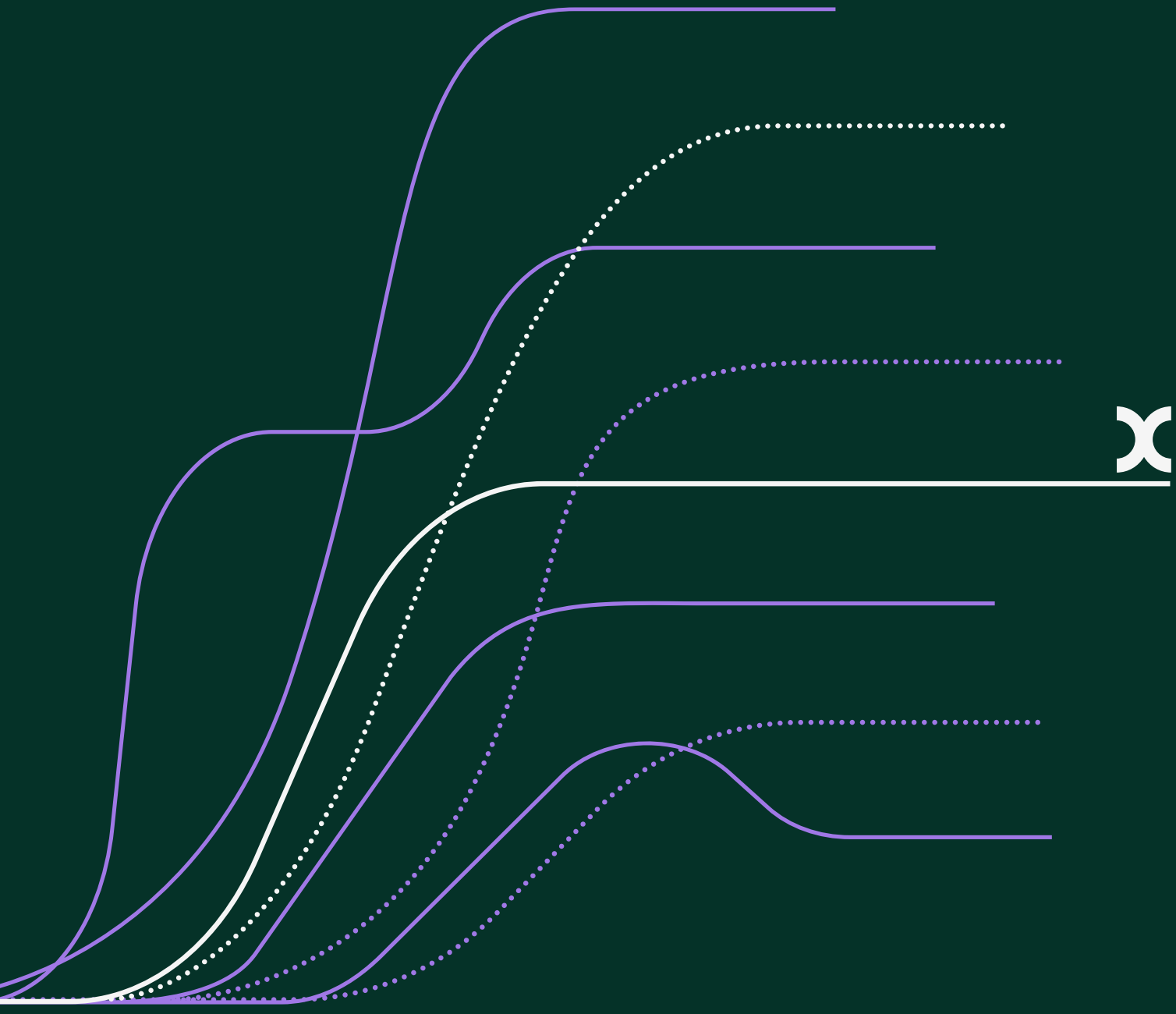
The economic, social and environmental value of regional airlines in Europe

–

Prepared for the European Regions Airline Association

28 February 2025



Contents

Figures and Tables

Executive summary

Regional airlines play a crucial role in the European aviation ecosystem. They facilitate economic growth by channelling economic activity into regional areas, and improve connectivity, particularly for individuals that need to travel to and from regions that are remote or poorly served by other transportation modes. Additionally, they play a critical role in helping to meet environmental goals, by supporting efforts to decarbonise the aviation sector.

In this report, we estimate the economic impact of regional aviation in Europe, and discuss how regional aviation contributes to the promotion of social welfare, focusing specifically on the connectivity that it offers to remote and underserved communities, as well as its role in supporting decarbonisation efforts.

1 The economic impact of regional airlines

Regional aviation is vital to the economies of many areas across Europe. By using local labour and resources, regional airlines support significant economic activity throughout the aviation value chain and in the broader economy, including creating employment opportunities, supporting local businesses and enhancing regional development.

We assessed the economic impact of regional air transport in 2023 by examining the employment and Gross Value Added (GVA) generated by airlines' passenger flight operations to and from regional areas across Europe.[1]

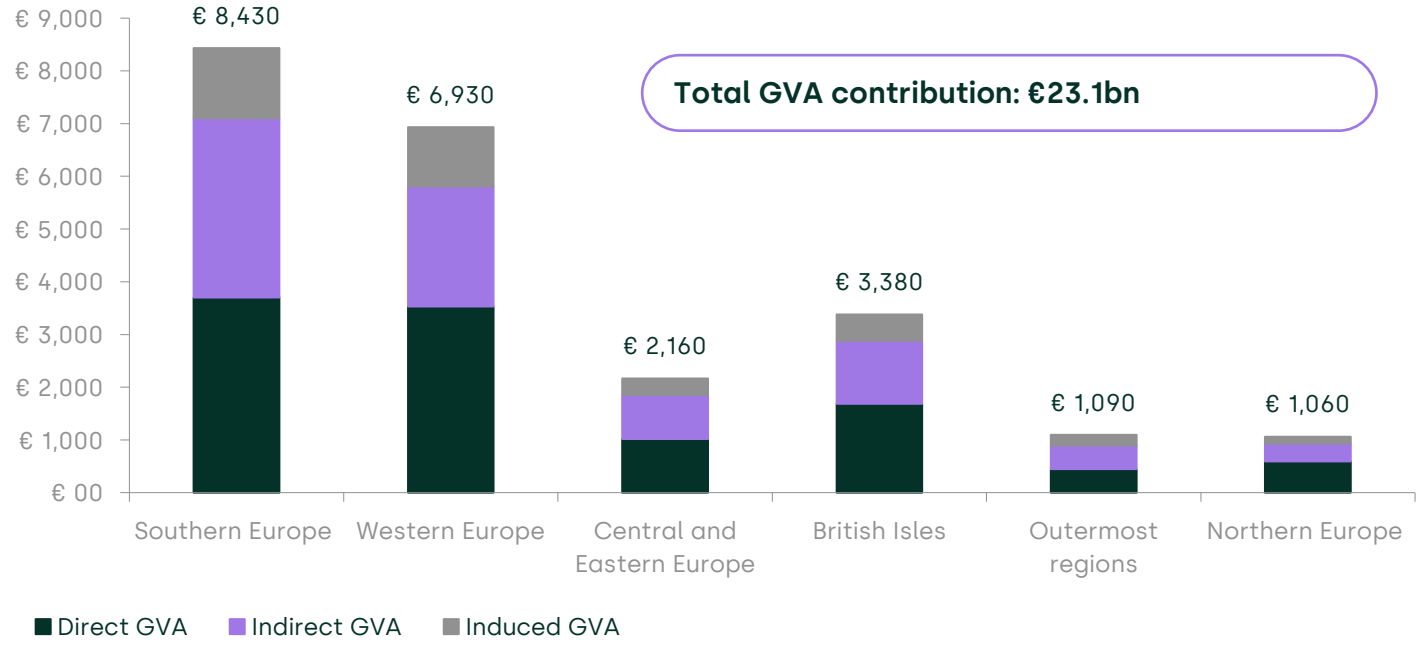
Overall, regional air transport supported **335,100 jobs** and generated **€23.1bn in GVA** across Europe in 2023.

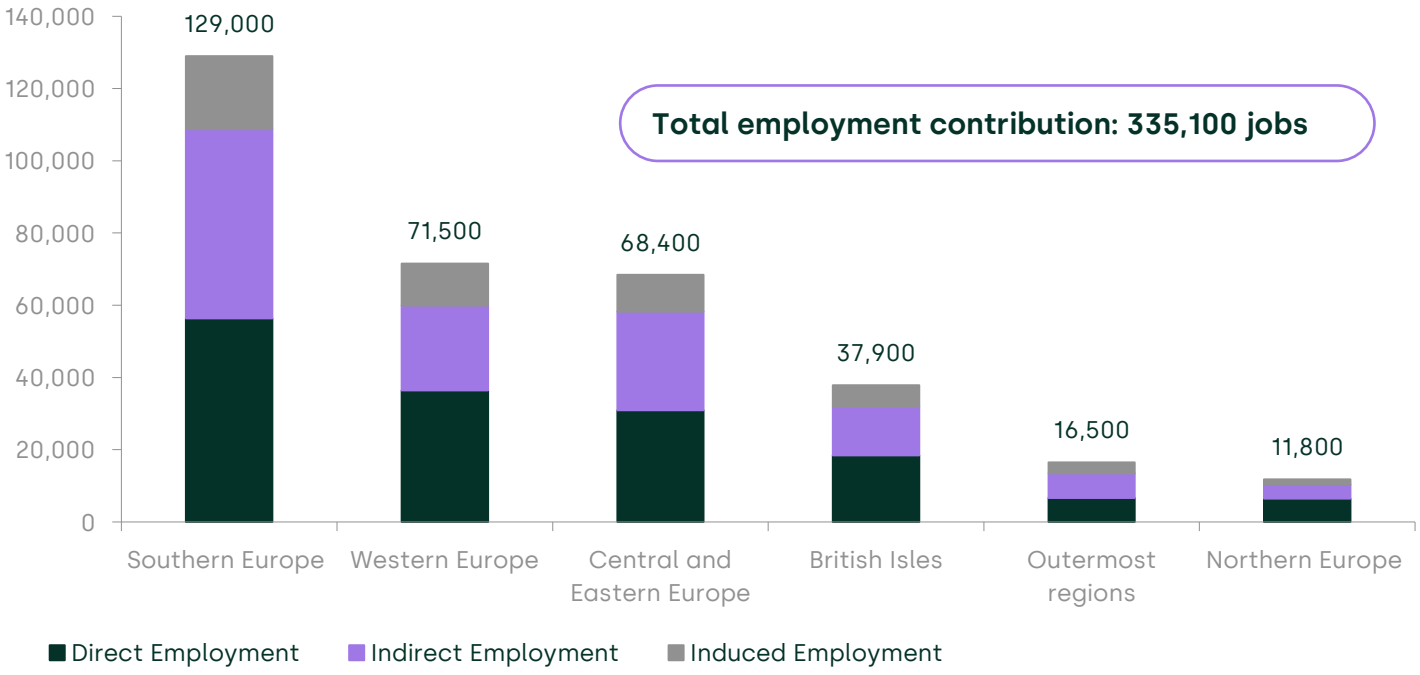
This economic impact arises as a direct result of the operation of flights, but also indirectly through the supply chain of these flights and impacts in the wider economy. Of this total economic footprint, approximately **67% of the GVA impact and 60% of the employment impact arose in Western and Southern Europe**. The figures below show the distribution of

[1] We consider all flights that arrive at, or depart from, regional airports. This includes all airlines on these routes, regardless of their business model.

the GVA and employment footprint of regional air transport in 2023, by region of Europe.

GVA (m) and employment impact of regional air transport in 2023 by region of Europe

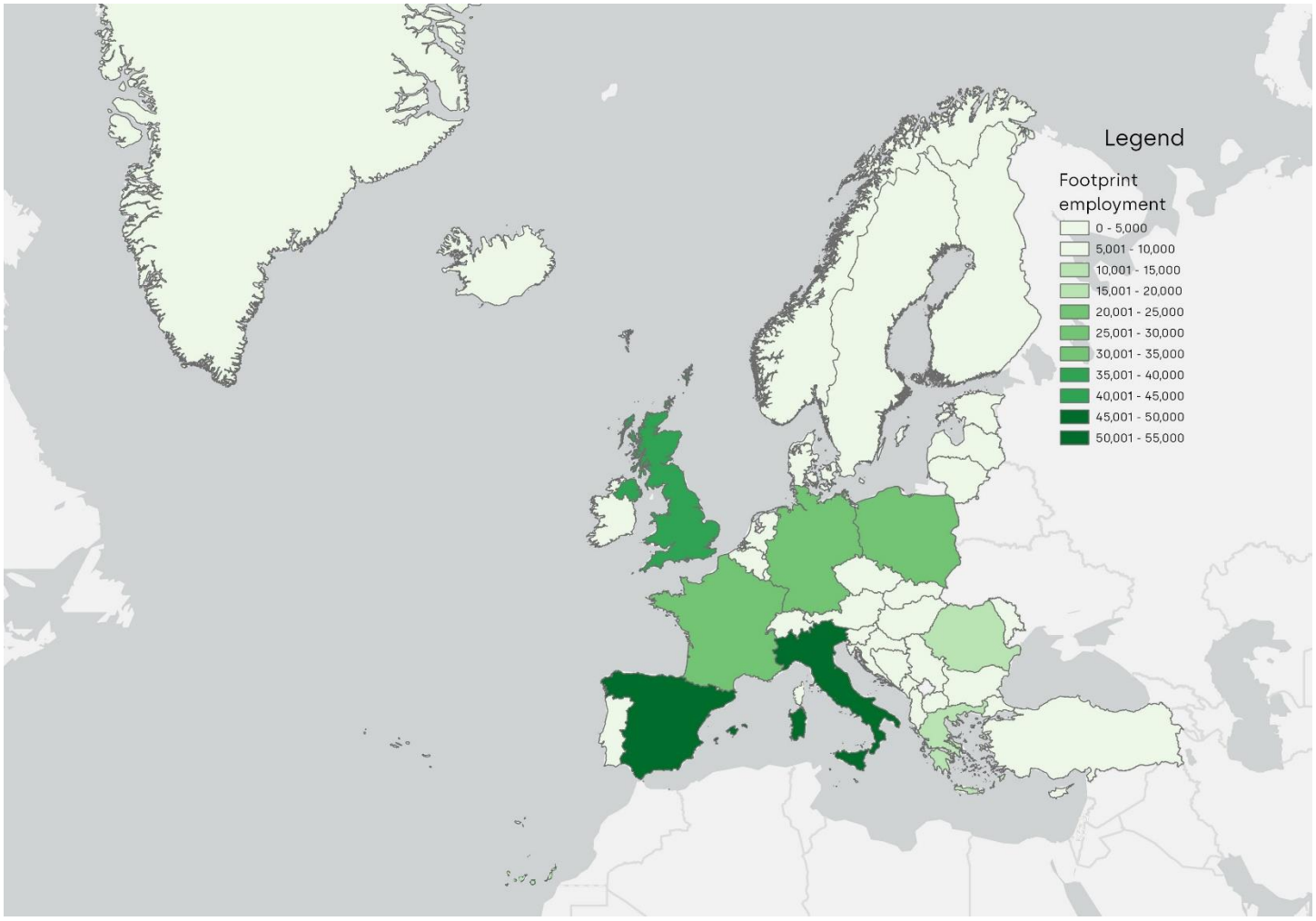




Note: GVA figures are rounded to the nearest ten million. Employment figures are measured by headcount and are rounded to the nearest 100.
Source: Oxera.

The map below illustrates the geographic distribution of the employment footprint of regional aviation in 2023.

Employment footprint of regional air transport by country or sub-national territory of Europe in 2023



Note: The map shows the total number of employees supported by the direct, indirect and induced footprints of regional air transport in Europe. As shown in the legend (in the top right-hand corner), darker shading indicates that more employment is generated within a given country/territory. The list of countries and sub-national territories considered is set out in section 2.1.2 and in Annex 4.6A1. Only airports located in the European part of Turkey have been considered.
Source: Oxera.

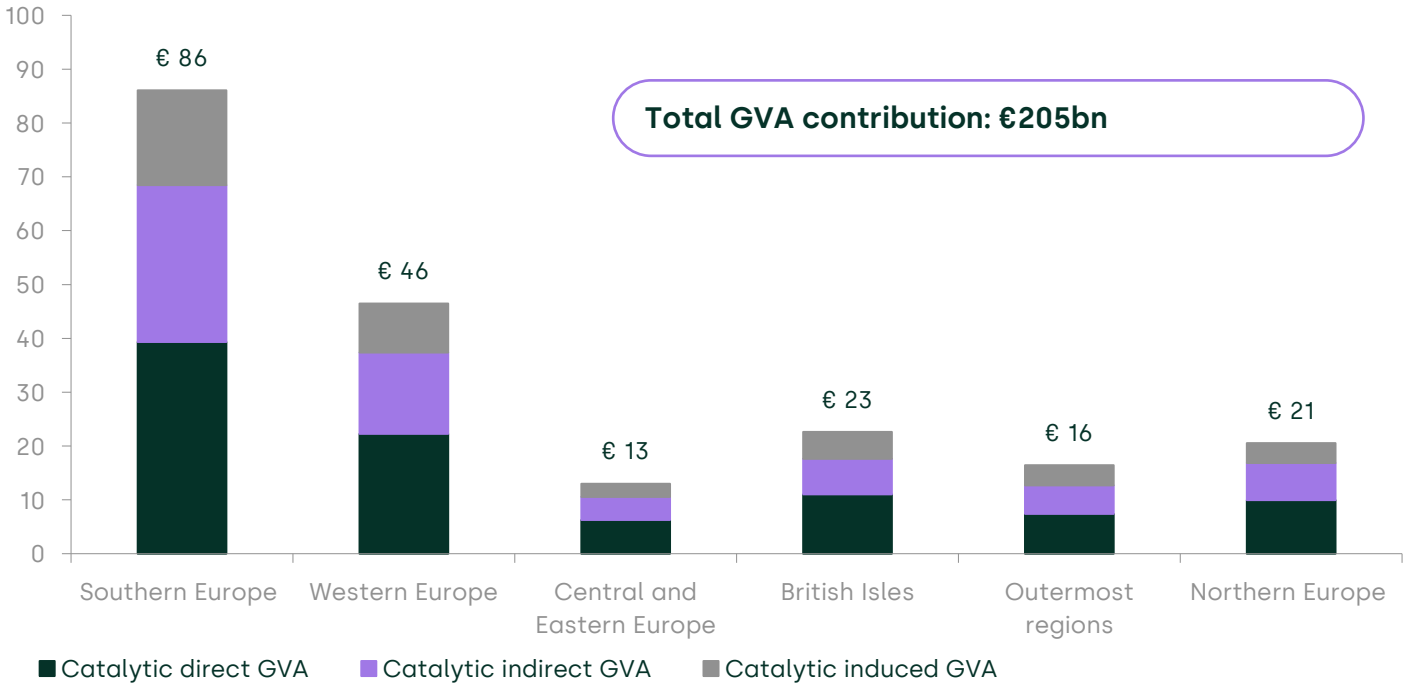
Regional aviation stimulates additional 'catalytic' economic activity by enabling passenger flows and connectivity to different regions. A large portion of this additional economic impact is likely to be associated with tourism flows as a result of regional flights. This economic impact arises directly through the spending of tourists at European destinations, but

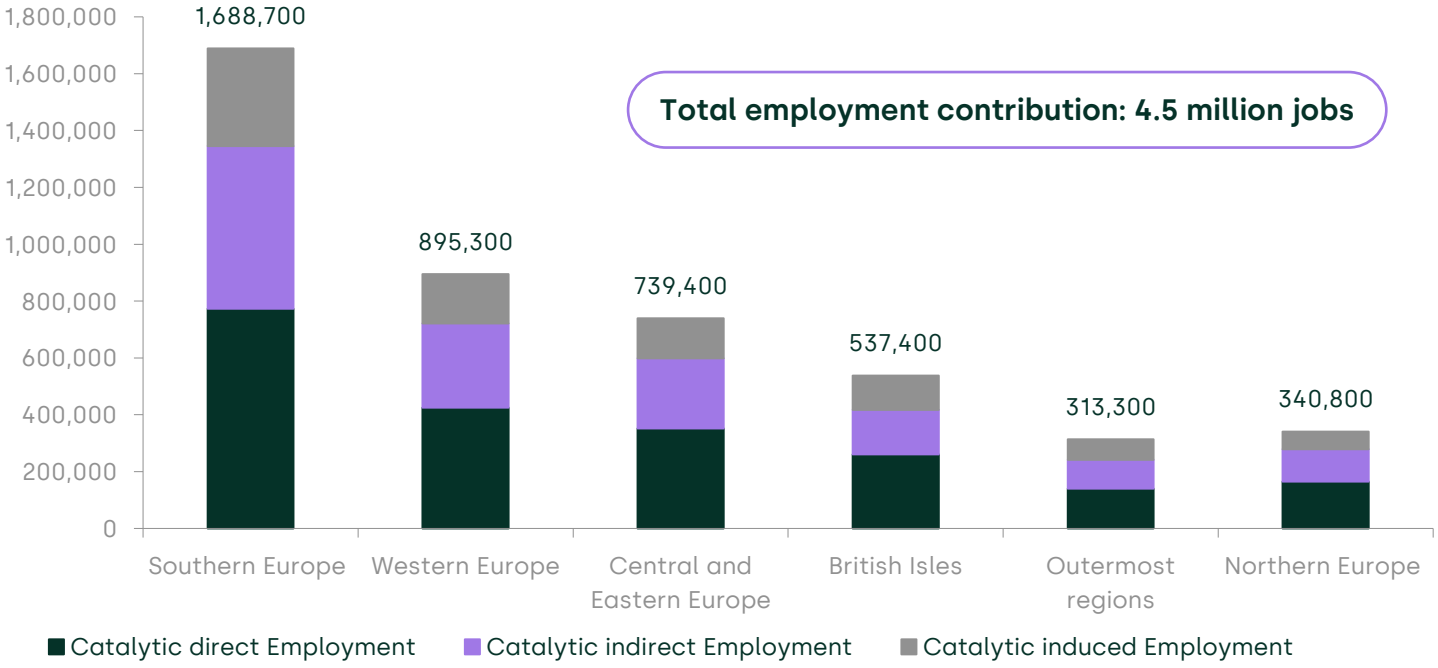
also indirectly through the supply chain of tourism and the wages of direct and indirect employees in tourism-related industries.

We estimate that the tourism enabled by regional aviation supported **4.5 million jobs** and **€205bn in GVA** in 2023 across Europe.

Of this additional economic footprint, approximately **65% of the GVA impact and 57% of the employment impact arose in Western and Southern Europe**, as shown in the figures below.

GVA (bn) and employment impact of tourism enabled by regional aviation in 2023 by region of Europe

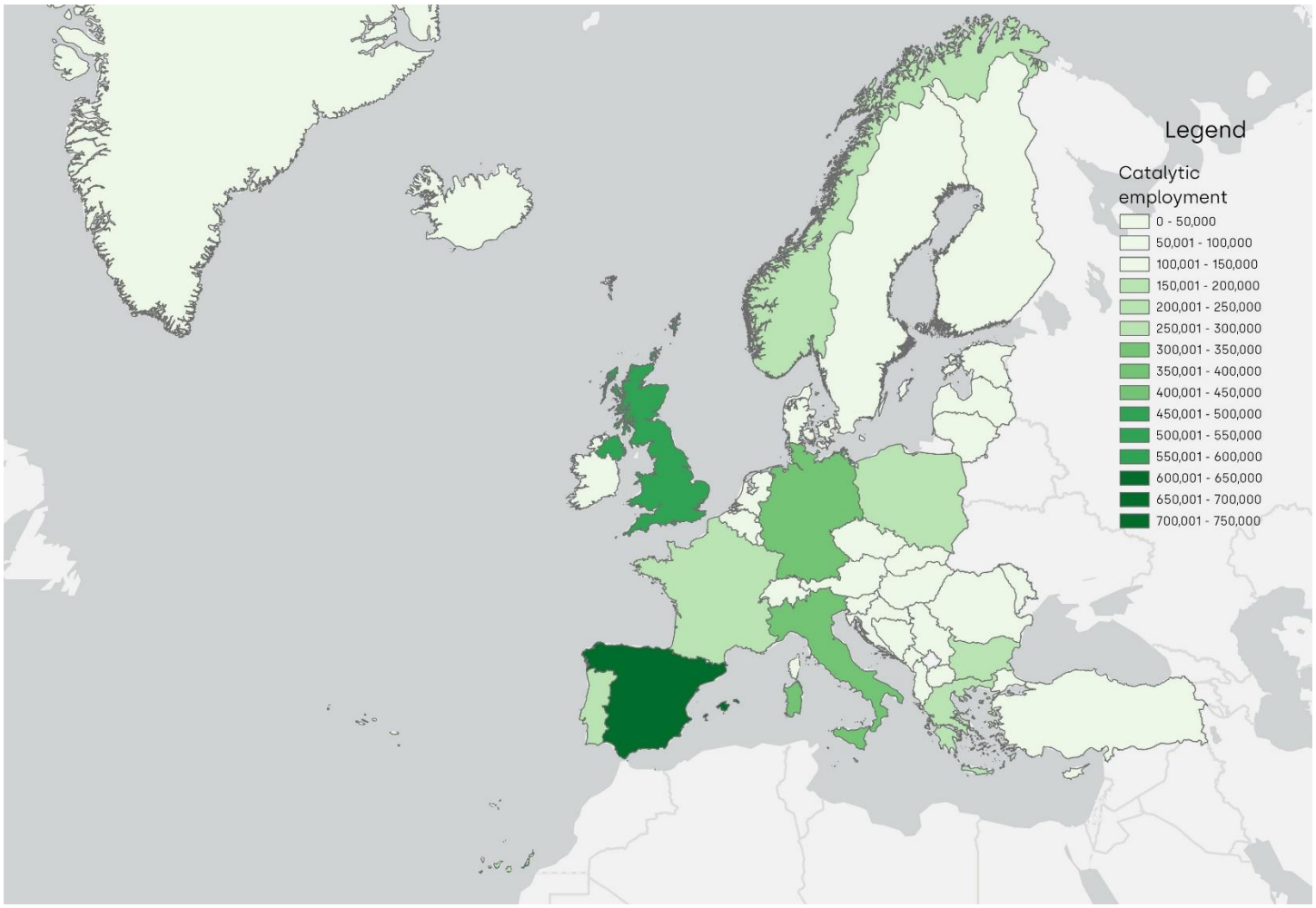




Note: GVA figures are rounded to the nearest 100 million. Employment figures are measured by headcount and are rounded to the nearest 100.
Source: Oxera.

The map below illustrates the geographic distribution of the employment footprint of tourism enabled by regional aviation in 2023.

Employment footprint of tourism generated by regional aviation by country or sub-national territory of Europe in 2023

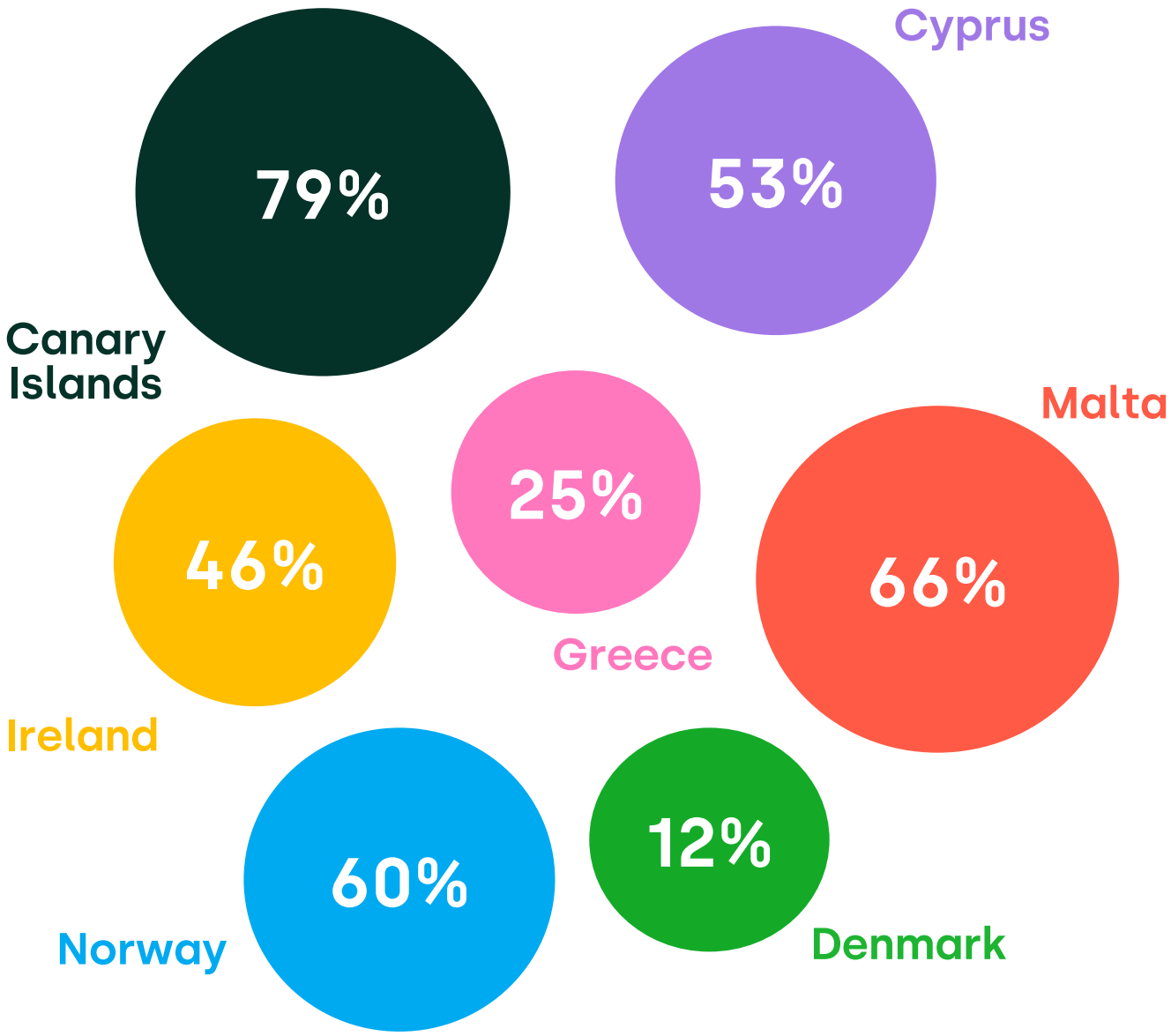


Note: The map shows the total number of employees supported by the direct, indirect and induced footprints of tourism generated by regional air transport across Europe by country. The darker shading indicates that more employment is generated within a given country. The list of countries and sub-national territories considered is set out in section 2.1.2 and in Annex 4.6A1. Only airports located in the European part of Turkey have been considered.
Source: Oxera.

We estimate that the employment generated by tourism as a result of regional aviation is **over 12% of the total direct and indirect tourism employment generated in Europe**.[2] This proportion is higher for areas that rely more heavily on regional aviation, such as Cyprus, the Canary Islands and Malta.

[2] Oxera analysis based on World Travel & Tourism Council (2024), 'Europe 2024 Annual Research: Key Highlights', May, p. 1.

Proportion of total tourism-related employment enabled by regional aviation in 2023



Source: Oxera analysis based on country-specific data from World Travel & Tourism Council (2024), '2024 Annual Research: Key Highlights', June; and Impactur Canarias (2023), 'Estudio del impacto económico del turismo sobre la economía y el empleo de las Islas Canarias', December.

By combining the economic footprint of regional air transport together with that of the tourism it enables, we estimate that in 2023, regional aviation contributed **€228bn in GVA** and supported **4.8 million jobs** across Europe.

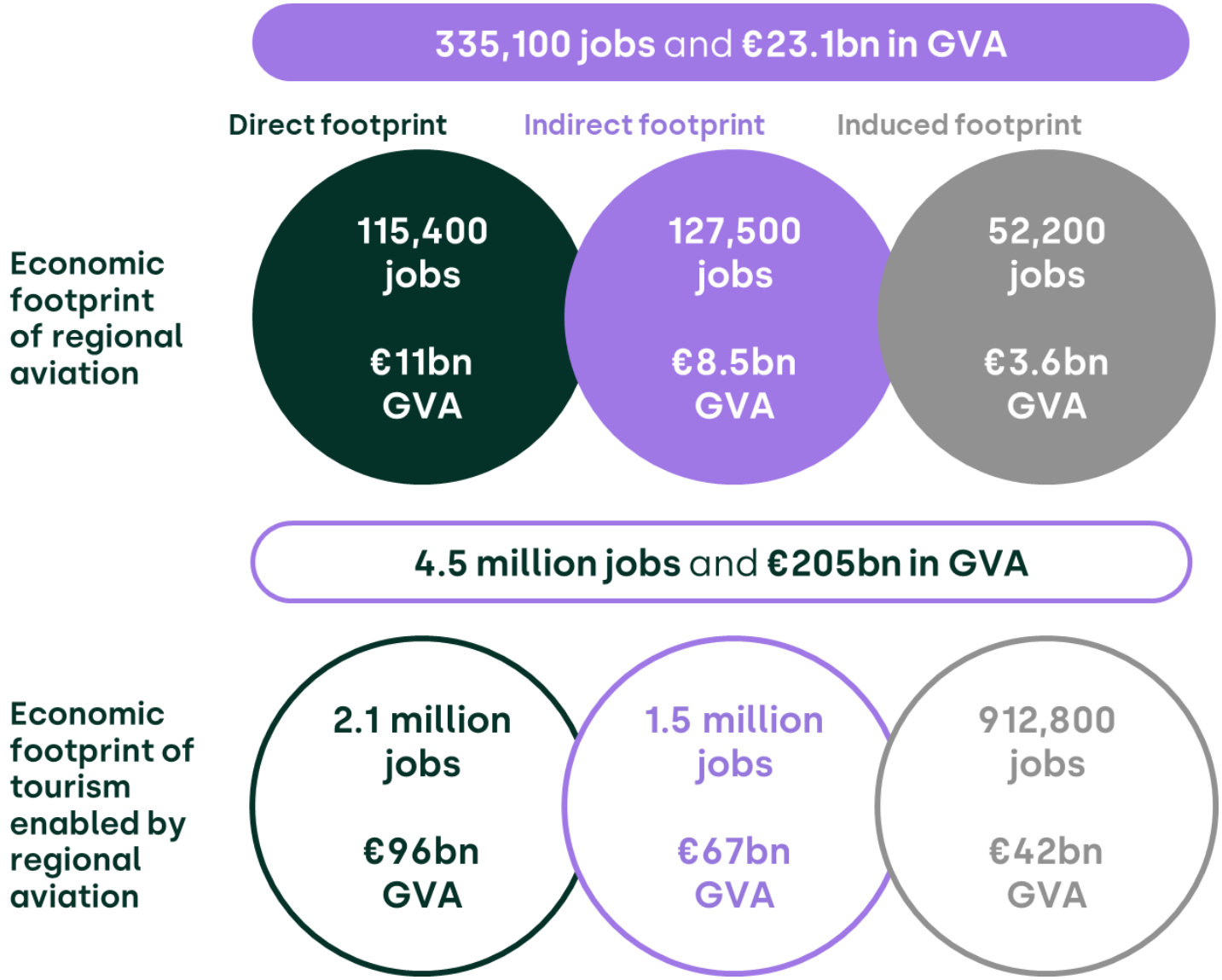
This level of economic activity is **comparable to the GDP of some European countries**, such as Portugal (€274bn), Greece (€227bn), and Hungary (€203bn).[3]

These figures represent a conservative estimate of the total economic impact of regional air transport, as airlines serving regional airports generate economic activity and additional employment through other activities beyond passenger services, such as cargo operations. Additionally, regional air services generate broader catalytic economic benefits beyond tourism, including increasing the attractiveness for businesses to locate in the region or generating additional government revenues, which we have not quantified in this report.

The economic footprint of regional air transport, along with the impact of tourism enabled by airlines operating regional routes in 2023 in Europe, is illustrated below.

[3] World Bank Group, 'GDP (current US$)', accessed November 2024.

Total economic impact of regional air transport in Europe in 2023



Note: Employment is measured by headcount. Employment and GVA figures may not sum due to rounding. GVA figures are presented in 2023 prices.
Source: Oxera.

2 Regional airlines improve social welfare

Regional airlines contribute to the social welfare of regional areas. They provide critical connectivity that links residents to business centres, healthcare, education and family. In many areas, air travel is the only feasible means for individuals to participate in the national and international economy and to access essential services.

To support this, European governments have introduced Public Service Obligations (PSOs) for essential air services to and from remote regions,

especially in areas with limited alternative transport. PSO routes ensure that underserved regions maintain crucial connections.

Research underscores the social value of regional airlines. A study in Norway highlighted the reliance on air travel among residents of remote regions, with over 70% expressing the view that local airports increased their likelihood of remaining in their home regions. Similar trends exist across Europe, where islands such as Corsica and the Canary Islands depend on air services to access mainland cities, with travel by other means either being time consuming or not possible.

The role of regional airlines extends to supporting access to essential services.

In the UK, the National Health Service (NHS) is a major user of inter-island flights in Scotland's remote areas, while **air services are essential for the transport of patients, samples and healthcare staff** to and from Bornholm Island in Denmark.

Studies show that access to these flights is especially valued in remote areas where healthcare professionals depend on air transport for consistent service provision.

Regional airlines also improve opportunities for businesses in regional areas by facilitating quick access to larger markets, attracting talent into regional areas and enabling daily commutes to urban centres.

In Bornholm, **a third of air passengers use flights for work-related travel**, with **over two-thirds indicating that air connectivity is essential for job retention.** In Corsica, **25% of residents travel by air for professional reasons,** making up 62% of passengers on round-trip flights between the island and Paris.

By providing critical links between regional areas and larger urban centres, regional airlines significantly improve quality of life and support regional development across Europe.

3 Regional airlines play a key role in achieving environmental goals in the air transport sector

The aviation sector faces substantial challenges in meeting environmental targets established by European and international authorities. The International Civil Aviation Organization (ICAO) has set a long-term aspirational goal (LTAG) of net-zero carbon emissions for international aviation by 2050, aligned with the United Nations Paris Agreement. The European Green Deal and the European Commission's Fit for 55 proposals further emphasise the need for significant reductions in greenhouse gas emissions–at least 55% by 2030 and achieving net zero by 2050.

To meet these ambitious targets, the aviation industry has already started adopting sustainable aviation fuels (SAFs), improving aircraft and airspace efficiency and investing in innovative aircraft designs and propulsion systems to reduce emissions.

A significant obstacle to the aviation sector's decarbonisation efforts, particularly for regional airlines, is the limited availability of SAF. The current supply of SAF is constrained, and its higher cost compared to traditional jet fuel poses a challenge for widespread adoption. Increasing SAF production and ensuring its widespread availability are crucial for enabling regional airlines to contribute effectively to achieving net-zero emissions by 2050.

Regional airlines are already contributing to decarbonisation efforts by using fuel-efficient turboprop aircraft for short flights (i.e. under 300 nautical miles), which can reduce CO_2 emissions by up to 45% compared to regional jets. Moreover, their focus on offering point-to-point flying helps reduce emissions by providing direct flights to remote and underserved regions, where connecting flights are typically not available. Without these direct services, travellers might otherwise rely on longer, higher-emission journeys by car or other less efficient modes of transport.

In parallel, there is substantial research and development into alternative technologies.

Electric, hybrid and hydrogen aircraft present promising avenues for reducing aviation's environmental impact. **The unique operational model of regional airlines means that they are able to act as test beds for these technologies and can help facilitate wider adoption.**

These technologies can eliminate in-flight CO_2 emissions and reduce other harmful non-CO_2 pollutants, addressing both greenhouse gas emissions and local air quality concerns.

Electric aircraft currently under development have typical ranges of about 200 nautical miles, while hybrid-electric models can extend this to around 500 nautical miles. Hydrogen-powered aircraft could accommodate even longer distances, with estimates indicating that their adoption could significantly reduce emissions on short- to medium-haul flights. These technologies are therefore particularly well-suited to the business model of regional airlines.

The Alliance for Zero-Emission Aviation (AZEA) forecasts that **by 2050, nearly all regional flights within Europe could be powered by hybrid–electric, electric or hydrogen propulsion.**

AZEA estimates that over one-third of short- to medium-haul flights could theoretically be powered by liquid hydrogen. The Destination 2050 roadmap highlights that hydrogen-powered aircraft could enter service by 2035; however, their overall share in sector-wide emission reductions will depend on technological, market, and infrastructure challenges.

Beyond environmental impacts, electric and hydrogen aircraft can also enhance regional connectivity and economic development, particularly in remote communities.

Several regional airlines, such as Widerøe and Loganair, are proactively investing in zero-emission technologies, supported by collaborations with industry stakeholders and initiatives like AZEA.

Despite the promising potential of electric, hybrid and hydrogen aircraft, challenges such as infrastructure costs and regulatory barriers remain. Continued public–private partnerships and strategic investments are crucial for overcoming these hurdles and ensuring that the aviation industry can achieve its decarbonisation targets while supporting regional economic growth and social welfare.

1 Introduction

Regional airlines offer point-to-point flights over short to medium distances, as well as operating within a hub-and-spoke model. They typically serve smaller cities or regions that are not served by many other airlines. By linking smaller communities with larger cities, the connectivity provided by these airlines facilitates the movement of people, promotes economic activity, and enhances social opportunities.

This report presents the economic, social and environmental value of regional air transport in Europe. By value, we mean the role that regional airlines play in supporting activity across European economies, fostering social welfare by enhancing connectivity to underserved regions and contributing to the sector's environmental goals.

The remainder of this report is structured as follows.

- Section 2 quantifies the economic impact of regional air transport by estimating the economic activity it supported in Europe in 2023.
- Section 3 discusses the social value of regional airlines. The social value refers to the additional benefits that regional airlines provide to peripheral, remote or underserved regions across Europe by improving their connectivity.
- Section 4 explores the role of regional airlines in helping the aviation sector to achieve its environmental goals by supporting efforts to decarbonise air transport in Europe.

2 The economic impact of regional air transport

2.1 Introduction

This section presents the economic impact of regional air transport in Europe in 2023. The economic impact is estimated as the scale of the economic activity supported by airlines operating regional routes, measured by employment and Gross Value Added (GVA).[4]

- **Employment** is defined as the employment (of full-time equivalent employees) supported by these airlines.
- **GVA** is a measure of economic productivity that represents the amount of goods and services produced in a country, minus intermediate consumption (i.e. the costs of all inputs and raw materials used in that production).[5]

The economic impact consists of four components, as set out in Table 2.1 below.

Table 2.1 Components of the economic impact

Impact	Description
Direct footprint	Employment and GVA directly generated by regional air transport.
Indirect footprint	Employment and GVA associated with the activity of firms in the supply chain of airlines operating regional routes (e.g. ground handling agents and food and beverage suppliers).
Induced footprint	Employment and GVA associated with the spending of wages by the direct and indirect employees of airlines operating regional routes and their suppliers (e.g. at restaurants and hairdressers).
Catalytic effect	Employment and GVA supported by users of regional aviation (e.g. those visiting the regional area for tourism).

Note: Employment is measured by full-time equivalent employees.
Source: Oxera.

[4] The economic impact is a measure of the 'gross' activity supported by airlines operating regional routes, not accounting for how labour and resources might be used in the absence of these airlines.
[5] GVA is commonly used to measure the value created by specific industries or sectors. GVA differs from GDP, as GVA excludes the impact of taxes and subsidies.

We discuss each of the impacts in more detail in the following subsections.

2.1.1 Defining regional aviation

In order to estimate the economic impact of regional air transport, it is essential to first define what constitutes a regional flight in Europe. There is no commonly agreed definition for the term 'regional flight'.

The European Parliament describes regional flights as those departing from, or arriving at, non-hub airports whose 'principal catchment area is [not] a capital city'.[6] Others base their definition on alternative criteria such as annual passenger volumes that are below a certain threshold,[7] or specific routes served.[8]

For the purposes of this assessment, we have applied three criteria to determine if a European airport should be classified as 'regional'. We consider an airport as regional if:[9]

- it offered fewer than 20 million seats in 2023;[10]
- it is not the largest airport in the country, unless it is the only airport in that country, or;[11]
- it is not located in the same city as the largest airport in the country, or in the same city as an airport with over 20 million seats.[12]

We define regional flights (also referred to as regional aviation or regional air transport throughout this report) as any flights departing from or arriving at regional airports. For instance, according to the criteria above, Nice Côte d'Azur Airport is classified as a regional airport, whereas London Heathrow Airport is not. Any flight between Heathrow and Nice is considered a regional flight because at least one of the

[6] European Parliament (2012), 'European Parliament resolution of 10 May 2012 on the future of regional airports and air services in the EU', May, accessed November 2024.
[7] Lufthansa Consulting (2020), 'Through severe turbulence to new heights: The future of regional airports is tangible for those actively mastering the challenges', December.
[8] Airports Council International defines regional flights as those operating 'short and medium range routes' and intended 'to serve point to point destinations'. Airport Council International, 'Regional Airports' Forum', accessed August 2024.
[9] Based on OAG 2023 data. We have made exceptions for four airports that did not classify as regional under our criteria, but which primarily handle short- and medium-haul routes: Edinburgh Airport, Bromma Stockholm Airport, Belgrade Nikola Tesla Airport and Franjo Tuđman International Airport (Zagreb). The countries and sub-national territories within scope are set out in section 2.1.2 below.
[10] We assumed a 1:1 ratio of departing-to-arriving flights and focused on airports with fewer than ten million departing seats, based on OAG 2023 data.
[11] For example, Luxembourg Airport and Malta International Airport are the only airports in their respective countries.
[12] This is the case for airports that may qualify as regional, according to the first and second criteria we have set out, but are located in large cities. For example, London City Airport (London, England).

airports is classified as regional. This classification applies even if one of the airports is located outside Europe. For example, flights from Nice Airport to Tunis–Carthage Airport in Tunisia would still be classified as regional flights.

Throughout this report, the terms regional flights and regional areas refer to the definitions of regional flights and areas (i.e. the location around the airports) set out above.

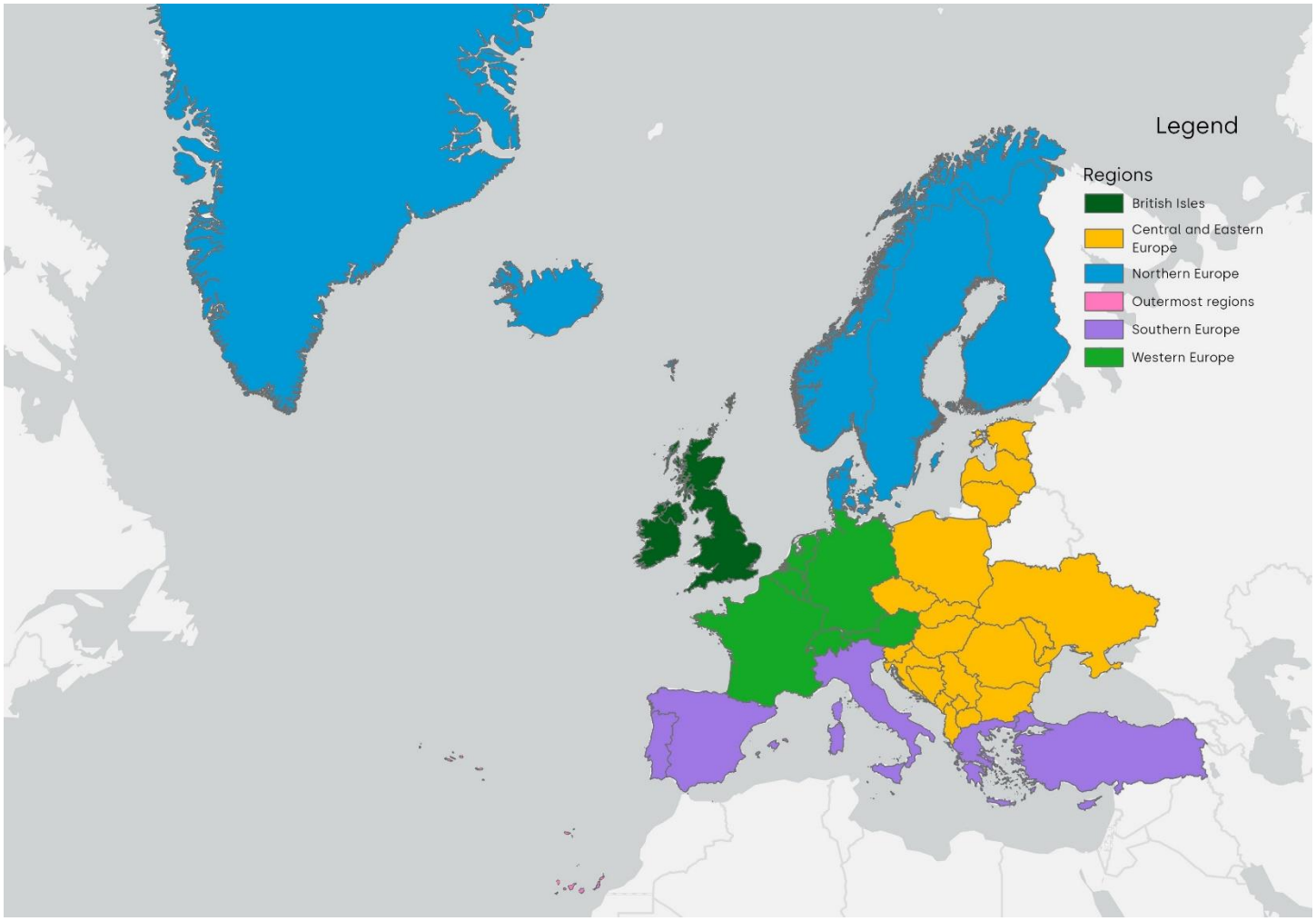
2.1.2 Study areas

As part of assessing the economic impact of regional air transport in Europe, we have defined six regions to show the distribution of impacts: British Isles, Central and Eastern Europe, Northern Europe, Outermost regions, Southern Europe and Western Europe.

Figure 2.1 below illustrates the mapping of each country and sub-national territory to the different regions. The geographic scope considered aligns with the countries included in EUROCONTROL.[13] Further detail is included in Annex A1.

[13] With the exceptions of Georgia and Armenia, which are excluded.

Figure 2.1 National and sub-national study areas by region of Europe



Note: Only airports located in the European part of Turkey have been considered. For further detail on the countries and sub-national territories included in each region, see Annex 4.6A1.
Source: Oxera.

The remainder of this section is structured as follows.

- Section 2.2 provides an overview of the total economic footprint of regional air transport in 2023.
- Sections 2.3, 2.4 and 2.5 detail the estimation of the direct, indirect and induced economic footprints of regional air transport in 2023.
- Section 2.6 explores one of the most significant catalytic effects of regional aviation – tourism.
- Section 2.7 examines additional catalytic effects of regional aviation.

2.2 Total economic footprint

Table 2.2 below presents the total economic footprint of regional air transport in Europe. In 2023, regional aviation contributed €23.1bn in GVA and supported 335,100 jobs in Europe through their direct, indirect and induced impacts.

Table 2.2 Total economic footprint of regional air transport in Europe in 2023

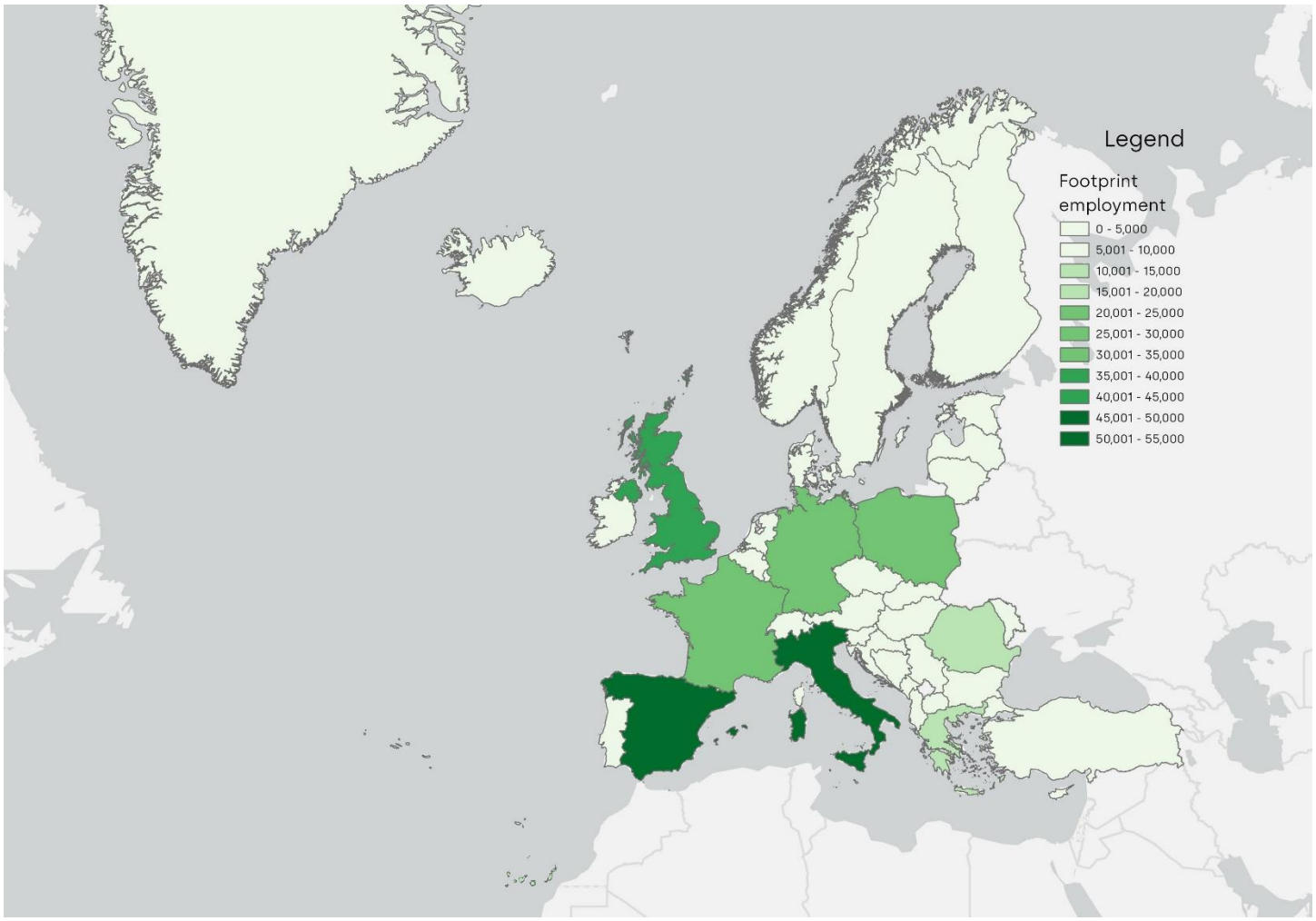
	GVA (m)	Employment
Direct footprint	€10,960	155,400
Indirect footprint	€8,510	127,500
Induced footprint	€3,590	52,200
Total economic footprint	**€23,060**	**335,100**

Note: Employment is measured by headcount and rounded to the nearest 100. GVA figures are rounded to the nearest ten million and are presented in 2023 prices. Figures may not sum due to rounding.
Source: Oxera.

Of the total footprint presented above, approximately 67% of the GVA impact arose in Western and Southern Europe.[14] This is due to the significantly higher volume of regional flights in these areas when compared to other countries. Figure 2.2 below illustrates the geographic distribution of the employment footprint of regional air transport in 2023.

[14] For employment, the corresponding figure is 60%.

Figure 2.2 Employment footprint of regional air transport by country or sub-national territory of Europe in 2023



Note: The map shows the total number of employees supported by the direct, indirect and induced footprints of airlines operating regional routes in Europe. As shown by the legend (in the top right-hand corner), darker shading indicates that more employment is generated within a given country or territory. The list of countries and sub-national territories considered is set out in section 2.1.2 and in Annex 4.6A1. Only airports located in the European part of Turkey have been considered.
Source: Oxera.

In the following subsections, we explain the estimation of the direct, indirect and induced footprint of regional aviation in further detail and present the results for each footprint separately. These footprints capture the contribution of regional air transport through airlines' passenger flight operations. In practice, airlines operating regional routes generate additional employment and economic activity through other activities, such as providing cargo services. Therefore, the estimates presented in this section can be considered as a conservative estimate of their impact.

2.3 Direct footprint

The direct footprint is the economic activity that is directly linked to regional air transport (for instance, employees of airlines). It is measured by direct employment and direct GVA.

To assess the direct footprint of regional aviation, we first need to determine the extent to which airline operations rely on local labour and resources at both the origin and destination airports. This involves analysing the share of airline revenue derived from local inputs.

To achieve this, we analyse fare revenue for flights to, and from, European airports in 2023 and disaggregate the revenue into cost components.[15, 16] We then determine how these costs are distributed across Europe, with the understanding that these activities directly impact the economies of the relevant areas. This ensures fare revenues are accurately apportioned between origin and destination locations.[17] For example, salaries for staff who work at the origin and destination airports are attributed to their respective local economies. However, some components of airlines' costs–such as fuel and oil–may be directed to suppliers outside of Europe, and therefore do not contribute directly to the European economy.

This attribution is used to estimate the portion of direct airline output which contributes to the economies surrounding the origin and destination airports of a flight. We then use national statistics on GVA per output and GVA per job in the air transport services industry to estimate the direct GVA and employment supported by regional air transport in these locations.[18]

[15] ATR, the aircraft manufacturer, provided analysis of aggregated passengers and fare revenues for all flights to and from Europe in 2023 from the Milanamos travel database. The air fare revenues for flights that qualified as regional were identified.
[16] We used data on the proportion of different costs relative to total airline costs, as reported in International Air Transport Association (2024), 'Unveiling the biggest airline costs', June. Additionally, we used data on airline profits as a proportion of revenues in 2023, as reported in International Air Transport Association (2023), 'Airlines Set to Earn 2.7% Net Profit Margin on Record Revenues in 2024', December.
[17] For further detail on how cost components are allocated between origin and destination areas, see Annex 4.6A2.
[18] We used statistics for each of the countries considered. For sub-national territories, we used statistics for the countries that these territories belong to. GVA per output and GVA per job ratios for the air transport industry for countries in the European Union were calculated from the most recent data available at Eurostat (2024), 'Symmetric input-output table at basic prices (product by product)', July; Eurostat (2024), 'Symmetric input-output table at basic prices (industry by industry)', July; and Eurostat (2024), 'Employment by sex, age and detailed economic activity (from 2008 onwards, NACE Rev. 2 two digit level) – 1 000', June. Data for countries outside of the European Union was obtained from United Nations Statistics Division (2023), 'Table 2.6 Output, gross value added and fixed assets by industries at current prices (ISIC Rev. 4)', October, and from other national Input-Output Analytical tables. When statistics were not available for specific countries, we used the average GVA per output and GVA per job ratios from countries for which data was available.

The direct footprint of regional air transport is presented by region in Table 2.3 below.[19] In 2023, airlines operating regional flights supported approximately 155,400 jobs and generated €11bn in GVA across Europe.[20] This highlights the significant economic activity directly facilitated by regional aviation.

Table 2.3 Direct footprint of regional air transport in Europe in 2023

	GVA (m)	Employment
Southern Europe	€3,700	56,400
Western Europe	€3,530	36,400
Central and Eastern Europe	€1,020	31,000
British Isles	€1,690	18,500
Outermost regions	€440	6,700
Northern Europe	€590	6,500
Total direct footprint	**€10,960**	**155,400**

Note: Employment is measured by headcount and rounded to the nearest 100. GVA figures are rounded to the nearest ten million and are presented in 2023 prices. Figures may not sum due to rounding. The employment impact in Central and Eastern Europe represents a significantly larger share of the direct footprint compared to the GVA impact, reflecting lower productivity in these countries.
Source: Oxera.

2.4 Indirect footprint

The indirect footprint is an estimate of the employment and GVA that is supported in Europe through the supply chain of airlines operating regional flights–for example, the employment and GVA generated through catering companies serving these airlines.

The indirect output of regional aviation is calculated using the direct output, estimated above, and input–output tables—which describe how primary inputs and products are used to produce further products and

[19] The detailed list of countries and sub-national territories included within each region of Europe is detailed in Annex 4.6A1.
[20] Our economic footprint analysis focuses solely on the employment required to support passenger services. It does not account for other airline activities, such as cargo operations, which also contribute to overall employment.

outputs for final consumption—for each country.[21] The indirect GVA and employment is then estimated using national statistics on GVA per output and GVA per job for the air transport services industry.[22]

The indirect footprint of regional air transport in Europe is presented in Table 2.4 below.[23] In 2023, airlines operating regional flights supported 127,500 jobs and generated €8.5bn in GVA in Europe through their supply chain. This implies that, for each direct job facilitated by the airlines, an additional 0.8 indirect jobs were supported through the airlines' supply chains in different European countries.

Table 2.4 Indirect footprint of regional air transport in Europe in 2023

	GVA (m)	Employment
Southern Europe	€3,400	52,400
Western Europe	€2,280	23,500
Central and Eastern Europe	€840	27,300
British Isles	€1,190	13,600
Outermost regions	€450	6,800
Northern Europe	€340	3,900
Total indirect footprint	**€8,510**	**127,500**

Note: Employment is measured by headcount and rounded to the nearest 100. GVA figures are rounded to the nearest ten million and are presented in 2023 prices. Figures may not sum due to rounding. The employment impact in Central and Eastern Europe represents a significantly larger share of the direct footprint compared to the GVA impact, reflecting lower productivity statistics in these countries.
Source: Oxera.

[21] Input–output indirect multipliers for the air transport services industry were used. Input–output tables for countries in the European Union were sourced from Eurostat (2024), 'Symmetric input-output table at basic prices (product by product)', July; and Eurostat (2024), 'Symmetric input-output table at basic prices (industry by industry)', July. For countries outside of the European Union, input–output tables were obtained from countries' national statistics offices. For sub-national territories, we used the tables corresponding to the countries these territories belong to. Where input–output tables were not available at the desired level of detail for specific countries, we used the average direct–indirect output relationship implied by the country-specific tables for which we had data. This was the case for Albania, Bosnia and Herzegovina, Switzerland, Iceland, Luxembourg, Montenegro, North Macedonia, Malta, Moldova and Serbia.
[22] See footnote 19.
[23] The detailed list of countries and sub-national territories included within each region of Europe is detailed in Annex 4.6A1.

2.5 Induced footprint

The induced footprint is an estimate of the employment and GVA supported in European countries by the spending of wages by direct and indirect employees of airlines serving regional airports. This includes additional jobs and GVA created by local businesses, such as restaurants or hairdressers, due to the expenditure of employees working for regional airlines and in their supply chains.

Similar to the indirect footprint, the induced footprint is estimated using input–output analysis. However, we amend the input–output model to account for the compensation of employees and final consumption expenditure by households. This is intended to account for the fact that a bigger air transportation sector would generate additional income (i.e. more wages through additional employment) and additional spending (i.e. more spending through the additional income generated) in other sectors (for example, at local grocery shops).[24]

The induced footprint of regional aviation is presented in Table 2.5 below. We estimate that €3.6bn was generated in GVA and that 52,200 jobs were supported by the induced footprint of airlines operating regional flights in 2023. This implies that, for each direct and indirect job facilitated by the airlines, a further 0.2 jobs were supported through induced spending.

Table 2.5 Induced footprint of regional air transport in Europe in 2023

	GVA (m)	Employment
Southern Europe	€1,330	20,200
Western Europe	€1,130	11,600
Central and Eastern Europe	€300	10,200
British Isles	€500	5,800
Outermost regions	€200	3,000

[24] Input–output induced multipliers for the air transport services industry were used. Input–output tables generally include information on the compensation of employees by sector. Data on the final consumption by households for countries in the European Union was sourced from Eurostat (2024), 'Non-financial transactions – annual data', July. For countries outside of the European Union, data on the final consumption by households was obtained from national statistics offices. For sub-national territories, we used data corresponding to the countries these territories belong to. Where input–output tables were not available at the desired level of detail for specific countries, we used the average direct-induced output relationship implied by the country-specific tables for which we had data. This is the case for the countries listed in footnote 21.

	GVA (m)	Employment
Northern Europe	€130	1,400
Total induced footprint	**€3,590**	**52,200**

Note: Employment is measured by headcount and rounded to the nearest 100. GVA figures are rounded to the nearest ten million and are presented in 2023 prices. Figures may not sum due to rounding. The employment impact in Central and Eastern Europe represents a significantly larger share of the direct footprint compared to the GVA impact, reflecting lower productivity statistics in these countries.
Source: Oxera.

2.6 Catalytic impacts: tourism

The catalytic impact refers to the additional economic activity generated by firms in European countries as a result of the presence of regional air transport. The activity of these firms is not directly related to the airlines' activities—i.e. it is not related to the direct, indirect or induced footprint—but the firms nevertheless benefit from the passenger flows and additional connectivity that the airlines offer.

By providing more direct routes and additional connectivity, the presence of regional air services enhances the appeal of European regions for businesses looking to establish or expand operations. This stimulates economic activity in various ways, such as by increasing labour demand and enhancing productivity. While there are a number of potential benefits of regional aviation (see section 2.7 below for further detail), this assessment focuses on one particular benefit that is likely to represent a significant part of the catalytic effects arising from regional aviation–the economic impact of tourism facilitated by regional airlines.

Regional airlines enable tourists to travel to regional areas, spending money on accommodation, dining, entertainment and other cultural activities, and contributing significantly to the local economy. Additionally, suppliers of tourism-related services often depend on local supply chains and employ individuals who spend their wages in the local area. As a result, tourism supports a large number of jobs and local businesses across a wide range of industries.

This economic activity is particularly significant for islands and remote regions, where air transport is often the primary or sole means for tourists to access the area. This is, for example, the case for regions such as the Azores, Balearic Islands, Canary Islands, Channel Islands, Faroe Islands, Madeira, Sardinia and Sicily.

Table 2.6 below presents data on the proportion of GDP supported by tourism in these regions, along with the proportion of tourists arriving by air. These figures illustrate the crucial role of regional air travel in sustaining economic activity in these locations.

Table 2.6 Proportion of GDP supported by tourism in select regions

Region	Number of annual inbound tourists	Proportion of tourists arriving by air	Proportion of region's GDP supported by tourism
Azores	712,503	100%	19%
Balearic Islands	22,032,530	84%	40%
Canary Islands	14,170,762	87%	35%
Channel Islands	1,716,000	73%	14–24%[1]
Faroe Islands	70,000	70%	6%
Madeira	4,094,051	92%	29%
Sardinia	4,525,712	63%	7%
Sicily	8,591,385	58%	15%

Note: [1] Tourism accounted for 24% of GDP in Jersey and 14% in Guernsey.
Source: Oxera based on the latest information available from national statistics offices and other public sources.

In this subsection, we present the estimates of the direct, indirect, and induced footprint of tourism facilitated by regional aviation in Europe in 2023, measured in terms of GVA and employment.

2.6.1 Total economic footprint of tourism

Table 2.7 below presents the total economic footprint of tourism enabled by regional aviation in 2023. It is estimated that this tourism supported 4.5 million jobs and generated €205bn in GVA in Europe. As explained previously, these estimates reflect a significant proportion of the catalytic effect of regional aviation. However, there are other catalytic benefits that we have not quantified, and as such this estimate is likely to be conservative.

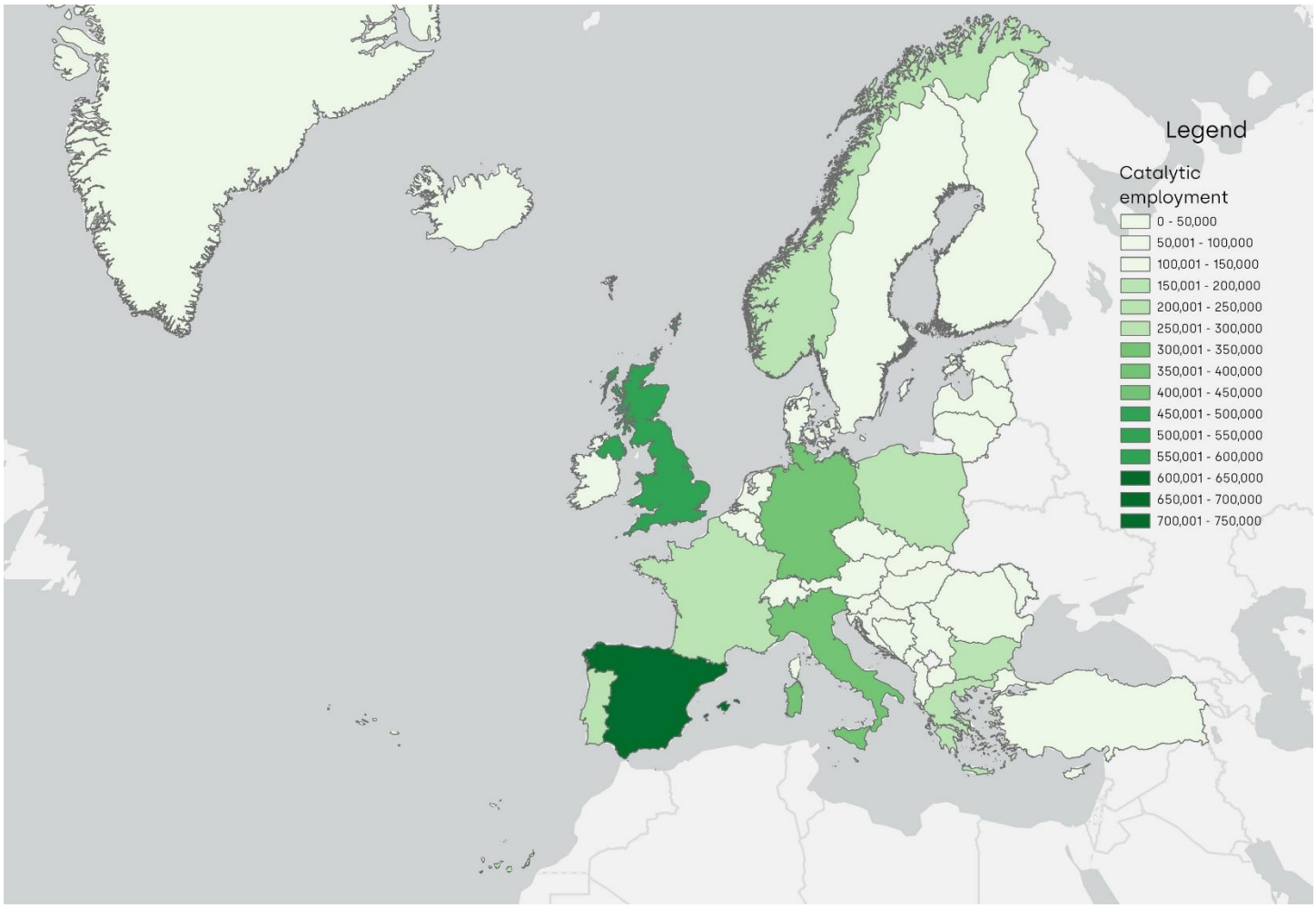
Table 2.7 Total economic footprint of tourism generated by regional aviation in Europe in 2023

	GVA (bn)	Employment
Direct footprint	€96.2	2,116,200
Indirect footprint	€67.4	1,485,800
Induced footprint	€41.6	912,800
Total economic footprint	**€205**	**4,510,000**

Note: Employment is measured by headcount and rounded to the nearest 100. GVA figures are rounded to the nearest 100,000 million and are presented in 2023 prices. Total figures are rounded to the nearest billion and nearest 10,000 respectively. Figures may not sum due to rounding.
Source: Oxera.

Figure 2.3 below illustrates the geographic distribution of the employment footprint of tourism facilitated by regional aviation in 2023. This provides an overview of the areas that benefit more significantly from the presence of regional flights in terms of the level of employment supported by tourism.

Figure 2.3 Employment footprint of tourism generated by regional air transport by country or sub-national territory of Europe in 2023



Note: The map shows the total number of employees supported by the direct, indirect and induced footprints of tourism generated by regional air transport across Europe by country. The darker shading indicates that more employment is generated within a given country. The list of countries and sub-national territories considered is set out in section 2.1.2 and in Annex 4.6A1. Only airports located in the European part of Turkey have been considered.
Source: Oxera.

Employment generated by regional aviation, both directly and indirectly through tourism, constitutes a significant share of the overall tourism-related employment in Europe. In 2023, our estimates indicate that regional air transport supported 12% of total direct and indirect tourism employment across Europe.[25]

[25] Oxera analysis based on World Travel & Tourism Council (2024), 'Europe 2024 Annual Research: Key Highlights', May, p. 1.

This impact is greater in countries with substantial regional air traffic. For instance, in countries like Malta, where the local economy relies heavily on travel and tourism, our estimates indicate that employment generated by regional aviation accounted for 66% of the total direct, indirect and induced jobs associated with travel and tourism.[26] Similarly, in Spain's Canary Islands, we estimate that jobs related to tourism facilitated by regional aviation contributed to 79% of the region's total tourism-related employment.[27]

In the following subsections, we explain the estimation of the direct, indirect and induced footprint of tourism enabled by regional air travel in further detail.

2.6.2 Direct footprint of tourism

The direct footprint of tourism facilitated by regional aviation refers to the economic activity directly generated by tourists who travel on regional air services to destinations across Europe. This impact is measured by the direct catalytic employment and GVA resulting from tourist-related spending in these locations.

To estimate this direct tourism footprint, we first estimate tourist expenditure in regional destinations in 2023. An overview of the method used is provided in Table 2.8 below.

Table 2.8 Calculation of tourist expenditure associated with regional air travel

Number of tourists associated with regional air travel	The number of tourists that travelled to different European countries in 2023 using regional air travel is estimated using 2023 data on total tourist arrivals by air per country (A), the total number of air arrivals per country (B), and the number of arrivals via flights that involved a regional airport (C).[28] The number of tourists arriving at different destinations associated with regional air travel in 2023 was then calculated as (A/B)*C.

[26] Based on World Travel & Tourism Council (2024), 'Malta 2024 Annual Research: Key Highlights', June, p. 1.
[27] Based on Impactur Canarias (2023), 'Estudio del impacto económico del turismo sobre la economía y el empleo de las Islas Canarias', December.
[28] Data on the number of air tourist arrivals per country was sourced from public sources. In cases where this information was unavailable, we used the average proportion based on data from countries where it was available. For total air arrivals by location, ATR provided us with passenger data analysis for all flights to and from Europe in 2023 from the Milanamos travel database. The number of passengers arriving at regional airports was obtained according to our definition in section 2.1.1.

Tourist expenditure per arrival	Average tourist expenditure per arrival for the different countries considered was sourced from the United Nations World Tourism Organisation data for inbound tourism.[29]
Tourism expenditure associated with regional air travel	Tourist expenditure was calculated by multiplying the number of tourist arrivals at regional locations in 2023 by the average expenditure per tourist arrival.[30]

Source: Oxera.

Total tourism expenditure is then disaggregated into various sectors of the economy where tourists spend their money. We categorise overall expenditure into the following sectors: accommodation services; food and beverage services; travel agencies and other reservation services; cultural services; and sports and recreational services.[31] This categorisation is based on data from 2022, which shows the proportion of tourism spending across these sectors in different countries.[32] For each of these sectors, we used national statistics on GVA per output and GVA per job ratios to estimate the direct GVA and employment supported by tourism in each sector.[33]

Table 2.9 below presents the estimated direct footprint of tourism facilitated by regional air travel in Europe in 2023. We estimate that tourism generated €96.2bn in GVA and supported 2.1 million jobs across Europe.

[29] The most recent data was obtained and adjusted to 2023 prices when necessary. United Nations World Tourism Organisation, 'Global and regional tourism performance', accessed July 2024. For sub-national territories, we obtained tourist spend per arrival data from publicly available sources. When specific information was unavailable, we used the average spending per tourist arrival based on data from countries where it was available.
[30] Our assessment excludes the domestic expenditure lost when residents of regional areas travel to other destinations. However, this impact is likely less significant than the effects of inbound tourist spending, as local residents would likely spend considerably less if they remained at home rather than going on holiday.
[31] This is consistent with the definition of the sectors that support tourism provided by United Nations (2010), 'International Recommendations for Tourism Statistics', New York.
[32] Eurostat (2024), 'Expenditure by duration, purpose, main destination of the trip and expenditure category', February. Expenditures under the category 'other' were split equally into the following sectors: travel agencies and other reservation services, cultural services and sports, and recreational services.
[33] We used statistics for each of the countries considered. For sub-national territories, we used statistics for the countries that these territories belong to. GVA per output and GVA per job ratios for countries in the European Union were calculated from the most recent data available at Eurostat (2024), 'Symmetric input-output table at basic prices (product by product)', July; Eurostat (2024), 'Symmetric input–output table at basic prices (industry by industry)', July; and Eurostat (2024), 'Employment by sex, age and detailed economic activity (from 2008 onwards, NACE Rev. 2 two digit level) – 1 000', June. Data for countries outside of the European Union was obtained from United Nations Statistics Division (2023), 'Table 2.6 Output, gross value added and fixed assets by industries at current prices (ISIC Rev. 4)', October, and from other national input–output analytical tables. When statistics were not available for specific countries, we used the average GVA per output and GVA per job ratios from countries for which data was available.

Table 2.9 Direct footprint of tourism generated by regional air travel in Europe in 2023

	GVA (bn)	Employment
Southern Europe	€39.3	773,600
Western Europe	€22.3	425,100
Central and Eastern Europe	€6.3	352,000
British Isles	€11.0	261,000
Outermost regions	€7.4	140,100
Northern Europe	€10.0	164,400
Total direct footprint	**€96.2**	**2,116,200**

Note: Employment is measured by headcount and rounded to the nearest 100. GVA figures are rounded to the nearest 100,000 million and are presented in 2023 prices. Figures may not sum due to rounding. The employment impact in Central and Eastern Europe represents a significantly larger share of the direct footprint compared to the GVA impact, reflecting lower productivity statistics in these countries.
Source: Oxera.

2.6.3 Indirect footprint of tourism

The indirect footprint of tourism facilitated by regional aviation is an estimate of the employment and GVA that is supported in Europe through the supply chain associated with tourism.

Similar to the indirect and induced footprints estimated in sections 2.4 and 2.5 above, this indirect footprint is estimated using input–output analysis for the sectors of the economy that support tourism.[34] The indirect footprint of tourism associated with regional air transport in 2023 is presented below in Table 2.10.

[34] Input–output indirect multipliers for the different industries that constitute tourism were used. Input–output tables for countries in the European Union were sourced from Eurostat (2024), 'Symmetric input–output table at basic prices (product by product)', July; and Eurostat (2024), 'Symmetric input–output table at basic prices (industry by industry)', July. For countries outside of the European Union, input–output tables were obtained from countries' national statistics offices. For sub-national territories, we used the tables corresponding to the countries these territories belong to. Where input–output tables were not available at the desired level of detail for specific countries, we used the average direct–indirect output relationship implied by the country-specific tables for which we had data. This was the case for Albania, Bosnia and Herzegovina, Switzerland, Iceland, Luxembourg Montenegro, North Macedonia, Malta, Moldova and Serbia.

Table 2.10 Indirect footprint of tourism generated by regional aviation in Europe in 2023

	GVA (m)	Employment
Southern Europe	€29.2	571,700
Western Europe	€15.1	295,700
Central and Eastern Europe	€4.3	246,000
British Isles	€6.6	156,000
Outermost regions	€5.3	101,900
Northern Europe	€6.9	114,600
Total indirect footprint	**€67.4**	**1,485,800**

Note: Employment is measured by headcount and rounded to the nearest 100. GVA figures are rounded to the nearest 100,000 million and are presented in 2023 prices. Figures may not sum due to rounding. The employment impact in Central and Eastern Europe represents a significantly larger share of the direct footprint compared to the GVA impact, reflecting lower productivity statistics in these countries.
Source: Oxera.

In 2023, the economic activity generated by the suppliers to regional providers of tourism services—i.e. the indirect footprint of tourism associated with regional aviation—was €67.4bn in GVA, supporting 1.5 million jobs.

2.6.4 Induced footprint of tourism

The induced footprint of tourism that is associated with regional air transport is an estimate of the employment and GVA supported in Europe by the spending of wages by direct and indirect employees to the providers of tourism services. This includes additional jobs and GVA created in local businesses, such as grocery or retail shops, due to the expenditure of employees working for restaurants, hotels or other tourism-related industries.

This induced footprint is estimated using input–output modelling as above, adjusted to account for employee compensation and final consumption expenditure by households. As described in section 2.5, this methodology accounts for the extent to which an increase in GVA in one sector (for instance, accommodation or food and beverage services)

generates additional income and spending in other sectors of the economy.[35]

Table 2.11 below presents the induced footprint of tourism facilitated by regional aviation in 2023. In Europe, 912,800 jobs and €41.6bn in GVA were generated by the spending of wages of direct and indirect employees of tourism-related services.

Table 2.11 Induced footprint of tourism generated by regional air transport in Europe in 2023

	GVA (m)	Employment
Southern Europe	€17.6	343,400
Western Europe	€9.1	174,500
Central and Eastern Europe	€2.5	141,300
British Isles	€5.0	120,400
Outermost regions	€3.8	71,300
Northern Europe	€3.7	61,800
Total induced footprint	**€41.6**	**912,800**

Note: Employment is measured by headcount and rounded to the nearest 100. GVA figures are rounded to the nearest 100,000 million and are presented in 2023 prices. Figures may not sum due to rounding. The employment impact in Central and Eastern Europe represents a significantly larger share of the direct footprint compared to the GVA impact, reflecting lower productivity statistics in these countries.
Source: Oxera.

2.7 Other catalytic effects

As mentioned above, regional aviation can stimulate economic activity in Europe through a number of mechanisms, beyond the facilitation of tourism and its associated economic impacts.

[35] Input–output induced multipliers for the different industries that constitute tourism were used. Input–output tables generally include information on the compensation of employees by sector. Data on the final consumption by households for countries in the European Union was sourced from Eurostat (2024), 'Non-financial transactions – annual data', July. For countries outside of the European Union, data on the final consumption by households was obtained from national statistics offices. For sub-national territories, we used data corresponding to the countries these territories belong to. Where input–output tables were not available at the desired level of detail for specific countries, we used the average direct-induced output relationship implied by the country-specific tables for which we had data. This is the case for the countries listed in footnote 34.

Estimating the monetary benefits associated with these catalytic impacts is complex, and obtaining precise figures can be difficult. Therefore, we have focused our analysis on the economic footprint of tourism facilitated by regional aviation, as this likely represents one of the largest catalytic effects. However, in the following subsections, we highlight other significant catalytic benefits of regional aviation.

2.7.1 Regional freight services enable the flow of essential goods

While the assessment in this report focuses on the economic impact associated with the transportation of passengers by regional air transport, regional airlines also provide essential freight services. These services are particularly vital for islands and peripheral areas, where limited road and rail networks often make air transport the most viable option for freight transport.

Regional areas are typically underserved by traditional logistics companies such as FedEx and UPS. The high operating costs associated with running services to these areas, combined with the limited freight demand due to smaller populations, have made it unprofitable for commercial freight services to operate in these areas.

In contrast, by combining cargo with passenger flights, regional airlines can make it viable to provide these services where freight demand alone is insufficient to sustain the route. When passenger demand is low, but the need for bulk goods is high, dedicated freighter aircraft are instead used to fulfil the demand. Regional airlines rely on smaller aircraft – such as modified cargo versions of turboprops or regional jets – which can operate on shorter runways and at smaller airports commonly found in remote regions.

Regional airlines transport a wide range of goods, such as food, medical supplies, mail, electronics, artwork and livestock.[36] Regional freighters also facilitate e-commerce, which has significantly expanded the range of goods available to people living in remote communities.[37] Many of these items are perishable or urgently needed, and air transport offers the fastest and most reliable way to ensure their safe delivery. Regional air services therefore enable consumers and businesses across Europe to access essential goods and inputs for production.

Regional airlines also allow producers to export their goods to international markets, generating revenue, and supporting local

[36] Maersk (2024), 'What is air freight: Meaning, benefits, and suitability', April.
[37] International Air Transport Association (2022), 'E-Commerce Monitor: An opportunity for partnership'.

production and employment. For example, the Faroe Islands, located in the North Atlantic, specialise in fishing—particularly salmon farming—due to their unique geography and natural resources. Regional air freight services allow producers in the Faroe Islands to export their surplus, with fish products accounting for 90–95% of the islands' total export value.[38] This export activity plays a crucial role in the region's economy, with exports contributing 64% of the Faroe Islands' GDP.[39]

Many Public Service Obligation (PSO) routes, established by European governments, mandate that airlines serving remote regions also transport essential goods, recognising the dependence of isolated communities on regional air freight services for access to vital supplies.[40] For example, Loganair, the UK's largest regional airline, operates dedicated freighter services to the Western and Northern Isles on behalf of Royal Mail. The airline adjusts its capacity to meet seasonal demand for importing goods and exporting local produce, further underscoring the importance of regional air transport in these areas.[41]

2.7.2 Regional aviation increases the attractiveness of regional areas for businesses and workers

Regional air transport makes peripheral and isolated regions more attractive for businesses seeking to establish or expand operations, and for workers looking to live in the area. Regional aviation facilitates the movement of goods and services, reduces travel time for business passengers, and lowers operational costs for international firms. It also opens up new business opportunities and fosters innovation by linking regional businesses with international markets.

The presence of new businesses drives up demand for labour and encourages the concentration of economic activity in these areas. This clustering effect boosts productivity, creating further job opportunities, which in turn supports regional socioeconomic development and contributes to population growth.

Additionally, the availability of charter services—enabled by regionally based aircraft and crews—provides significant socioeconomic benefits. These services offer on-demand capacity for transporting large groups of workers to remote sites, and provide local sports teams with the

[38] Government of the Faroe Islands, 'Foreign Trade', accessed August 2024.
[39] Oxera analysis based on data from European Commission (2024), 'Trade in Faroe Islands – Factsheet', May; and World Bank Group (2024), 'GDP (current US$) – Faroe Islands', accessed August 2024.
[40] European Regions Airline Association (2024), 'Study on the practice of Public Service Obligations in Europe', June, pp. 20–21.
[41] Information provided by Loganair, upon Oxera's request.

opportunity to compete on a national level. Without regional air travel, many events which generate substantial economic benefits for remote communities (such as music festivals, cultural gatherings and sporting competitions) would not be possible. Additionally, charter services offer supplementary capacity to other airlines, helping to minimise disruptions for both airlines and passengers.

The literature sets out the positive impact of air transport services on economic activity in peripheral regions. For instance, Norway introduced new air services in the late 1960s and early 1970s to support a dispersed population. Research has shown that the presence of an airport resulted in a 1% annual increase in both population and employment throughout the decade, relative to areas that did not have an airport. Access to an airport was particularly crucial for businesses in service sectors such as hospitality, finance, energy, real estate and logistics, and was especially valuable for firms with offices in other regions or abroad.[42]

In section 3.4 below, we review additional evidence on the social value of regional air transport to local residents and businesses. Numerous studies demonstrate that regional air transport enhances the attractiveness and competitiveness of the business environment, supports workforce retention, and promotes a dynamic labour market in remote areas.

2.7.3 Government revenue

Regional aviation can also generate economic impacts through the creation of tax revenue. Many governments impose taxes on passengers departing from or arriving at national airports, leading to tax receipts from aviation.

In the UK, for example, the government collects Air Passenger Duty (APD) from all departing passengers. If we apply the average APD rate for domestic and European destinations to the number of passengers that departed on flights from regional UK airports in 2023, we estimate that regional aviation alone could generate approximately £313m (€360m) in additional tax revenue in the UK.[43]

[42] Tveter, E. (2016), 'Effects of airport accessibility on regional development: Evidence from implementation of regional airports in Norway', September.
[43] This is an illustrative estimate designed to align with the economic footprint analysis conducted for 2023. To maintain consistency, we have applied the Air Passenger Duty (APD) rates effective from 1 April 2023. These rates reflect the average APD charged for domestic and EEA destinations in the lowest class of travel available on the aircraft, resulting in an average APD rate of £9.75 per departing passenger. We selected the lowest class of travel to ensure a conservative assessment. Given the scheduled increase in APD rates from 2025 and the likelihood of travel occurring in higher

Other countries have similar taxes. For example, France introduced a tax called the 'taxe de solidarité sur les billets d'avion' (solidarity tax on airline tickets) that applies to both domestic and international flights and is used to fund development projects.[44] Similarly, Germany imposes an 'aviation tax' which is charged on each departing passenger. This tax varies based on the distance of the flight.[45]

In addition to the direct tax revenue, regional aviation also generates indirect tax revenue through the increased productivity, employment, and overall spending discussed in the sections above.

classes, this estimate is likely to understate the full impact on UK government revenues. HM Government (2024), 'Historic rates for Air Passenger Duty', April. The number of departing passengers from regional destinations in the UK was approximately 34 million.

[44] Guichet Fiscal Unique des Taxes Aéroportuaires (2024), 'Notice Explicative pour l'établissement de la déclaration <<Tarif de Solidarité>> pour la taxe sur le transport aérien de passagers', April.

[45] FCC Aviation, 'German Aviation Tax', accessed August 2024.

3 The social value of regional airlines

3.1 Introduction

Regional airlines have a significant impact beyond their contribution to economic activity. They create social value by connecting remote and isolated regions with the rest of the country and other countries. This ensures that individuals in these regions are connected to business centres, healthcare and education services, employment opportunities, and family and friends. In particular, in some cases, aviation is the only feasible way for individuals in regional areas to participate in the wider economy and access essential services, as well as to connect to a larger national and international transport system.[46]

Drawing on a literature review, this section outlines how regional airlines contribute to social welfare. To illustrate the potential social value of regional airlines, we include examples from diverse regions across Europe.

3.2 Regional airlines sustain local communities

Regional airlines play a crucial role in improving connectivity for isolated regions, supporting local residents and the overall social welfare of these communities. For this reason, European governments have introduced PSOs that aim to improve air services to and from (as well as within) remote regions. According to the Treaty on the Functioning of the European Union:

> In particular, the Union shall aim at reducing disparities between the levels of development of the various regions and the backwardness of the least favoured regions. Among the regions concerned, particular attention shall be paid to rural areas, areas affected by industrial transition, and regions which suffer from severe and permanent natural or demographic handicaps such as the northernmost regions with very low population density and island, cross-border and mountain regions.[47]

PSO routes can be established for peripheral regions when they are considered 'vital for the economic and social development of the region

[46] European Parliament (2023), 'On electric aviation – a solution for short and mid-range flights', December.
[47] European Union (2008), 'Treaty on the Functioning of the European Union – Part three: Union policies and internal actions – Title XVIII: Economic, social and territorial cohesion', Article 174, May, accessed November 2024.

served by the airport'.[48] This is particularly likely to be the case when there are few alternative means of connectivity—for example, for island communities.

Several studies have explored the social value of air travel, particularly for remote communities in Europe, with many focusing on the Northern Nordic regions. Due to the landscape, these areas are challenging to reach through other modes of transportation, making regional aviation indispensable. In fact, in Norway, the extensive regional aviation network ensures that 99.5% of the population can travel to the capital city and return within the same day.[49]

One academic study provides valuable insights by surveying residents near two airports in different regions of Norway.[50]

- One of the airports is a small-sized airport, Brønnøysund Airport, that serves a relatively remote region and has direct air services to other regions in Norway, but not to the capital city of Oslo or to destinations abroad.
- The other is a medium-sized airport, Ålesund Airport, that serves a relatively accessible region and has direct air services to Oslo and to a number of destinations in Norway and abroad.

The study finds that local airports were significantly more important for residents in the remote region. Due to the longer travel times by land to centres of economic and social activity, residents were more reliant on air travel as a practical mode of transport than those in the other region. The results showed that 67% of respondents in the remote region strongly agreed that having a local airport provided them with better opportunities for holidays, and 50% believed it enhanced their ability to maintain contact with friends and relatives.

The study also found that the presence of a local airport was statistically more important for the retention of residents in the remote region when compared to the other region. In general, 70% of the respondents strongly agreed that they were more likely to continue living in the region as a result of having a local airport.

[48] International Transport Forum (2018), 'Government Support Measures for Domestic Air Connectivity', p. 27.
[49] Halpern, N. and Bråthen, S. (2011), 'Impact of airports on regional accessibility and social development', *Journal of Transport Geography*, **19**:6, 1145–1154.
[50] Ibid.

Regional air travel is also important for the connectivity of other regions in Europe. For example:

- Residents in the Danish island of Bornholm in the Baltic Sea depend on air travel to reach Copenhagen. Apart from a daily ferry to Køge, air travel is the only way to travel to and from Bornholm without passing through Sweden.[51]
- For residents of Corsica, direct flights to Paris are the fastest connection, with alternative options requiring more than three additional hours of travel (see Box 3.1).[52]
- In Spain's Canary Islands, residents are entirely reliant on air travel to stay connected with the mainland. The shortest ferry journey between the islands and mainland Spain takes 31 hours, while flights take less than three hours.[53] Acknowledging the essential role of air travel in residents' quality of life, the local government has introduced a programme offering travel discounts, package deals and support for residents over 55.[54]
- Within Scotland, there are no viable rail alternatives to the Scottish Isles and other regional areas. This means that residents would have to travel by road or ferry if the regional air services did not exist, which would require significantly more time.[55]

By connecting isolated areas with larger urban centres, regional air travel promotes the social development of regions, supports local residents and enhances individuals' quality of life. In the following sections, we explore additional ways in which regional aviation creates social welfare in these areas.

3.3 Regional airlines enable local residents to reach essential services

By offering reliable and efficient transportation options, regional airlines ensure that residents of remote areas can easily reach vital services such as healthcare and education.

A study by airport operator Avinor demonstrates the importance of air transport for accessing healthcare services for individuals in remote

[51] EY (2024), 'Analysis of Bornholm's flight operations', April, p. 29.
[52] Air Corsica (2022), 'Air Corsica S.A.E.M.L's response to the public consultation launched by the collectivité de Corse concerning the current public service scope of air services between Corsica and the mainland', p. 31.
[53] Direct Ferries, 'Huelva Las Palmas', accessed September 2024.
[54] Europa Press Islas Canarias (2023), 'Canarias pone en marcha un programa pionero de viajes para mayores de 55 años', September.
[55] Laird, J. (2020), 'Transport connectivity for remote communities in Scotland', International Transport Forum Discussion Papers, No. 2020/30, OECD Publishing, Paris, p. 10.

Norwegian communities.[56] The study reports that 20–30% of journeys on short-haul air routes from regional areas to population centres were for healthcare or other medical purposes. Other survey evidence from remote communities in Norway highlights that 54% of respondents considered that regional aviation improved their access to healthcare services. These benefits were particularly pronounced in the more remote and less connected regions, where residents placed even greater value on improved access to healthcare and social connections.[57]

In the UK, the National Health Service (NHS) is the largest business user of inter-island air services in the remote region of Argyll and Bute in Scotland. In 2004, 20% of passengers on air routes within the Highlands and Islands were patients or healthcare professionals, while in Orkney, 40% of inter-island flights were related to education.[58] The UK's main regional airline, Loganair, has transported over 55,000 NHS patients, primarily to and from communities in the Western and Northern Isles, who would otherwise have had to take slower, and less comfortable, road and ferry journeys.[59]

Regional airlines are also a key factor in attracting healthcare professionals and specialists to the region. For example, on Bornholm Island in Denmark, patients and medical staff constitute 15% of the passenger base on flights to and from the island. An agreement between the Capital Region of Denmark, Bornholm Regional Municipality, and DAT facilitates the transportation of patients, samples, and staff by air.[60]

Healthcare professionals have emphasised the importance of frequent flights for maintaining outpatient services on the island. For example, the Chief of Staff and Acting Deputy Director of Bornholm Hospital stressed the critical role they play in ensuring a reliable service to their patients, due to the significant number of staff that depend on these flights for commuting purposes.

[56] Avinor (2020), 'Aviation in Norway. Sustainability and social benefit', October.
[57] Halpern and Bråthen (2011), 'Impact of airports on regional accessibility and social development', Journal of Transport Geography, 1145–1154.
[58] Laird (2020), 'Transport connectivity for remote communities in Scotland', International Transport Forum Discussion Papers, No. 2020/30, OECD Publishing, Paris, p. 14.
[59] Information provided to Oxera by ERA.
[60] EY (2024), 'Analysis of Bornholm's flight operations', April, p. 6.

> For us, the morning flight to and from Bornholm and the afternoon flights from Bornholm are especially important. If they are changed or cancelled, we are vulnerable. It's on these flights that we get staff over, and that's where staff go home again. This is what allows us to start our outpatient clinics at regular times and ensure a full programme for the benefit of patients. As soon as there is the slightest delay, we have to start changing the outpatient programme. This means patients are moved around during the day, or in the worst case, we have to cancel patient appointments. We are vulnerable because many of our doctors come over by plane.[61]

Other hospitals in these regions have acknowledged the importance of air transport. For instance, the travel policy of Helgeland Hospital Trust in Northern Norway recommends air transport as the primary mode of transport for residents needing to travel from regional areas to larger population centres for medical care.[62]

Local requirements for PSOs further underscore the importance of regional aviation in supporting access to essential services. There are often minimum requirements for PSO flights with respect to frequencies and capacity. There may also be other requirements that recognise that regional aviation serves as the main way for many residents to access essential services. For example:

- Some countries mandate that PSO flights have capacity to transport patients or passengers travelling for medical care. The Azores, for instance, requires flights to accommodate patients on stretchers, while Italy mandates that airlines operating PSO routes provide 20,000 free seats per year to transport patients and pregnant women from Lampedusa or Pantelleria to mainland hospitals.[63]
- Some territories require specific travel advantages or reduced fares to be offered to local residents and offsite students commuting to or from remote islands or regions for educational purposes. For example, for remote communities in Scotland, a

[61] Ibid, p. 30.
[62] Halpern, N. and Bråthen, S. (2011), 'Impact of airports on regional accessibility and social development', *Journal of Transport Geography*, **19**:6, 1145–1154.
[63] European Regions Airline Association (2024), 'Study on the practice of Public Service Obligations in Europe', June, pp. 20–21.

discount of 50% on the core air fare is available on certain routes for residents of designated remote communities.[64]

- Other territories mandate that airlines provide additional services, such as carrying freight, mail, newspapers, or even coffins. Some require scheduling that allows local residents to make day return trips, facilitating visits to friends or relatives without the need for overnight stays.[65]

Due to their strategic importance, PSO routes were among the first to be reinstated in many countries following the outbreak of the COVID-19 pandemic.[66]

3.4 Regional airlines expand access to employment opportunities and are highly valued by businesses

Frequent regional air services are also important for maintaining an attractive and competitive business environment and a vibrant labour market. They provide individuals with a faster, more convenient mode of travel to business hubs, expanding access to job opportunities. For businesses, these air services are also valuable, enabling them to access a broader talent pool and establish connections with other markets both domestically and internationally.

A significant proportion of people living on islands or in remote areas rely on air transport for commuting to work. For example, survey data from the airport in Bornholm Island shows that 33% of passengers use air travel for commuting to work or for business-related visits. Among those who commute by plane, both to and from Bornholm, more than two-thirds indicated that the flight connection is crucial for maintaining their current job. Additionally, 19% of Bornholm residents said that they would relocate to other parts of the country if they lost access to air travel, and 23% of commuters living outside Bornholm stated that they would stop working on the island if air travel were no longer available. Data from the Danish Civil Aviation and Railway Authority highlights the consistent demand for these routes throughout the year.[67]

For businesses and work-related visitors, the speed and frequency of air services are particularly important. In the Bornholm airport survey, 92% of passengers cited travel time as their primary reason for choosing air

[64] Laird, J. (2020), 'Transport connectivity for remote communities in Scotland', International Transport Forum Discussion Papers, No. 2020/30, OECD Publishing, Paris, p. 14.
[65] European Regions Airline Association (2024), 'Study on the practice of Public Service Obligations in Europe', June, pp. 20–21.
[66] European Commission (2021), 'Updated overview of the State aid rules and public service obligations rules applicable to the air and maritime transport sector during the COVID-19 outbreak', March.
[67] EY (2024), 'Analysis of Bornholm's flight operations, April, pp. 22–23.

travel over other modes of transportation.[68] The ability to make business trips in one day was highlighted as very important.

In Northern Norway, a well-co-ordinated network of airports and routes enables most residents to complete a round trip to Oslo in a single day while still having a productive day of meetings in the capital. Air travel dominates trips between Western Norway, mid-Norway and Northern Norway, with a 60–80% market share, and an even higher share among business travellers. Even for short trips of up to 500km, air travel remains a popular choice. For instance, the flight between Oslo and Trondheim takes about an hour, with an additional hour for travel to and from the airports. In contrast, travelling by car or train takes around 6–7 hours each way.[69] Survey evidence from regional populations with access to a local airport in Norway shows that the primary reason for air travel was work related, followed by visits to friends or relatives.[70]

A study conducted in Västernorrland in Sweden further highlights the importance of air travel for local businesses and their employees.[71] The majority of companies surveyed reported that air travel was essential for having their workers on site, facilitating visits from suppliers and attracting investment to the region. For business travellers, the reliance on air travel was particularly significant given the lengthy travel times by train to the capital city and other major business centres.

As discussed in section 2.7 above, regional air transport also increases the attractiveness of remote regions for businesses looking to establish or expand operations. By offering more direct routes and frequent flights, regional airlines improve the connectivity of isolated areas and stimulate tourism, driving additional demand for local businesses. This increases economic activity and, in turn, creates further job opportunities that contribute significantly to the socioeconomic development of the region.

In Box 3.1 below, we present a case study that illustrates how regional aviation improves Corsica's connectivity with the rest of continental Europe and contributes to the overall welfare of the region.

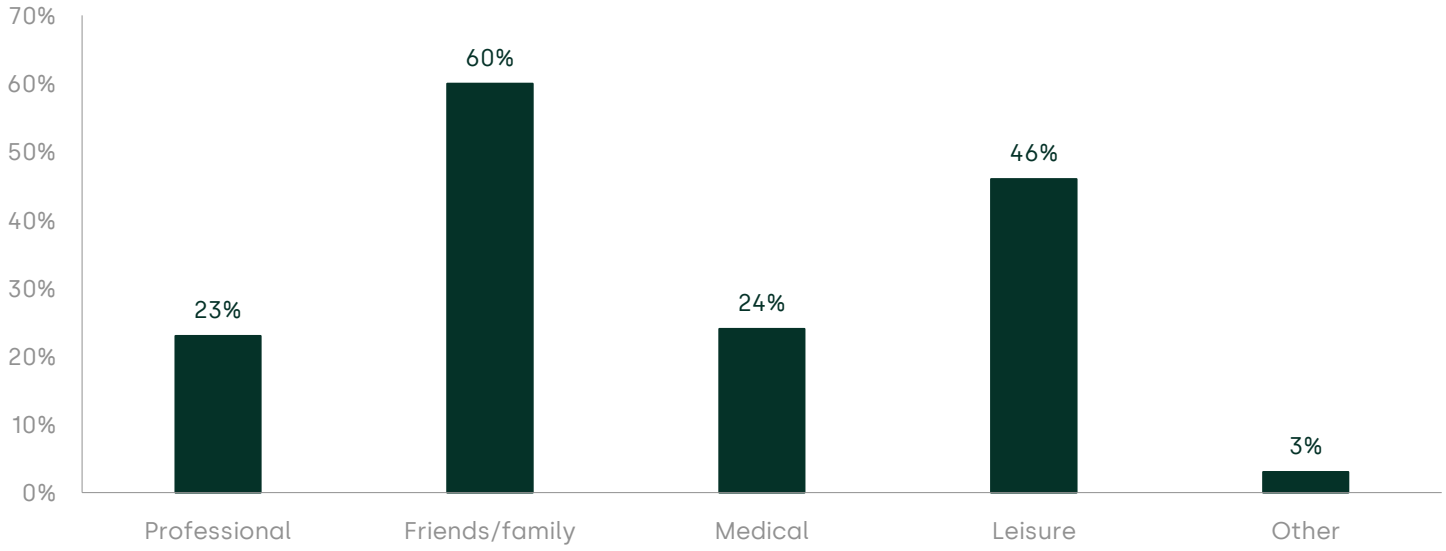
[68] Ibid.
[69] Avinor (2020), 'Aviation in Norway. Sustainability and social benefit', October, p. 13.
[70] Halpern, N. and Bråthen, S. (2011), 'Impact of airports on regional accessibility and social development', *Journal of Transport Geography*, **19**:6, 1145–1154.
[71] Sweco (2021), 'Social impacts of aviation activities in Västernorrland', March.

Box 3.1 The role of regional aviation in supporting the local population in Corsica

Corsica, situated in the Mediterranean Sea, is one of France's 18 regions. As an island, both residents and visitors rely heavily on air and sea transport to connect to mainland France and international destinations. Recognising the essential nature of air transport for Corsican residents, PSO routes have been introduced to ensure regular and affordable air services between Corsica and mainland France.[72] Corsica's PSO routes link its four airports—Ajaccio, Bastia, Calvi and Figari—to major mainland cities including Marseille, Nice and Paris-Orly.[73] Residents benefit from reduced airfares on these routes, while still enjoying the same flexibility and conditions as regular ticket holders.[74]

A survey carried out in the region revealed that a majority of residents (71%) completed an average of six return trips per year by air, for purposes of family and friend visits (60%), leisure trips (46%), as well as business (23%) and medical travel (24%).[75] The survey also revealed that 92% of residents consider that air travel to and from Corsica has a 'beneficial' or 'very beneficial' impact on their daily lives.[76]

Figure 3.1 Two main trip purposes listed by passengers who were residents in Corsica



Note: Passengers could choose up to two main trip purposes. Therefore the percentages do not add up to 100%.

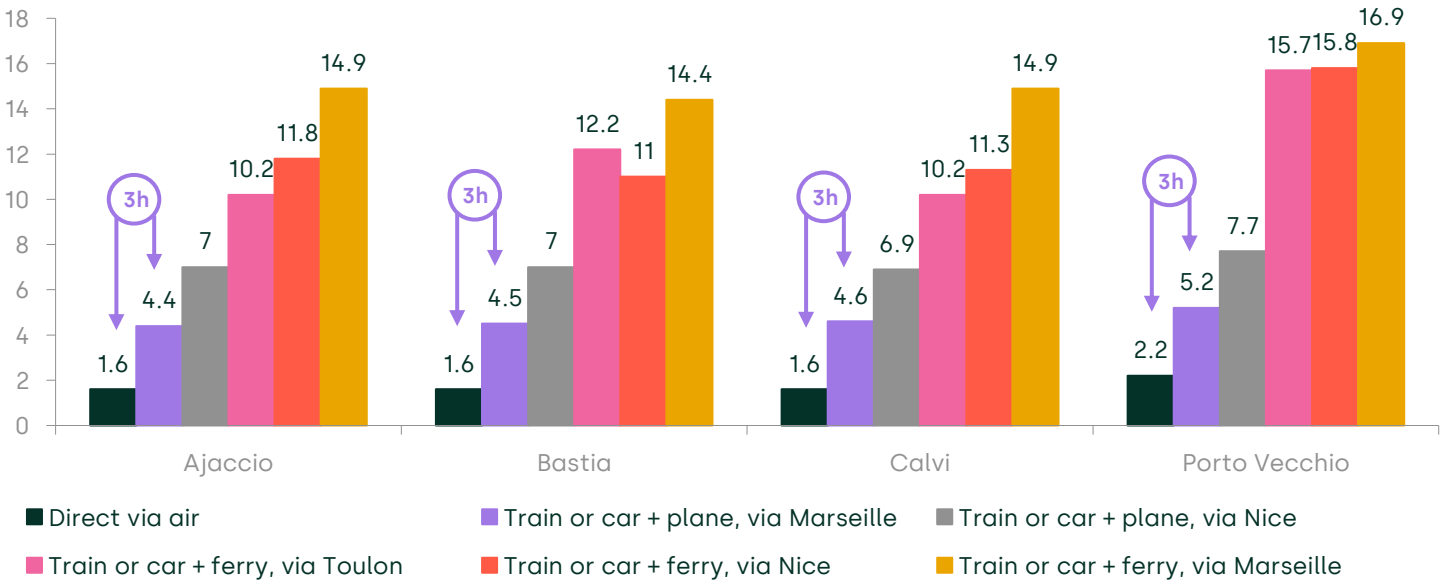
[72] Air Corsica (2022), 'Air Corsica S.A.E.M.L's response to the public consultation launched by the Collectivité de Corse concerning the current public service scope of air services between Corsica and the mainland', p. 78.
[73] European Union (2023), 'List of Public Sector Obligations (161 routes as of 17/2/2023)', February, accessed November 2024.
[74] Ibid., p. 51.
[75] MS Consulting (2022), 'Study to assess the impact of the existence of Air Corsica on the Corsican economy', September, p. 41.
[76] Ibid.

Source: MS Consulting (2022), 'Study to assess the impact of the existence of Air Corsica on the Corsican economy', September, p. 17.

While ferry services offer connections to ports in Nice, Toulon, Savona, Livorno and Marseille,[77] air transport is essential as it allows same-day roundtrips to mainland France, which are critical for attending meetings, appointments or maintaining personal connections. Corsican residents make up 62% of passengers on round-trip flights between the island and the capital.[78] Sea travel, while an option, cannot provide round trips within a day or even half a day, which increases both travel time and costs. By enabling day trips, air travel also helps residents save on accommodation expenses.

As illustrated in Figure 3.2 below, the travel duration from various Corsican locations to Paris-Orly varies significantly depending on the mode of transport. Without direct air services, a trip from Corsica to Paris would take at least 2.5 times longer when using a combination of rail and air travel, and up to five times longer when relying on other transportation modes.

Figure 3.2 Comparison of journey duration (hours) between Paris-Orly and Corsican locations, by mode of transport



Source: Air Corsica (2022), 'Air Corsica S.A.E.M.L's response to the public consultation launched by the Collectivité de Corse concerning the current public service scope of air services between Corsica and the mainland', p. 31.

[77] Direct Ferries, 'Ferry from France to Corsica', accessed September 2024.
[78] Air Corsica (2022), 'Air Corsica S.A.E.M.L's response to the public consultation launched by the Collectivité de Corse concerning the current public service scope of air services between Corsica and the mainland', p. 32.

Passenger data shows that demand for air routes between Ajaccio and Bastia and the mainland cities of Marseille and Nice is steady throughout the year.[79] This reflects the year-round need for air travel among residents for work, medical appointments, and family visits.

Indeed, due to the limited availability of specialised healthcare services in Corsica, many residents must travel to mainland France for consultations, treatments or surgeries. Corsican doctors often prescribe consultations with specialists on the mainland as part of co-ordinated healthcare plans. Air transport significantly reduces travel time, allowing patients to access critical services more efficiently.[80]

Some residents also choose to seek medical treatment on the mainland for personal reasons. These include the reputation of certain specialists, shorter waiting times compared to Corsica, or the convenience of having family or friends on the mainland. In fact, 15% of hospital admissions for Corsican residents occur in mainland France. It is estimated that 52,000 passengers travel annually for hospitalisation or follow-up care on the eight routes connecting Corsica to Marseille and Nice.[81] Among those who travel for healthcare, it is common for individuals to make more than five return trips per year.[82]

Medical freight is also a critical component of air transport on the island. Between Ajaccio, Bastia and Marseille, 52% of the freight tonnage carried by Air Corsica from September 2021 to August 2022 consisted of medical goods, including medicine, test samples, blood, and hospital supplies. This air link was particularly vital during the COVID-19 pandemic, helping to maintain essential healthcare services and manage patient care.[83]

Source: Oxera.

3.5 Conclusion

Regional airlines significantly enhance connectivity by linking remote areas to the rest of the country and international destinations. This improved access creates social welfare by facilitating faster and easier access to essential services including healthcare, education, and employment opportunities. The impact is particularly pronounced in areas where other forms of transport are impractical such as island regions. For these residents, air travel is often the only option for visiting family, attending meetings or accessing medical care.

[79] Ibid., pp 38–49.
[80] Air Corsica (2022), 'Air Corsica S.A.E.M.L's response to the public consultation launched by the Collectivité de Corse concerning the current public service scope of air services between Corsica and the mainland', p. 69.
[81] Ibid., p. 70.
[82] MS Consulting (2022), 'Study to assess the impact of the existence of Air Corsica on the Corsican economy', September, p. 41.
[83] Ibid., p. 72.

In recognition of regional aviation's contribution to socioeconomic development, many countries have established PSOs.[84] PSOs are important for facilitating social inclusion and economic development.

[84] European Parliament and the Council of the European Union (2008), 'Regulation (EC) No 1008/2008 of the European Parliament and of the Council of 24 September 2008 on common rules for the operation of air services in the Community (Recast)', OJ L 293/3, Article 16, para. 1.

4 The role of regional airlines in the decarbonisation of air transport

4.1 Introduction

One of the most significant challenges facing the aviation sector going forward is meeting environmental targets in order to comply with European and international objectives. The International Civil Aviation Organization (ICAO) has adopted a global long-term aspirational goal (LTAG) of net-zero carbon emissions by 2050 for international aviation in support of the United Nations Framework Convention on Climate Change Paris Agreement's temperature goal.[85] The European Green Deal sets out a goal of achieving net-zero emissions by 2050, and the European Commission's Fit for 55 proposals set a target of reducing net greenhouse gas emissions by at least 55% by 2030.[86]

Achieving these goals will require the widespread adoption of new propulsion technologies such as electric- and hydrogen-powered aircraft that can eliminate in-flight CO_2 and warming non-CO_2 emissions, sustainable aviation fuels (SAF), including e-fuels, and enhancements in aircraft and airspace efficiency.

This section explores how regional airlines, with their distinct operational model and network of routes, can play a pivotal role in the ongoing decarbonisation of aviation.

4.2 The current contribution of regional airlines to the decarbonisation of air transport

Regional airlines are already making notable contributions to decarbonising the air transport sector through new aircraft technology and route management.

For very short flights—typically those under 300 nautical miles—regional airlines increasingly rely on turboprop aircraft, which are notably more fuel efficient and produce lower CO_2 emissions than regional jets. In 2023, for instance, approximately 267,000 flights in Europe were operated by regional jets on routes under 300 nautical miles. Replacing these jets with turboprops, which are optimised for shorter distances,

[85] International Civil Aviation Organization (2022), 'States adopt net-zero 2050 global aspirational goal for international flight operations', October.
[86] European Commission (2019), 'The European Green Deal', December; and, European Council, 'Fit for 55', accessed July 2024.

could reduce emissions by up to 45%, as highlighted by aircraft manufacturer ATR.[87]

In addition, regional airlines tend to prioritise point-to-point flying, which allows for direct connections between city pairs. This strategy is particularly relevant for short routes, where the detour of connecting through a hub airport significantly increases distance and emissions. For example, a direct route between La Coruña and Santander reduces the distance travelled by half in comparison with a flight connecting through Madrid.[88]

A significant part of the decarbonisation effort in aviation has focused on the use of SAF, which requires few, if any, alterations to engines, aircraft and airport infrastructure. The use of SAF has been shown to provide reductions in CO_2 lifecycle emissions compared to fossil fuels by up to 80% in some cases.[89] SAF also contains fewer impurities (such as sulphur), which enables an even greater reduction in sulphur dioxide and particulate matter emissions.

Over the last few years, some regional airlines have made their first flights with SAF. For example, in November 2022, Air Nostrum operated 14 flights with a SAF mix. Similarly, Azores Airlines completed its first flight with SAF in October 2022, while in a trial, KLM Cityhopper supplied enough SAF to the airports in Amsterdam and Trondheim to cover 100% of the fuel needed for a round-trip flight between these airports.[90] Additional policy measures, such as the implementation of Book & Claim systems will be necessary to make this standard practice.[91]

While SAF offers a promising pathway to decarbonising air transport, there is a limited supply of SAF due to limited feedstocks, and the cost of SAF is significantly higher than traditional jet fuel. To scale up production and reduce costs, particularly for e-fuels, which are less reliant on feedstocks but more dependent on energy sources, it is important that the EU considers developing a comprehensive industrial strategy.

[87] Information provided by ATR to Oxera upon request.
[88] On longer routes, such as Madrid to São Paulo, the impact of a stopover is less pronounced due to the overall greater distance.
[89] International Air Transport Association (2024), 'Net Zero 2050: sustainable aviation fuels', May.
[90] Currently, certified SAF are subject to a maximum blending ratio of 50% with fossil-based jet fuel, but industry and fuel standard committees are looking into the future use of 100% SAF by 2030. Information available from company entries into the European Regions Airline Association 'ERA Airline of Year 2023' awards. This information was provided to Oxera by ERA upon request.
[91] A Book & Claim system allows airlines to purchase the environmental benefits of SAF without needing the fuel to be physically supplied to their specific flights, supporting broader SAF adoption and scalability.

Regional airlines, aligned with the wider aviation industry, have worked together to set up an industrial strategy for SAF and, more generally, a roadmap (Destination 2050) to decarbonise the aviation sector, ensuring that all industry stakeholders contribute to achieving net-zero emissions by 2050.[92]

While the cost of SAF is expected to decrease as production ramps up in the future, other low-carbon solutions are likely to be necessary to meet European aviation demand. Regional aviation, with its shorter routes, is well suited to serve as a testing ground for emerging technologies, potentially playing a significant role in their development and implementation. The greater the use of electric, hybrid and hydrogen aircraft on regional routes, the more demand for SAF can be reduced allowing SAF to be allocated to longer-distance commercial flights, where alternatives may take much longer to develop at industrial scale.

4.3 Regional aviation is ideally suited for electric, hybrid and hydrogen aircraft

Electric, hybrid and hydrogen aircraft can significantly reduce the environmental impact of aviation. Electric aircraft operate entirely on electric propulsion systems, powered by batteries, fuel cells or solar cells. Hybrid aircraft combine traditional fuel engines with electric propulsion, offering greater operating range, flexibility and improved fuel efficiency. Hydrogen aircraft utilise hydrogen as a fuel source, either by burning it in a modified turbine engine, or converting it into electricity using a fuel cell.

From a technical perspective, hydrogen and electric aircraft can eliminate all in-flight CO_2 emissions and other greenhouse gases, making them the most sustainable technologies.[93] Hybrid–electric aircraft offer a significant reduction in CO_2 emissions, ranging from 49% to 88% in comparison to traditional fossil-fuelled aircraft.[94] As electricity and hydrogen production become increasingly sustainable through technological advancements and greater reliance on renewable energy, the overall CO_2 impact of these aircraft will further decrease.

[92] ICF (2025), 'European SAF Industrial Policy', January, https://www.eraa.org/sites/default/files/eu_industial_strategy_saf_report_a4e_aci_arc_asd_era_gama_january_2025.pdf; and, Destination 2050 (2025), 'Destination 2050 – Roadmap', February.
[93] Clean Aviation, 'H2 powered aircraft', accessed July 2024. European Union Aviation Safety Agency, 'Sustainable Aviation Fuels', accessed September 2024.
[94] The International Council on Clean Transportation (2022), 'Performance analysis of regional electric aircraft', July.

These technologies also address non-CO_2 warming effects, which can cause two to three times the warming effect of CO_2 emissions.[95] Non-CO_2 impacts stem from the combustion of aircraft fuels and include emissions such as water vapor, nitrogen oxides, sulphur dioxide, carbon monoxide, hydrocarbons, particulate matter and soot. Aircraft that do not burn fuel, such as electric aircraft, completely avoid these emissions and the associated climate effects. Hydrogen-powered aircraft, when using fuel cells, primarily emit water vapor. However, when hydrogen is burned in a gas turbine, some combustion emissions are produced, although these differ from those of kerosene combustion.[96]

In addition to climate effects, non-CO_2 emissions can harm the environment and public health. For instance, nitrogen oxides (NOx) affect local air and soil quality through nitrogen deposition, while particulate matter can pose serious health risks.[97] As a result, addressing non-CO_2 emissions has become a key priority on both scientific and political agendas.[98]

The range of electric and hydrogen aircraft varies significantly based on their design, battery capacity and intended use, but overall, the technological complexities and current limitations of these power sources mean that they are best suited for short-to-medium flight distances. As an order of magnitude and with the technology already available, or available very soon, standard fully-electric aircraft are expected to have a range of 200 nautical miles, carrying around nine passengers. A hybrid–electric aircraft could carry 19 to 30 passengers and have a range of 300 to 500 nautical miles.[99] Hydrogen aircraft or hybrid turboprops could accommodate 40 to 70 passengers with an operating range of approximately 900 nautical miles.[100]

In its Vision Document, the Alliance for Zero-Emission Aviation (AZEA) has estimated that by 2050, nearly all regional flights within Europe

[95] Lee, D.S. (2018), 'The current state of scientific understanding of the non-CO_2 effects of aviation on climate', Manchester Metropolitan University, December, accessed November 2024.
[96] Only water vapor and nitrogen oxides remain, while emissions such as sulphur dioxide, carbon monoxide, hydrocarbons, particulate matter and soot are entirely eliminated. Ibid.
[97] SEO Amsterdam Economics (2024), 'Destination 2050 – Roadmap'.
[98] For example, the European Union is establishing a Monitoring, Reporting and Verification (MRV) Framework for non-CO_2 emissions under an implementing act of the Emissions Trading System (ETS) Directive by 31 August 2024, which will provide the necessary methods and tools to monitor non-CO_2 emissions, enabling a CO_2 equivalent per flight to be produced. For more information, see European Commission (2024), 'New monitoring rules agreed for the EU ETS, including non-CO_2 emissions from the aviation sector', August, accessed November 2024.
[99] Information provided by various industry stakeholders, including Aura Aero, Heart Aerospace, Maeve and Cosmic Aerospace.
[100] Information provided by various industry stakeholders, including Vaeridion, AURA AERO, Heart Aerospace, Maeve, ZeroAvia, Deutsche Aircraft and ATR, through ERA to Oxera upon request.

could be powered by hybrid-electric, electric or hydrogen propulsion.[101] The same document estimates that over one-third of short- to medium-haul flights could theoretically be powered by liquid hydrogen, as the routes are sufficiently short for potential hydrogen-powered aircraft to operate them. In its ambitious scenario, AZEA estimates that by 2050, 12 million out of 25 million regional flights will be operated by electric, hybrid and hydrogen propulsion.

Similarly, the Destination 2050 roadmap highlights that hydrogen-powered aircraft could enter service by 2035, offering the potential for zero-emission operations on intra-European flights. While these technologies have significant potential, their overall share in sector-wide emission reductions by 2050 will depend on technological, market, and infrastructure challenges.[102]

Based on current projections, AZEA expects the following entry-into-service (EIS) dates according to aircraft size and design approach.[103]

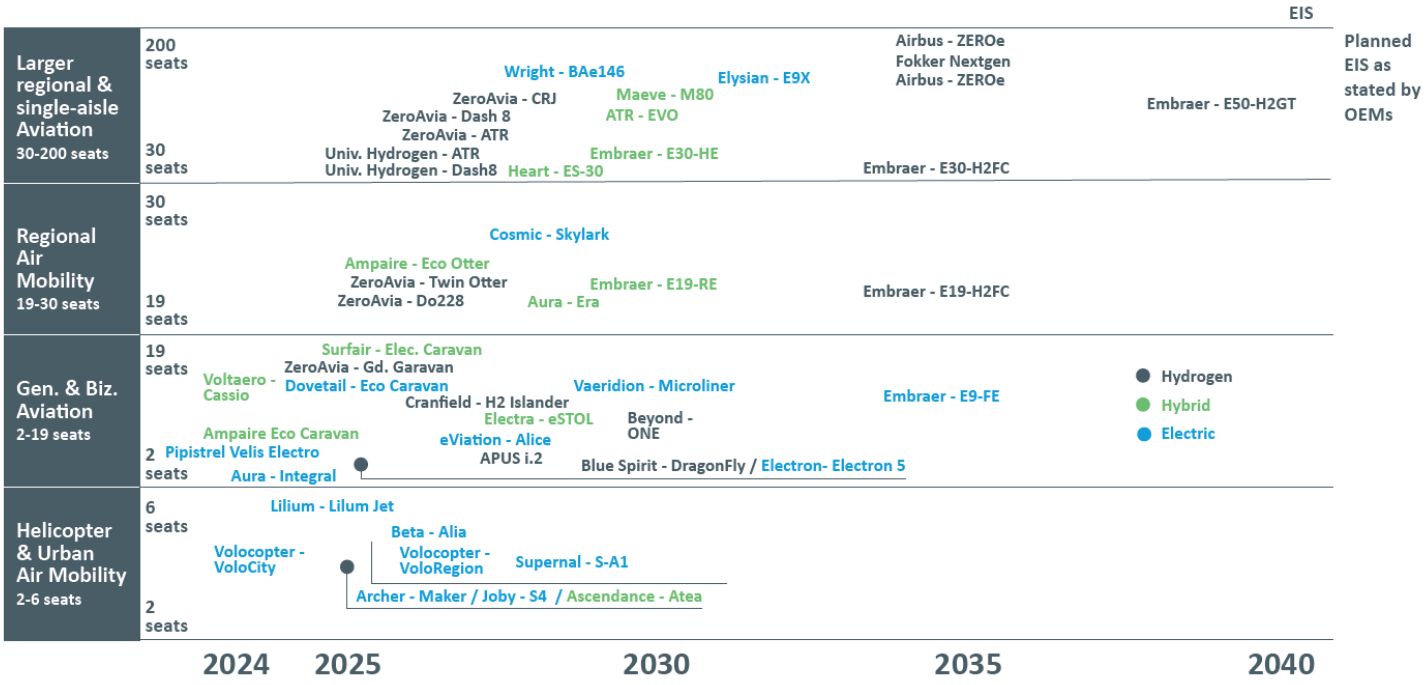
- **By 2030:** regional air mobility aircraft will enter the market.
- **By late 2030s:** larger regional and single-aisle hydrogen-powered aircraft developed for mass-transit, short-haul markets.
- **From 2040+:** potential hydrogen-powered longer-range aircraft.

It is important to note that these timelines do not always account for certification processes, which depend on factors such as how advanced the technology is and how many applications need to be processed.

Figure 4.1 below provides an overview of aircraft developments along with their announced EIS dates. This highlights the extensive range of initiatives underway and underscores the rapid advancements in electric and hydrogen aviation.

[101] Alliance for Zero-Emission Aviation (2024), 'Flying on electricity and hydrogen in Europe', June, p. 8.
[102] Destination 2050 (2025), 'Destination 2050 – Roadmap', February, p. 13
[103] Alliance for Zero-Emission Aviation (2024), 'Flying on electricity and hydrogen in Europe', June, p. 10.

Figure 4.1 Overview of aircraft developments and their announced entry-into-service dates, by type of aircraft



Note: Since AZEA published this table, some companies listed are no longer operational. For example, Lilium and Universal Hydrogen have ceased operations and should be excluded when interpreting these figures.
Source: Alliance for Zero-Emission Aviation (2024), 'Flying on electricity and hydrogen in Europe', June, p. 10.

In Box 4.1 below, we examine the cases of ZeroAvia, Fokker Next Gen, Airbus and Embraer which are developing hydrogen–electric propulsion systems for small- and medium-sized aircraft, and aim to launch zero-emission regional flights in the coming years.

Box 4.1 ERA members developing hydrogen-electric propulsion aircraft

ZeroAvia, Fokker Next Gen, Airbus and Embraer

Currently four ERA member aircraft manufacturers have undertaken research projects in the field of hydrogen, both for electric generation and liquid hydrogen combustion. ZeroAvia has reached a mature industrial scale and is already commercialising hydrogen-based technological components.

ZeroAvia is developing sustainable, electric-powered aircraft. Its hydrogen-electric engines harness hydrogen fuel cells to generate electricity for powering electric motors that drive propulsors, producing only water as a byproduct. This technology has the potential to reduce in-flight emissions by around 90% while also lowering operational costs due to less frequent maintenance and cheaper fuel.

ZeroAvia's flagship engine, the ZA600, is designed for aircraft with up to 20 seats. The aim is to retrofit and replace fossil-fuel engines in popular models like the Cessna Grand Caravan, Twin Otter, and Dornier 228. This engine targets a range of 250–300 nautical miles (plus reserves), which covers the majority of routes flown by these aircraft. Entry into service is expected within the next few years. The company is also developing a larger engine, the ZA2000, intended for 40–80 seat aircraft like the ATR 72 and Dash 8 series, with a projected range of 500–700 nautical miles. These larger aircraft are expected to enter into service in 2028. ZeroAvia's technology is designed to scale, with a roadmap that extends to regional jets and narrow-body commercial aircraft.

Fokker Next Gen is working on a project involving direct LH2 combustion for an aircraft with cabin configuration between 120–150 seats. They plan to produce a prototype by 2027 for ground testing purposes. Fokker Next Gen is also already involved in Clean Aviation projects (notably with Rolls-Royce) and Dutch Government research projects.

Airbus is meeting a number of technology and testing milestones as it moves towards its ambition of bringing to market a hydrogen-powered commercial aircraft. Many of these milestones revolve around establishing the means of propulsion, either via hybrid hydrogen -electric fuel cells or direct hydrogen combustion, for which demonstrators have been launched. It has also set-up dedicated Development Centres in France, the UK, Germany and Spain to work on tanks and cryogenic fuel systems.

Airbus founded the 'Hydrogen Hubs at Airports' network, a 360-degree approach that looks beyond the airport to take into account other important factors such as where and how green hydrogen is produced, the cost and logistics of hydrogen supply and storage, and what kinds of long-distance pipelines and distribution networks could be necessary.

In February 2025, Airbus announced that the originally planned Entry Into Service date of 2035 for its first hydrogen-powered commercial aircraft would be delayed by at least five to ten years, in part due to the slower than expected development of green (renewable) hydrogen production and distribution infrastructure.

Embraer has revealed the Energia concept, focusing on hydrogen technology. The manufacturer plans to explore hydrogen fuel cells with aircraft currently named E19H2FC, E30H2FC, and E50H2FC, targeting a 2035 launch. These aircraft are expected to have a range of up to 600 nautical miles and will offer seat configurations for 19, 30, and 50 passengers.

Source: Oxera based on ZeroAvia (2022), 'ZeroAvia & AGS Airports Team Up to Bring Zero-Emission Flights to Scotland', November; ZeroAvia (2023), 'ZeroAvia Strikes Deal to Bring Zero-Emission Flights to Sweden', March; Fokker Next Gen, 'Fokker Next Gen at Farnborough 2024', accessed November 2024; Airbus, 'ZEROe', accessed November 2024;

Embraer, 'Future Aircraft Concepts', accessed November 2024; and other information provided to Oxera by ZeroAvia and ERA upon request.

4.4 Electric and hydrogen aircraft can provide additional benefits to regional areas

In addition to the environmental benefits, electric and hydrogen aircraft may lead to greater frequency of regional air transport if they become most cost effective as they may require less maintenance, can be more energy efficient and rely less on complex and costly fuelling infrastructure.[104] This additional frequency will provide additional connectivity and the associated benefits to remote and isolated communities.

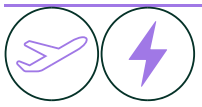
This could be especially relevant for many regional locations, such as remote Nordic communities, where large bodies of water, vast forest areas, long coastal lines, mountain ranges and fjords limit mobility and airport infrastructure.[105] In fact, airport operator Avinor and the Norwegian Civil Aviation Authority have entered into a co-operation agreement for the establishment of Norway as an international test arena for zero- and low-emission aircraft.[106]

As establishing hydrogen storage and distribution infrastructure at regional airports will be costly and complex, government support and appropriate regulatory frameworks for hydrogen infrastructure and flights may be needed to reduce these costs over time.

In addition to enhanced connectivity and reduced environmental impact, electric and hydrogen aircraft offer a number of other benefits to regional communities. For instance, electric and hydrogen aircraft operate much more quietly than traditional aircraft. This means they can serve rural and noise-sensitive areas with minimal disturbance.[107] Regional airports could also be transformed into renewable energy hubs to meet the energy demands of the aircraft and provide surplus energy to benefit the surrounding community.[108]

[104] Hydrogen aircraft may require specialised and more complex infrastructure for production, storage, and distribution due to the challenge of storing hydrogen and the high cost of producing hydrogen nearby for a small airport.
[105] Lundberg, T. (2022), 'Accessibility study for electric aviation', December, accessed November 2024.
[106] International Airport Review (2024), 'Agreement to establish Norway as an international test arena for zero and low emission aviation', April.
[107] International Air Transportation Association (2019), 'Electric, Hybrid, and Hydrogen Aircraft – State of Play', p. 125, accessed November 2024.
[108] National Renewable Energy Laboratory (2023), 'Impacts of Regional Air Mobility and Electrified Aircraft on Airport Electricity Infrastructure and Demand', February.

Box 4.2 ERA members developing electric and hybrid-electric aircraft



ERA's membership includes established and new aircraft manufacturers working on developing hybrid and full electric aircraft. Some companies have already reached significant milestones as set out below.

ATR, an established aircraft manufacturer, is launching a new aircraft, based on mild hybridisation. The ATR 'EVO' concept aims to incorporate innovative technologies to enable significant improvements in operating costs and sustainability, while remaining affordable. ATR is targeting an EIS by 2030+. Designed to significantly reduce CO_2 emissions and direct maintenance costs (-20% compared to in-service aircraft powered by PW127M engines) while enhancing aircraft performance, the ATR EVO will remain a two-engine turboprop, with 100% SAF capability. In addition to an innovative propulsion system, the plan for the ATR EVO also foresees significant upgrades, including an eco-designed cabin, leveraging lighter, new bio-sourced materials, along with recycled and reusable materials, with a focus on reducing waste throughout its entire lifecycle.

Heart Aerospace is a Swedish aerospace company focused on developing electric-powered aircraft, specifically targeting the regional aviation market. Their mission is to revolutionise air travel by creating sustainable, zero-emission planes that can replace conventional, fossil fuel-powered aircraft, especially for short regional routes. Heart Aerospace's aircraft require shorter runways, emit less noise pollution and are more cost effective.

The company's flagship project is the ES-30, a fully electric regional aircraft with capacity for 30 passengers. The ES-30 is designed to achieve a range of 400km by the late 2030s, with a hybrid mode that extends its range to 600km by incorporating an onboard generator.

Vaeridion, is a German company developing a full battery–electric 'microliner' that can fly with the lowest energy consumption for up to nine passengers plus crew, for distances up to 500km. Its long, slender wings help reduce drag during flight and allow the aircraft to glide more efficiently. To optimise the structural weight and therefore the travel distance, the batteries are integrated into the wing. Vaeridion has also successfully tested an innovative concept of two electric engines with one propeller, which allows safety conditions to operate Instrument Flight Rules (IFR) procedures.

AURA AERO, is a French company aiming for industrial production of a 19-seater, hybrid-electric with eight electric engines and two electric generation turbines. With different cabin configurations—passenger, cargo and VIP—the aircraft can reach 200 nautical miles at the maximum payload value and up to 900 nautical miles in other configurations. AURA AERO has started to build a production facility in Toulouse and in the US. Aside from its regional aircraft project, the company is currently certifying a 100% electric two-seater training aircraft.

The **Embraer** Energia project also includes hybrid-electric aircraft (with models named E19HE, E30HE, and E50HE). By combining different technologies, hybrid-electric propulsion maximises the synergies between thermal and electric engines. The technology is expected to be ready after 2030, with a range of up to 600 nautical miles and seat configurations for 19, 30, and 50 passengers. Carbon emissions are projected to be up to 25% lower with JetA and up to 90% lower when using SAF.

Other ERA member companies are developing new technology aircraft, such as **Maeve Aerospace** (hybrid–electric) with the Maeve M-80 with 80 seats, **Elysian Aircraft** (electric with turbogenerators as reserve) with 90 seats, and **Cosmic Aerospace** (all electric, 24 seats).

Source: Heart Aerospace, AURA AERO, Embraer, Vaeridion and ATR websites, as well as information provided by ERA to Oxera upon request.

4.5 Initiatives focused on electric and hydrogen technologies for regional aviation

In light of the broad range of benefits afforded by these new technologies, many regional airlines and other stakeholders have started to invest in developing these solutions for regional aviation.

4.5.1 ZeroAvia

ZeroAvia is a member of the UK Government's Jet Zero Taskforce (formerly the Jet Zero Council), which plays a key role in shaping the UK's Jet Zero Strategy and setting zero-emission aircraft adoption targets. The company also partners with AZEA, a collaboration between industry leaders and policymakers to accelerate the shift towards cleaner air travel across Europe.

Recognising the ideal fit of regional routes for early adoption, ZeroAvia has formed strategic partnerships to introduce hydrogen–electric aircraft for regional air travel. Notably:

- ZeroAvia has partnered with Braathens Regional Airlines, Skellefteå Airport and Skellefteå Kraft to use its hydrogen–electric engine systems on routes from North-East Sweden. The partners will examine the potential for operating a range of regional aircraft on commercial passenger routes using both engines being developed.
- In Scotland, ZeroAvia has partnered with AGS Airports to develop hydrogen fuel infrastructure and the regulatory framework for zero-emission flights from Aberdeen and Glasgow airports. It expects commercial routes from Glasgow using its ZA600 engine launching in 2025.

4.5.2 Heart Aerospace

Heart Aerospace has also formed partnerships with various local governments in Sweden and Finland to advance sustainable connectivity in island regions.

Box 4.3 Heart Aerospace's partnerships with regional governments

Gotland region, Sweden

Located off Sweden's southeastern coast, Gotland is home to approximately 61,000 permanent residents, with a seasonal increase in population during the summer months. Given Gotland's reliance on air and ferry transport, ensuring sustainable and reliable connectivity is crucial for the island's growth and accessibility.

Gotland has committed to the goal of establishing at least one commercial operator using electric aircraft for flights to and from the island. This initiative supports broader efforts to reduce greenhouse gas emissions and enhance Gotland's appeal as a destination. Meit Fohlin, Chair of the Regional Executive Board, emphasised the significance of the collaboration with Heart Aerospace:

'On Gotland, we are entirely dependent on air and ferry traffic to and from the island, and we must be able to travel sustainably. This decision to deepen the collaboration with Heart Aerospace is an important milestone in our journey towards sustainable communications.'

The partnership between Region Gotland and Heart Aerospace will focus on assessing operational needs, technical requirements, ground infrastructure, maintenance, and potential business models.

Åland region, Finland

Similarly, Åland region, in Finland, is an autonomous region of Finland situated in the Baltic Sea between the economic hubs of Southern Finland and the Stockholm region on Sweden's east coast. Mariehamn, Åland's capital, is strategically located less than 150km from Stockholm and Turku, Finland's third-largest city, and under 300km from Helsinki and Tampere, Finland's capital and second-largest city, respectively. This proximity to major urban centres makes Åland an ideal candidate for early adoption of Heart Aerospace's ES-30 aircraft.

Flight services are crucial for maintaining Åland's economic and social ties with nearby cities on the Finnish and Swedish mainland. Despite its small population of 30,000, Åland hosts 2,800 enterprises, including three publicly traded companies. The region's economic growth is bolstered by its strategic location and robust transport connections. Fredrik Karlström, Minister

for Trade and Industry in the Government of Åland, highlighted the significance of sustainable aviation for the region:

'Åland has had a positive population trend for the past 50 years and continues to grow each year. As an island community, our flight connections are vital to us, but so is our environment. That is why quiet, zero-emission electric flights are highly interesting to us.'

Currently, Åland has three flight connections from Mariehamn to Stockholm, Sweden, and to Turku and Helsinki on the Finnish mainland. The introduction of Heart Aerospace's ES-30 could enhance these routes, offering a quieter, more environmentally friendly alternative that aligns with Åland's commitment to sustainability and continued economic growth.

Source: Heart Aerospace (2024), 'Electrifying regional air travel'; Heart Aerospace (2024), 'Swedish Region Gotland Partners with Heart Aerospace for Sustainable Aviation', June; Heart Aerospace (2023), 'Heart Aerospace to explore early use case for electric ES-30 airplane with Åland Islands', March, accessed November 2024, respectively.

4.5.3 Initiatives by regions, aircraft manufacturers, airports and action groups

In addition, many other regional airlines, airports, and stakeholders are actively contributing to the development of sustainable aviation.

- Widerøe, Scandinavia's largest regional airline, has established Widerøe Zero, an air mobility business incubator aimed at tackling the regulatory, commercial and financing challenges involved in purchasing and putting new zero-emission aircraft into service. They plan to gradually introduce electric aircraft on their short-haul network from the beginning of the 2030s.[109]
- Loganair, the only UK regional airline on the Jet Zero Taskforce, is actively driving industry progress toward net-zero flights. Committed to achieving net zero by 2040, Loganair has tested electric aircraft in California and is working on Project Heart, the UK's leading initiative for the development of hydrogen-powered flight.[110] Loganair has also entered an exclusive partnership with Heart Aerospace to establish use cases for hybrid–electric aircraft (the ES-30) within Loganair's extensive Scottish and UK network.[111]
- AURA AERO has partnered with EDF Group to develop charging infrastructure for electric and hybrid aircraft. They have

[109] Information available from company entries into the European Regions Airline Association 'ERA Airline of Year 2023' awards. This information was provided to Oxera by ERA upon request.
[110] Information available from company entries into the European Regions Airline Association 'ERA Airline of Year 2023' awards. This information was provided to Oxera by ERA upon request.
[111] Heart Aerospace (2024), 'Heart Aerospace and Loganair enter Exclusive Partnership to Advance Hybrid-Electric Aviation in the UK', September.

developed a fully electric two-seater, and plan to introduce a 19-seater hybrid-electric aircraft by 2028. The collaboration will focus on creating adaptable charging solutions for various airport types, aiming to support the decarbonisation of regional air mobility.[112]

- Groningen Eelde Airport, a small international airport in the Netherlands, is advancing electrification and hydrogenation in aviation. In collaboration with several companies, they are working on implementing liquid hydrogen as an aircraft fuel. Since 2020, through initiatives like 'Power-Up' and partnerships with Electron Aviation and EVIA AERO, the airport has also been actively pursuing the commercialisation of electric flying.[113]

Sector-wide initiatives, like AZEA, actively promote the development of these technologies. These initiatives are not only advancing technological progress, but also ensuring that regulatory frameworks are appropriately designed to support successful implementation. This initiative is discussed further in Box 4.4 below.

Box 4.4 The Alliance for Zero-Emission Aviation

AZEA is a voluntary initiative designed to prepare the European aviation sector for the transition to electric and hydrogen propulsion, in line with the objectives of the European Green Deal.

Launched in June 2022, AZEA includes representatives from aircraft manufacturers, airlines, airports, energy companies and fuel providers, standardisation and certification agencies, passenger and environmental interest groups and regulators. These stakeholders are united to collaborate in overcoming barriers that hinder the deployment of innovative electric and hydrogen-powered aircraft. They aim to deepen the industry's understanding of these technologies and provide policy recommendations to support their integration into service.

To achieve these goals, AZEA has established working groups focusing on areas such as aircraft development, energy generation and transmission, aerodrome requirements, certification, regulation and standardisation, network requirements and other incentives.

[112] AURA AERO (2023), 'Further to the reveal of INTEGRAL E, its electric zero-emission aircraft, AURA AERO prepares the future of electric aviation with EDF Group', June.
[113] Groningen Airport Eelde, 'Sustainable aviation', accessed September 2024.

AZEA members have set an ambitious goal to deploy 23,000 electric and hydrogen aircraft by 2050, depending on effective ecosystem and policy co-ordination. This initiative aims for 36 to 68% of intra-EU flights to be operated by hydrogen- and electricity-powered aircraft by 2050, with nearly all regional flights in Europe using these technologies.

AZEA has outlined essential areas for public–private collaboration to fully leverage the potential of electricity and hydrogen in aviation. These areas include:

- maximising support for private investment in electric and hydrogen aircraft technologies;
- integrating aviation's energy demands into overall energy planning;
- adapting airport infrastructure to ensure the supply of necessary energy;
- establishing appropriate regulations and certification processes; and
- co-ordinating the integration of new aircraft into European airspace.

Source: Alliance for Zero-Emission Aviation (2024), 'Flying on electricity and hydrogen in Europe', June.

4.6 Conclusion

In many ways, regional aviation is already reducing its environmental impact—for example, through the use of more efficient aircraft and engines, and the use of SAF.

Going forward, electric, hybrid and hydrogen aircraft offer significant potential for reducing both the CO_2 and non-CO_2 environmental impacts of aviation, helping to support global decarbonisation efforts. In addition to lowering emissions, these technologies can improve local air quality and cut noise pollution. With established and emerging manufacturers accelerating the development of electric, hybrid and hydrogen aircraft, their widespread use could play a pivotal role in achieving the aviation industry's decarbonisation targets.

Regional airlines are expected to lead the way in adopting these technologies given the nature and duration of their flights. The integration of electric, hybrid and hydrogen technologies into regional aviation can enable more direct flights between smaller airports. A recent European Parliament resolution highlights how cleaner, faster and more accessible air travel 'would increase connectivity and accessibility in smaller, more isolated and sparsely populated areas, including island regions and the outermost regions, and particularly in

terms of access to public services, the creation of job opportunities and more sustainable tourism.'[114]

In light of the benefits of electric and hydrogen aviation, many regional airlines have started to invest in their development and integration. Initiatives like AZEA are fostering public–private collaboration to harness the full potential of electricity and hydrogen in aviation. Industry leaders in the ERA membership are already driving the integration of electric and hydrogen aircraft into regional air travel.

Despite the promising potential of electric, hybrid and hydrogen aircraft, significant challenges remain for their widespread implementation. While European and UK agencies are making notable progress, for example through the UK's Hydrogen Sandbox, further efforts are necessary to support electric and hydrogen aircraft technologies.

[114] European Parliament (2023), 'On electric aviation – a solution for short and mid-range flights', December, p. 6, para. 2, accessed November 2024.

A1 Countries and sub-national territories

Table A1.1 below presents the countries and sub-national territories considered in the economic impact assessment in section 2, and sets out how these map onto the different regions considered. These align with the members of the EUROCONTROL agency in Europe.[115]

Table A1.1 Countries and sub-national territories considered in the assessment by region of Europe

Country / sub-national territory	Region	Country / sub-national territory	Region
Belgium	Western Europe	Ireland	British Isles
France	Western Europe	United Kingdom	British Isles
Germany	Western Europe	Hebrides	British Isles
Luxembourg	Western Europe	Isle of Scilly	British Isles
Netherlands	Western Europe	Isle of Man	British Isles
Switzerland	Western Europe	Orkney Islands	British Isles
Austria	Western Europe	Shetland Isles	British Isles
Croatia	Central and Eastern Europe	Azores	Outermost regions
Montenegro	Central and Eastern Europe	Madeira	Outermost regions
Romania	Central and Eastern Europe	Canary Islands	Outermost regions
Serbia	Central and Eastern Europe	Portugal	Southern Europe
Czechia	Central and Eastern Europe	Spain	Southern Europe
Lithuania	Central and Eastern Europe	Corsica	Southern Europe
Ukraine	Central and Eastern Europe	Italia	Southern Europe
Poland	Central and Eastern Europe	Malta	Southern Europe

[115] Except for the case of Georgia and Armenia.

Country / sub-national territory	Region	Country / sub-national territory	Region
Slovakia	Central and Eastern Europe	Cyprus	Southern Europe
Hungary	Central and Eastern Europe	Greece	Southern Europe
Estonia	Central and Eastern Europe	Turkey[1]	Southern Europe
Albania	Central and Eastern Europe	Denmark	Northern Europe
Moldavia	Central and Eastern Europe	Estonia	Northern Europe
North Macedonia	Central and Eastern Europe	Finland	Northern Europe
Kosovo	Central and Eastern Europe	Norway	Northern Europe
Bosnia-Herzegovina	Central and Eastern Europe	Sweden	Northern Europe
Bulgaria	Central and Eastern Europe	Faroe Islands	Northern Europe
Latvia	Central and Eastern Europe	Greenland	Northern Europe
Slovenia	Central and Eastern Europe	Iceland	Northern Europe
Channel Islands	British Isles		

Note: Only airports located in the European part of Turkey have been considered.
Source: Oxera.

A2 Geographical allocation of fare revenue

As explained in section 2.3, assessing the economic impact of regional aviation requires an estimate of the share of airline output produced from local labour and other local resources in the different countries and sub-national territories.

We analysed fare revenues (as a measure of output) for flights to and from different European airports, breaking revenue down into components. This involved using data on the proportion of air fare revenues that can be attributed to airline profits and different operational costs.[116] We then allocated these costs between the origin and destination locations, effectively distributing the airlines' output based on their activities across different regions of Europe.

We classified the components of air fare revenues into the two categories below.

- **Airline fare components likely to be shared equally between the origin and destination:** we allocated this portion of air fare revenues equally between the origin and destination for each flight.
- **Airline fare components likely to be location-specific**: these are allocated to regional and non-regional areas based on the nature of the fare component.[117]

In Table A2.1 below, we set out the components used to break down fare revenues. We indicate the proportion of air fare revenues that these components represented and how we classified them. We provide the rationale for each classification below.

[116] We utilised data on the proportion of different costs relative to total airline costs, as reported in International Air Transport Association (2024), 'Unveiling the biggest airline costs', June. Additionally, we used data on airline profits as a proportion of revenues in 2023, as reported in International Air Transport Association (2023), 'Airlines Set to Earn 2.7% Net Profit Margin on Record Revenues in 2024', December.
[117] We define regional areas as the area surrounding a 'regional airport' as defined in section 2.1.1.

Table A2.1 Components of air fare revenues

Component	Proportion of air fare revenue	Classification	Rationale
Flight crew salaries and expenses	8.38%	Location-specific	Flight crews for major airlines are likely to be based at hub airports or where the carrier is based. This is likely to be outside of regional areas in most cases.
Aircraft fuel and oil	27.95%	(Partially) shared equally	Fuel and oil are purchased at the airport where the aircraft is refuelling. Fuel handling agents and operators are likely to be based locally to fuel aircraft at the airport. However, a portion of the price paid by airlines will also go to major fuel companies which may be based outside of Europe. Therefore, we have only included half of aircraft fuel and oil costs in our assessment. Half of this cost component (13.99%) is distributed equally between origin and destination locations.
Flight equipment rentals	2.82%	Location-specific	Rentals of aircraft and other flight equipment are generally managed by the airline's central procurement department and are not typically incurred in regional areas. Therefore, we have attributed this cost component of air fare revenues to the non-regional part of the flight.
Flight equipment maintenance and overhaul	8.18%	Location-specific	Major maintenance and overhauls for large airlines are usually done at the airline's central facilities or specialised service centres. This is likely to be outside of regional areas in most cases.
Depreciation and amortisation	8.86%	Not included	These are accounting costs related to the ownership of assets and are not directly incurred at the origin/destination locations.
User charges	4.38%	Shared equally	User charges include landing fees, airport fees and other charges that are typically incurred at the airport of origin and destination, so they are allocated equally between origin and destination locations.
Station expenses	6.92%	Shared equally	These are costs related to the airline's operations at specific airports, such as ground handling and airport services, and are incurred equally in both origin and destination locations.
Passenger services	6.23%	Shared equally	Costs related to passenger services at the airport (such as lounges or in-flight services) are incurred equally in both origin and destination locations.
Ticketing, sales and promotion	4.58%	Location-specific	Ticketing, sales and promotion costs for the majority of airlines are generally managed centrally and are not typically incurred directly in the regional areas.

Component	Proportion of air fare revenue	Classification	Rationale
General and administrative	7.50%	Location-specific	Costs in this category are usually incurred centrally at the airline's headquarters or main offices and are not specific to the local regions that are flown to.
Other operating expenses	9.90%	Shared equally	This category can include various costs, many of which are likely to be shared equally between origin and destination locations (e.g. compliance with local laws and environmental or safety standards specific to the destination).
Other costs	1.69%	Shared equally	Other costs vary widely, many of which are likely to be shared equally between origin and destination locations (e.g. insurance costs specific to local operations or properties).
Airline profits	2.60%	Location-specific	Profits are a result of overall financial performance and are likely to be accrued in the countries where airlines reside financially. In the majority of cases, this will be in non-regional areas.

Note: Since our analysis encompasses a broad range of flights, we used industry-wide estimates to determine the proportion of airline costs and profits within airfare revenues.
Source: Oxera analysis based on International Air Transport Association (2024), 'Unveiling the biggest airline costs', June; and International Air Transport Association (2023), 'Airlines Set to Earn 2.7% Net Profit Margin on Record Revenues in 2024', December

Contact

Michele Granatstein
Partner
+44 (0) 20 7776 6606
michele.granatstein@oxera.com

oxera.com