D.T1.1.1 CARBON FOOTPRINT REPORT

Version n. 1

YEARS 2019-2022

Bari, Brindisi, Foggia, Taranto-Grottaglie Airport

01/2023

Aeroporti di Puglia S.p.A.

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INTRODUCTION

The Earth's climate has always been subject to fluctuations that are influenced by various factors such as the Earth's orbit, solar radiation, volcanic eruptions, etc.

Human activities have also contributed significantly to these changes in recent years due to emissions of fossil gases (GHGs) released into the atmosphere.

The latest IPCC report of 2021 (AR6) confirms that the Earth's climate is warming (the average temperature on the earth's surface has increased by about 0.6 °C in the last century) and that human influence on the climate system is evident. GHG emissions are leading to an increase in global average temperatures with effects on the climate (such as increased intensity of drought events, floods and severe storms). In fact, models predict that, if anthropogenic GHG emissions are not reduced, global warming could exceed 2°C by 2050 and could exceed 4°C by 2100, compared to the pre-industrial era.

In order to combat climate change, actions have been developed at global level; In 2012, the amendment to the Kyoto Protocol included new commitments and reporting obligations by 2020, followed by the 2015 Paris Agreement which included a global commitment to limit the temperature increase to 2°C with the ambition to limit the increase to 1.5°C. 160 countries have ratified the agreement that represents the strongest global consensus on the need for action to date.

The European Union, in particular, has completed in 2021 the procedure for adopting the act setting in legislation the objective of climate neutrality by 2050. European climate legislation sets a binding EU climate target for a reduction in net greenhouse gas emissions (emissions net of removals) of at least 55% by 2030 compared to 1990 levels.

The European Union has also adopted an ambitious package of measures to facilitate capital flows towards sustainable activities across the Union. By redirecting investor interest towards more sustainable technologies and businesses, the measures will be instrumental in making Europe climate neutral by 2050 and will make the EU a world leader in standard-setting sustainable finance. The package includes, inter alia, the Delegated Act on the climate aspects of the EU taxonomy, which aims to promote sustainable investment by better clarifying which economic activities contribute most to achieving the EU's environmental objectives.

In 2021, IPCC accounted for actual GHG emissions by sector, providing an overview of how human activities impact the environment:

- Fuel combustion: 75.7%
- Transport, including domestic aviation 25.8%
- Energy industries 24.1%
- Households, commerce, institutions and other 14.2%
- Production, industry and construction 11.6%
- Agriculture 10.3%
- Industrial processes 9.2%
- Waste management 3.1%

In this context, the aviation sector is responsible for 3-4% of global GHG emissions from energy consumption related to its activity.

The sector's emissions essentially consist of:

- Emissions resulting from airport activities (e.g. Energy to power infrastructure, manage, heat, cool buildings, etc.).
- Emissions from the use of fuel to power aircraft

Although emissions from the sector are not included in the 2015 Paris Agreement, the International Civil Aviation Organization (ICAO) has set itself the goal of reducing the impact of the sector by improving energy efficiency by 2% per year and stabilizing CO_2 emissions.

It also established a system of compensation for CO_2 for the fraction of emissions that would exceed the level reached in 2020 despite technical reduction measures taken at the same time.

Overall, all companies recognize that the climate crisis poses financial risk in both physical and transitional terms.

Transition risks will arise as the economy shifts towards low-carbon and more climate-resilient business models.

The European Commission's Guidelines on Climate Information Reporting identify the following types of transition risks for organisations with a negative impact on the climate:

- Political risks arising from exposure to various types of future regulations
- Legal risks, for example, from litigation or failure to adapt to climate change
- Technological risks, for example, if the technologies used by the company become obsolete compared to others with reduced climate impact
- Market risks from a shift in customer behaviour towards alternative suppliers offering low-carbon solutions
- Reputational risks, such as difficulty attracting and retaining customers, staff and investors.

In this context, the strong sensitivity on sustainability issues has led to the adhesion by Aeroporti di Puglia to the UN Global Compact and to report in its annual report also aspects that are not purely financial.

Aeroporti di Puglia believes that sustainability is an essential constraint for all business decisions, determining positive effects for the development of the territory where the company operates.

Modern companies, especially those that operate in the public sector or that are engaged in managing services and infrastructures in favour of a community, have the duty to face their risks and calibrate their management choices in the direction of extreme attention to socio-environmental profiles and transparency and correctness of government processes.

The following are the most important aspects addressed from 2019 by Aeroporti di Puglia in relation to the principles of the Global Compact with respect to environmental issues:

- supporting a preventive approach to environmental challenges
- take initiatives that promote greater environmental responsibility
- encourage the development and dissemination of environmentally friendly technologies

Aeroporti di Puglia believes that attention to the environment represents a message with a strong social value that the particular importance of the airport structure helps to spread to a wider "audience" and not limited to the local population.

This study was carried out using the methodology of the Airport Carbon Accreditation scheme (hereinafter ACA).

ACA is a program developed in Europe by the Airports Council International (ACI) Europe in 2009 that reached a global scale in 2014.

The aim of the programme is to encourage and facilitate the adoption of good carbon management practices by airports.

ACA accreditation provides an opportunity for airports to gain public recognition for their achievements, promotes energy efficiency improvements, encourages knowledge transfer, raises the profile and credibility of an airport, encourages standardisation and increases awareness of all stakeholders towards these issues.

ACA focuses on CO_2 emissions, as they account for the vast majority of airport GHG emissions. Independent third-party verification by an ACA-approved verifier is an essential component of the program.

Airports can participate in one of four levels of accreditation that progressively extend the boundaries and scope of the scheme and require increasingly stringent commitments to reduce emissions:

- Level 1. Mapping - Measurement of the airport's carbon footprint (scope 1 and 2)
- Level 2. Reduction - Managing emissions to achieve a specific reduction target
- Level 3. Optimisation - Involvement of other airport stakeholders in reducing emissions
- Level 4. Transformation - Transform the airport and stakeholder operations to achieve absolute reductions in line with the Paris Agreement.

In addition, airports at level 3 and 4 can choose to offset their residual emissions, reaching level 3+ (neutral) and 4+ (transition) respectively.

The following diagram summarizes the requirements set by ACA for the achievement of each level.

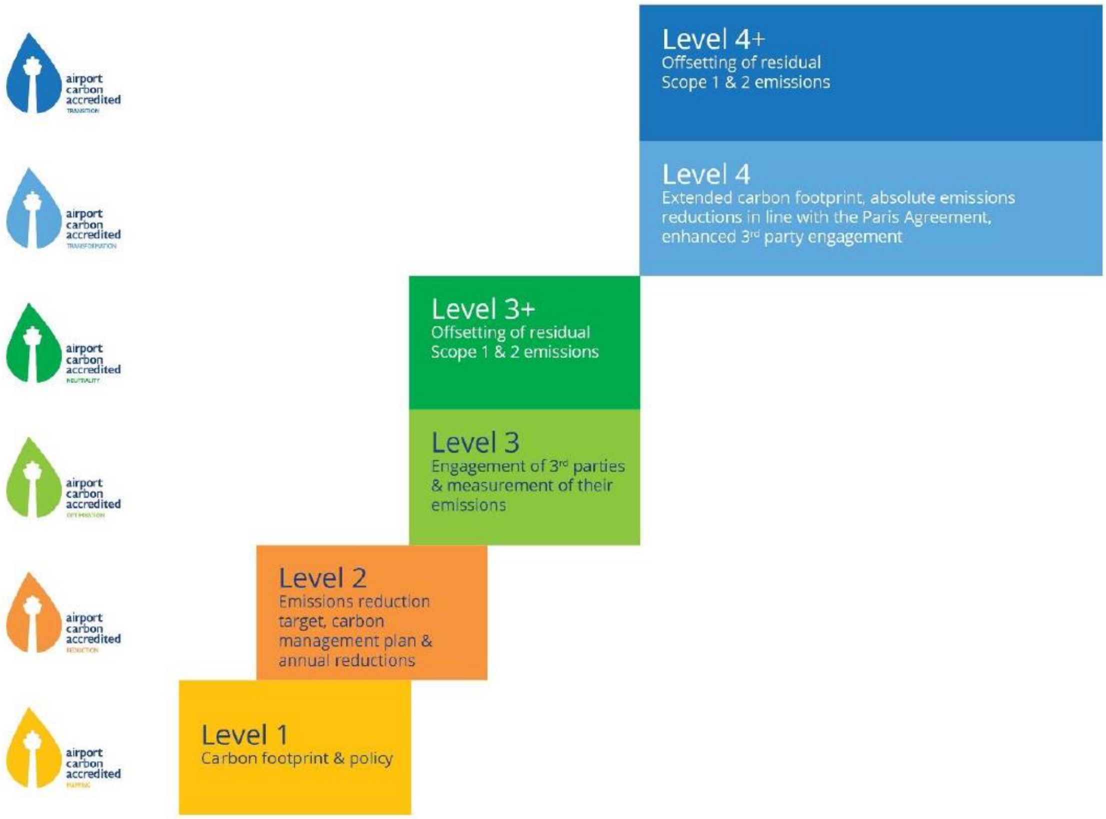

Figure 1 *Main requirements for each level of ACA accreditation*

ACA is also developed in line with the GHG Protocol and the principles of ISO 14064-1, as it defines the framework and management system to develop the carbon footprint and identify projects to reduce emissions.

Purpose and scope

The aim of this study is to develop a greenhouse gas inventory of airport activities with reference to the requirements of the ACA scheme - Level 2 Reduction.

Especially applies to the accounting of emissions of SCOPE 1 and SCOPE 2 associated with airport activities and services that are under the control of Aeroporti di Puglia.

The quantification of Scope 3 emissions is currently excluded as they are not required by the ACA Level 2 Reduction requirements.

The profile of the group

Aeroporti di Puglia S.p.A., a company owned for more than 99% by the Puglia Region, manages the airports of Bari, Brindisi, Foggia and Taranto-Grottaglie under concession, based on the Agreement signed with ENAC on 25.1.2002, expiring 11.2.2043.

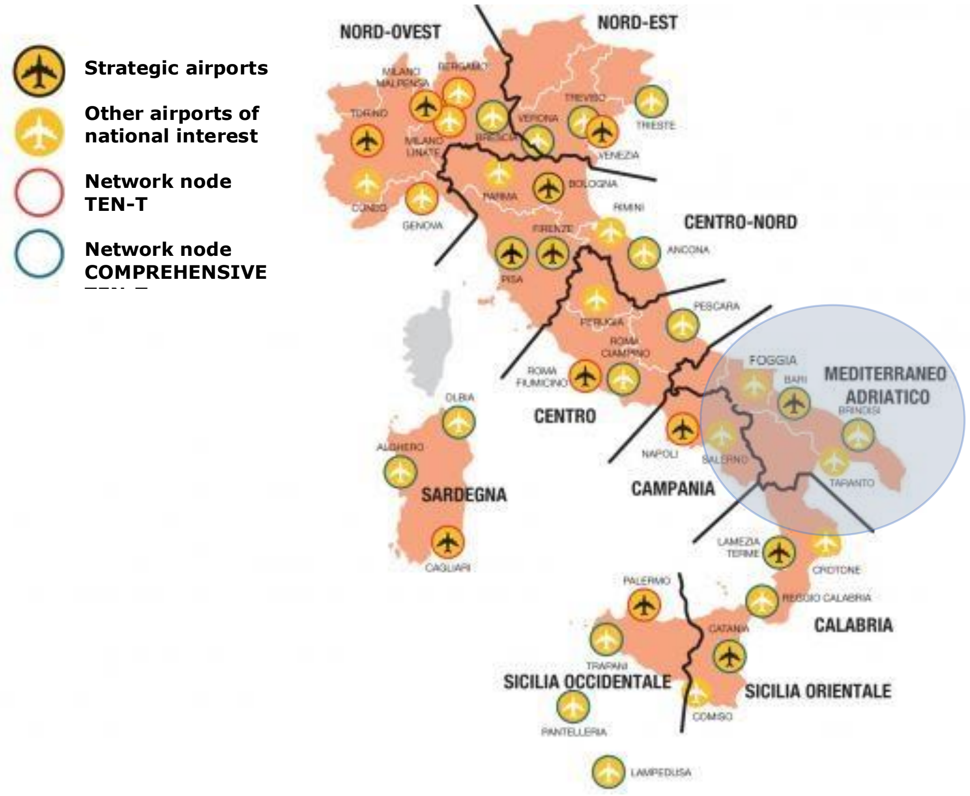

Figure 2 *Traffic basins and strategic airports of national interest (Presidential Decree no. 201/2015) – source ENAC, amended*

The company "Aeroporti di Puglia S.p.A.", established on 8 February 1984, is the concessionaire of the National Civil Aviation Authority until 11 February 2043 for the design, development, construction, adaptation, management, maintenance and use of airport facilities and infrastructures pertaining to state property of Apulian airports ("Karol Wojtyla" of Bari, "Aeroporto del Salento" of Brindisi, "Gino Lisa" of Foggia, "M. Arlotta" of Grottaglie), by virtue of the Convention of 25 January 2002, approved by Interministerial Decree of 6 March 2003.

The social activities also include the management of handling services, security control services relating to passengers, hand and hold baggage and other aviation and extra aviation services.

The four Apulian airports, managed in a coordinated manner, constitute the first and only Airport Network in Italy recognized by Interm Decree. N. 6/2018 pursuant to EU Directive 2009/12, guaranteeing the opportunity to develop an integrated development planning, due to functional specificities that can be attributed with a view to overall optimization of the system.

Below are the statistics taken from Assaeroporti (https://assaeroporti.com/dati-annuali/) relating to the consistency of traffic in the years from 2019 to 2022.

Table 1 *Traffic statistics 2019-2022 (source Assaeroporti)*

Airport	Traffic	2019	2020	2021	2022
Bari	Cargo	2,273	2,514	2,402	2,318
	Movements	45,885	21,519	32,934	53,677
	Passengers	5,545,588	1,703,130	3,289,239	6,405,845
Brindisi	Cargo	11	43	18	94
	Movements	21,913	11,493	16,789	27,030
	Passengers	2,697,749	1,016,571	1,853,449	3,231,936
Foggia	Cargo	-	-	-	-
	Movements	693	30	239	637
	Passengers	387	-	70	2,145
Taranto-Grottaglie	Cargo	7,588	5,006	1,494	757
	Movements	1,010	731	894	997
	Passengers	899	278	984	1,235

The above data make evident the abrupt reduction in traffic suffered by the entire airport system of Aeroporti di Puglia during the pandemic crisis of the year 2020; The year 2021 showed good signs of recovery in traffic that consolidated during 2022.

For the reasons set out above, and following the indications of the ACA Program, the emissions data for the year 2020 are reported in this report for comparison statistical purposes only and are not considered for the purpose of meeting the ACA Level 2 requirements.

Bari Airport

Bari International Airport is an essential element in the development process of an area that, in Southern Italy, is characterized by its economic dynamism.

The current passenger terminal is spread over an area of about 30,000 square meters distributed over five levels, built according to the most rigorous standards of safety and operational efficiency, which make it one of the most important structures on the Italian airport scene. Since February 2015 it has been operating the new east wing of the Bari passenger terminal. In the new wing, which covers about 13,000 square meters, there are 6 gates and additional commercial spaces.

Thanks to the expansion, the Bari passenger terminal can cope with an estimated traffic of about 8,000,000 passengers, of which 1,600 Pax/hour TPHP (Typical Peak Hours Passengers).

With the further infrastructural implementation, Bari Airport is confirmed as a key element of the regional airport network. Its inclusion in the National Plan of Airports as a strategic airport for the Mediterranean/Adriatic basin is an explicit recognition of the levels of excellence achieved by the structure in terms of infrastructure, quality of services, intermodality and network of connections.

Solutions have been adopted aimed at energy saving and environmental sustainability, aimed at the use of renewable sources as well as the reduction of energy losses and waste in the use of thermal and electrical energy.

These include the home automation control of the systems and the introduction of consumption verification systems through partial activation, in addition to the use of elements capable of guaranteeing low power absorption.

Double skin façade systems, eco-efficient electrical systems, photovoltaic panels integrated into the facades and on the roofs were also used.

Particular attention has also been paid to the aesthetic pleasantness of the spaces, with emblematic references to Puglia.

Figure 3 *Bari Airport Planimetry (© 2022, Google Earth)*

Brindisi Airport

At the service of a very large area, Brindisi Airport is the gateway to an area with a very strong tourist vocation.

In the articulated transport system of the region, the airport plays a fundamental role having two structures, port and airport, which in fact constitute a single reality.

An airport endowment of the highest level that allows Brindisi to reach levels of excellence in terms of intermodal integration of the transport system. An integrated metrobus connection between the airport and the railway network is at an advanced planning stage.

These enormous development potentials have been given adequate support with a plan of interventions that have re-evaluated the airport that today is among those of national interest provided for by the National Airport Plan. The new airport development plan includes new AVL facilities on the two runways and a new control tower.

Work is currently underway to expand the aircraft parking apron and boarding halls. For the latter, new areas are planned for about 1500 square meters, a further 3 gates located on the first floor of the current airport and 2 covers connecting with the parking lots at the arrivals and departures gates (land side area).

The main purpose of the interventions was to improve the service, operational and functional standards of the airport. The extension was achieved with the addition of new buildings along the four sides of the previous terminal, one floor on the long sides and two floors on the short heads.

For the prospects, a decisive and uncompromising solution was found in search of open spatiality. For the facades, on the other hand, a new load-bearing structure was created with triangular portals in tubular steel, transversal to the existing pillars, alternating with high-tech stainless-steel fabric meshes. This type of façade chosen, in addition to allowing better control of the microclimate and better environmental comfort, allows a reduction of about 30% of energy needs. In this way, in addition to a strong formal characterization of the building, with a recognizable solid and durable appearance, the idea of the "place" was exalted not only of hasty passage, but also of meeting and exchange.

A large canopy in laminated aluminium panels helps to draw the detachment line of the roof along the entire road front, allowing protection from atmospheric agents at arrivals and departures.

The technical requirements adopted for the project were all aimed at a safe, efficient and pleasant building to live for all users, occasional and continuous.

The road access system to the airport and the provision of spaces for car parking and bus parking were completely inadequate and, in any case, underestimated. compared to traffic forecasts for 2007 and 2017.

With the project, the rationalization of the methods of approach to the airport and the parking lots was implemented, creating an annular distribution system that allows greater fluidity of circulation and a better understanding of the spaces and functional hierarchies of traffic.

All the edges of the roads and the rows of parking lots, as well as the traffic divider, are arranged in green with a careful choice of plantings characteristic of the area.

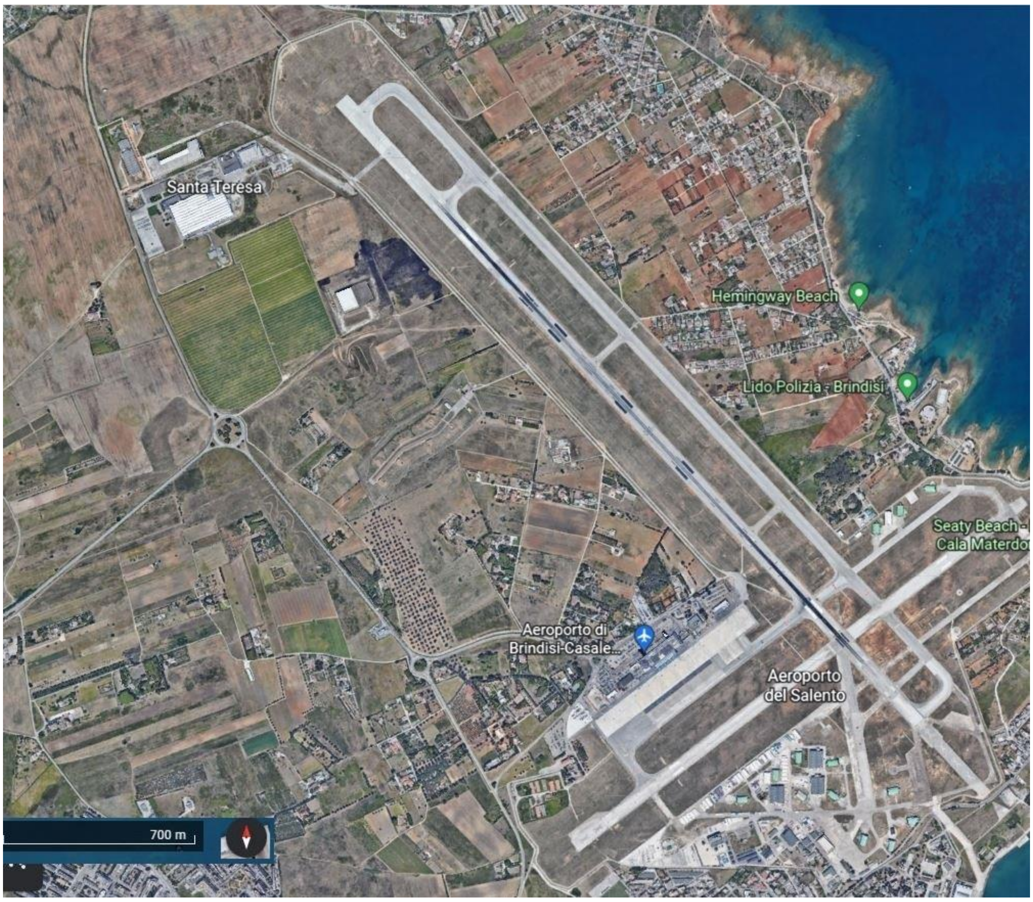

Figure 4 *Brindisi airport plan (© 2022, Google Earth)*

Foggia Airport

The airport of Foggia is a structure strategically located in the articulated road and railway system of the Capitanata.

After the interventions that allowed the redevelopment of the current passenger terminal, the new passage is represented by the extension of the runway. At the end of the interventions, runway 15/33 will allow the operation of aircraft of greater capacity.

The use of these aircraft will contribute to the relaunch of the airport and the consequent development of commercial traffic functional to the mobility needs of the centres of the Tavoliere, the Dauni Mountains and the Gargano, one of the most important attractive poles of the holiday industry and tourism of Puglia.

Figure 5 *Foggia airport plan (© 2022, Google Earth)*

Taranto – Grottaglie Airport

The National Plan of Airports has classified Taranto-Grottaglie airport as an airport of national interest intended to perform functions of integrated logistics platform to support research and industrial development.

Within the regional airport network, in fact, Taranto-Grottaglie airport has a pre-eminent cargo-logistics function and is an example of international integration between air transport and aerospace industry. The airport, already an integral part of the international program for the on-site production of the fuselages of the Boeing 787 "Dreamliner", is currently affected by its further development as a strategic infrastructure for Europe for the growth of the industrial and academic system at the service of the aeronautical and aerospace sector, as confirmed by the identification of the same as the first Italian spaceport destined to accommodate suborbital flights.

We are therefore working on the development of a structure that boasts favourable logistical conditions and is equipped with a flight corridor for unmanned aircraft, an essential condition to attract and root the growth of important production and scientific realities.

In this sense, an infrastructure and expansion project of the airport is underway that takes into account the needs expressed by the industrial partners involved in this ambitious production settlement program, in harmony with the programming of the Apulian Aerospace Technology District, which emerges among the Italian districts for the excellent results achieved and for the high level of growth, and which is part of the logic of integration of value and said function between airport activity and aerospace activity strongly desired by the Regional Administration.

Figure 6 *Taranto-Grottaglie airport plan (© 2022, Google Earth)*

1 AIRPORT GHG EMISSION MANAGEMENT POLICY

Aeroporti di Puglia (AdP), through its highest hierarchical level, considers it a legitimate and concrete aspiration to put environmental protection and mitigation of anthropic effects on the climate before interventions of easier implementation and greater economic performance, in the belief that this represents a message with a strong social value that the particular importance of the airport structure helps to spread to a wider "audience" and not limited to the local population only. With this in mind, a series of interventions are framed in the field of supply and reduction of energy consumption, and in general of mitigation of environmental impact, implemented and planned in the short and medium term.

In this context, the strategic objective of AdP is framed to significantly and rapidly reduce the climate-changing emissions produced by the activities of the airports under its control, with reference to CO_2 emissions, and stimulate sustainable mobility of regional transport.

To pursue this goal, AdP has started a management process, also through adherence to the "Airport Carbon Accreditation" program at Level 2 (Reduction), and progressive reduction of climate-changing emissions, through energy efficiency measures, both at the infrastructural level and technological systems and, of strategic energy supply choices, favouring the use of energy from renewable sources and increasing the share of energy. Self-produced and consumed by photovoltaic systems installed and to be installed.

In this case, among the activities aimed at the energy efficiency of buildings and public energy users, or for public use, currently being carried out in agreement with the Ministry of the Environment and the Protection of the Territory and the Sea, ENAC and the Puglia Region, include the interventions of:

- biomass cogeneration serving Bari airport;
- energy efficiency of passenger terminals;
- integration of the efficiency system with high-efficiency lighting system along the driveway to the passenger terminal;
- integration of the AVL plant efficiency system.

In the field of technological systems, the strategic objectives concern in particular:

- the transformation of technological systems according to the best international energy efficiency standards, progressively reducing fossil fuel consumption in favour of electricity plants by progressively reducing the consumption of fossil fuels;
- the progressive replacement of stopover operating vehicles with electric vehicles.

The top management is committed to promoting the commitment to the pursuit of the objectives of reducing climate-changing emissions, at all company levels, promoting the progressive involvement of all stakeholders of Aeroporti di Puglia.

1.1 Interventions carried out to mitigate impacts

With the ratification of the international document of the Global Compact, Aeroporti di Puglia was the first Italian airport manager to formally commit to pursuing, in its sphere of influence, ten fundamental principles, relating to human rights, labour standards, environmental protection and the fight against corruption. Principles already universally shared deriving from the Universal Declaration of Human Rights, the ILO Declaration, the Rio Declaration and the United Nations Convention against Corruption.

In particular, the commitment dedicated to the virtuous management of Apulian airports has meant that the Apulian network has become a reference model at national level for the methods of approach to environmental dynamics during the design and construction of new infrastructures: a further incentive to continue on the path started that has allowed us to reach levels of excellence in the field of airport services, intermodal integration and the quality of the tourist offer.

In terms of energy supply, photovoltaic systems have been operating for years in the airports of Bari and Brindisi - for a total of 500 Kw - to produce renewable energy that is fed into the networks serving the airport. This, in addition to reducing the peaks in the use of energy produced from traditional non-renewable sources and meeting part of the energy needs of the two airports, has made it possible to reduce the effects of direct radiation on the building envelope of the passenger terminal, with a consequent reduction in electricity consumption attributable to the air conditioning system.

In addition to large-scale systems, photovoltaics has been also used for the roofing of the pedestrian paths of the Karol Wojtyla airport in Bari, made with canopies integrated with advanced electricity production technologies, functional to the management of the lighting of the paths themselves.

At the same time as the infrastructure process, Aeroporti di Puglia has implemented, as part of the Interregional Operational Program 2007 - 2013 "Renewable energy and energy saving", a plan of integrated interventions aimed at improving the energy efficiency of Bari airport.

Among the activities aimed at the energy efficiency of buildings and public energy users or for public use in agreement with the Ministry of the Environment and the Protection of the Territory and the Sea, ENAC and the Puglia Region, there are the interventions of:

- biomass cogeneration serving Bari airport;
- energy efficiency of passenger terminals;
- integration of the efficiency system with high-efficiency lighting system along the driveway to the passenger terminal;
- integration of the AVL plant efficiency system.

Finally, there are numerous other applications – electric ramp vehicles, bicycles for travel on board, separate waste collection – through which Aeroporti di Puglia has concretely implemented its environmental choices.

All Apulian airports are in possession of the Environmental Management System Certifications according to the ISO 14001 standard.

2 DATA COLLECTION

2.1 Data collection methodology

The ACA requirements for Level 2 include the implementation of Level 1 "mapping", namely:

- Definition of an Emission Reduction Policy, i.e. a public commitment to reduce greenhouse gases, carbon or energy entered at the highest level (i.e., CEO, Director of Operations, Board of Directors). This can be an independent statement or part of an existing policy statement (e.g. EMAS or ISO 14001) or a report (e.g. Annual or Environmental Report).
- Development of a GHG inventory for CO_2 emissions of Purpose 1 and 2 of the airports. Airports are expected to consolidate all key carbon footprint information and data into a carbon footprint report.

In addition to the above, Level 2 requires you to:

- Formulate a carbon reduction target. The target is related to Scope 1 and Scope 2 emissions and includes the emission improvement metric (i.e. absolute or intensity target). The airport must also select a base year for the target;
- Demonstrate the reduction of Scope 1 and 2 emissions compared to the three-year moving average, to continue to improve its carbon management performance over time;
- Develop a Carbon Management Plan to achieve the goal. The airport must also provide evidence to demonstrate that the Plan is being implemented effectively.

The Carbon Management plan must include at least the following contents:

- Responsibilities, resource allocation and organizational structure.
- Carbon management initiatives.
- Implementation plan.
- Communication, awareness and training.
- Self-assessment/auditing.

2.2 Organizational boundaries

Aeroporti di Puglia has identified the following activities and operations that fall under its control in order to account for and report greenhouse gas emissions.

The organizational boundaries include the activities carried out for the correct management and operation of the service and facilities of the following airports:

Table 2 *Boundaries organizational Aeroporti di Puglia*

Airport	Address
Salento Airport	Contrada Baroncino, snc - 72100 Brindisi (BR) - Italy
Civil Airport of Foggia	Viale Degli Aviatori - 71100 Foggia (FG) - Italy
Civil Airport of Grottaglie	Strada Provinciale, 82 74023 Grottaglie (TA) - Italy
Karol Wojtyla Airport	Viale Enzo Ferrari - 70128 Palese (BA) - Italy

And in particular they include:

- Air conditioning system
- Lighting (excluding AVL track lights)
- Baggage handling and handling system (BHS)
- Services including:
    - management of centralized infrastructures; assistance for passengers, ramps and freight;
    - ground handling services;
    - Security Services
    - Sub-concessions of spaces to third parties
    - Management of advertising spaces
    - management of the paid parking service for departing passengers.

ACA uses the GHG Protocol control approach of reporting 100% of each emission source over which the airport has operational control.

2.3 Operating boundaries

Operating boundaries define the scope (Scope as defined by GHG Protocol) of direct and indirect emissions for operations based on the organizational boundary previously identified.

The operating boundary (Scope 1, Scope 2) is therefore applied uniformly to identify and classify direct and indirect emissions at each operational level.

In general, emission sources (assets/installations) are classified:

- Scope 1: direct greenhouse gas emissions from sources owned and/or controlled by the airport, e.g. combustion emissions in boilers, furnaces, owned or controlled vehicles, etc.
- Scope 2: Indirect greenhouse gas emissions from the generation of electricity, steam, heat or cooling purchased and consumed by the airport. Scope 2 emissions occur physically in the plant where the purchased energy carrier is generated.

- Scope 3: Other indirect emissions, which are a consequence of airport operations but come from sources not owned and/or controlled by the company (e.g. aircraft movements, vehicles and equipment operated by third parties, off-site waste management, etc.). These sources may be located inside or outside the airport premises (geographical border).

Scope 3 emissions are excluded from this study.

Details of the airport-specific operating boundaries are set out in the following paragraphs of this report.

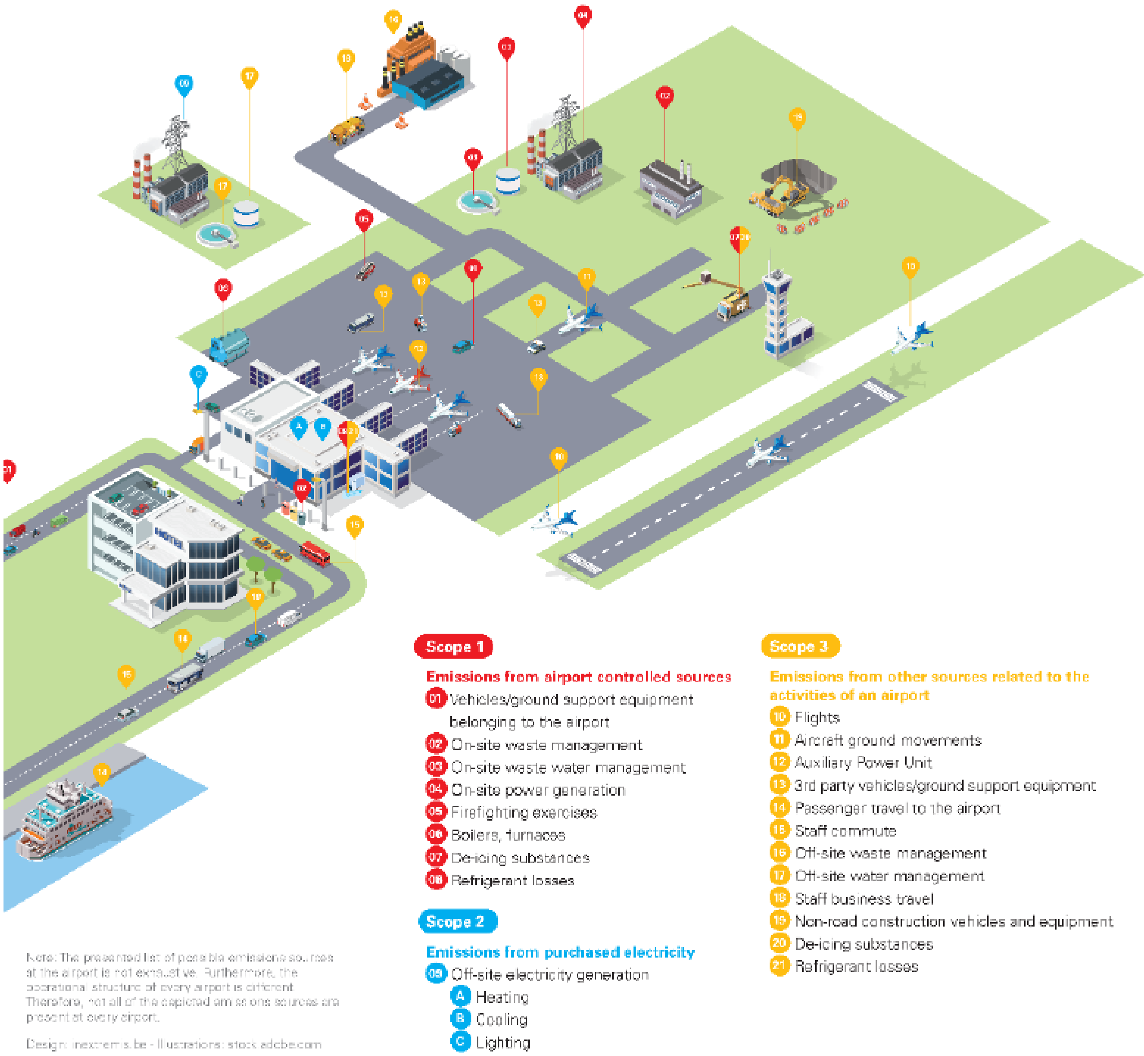

Figure 7 *Sources/scope for classification of direct and indirect emissions at the airport (ACA, 2020)*

2.4 Quantification of emissions – general

2.4.1 Reference year and reporting period

A base year has been selected for the definition of the airport reduction target, to be able to compare year on year the improvements generated by the projects implemented for the reduction of CO_2 emissions.

The base year selected by Aeroporti di Puglia is 2019.

The emissions of the years 2019 to 2022 were also reported both for statistical purposes and in order to assess the improvement in performance for the year 2022 with reference to the moving average of the period 2019 and 2021, using the evaluation criteria provided by the ACA.

The year 2020 was not considered for the evaluation of the performance improvement, in line with the requirements of the ACA program which provide for its exclusion as affected by the reduction in traffic induced by the pandemic event.

2.4.2 Identification of GHG sources

To proceed with the quantification of emissions, once the organizational and operational boundaries had been defined, the emission sources were identified within them, dividing them between stationary and mobile direct emission sources (Scope 1) and indirect emission sources (Scope 2).

Table 3 *Examples of Scope 1 and 2 GHG sources*

Scope 1 - Direct emissions	
Fixed sources	Boilers, engines, fire drills, generators, etc.
Mobile sources	Vehicles (airside/landside), GPU.
Process emissions	Wastewater management.
Other	Anti-icing substances
Scope 2 - Indirect energy emissions	
	Emissions from purchased electricity

3 CARBON FOOTPRINT CALCULATION METHODOLOGY

3.1 Quantification methodology and data collection

GHG emissions have been calculated and expressed in terms of CO_2. When calculating emissions associated with on-site water treatment, the result shall be expressed in terms of CO_2 equivalent (CO2e); for homogeneity of the overall treatment of the inventory, this quantity was in any case expressed in CO_2.

Hence, CO_2 emissions or CO_2 and the i-th activity (E_i) are obtained from the multiplication of data quantifying the i-th activity of the organization (AD_i) with the corresponding emission factor (EF_i).

$$Ei = EF_i * AD_i \quad [kg\ CO_2]$$

The data collection was carried out by the representatives of each airport for the quantification of the activity data associated with the different emission sources, the following data were collected with the support of the various responsible functions as described below:

Table 4 *GHG sources, Scopes, data sources and responsible functions*

SCOPE	GHG SOURCES	DATA	RESPONSIBLE
1	Generators – natural gas	Natural gas consumption from bills	Energy Manager
1	Generators - diesel Generators	Diesel consumption from invoices	Ref. Sist. eE-MOR - ENAC Safety Service Office Technical Office
1	Vehicles and vehicles for transport	Fuel consumption from invoices and fuel transport documents	Ref. Sist. eE-MOR - ENAC Safety Service Office Technical Office
2	Electrically powered airport and sub-concessionaire plant/machinery/equipment	Electricity consumption from bills	Energy Manager

The data required for the development of the study for the four airports in the different years under evaluation come from direct sources and in some cases indirect due to the lack of specific data. In the latter case, even in the absence of a site-specific source, the data is supported by consistent bases of representativeness.

3.2 Criteria for recalculating GHG inventory

In order to maintain a consistent and effective monitoring, Aeroporti di Puglia will periodically verify the adequacy of the inventory of the reference year. Only by maintaining a consistency of methodology and reporting boundaries is it possible to obtain consistent and reliable measures. There are cases in which action is needed to re-quantify this inventory.

The revision of the inventory of the reference year in the case of Aeroporti di Puglia will be carried out if one or more of the following conditions are met:

1. Organizational and/or operational boundaries have changed; for example, this happens when new buildings are acquired, or new activities are started, or terminal extensions are carried out;
2. The ability of Aeroporti di Puglia to control one or more activities included in the inventory has changed; for example, this happens when a previously indirect activity passes under the direct control of Aeroporti di Puglia;

The GHG emissions quantification model is outdated and/or incorrect; This is the case, for example, when incorrect emission factors or obsolete characterisation factors (GWPs) have been used.

3.3 Emission and conversion factors

The emission and conversion factors used in this study are set out in the Annex (**Errore. L'origine r iferimento non è stata trovata.** and **Errore. L'origine riferimento non è stata trovata.**).

Since the ACA methodology for Level 1 and 2 provides for the reporting of CO_2 emissions only, in general, emission factors that were specific to CO_2 emissions were selected where possible. and that did not include the contribution of other greenhouse gases (e.g. CH_4, N_2O, climate-changing refrigerant gases, etc.).

When this was not possible, the CO_2 equivalent factor was used. considering the approach as conservative with respect to the ACA requirement.

Emissions associated with on-site wastewater treatment were calculated in terms of CH_4 emissions which were then converted into CO_2 equivalent emissions; for homogeneity of the overall treatment of the inventory, this quantity was in any case expressed in CO_2.

The selection of emission factors considered data quality criteria such as temporal, technological and geographical representativeness.

Factors were therefore chosen that were where possible related to the Italian context, to the specific inventory years analysed and as close as possible to the energy/material production processes.

3.4 Exclusions and limitations

The exclusion threshold has been set at 2% of total GHG inventory emissions.

Contributions from the following sources were excluded from the GHG inventory:

- Use of CO_2 fire extinguishers
- Fire drills (with LPG combustion)
- Use of glycol for the de-icing process

Emissions associated with excluded sources are estimated to contribute less than 1% to total annual airport emissions.

4 CARBON EMISSIONS BY SOURCE AND ACTIVITY

4.1 Scope 1 emissions

The Scope 1 emissions considered are as follows:

- **Emissions from stationary sources:** this category includes emissions related to stationary sources that are linked to energy consumption by Aeroporti di Puglia.
  In general, this category includes the combustion of fuels for heating and domestic hot water or for the operation of generating sets (fixed and mobile emergency generators), combustion for emergency tests using combustion processes (**Errore. L'origine riferimento non è stata t rovata.**).
- **Emissions from mobile sources:** Mobile sources refer to the use of vehicles that may be functional to the transport of goods or persons or still used in airport operations. In most cases emissions are associated with fuel consumption (diesel, gasoline). More specifically, the main mobile sources consist of:
  - Cars (landside/airside)
  - GPU (ground power units)
  - GSE (ground support equipment)
  - Bus passenger transport from/to air terminal
  - Luggage transport vehicles

4.2 Scope 2 emissions

Within the Scope 2 inventory, data collected by extracting it from energy purchase invoices for sites included in the scope of the inventory were considered.

For the purposes of reporting the emissions associated with the use of electricity for each site, the criteria of the Scope 2 Guidance of the GHG Protocol were applied using the location based and market-based approaches (cf. Glossary).

Especially:

- For the location-based approach, the emission factors associated with the energy mix (grid-mix) of Italian generation/import (fossil fuels and/or renewable sources) were used.
- for the market-based approach, the residual-mix emission factors (generation mix net of production from renewable sources used in qualification mechanisms) calculated by AIB for Italy were used.

Emissions for electricity consumption associated with the activities of sub-concessionaires are included in the calculation of Scope 2 emissions as these consumptions are not monitored by specific meters.

The stationary sources considered for each airport are listed below.

4.3 Scope 1 and 2 GHG Inventory Aeroporti di Puglia

Below are the GHGs divided by Scope and by sources under the control of Aeroporti di Puglia.Below are the GHGs divided by Scope and by sources under the control of the Aeroporti di Puglia.

Table 5 *Scope 1 and 2 GHG inventories of Aeroporti di Puglia's airports*

Emissions by source	2019 ($kgCO_2$)	2020 ($kgCO_2$)	2021 ($kgCO_2$)	2022 ($kgCO_2$)
Generation of electricity, heat, or steam	667,444	751,020	839,256	794,937
Physical or chemical processing	153,351	47,096	90,957	177,140
Transportation of materials, products, waste, and employees	616,153	379,912	425,750	641,255
Total Scope 1	**1,436,948**	**1,178,028**	**1,355,962**	**1,613,332**
Electricity	5,011,058	3,983,462	4,321,154	4,360,759
Total Scope 2	**5,011,058**	**3,983,462**	**4,321,154**	**4,360,759**

Below are the graphs relating to the breakdown of emissions by Scope and by source.

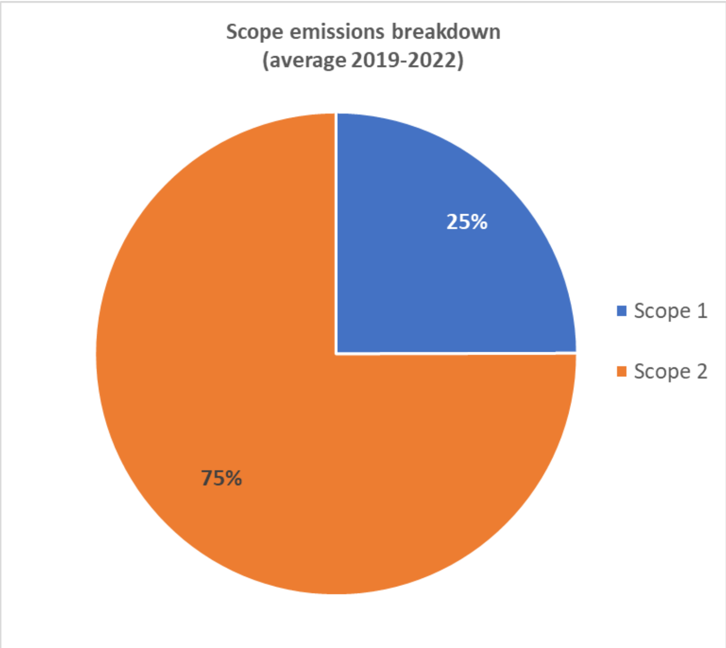

Figure 8 *% Emissions by Scope of Aeroporti di Puglia*

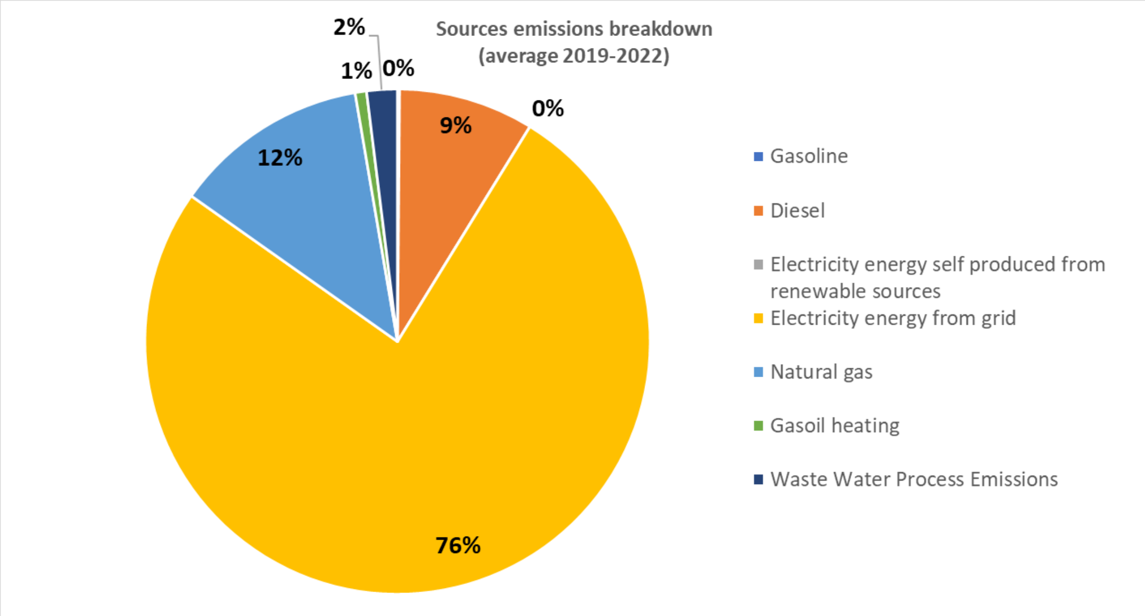

Figure 9 *% Emissions by source of Aeroporti di Puglia*

4.4 Scope 1 and 2 GHG Inventory Bari Airport

Below are stationary sources of GHG (scope 1).

Table 6 *Stationary sources of GHG Bari airport*

Location	Source	Scope	Fuel	Responsible
Airport Grounds	n.1 CHP unit	1	Biomass	Inactive
Aeropax 01	n. 3 boilers	1	Natural gas	Technical Office/External Procurement
Aeropax 02 Airport (Extension)	n. 2 boilers	1	Natural gas	Technical Office/External Procurement
VVF	n. 1 DHW boiler	1	Natural gas	Technical Office/External Procurement
Aeropax 01	3 Generating sets	1	Diesel oil	Technical Office/External Procurement
Aeropax 02 Airport (Extension)	1 Generator set	1	Diesel oil	Technical Office/External Procurement
Lighthouse Towers	1 Generator set	1	Diesel oil	Technical Office/External Procurement
Old Airport	1 Generator set	1	Diesel oil	Technical Office/External Procurement
VVF	1 Generator set	1	Diesel oil	Technical Office/External Procurement

The following table shows the direct (scope 1) and indirect (Scope 2) emissions under the control of Bari Airport.

Table 7 *Scope 1 and Scope 2 emissions inventory Bari Airport*

Emission per source	2019 ($kgCO_2$)	2020 ($kgCO_2$)	2021 ($kgCO_2$)	2022 ($kgCO_2$)
Generation of electricity, heat, or steam	588,376	696,975	774,792	726,558
Physical or chemical processing	153,351	47,096	90,957	177,140
Transportation of materials, products, waste, and employees.	356,091	258,526	267,249	430,230
Total Scope 1	**1,097,818**	**1,002,598**	**1,132,998**	**1,333,928**
Electricity	3,369,274	2,847,113	2,994,183	3,036,762
Total Scope 2	**3,369,274**	**2,847,113**	**2,994,183**	**3,036,762**

Below are the graphs relating to the breakdown of emissions by Scope and by source.

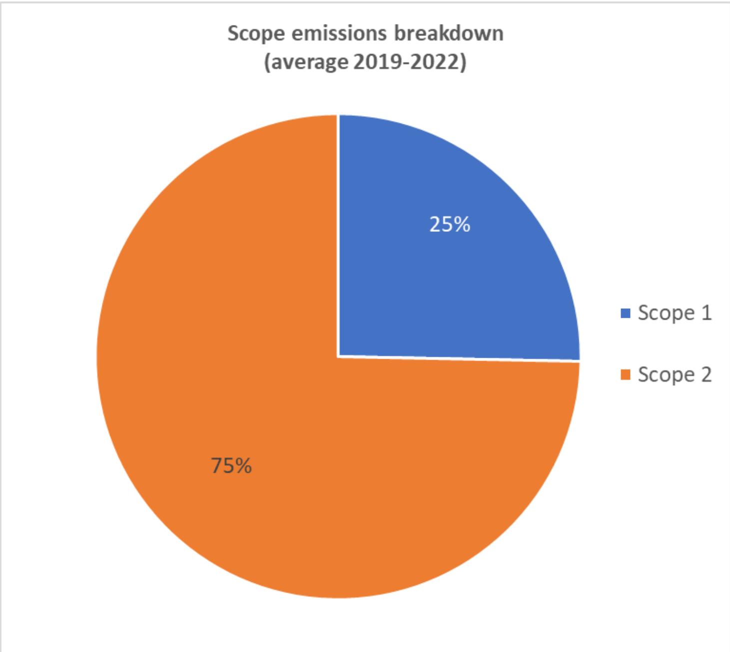

Figure 10 *% **Emissions** by Scope Bari airport*

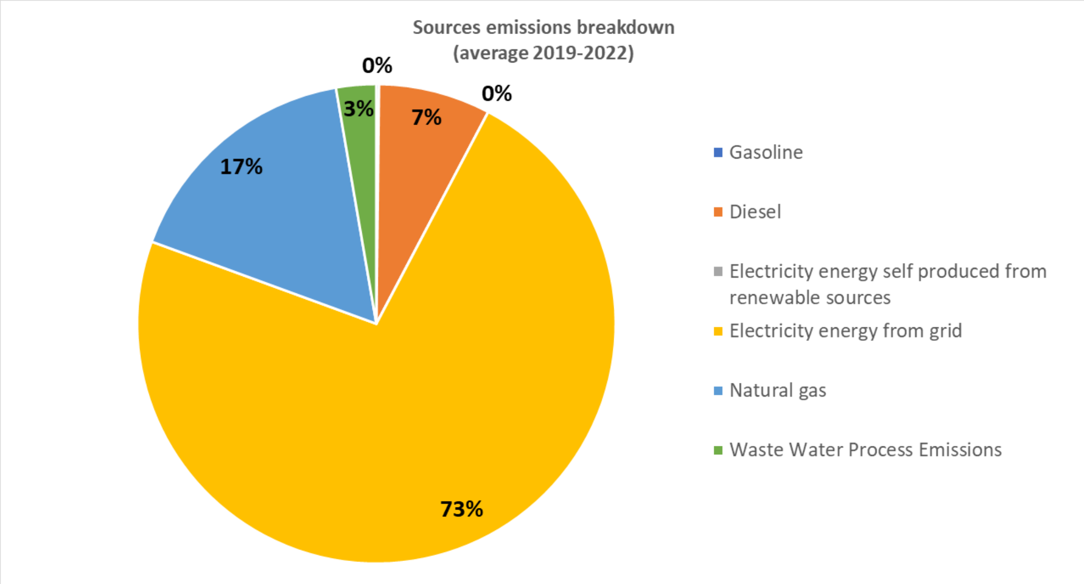

Figure 11 *% Emissions by source Bari airport*

4.5 Scope 1 and 2 GHG inventory Brindisi Airport

Below are stationary sources of GHG (scope 1).

Table 8 *Stationary sources of GHG Brindisi airport*

Location	Source	Scope	Fuel	Responsible
Air terminal	2 Generating sets	1	Diesel oil	Technical Office/External Procurement
AVL Cab	2 Generating sets	1	Diesel oil	Technical Office/External Procurement

The following table shows the direct (Scope 1) and indirect (Scope 2) emissions under the control of Brindisi Airport.

Table 9 *Scope 1 and Scope 2 emissions inventory Brindisi Airport*

Emission per source	2019 ($kgCO_2$)	2020 ($kgCO_2$)	2021 ($kgCO_2$)	2022 ($kgCO_2$)
Transportation of materials, products, waste, and employees.	169,563	97,328	127,894	190,929
Total Scope 1	**169,563**	**97,328**	**127,894**	**190,929**
Electricity	1,362,620	922,769	1,092,303	1,064,533
Total Scope 2	**1,362,620**	**922,769**	**1,092,303**	**1,064,533**

Below are the graphs relating to the breakdown of emissions by scope and by source.

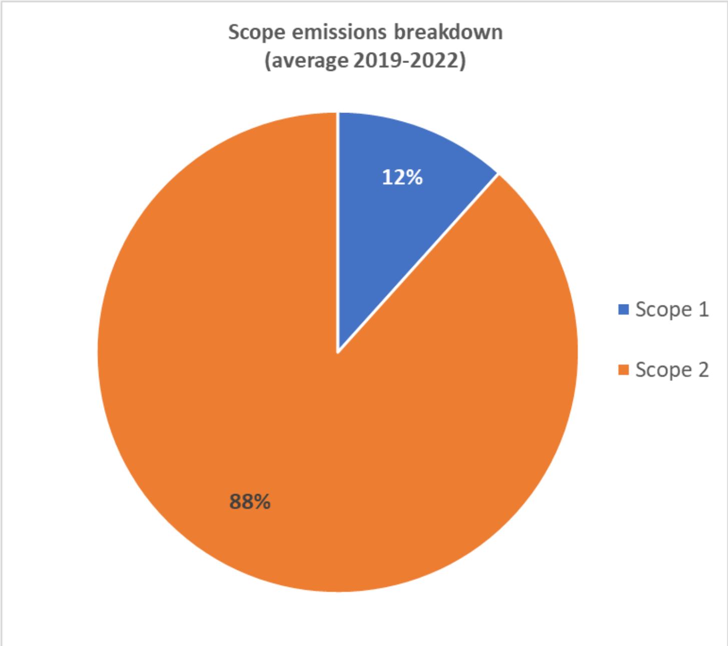

Figure 12 *% Emissions by Scope Brindisi airport*

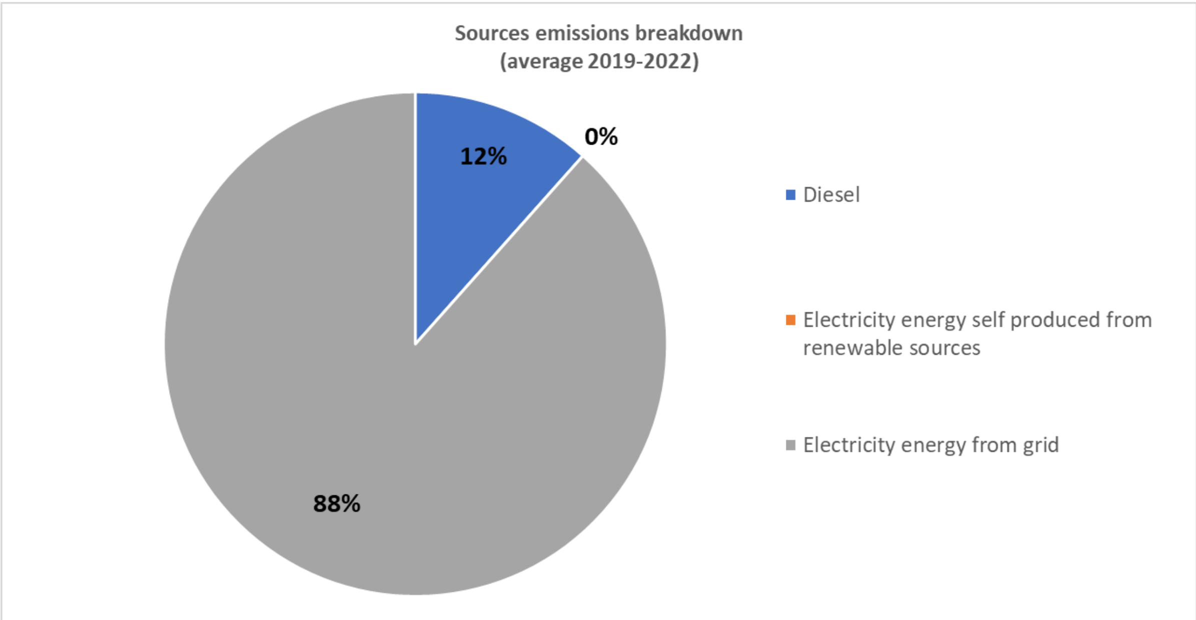

Figure 13 *% Emissions by source Brindisi airport*

4.6 Scope 1 and 2 GHG inventory Foggia Airport

Below stationary sources of GHG are reported (Scope 1).

Table 10 *Stationary sources of GHG Foggia airport*

Location	Source	Scope	Fuel	Responsible
Air terminal	1 Thermal power plant	1	Diesel oil	Technical Office/External Procurement
Air terminal	1 Generator set	1	Diesel oil	Technical Office/External Procurement

The following table shows the direct (scope 1) and indirect (Scope 2) emissions under the control of Foggia Airport.

Table 11 *Scope 1 and Scope 2 emissions inventory Foggia Airport*

Issue for source	2019 ($kgCO_2$)	2020 ($kgCO_2$)	2021 ($kgCO_2$)	2022 ($kgCO_2$)
Generation of electricity, heat, or steam	30,178	-	-	-
Transportation of materials, products, waste, and employees.	6,368	816	-	8,260
Total Scope 1	**36,546**	**816**	**-**	**8,260**
Electricity	114,869	78,787	90,593	120,713
Total Scope 2	**114,869**	**78,787**	**90,593**	**120,713**

Below are the graphs relating to the breakdown of emissions by Scope and by source.

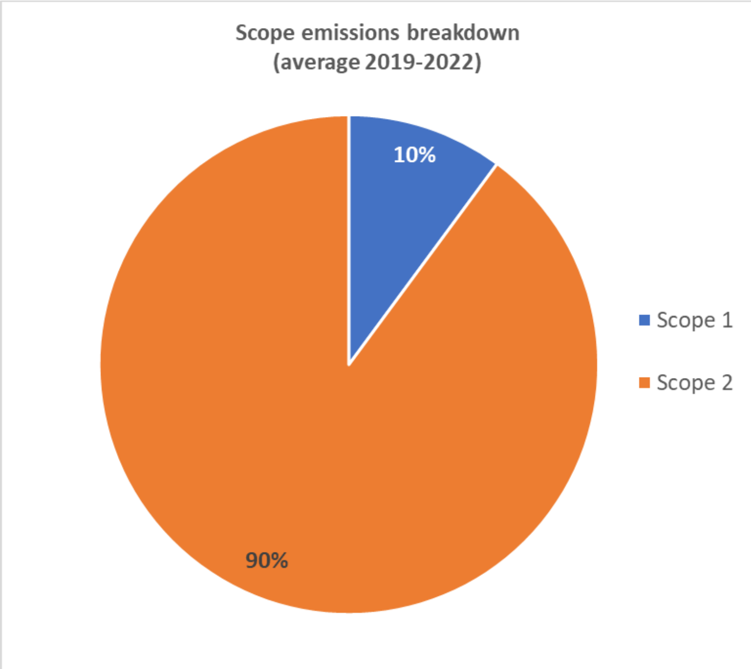

Figure 14 *% Emissions by Scope Foggia airport*

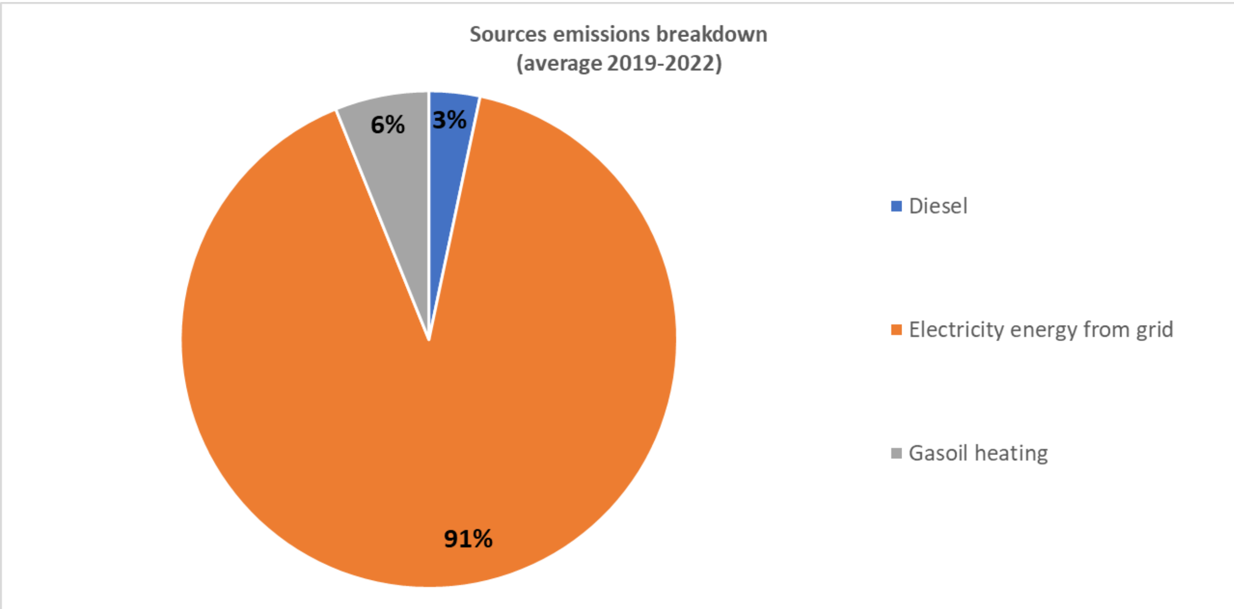

Figure 15 *% Emissions by source Foggia airport*

4.7 Scope 1 and 2 GHG Inventory Taranto Airport – Grottaglie

Below stationary sources of GHG (scope 1) are reported.

Table 12 *stationary sources of GHG Taranto-Grottaglie airport*

Location	Source	Purpose	Fuel	Responsible
Air terminal	1 Thermal power plant	1	Natural gas	Technical Office/External Procurement
VVF	2 Thermal power plant	1	Diesel oil	Technical Office/External Procurement
Air terminal	1 Generator set	1	Diesel oil	Technical Office/External Procurement
AVL Cab	2 Generating sets	1	Diesel oil	Technical Office/External Procurement
Radio assistance	3 Generating sets	1	Diesel oil	Technical Office/External Procurement

The following table shows the direct (Scope 1) and indirect (Scope 2) emissions under the control of Taranto-Grottaglie Airport.

Table 13 *Scope 1 and 2 emissions inventory Taranto-Grottaglie Airport*

Issue for source	2019 ($kgCO_2$)	2020 ($kgCO_2$)	2021 ($kgCO_2$)	2022 ($kgCO_2$)
Generation of electricity, heat, or steam	48,891	54,045	64,464	68,379
Transportation of materials, products, waste, and employees.	84,130	23,242	30,607	11,837
Total Scope 1	**133,021**	**77,287**	**95,071**	**80,215**
Electricity	164,294	134,793	144,076	138,750
Total Scope 2	**164,294**	**134,793**	**144,076**	**138,750**

Below are the graphs relating to the breakdown of emissions by scope and by source.

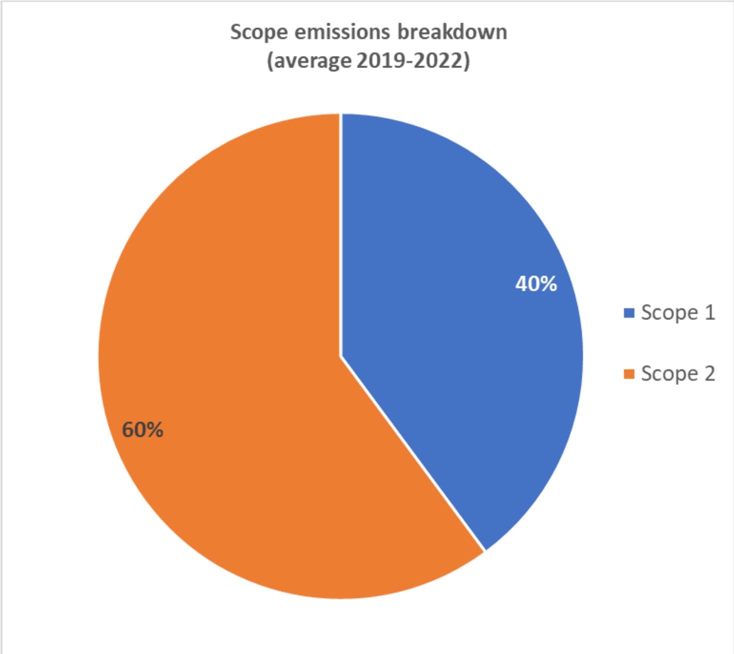

Figure 16 *% Emissions by Scope Taranto-Grottaglie airport*

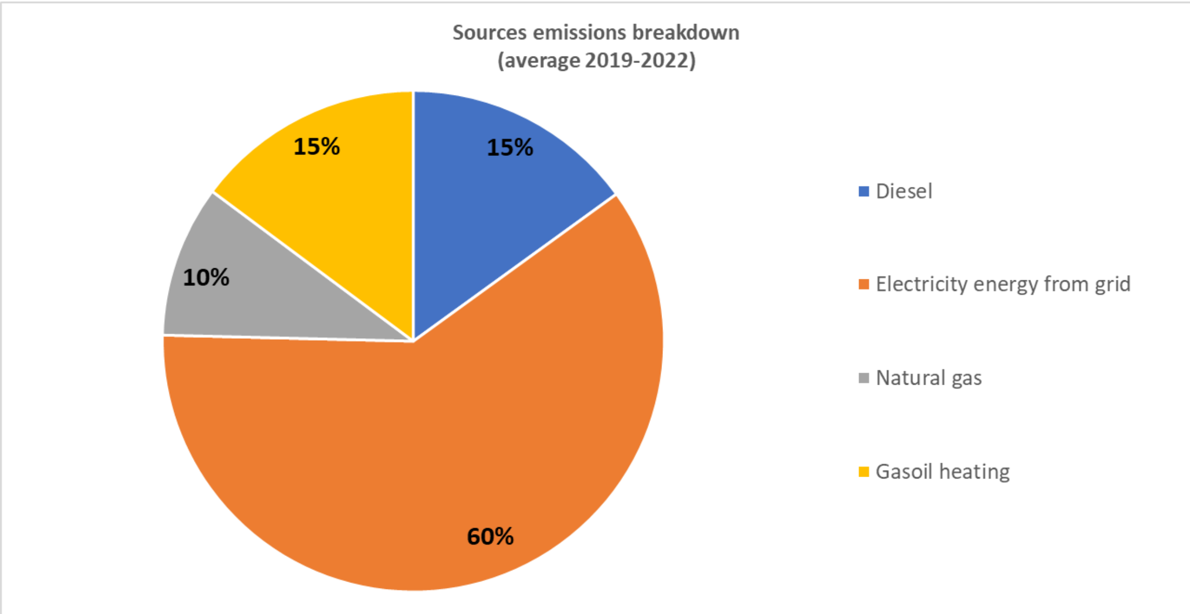

Figure 17 *% Emissions by source Taranto - Grottaglie airport*

4.8 Scope 3 Inventory

The following table shows a list of potential sources of significant emissions classifiable as Scope 3 potentially quantifiable in the Airports of AdP.

Table 14 *Inventory of potential Scope 3 emissions sources of Aeroporti di Puglia*

Scope 3 - Other indirect emissions		
Aircraft	*Aircraft ground movements, engine start at idle (run-up), reverse engine thrust, taxiing, APU, PCA, etc.*	*Take off, land, approach, altitude, sail from origin to destination, etc.*
Fixed sources	*Boilers, furnaces, burners, turbines, heaters, incinerators, engines, fire drills, torches, etc.*	*Boilers, furnaces, burners, turbines, heaters, incinerators, engines etc., of third parties.*
Mobile sources	*Vehicles, GSE equipment and ground power units operated by 3rd parties, personnel trips with external vehicles/commuting, transportation, construction vehicles and facilities, etc.*	*Business travel (3rd part), surface land or sea access (passengers), staff travel/commuting (3rd party), vehicles owned by 3rd party, etc.*
Process emissions	*Off-site management/disposal of airport waste, etc.*	*Waste management where disposal agreements are made by 3rd parties, etc.*
Infrastructure	*Mains power and fuel consumed by close partners, etc.*	*Network power and fuel consumed by other 3rd parties, etc.*
Other	*Leaks of coolant, anti-icing substances, leaks from the system, in particular the use of CO_2-based extinguishing agents, fuel tanks, etc.*	*Leaks of coolant, anti-icing substances, leaks from the system, in particular the use of CO_2-based extinguishing agents, fuel tanks, etc.*

5 ANNUAL EMISSIONS TREND

5.1 Emissions trend in the years 2019, 2020, 2021, 2022 Aeroporti di Puglia

Below are the trends over the years of the emissions of the Aeroporti di Puglia.

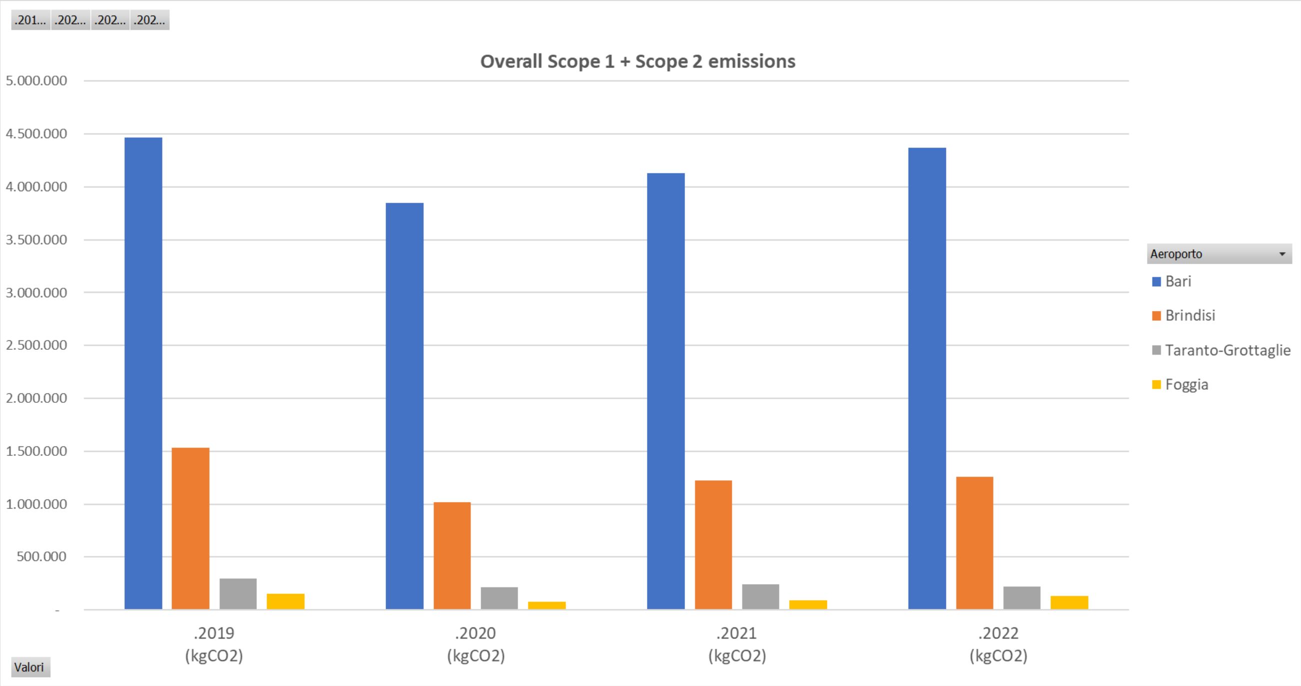

Figure 18 *overall emissions trend Aeroporti di Puglia*

5.2 Breakdown % emissions by source Aeroporti di Puglia

The following table breaks down GHG emissions by source in the various years in order to highlight the variations in contributions over the years as well as to understand the impact of individual sources.

Table 15 *% emissions breakdown by source of Aeroporti di Puglia*

Breakdown % Emissions by source	2019	2020	2021	2022
Petrol	0.1%	0.1%	0.2%	0.1%
Diesel	9.5%	7.3%	7.3%	10.6%
Self-produced electricity from renewable sources	0.0%	0.0%	0.0%	0.0%
Electricity from the grid	77.7%	77.2%	76.1%	73.0%
Natural gas	9.4%	14.0%	14.1%	12.5%

Breakdown % Emissions by source	2019	2020	2021	2022
Gasoil heating	0.9%	0.6%	0.7%	0.8%
Wastewater Process Emissions	2.4%	0.9%	1.6%	3.0%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

5.3 Monitoring indicators

The following indicators have been identified to monitor the improvement of the performance of processes, activities and plants associated with improvement projects that will be identified for the reduction of the carbon footprint.

Table 16 *performance monitoring indicators*

PERFORMANCE INDICATOR	unit
ACA target indicators	
Reduction of CO_2 emissions per passenger	$tonCO_2/Pax$
Reduction of CO_2 emissions for workload unit (WLU)	$tonCO_2/WLU$
Electrical energy	
Electricity consumption referred to the amount of traffic	kWh/WLU
Electricity consumption relative to relative area	kWh/m^2
Total primary energy	
Primary energy consumption per unit of traffic	TOE/WLU
Primary energy consumption relative to relative area	TOE/m^2

Below are the monitoring indicators taken into account for the overall performance of Aeroporti di Puglia and for individual airports.

Table 17 *Monitoring indicators Aeroporti di Puglia*

Airport	2019	2020	2021	2022	Rolling average 2019_2021
ACA target indicators					
$kgCO_2/WLU$					
Bari	0.802	2.227	1.246	0.680	1.024
Brindisi	0.568	1.003	0.658	0.388	0.613
Foggia	391.2	n.a.	1,294	60.11	842.7
Taranto-Grottaglie	3.872	4.213	15.01	24.87	9.445
$kgCO_2/Pax$					
Bari	0.806	2.260	1.255	0.682	1.030
Brindisi	0.568	1.003	0.658	0.388	0.613
Foggia	391.2	n.a.	1,294	60.11	842.7

Airport	2019	2020	2021	2022	Rolling average 2019_2021
Taranto-Grottaglie	330.7	762.8	243.0	177.2	286.9

Electrical energy					
kWh/WLU					
Bari	2.352	6.760	3.827	2.005	3.089
Brindisi	2.005	3.884	2.597	1.448	2.301
Foggia	1,103	n.a.	5,267	229.0	3185
Taranto-Grottaglie	7.952	10.50	36.82	64.15	22.39
kWh/m^2					
Bari	351.7	313.8	340.5	346.1	346.1
Brindisi	462.5	337.8	411.6	400.3	437.1
Foggia	474.3	343.3	409.7	545.9	442.0
Taranto-Grottaglie	407.0	352.4	390.9	376.5	399.0

Total primary energy					
TOE/WLU					
Bari	0.00051	0.00149	0.00084	0.00045	0.00067
Brindisi	0.00040	0.00076	0.00051	0.00029	0.00045
Foggia	0.23305	n.a.	0.98499	0.04414	0.60902
Taranto-Grottaglie	0.00207	0.00249	0.00890	0.01492	0.00549
TOE/m^2					
Bari	0.07567	0.06894	0.07495	0.07690	0.07531
Brindisi	0.09137	0.06602	0.08078	0.08043	0.08607
Foggia	0.10021	0.06451	0.07661	0.10521	0.08841
Taranto-Grottaglie	0.10590	0.08357	0.09450	0.08755	0.10020

6 MEASURES TO IMPROVE CARBON FOOTPRINT MONITORING

Aeroporti di Puglia has identified the following potential interventions that can improve the monitoring of its CO_2 emissions:

1. Implementation of SCADA (Supervisory Control and Data Acquisition) systems and continuous remote data acquisition systems;
2. Installation of smart meters in order to allow the monitoring of electricity consumption and separately count the consumption of *tenants*;
3. Implementation of a specific monitoring plan for all emission sources, and optimization of data collection and validation).
4. Definition and implementation of a training programme for responsible personnel.

CONCLUSIONS

The goal of the present study is the analysis of the inventory of GHG emissions generated from the four airports under the control of Aeroporti di Puglia, i.e. the airports of Bari, Brindisi, Foggia and Taranto – Grottaglie from 2019 to 2022.

The study allowed identification of the sources and the Quantification of emissions Scope 1 and Scope 2 for each airport and allowed identification of potential emissions Scope 3.

The inventory carried out is complete, with all the primary data provided by the AdP referents, except for some data reconstructed through interpolations if they were not available.

Having considered 2019 as the first reporting year, the impact generated by the COVID19 pandemic on the aviation sector was taken into account in carrying out this study, an event that led to a drastic drop in air traffic, therefore the data relating to 2020 were still reported but not considered for the purposes of calculating the moving averages being considered an anomalous year due to the extraordinary pandemic event

Summarizing the main results of the study, the following conclusions are highlighted:

- The data analysed shows the overcoming of traffic, understood as traffic unit (TU), already recorded in November 2022, compared to 2019 (last pre-pandemic year), for all airports under the control of AdP except the airport of Taranto-Grottaglie (**Errore. L'origine riferimento non è stata trovata.**).
- Clear predominance of Scope 2 emissions related to the consumption of electricity purchased, compared to scope 1 emissions, with a ratio, overall for all airports, of about 3 to 1 (**Errore. L 'origine riferimento non è stata trovata.**).
- Improvement of monitoring indicators, in particular $kgCO_2$/WLU and $kgCO_2$/Pax (average reduction for 3 airports out of 4 for both indicators equal to -54.4%), for 2022 compared to previous years, due to the increase in traffic volume recorded for all airports except Taranto – Grottaglie and to a simultaneous containment of increases in energy consumption (**Errore. L 'origine riferimento non è stata trovata.**, **Errore. L'origine riferimento non è stata trovata.**, **Errore. L'origine riferimento non è stata trovata.**, **Errore. L'origine riferimento non è stata tr ovata.**).
- Emissions trend: down by 7.3% in 2022 compared to the levels recorded in the pre-pandemic year considered (2022 vs 2019) and by 1.5% compared to the average emissions recorded in 2019 and 2021 (**Errore. L'origine riferimento non è stata trovata.**).

GLOSSARY AND ACRONYMS

ACA: Airport Carbon Accreditation

AdP: Aeroporti di Puglia

Biogas Guarantee of Origin (BGO): A similar GO mechanism can be applied to certify biomethane and biogas that are fed into the natural gas network. Both can be certified, and such certificates exchanged in a system with certificate register where purchased biogas and biomethane are traced.

Carbon dioxide equivalent CO_2e: Unit that allows you to compare the force radiant of a GHG with that of carbon dioxide. Carbon dioxide equivalent is calculated using the mass of a given GHG multiplied by global warming potential.

Direct emission of greenhouse gases: GHG emission from greenhouse gas sources of owned or controlled by the organization.

Direct removal of greenhouse gases: Removal by GHG from Absorbers of greenhouse gases of owned or controlled by the organization.

Gas greenhouse gases, greenhouse gases, GHG (*greenhouse gas*): Gaseous constituent the atmosphere, both natural and anthropogenic, which absorbs and emits radiation to specific wavelengths within the spectrum of emitted infrared radiation from the earth's surface, atmosphere and clouds.

GHG activity data: Quantitative measures of activity from which resulting in GHG emissions or removals. Examples: amount of energy, fuel or electricity consumed, of materials produced, of services provided or the extent of the territory involved.

GHG ratio: A stand-alone document adopted to communicate GHG information from a GHG organisation or project to intended users.

Global Warming Potential, GWP (*global warming potential*): Index, based on the radiant properties of GHG, who measure the radiating force of a mass unit of a given GHG in the current atmosphere compared to an equivalent unit of carbon dioxide over a given period Time horizon.

Greenhouse gas absorber: Process which removes a GHG from the atmosphere.

Greenhouse gas emission factor: Factor relating activity data to GHG emissions.

Greenhouse gas emissions: Release of a GHG in the atmosphere.

Greenhouse gas inventory: List of GHG emissions and removals and their quantification.

Greenhouse gas removal factor: Factor that correlates activity data to GHG removals.

Greenhouse gas sink: Component, different from the atmosphere, with the ability to accumulate GHG and to store and release them.

Greenhouse Gas Statement: an effective and objective statement of the subject matter of the verification or validation. The GHG declaration could be provided within a GHG report or GHG project.

Guarantee of origin (GO): It is an instrument defined in Article 19 of the European Directive 2018/2021/EC. to track electricity from renewable sources and provide information to electricity customers on the source of the energy purchased. Guarantees of origin are the only precisely defined instruments that certify the origin of electricity produced from renewable sources.

Indirect emission of greenhouse gases: GHG emission resulting from operations and activities of an organization from non-source sources of owned or controlled by the organization.

Intended user: Individual or organization identified by those reporting GHG-related information as the one to whom such information is addressed in order to make decisions.

Location-based method for the quantification of scope 2 emissions: Method for quantifying GHG emissions scope 2 based on the average emission factor associated with energy generation for defined locations, including local, subnational or national boundaries

Market-based method for quantifying scope 2 emissions: method for quantifying GHG emissions scope 2 on the basis of GHG emissions emitted by energy generators for which the entity reporting the emissions purchases qualification tools that, contractually, can be supplied together with electricity (bundled) or individually (unbundled).

Organization: Person, or group of people, with specific responsibilities, authorities and relationships aimed at achieving its objectives.

PAX: Passenger

Plant: Single installation, set of installations or production processes (fixed or furniture), which can be defined within a single geographical boundary, a unit organizational or a production process.

Reference year: Specific Historical period Identified in order to compare emissions or GHG removals or other GHG-related information over time.

Removal of greenhouse gases: withdrawal of a GHG from the atmosphere by absorbers of GHG.

Source of greenhouse gases: Process that releases a GHG into the atmosphere.

TOE: Tonnes of oil equivalent

TU: Traffic unit

WLU: Workload Unit

REFERENCES

ACA Accreditation Manual Issue 12, Nov. 2020

ISO 14064-1:2018 "Greenhouse gases. Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals"

GHG Protocol – A Corporate account and reporting Standard (World Resources Institute)

GHG Protocol – Scope 2 Guidance – WRI, 2015

ACI Resolution - European airports committing to net zero carbon emissions by 2050 – last update 20 May 2021

Regulation (EU) No 139/2014 technical requirements and administrative procedures relating to aerodromes pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council

Regulations for the construction and operation of airports (current text) - ENAC

IATA (Airport Handling Manual)

Airport master plan

Airport manual

Stopover Regulations

ANNEX

A.1 Emission factors

Source	2019	2020	2021	2022	Units of measurement	Notes
Petrol	2.196	2.155	2.180	2.148	kg CO_2/l	DEFRA, Petrol (average biofuel blend)
Diesel	2.560	2.511	2.475	2.521	kg CO_2/l	DEFRA, Diesel (average biofuel blend)
Self-produced electricity from renewable sources	0.000	0.000	0.000	0.000	kg CO_2/kWh	ACA, Application manual 2020
Electricity from the network location	0.269	0.255	0.246	0.246	kg CO_2/ kWh	ISPRA, 2022 (report 363/2022) tab. 2.25 (electricity consumption)
Electricity from the market network	0.466	0.459	0.457	0.457	kg CO_2/ kWh	AIB, European Residual Mix
Natural gas	1.975	1.984	1.983	1.983	kgCO_2/stdm^3	ISPRA, National Inventory Report 2022
Gasoil heating	3.155	3.155	3.169	3.169	kgCO_2/kg	ISPRA, National Inventory Report 2022
LPG	1.521	1.553	1.555	1.555	kgCO_2/L	DEFRA, LPG
Wastewater Process Emissions	28.00	28.00	28.00	28.00	kCO_2/kg	Fifth Assessment Report (AR5)

A.2 Conversion factors

Sources	TOE	GJ	MWh	Notes
Petrol	0.0007650	0.0320	0.0089	Litres
Diesel	0.0008600	0.0360	0.0100	Litres
Self-produced electricity from renewable sources	0.0001870	0.0078	0.0010	kWh
Electricity from the network location	0.0001870	0.0078	0.0010	kWh
Electricity from the market network	0.0001870	0.0078	0.0010	kWh
Natural gas	0.0008360	0.0350	0.0097	Stm^3
Gasoil heating	0.0008600	0.0360	0.0100	Litres
LPG	0.0006160	0.0258	0.0072	in the liquid state

A.3 Energy balance

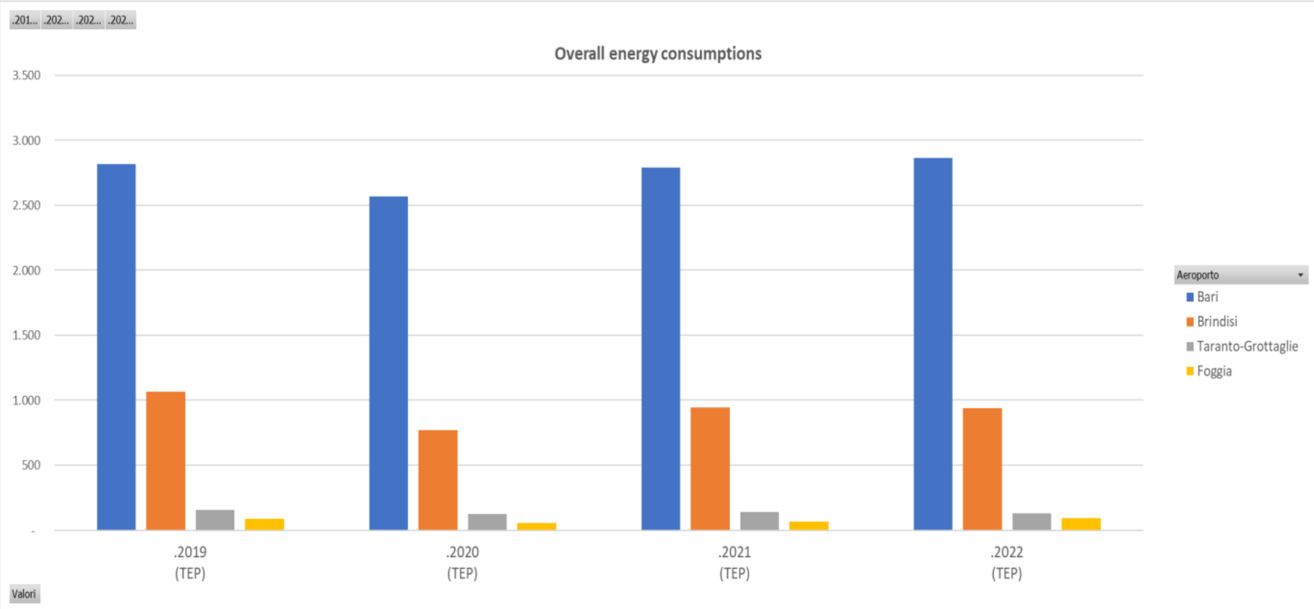

Figure 19 *Total energy consumption in TOE of Aeroporti di Puglia*

Table 18 *Energy consumption in TOE Aeroporti di Puglia*

Energy consumption by source	2019 (TOE)	2020 (TOE)	2021 (TOE)	2022 (TOE)
Petrol	2	2	4	3
Diesel	205	129	144	216
Self-produced electricity from renewable sources	172	159	161	164
Electricity from the grid	3,482	2,921	3,289	3,319
Natural gas	258	304	338	315
Gasoil heating	16	8	10	13
Total	**4,135**	**3,522**	**3,946**	**4,030**

Table 19 *Energy consumption in TOE Bari Airport*

Energy consumption by source	2019 (TOE)	2020 (TOE)	2021 (TOE)	2022 (TOE)
Petrol	2	2	4	3
Diesel	117	87	89	144
Self-produced electricity from renewable sources	108	97	92	99
Electricity from the grid	2,341	2,088	2,279	2,311
Natural gas	249	294	327	306

Energy consumption by source	2019 (TOE)	2020 (TOE)	2021 (TOE)	2022 (TOE)
Total	**2,818**	**2,567**	**2,791**	**2,863**

Table 20 *Energy consumption in TOE Brindisi Airport*

Energy consumption by source	2019 (TOE)	2020 (TOE)	2021 (TOE)	2022 (TOE)
Diesel	57	33	44	65
Self-produced electricity from renewable sources	65	62	69	65
Grid electricity (fossil/renewable)	947	677	831	810
Total	**1,068**	**772**	**945**	**940**

Table 21 *Energy consumption in TOE Foggia Airport*

Energy consumption by source	2019 (TOE)	2020 (TOE)	2021 (TOE)	2022 (TOE)
Diesel	2	0	-	3
Grid electricity (fossil/renewable)	80	58	69	92
Gasoil heating	8	-	-	-
Total	**90**	**58**	**69**	**95**

Table 22 *Energy consumption in TOE Taranto Airport - Grottaglie*

Energy consumption by source	2019 (TOE)	2020 (TOE)	2021 (TOE)	2022 (TOE)
Diesel	28	8	11	4
Grid electricity (fossil/renewable)	114	99	110	106
Natural gas	9	11	11	9
Gasoil heating	8	8	10	13
Total	**159**	**125**	**142**	**131**

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