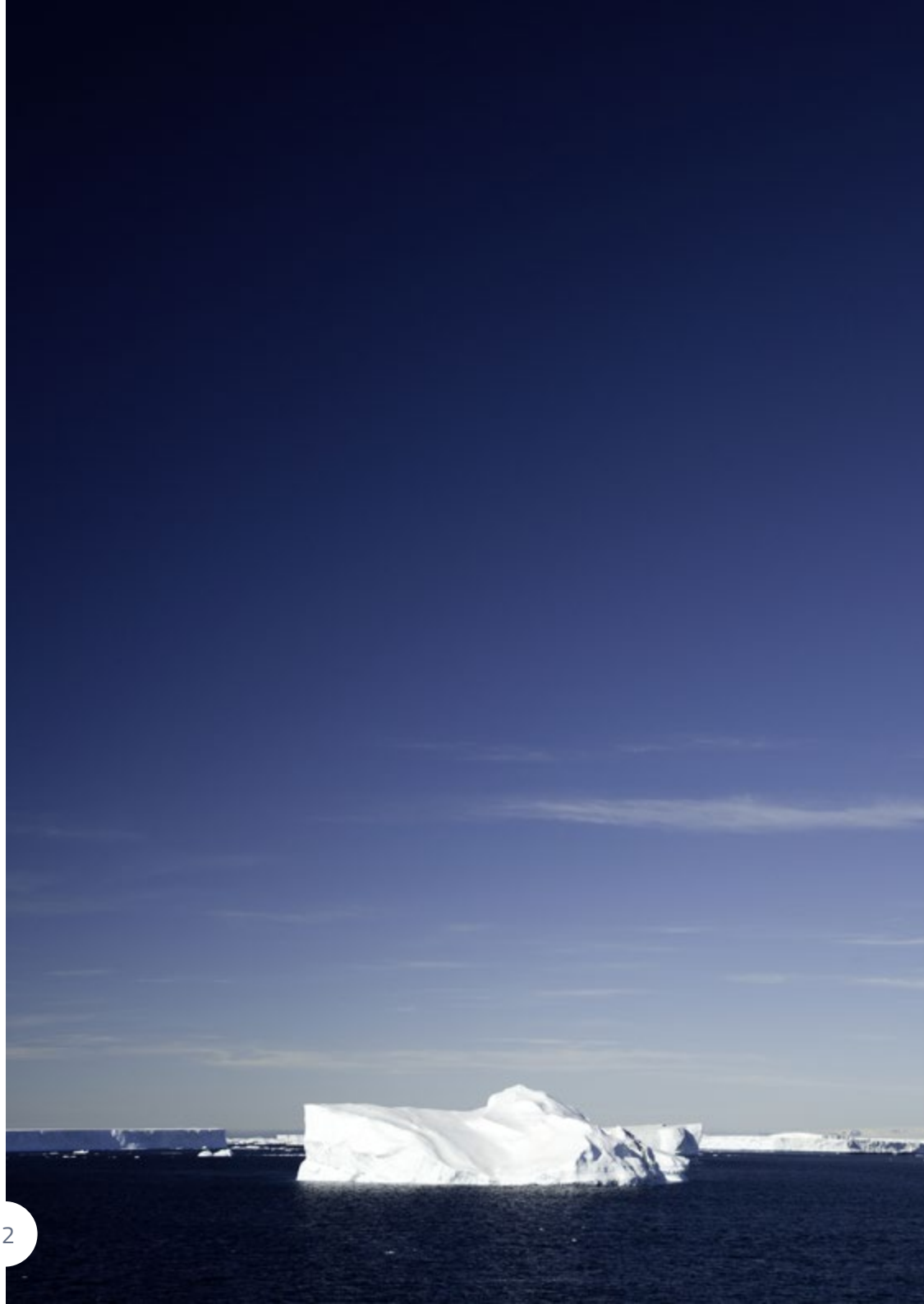
Replacing traditional methane or oil-fired heating systems with electric heat pumps will reduce direct GHG emissions.

In 2023, three oil-fired heating systems were replaced by heat pumps at the Rome training centre and the Foggia and Sassari branches. The Bank's last oil-fired system, installed at the Catania branch, will be replaced by a heat pump in 2025. In addition, plans are under way to electrify the winter air-conditioning system at the Bari branch, replacing the methane gas heating system. At the Forlì and Potenza branches, hybrid winter air-conditioning systems will be installed, combining methane gas boilers with heat pumps.

A feasibility study was completed in 2023 for the installation of a heat pump system integrated with a solar thermal system at the Largo Bastia site to produce hot water for sanitary use and partly for air conditioning: this solution, which is now at the design stage, will only use methane gas during the coldest months of the year.

The CONSIP Agreement

The number of Bank of Italy branches participating in the CONSIP Integrated Energy Services Framework Agreement, Edition 4 (IESFA4) went up from 7 to 15. By signing the agreement, the parties commit to managing and maintaining their systems, using renewable electricity and heating fuels, progressively improving the efficiency of their technological and lighting systems, achieving specific energy saving targets and, where possible, installing PV systems.



Workplace management solutions

By adopting a hybrid work model – whereby staff can alternate between on-site and remote work – the Bank has been able to test new working arrangements in some buildings, including desk sharing. The reduced need for workstations allowed an entire area of a building in Rome to be decommissioned and its systems shut down, resulting in a reduction in consumption estimated at around 220,000 kWh of electricity and 12,000 cubic metres of methane gas per year (saving around 240 tonnes of CO_2 equivalent in GHG emissions). In addition, three buildings not open to the public were closed for a few days over the Christmas period on a trial basis.

To reduce energy consumption, the Bank decided – on a voluntary basis – to deviate from the temperature requirements for public buildings, specifically by setting temperatures 1°C higher in summer 2023 and 1°C lower in winter 2023-24.

The recently adopted guidelines for the design and use of smart offices will result in a much more efficient use of spaces and in improved corporate well-being, thus reducing the Bank of Italy's overall building requirements, maintenance costs, consumption and carbon footprint.

Maintenance work and new projects

After the renovation of the façades, the building at Via Milano 60 in Rome is undergoing works on its interior and technical installations which will reduce its energy requirements by approximately two thirds (the building's energy performance rating will go from its current E rating to A2).

The building in Via Mazzarino in Rome is undergoing a complete retrofitting: the renewed building envelope and technological installations will meet the highest energy efficiency standards (the building's energy performance rating will go from E to A3).

The feasibility study for the construction of the Bank's new data processing centre has been updated (see the box 'The design of the Bank's new data processing centre').

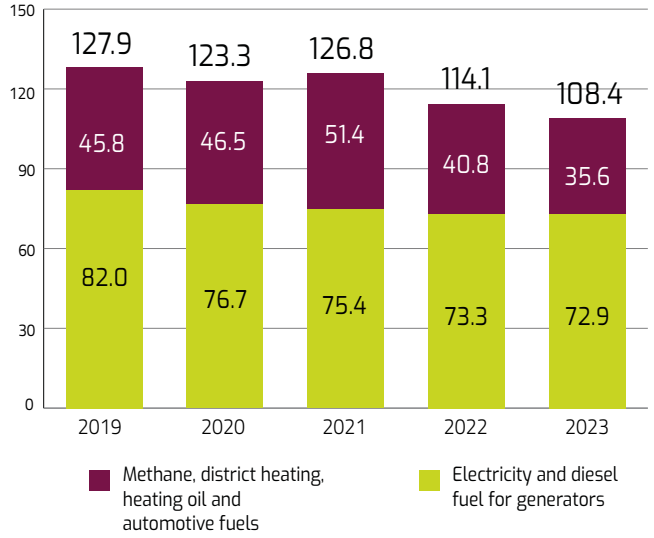
Green IT

By 2024, all desktop printers will be phased out and replaced by a much smaller number of multi-purpose devices for shared use. This will cut

FIGURE 5

ENERGY - BANK OF ITALY

Energy consumption (megawatt-hours) (1)



(1) Any mismatches are due to the rounding of decimals.

around 210 tonnes of CO_2 equivalent emissions per year, which is 50 per cent of the emissions produced by the current printers.

Energy consumption

In 2023, overall heat and electricity consumption was affected by a number of structural and cyclical factors: a) changes in the use of property, with the full activation of some buildings, including the one in Via delle Quattro Fontane in Rome; b) energy efficiency upgrades; c) weather conditions (a mild winter with lower gas consumption and a sweltering summer with higher electricity consumption); d) emergency measures for the management of air-conditioning systems, in accordance with national regulations (Ministerial Decree 383/22) or local instructions from the mayors, which the Bank has adopted on a voluntary basis; e) an increase in electricity consumption due both to the electrification of heating systems and to the higher energy requirements of the Bank's two data processing centres (at the Centro Donato Menichella in Frascati and the Largo Bastia building in Rome).

As a result of these factors, total heat consumption (natural gas, district heating and, to a much lesser extent, heating oil) dropped by 13 per cent compared with 2022 (and was 22 per cent lower than in 2019). Total electricity consumption held broadly stable (11 per cent lower than in 2019; Figure 5; Table a4).

THE PROJECT FOR THE BANK'S NEW DATA PROCESSING CENTRE

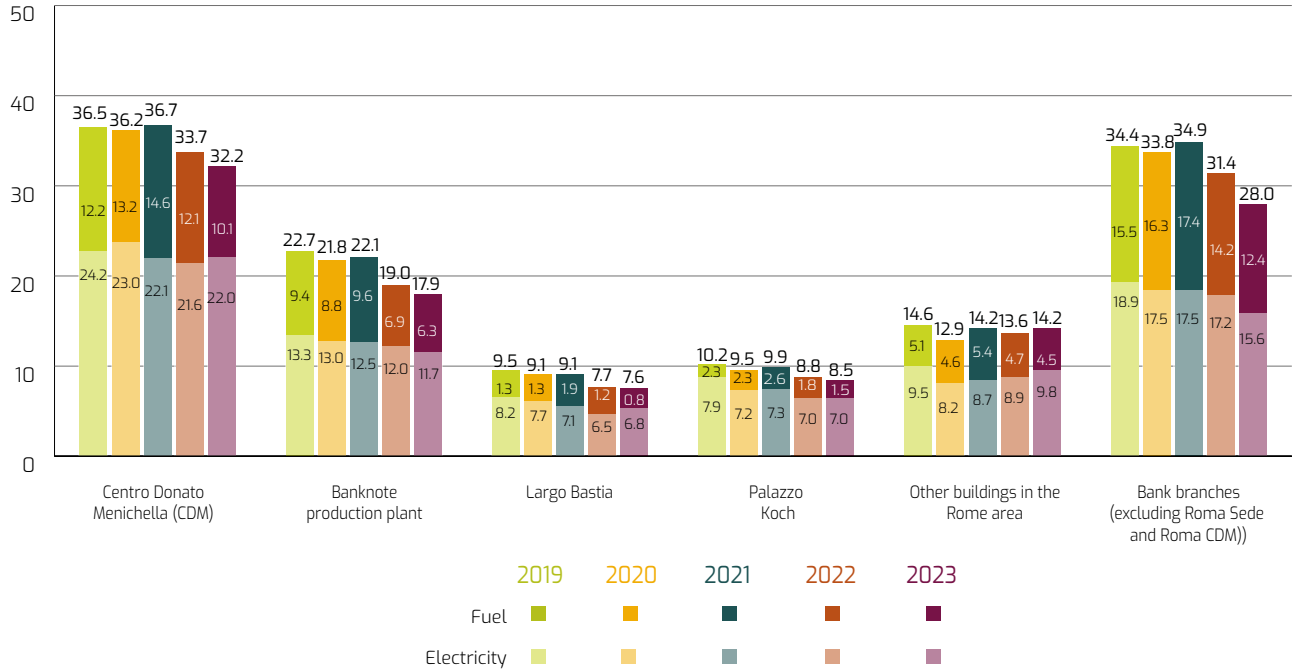
The Bank's new data processing centre will be built in the Castel Romano area in Rome and will be designed according to the most advanced environmental sustainability criteria.

At present, the feasibility study for the new centre includes: a) pursuing maximum energy efficiency by insulating the building, reusing the heat produced by the processors, installing systems with the best energy performance and raising the temperature of the cooling water (from 10-12 °C to 15-20 °C, subject to the need to dissipate the heat produced by the processors); b) drastically reducing GHG emissions by only using heat pumps – instead of gas boilers – for heating and hot water production, and refrigeration units with climate-friendly refrigerant gases; c) producing renewable energy through PV systems with an installed capacity of around 1 megawatt and, where possible, through geothermal or micro-wind systems; d) introducing advanced consumption management and monitoring systems; e) using solutions that minimize land use as much as possible; f) creating a large number of green areas and planting native trees and shrubs; g) carefully managing water by harvesting rainwater and reusing grey water through phytodepuration systems; h) using environmentally sustainable building materials; and i) using specific environmental quality protocols for new buildings (e.g. the LEED certification programme).

ENERGY - BANK OF ITALY

FIGURE 6

Energy consumption (megawatt-hours)



(1) Any mismatches are due to the rounding of decimals.

water

Water consumption accounts for less than 1 per cent of the Bank's GHG emissions.

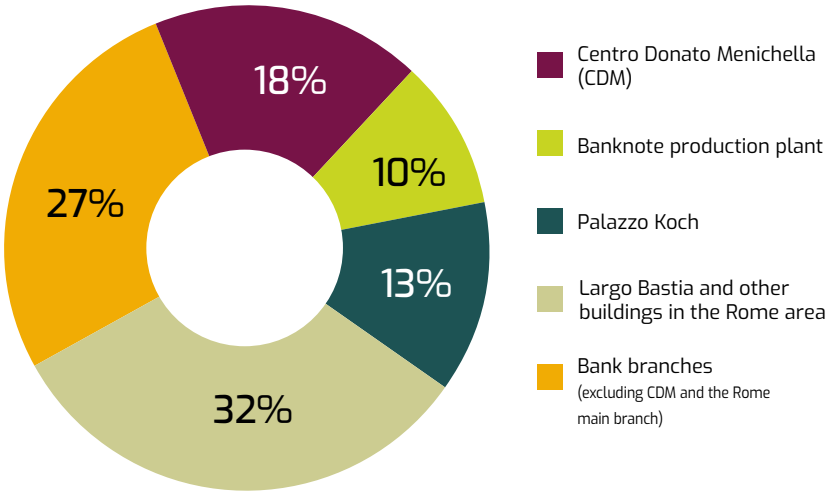
We are committed to gradually reducing our consumption of drinking water. Where possible, non-drinking water is used to irrigate the green areas or for industrial purposes (for banknote production and in the cooling towers for producing cooled water).

Centro Donato Menichella, Palazzo Koch and the banknote production plant are the sites with the highest number of people; they consume about half of the total drinking water used (Figure 7; Table a9).

WATER - BANK OF ITALY

FIGURE 7

Drinking water consumption (per cent)

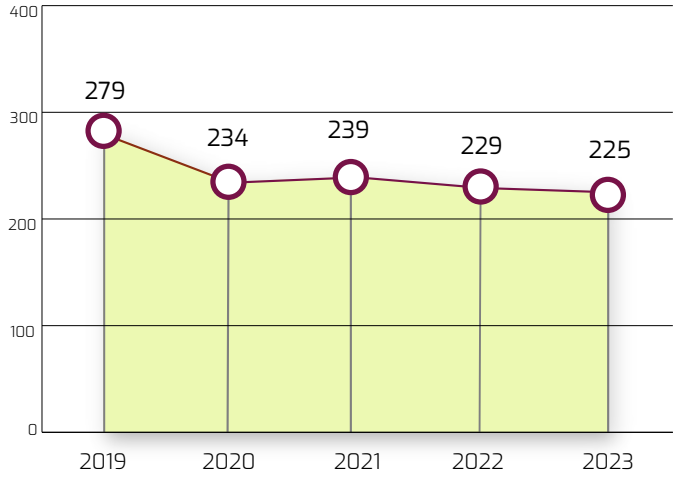


In 2023, total drinking water consumption (225,000 cubic metres) was slightly lower than in the previous year and 19 per cent lower than in 2019, the last year before the pandemic (Figure 8; Table a8).

WATER - BANK OF ITALY

FIGURE 8

Drinking water consumption (thousands of cubic metres)



Total non-drinking water consumption was 195,000 cubic metres, 5 per cent more than a year earlier due to increased consumption at the banknote production plant.

Several measures are under way to optimize water use, either by improving toilet facilities (e.g. by phasing out flush tanks or by installing timed dispensers) or by introducing early warning systems to detect any abnormal use or leaks.

paper

Total paper consumption accounts for less than 1 per cent of the Bank's GHG emissions.

We are committed to reducing paper consumption by streamlining and digitalizing processes, documents and publications.

Office paper

The general public has been making increasing use of the 'Online Services for the Public', platform, available since 2019, to submit reports and access the Bank's information services. In 2023, more than 86 per cent of the Bank's external communications were digital (98 per cent in terms of pages sent).

-65%

Reduction in the supply of paper for office use compared with the pre-pandemic period (2019)

Internal work processes have been fully digitalized and only require the printing of documents in rare cases: exceptions include some State Treasury procedures, which will be fully digitalized by the end of 2024, and those for the operational and accounting management of the branches, for which a new application is being launched. By the end of 2024, this application will have almost completely eliminated paper-based processes. In addition, a new internal service portal will help to further dematerialize documents by minimizing paper communications sent to retirees.

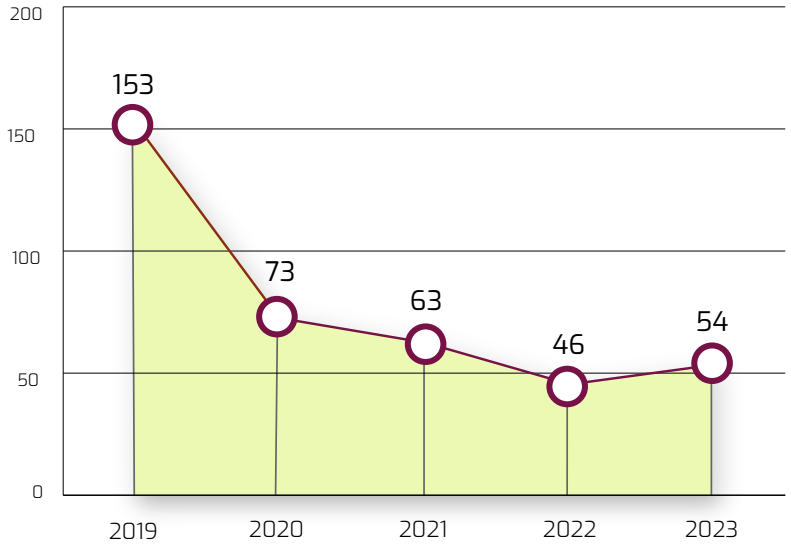
The Bank was also authorized by the General Archives Directorate of the Ministry of Culture to destroy all the more recent original paper documents for which certified digital copies are available. Some 33 tonnes of paper were recycled in 2023 (around 1,500 linear metres of archives).

The Bank uses both virgin and recycled paper. Where possible, it purchases EU Ecolabel certified paper, which complies with the highest environmental standards at all stages of the manufacturing process.

Total office paper purchases increased by 18 per cent in 2023 compared with the previous year, but were still about one third of those before the pandemic (Figure 9; Table a10). The increase was due to stockpiling.

PAPER - BANK OF ITALY FIGURE 9

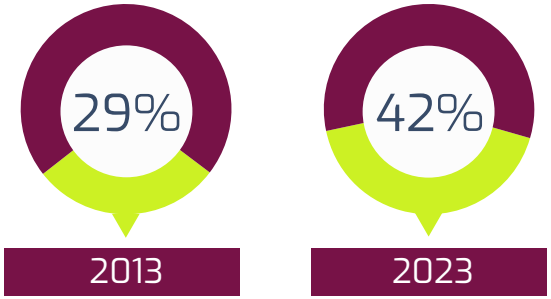
Purchase of packs of A3 and A4 office use paper (thousands of kilograms)



The share of recycled paper purchased remained stable at 42 per cent (Figure 10; Table a10).

PAPER - BANK OF ITALY FIGURE 10

Recycled office paper (per cent)



Publications

The Bank of Italy's publications are all available in digital format on its website. Some are digital only, and these include the Environment Report (since 2021), the Annual report on sustainable investments and climate-related risks, the publications in the Statistics Series, the Occasional Papers (Questioni di Economia e Finanza) and the Working Papers (Temi di Discussione) series, Notes on Financial Stability and Supervision and The Italian economy in brief.

7.6

Sheets of A4 equivalent paper used on average in one day by each member of staff

Hard copies of other publications are only printed on demand or for specific needs, such as those distributed on the occasion of the Governor's 'Concluding Remarks' at the end of May. Print runs of these publications have been steadily reduced over the years: for example, the number of printed copies of the Annual Report went down to 1,500 in 2024 (from 1,895 in 2023 and 2,700 in 2019).

-47%

Reduction in paper consumption for publications compared with 2019

The Bank also prints financial education publications, which are mainly distributed in schools.

In order to reduce the environmental impact of the Bank's printing activity, the largest share of the paper used in 2023 was FSC-certified, whereas EU Ecolabel paper was used for the copies of the Governor's 'Concluding Remarks' and other publications (25 per cent of paper weight).

Paperless formats, such as the HTML language used for the Environment Report since 2021, are being analysed and tested as an alternative to printing in order to improve information accessibility and usability.

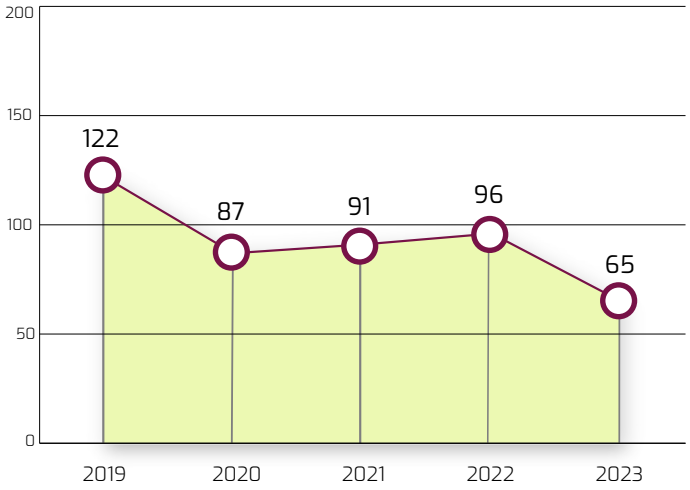
Last year, the overall consumption of paper used for publications and other published material (e.g. conference handouts) declined by 32 per cent compared with the previous year and by 47 per cent compared with 2019.

In 2023, part of the printing process for the publications was outsourced (Figure 11; Table a11).

FIGURE 11

PAPER - BANK OF ITALY

Use of paper for publications
(thousands of kilograms)



waste and charitable donations

Less than 1 per cent of the Bank's GHG emissions are due to waste production. Our waste management priorities are to reduce the production of waste at source and to promote a circular economy of reuse and recycling instead of landfill disposal.

Waste

All waste produced by offices, staff canteens, archives, as well as waste from printing the Bank's publications and IT waste, is collected separately and sent for recycling (Table a13). Waste from the banknote production process is recycled or sent to energy recovery facilities (see the section 'Banknotes'). Plastic is used sparingly in the Bank. At its staff canteens and at the Ancona, Arezzo, Florence, Forlì, Perugia and Venezia branches, the water dispensers are connected to the local water network, drastically reducing the use of bottled water. Bank staff have been issued with insulated steel bottles, and single-use cups and tableware (made of recyclable paper or compostable material) are only used when absolutely necessary. When the use of bottled water cannot be avoided, returnable glass water bottles are widely used.

Charitable donations

Charitable donations of food and other goods, such as furniture and computers, promote a socially responsible and circular economy while cutting down waste.

The Bank's staff canteens have minimized the number of meals that are prepared and then not consumed. In 2023, the Rome and Frascati canteens resumed the donation of unconsumed meals, which had been discontinued in previous years because of difficulties in finding charities that were equipped to transport food in accordance with health regulations.

Furthermore, some 1,000 items of furniture and 415 personal computers that were no longer fit for purpose in the Bank were donated to schools, organizations and non-profit associations upon request.

In the Rome and Frascati offices, more than 240 old pairs of glasses and 140 second-hand mobile phones were collected and donated to charities.

banknotes

The production, distribution, recirculation and disposal of euro banknotes account for 8 per cent of the Bank's GHG emissions.

Together with the ECB and the other central banks of the Eurosystem, the Bank of Italy contributes to reducing the environmental impact of the cash life cycle.

Eurosystem initiatives

Together with other NCBs, the Bank participated in an ECB-sponsored study to assess the environmental footprint of euro banknotes as a means of payment. The study was conducted using the standardized Product Environment Footprint (PEF) methodology and required the analysis of the entire banknote life cycle, including raw material suppliers and cash handlers. The findings of this study were presented by the ECB in December 2023: the environmental footprint of the average annual banknote payments per euro-area citizen was 101 micropoints, equivalent to the environmental impact of driving 8 kilometres by car, or 0.01 per cent of the total environmental impact of an EU citizen's annual consumption.

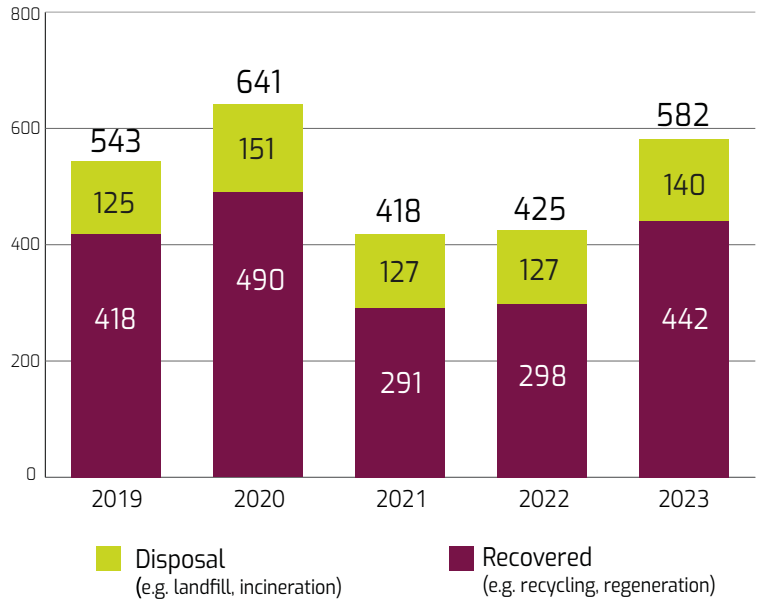
The main activities contributing to the environmental footprint of euro banknotes are the power supply to ATMs (37 per cent), transport (35 per cent), processing activities during the distribution phase (10 per cent), paper production (9 per cent), checking the authenticity of banknotes used at points of sale (5 per cent) and banknote production (3 per cent).

Banknote production

Our banknote production plant has been ISO 14001 certified since 2004. Numerous steps have been taken over the years to limit the environmental impact of the production process, including: (a) energy optimization of the plant's technological facilities; (b) retrofitting of the industrial wastewater treatment system; (c) increasingly effective management of industrial waste, favouring re-use and recovery (e.g. recycling, regeneration, waste-to-energy conversion) over disposal (incineration, landfill; see Figure 12

WASTE - BANKNOTE PRODUCTION PLANT FIGURE 12

Special waste from the banknote printing process (thousands of kilograms)



and Table a14). With the cooperation of our paper suppliers, the wooden packaging used to transport watermarked paper is now returned to the paper mills for reuse. We are also holding meetings with one of our ink suppliers to streamline deliveries and explore eco-friendlier ink packaging solutions.

On the production side, we are continuing to test a direct laser engraving system for chalcography plates, which is expected to have a lower environmental impact than the traditional galvanic electroforming process: the preliminary test phase was completed with the production of small plates, and a feasibility study was launched to test the use of standard size plates in current production. This system will not only produce less hazardous waste, but also reduce health and safety risks for workers.

Personal protective equipment with a low carbon footprint, made from recycled materials and using processes that ensure net zero GHG emissions, was purchased for employees working at this facility.

Banknote transportation

To reduce the environmental impact of transporting banknotes from the production site to the Bank's branches, our armoured fleet is gradually being replaced with vehicles that comply with the latest EU emission directives. The first seven new vehicles will be delivered in 2024.

In April 2024, the Bank published guidance on outsourcing air transport of banknotes to other Eurosystem central banks: in order to reduce the

environmental impact of these transports, the Bank may require suppliers to use a higher share of sustainable aviation fuel (SAF) than the 2 per cent threshold set by Regulation (EU) 2023/2405 (ReFuelEU Aviation), which will enter into force in 2025.

Management of worn banknote waste

At the Currency Circulation Management Directorate in Rome and at 34 branches, the banknotes in circulation are periodically sorted to ensure that cash quality standards are maintained. All banknotes deemed unfit for circulation because they are worn or damaged are then shredded.

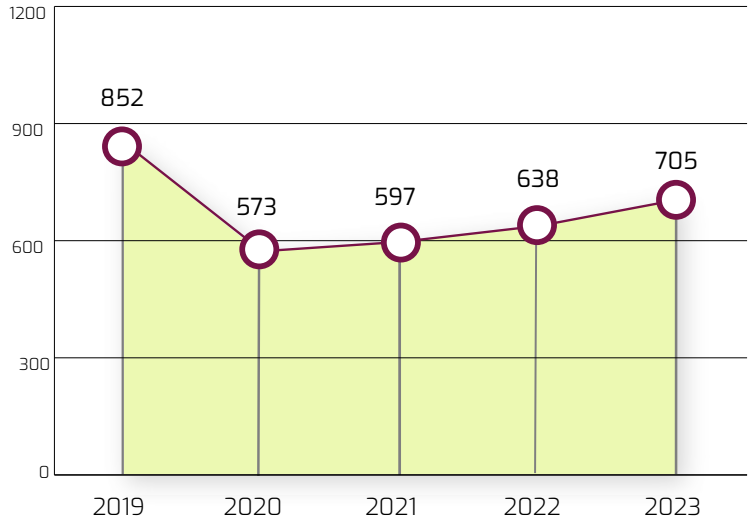
100%
Worn-out banknotes
sent to waste-to-energy plants

In 2023, the production of waste from shredded banknotes increased by 10 per cent from the previous year (Figure 13; Table a14). In line with the decisions taken by the Eurosystem, all waste from the production of banknotes and from shredded worn banknotes is disposed of in the most environmentally responsible way, i.e. in secondary solid fuel (SSF) production facilities or in waste-to-energy incineration plants. This saved 4 tonnes of CO_2 equivalent emissions (Table a2).

The Bank has commissioned the Department of Engineering of the University of Naples Federico II to assess the industrial feasibility of reusing worn banknote fragments in construction.

WASTE - BANK OF ITALY FIGURE 13

Worn banknotes withdrawn from circulation and shredded (thousands of kilograms)



sustainable mobility

Business trips, commuting and remote work energy consumption account for 35 per cent of the Bank's GHG emissions.
We are committed to reducing work-related travel and encouraging the use of environmentally sustainable means of transport and electric mobility.

Remote working, commuting and travel between Bank premises

From an environmental perspective, remote working results in: (a) lower energy and water consumption in the workplace owing to a smaller number of people on site; (b) a reduction in commuting and its atmospheric emissions; (c) an increase in household consumption. On average, 37 per cent of work was performed remotely in 2023, which is a lower figure than in 2022, when it was 42 per cent, but conspicuously higher than in 2019, the year before the pandemic, when it was 4 per cent.

n 2023, employees were asked to fill in a questionnaire prepared in partnership with the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) in order to: (a) collect information on commuting habits and calculate their emissions; (b) estimate additional household energy and heat consumption when teleworking (see the box 'Latest data on commuting and remote working').

Overall, total GHG emissions from employee commuting amounted to around 3,500 tonnes of CO_2 equivalent, down by 5 per cent on the previous year: the higher number of commuter journeys in 2023 was more than offset by the use of less polluting means of transport (Table a2). Total emissions from additional household energy consumption amounted to 532 tonnes of CO_2 equivalent in 2023 (602 tonnes in 2022). This reduction is proportional to the lower total number of remote working days.

The data collected through the questionnaire compiled with ENEA were also used to update the Bank's Commuting Plan (Piano degli spostamenti casa-lavoro, PSCL) for staff working in Rome and Frascati and to draw up similar plans for the Bari, Bologna, Milan, Naples, Palermo and Turin branches. PSCLs aim to identify and implement targeted sustainable mobility measures that reduce the use of private means of transport for commuting.

To reduce the amount of fossil fuels consumed for commuting, charging stations for electric cars, motor bikes, and bicycles have been installed at the Bank's main offices in Rome and Frascati. In 2023, 23 fast-charging stations were installed in the Bank's car parks for employees to charge their electric vehicles (EVs) at subsidized rates (each station can charge two cars); 20 stations are awaiting connection to the local electricity grid operator.

15

Electric cars for transfers to and from the Rome and Frascati offices

A number of EV charging stations are being installed at the Bolzano and Cagliari branches. The bicycle and scooter charging stations in Cagliari are partly powered by the PV canopy.

To encourage soft mobility and the use of bicycles for commuting, changing rooms with showers for employees were installed in two buildings in Rome on a trial basis, as well as new bicycle racks.

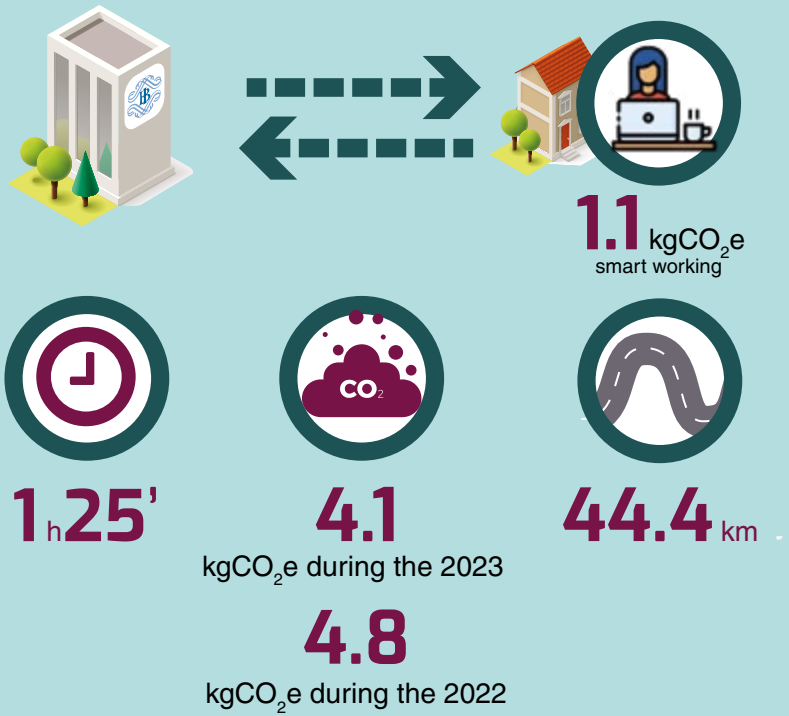
The fleet of corporate shuttle buses, which runs 67 trips daily along seven

LATEST DATA ON COMMUTING AND REMOTE WORKING

The questionnaire developed in partnership with ENEA allowed us to update the information collected in 2020 on staff commuting and to look into the energy consumption associated with remote working.

The questionnaire showed that the average commuting distance is 22.2 km (less than 20 km for employees in the Rome and Frascati offices and more than 30 km for employees in the branch network) and the average commuting time is 42.5 minutes (in the previous survey, the average distance was 21 km and the time 37.5 minutes). Trains and private cars (39 per cent and 38 per cent of the kilometres travelled, respectively) are the most common means of transport. Based on the data collected, the average daily per capita emissions for staff commuting were estimated at 4.1 kilogrammes of CO_2 equivalent: the reduction from the 2020 figure of 4.8 kilogrammes of CO_2 equivalent is due to increased use of public transport and the use of less polluting private cars than in the previous survey.

This study with ENEA also allowed us to estimate the daily emissions for a day's remote working at 1.1 kilogrammes of CO_2 equivalent: this figure includes the additional household consumption for heating and cooling the areas where employees work, as well as energy consumption for lighting and laptop use. It is about a quarter of the equivalent environmental impact of a day's commuting to the office (for more details, see the item 'Indirect transport-related GHG emissions' in the Methodological Notes). During the pandemic, the gap between the two figures was wider due to the increased use of private transport as people were afraid of contagion.



routes in Rome and Frascati, was designed to cater to staff travelling to work and back, as well as between the Bank's premises. The service is operated by a fleet partly made up of methane-powered buses, which are less polluting than conventional diesel buses. The number of methane-powered vehicles will be increased from 9 to 12 by the end of the year.

We have added 17 hybrid or electric cars to our chauffeured car service fleet. To help reduce the environmental impact of travel between premises within the Rome area, the Bank has signed long-term rental contracts for 15 electric cars and is updating its bike-sharing service. The Cagliari branch will rent an electrical bicycle on a trial basis.

Business travel

For 2023, 2024 and 2025, the Bank has set a reduction target for business travel emissions, i.e. a decrease of 25 per cent, 30 per cent and 35 per cent respectively compared with 2019.

In order to meet this target, a GHG emissions budget was introduced in 2023 on a trial basis, alongside the customary financial budget that is allocated to each Bank unit. Over the course of each year, shares of this budget are deducted in proportion to the estimated emissions for each business trip made. This tool, which is currently non-binding, will also raise awareness of the environmental impact of business travel among managers and employees.

Furthermore, since last year, staff travelling on business have not only received a list of suggested hotels from the agency, but also their environmental rating, which is based on the hotels' responses to a questionnaire drawn up by the Bank and updated annually.

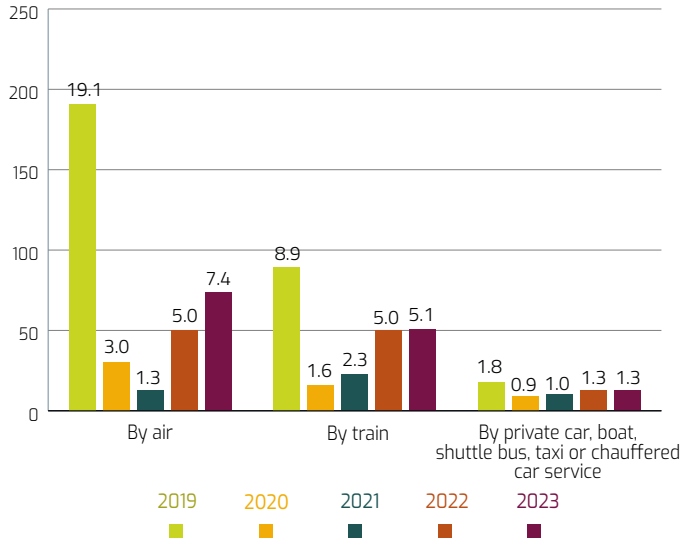
To further reduce the impact of business travel, the Bank buys sustainable aviation fuel (SAF) credits for air travel: under a number of agreements signed with the main airlines, the Bank accrues credits by travelling with SAF and redeems them for future flights.

On the international front, a working group was set up at the Bank of Italy's initiative with the aim of drawing up guidelines to reduce business travel between the headquarters of the Eurosystem central banks.

The remote communications infrastructure (136 sets of videoconferencing equipment, 4 multi-purpose monitors and 10 devices to improve interaction and collaboration in hybrid meetings) did not change in 2023: over 2.6

BUSINESS TRAVEL - BANK OF ITALY FIGURE 14

Distances travelled by means of transport (millions of kilometres)



million phone calls were made and 410,000 online meetings were held, down slightly from the previous year's figures.

In 2023, the total number of kilometres travelled for business by all means of transport rose by 22 per cent from the previous year (-54 per cent compared with 2019): the increase in kilometres travelled by air was 48 per cent, while there was no change in kilometres travelled by train (Figure 14; Table a15). Overnight stays on business trips declined by 8 per cent from 2022 (down by 46 per cent compared with 2019) and 87 per cent of them were at hotels located in Italy.

Overall, GHG emissions increased by 15 per cent in 2023 compared with the previous year. Compared with 2019, the last year before the pandemic, both the number of missions and the number of kilometres travelled fell, with a 58 per cent reduction in GHG emissions, well above the 25 per cent reduction target set for 2023.

green procurement

The purchase of some goods and services (those currently included in the calculations of our carbon footprint, i.e. canteen services, furniture and IT equipment) accounts for 15 per cent of the Bank's GHG emissions.
Our green procurement policy is intended to help guide the market towards developing eco-friendlier works, goods and services.

Tender processes comply with the minimum environmental standards set by the Italian Ministry of Environment and Energy Security (criteri ambientali minimi, CAM). Moreover, where applicable, the Bank of Italy: (a) requires environmental certifications (ISO 14001 or EMAS) or energy management certifications (ISO 50001); (b) includes green clauses for the provision of services; (c) requires eco-labels for the goods covered by procurement contracts; and (d) awards points to companies using products, tools and procedures with the lowest environmental impact (in the tenders in which the award criterion is 'best value for money').
The Bank also encourages its suppliers to adopt best practices in terms of social responsibility and good governance by requiring them to hold specific certifications for occupational health and safety (ISO 45001), protection of workers' rights (SA 8000), gender equality (UNI/PdR 125) and corruption prevention (ISO 37001).
Internal procedures require contracting units to include environmental and social criteria as early as the procurement planning stage, or to explain why these criteria should not be included.
In 2023, a total of 64 procurement procedures were started (excluding contracts negotiated with a single provider, direct awards and Eurosystem-wide contracts). Environmental or social responsibility criteria were included in 28 of them. The remaining procedures involved services for which it is not possible to set green criteria, given their nature (e.g. the purchase of intangibles such as software and databases).
In almost all procedures (92 per cent) with additional environmental, social or governance (ESG) criteria, the winning companies submitted bids – and subsequently assumed contractual obligations – that met these criteria.
In the tenders for canteen services at the Bank's Head Office and branches, in addition to the possession of the ISO 14001/EMAS, SA 8000, ISO 22000 (food safety) and ISO 22005 (food chain traceability) certifications, extra points were awarded to bidders that: a) use staff uniforms and detergents with the EU Ecolabel or equivalent environmental labels; b) collect and donate unconsumed meals; and c) use organic and locally sourced products (short supply chain). Additional points were awarded in the Rome and Frascati canteen tenders to bidders that: a) hold an ISO 45001 certification; b) purchase certified Gold Standard carbon credits to offset the emissions from their services; and c) use vehicles with a low environmental impact to transport food.
For the service of statistical analysis of international freight transport, tenderers were required to hold ISO 14001/EMAS and SA8000 certification and were awarded additional points for offsetting the GHG emissions resulting from the provision of this service by purchasing carbon credits on the voluntary market.
When awarding the contract for the extraordinary maintenance and renovation of its building in Via Mazzarino in Rome, the Bank of Italy required compliance

with the CAM and possession of the relevant certifications (ISO 14001/ EMAS, SA 8000, ISO 45001, ISO 37001), and considered the following as bonus criteria: a) the design and installation of a heat pump system integrated with methane gas condensing boilers; b) the design and construction of a rainwater harvesting system; c) the use of a higher percentage of recycled material than that required by the CAM; d) staff training on reducing the environmental impact of construction sites; and e) the supply and installation of information panels on environmental microclimate quality.

In the tenders for the operation and maintenance of building systems at the Head Office premises and at branches, compliance with the CAM was required and higher scores were given to bidders that: a) have ISO 50001 or UNI 11352 certification (for Energy Service Companies, ESCOs); b) have ISO 14001 or EMAS certification; c) have SA 8000 and ISO 45001 certifications and re-employ staff working for former contractors who are not covered by a re-hire clause; and d) use low-emission vehicles (hybrid or electric, complying with an emission standard of no less than Euro 6).

Tenderers for the supply of watermark paper for the production of banknotes were required to use cotton fibres that are 100 per cent sourced from organic and fair trade farming or from integrated production. They were also required to use pallets and packaging materials that have already been used and are suitable for reuse. The ISO 14001 certification was required in the tenders for the supply of machinery for shredding worn banknotes and of paper bands for banknote packaging.

In the procurement of professional services for the digitalization of the historical archives, bonus points were awarded for SA 8000 and ISO 45001 certification, and a qualitative appraisal of suppliers was introduced based on their employment conditions (salary, benefits and stability of contracts). This appraisal was also included in the tender procedure for workstation handling and installation services.

In renewing the IT services provided, including in part, through external infrastructure (e.g. public cloud), the Bank awarded bonus points for: greater data centre efficiency (power usage effectiveness, PUE); data centres powered exclusively by electricity from renewable sources; and ISO 50001 and 14001 certifications.

The Bank of Italy's commitment to green procurement has been recognized by the Eurosystem Procurement Coordination Office (EPCO), which promotes cooperation among European central banks in the area of procurement: in February, EPCO awarded the Bank of Italy the 2023 Most Sustainable Procurement Award for its achievements in this field and for its procurement procedures benefiting other central banks.

biodiversity and reforestation

We are committed to urban reforestation and the protection of our green heritage and biodiversity.

Urban reforestation

Trees and forests in urban and suburban areas provide many environmental, social and climate benefits: they help combat climate change by absorbing carbon dioxide; they improve air quality and microclimates, counteracting the formation of heat islands in summer; and they improve and decorate urban landscapes, creating green spaces available to the community.

For these reasons, the Bank participated in the Foresta Italia project in autumn 2023-24, sponsored by the Ministry of the Environment and Energy Security and the Ministry of Agriculture, Food Sovereignty and Forestry, by financing four urban reforestation projects in Italy.

In partnership with the Forestry, Environment and Agri-Food Unit of Carabinieri Police and with the operational support of a non-profit organization, 4,500 native trees were planted over a total area of around 4.5 hectares in Rome, Benevento, Spilamberto (Modena) and Statte (Taranto). The planting of the trees and their care were entrusted to local nurseries.

Protecting our green heritage

The Bank pays particular attention to reducing land use and taking care of its highly biodiverse green heritage, which is predominantly located in the areas surrounding the banknote production plant in Rome ('Polo Tuscolano'), the Centro Donato Menichella in Frascati, the Sadiba training centre in Perugia and the branches of Agrigento, Arezzo, Bergamo, Piacenza and Sassari (Table a16).

The Polo Tuscolano area covers approximately 25 hectares and has over 500 trees, while the 37 hectares of the Centro Donato Menichella are home to around 1,000 olive trees, among other plants. In Sadiba's 7-hectare park in Perugia, there are more than 2,660 trees, and numerous shrubs and aromatic plants.

All these areas are also home to a variety of animals, such as squirrels and various bird species.

Our management and maintenance activities aim to protect existing trees with regularly updated monitoring plans and to constantly improve our green heritage by introducing new plant species that do not upset the balance of the surrounding environment and ecosystems, including in urban and suburban areas.

Three projects will be completed by the end of 2024: a) we will build an outdoor workspace at the CDM with beds of Mediterranean shrubs and medicinal plants; b) we will create an educational trail called Hortus Romanus at Polo Tuscolano, which will lead visitors through vegetable gardens grown using agricultural techniques developed in ancient Rome and through historical landmarks of incalculable value, including a section of a Roman aqueduct; c) we will set up two beehives in the orchard area at the Sadiba training centre.

Furthermore, to help raise awareness of environmental and biodiversity issues, we organize courses, seminars and guided tours in the green areas of the Rome and Frascati sites and in the Sadiba Training Centre.

sustainable investment

We promote sustainable investment to help protect the environment and to drive economic and social growth.

Since 2019, the Bank of Italy has integrated environmental, social and governance (ESG) criteria into the management of its non-monetary policy financial assets. Its guiding principles are set out in the Responsible Investment Charter, published in 2021. The integration of sustainability criteria into investment strategies serves two purposes: improving the risk-return profile of investments and contributing to environmental stewardship and sustainability. In the area of fighting climate change, the Bank is committed to ensuring, according to its mandate, that its investment operations pursue both the Paris Agreement and the European Union's 2050 climate neutrality target.

In practice, equity and corporate bond investments aim to improve our portfolios' ESG scores and climate metrics over time and against benchmark indices. The climate metrics used by the Bank include information on corporate carbon emissions and, as of 2022, on decarbonization commitments.

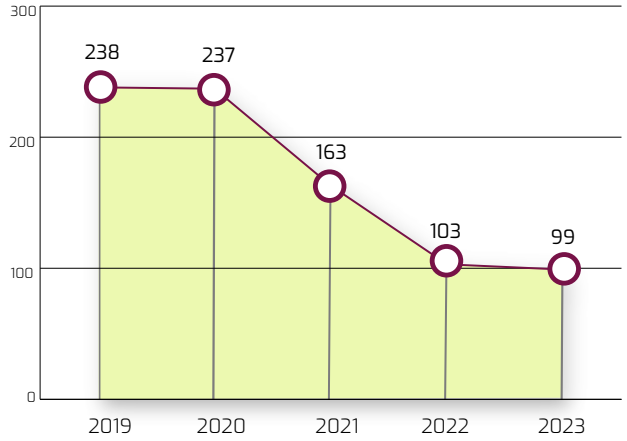
A sustainable investment performance review is available in the Bank's Annual report on sustainable investments and climate-related risks, which also explains how sustainability profiles are integrated into investment decisions, strategies and risk management, as well as illustrating the methods for measuring these profiles.

For our internally managed equity portfolio in euros (worth €17.3 billion and accounting for just under 80 per cent of our private sector investments), the weighted average carbon intensity (WACI) has been reduced by 58 per cent since 2019, to 99 tonnes of CO_2 equivalent emissions per million euros of sales (Figure 15; Table a17). This is 38 per cent lower than the benchmark index. The portfolio has also outperformed the benchmark in terms of use of electricity (-18 per cent), water consumption (-26 per cent) and waste production (-19 per cent).

For the corporate bond portfolio in euros (around 4 per cent of our private sector investments), the WACI has dropped by 54 per cent since 2019, to 68 tonnes of CO_2 equivalent emissions per million euros of sales (Table a17), i.e. 32 per cent lower than for the benchmark.

SUSTAINABLE INVESTMENT - BANK OF ITALY FIGURE 15

Weighted average carbon intensity of the equity portfolio in euros, 2019-23 (1)
(tonnes of CO_2e per million euros of sales)



(1) The weighted average carbon intensity values reported are not entirely comparable with those indicated in the 2023 Environment Report, as it was agreed in the Eurosystem to use a different data update criterion (for more information on this, see the Methodological Note of the Annual Report on Sustainable Investment and Climate Risk for 2023).

Our sustainable investment also includes foreign currency equities and corporate bonds (around 15 and 2 per cent of our private sector investments, respectively), as well as sovereign, supranational and agency debt securities. In terms of public sector securities, the Bank continued to pursue the strategy of thematic investing in green bonds, which currently amount to a total of €5.4 billion.

eco-friendly culture

The Bank works with other institutions on sustainable finance and contributes to national and international efforts in this area. In its role as supervisory authority, it helps to ensure that financial intermediaries perform sound and prudent ESG risk management. It shares the findings of its research and analysis on the links between the economy, finance, energy and the environment, and participates in educational initiatives to raise awareness of environmental issues among firms and the general public.

International and EU projects

The Bank is an active member of the Network for Greening the Financial System (NGFS), the global network of 138 central banks and supervisory authorities that produces studies and promotes the exchange of experience on environmental and climate risk management in the financial sector. Since 2022, the Bank of Italy and the Central Bank of New Zealand have been coordinating the Net Zero for Central Banks working group, which supports central banks' efforts to reduce their GHG emissions, promote sustainable investments and disseminate information on climate risks. Since 2024, a new focus of the working group has been devoted to climate transition plans.

Within the G20, the Bank of Italy is a member of the permanent Sustainable Finance Working Group (SFWG), which laid out a multi-year G20 Sustainable Finance Roadmap to identify the obstacles to and solutions for the development of a sustainable financial system. The Bank of Italy and the Italian Ministry of Economy and Finance are co-chairs of the Climate Change Mitigation Working Group (CCM WG) in 2024, under the Italian presidency of the G7. In this capacity, the Bank has promoted a programme of activities to study the macroeconomic impacts of climate transition and mitigation policies, the role of technology in developing transition plans and the macrofinancial risks associated with nature.

The Bank also contributes to the work of the Financial Stability Board (FSB), whose programme for 2024, published in January, includes climate-related financial risks as one of its priorities. Furthermore, the Bank is part of the joint working group of the European Central Bank and the European Systemic Risk Board (ESRB), which has promoted a common methodological approach to analysing climate-related risks to financial stability and published a report on nature-related financial risks at the end of 2023.

Within the Eurosystem, the Bank is also a member of the Eurosystem Climate Change Forum (ECCF), which facilitates the discussion of issues of common interest and the development of joint initiatives, and of the Environmental Network of Central Banks (ENCB), which promotes the sharing of best practices in managing internal environmental matters.

In September 2023, the Bank hosted an NGFS Steering Committee meeting, an ECCF meeting, and a workshop on the frontiers of sustainable investment, organized by the NGFS Sustainable Investment Group.

Supervisory action

At the international level, the Bank is involved in the work of the Basel Committee on Banking Supervision (BCBS), which is exploring the inclusion of climate-related risks in prudential standards: in November 2023, it

launched a public consultation on the inclusion of climate-related risks in banks' disclosures to customers. On the European front, the European Banking Authority (EBA) launched a public consultation on a discussion paper on banks' management of ESG risks, in view of the adoption of the new regulatory package introducing safeguards against these risks. In line with the EU's Single Supervisory Mechanism, the Bank has included climate-related and environmental risks among its supervisory priorities and progressively strengthened its dialogue with financial intermediaries and trade associations through dedicated surveys, meetings and workshops in 2023.

In September, the Bank hosted two roundtables with banks and other supervised financial intermediaries to keep the dialogue going and encourage the exchange of experiences and the definition of best practices. Furthermore, it continued to monitor the action plans submitted by supervised financial intermediaries for the integration of climate-related and environmental risks into business processes, in line with the supervisory expectations published in 2022. The key findings of our ongoing monitoring and an update of the best practices identified were published in December 2023.

Sustainable finance literacy

The Bank is a member of the EBA's international working groups and the OECD's International Network on Financial Education (INFE), which aim to promote sustainable finance literacy among the general public.

In Italy, it has launched a series of financial education courses on the climate transition and on sustainable finance, including in partnership with other authorities and public school and university stakeholders.

A special section of the Bank's financial education website, 'Economics for everyone', is dedicated to sustainable finance, explaining in simple terms what sustainable investments are and how to reduce and manage their risks.

Participation in national working groups

Together with the Italian Ministry of Environment and Energy Security (MASE), the Italian Companies and Stock Exchange Commission (CONSOB), the Italian Pension Fund Supervisory Authority (Covip) and the Italian Institute for the Supervision of Insurance (IVASS), the Bank of Italy is a member of the Platform on Sustainable Finance, created by the Italian Ministry of Economy and Finance to promote the dissemination of sustainability information and risk assessment methodologies aimed at mobilizing private capital market resources to support the ecological transition in Italy. In April 2024, the Platform published its Annual Report for 2023 on the achievements in 2023 and on the working groups in its three priority areas: the identification and availability of data on climate and natural hazards; sustainability reporting by unlisted small and medium-sized enterprises; and insurance against climate-related and environmental risks. The Bank's experts help prepare the MASE report on the national energy situation ('La situazione energetica nazionale') and participate in the work of the Committee for Natural Capital coordinated by the same Ministry, which publishes regular reports on the state of natural capital in Italy; Furthermore, it contributes to the work of the Italian Observatory on Energy Poverty (Osservatorio Italiano sulla Povertà Energetica, OIPE) and is part of two monitoring centres run by ABI Lab, the Italian Banking Association Hub for research and innovation: the Electricity and Gas Market Monitoring Centre, which studies changes in energy prices and regulations, and the Green Banking Monitoring Centre, which investigates how environmental impacts are managed in internal operations and draws up guidelines on environmental reporting.

Conferences, analysis and research

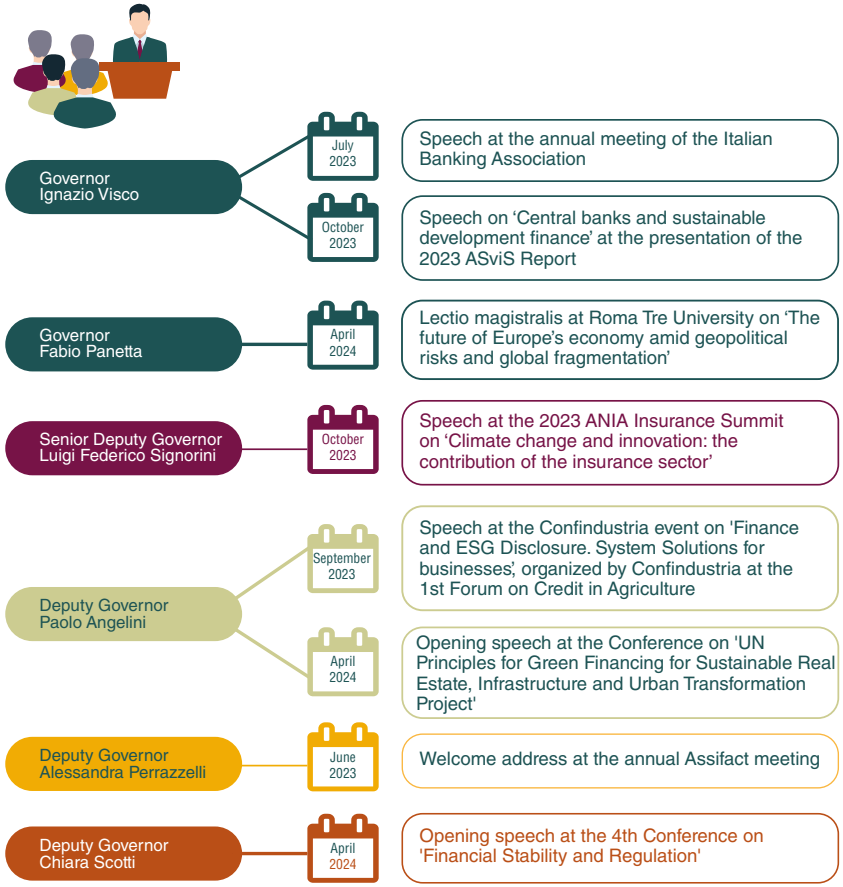
Between July 2023 and July 2024, the Governor and the other members of the Governing Board gave speeches at several events and conferences on sustainable finance. The main ones are listed in Figure 15. In March 2024, the Deputy Governor of the Bank of Italy Paolo Angelini published the paper 'Portfolio decarbonisation strategies: questions and suggestions' (Banca d'Italia, Questioni di economia e finanza (Occasional Papers), 840, 2024).

Sustainable finance and the impact of climate change on the stability of the economic and financial system are firmly embedded in the Bank's research agenda. Research and analysis were carried out last year to study the impact of the green transition on the labour market and on business trends. Our researchers published 17 studies on these subjects in 2023, all available on a dedicated page on our website.

The Bank also hosted and organized several conferences, events and meetings on environmental and climate issues, including two legal seminars in November 2023 and February 2024 on the constitutional protection of the environment, biodiversity and ecosystems and on climate litigation. In March 2023, the Bank of Italy and the Florence School of Banking & Finance organized a Conference on ESG and the climate imperative: Regulatory and policy challenges for the banking sector. A workshop on sustainable finance and the green transition was held in April in partnership with the

Main speeches on climate change, sustainability and sustainable finance delivered by Governing Board members at external conferences between June 2023 and May 2024

FIGURE 16



Italian Association of Energy Economists. The fourth joint Workshop on International Capital Flows and Financial Policies, organized by the Bank of Italy, the Bank of England, Banque de France, the International Monetary Fund and the OECD, was held in Rome in October.

A seminar on sustainable finance was organized as part of the Bank's international technical cooperation activities with the central banks of the European Neighbourhood Policy countries and other emerging economies.

Other projects

The Bank worked with the Scuola nazionale dell'Amministrazione (SNA) to design and deliver a training course for senior and middle management in the public sector on 'General government sustainability: strategies, management and reporting'.

On 29 September 2023, on the occasion of the European Researchers' Night – promoted by the European Commission to create opportunities for researchers to meet the general public and spread scientific culture – the Bank took part in a number of initiatives organized by the Frascati Science Association. For this event, the Centro Donato Menichella in Frascati was open to the public and offered thematic guided tours, many of which were about environmental sustainability.

In the school year 2023-24, the Bank hosted 233 'Work Experience Projects' (Percorsi per le Competenze Trasversali e l'Orientamento, PCTO) for high school students: 19 of these (held in Rome and in the Agrigento, Ancona, Bari, Campobasso, Catania, Catanzaro, Firenze, Livorno, Milan, Palermo, Perugia, Pescara, Piacenza and Salerno branches) covered environmental issues and involved 214 students.

In July 2023, a 700-square-metre mural was painted on the outside wall of our Catania branch: the work, entitled Banco di vita (Bank of Life), was created using photocatalytic mineral paints that reduce smog and pollution.

214
High school students involved in work experience projects (PCTO) on environmental issues in the school year 2023-24

In-house training and staff awareness

In-house workshops on natural capital, energy and water resources have been organized. Three courses on sustainable finance will be held in 2024 and a self-study module on the 2030 Agenda and the Sustainable Development Goals, developed in collaboration with the Italian Alliance for Sustainable Development (ASVIS), will be made available to all employees.

This year, we have joined several awareness raising initiatives. On 16 February 2024, the Bank participated in the annual Italian Energy Saving and Sustainable Lifestyles Day by switching off the exterior lighting of its buildings, as it does every year. In addition, on 23 March, together with the ECB and other European central banks, the Bank joined the global Earth Hour initiative, promoted by the World Wildlife Fund (WWF). In June, we circulated information to our staff on World Environment Day, organized by the United Nations General Assembly.

Our onboarding process for new employees includes a specific training module on environmental sustainability. Furthermore, all new recruits receive a welcome pack with eco-friendly stationery and an insulated steel water bottle.

statistical tables

This section comprises 18 statistical tables with quantitative and detailed indicators on the Bank of Italy's environmental impacts:

Table a1 Staff
" a2 GHG emissions
" a3 Leakages of fluorinated greenhouse gases
" a4 Energy consumption
" a5 Renewable electricity purchased
" a6 Emissions of nitrogen oxides (NO_X) and sulphur dioxide (SO_2) from fossil fuel use
" a7 Energy consumption by facility
" a8 Water consumption
" a9 Water consumption by facility
" a10 Office paper purchases
" a11 Use of paper for publications
" a12 Toner cartridges
" a13 Waste generation
" a14 Banknotes
" a15 Business travel
" a16 Land use
" a17 Sustainable investment
" a18 Assessment of uncertainty in the calculation of GHG emissions

The percentages shown in the statistical tables were calculated using non-rounded data. In addition, the following symbols and conventions were used:

– the phenomenon does not exist;
.... the phenomenon exists, but the data are not known;
.. the value is nil or less than half of the final digit shown.

Table a1

Staff (1)
(units)

VOCI	2019	2020	2021	2022	2023
Employees	6,337	6,416	6,330	6,522	6,665
Staff seconded to other organizations (2)	256	255	299	318	303
Total employees	**6,593**	**6,671**	**6,629**	**6,840**	**6,968**

(1) Data as at 31 December of each year. – (2) Staff at representative offices and financial attachés abroad, staff on leave or seconded to the European Central Bank and other national and international institutions.

Table a2

GHG emissions
(tonnes of CO_2 equivalent)

	2019	2020	2021	2022	2023
Direct emissions: Scope 1					
From stationary combustion					
Heating fuels	9,393	9,489	10,505	8,356	7,267
Fuels for generators	43	88	63	53	56
From mobile combustion (car fleet)	17	11	13	17	15
From leakages of fluorinated greenhouse gases	70	950	483	823	930
Total (A)	**9,523**	**10,539**	**11,065**	**9,250**	**8,268**
Indirect emissions: Scope 2 (market-based)					
From imported energy					
Electricity (1)	0	0	0	0	0
District heating	168	208	220	178	241
Centralized heating	43	44	60	57	44
Total (B1)	**211**	**252**	**280**	**235**	**285**
Indirect emissions: Scope 2 (location-based)					
From imported energy					
Electricity (2)	25,995	22,762	20,982	19,101	19,554
District heating	168	208	220	178	241
Centralized heating	43	44	60	57	44
Total (B2)	**26,206**	**23,013**	**21,262**	**19,337**	**19,839**
Indirect emissions: Scope 3					
From transportation					
Business travel	4,262	852	609	1,545	1,877
Nights spent in hotels for business trips	1,105	191	362	415	388
Bank staff commuting	6,030	3,054	3,342	3,703	3,523
Remote working by Bank staff	62	902	880	602	532
External staff commuting	3,363	3,391	3,597	3,145	2,865
Total (C1)	**14,821**	**8,390**	**8,790**	**9,411**	**9,186**

continues

continues: Table a2

GHG emissions
(tonnes of CO_2 equivalent)

	2019	2020	2021	2022	2023
From products used by the Bank					
Energy-related activities (3)	3,625	2,906	3,145	3,283	1,957
Water	187	177	176	174	159
Paper for publications	115	82	85	89	50
Office paper	92	51	52	47	47
Toner cartridges	133	85	95	89	77
Outsourced publication printing services	–	–	–	–	11
Furniture	546	552	560	1,269	719
IT equipment	1,538	2,543	1,730	467	330
Canteen services	3,219	1,726	1,737	2,410	2,836
Total (C2)	**9,456**	**8,122**	**7,580**	**7,829**	**6,185**
From banknotes					
Transportation of paper and ink for the production of banknotes	542	107	379	514	323
Paper and ink for the production of banknotes	807	870	748	1,257	902
Waste from the banknote production process	66	80	64	66	82
Transportation of banknotes	1,286	1,626	1,172	890	846
Waste consisting of shredded worn banknotes	120	68	56	19	15
Total (C3)	**2,822**	**2,751**	**2,420**	**2,745**	**2,168**
Total (C)=(C1)+(C2)+(C3)	**27,098**	**19,262**	**18,790**	**19,984**	**17,538**
Total emissions (market-based) (A)+(B1)+(C)	**36,832**	**30,053**	**30,136**	**29,469**	**26,091**
Total emissions (location-based) (A)+(B2)+(C)	**62,827**	**52,815**	**51,117**	**48,570**	**45,645**
GHG emissions per employee (market-based) (tCO_2e/employee)	5.8	4.7	4.8	4.5	3.9
GHG emissions per employee (location-based) (tCO_2e/employee)	9.9	8.2	8.1	7.4	6.8

See the section 'GHG emissions' and its subsections in the Methodological Notes.
(1) The market-based methodology requires emissions to be calculated using factors relating to where the energy purchased was sourced, in line with the provisions of the supply contract. Since 2013, the Bank has purchased electricity exclusively from renewable sources; as a result, the emissions for the electricity purchased are zero. – (2) The location-based methodology requires GHG emissions to be calculated by applying the average emission factor of the country where the energy is purchased. – (3) Activities connected to the consumption of energy outside the Bank that are relevant to its operations: methane gas, diesel gas, petrol, purchased and self-produced electricity, and district heating energy.

Table a3

Leakages of fluorinated greenhouse gases
(kilogrammes)

FLUORINATED GAS	2019 (1)	2020	2021	2022	2023
R32	–	1.0	1.0	1.5	0.6
R134A	–	307.0	57.0	344.5	85.0
R407C	36.0	135.0	38.8	60.0	45.8
R410A	0.4	98.5	142.4	79.9	49.2
R227EA	–	–	–	–	6.0
R404A	–	–	–	–	123.0

(1) The data for 2019 may be underestimated due to the time lag with which they were collected.

Table a4

Energy consumption
(megawatt-hour)

	2019	2020	2021	2022	2023
Electricity	81,881	76,396	75,125	73,112	72,653
of which: self-produced (1)	39	67	62	66	59
Diesel oil for generators	162	330	237	198	208
District heating	778	990	1,035	841	1,143
Methane gas for heating	43,989	44,470	49,415	39,262	33,904
Heating oil	967	1,015	940	664	479
Fuels for the car fleet	65	42	50	65	54
Total (2)	**127,842**	**123,243**	**126,801**	**114,143**	**108,441**
Energy consumption per square metre (MWh/m²)	0.16	0.16	0.16	0.14	0.13
Energy consumption per employee (MWh/employee)	20.2	19.2	20.0	17.5	16.3

See the section 'Consumption of fuel, electricity, water, paper and toner' in the Methodological Notes.
(1) Using photovoltaic plants. – (2) Any mismatches are due to the rounding of decimals

Table a5

Renewable electricity purchased (1)
(per cent)

SOURCE	2019	2020	2021	2022	2023
Wind	28.7	–	60.7	46.6	–
Hydroelectric	24.4	73.5	14.4	22.2	90.5
Solar	46.9	–	24.9	31.2	9.5
Thermal - solid biomass	–	26.5	–	–	–

Source: Based on data from Gestore dei Servizi Energetici – GSE SpA.
(1) The percentages are calculated based on the 'Guarantee of Origin' certificates

Table a6

Emissions of nitrogen oxides (NO_x) and sulphur dioxide (SO_2) from fossil fuels
(kilogrammes)

	2019	2020	2021	2022	2023
Nitrogen oxides (NO_x)	4,797	4,872	5,357	4,203	3,601
Sulphur dioxide (SO_2)	237	274	251	188	153

See the section 'Emissions of other pollutants' in the Methodological Notes.

Table a7

Energy consumption by facility
(megawatt-hour)

	2019	2020	2021	2022	2023
			Electricity (1)		
Palazzo Koch	7,869	7,229	7,325	6,974	6,968
Centro Donato Menichella	24,237	23,061	22,134	21,616	22,034
Banknote production plant	13,338	12,965	12,525	12,048	11,663
Largo Bastia	8,222	7,730	7,142	6,531	6,823
Other buildings in Rome	9,452	8,214	8,726	8,902	9,800
Branches (2)	18,925	17,527	17,510	17,240	15,574
Total electricity	**82,043**	**76,726**	**75,362**	**73,311**	**72,862**
			Energy for heating and transport (3)		
Palazzo Koch	2,296	2,306	2,569	1,797	1,482
Centro Donato Menichella	12,244	13,162	14,587	12,062	10,137
Banknote production plant	9,384	8,801	9,586	6,941	6,270
Largo Bastia	1,285	1,343	1,909	1,155	756
Other buildings in Rome	5,108	4,638	5,433	4,718	4,485
Branches (2)	15,482	16,267	17,355	14,159	12,449
Total energy for heating and transport	**45,799**	**46,517**	**51,439**	**40,832**	**35,579**
			Total energy		
Palazzo Koch	10,165	9,535	9,894	8,771	8,450
Centro Donato Menichella	36,481	36,223	36,721	33,678	32,171
Banknote production plant	22,722	21,766	22,111	18,989	17,933
Largo Bastia	9,507	9,073	9,051	7,686	7,579
Other buildings in Rome	14,560	12,852	14,159	13,620	14,285
Branches (2)	34,407	33,794	34,865	31,399	28,023
Total energy (4)	**127,842**	**123,243**	**126,801**	**114,143**	**108,441**

See the section 'Consumption of fuel, electricity, water, paper and toner' in the Methodological Notes.
(1) Includes energy produced by generators. – (2) Excludes the Roma Sede and Rome CDM branches; includes the consumption of the three representative offices abroad and the office at the House of the Euro. – (3) Includes methane gas, district heating, heating oil and fuel consumption for the car fleet. – (4) Any mismatches are due to the rounding of decimals.

Table a8

Water consumption
(cubic metres)

	2019	2020	2021	2022	2023
Drinking water	278,523	234,010	239,143	228,865	224,698
Non-drinking water	166,028	186,365	178,697	185,294	195,236
Total (1)	**444,551**	**420,375**	**417,840**	**414,159**	**419,934**
Water consumption per employee (m^3/ employee)	70.2	65.5	66.0	63.5	63.0

See the section 'Consumption of fuel, electricity, water, paper and toner' in the Methodological Notes.
(1) Any mismatches are due to the rounding of decimals.

Table a9

Water consumption by facility
(cubic metres)

	2019	2020	2021	2022	2023
			Drinking water		
Palazzo Koch	37,857	33,744	34,001	29,099	29,414
Centro Donato Menichella	59,767	55,206	53,057	49,704	41,060
Banknote production plant	23,463	24,363	33,277	31,619	21,514
Largo Bastia	6,041	3,529	2,651	2,147	1,440
Other buildings in Rome	63,781	48,114	57,239	56,146	69,827
Branches (1)	87,614	69,054	58,918	60,150	61,443
Total drinking water	**278,523**	**234,010**	**239,143**	**228,865**	**224,698**
			Non-drinking water (2)		
Palazzo Koch	2	..	1	19	3
Centro Donato Menichella	98,638	114,028	109,300	118,188	113,562
Banknote production plant	45,324	59,392	56,493	50,073	64,196
Largo Bastia	10,789	6,530	9,163	7,086	7,811
Other buildings in Rome	8,572	4,073	2,540	7,482	7,710
Branches (1)	2,703	2,342	1,200	2,446	1,954
Total non-drinking water	**166,028**	**186,365**	**178,697**	**185,294**	**195,236**
			Total water		
Palazzo Koch	37,859	33,744	34,001	29,118	29,417
Centro Donato Menichella	158.405	169,234	162,357	167,892	154,622
Banknote production plant	68,787	83,755	89,770	81,692	85,710
Largo Bastia	16,830	10,059	11,814	9,233	9,251
Other buildings in Rome	72,353	52,187	59,779	63,628	77,537
Branches (1)	90,317	71,396	60,118	62,596	63,397
Total water (3)	**444,551**	**420,375**	**417,839**	**414,159**	**419,934**

See the section 'Consumption of fuel, electricity, water, paper and toner' in the Methodological Notes.
(1) Excludes the Roma Sede and Rome CDM branches; includes the consumption of the three representative offices abroad and the office at the House of the Euro. – (2) Includes the consumption of cooling water for installations and of water for irrigating green areas. – (3) Any mismatches are due to the rounding of decimals.

Table a10

Office paper purchases
(tonnes)

	2019	2020	2021	2022	2023
White paper with EU Ecolabel certification	69.2	29.1	23.1	26.4	31.3
Recycled paper with EU Ecolabel certification	83.4	44.0	39.5	19.3	22.6
Total	**152.6**	**73.1**	**62.6**	**45.7**	**53.9**
Recycled paper as a percentage of total purchases	55	60	63	42	42

See the section 'Consumption of fuel, electricity, water, paper and toner' in the Methodological Notes.

Table a11

Use of paper for publications
(tonnes)

	2019	2020	2021	2022	2023
White paper with EU Ecolabel, FSC, PEFC certifications	0.8	59.3	67.9	61.6	45.1
White paper	121.3	27.5	22.9	34.3	8.2
Paper used for outsourced publication printing services	–	–	–	–	11.5
Total	**122.1**	**86.8**	**90.8**	**95.9**	**64.8**

See the section 'Consumption of fuel, electricity, water, paper and toner' in the Methodological Notes.

Table a12

Toner cartridges
(units and kilogrammes)

	2019	2020	2021	2022	2023 (1)
Total toner cartridges per office (units)	5,387	3,278	1,103	869	889
Total toner used to print publications (kg)	4,389	2,982	3,568	3,578	1,742

See the section 'Consumption of fuel, electricity, water, paper and toner' in the Methodological Notes.
(1) The figure for 2023 is not fully comparable with previous years due to the partial outsourcing for printing publications.

Table a13

Waste generation (1)
(kilogrammes)

	2019	2020	2021	2022	2023
Archival document waste	32,410	8,350	14,200	93,000	33,230
Decommissioned furniture (2)	36,540	23,550	36,240	32,250	47,280
Paper and cardboard packaging (2)	49,990	49,490	15,110	20,870	53,790
Waste from publication printing processes	3,770	5,080	2,970	3,277	1,801

(1) Excludes waste linked to the life cycle of banknotes. – (2) Only includes waste generated in the Rome and Frascati buildings.

Table a14

Banknotes
(units)

	2019	2020	2021	2022	2023
Euro banknotes produced (millions of notes)	791	692	663	807	925
Paper and ink purchased for the production of banknotes (kg)	813,524	894,370	763,888	1,292,427	919,041
Transportation of paper and ink for the production of banknotes (km travelled)	131,417	67,666	108,224	57,643	53,282
Waste from the banknote production process (kg)	542,763	641,174	418,200	424,945	581,725
Transportation of banknotes to and between the branches of the Bank of Italy (litres of diesel oil)	133,904	151,162	147,485	132,793	145,915
Transportation of banknotes to and from other central banks (no. of flights)	24	32	21	14	13
Waste consisting of shredded worn banknotes (kg)	851,596	572,745	597,382	637,930	704,661

See the sub-section 'Indirect GHG emissions relating to the life cycle of banknotes' in the section 'GHG emissions' in the Methodological Notes.

Table a15

Business travel
(thousands of kilometres and units)

VOCI	2019	2020	2021	2022	2023
By air	19,111	3,019	1,287	5,013	7,427
By train	8,900	1,565	2,254	4,995	5,060
By ship	….	….	….	5	3
By corporate shuttle bus	284	214	294	386	366
By chauffeured car	254	35	10	46	87
By taxi	….	….	….	58	81
By private car	1,225	659	694	825	793
Total business travel	**29,774**	**5,492**	**4,539**	**11,328**	**13,817**
Overnight stays (1)	49,532	8,468	15,852	28,924	26,692
of which: in Italy	41,419	7,375	15,582	26,715	23,231

(1) Overnight stays from 2019 to 2022 were recalculated using a different methodology.

Table a16

Land use
(square metres)

	2023
Total sealed area	360,307
Total nature-oriented area	226,194
Total land use	586,501

See the section 'Land use' in the Methodological Notes.

Table a17

Sustainable investment (1)
(environmental footprint indicators)

	2019	2020	2021	2022	2023
Euro-denominated equity portfolio					
Weighted average carbon intensity (2)	237.6	237.5	162.9	103.5	99.3
Weighted average energy intensity (3)	0.56	0.44	0.39	0.36	0.50
Euro-denominated corporate bond portfolio					
Weighted average carbon intensity (2)	148.8	133.5	111.3	76.8	68.3
Weighted average energy intensity (3)	0.38	0.48	0.39	0.31	0.22
Euro-denominated government bond portfolio					
Weighted average carbon intensity (4)	176.0	168.3	174.1	140.3	140.4
Weighted average energy intensity (5)	0.73	0.72	0.72	0.72	0.72

Sources: Based on ISS data for weighted average carbon intensity and on LSEG data for weighted average energy intensity. See 'Environmental indicators for investments' in the Methodological Notes.
(1) The weighted average carbon intensity values reported are not directly comparable with those indicated in the 2023 Environment Report, as it was agreed in the Eurosystem to use a different data update criterion. – (2) Tonnes of CO_2 equivalent emissions per million euros of sales. – (3) Megawatt-hours of energy per million euros of sales. – (4) Tonnes of CO_2 equivalent emissions per million euros of gross domestic product at purchasing power parity (GDP PPP). – (5) Kilowatt-hours of energy per dollar of GDP PPP.

Table a18

Assessment of uncertainty in the calculation of GHG emissions

	Uncertainty in activity data	Uncertainty in emission factors	Compound uncertainty
Direct emissions: Scope 1			
Petrol for transport (car fleet)	low	very low	low
Diesel fuel for transport (car fleet)	low	very low	low
Gas oil for generators	low	very low	low
Heating oil	low	very low	low
Methane gas for heating	very low	very low	very low
Leakages of fluorinated greenhouse gases	low	very low	low
Indirect emissions: Scope 2			
Electricity (location-based)	very low	very low	very low
District heating	very low	very low	very low
Centralized heating	high	very low	high
Indirect emissions: Scope 3			
Business travel			
By air (with RFI)	very low	medium	medium
By train	very low	medium	medium
By ship	very low	very low	very low
By private car	very low	very low	very low
By taxi	very low	very low	very low
By chauffeured car	medium	very low	medium
By corporate shuttle bus	very low	very low	very low
Overnight stays in hotels for business trips	very low	very low	very low
Bank staff commuting	very low	medium	medium
Remote working by Bank staff	high	very low	high
External staff commuting	medium	high	high
Energy-related activities			
Petrol for transport	low	very low	low

continues

continues: Table a18

Assessment of uncertainty in the calculation of GHG emissions

	Uncertainty in activity data	Uncertainty in emission factors	Compound uncertainty
Diesel fuel for transport	low	very low	low
Gas oil for generators	low	very low	low
Heating oil	low	very low	low
Methane gas for heating	very low	very low	very low
Electricity (purchased)	very low	very low	very low
Electricity (self-produced)	low	very low	low
Water	low	very low	low
Paper for publications	low	very low	low
Office paper			
Purchases	low	very low	low
Other paper waste	low	medium	medium
Toner cartridges			
Consumption	medium	very low	medium
Waste	low	medium	medium
Furniture			
Purchases	low	medium	medium
Waste	medium	very low	medium
IT equipment	low	very low	low
Canteen services	very low	medium	medium
Transportation of paper and ink for the production of banknotes	low	medium	medium
Paper and ink for the production of banknotes	low	low	low
Waste from the banknote production process	low	very low	low
Transportation of banknotes			
By air (with RFI)	low	low	low
By land	low	very low	low
Waste consisting of shredded worn banknotes	low	very low	low

See 'Assessment of uncertainty in the calculation of GHG emissions' in the Methodological Notes.

methodological notes

This section contains methodological information such as: the details of the extent of the buildings and the activities to which the indicators and information contained in the Environment Report refer (organizational boundaries); the standards and guidelines used; and the information sources from which the factors used for calculating environmental indicators are taken.

Details are also given on how these indicators are calculated, divided into headings and sub-items:

- consumption of fuel, electricity, water, paper and toners;
- GHG emissions;
- emissions of other pollutants;
- land use;
- waste generation;
- environmental indicators for investments.

The section concludes with: the percentage change in the emission factors; the methodology for assessing the uncertainty of GHG emission data; and a table to compare the information required by the Global Reporting Initiative (GRI) reporting standard with the sections of the Environment Report in which this information is reported.

Organizational boundaries and reference period

The data in this edition of the Environment Report refer to organizational boundaries consisting of:

- Bank staff, with the exception of staff seconded to external institutions;
- the buildings in Rome and Frascati (including the Carlo Azeglio Ciampi Centre for Monetary and Financial Education, the Salone Margherita theatre, archives, and warehouses not staffed by Bank employees and authorized garages), the building that houses the Milano Hub innovation centre, branches operating in Italy, including the Sadiba Training Centre in Perugia, closed branches, the representative offices in London, New York and Tokyo, and the office at the House of the Euro in Brussels.

The figures with the words "Bank of Italy" in the title illustrate the data relating to the boundaries outlined; in the others, the reference building or activity is specified.

As regards the calculation of environmental indicators per employee (e.g. water consumption per employee), the presence of staff belonging to external firms and of Carabinieri police officers was not taken into account, even if their respective activities were carried out continuously within the buildings.

The data in this edition of the Environment Report are updated as of 31 December 2023. The baseline year chosen for calculating changes in the key environmental indicators is 2019, the last year before the pandemic.

The percentages reported in the text and infographics were calculated from unrounded data.

Reference standards and guidelines

The Report's contents and quantitative indicators were prepared using the following methodologies:

- Global Reporting Initiative (GRI) Standards, GRI 2016;
- European Sustainability Reporting Standards (ESRS), EFRAG, 2023;
- Linee guida sull'applicazione in banca degli standard GRI in materia ambientale, ABI Lab, 2022 (Linee guida ABI Lab).

With specific regard to the calculation of GHG emissions, reference was also made to the following methodologies:

- A Corporate Accounting and Reporting Standard and Corporate Value Chain (Scope 3) Standard, Greenhouse Gas (GHG) Protocol;
- UNI EN ISO 14064-1:2019 Greenhouse gases – Part 1, 2019 (ISO 14064) and UNI ISO/TR 14069:2017 Greenhouse gases – Quantification and reporting of greenhouse gas emissions for organizations – Guidance for the application of ISO 14064-1, 2017.

Information sources

Information sources available up to 31 December 2023 were used for the calculation of environmental indicators and GHG emissions, unless otherwise specified.

For the calculation of GHG emissions, the publications and databases of the Institute for Environmental Protection and Research (Ispra) were used, including:

- the Italian Greenhouse Gas Inventory report 1990-2021. National Inventory Report 2023 (NIR 2023), particularly Annex 6, National Emission Factors;
- the Common Reporting Format 2023 (CRF 2023), published together with the NIR 2023, particularly Table1.A(a)s4;
- the emission factors database.

Since there are no nationally determined emission factors, the following international databases were used for the calculation of GHG emissions:

- the Climate change 2021 report: the physical science basis, Working Group I contribution to the Sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC);
- the emission factors database of the Department for environment, food and rural affairs (Defra) of the British Government;
- the emission factors database of the French Government's Environmental Transition Agency (Agence de l''environnement et de la maîtrise de l''énergie, Ademe).

For the calculation of GHG emissions of business travel, the following were used:

- the International Civil Aviation Organization (ICAO) calculator for emission factors, the length of the routes flown and the weight of fuel used for each flight;
- the Ecopassenger calculator developed by the International Railways Union (UIC) in agreement with the Sustainable Development Foundation, the Institut für Energie und Umweltforschung Heidelberg (IFEU), the Hacon Ingenieurgesellschaft mbH and the EcoTransIT World calculator developed by the Smart Freight Centre in agreement with the Global Logistics Emissions Council, for the emission factors and the length of train routes respectively.

For the calculation of the emissions relating to the provision of canteen services, the emission factors database of the French Agribalyse programme on ready-to-eat food products was used.

Consumption of fuel, electricity, water, paper and toner

Fuel consumption. – The consumption of fuels (methane gas, diesel and petrol) for heating purposes and other uses (e.g. transport, generators) was obtained from the direct reading of meters or from the corresponding bills and invoices. In the case of methane gas, the metered consumption values were multiplied by the respective conversion factors in order to determine the consumption, expressed in standard cubic metres (Sm^3).

Estimates were used for the three representative offices abroad, for the office at the House of the Euro and for rented buildings, as no methane gas consumption data are available. The consumption of the three representative offices abroad was obtained by multiplying the average methane gas consumption of the branches opened in the reference year (expressed in Sm^3/m^3 of heated volume) by the volume (in m^3) of each office (this volume was estimated by multiplying the net surface area of each office by an average height of 3 metres). The consumption of rented buildings and of our House of the Euro office was obtained by multiplying the consumption in the reference year (expressed in Sm^3/m^3 heated volume) of the most similar building – in terms of installation characteristics and building envelope – by the volume of the rented building.

For 2023, the energy (expressed in gigajoules, GJ) associated with the consumption of gas oil, natural gas and petrol was calculated using the conversion factors shown in Table A. The 277.778 GJ/kWh factor, published by the IPCC, was used for the conversion from gigajoules to kilowatt-hours.

Table A

Conversion factors by fuel type
(GJ per litre of fuel and GJ per Sm^3 of methane gas)

FUEL	GJ produced per unit of fuel
Gas oil for generators	0.0360108 GJ/l
Natural gas for heating	0.034288 GJ/Sm^3
Heating oil	0.0360108 GJ/l
Diesel fuel for transport	0.0359940 GJ/l
Petrol for transport	0.0319162 GJ/l

Source: Our calculations based on 2023 NIR and 2023 CRF data. Conversion factors based on those reported in the respective updates of the NIR and the CRF were used for the calculation of the emissions for the years prior to 2023. For further details, see ABI Lab, 'Linee guida sull'applicazione in banca degli Standard GRI in materia ambientale' (only in Italian).

Electricity consumption. – Electricity consumption was obtained directly from the distributor and was checked using readings from meters located in the various buildings. Data are available for all buildings within the organizational boundaries except for the three representative offices abroad and the office at the House of the Euro: for these, the electricity consumption was estimated by multiplying the average figure for the branches opened in the year in question (expressed in kWh/m^3) by the volume of each office.

For the breakdown between renewable and non-renewable energy, the energy consumption of the representative offices and the office at the House of the Euro was assumed to come from renewable sources.

Water consumption. – Water consumption was obtained by direct readings from the meters and checked against the bills. In order to estimate the water consumption of the three representative offices abroad, the House of the Euro office and the rented buildings, the average value for all the Bank's

buildings in the year in question (expressed in m^3/employee) was multiplied by the number of staff employed by each office or working in the rented building.

Paper and toner consumption. –Figures for the actual consumption of office paper and toner are not available, so data on purchases were used. Actual paper and toner consumption was reported for the printing of institutional publications.

GHG emissions

International standards ISO 14064 and the GHG Protocol classify GHG emissions into the following categories:

a) direct emissions (Scope 1);
b) indirect emissions from imported energy (Scope 2);
c) other indirect emissions (Scope 3), which are in turn subdivided into:
   – from transportation;
   – from products used by the organization;
   – associated with the use of products from the organization;
   – from other sources.

The following calculation methodologies were used:

Direct emissions (from fixed and mobile combustion and leakage of fluorinated greenhouse gases)

Fossil fuels. – The consumption of gas oil, natural gas and petrol results in emissions of carbon dioxide (CO_2), methane (CH_4) and dinitrogen monoxide (N_2O): the 2023 GHG emissions were calculated using the factors shown in Table B.

Table B

Emission factors by fuel type
(grammes of greenhouse gases emitted per litre of fuel and per Sm³ of methane gas)

FUEL	Emissions of carbon dioxide	Emissions of methane	Emissions of dinitrogen monoxide
Gas oil for generators	2,661.96 gCO_2/l	0.252084 gCH_4/l	0.072013 gN_2O/l
Natural gas for heating	2,006.0 gCO_2/Smc	0.08572 gCH_4/Smc	0.03429 gN_2O/Smc
Heating oil	2,661.96 gCO_2/l	0.252084 gCH_4/l	0.072013 gN_2O/l
Diesel fuel for transport	2,646.0 gCO_2/l	0.003269 gCH_4/l	0.0983 gN_2O/l
Petrol for transport	2,332.48 gCO_2/l	0.305324 gCH_4/l	0.02605 gN_2O/l

Source: Our calculations based on 2023 NIR and 2023 CRF data. Conversion factors based on those reported in the respective updates of NIR and CRF were used for the calculation of the emissions for the years prior to 2023. For further details, see ABI Lab, 'Linee guida sull'applicazione in banca degli Standard GRI in materia ambientale' (only in Italian).

The GHG emissions associated with the use of each fossil fuel, expressed in tonnes of carbon dioxide equivalent (tCO_2e), were derived from the sum of the emissions of carbon dioxide, methane and dinitrogen monoxide, expressed in tonnes and multiplied by their respective global warming potential (GWP)[1], using the formula: $tCO_2e = tCO_2 + 27.9\ tCH_4 + 273\ tN_2O$.

Fluorinated greenhouse gases. – Direct emissions relating to fluorinated GHG leakages from air conditioning and heat pumps were calculated using the GWPs published in the "Climate change 2021: the physical science basis" report. The calculation of emissions in terms of tCO_2e is performed by multiplying the mass in tonnes of each refrigerant gas by its GWP (Table C).

1 For more details, see 'Climate change 2021: the physical science basis'.

Table C

GWP of fluorinated greenhouse gases that recorded leakages

FLUORINATED GAS	GWP at 100 years
R32	771.0
R134A	1,530.0
R227EA	3,220.0
R407C	1,907.9
R410A	2,255.5
R434A	3,654.4

Source: 'Climate change 2021: the physical science basis', IPCC Sixth Assessment Report.

Indirect GHG emissions from imported energy

Electricity. – Two different values are provided for calculating indirect emissions relating to electricity consumption, calculated according to the market-based and location-based methodologies respectively.

The market-based methodology requires emissions to be calculated using factors relating to the sources from which the energy purchased comes, in line with the conditions of the supply contract. The Bank of Italy has been purchasing electricity exclusively from renewable sources since 2013 and consequently, according to the criteria of this methodology, the emissions relating to the electricity purchased are zero.

According to the location-based methodology, GHG emissions are calculated by applying the national grid-average emission factors, based on the average consumption mix of the Italian grid, from which electricity is consumed (the fuel mix or energy mix). Table D shows the factors used to calculate the emissions of carbon dioxide, methane and dinitrogen monoxide in relation to the purchase of electricity for 2023.[2]

2 These factors were calculated on the basis of those reported in the NIR 2023 and the 2023 CRF (see ABI Lab Guidelines for further details). Conversion factors based on those reported in the respective updates of the NIR and the CRF were used for calculating the emissions for the years prior to 2023.

Table D

Emission factors for electricity
(grammes of greenhouse gases emitted per kWh of electricity purchased)

	Emissions of carbon dioxide	Emissions of methane	Emissions of dinitrogen monoxide
Electricity	268 gCO_2/kWh	0.0167 gCH_4/kWh	0.0027 gN_2O/kWh

Source: Our calculations based on 2023 NIR and 2023 CRF data. Conversion factors based on those reported in the respective updates of the NIR and the CRF were used for calculating the emissions for the years prior to 2023. For further details, see ABI Lab, 'Linee guida sull'applicazione in banca degli Standard GRI in materia ambientale' (only in Italian).

The GHG emissions associated with the use of electricity, expressed in tCO_2e, were obtained from the sum of the emissions of carbon dioxide, methane and dinitrogen monoxide, expressed in tonnes and multiplied by the respective GWP, using the formula: $tCO_2e = tCO_2 + 27.9\ tCH_4 + 273\ tN2O$.

District heating. – District heating uses heat (transported from a fluid such as water) from a production plant (e.g. cogeneration or waste-to-energy plants). In accordance with the ABI Lab Guidelines, indirect GHG emissions from heat purchased through district heating were calculated using the coefficient provided by Ispra, which was 209.50 gCO_2/kWh.[3]

Indirect transport-related GHG emissions

Business travel by air. – Indirect GHG emissions from air travel were estimated using the ICAO online calculator, which provides the kilometres and emissions for each air journey, calculated on the basis of: (a) the aircraft used to travel on individual routes; (b) the routes followed; and (c) passenger load factors.

3 See the Ispra Emission factors database, 'Serie storiche emissioni, Fattori di emissione per la produzione ed il consumo di energia elettrica in Italia'.

In line with the information provided by Ademe, for each route, the carbon dioxide equivalent value obtained by the calculator was then multiplied by a radiative forcing index (RFI) of 2.[4]

Business travel by train. – Indirect GHG emissions from train journeys are estimated using the Ecopassenger online calculator. The mileages for the journeys were taken from the EcoTransIT World online calculator.

Business travel by ship. – Indirect GHG emissions from ship travel have been included in the calculation of the Bank's carbon footprint since 2022. These emissions have been calculated by multiplying the kilometres travelled by employees by the factor provided by Defra of 112.70gCO_2e/km.

Business travel by car. – Indirect GHG emissions from the use of private cars for business trips were calculated by multiplying the kilometres travelled by employees by the average factor provided by Ispra of 166.96 gCO_2/km.[5]

Business travel by taxi. – Indirect GHG emissions from the use of taxis have been included in the calculation of the Bank's carbon footprint since 2022. These emissions have been calculated by multiplying the actual kilometres by the average factor used for car business travel provided by Ispra.

4 Radiative forcing is the metric used by the IPCC to assess the human-induced imbalance in the Earth's climate system. In the case of airplanes, the emissions they generate may change the composition of the atmosphere – both in terms of gas input and aerosol formation – and, consequently, the climate. Aircraft impacts also occur in the upper layer of the troposphere and can lead to climate changes of a different nature than those created by carbon dioxide. Given the difficulty of accurately assessing the overall climate impact of air travel, Ademe proposes the use of an RFI, i.e. a multiplication factor for emissions. In line with these indications, an RFI of 2 was chosen: for each kilogramme of carbon dioxide equivalent emitted for the combustion of the fuel, one additional kilogramme is then added for other aviation-related effects.

5 See the Ispra Emission factors database, 'Serie storiche emissioni, Banca dati dei fattori di emissione medi del trasporto stradale in Italia, auto private' (Passenger cars).

Business travel by chauffeured cars. – Emissions from the use of chauffeured car services were calculated by multiplying the number of routes by the length of a hypothetical average route (assumed to be 30 km) and by the abovementioned Ispra factor.

Corporate shuttle buses. – This system of collective transport links the various buildings of the Bank located in Rome and Frascati with the main public transport hubs on working days. The number of trips made and the kilometres for each run are multiplied by the average factor supplied by Ispra of 632.99 gCO_2/km.[6] Emissions from corporate shuttle buses are then included in the indirect emissions relating to business trips.

Nights spent in hotels for business trips. – Indirect GHG emissions from overnight stays are calculated by multiplying the number of nights by the emission factor provided by Defra for the city or country in which the hotel facility is located. For countries for which Defra does not provide an emission factor, average emission factors for the geographical reference area were used.

Commuting to work by employees and external collaborators. – Indirect GHG emissions linked to staff commuting were calculated based on data collected through a questionnaire circulated to all employees in June 2023 to assess the environmental impact of hybrid working. Specifically, for emissions from private cars and motorcycles used by employees, the COPERT software tables were used, the development of which is coordinated by the European Environment Agency. Vehicle type, fuel type, engine capacity and emission standard were taken into account in the calculation of emissions. For public transport (trains, urban buses, extra-urban buses, metro, trams, ferries, electric bicycles, electric scooters), emissions were estimated using factors provided by Defra. The emission factors were multiplied by the number of kilometres travelled by each respondent with the different means of transport to calculate the average daily emissions. These emissions were then weighted by the number of days worked on site by each respondent.
The check on how the sample fits to the survey population revealed significant differences in two key variables, which were then post-stratified: 1) the place of work, divided into the Rome area and the branches; 2) the hybrid work model (fully remote, occasionally remote, sporadically remote, standard arrangement, extended arrangement). The results were aggregated by place of work and hybrid work model in order to derive specific emission factors for each statistical subgroup resulting from the combination of the two variables. The recalibration based on the composition of the survey population resulted in an estimated emission factor for 2023 of 4.112 $kgCO_2e$ per day worked on site by each employee.
The factors used for the years 2019 to 2022 were calculated on the basis of the data collected in the previous survey in 2020, i.e:
– 4.837 $kgCO_2e$ before the pandemic, i.e. from 2019 through February 2020;
– 6.103 $kgCO_2e$ during the pandemic, i.e. from March 2020 to December 2021 (the higher emission factor during this period is due to the increased use of private transport during the health emergency);

6 See the Ispra Emission factors database, 'Serie storiche emissioni, Banca dati dei fattori di emissione medi del trasporto stradale in Italia, autobus a diesel' (Buses diesel coaches standard <=18 t Euro VI).

– 4.837 $kgCO_2e$ for 2022, assuming that the means of transport used for commuting were exactly the same as before the pandemic.

Emissions due to staff commuting to work were calculated by multiplying these factors by the number of days worked on site.

An estimate of the emissions from commuting to work by external staff who regularly access company facilities (employees of external firms, guests, Carabinieri police officers and security staff) was obtained by multiplying the access data for these workers by the same emission factors used for internal staff commuting: external employees were therefore assumed to make the same home-work journey and to use the same means of transportation or combination thereof as internal staff do.

Remote working. – From an environmental perspective, remote working implies:

(a) a reduction in commuting and in the associated emissions (see the sub-item 'Commuting to work by employees and external collaborators');

(b) an increase in household consumption.

In terms of electricity consumption, the emissions associated with employees working remotely were first estimated by looking at the consumption of laptops and lighting. The electricity consumption of a remote working day was calculated as the sum of:

a) the consumption of a Lenovo ThinkPad T490,[7] calculated by multiplying its energy absorption of 24.1 W by 8 hours of operation;

b) the consumption of one or more compact fluorescent lamps, with a total absorption of 30 W, for 4 hours per day of operation.

The energy consumption thus determined, at 0.3128 kWh per day, was multiplied by the total number of days worked remotely in one year. The resulting value was then multiplied by the emission factors of the national energy mix (for 2023, see Table D) in order to obtain the corresponding GHG emissions. Emissions from the use of laptops and lighting in 2023 were 0.084 $kgCO_2e$ for each day worked remotely by one employee.

Emissions from cooling and heating were calculated based on the analysis of the responses on consumption habits in the places where employees telework, as recorded in the questionnaire for assessing the environmental impact of hybrid working circulated to all employees in June 2023. About 50 per cent of the respondents reported consuming more energy for heating and cooling purposes on remote working days than they would have on on-site working days. The Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) has developed a model to estimate the emissions associated with this excess consumption, depending on the different climate zones from B to E in which the respondents' homes are located and assuming an average net area of 100 square metres. The factors obtained from this model were multiplied by the number of Bank employees working in each climate zone; the results were aggregated by taking into account the responses on energy efficiency measures carried out in remote workplaces. The calculation resulted in an estimated emission factor for domestic excess consumption for heating and cooling of 1.015 $kgCO_2e$ for each day worked remotely by one employee.

7 These consumptions are described in the manufacturer's technical sheets as Category 1: functional adder allowances (kWh) field details, according to the Energy Star specification.

Indirect GHG emissions from products used by the organization

Emissions from energy-related activities. – This category includes emissions during all the phases that take place before fuel combustion or energy consumption, such as extraction, transport, and construction of production and distribution infrastructure.

In the case of fuels, indirect emissions were estimated using the factors in Table E, provided by Defra.

Table E

Indirect emission factors relating to fuel consumption
(grammes of carbon dioxide equivalent per litre and Sm³ of methane gas)

ORIGIN	Emissions
Petrol	606.64 gCO_2e/l
Gas oil	624.09 gCO_2e/l
Methane gas	336.60 gCO_2e/Smc

Source: Defra.

As regards electricity, the Bank of Italy has purchased energy exclusively from certified renewable sources since 2013. The Guarantee of Origin (GO) certificates make it possible to derive for each year the composition of the sources of the renewable energy purchased.

Indirect emissions relating to the purchase of renewable electricity were then calculated using the factors in Table F, provided by Ademe.[8]

8 Ademe, Consulter les données, 2. Emissions indirectes associées à l'énergie, Energie, Electricité, Moyen de production, Renouvelables.

Table F

Indirect emission factors relating to the renewable energy purchased by the Bank in 2023
(grammes of carbon dioxide equivalent per kWh of electricity)

ORIGIN	Emissions
Hydropower	6.0
Wind	15.6
Solar	43.9

Source: Ademe.

For district heating energy, indirect emissions were estimated using the factor provided by Defra of 11.2 gCO_2e/kWh.

Indirect emissions from water consumption. – The estimate of indirect emissions from water consumption was made, for both drinking and non-drinking water, by using the factor provided by Defra of 378 gCO_2e/m^3, which also takes into account the final treatment and purification phase.

Indirect emissions from purchases of office paper and paper for publications. – The data on kilogrammes of paper purchased were multiplied by the factors provided by Defra, i.e. 910 gCO_2e/kg for white paper and 730 gCO_2e/kg for recycled paper; an additive factor of 21.3 gCO_2e/kg was added to these factors, which also takes emissions at the final recycling stage into account. These emissions also include those relating to the recycling of archival paper waste (the figure was obtained by multiplying the kilogrammes of archive waste by the Defra factor of 21.3 gCO_2e/kg).

Indirect emissions from toner consumption. – Emissions relating to toner consumption were estimated using a factor of 2.990 gCO_2e per page in A4 equivalent format: the highest factor included in Ademe's Guide Sectoriel 2012 was chosen cautiously,[9] and increased by 30 per cent, in line with the same study, to take into account the fact that the toner cartridges consumed by the Bank are new and not refurbished. The emissions are therefore calculated by estimating the amount of A4 equivalent sheets of paper that can be printed based on the number of toner cartridges purchased (see the item 'Consumption of fuel, electricity, water, paper and toner'). These emissions also include those relating to waste generated in the printing process for the Bank's publications, mostly consisting of empty toner cartridges containing no hazardous substances (the figure was obtained by multiplying the kilogrammes of empty toner cartridges by the Defra factor for the recovery of mixed waste, i.e. 21.3 gCO_2e/kg).

Indirect emissions relating to outsourced publication printing services – The printing of publications has been partly outsourced since 2023. The emissions associated with these services were estimated using a monetary emission factor provided by Ademe, equal to 170 gCO_2e per euro spent, excluding VAT.[10]

Indirect emissions from the use of furniture. – Emissions from the purchase of office furniture were estimated using a monetary emission factor provided by Ademe, equal to 600 gCO_2e per euro spent, excluding VAT.[11] In line with the GHG protocol, these emissions are fully counted against the year of purchase of the assets and no amortization is made. These emissions also include those relating to the disposal of furniture from the premises in Rome and Frascati (the figure was obtained by multiplying the number of discarded pieces of furniture by an average weight of 30 kg and then by the Defra factor, equal to 520 gCO_2e per kg of waste).

Indirect emissions from the purchase of IT equipment. – Indirect emissions associated with the purchase of laptops, monitors and printers were calculated using the data, expressed in terms of $kgCO_2e$ and relating to the entire life cycle, as shown on the manufacturer's technical sheets, reducing the emissions from the use phase as they have already been included in the Bank's energy consumption. Emissions relating to the purchase of videoconferencing equipment, for which life cycle emission information is not available, were estimated using the factor provided by Ademe for televisions larger than 49 inches.[12] For emissions relating to the purchase of servers, network equipment, data storage equipment and other network hardware, the data on the manufacturer's technical sheets were used where possible; if not available, a factor provided by another producer was used for similar generic equipment, subtracting the GHG emissions from the use phase. In line with the GHG protocol, the emissions calculated were fully counted against the year in which the assets were purchased.

Indirect emissions from the provision of canteen services. – In order to calculate the indirect emissions associated with the provision of canteen services, a

9 Ademe, Guide Sectoriel 2012, Tableau 28: Facteurs d'émissions cartouches et toners d'impression.
10 Ademe, Consulter les données, 4. Emissions indirectes associées aux produits achetés, Achats de services, Ratios monétaires, Service/Services (imprimerie, publicité, architecture et ingénierie, maintenance multi-technique des bâtiments, gardiennage, nettoyage, sécurité, agence de voyage, autres services aux entreprises).
11 Ademe, Consulter les données, 4. Emissions indirectes associées aux produits achetés, Achats de services, Ratios monétaires, Service/Services (imprimerie, publicité, architecture et ingénierie, maintenance multi-technique des bâtiments, gardiennage, nettoyage, sécurité, agence de voyage, autres services aux entreprises).

12 Ademe, Consulter les données, 4. Emissions indirectes associées aux produits achetés, Achats de matière et de biens, Machines et équipements, Autres,Télévision/49 pouces, Informations additionnelles, Ordinateurs et équipements périphériques, Télévision >49 pouces.

survey of the food consumed in six canteens in the Rome area in 2019 was carried out in collaboration with the Bank's current canteen service provider. Using the emission factors provided by the Agribalyse programme for agricultural and food products,[13] covering the whole life cycle, total emissions in carbon dioxide equivalent were calculated and then divided by the number of meals provided by those canteens in 2019 (excluding coffee bars): this calculation resulted in an emission value of 5.227 kgCO_2e per meal served.[14] This factor was then multiplied by the number of meals provided in 2019, 2020, 2021 and 2022 in the Bank's 17 internal canteens, six of which are in Rome, one in Frascati and ten at some of its branches.

Indirect GHG emissions relating to the life cycle of banknotes

Raw materials for banknote production. – Indirect GHG emissions for the raw materials purchased in 2023 for banknote production were estimated, as a rough approximation, using: (a) for paper, the Defra factor for non-recycled paper (910 gCO_2e/kg); and (b) for inks, the factor provided by Ademe for offset printing inks (1.870 gCO_2e/kg).[15]

Transportation of raw materials for banknote production. – For air transport, the ICAO calculator was used to determine the weight (in kilogrammes) of the fuel consumed to travel between the departure airport and the arrival airport (assuming, as a precautionary measure, that these raw materials are the only item being transported); GHG emissions were then obtained by multiplying this weight by the aviation spirit factor, provided by Defra, of 3,193.69 gCO_2e per kg of fuel and by a radiative force index of 2. For land-based transport, GHG emissions were obtained by multiplying the total kilometres travelled by the average emission factor supplied by Ispra, i.e. 453.0 gCO_2e/km.[16]

Transportation of banknotes. – For air transport, the ICAO calculator was used to determine the weight (in kilogrammes) of the fuel used to travel between the departure airport and the arrival airport (banknotes are always transported on flights dedicated exclusively to that purpose); GHG emissions were then obtained by multiplying this weight by the aviation spirit factor, provided by Defra of 3,193.69 gCO_2e per kg of fuel and by a radiative force index of 2 (see the item: Greenhouse gas emissions, sub-item: Indirect transport-related greenhouse gas emissions). For land transportation, GHG emissions were obtained by multiplying the total litres of diesel consumed by the average emission factor of 0.35994 GJ/l, provided by Ispra in the NIR 2023.

Waste from the banknote production process. – The different types of waste associated with the production process were considered to belong to the categories 'paper' or 'mixed'; the data on kilogrammes of waste were multiplied by the Defra emission factors for each type of waste and for each type of final treatment (disposal or recovery; see Table G).

13 Agribalyse, tableur pour les produits alimentaires, prêts à être consommés.
14 This factor includes a 30 per cent increase to account for uncertainty in the estimation.
15 Cfr. Ademe, Consulter les données, 4. Emissions indirectes associées aux produits achetés, Achats de matière et de biens, Autres produits manufacturés, Consommables de bureau, Encre couleur impression offset.
16 See the Ispra Emission factors database, 'Report e serie storiche, Banca dati dei fattori di emissione medi del trasporto stradale in Italia', Heavy Duty Trucks, Diesel, Rigid 7.5 - 12 t, Euro V, CO_2 2019 g/km totale.

Waste consisting of shredded worn banknotes. – Emissions were calculated by multiplying the total weight of waste consisting of the shredded worn banknotes (see the item: Generation of waste) sent for recovery and disposal by the respective Defra factors relating to the recovery and disposal of paper waste (Table G).

Table G

Indirect emission factors relating to waste disposal and recovery
(grammes of carbon dioxide equivalent per kg of treated waste)

TYPE OF WASTE	Final treatment	Emissions
Paper	recovery	21.3
Paper	disposal	1,164.4
Iron	recovery	21.3
Mixed	recovery	21.3
Mixed	disposal	520.3

Source: Defra.

Emissions from other pollutants

Consumption of gas oil, natural gas and petrol also results in emissions of nitrogen oxides (NO_X) and sulphur dioxide (SO_2). The emissions of these pollutants were calculated using the factors shown in Table H.[17]

17 These factors were calculated on the basis of those reported in the Ispra database, 'Report e serie storiche, Fattori di emissione dalla combustione in Italia anno 2020', table Non industrial, and 'Banca dati dei fattori di emissione medi del trasporto stradale in Italia', Passenger Cars, Petrol e Diesel, NO_x e SO_2, 2020 t/TJ totale.

Table H

Emission factors by fuel type
(grammes of NO_x and SO_2 per litre, per Sm^3 or per GJ fuel)

FUEL	Emissions of nitrogen oxides	Emissions of sulphur dioxide
Gas oil for generators	1.80012 gNO_x/l	1.68756 gSO_2/l
Natural gas for heating	0.966 gNO_x/Sm^3	0.01 gSO_2/Sm^3
Heating oil	1.80012 gNO_x/l	1.68756 gSO_2/l
Diesel fuel for transport	209.867 gNO_x/GJ	0.325 gSO_2/GJ
Petrol for transport	48.719 gNO_x/GJ	0.221 gSO_2/GJ

Source: Our calculations based on Ispra data.

Waste generation

This item only reports the data available for: (a) archive-related waste; (b) furniture, paper and cardboard packaging, and waste produced in printing the Bank's publications, for the buildings in Rome and Frascati only; and (c) waste relating to the banknote production process and waste consisting of shredded worn banknotes. The weight of the latter was estimated by multiplying the number of shredded worn banknotes by the average weight of a euro banknote (i.e. 0.88 g/banknote). For other types of waste, no detailed data were reported as they are not available.

Land use

Soil in its natural state provides several ecosystem services. Land use is defined as the increase in artificial land cover associated with human

settlements, mainly due to the construction of new buildings and to land conversion; the most common form of artificial cover is soil sealing. The data reported for 2023 are expressed in square metres of land use relating to the buildings to which the indicators and information in the Environment Report refer (organizational boundaries), with a distinction between the total sealed area and the total nature-oriented area, as suggested by DR E4-5 of the ESRS standards.

Environmental indicators for investments

The indicators used in the Environment Report to assess the environmental profiles of investments are Weighted Average Carbon Intensity (WACI) and Weighted Average Electricity Intensity.[18]

The WACI for each portfolio measures the exposure to issuers with high levels of GHG emissions. The indicator is calculated by weighting the carbon intensity of each issuer by its weight in the portfolio. For individual equity and bond issuers, the figure is calculated as the ratio of the sum of direct emissions (Scope 1) and indirect emissions from purchased energy (Scope 2) expressed in tCO_2e to the respective sales in millions of euros. For government bonds, carbon intensity is the ratio of the country's GHG emissions – expressed in tCO_2e – to GDP at purchasing power parity (PPP) in millions of euros.

Like the WACI, the weighted average energy intensity of each portfolio is calculated by weighting the energy intensity of each issuer by its weight in the portfolio. For equity and bond issuers, the energy intensity is the ratio of electricity consumption expressed in MWh to the respective sales in millions of euros. For government bonds, the energy intensity is defined as the ratio of the country's primary energy demand, expressed in kWh, to GDP at PPP in USD.

Update of emission factors

The factors for calculating GHG emissions are continuously updated. Table I shows the emission factors that have changed significantly (i.e. by more than 5 per cent) since 2022.

If this change exceeds 50 per cent, the time series for GHG emissions is reconstructed.

Table I

Percentage change in emission factors

EMISSION FACTOR	Scope	Source	Percentage change 2022-23
Water	Scope 3	DEFRA	-10.2%
Commuting (by employees and external collaborators)	Scope 3	Internal measurement	-15.0%
Paper waste disposal	Scope 3 (Table G)	DEFRA	11.8%
Mixed waste disposal	Scope 3 (Table G)	DEFRA	11.4%

Assessment of uncertainty in the calculation of GHG emissions

In line with the requirements of international methodologies, an assessment of the uncertainty in the calculation of GHG emissions was carried out: specifically, a semi-quantitative criterion was used to determine

18 For more details, see the Bank of Italy's 'Annual report on sustainable investments and climate-related risks for 2023'.

the uncertainty associated with the source of the activity data and with the emission factor (Table J). Based on this information, the compound uncertainty for each direct and indirect emission source is estimated.

Table J

Assessment of uncertainty in the calculation of GHG emissions

UNCERTAINTY	Uncertainty in activity data	Uncertainty in emission factors
High	The data are estimated (e.g. based on studies or comparable situations).	The emission factors are estimated as a rough approximation but are still very general.
Medium	Data are available but incomplete (e.g. not available for the entire assessment period) or only data on costs are available.	The emission factors are available but are either not very specific and robust or they are monetary factors, which estimate the carbon footprint based on the cost incurred.
Low	The data are complete and reliable, but may have some inaccuracies/ omissions which, however, do not have a significant impact on the results. Assumptions and estimates are kept to a minimum.	The emission factors are specific and robust, but may still have a degree of uncertainty. Some average factors from sources such as Ademe or Defra fall into this group.
Very low	The data are complete and reliable, and are obtained from measurements and meter readings. No assumptions or estimates are made.	All emission factors are specific and reliable and are taken from widely used databases such as Ademe or Defra.

Feedback table for the information required by the GRI standards

Table K shows the correspondence between the indicators required by the GRI reporting standards, the sections of the 2024 Environment Report and the statistical tables with the indicators.

Table K

Indicators required by the Global Reporting Initiative (GRI) reporting standard

GRI STANDARD	Definition of the standard	Section	Statistical tables
103-2	The management approach and its components	Introduction	a1; a2
301-1	Materials used by weight or volume	Water, banknotes	a10-a12; a14
301-2	Recycled input materials used	Paper	a10
302-1	Energy consumption within the organization	Energy	a4-a5; a7
302-3	Energy intensity	Energy	a4
302-4	Reduction of energy consumption	Energy	a4; a7
303-1	Interaction with water as a shared resource	Water	a8-a9
305-1	Direct GHG emissions (Scope 1)	At a glance	a2-a3; a6
305-2	Indirect GHG emissions from energy consumption (Scope 2)	At a glance	a2
305-3	Other indirect GHG emissions (Scope 3)	At a glance	a2
305-4	GHG emissions intensity	At a glance	a2
305-5	Reduction of GHG emissions	At a glance	a2
305-7	Nitrogen oxides (NO_x), sulphur oxides (SO_x) and other significant emissions	–	a6
306-3	Waste generated	Waste	a13-a14
308-1	New suppliers assessed using environmental criteria	Green procurement	–

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