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EUROPEAN RESEARCH PROJECT //

Collecting and analysing data for the post-27 INTERREG (Core-IB)

Italy-Switzerland

Border profile

March 2026

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1 Introduction

1.1 Context and objective of the border profile

The ESPON Core-IB project (Collecting and analysing data for the post-27 INTERREG) provides evidence-based, non-binding analytical work to support the next generation of Interreg programmes post-2027. By collecting and analysing harmonised territorial data, the project highlights key socio-economic characteristics, cross-border interactions, and governance structures. Its spatial focus covers 48 cross-border cooperation areas (40 land and 8 maritime), including all EU internal border regions and those bordering Liechtenstein, Switzerland, and Norway. The findings are analytical and informative; they do not create regulatory or policy obligations for Member States, the European Commission, or programme authorities. Each border profile serves as a comparable knowledge base for policymakers at EU, national, and regional levels, supporting dialogue and reflection rather than prescribing policy choices. The profiles aim to provide consistent, data-driven territorial evidence that can inform strategic discussions about future cross-border cooperation and contribute to the preparation of Interreg programmes post-2027.

The Core-IB border profiles are designed to support the upcoming steps in the Interreg programming process with analyses based on data that is available at the European scale, including ESPON, Eurostat, DG REGIO, JRC, and Interreg databases. Their main purpose is to ensure comparability of data analyses and to provide programme areas with access to recent harmonised data at high geographical resolution (NUTS3 level or finer). Member States may hold additional or more detailed data which can further enrich or contextualise the findings beyond the Core-IB project. These national sources are essential for refining and validating territorial evidence in policymaking processes, including additional regional, fine-scale information and insights from political processes related to prioritisation and objective setting. All border profiles follow a systematic and methodologically robust approach. They provide territorial evidence, structured along 6 thematic dimensions, offering insights into the geographic, economic, environmental, socio-economic, border security and governance characteristics of the border region. Quantitative data and qualitative analyses are combined to ensure meaningful insights into all 48 border areas. Due to methodological constraints and limited resources, local studies and national datasets falling outside the European data framework could not be included. Visualisations, such as maps and charts based on descriptive statistics, facilitate understanding and support evidence-based policymaking. The profiles analyse the border region as a whole at NUTS3 (2021) level (corresponding to the current Interreg VI-A programme area)[1] and position it within a broader European context. For comparative purposes, several reference categories are applied:

- European averages (EU27 + Norway, Switzerland and Liechtenstein, depending on data availability)
- National averages
- National border region averages
- Aggregated border region averages

To complement the quantitative evidence, the profiles also draw on strategic and qualitative sources, including:

- Strategic documents from the Interreg Programme 2021-2027
- Border Orientation Papers from the 2021-2027 programming period
- Information from the keep.eu database on cross-border cooperation activities
- Information from the Cohesion Open Data platform
- Information from the b-solutions initiative
- Information from recent ESPON Projects (i.e., CROSSGOV, House4All, PROFECY Update, CPS 2.0)

[1] As defined by Annex 1, Commission Implementing Decision (EU) 2022/74 of 17 January 2022, as amended by Commission Implementing Decision (EU) 2023/1638 of 14 August 2023 (OJ L204, 17.8.2023, p. 9): https://eur-lex.europa.eu/eli/dec_impl/2022/75/oj/eng

Within the ESPON framework, the CROSSGOV project (Governance mechanisms for cross-border functional areas) has been implemented in parallel to Core-IB. The CROSSGOV hub[2] provides a comprehensive platform for interactive data exploration, and selected data have been incorporated into this study.

Additional project-related information can be explored separately in the Core-IB **Final Report**. Further technical information on this border profile can be found in a separate **Technical Annex** providing an overview of data and methods.

1.2 Presentation of the border area

The Interreg VI-A border region 'Italy–Switzerland' covers the area between northern Italy and southern Switzerland (see Figure 1.1). In Italy, the programme area includes part of the regions of Piedmont, part of Lombardy, Aosta Valley, and the Autonomous Province of Bolzano–South Tyrol, located in the north-west and north-east of the country, comprising a total of 10 NUTS3 regions. In Switzerland, it covers the cantons Graubünden, Ticino, and Valais, encompassing a total of 3 NUTS3 regions.

Figure 1.1: Overview map

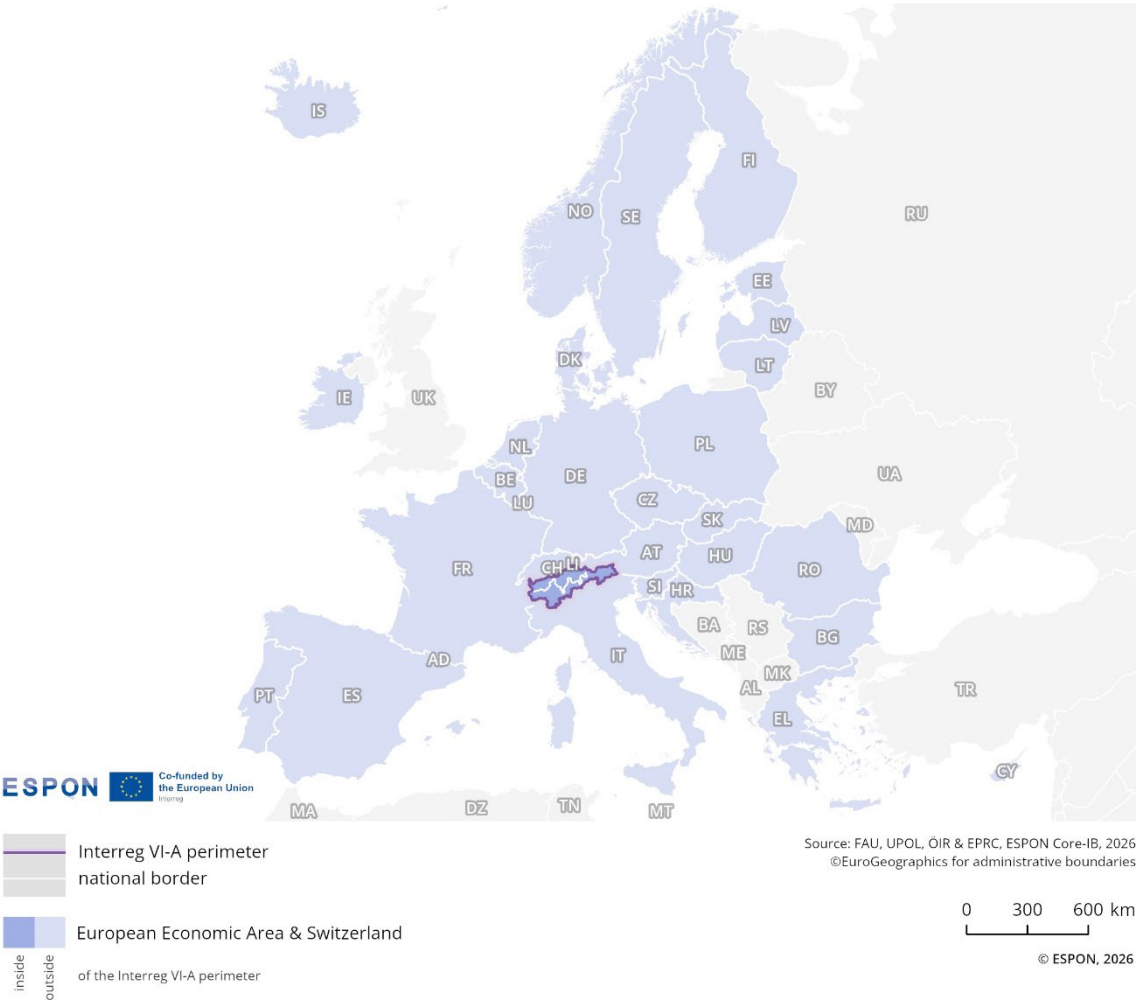
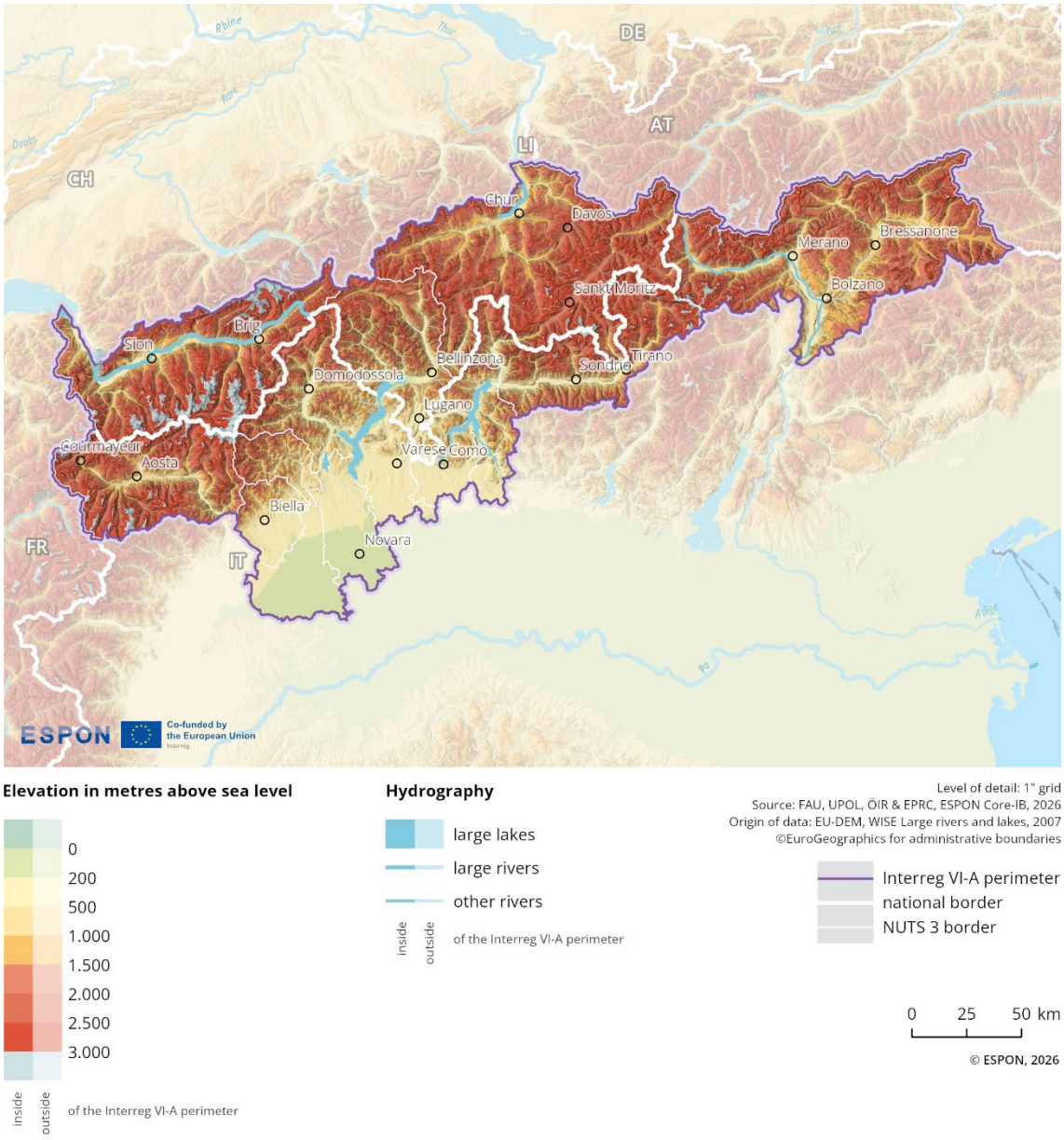


Figure 1.2 illustrates the region's geomorphological features and the perimeter of the current Interreg VI A programme area. Spanning approximately 38,000 km², the border region exhibits significant

[2] ESPON CROSSGOV Hub: https://gis-portal.espon.eu/arcgis/apps/experiencebuilder/experience/?id=27e3b86ef44441b08793a2239c370607

heterogeneity. It extends along the entire 750-kilometre length of the Swiss-Italian border, which is defined by the Alpine topography, a significant physical barrier. Important Alpine centres in this area include, amongst others, Aosta, Sion, Brig, Como, Davos, Sankt Moritz, Tirano, Merano/Meran, Varese, Sondrio, Lecco, Vercelli and Bolzano/Bozen.

Figure 1.2: Geographical features and characteristics[3]



The border largely follows mountainous terrain predominantly shaped by the Alps, featuring high mountain peaks, deep glacial valleys, extensive forests and alpine pastures. The region also contains several major lakes, including Lake Como, Maggiore and Lugano, which are important natural and cultural landmarks. Heading south into Italy, some parts of the programme area, around Novara, gradually flatten into the lowlands of the Po Valley.

The area is characterised by a complex hydrographic network with major rivers such as the Ticino and the Adda. The map illustrates the area's topographical and functional differences, ranging from sub-

[3] The selection of displayed settlements is based on factors such as size, administrative or cultural importance, transport links, regional coverage and cartographic clarity. This is part of a standard cartographic generalisation process with no pre-set thresholds, and the main aim is to provide orientation.

areas of significant international importance, especially from the perspectives of global tourism and alpine sports, to more peripheral and less accessible side valleys. These topographical characteristics strongly influence the settlement system, transport infrastructure and economic patterns within the programme area.

2 Cross-border analysis

2.1 Territorial dimension

The territorial dimension refers to the spatial characteristics and dynamics of a border region. It specifically depicts how factors such as population density, demographic trends, changes in settlement areas and accessibility influence and reflect cross-border integration.

2.1.1 Population and settlements

This sub-dimension illustrates the population characteristics and land use dynamics of the border region, based on analysed indicators. It examines population density, population development by age groups, and changes in settlement areas. The analysis highlights whether the border functions as a catalyst for integration or as a barrier. Comparisons with the respective countries and the EU average provide context for understanding the region's dynamics.

2.1.1.1 Population density

Indicator description

Population density refers to the number of residents per km². This indicator shows the number of inhabitants per square kilometre in a 1x1 km grid. It therefore provides information on the distribution and concentration of population across the region and allows to identify agglomerations of high density. In particular agglomerations at or close to the border area of key interest.

- **Source**: Eurostat
- **Temporal coverage**: 2021
- **Unit**: Inhabitants/km^2

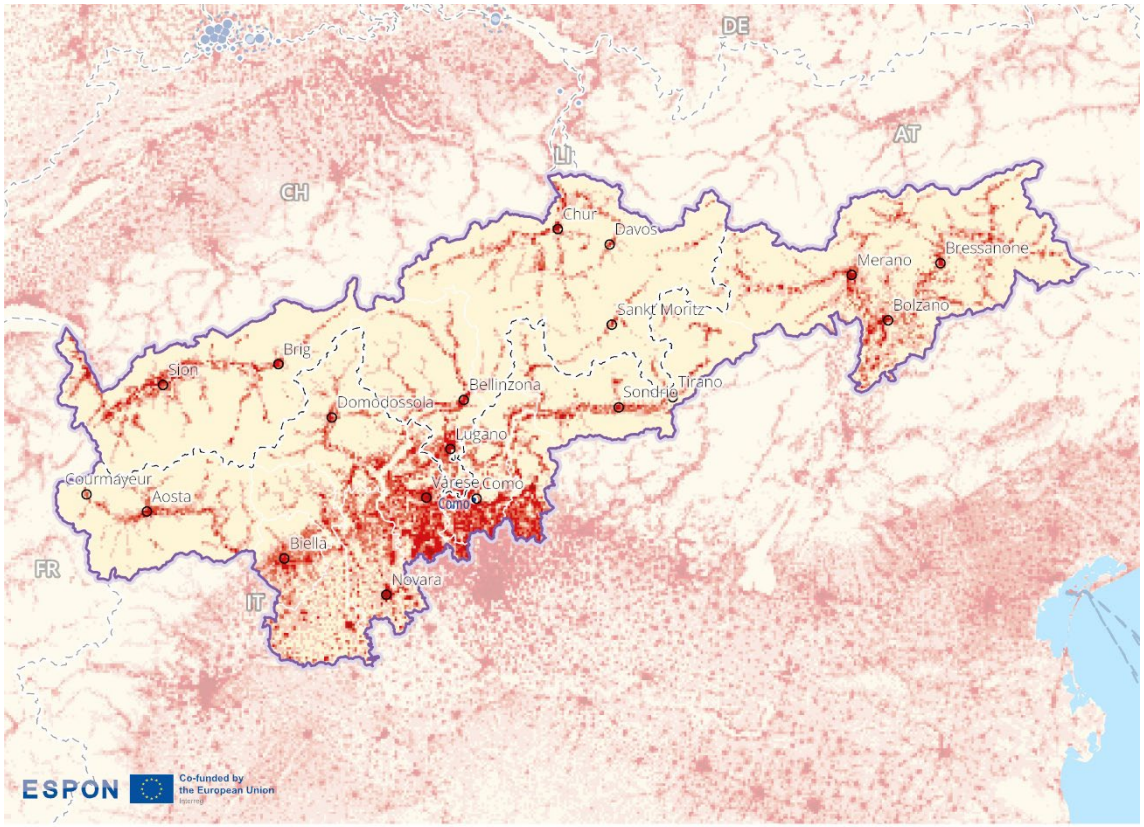
Please refer to the technical annex for more information.

The border region includes 10 urban centres with a population of over 30,000 inhabitants. This border region is very sparsely populated, except for a few towns, which on the Italian side include Novara, Varese, and their surroundings, and on the Swiss side, Lugano (63,000) and Chur (41,000). A large part of the territory is uninhabited. On the Swiss side, the highest population density is around the towns of Sion and Lugano. The Swiss part is more sparsely populated than the southern Italian part (see Figure 2.1).

The population density in this whole border region is 112 inhabitants/km², which exceeds the EU average of 109 inhabitants/km² (according to EUROSTAT), and it is therefore lower than the aggregated average of all EU evaluated border regions, which is 125 inhabitants/km².

The part of the border region in Italy has an average population density of around 144 inhabitants/km². It is therefore lower than the national average population density in Italy (193 inhabitants/km²). The part of the border region in Switzerland has an average population density of around 59 inhabitants/km². It is therefore lower than the national average population density in Switzerland (211 inhabitants/km²). Both parts show a heterogenous picture from sparsely populated areas to highly populated areas (e.g., cross-border area between Lugano and Milano).

Figure 2.1: Spatial patterns of population distribution



Number of inhabitants/km² (2021)

- 1–50
- 51–100
- 101–200
- 201–500
- 501–1,000
- 1,001–5,000
- 5,001–56,158
- no population

inside / outside of the Interreg VI-A perimeter

Twin cities (2025)

cities/towns with 10,000+ inhabitants not further than 5km from another one accross a country border

Border cities (2025)

other cities/towns with 10,000+ inhabitants not further than 10km from another one accross a country border

Level of detail: 1km grid
Source: FAU, UPOL, ÖIR & EPRC, ESPON Core-IB, 2026
Origin of data: GISCO Population Grid (version 1.3), 2021
OpenStreetMap, 2025
©EuroGeographics for administrative boundaries

- Interreg VI-A perimeter
- national border
- NUTS 3 border

0 25 50 km

2.1.1.2 Population development (by age groups)

Indicator description

Population development refers to the percentage change in population at regional level between 2014 and 2024. The data reflects on the total population, as well as on the age groups 0-14, 15-64 and 65+.

- **Source**: Annual Regional Database of the European Commission (ARDECO)
- **Temporal coverage**: 2014-2024
- **Unit**: Change in %

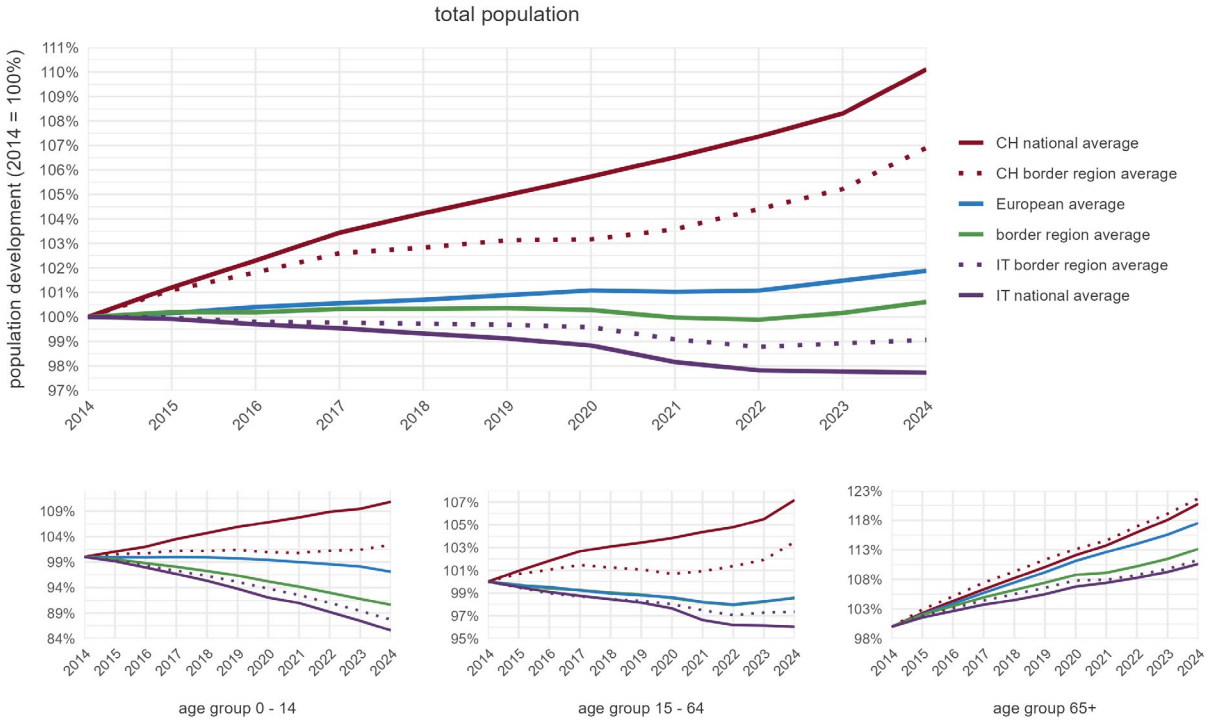
Please refer to the technical annex for more information.

Population in the Italy–Switzerland region in 2024 (Eurostat): 4.4 million inhabitants, of which:

- 79.0% in the Italian border territory (3.5 million inhabitants)
- 21.0% in the Swiss border territory (0.9 million inhabitants)
- Region within the border region with the highest population increase since 2014: Valais / Wallis (CH012) at 11.8%

Figure 2.2 shows the population growth in the Italy–Switzerland region between 2014 and 2024. During this period, the region has experienced a slight growth of 0.6%, with the highest growth rate observed on the Swiss side.

Figure 2.2: Population development (2014=100)



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Population growth across the border region is slightly below the European average (0.6% vs. 1.9%) and also slightly below than the average development in all border regions (0.6% vs 1.5%). While the Italian

border area shows a decline at both the regional and national levels (-0.9% vs. -2.3%), the Swiss border area exhibits substantially lower growth than the national average (6.9% vs. 10.1%).

In terms of the development of individual age groups in the region, the population aged 0–14 experienced a marked decrease of -9.4%, while the working-age population (15–64) showed a slight decrease of -1.4%. The population aged 65 and over underwent a notable increase of 13.1%.

2.1.1.3 Change in settlement areas

Indicator description

The indicator shows the relative change in settlement areas per LAU in the border region. It considers changes in land cover, from non-artificial areas (such as agricultural, forest and seminatural areas, wetlands and water bodies) to artificial areas (such as urban, industrial, construction sites) between 2012 and 2018. This indicator has to be viewed alongside population development in particular.

- **Source/method of retrieval**: The indicator is retrieved via processing of raster data from CORINE Land cover. The raster information is crossed with Local Administrative Units (LAU) to calculate a change in %.
- **Temporal coverage**: 2012-2018
- **Unit**: Change in %

Please refer to the technical annex for more information.

Figure 2.3 illustrates the change in settlement areas at municipal level between 2012 and 2018. Overall, the map shows similar patterns of change in settlement areas on both sides of the Italian-Swiss border. Changes are evident in particular around the urban centres of Sion, Como and Novara. The latter represent higher rates of change towards the metropolitan region of Milano. Brig, Aosta, Davos, Sankt Moritz, Merano/Meran, Bolzano/Bozen and Varese show no significant changes during the observed time period. Growth in settlement areas is particularly evident in the around the urban centres of Como and Novara. In close proximity to the national borders, the settlement area increases mainly around Como and around the Italian Skiresort Livigno. The map also reflects the topographical characteristics of the border region, with hardly any changes in settlement areas visible in steep, high-altitude mountainous areas.

Figure 2.3: Settlement area dynamics

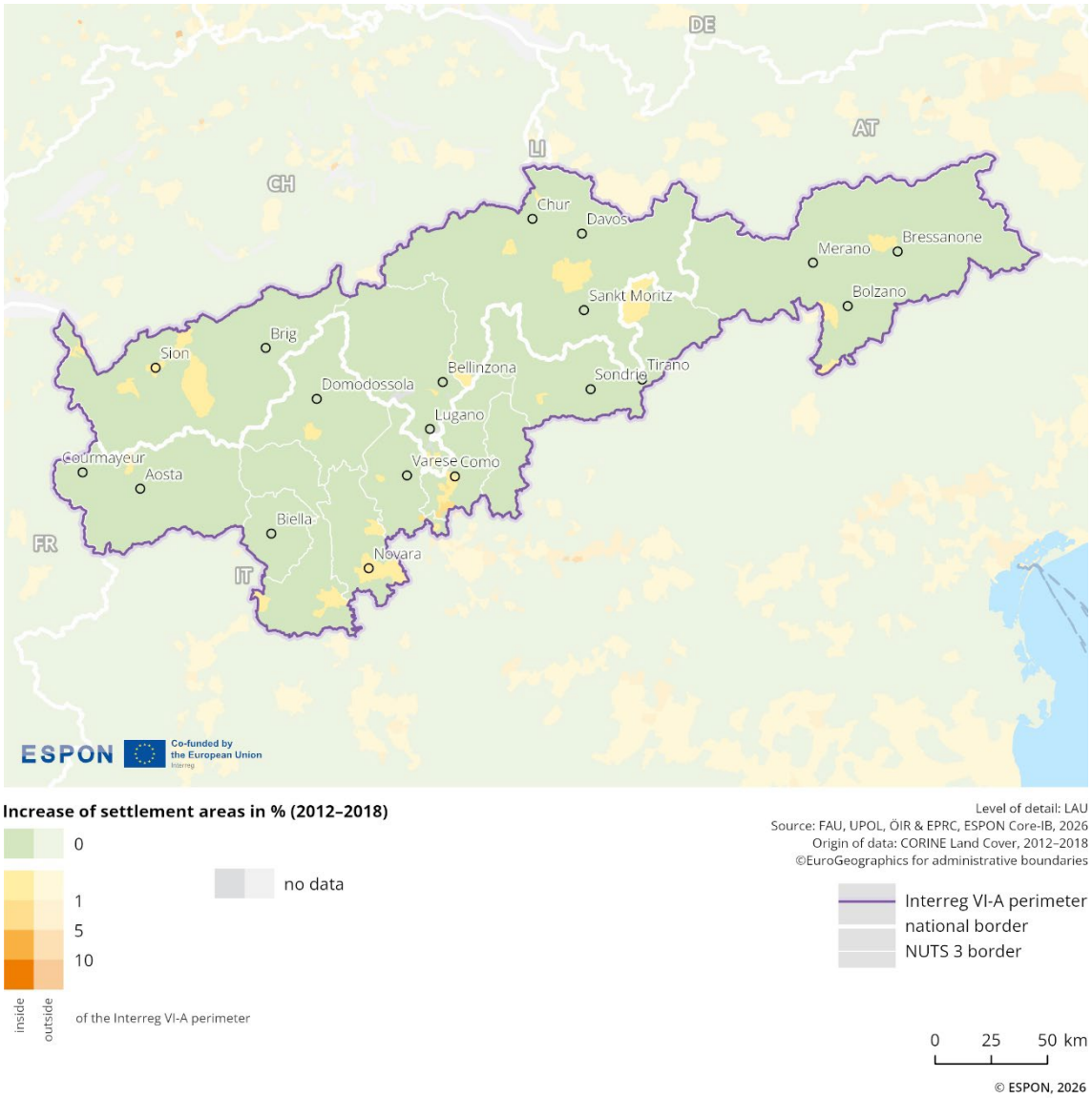
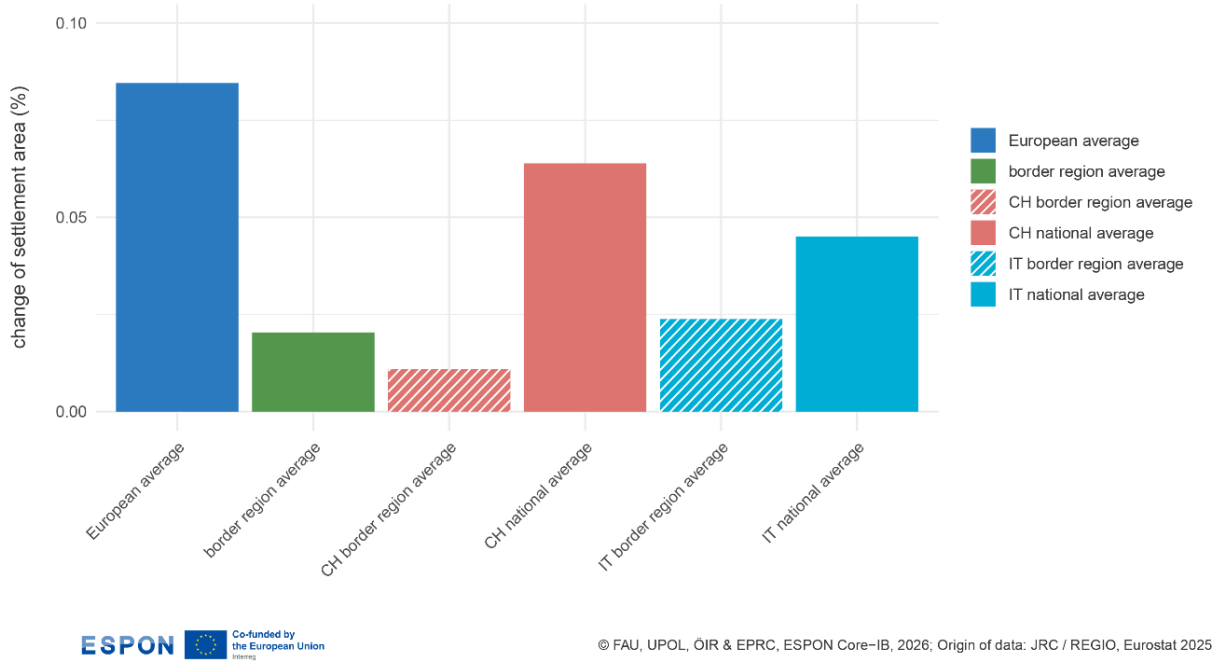


Figure 2.4 presents the change in settlement areas from a comparative perspective. The average for the Italy-Switzerland programme area is lower than the overall European average, which includes both EU member states and the EFTA (European Free Trade Association) countries Switzerland, Liechtenstein, and Norway. The Swiss national average is higher than the Italian one. In contrast, the Italian border-regional average is higher than the Swiss border-regional average. Both border-regional averages are lower than the respective national averages.

The programme area shows a moderate increasing settlement development. However, spatial development has to balance the various demands on land use (e.g., residential, commercial, tourism, transport, agriculture, and nature conservation), and this requires ongoing coordination and exchange, also across the border.

Figure 2.4: Change in settlement areas (2012-2018) (comparison)



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2.1.2 Accessibility of the border area

This sub-dimension illustrates the functional travel connections that already exist in the border region. It examines average cross-border travel times for different modes of transport and cross-border catchment areas based on mobility flows. It also considers travel times to and from border crossings. The analysis shows whether mobility flows are integrated between border regions or if the border hampers mobility.

2.1.2.1 Comparative quality of selected cross-border connections

Indicator description

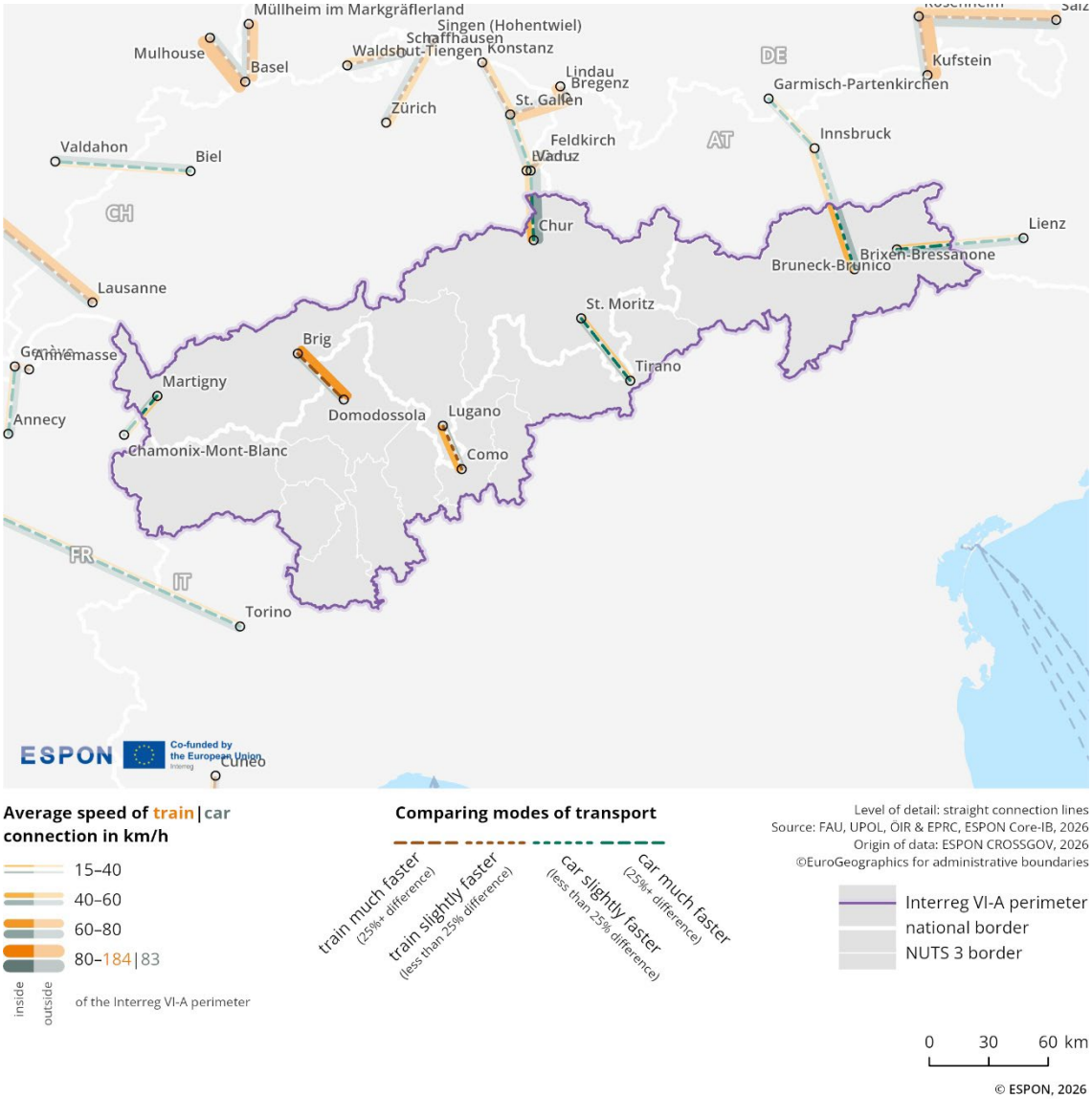
The indicator presents a comparative perspective for different modes of transport (public and private) and their average travel speed (so-called space-time-lines). As such it helps to understand and interpret accessibility patterns along the border and highlights the comparative quality of selected cross-border connections.

- **Source/method of retrieval**: Average number and speed of rail connections/ferries, average speed of car connections between selected cities and towns in border regions using Rail Travel Sites, Google Maps, luftlinie.org, Direct Ferries, local ferry companies
- **Temporal coverage**: 2025 (first quarter)
- **Unit**: km/h

Please refer to the technical annex for more information.

Cross-border accessibility shapes cross-border interactions. Figure 2.5 illustrates this using a "space-time-line" map, which shows parts of a European overview of car and train travel times in the Italy-Switzerland border region. This visualisation enables an assessment of transport quality by highlighting differences between public (train) and private (car) transport modes.

Figure 2.5: Comparative quality of selected cross-border connections



The selection of cities and connections covered is based on a set of criteria applied throughout Europe within the ESPON CROSSGOV project[4]. These criteria include the presence of a railway station, population size, distance to the border, node hub and functionality. The thickness of the lines (orange for trains, grey for cars) indicates the average speed of connections in km/h, with thicker lines representing faster connections. Dotted lines in-between reflect the indexed ratio between train and car speeds. A brown colour scale (values below 100) denotes that trains are faster than cars along the specific route, while a green scale (values above 100) indicates the opposite.

The selected connections within the programme area include Brig–Domodossola, Lugano–Como, and St. Moritz–Tirano. For most of these routes, namely Brig–Domodossola and Lugano–Como, train connections outperform car travel in terms of speed, especially on the Brig–Domodossola route, where the train is significantly faster. In contrast, the St. Moritz–Tirano route is characterized by slow travel times for both train and car, although the car remains the faster option.

[4] ESPON CROSSGOV Atlas, see Storymap on 'Space-time-lines': https://gis-portal.espon.eu/arcgis/apps/storymaps/collections/345c978adf784ad-fac30c16b90219d35?item=4

2.1.2.2 Cross-border catchment area based on mobility flows

Indicator description

This indicator measures the movement of people across borders. The density of cross-border movements by Twitter/X users is displayed on a grid cell covering an area of 20x20 km. The indicator does not differentiate between reasons for movement.

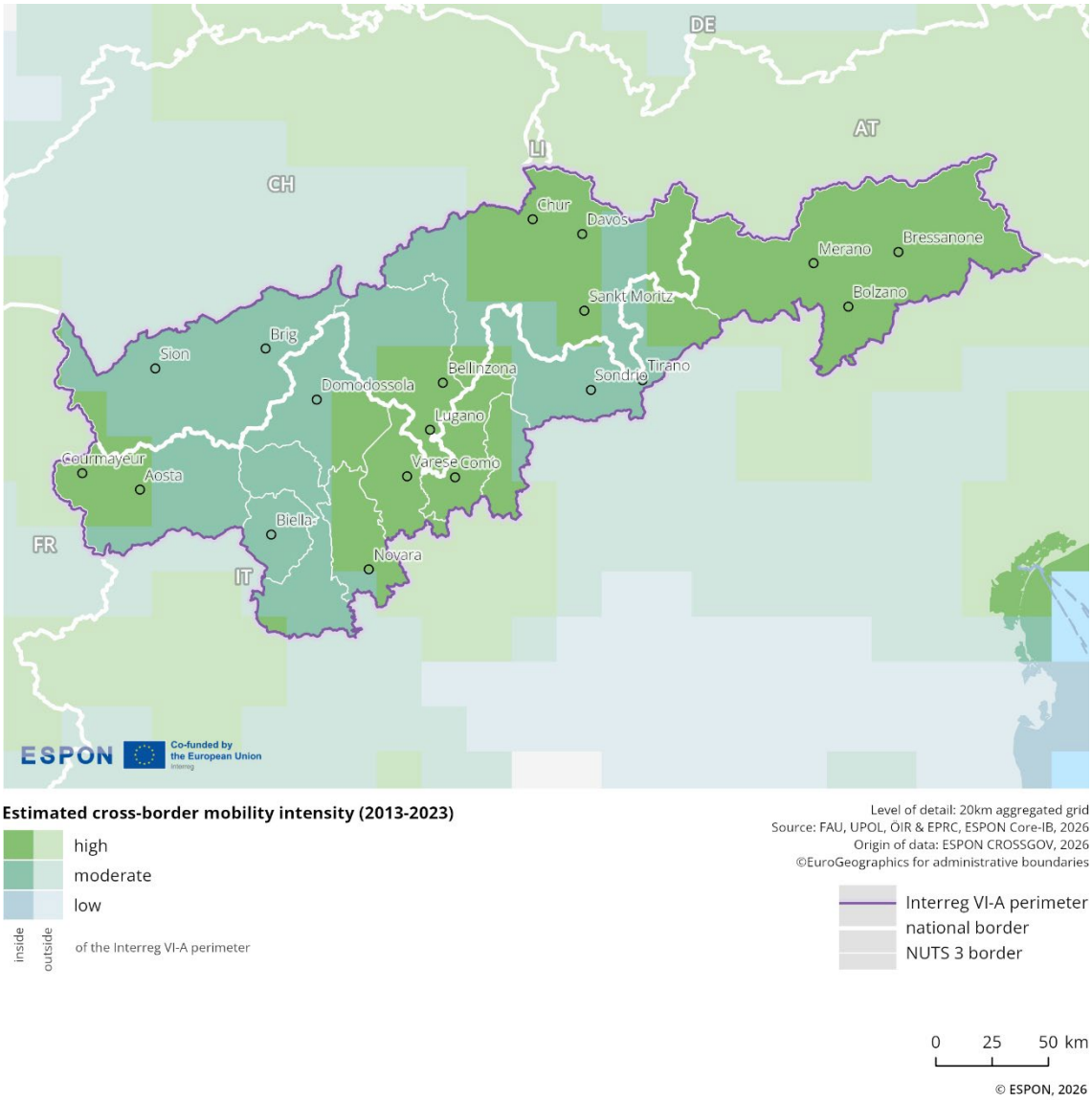
- **Source/method of retrieval**: The indicator is calculated based on Twitter (currently X) data. The digital footprint of individual users provides information about physical mobility flows and is used to calculate cross-border catchment areas of different intensity.
- **Temporal coverage**: 2013-2023
- **Unit**: n/a

Please refer to the technical annex for more information.

Figure 2.6 shows the cross-border catchment area in the border region based on mobility flows from 2013 to 2023, highlighting estimated cross-border mobility intensity across 3 different quartiles. The first quartile represents the 25% highest mobility intensity shown in dark green, the second quartile represents 25-50% coloured in green-blue, and the third quartile represents 50-75% in light blue.

The intensity of cross-border mobility of people within this cross-border region is rather variable. The highest mobility intensity is observed in several distinct areas of the region. These include the area around the city of Aosta, the area surrounding the cities of Lugano, Varese, Como, and Novara, the area around Davos and St. Moritz, and the area near Merano/Meran and Bolzano/Bozen. In the remaining parts of the region, the intensity is moderate, for example, around the cities of Sion, Brig, or Tirano.

Figure 2.6: Cross-border mobility intensity



2.1.2.3 Cross-border travel-time accessibility

Indicator description

The indicator shows the time it takes to travel from any location within a region to the next border crossing, using grid data and subsequent categorisations into accessibility groups of 30, 60 and 90 minutes. It reflects the accessibility in cross-border areas, considering road transport. The indicator can describe the quality and speed of road connections and thus spatial reach of the cross-border services.

- **Source/method of retrieval**: Based on the OpenStreetMap road network, the travel time to the border is calculated for a grid of the border are. Based on this, areas are calculated within which border crossings can be reached below thresholds of 30, 60 and 90 minutes. As additional visual element, key services pharmacies, doctors, hospitals and shops (retrieved from the ESPON PROFECY project) are displayed and categorised into the accessibility groups.
- **Temporal coverage**: 2025 (first quarter, for accessibility data), 2021 (for service facility data)
- **Unit**: Minutes

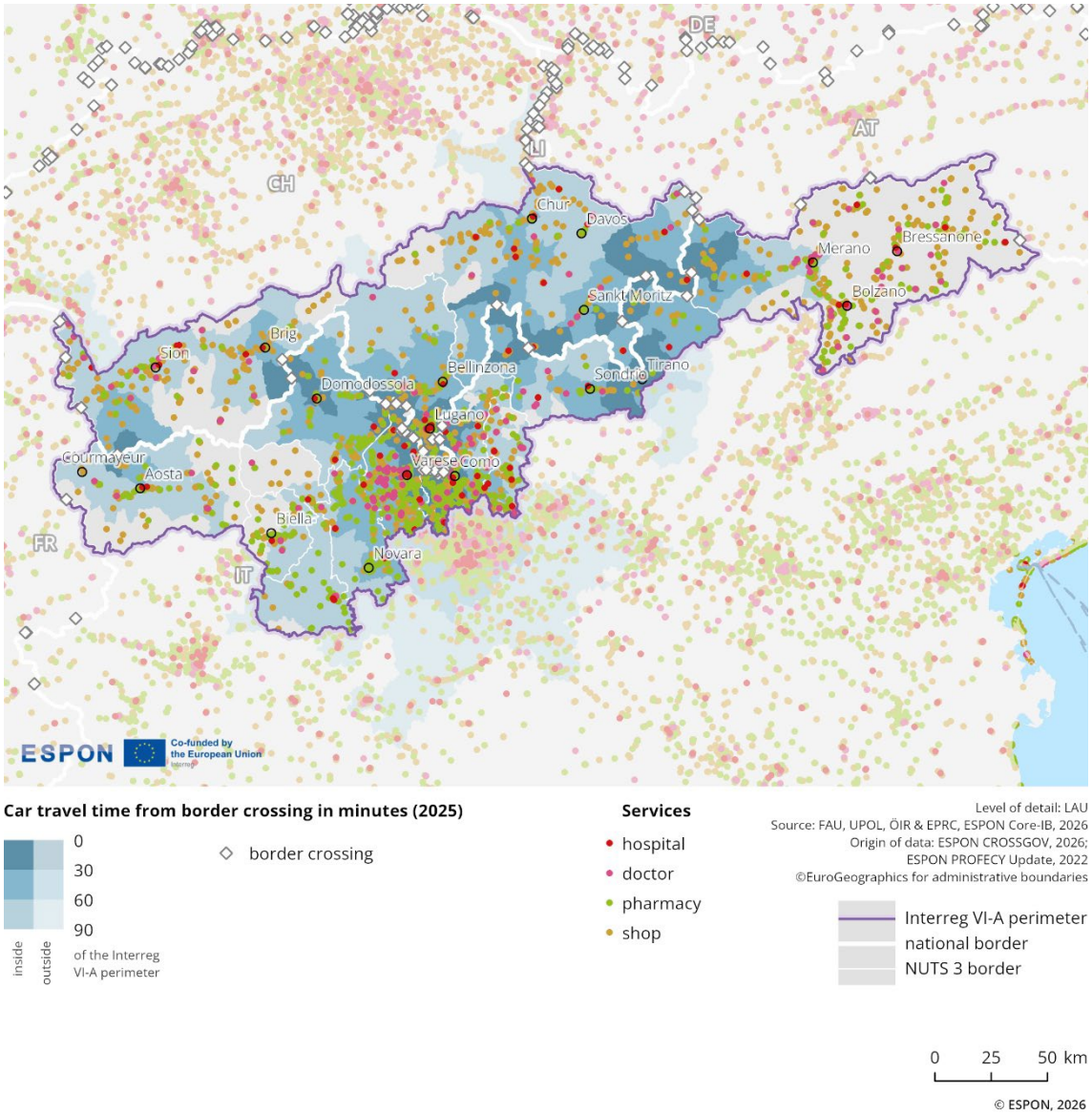
Please refer to the technical annex for more information.

Figure 2.7 illustrates cross-border travel time accessibility in the Interreg area, showing the time distance from the national border in 2025. The legend indicates 3 travel time categories in minutes (30, 60, 90) represented by different shades of blue. In addition, it marks the location of services, including hospitals, doctors (general practitioners), pharmacies, and shops (supermarkets and conventient stores), with distinct coloured symbols.

The map shows that only a few small areas bordering the border are in the under-30-minute category. Most of the territory has accessibility of 60 or 90 minutes. In the western part of the border, there are even areas on both sides of the border with times exceeding 90 minutes. Road connections are good only in some parts, and services are therefore easily accessible only in some areas.

Services like shops, hospitals, doctors and pharmacies are generally sparse and unequal. The highest concentration of services is near Milan.

Figure 2.7: Travel-time accessibility from border crossings



2.1.3 Key messages on the territorial dimension

The Italy–Switzerland border region is characterised by sharp contrasts in terms of settlement, accessibility and demographic development. One notable feature is the distribution of its population. Although the territory is home to more than 4.4 million people, it remains largely sparsely populated, with dense clusters only around urban centres such as Lugano, Novara, Varese, Bolzano/Bozen, Merano/Meran, Sion and Brig. The population density is considerably higher in Italy than in Switzerland, yet both countries remain below their national averages. This highlights the influence of mountainous terrain, which renders much of the area uninhabitable.

Demographic change adds another layer of complexity. Since 2014, population growth in the border area has been low and below European averages. The Swiss side has experienced modest growth, while the Italian side has declined. Ageing is a common trend across the region: the elderly population is growing, while the proportion of children and working-age people is shrinking. These patterns help to explain the pressures on services, labour markets and housing, as well as the need for long-term, cross-border responses.

Settlement development reflects similar trends. Growth is concentrated around urban hubs such as Como and Novara, while most mountainous areas have remained largely unchanged. This moderate expansion highlights the competing demands on land, ranging from tourism and housing to transport and nature protection, which require integrated planning across borders.

Accessibility also influences regional dynamics. On some routes, such as Brig-Domodossola, train links are faster than car travel, highlighting the importance of the rail network in cross-border integration. However, in many areas, car travel times to the next border crossing exceed 60 or even 90 minutes, and services such as hospitals and pharmacies are often difficult to access outside larger towns. Mobility patterns reflect this uneven distribution, being strongest around hubs such as Aosta, Varese, Como, Novara, Merano/Meran and Bolzano/Bozen.

2.2 Economic dimension

The economic dimension includes analyses of gross domestic product, labour market conditions, competitiveness, and key infrastructure and housing indicators. The aim is to illustrate the impact of the border on economic performance, whether it acts as a barrier or a bridge, and the extent to which integration is supported by labour mobility, remote working, and infrastructure connectivity.

2.2.1 Gross Domestic Product

This sub-dimension illustrates the economic situation of the border region by analysing gross domestic product (GDP). It shows economic development within the border region and how this has changed over time. Comparisons with the respective countries and the EU average provide important context for understanding the region's dynamics.

2.2.1.1 Gross domestic product per capita at current market prices

Indicator description

The indicator shows the regional GDP/capita in current prices and its development over the past years. It highlights structural differences and similarities between the border region and the respective national figures as well as the European average. Furthermore, it highlights patterns within the border region, although has to be interpreted with care in the case of a strong presence of commuters.

- **Source**: Eurostat, Annual Regional Database of the European Commission (ARDECO)
- **Temporal coverage**: 2010-2023
- **Unit**: Euro per capita

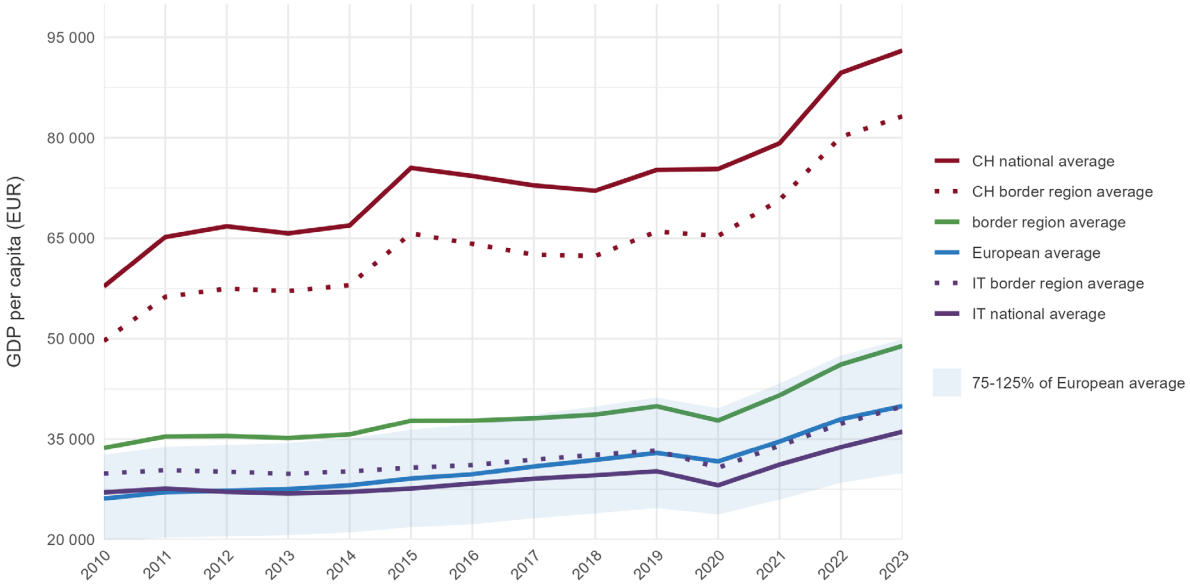
Please refer to the technical annex for more information.

In 2022, the border region's GDP per capita was 127.6% of the EU average and 129.6% of the average for other European border regions. Between 2014 and 2022, it grew by 29.7%, 6.0 percentage points less than the EU average and 5.5 percentage points less than the average for European border regions[5].

[5] Percentage changes are calculated using Eurostat data to ensure harmonised statistics from official sources. The latest year for which full coverage of all European regions is available on Eurostat is 2022. For visualisation purposes, ARDECO data has been used to enable longer time series to be visualised by filling the official dataset's existing gaps with model-based estimates. Therefore, slight deviations between the calculation and visualisation are possible.

Although the Swiss border region has a significantly lower GDP per capita than Switzerland as a whole, it is still more than double the EU average. The Italian border region, on the other hand, has a GDP per capita higher than the national average (see Figure 2.8).

Figure 2.8: Gross domestic product at current market prices (per capita)



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2.2.2 Labour market and commuting

This sub-dimension highlights the existing and potential functional links within the labour market of the border region. It examines the employment situation and commuting patterns, as well as the role of telework agreements, and considers developments over time based on analysed indicators. The analysis identifies factors that facilitate or hamper cross-border labour market integration.[6]

2.2.2.1 Share of employment

Indicator description

This indicator shows the share of employees in the population aged 15 to 64. Although it does not fully capture entrepreneurs, marginal employees, or civil servants, this is an important statistic for understanding general labour market patterns. It covers 2 aspects: first, high values can result from a high proportion of the resident population being employed. Second, high values can result from a high number of incoming commuters (from other NUTS3 regions within the country or from neighbouring countries). The same arguments apply to low values: they may indicate low levels of employment, or they may result from high shares of outgoing commuters. Values of more than 100% are possible, since the number of incoming commuters can exceed the number of inhabitants aged 15 to 64 (including both domestic and cross-border commuters).

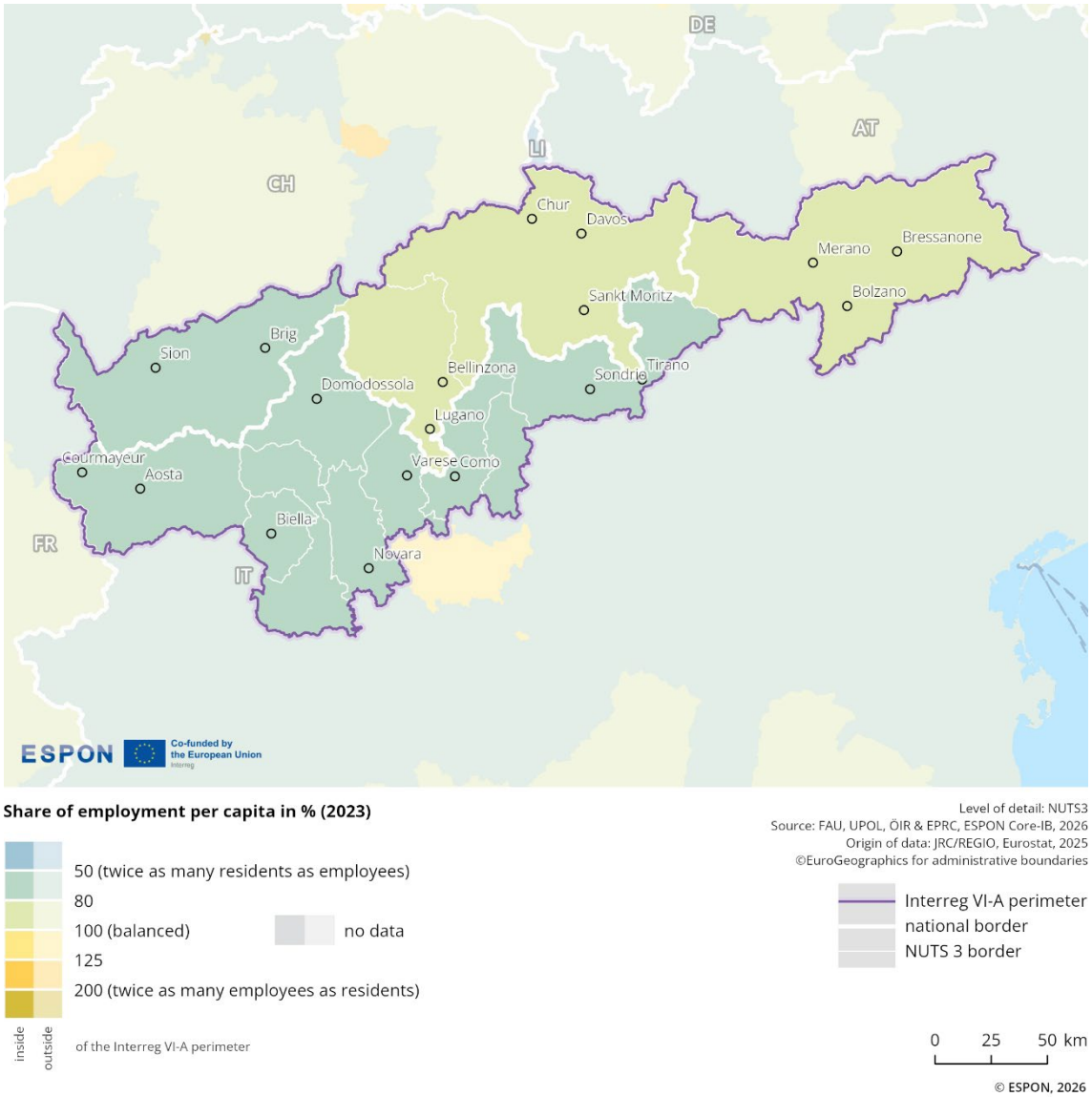
- **Source**: Eurostat, Annual Regional Database of the European Commission (ARDECO)
- **Temporal coverage**: 2014-2023
- **Unit**: Share in %

Please refer to the technical annex for more information.

Figure 2.9 illustrates the share of employment per capita in the population aged 15 to 64 in 2023. The data are categorised into ranges from below 50% (twice as many residents aged 15 to 64 as employees) to above 200% (twice as many employees as residents aged 15 to 64), with 100% representing a balanced ratio. Blue or green-coloured regions indicate more residents aged 15 to 64 than employees, while yellow regions indicate more employees than residents aged 15 to 64.

[6] See also: European Commission 2024: Cross-Border Regional Labour Market Analysis, https://op.europa.eu/s/AazM

Figure 2.9: Employment share[7]



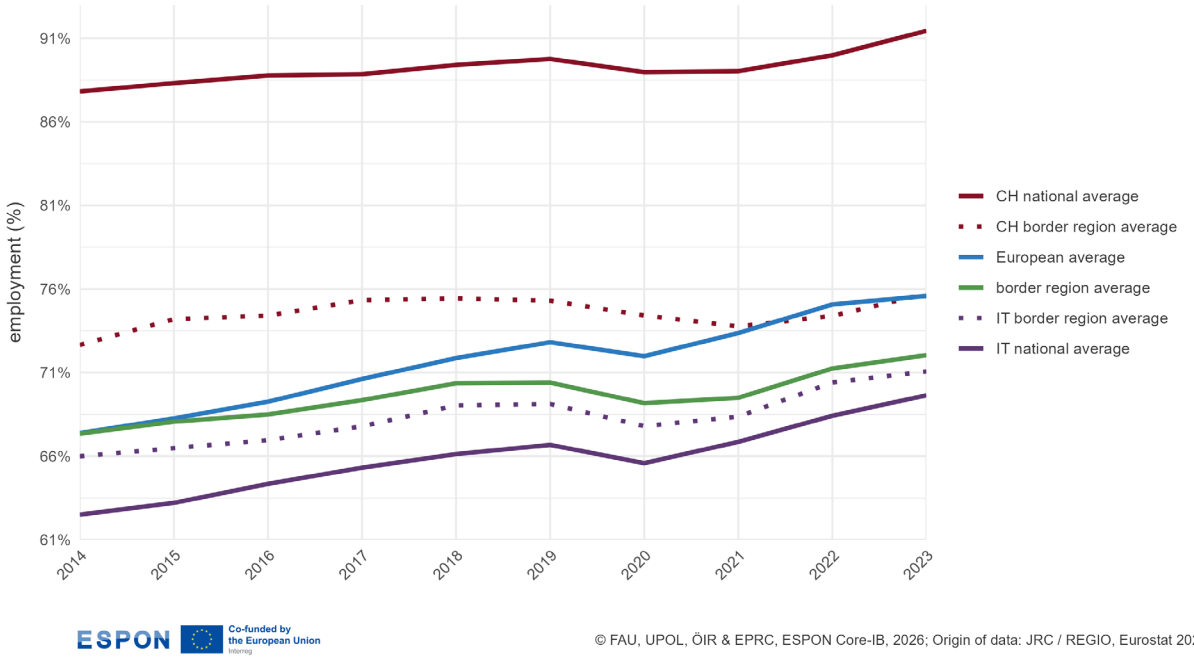
The share of employment in this border region is relatively stable, with the average for the entire region at 72.04% in 2023, having increased by 4.7 percentage points since 2014. Due to very similar indicator values, differences between individual countries are not very pronounced. In most of the Italian part, share of employment values range between 50% and 80%, with only the areas around Merano/Meran and Bolzano/Bozen falling in the 80% to 100% range. In the Swiss part, the values around the towns of Sion and Brig range from 50% to 80%, while around Davos and St. Moritz as well as in the Ticino/Tessin area they range from 80% to 100%. When comparing the share of employment in this border region with different averages, the following can be observed (see Figure 2.10):

- Compared to the European average, values in the cross-border region are lower by 3.5 percentage points, whereas in 2014 the difference was only 0.04 percentage points.
- Compared to the Italian average, values in the cross-border region are higher by 2.4 percentage points, with the difference in 2014 being 4.8 percentage points.
- Compared to the Swiss average, values in the cross-border region are lower by 19.4 percentage points, while in 2014 they were lower by 20.5 percentage points.

[7] Note: In this map, 'residents' refers to the population aged 15 to 64.

- The Italian border area reaches values 1.4 percentage points higher than the Italian national average, whereas the Swiss border area has values 15.7 percentage points lower than the Swiss national average.
- Compared to the average of all cross-border regions, values are lower by 2.4 percentage points, although in 2014 they were higher by 1.1 percentage points.

Figure 2.10: Employment share over time (comparison)



ESPON Co-funded by the European Union Interreg

2.2.2.2 Share of working-age population

Indicator description

This indicator shows the share of people aged 15 to 64 in the total population, reflecting the potential working-age population. The population counted includes all residents who live in the country permanently, excluding foreign students and military personnel. Using the 15–64 age range is a standard European statistical proxy, since differences in retirement age or labour participation across countries cannot be captured systematically. It allows for regional differentiation of potential workforce throughout the border region.

- **Source**: Eurostat, Annual Regional Database of the European Commission (ARDECO)
- **Temporal coverage**: 2014-2023
- **Unit**: Share in %

Please refer to the technical annex for more information.

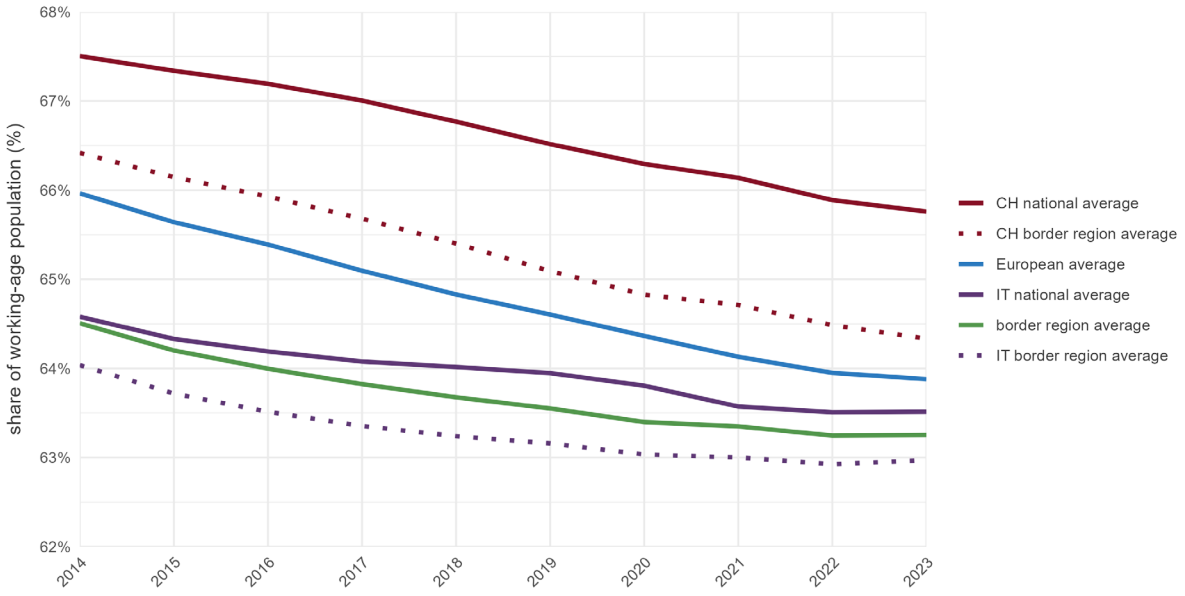
Figure 2.11 illustrates the evolution of the share of the working-age population in the Italy-Switzerland cross-border region between 2014 and 2023. In 2023, the border region shows an average working-age population share of 63.3%, compared to the European average of 63.9% and 63.7% for the average of all cross-border regions.

The share of the working-age population in the whole cross-border region is slightly higher than the Italian border average (63.0%), but noticeably lower than the Swiss border average (64.3%). Compared to national levels, the region falls just below both the Italian national average (63.5%) and the Swiss national average (65.8%), which scores the highest ratio of working-age population.

The region experienced a 1.2 percentage point decrease in the share of working-age population between 2014 (64.5%) and 2023 (63.3%). This decline is less pronounced than that of the European average, which dropped by 2.1 percentage points. The Swiss parts showed a more significant decline (-2.1 percentage points at the border, -1.7 percentage points nationally) compared to the Italian parts (-1.0 percentage point at the border, -1.1 percentage points nationally).

In summary, the Italy-Switzerland cross-border region experienced a modest decline in the share of the working-age population between 2014 and 2023. Still, the change is slightly more marked on the Swiss side.

Figure 2.11: Share of working-age population over time (comparison)



ESPON Co-funded by the European Union Interreg

2.2.2.3 Employment by sector

Indicator description

The indicator differentiates the number of jobs in a region by sector. This indicator focuses on workplace-based employment, providing insight into the employment landscape of a region. The dataset can be disaggregated according to "10-sector" NACE (Nomenclature statistique des activités économiques dans la Communauté européenne) classifications, allowing for detailed analysis of employment distribution across various industries.

- **Source**: Eurostat, Annual Regional Database of the European Commission (ARDECO)
- **Temporal coverage**: 2014-2023
- **Unit**: Share in %

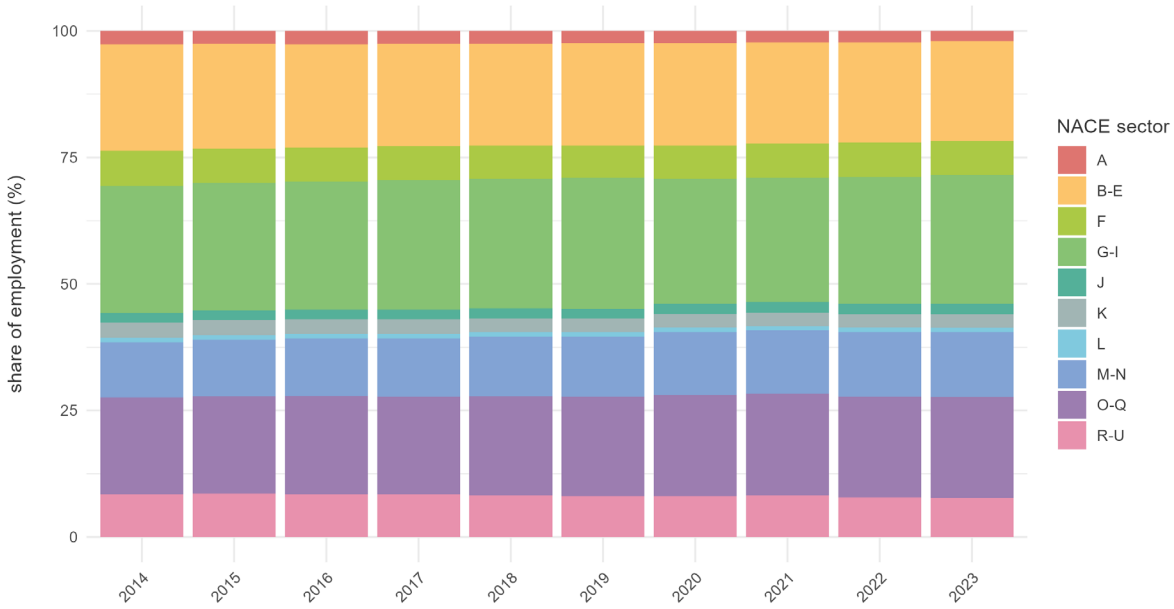
Please refer to the technical annex for more information.

Figure 2.12 illustrates the relative number of jobs in the border area differentiated by sectors. It shows where jobs are located (not where employed persons live). This workplace-based indicator offers insight into the employment structure of a region.

The dataset uses a '10-sector' classification based on NACE categories. The sectoral breakdown is as follows:

- A: Agriculture, forestry and fishing
- B-E: Mining and quarrying (B), Manufacturing (C), Electricity, gas, steam and air conditioning supply (D), Water supply; sewerage, waste management and remediation activities (E)
- F: Construction
- G-I: Wholesale and retail trade; repair of motor vehicles and motorcycles (G), Transportation and storage (H), Accommodation and food service activities (I)
- J: Information and communication
- K: Financial and insurance activities
- L: Real estate activities
- M-N: Professional, scientific and technical activities (M), Administrative and support service activities (N)
- O-Q: Education (O), Human health and social work activities (Q)
- R-U: Arts, entertainment and recreation R), Other service activities (S), Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use (T), Activities of extraterritorial organisations and bodies (U)

Figure 2.12: Employment by sector (comparison)



A: Agriculture, forestry and fishing
B-E: Mining and quarrying (B), Manufacturing (C), Electricity, gas, steam and air conditioning supply (D), Water supply; sewerage, waste management and remediation activities (E)
F: Construction
G-I: Wholesale and retail trade; repair of motor vehicles and motorcycles (G), Transportation and storage (H), Accommodation and food service activities (I)
J: Information and communication
K: Financial and insurance activities
L: Real estate activities
M-N: Professional, scientific and technical activities (M), Administrative and support service activities (N)
O-Q: Education (O), Human health and social work activities (Q)
R-U: Arts, entertainment and recreation (R), Other service activities (S), Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use (T), Activities of extraterritorial organisations and bodies (U)

Between 2014 and 2023, the relative number of jobs in the different sectors remains fairly stable. There is a slight decline in the share of employment in agriculture, forestry and fishing (A) and Mining and quarrying (B), Manufacturing (C), Electricity, gas, steam and air conditioning supply (D), Water supply; sewerage, waste management and remediation activities (E). Conversely, there is a modest increase in the number of jobs in Professional, scientific and technical activities (M), Administrative and support service activities (N) and Wholesale and retail trade; repair of motor vehicles and motorcycles (G), Transportation and storage (H) and Accommodation and food service activities (I).

Over the entire period, the sectors with the highest share of jobs are 'B-E' (mining, quarrying, manufacturing, electricity, gas, steam and air conditioning supply, water supply; sewerage, waste management and remediation activities, 'G-I' (wholesale and retail trade; repair of motor vehicles and motorcycles, transportation and storage, accommodation and food service activities) and 'O-Q' (education, human health and social work activities).

2.2.2.4 Outgoing cross-border commuters

Indicator description

The indicator shows outgoing cross-border commuting dynamics at NUTS3 level. Even though no origin-destination information can be provided, it is assumed that commuters primarily travel across the nearest border. Spatial, economic and population arguments are combined to calculate the number of outgoing cross-border commuters.

- **Source/method of retrieval**: Eurostat/LFS data on outgoing commuters currently available on NUTS2 level has been regionalised for NUTS3 by means of weighting by border length, NUTS3 population-weighted centroid distance to border, population per NUTS3 region (15–64 years old) and real compensation per employee
- **Temporal coverage**: 2015-2023
- **Unit**: Share in %

Please refer to the technical annex for more information.

Commuting is one of the most relevant cross-border flows to identify functional linkages. Figure 2.13 illustrates the share of outgoing commuters per capita for each NUTS3 region (more concretely speaking the share of outgoing commuters among the residential population of the age group 15-64 years old, resembling the potential labour force). Origin-destination information cannot be provided, but the share of outgoing commuters in regions close to the border indicates the relevance of commuting. It highlights functional relations in the labour market within the cross-border region.

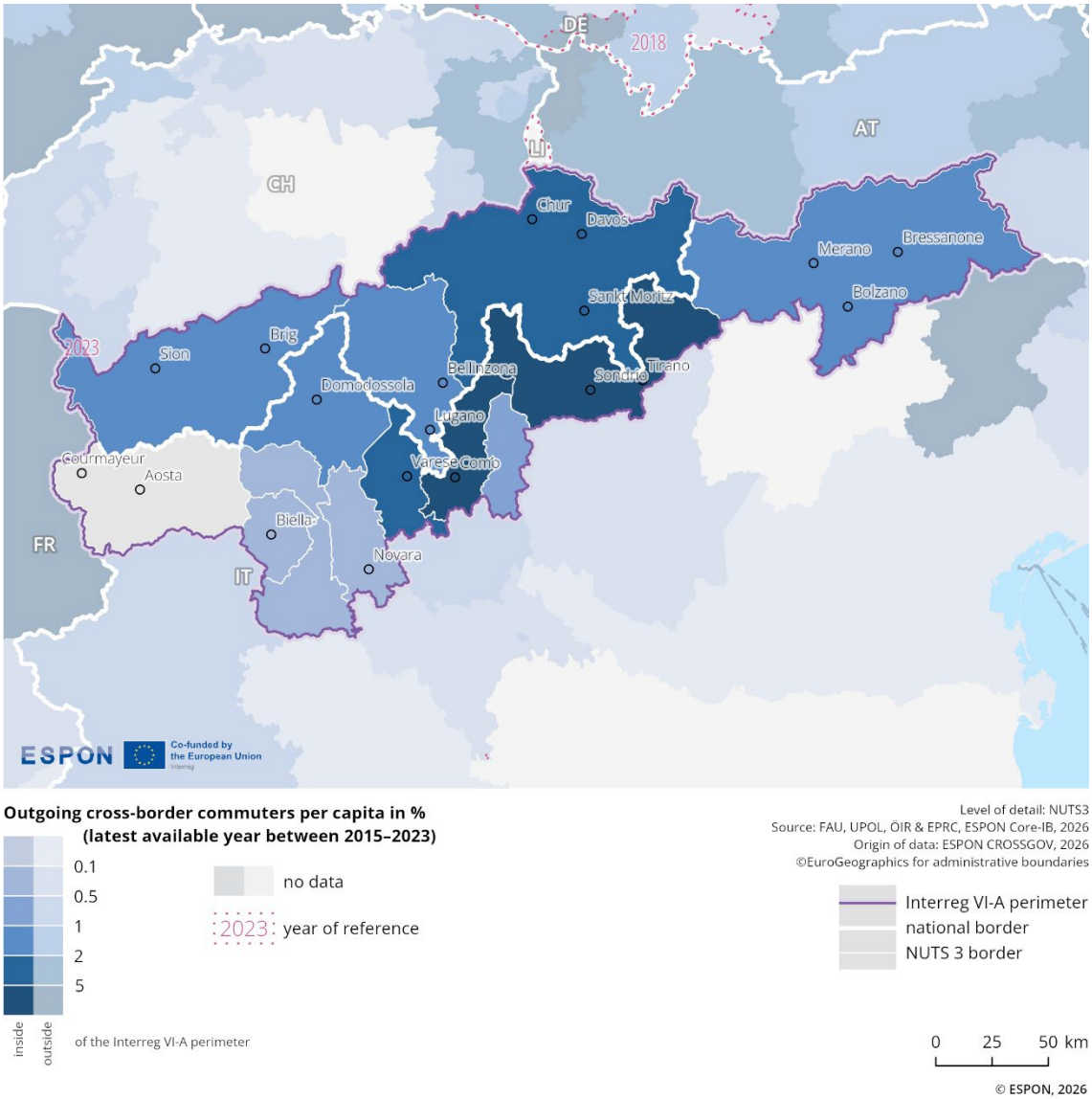
The map illustrates the share of cross-border commuters, based on the most recent available data. It shows relatively strong and fairly evenly distributed cross-border commuting activity in areas directly adjacent to the border on both the Italian and Swiss sides.

The border area around the regions Sondrio, Como and Graubünden stands out in particular, with high levels of outgoing commuters on both sides of the border, highlighting the important role of this region as a commuting corridor[8]. It is likely that some commuters are also heading to Liechtenstein.

Another 'hotspot' on the Italian side is the region of Varese. This NUTS3 region also shows elevated shares of outgoing cross-border commuters per capita. With slightly lower shares, the regions of Bolzano/Bozen, Verbano-Cusio-Ossola, Ticino and Valais also show notable outgoing commuting patterns. Overall, the spatial pattern shows a tendency for outgoing commuting flows from Italy to Switzerland.

[8] See Eurostat Statistical Atlas for NUTS3 (2021) regions: https://ec.europa.eu/statistical-atlas/viewer/?config=typologies.json&ch=NUTS&mids=BKGCNT,NUTS2021L3,CNTOVL&o=1,1,0.7&center=49.69576,14.3332,4&lcis=NUTS2021L3&

Figure 2.13: Outgoing cross-border commuting patterns



2.2.2.5 Cross-border telework agreements

Indicator description

The indicator shows what kind of legal framework for cross-border telework is enacted.

- **Source/method of retrieval**: The indicator is based on information about the legal framework for social security regarding cross-border teleworking, categorised by border pair.
- **Temporal coverage**: Status as of March 2025
- **Unit**: n/a

Please refer to the technical annex for more information.

The 2 countries involved in the programme are signatories of the 2023 Framework Agreement on Cross-Border Telework. Under this agreement, cross-border workers can telework from their country of residence for up to 50% of their total working time without affecting their social security affiliation.

2.2.3 Competitiveness

This sub-dimension illustrates the competitiveness of the border region by analysing the main industry sectors that contribute to its economic development. It assesses gross value added (GVA) at basic prices by sector, as well as nominal compensation per hour worked, in order to understand productivity levels and sectoral strengths.

2.2.3.1 Gross value added at basic prices by sector

Indicator description

The indicator shows the gross value added (GVA), which is a measure of the contribution of a country or region to the economy. Regional GVA represents the value generated by all units involved in the production of goods and services within a specific area. This indicator can be disaggregated by industry and service sector, allowing for a detailed analysis of economic contributions across different fields. Additionally, the sum of GVA across all industries or sectors, combined with taxes on products and minus subsidies on products, yields the gross domestic product (GDP) of the region. The dataset is available in "10-sector" NACE classifications, facilitating comprehensive evaluations of the regional economy.

- **Source**: Annual Regional Database of the European Commission (ARDECO)
- **Temporal coverage**: 2014-2023
- **Unit**: Million purchasing power standards (PPS)

Please refer to the technical annex for more information.

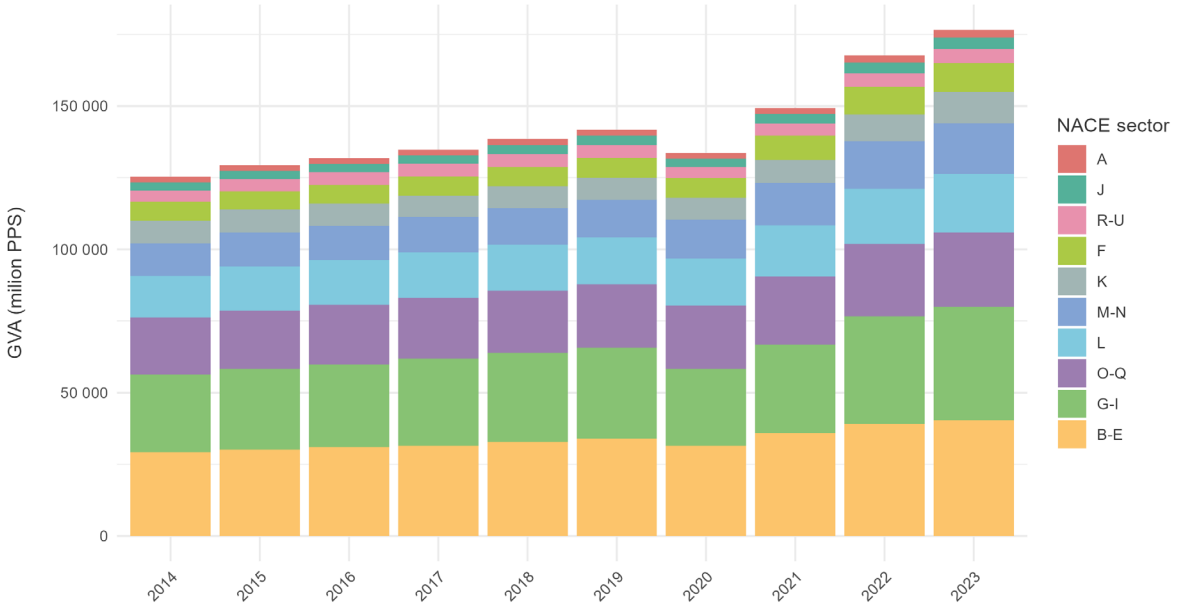
Figure 2.14 visualises gross value added (GVA), which is an important indicator of economic activity. GVA measures the value created by all economic activities involved in producing goods and services in a specific area. It is differentiated by sectors to provide detailed insights into the economic contributions of different fields.

The dataset uses a '10-sector' classification based on NACE categories. The sectoral breakdown is as follows:

- A: Agriculture, forestry and fishing
- B-E: Mining and quarrying (B), Manufacturing (C), Electricity, gas, steam and air conditioning supply (D), Water supply; sewerage, waste management and remediation activities (E)
- F: Construction
- G-I: Wholesale and retail trade; repair of motor vehicles and motorcycles (G), Transportation and storage (H), Accommodation and food service activities (I)
- J: Information and communication
- K: Financial and insurance activities
- L: Real estate activities
- M-N: Professional, scientific and technical activities (M), Administrative and support service activities (N)
- O-Q: Education (O), Human health and social work activities (Q)
- R-U: Arts, entertainment and recreation R), Other service activities (S), Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use (T), Activities of extraterritorial organisations and bodies (U)

Between 2014 and 2023, the GVA in the border area of Italy-Switzerland increased from 125,351 million purchasing power standards (PPS) to 176,577 million PPS — a growth of 42%. Sector groups B–E, G–I, and O–Q together make up over half of the total GVA, highlighting their significant contribution to the regional economy within the border area. The sector groups B–E contributed the largest share, with a total of 40,352 million PPS in 2023. This underlines the significance of sectors such as Mining and quarrying (B), Manufacturing (C), Electricity, gas, steam and air conditioning supply (D), Water supply; sewerage, waste management and remediation activities (E) in the Italy-Switzerland border region.

Figure 2.14: Gross value added at basic prices by sector (comparison)



A: Agriculture, forestry and fishing
B-E: Mining and quarrying (B), Manufacturing (C), Electricity, gas, steam and air conditioning supply (D), Water supply; sewerage, waste management and remediation activities (E)
F: Construction
G-I: Wholesale and retail trade; repair of motor vehicles and motorcycles (G), Transportation and storage (H), Accommodation and food service activities (I)
J: Information and communication
K: Financial and insurance activities
L: Real estate activities
M-N: Professional, scientific and technical activities (M), Administrative and support service activities (N)
O-Q: Education (O), Human health and social work activities (Q)
R-U: Arts, entertainment and recreation (R), Other service activities (S), Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use (T), Activities of extraterritorial organisations and bodies (U)

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2.2.3.2 Nominal compensation per hour worked

Indicator description

The indicator shows the average income paid for each hour worked, known as compensation per hour worked. This measure is calculated by dividing the "compensation of employees at current prices" by the total number of "hours worked (employees)." Employees, in this context, are defined as individuals engaged by contract in productive activities for a resident unit, receiving remuneration irrespective of their place of residence. The total hours worked is considered the most appropriate measure of labour input, representing the aggregate number of hours actually worked by employees. This indicator provides valuable insights into labour productivity and wage dynamics within the economy.

- **Source**: Annual Regional Database of the European Commission (ARDECO)
- **Temporal coverage**: 2023 (missing data from 2023 in Switzerland were supplemented by values from 2022)
- **Unit**: Euro

Please refer to the technical annex for more information.

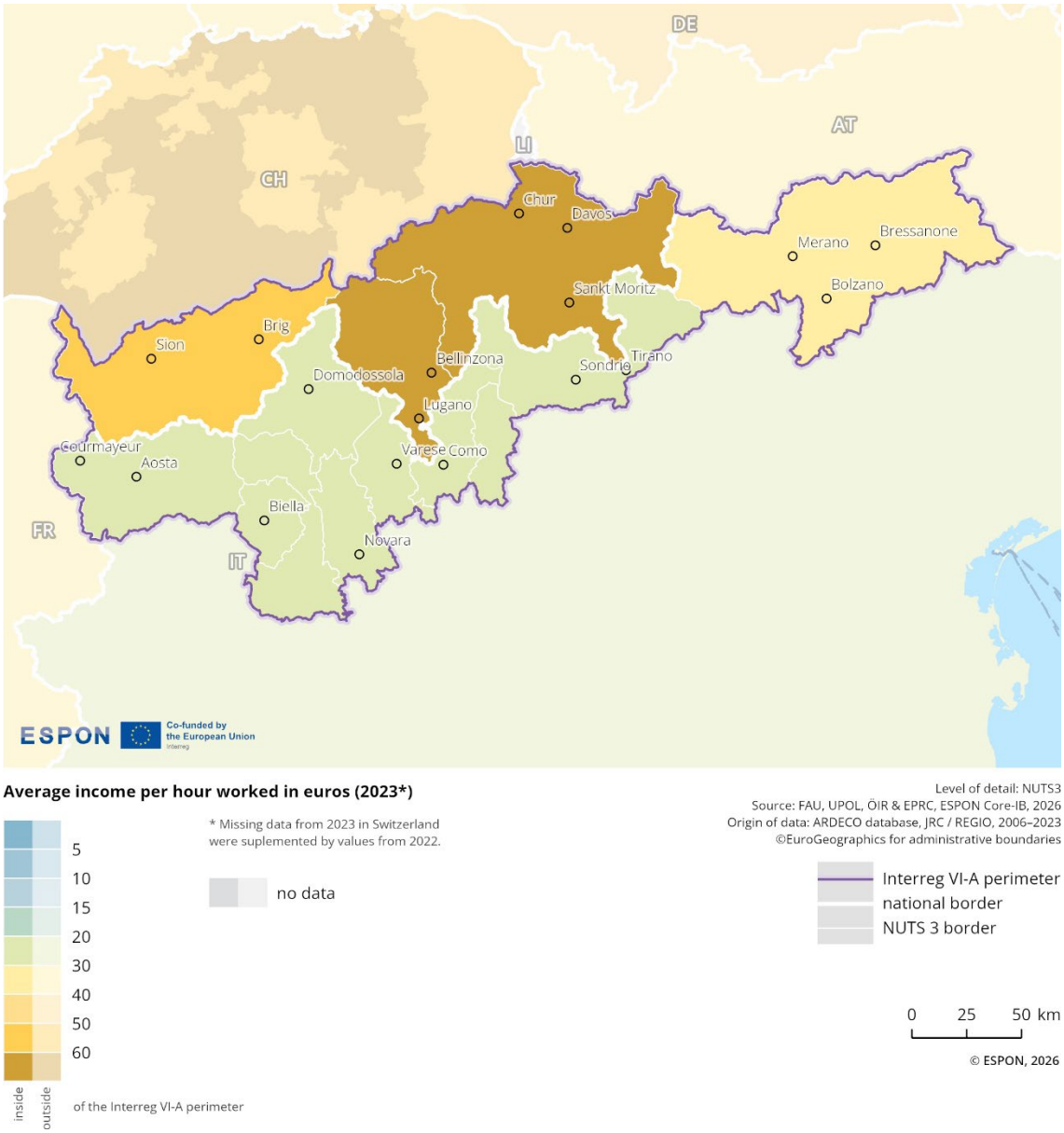
Figure 2.15 shows the average values for the 'compensation per hour worked'. This indicator is calculated by dividing the total compensation of employees (at current prices) by the total number of hours worked by those employees. In this context, 'employees' are defined as individuals engaged by contract in productive activities. The data is available for the place of work, regardless of the place of residence. Total hours worked represent the actual number of hours worked by employees and are considered the most accurate measure of labour input.

In 2023, nominal compensation per hour worked in the Italy–Switzerland border region appears to be distributed quite unevenly. In most Italian areas within this cross-border region, the average hourly income ranges between €20 and €30, with the exception of Bolzano/Bozen, which shows a slightly higher value (€30.60)[9]. The Swiss NUTS3 regions report significantly higher values ranging from €50 to more than €60. To contextualize the regional pattern shown in the figure, it is noteworthy that the national average hourly compensation reaches €24.70 in Italy and €63.30 in Switzerland, which helps situate the border region within national labour productivity context.

Cross-border wage differences can encourage labour migration from lower-wage areas to more economically prosperous neighbouring regions, creating both opportunities and challenges for local labour markets and social systems.

[9] See Eurostat Statistical Atlas for NUTS3 (2021) regions: https://ec.europa.eu/statistical-atlas/viewer/?config=typologies.json&ch=NUTS&mids=BKGCNT,NUTS2021L3,CNTOVL&o=1,1,0.7&center=49.69576,14.3332,4&lcis=NUTS2021L3&

Figure 2.15: Average income per hour



2.2.4 Infrastructure and housing

This sub-dimension shows the impact of the border on infrastructure and housing in the region. It assesses housing prices and average internet speed in order to identify cross-border effects, including potential price spillovers and disparities. The analysis reveals whether infrastructure and housing markets facilitate integration or expose structural challenges that are specific to the border area.

2.2.4.1 Advertised sales prices

Indicator description

The indicator shows the advertised sales price per square meter for houses/appartements as retrieved from commercial real estate websites at national level. In the cross-border region, local differences between average sales prices are highlighted and the "cutting" effect of the border and its influence on price levels is visualised.

- **Source/method of retrieval**: Processed ESPON House4all data. The original data is collected via web-scraping of national listing websites over a one-year period.
- **Temporal coverage**: 2024/2025
- **Unit**: Average price per square meter (€/m^2)

Please refer to the technical annex for more information.

Figure 2.16 illustrates the advertised sales price of housing in 2025 across the border region. The data are categorised into ranges of average housing price per square metre, from below 250 €/m² up to more than 8,000 €/m², shown in colours ranging from purple and blue to green, yellow and orange.

Lower prices are found in the southern part, where values drop below 500 €/m². The average advertised sales price in the Italian part of the border region is around 1,377 €/m², while in the Swiss part it is about 6,044 €/m². The overall average for the entire border region is 2,598 €/m², which is considerably higher than the average across all evaluated EU border regions (1,900 €/m²). In certain Swiss municipalities, prices reach and exceed the European average of 5,600 €/m².

Figure 2.16: Advertised housing prices

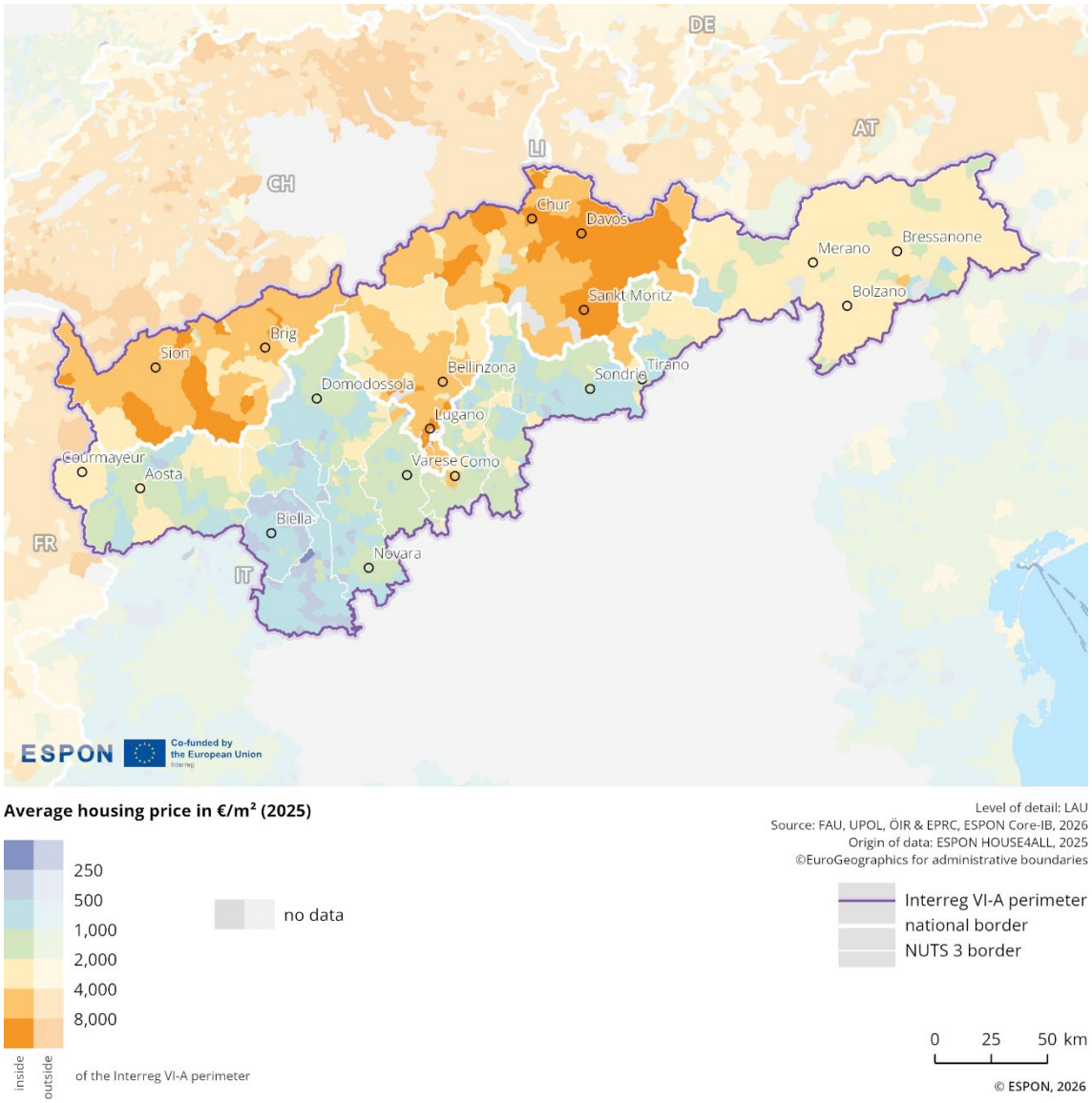
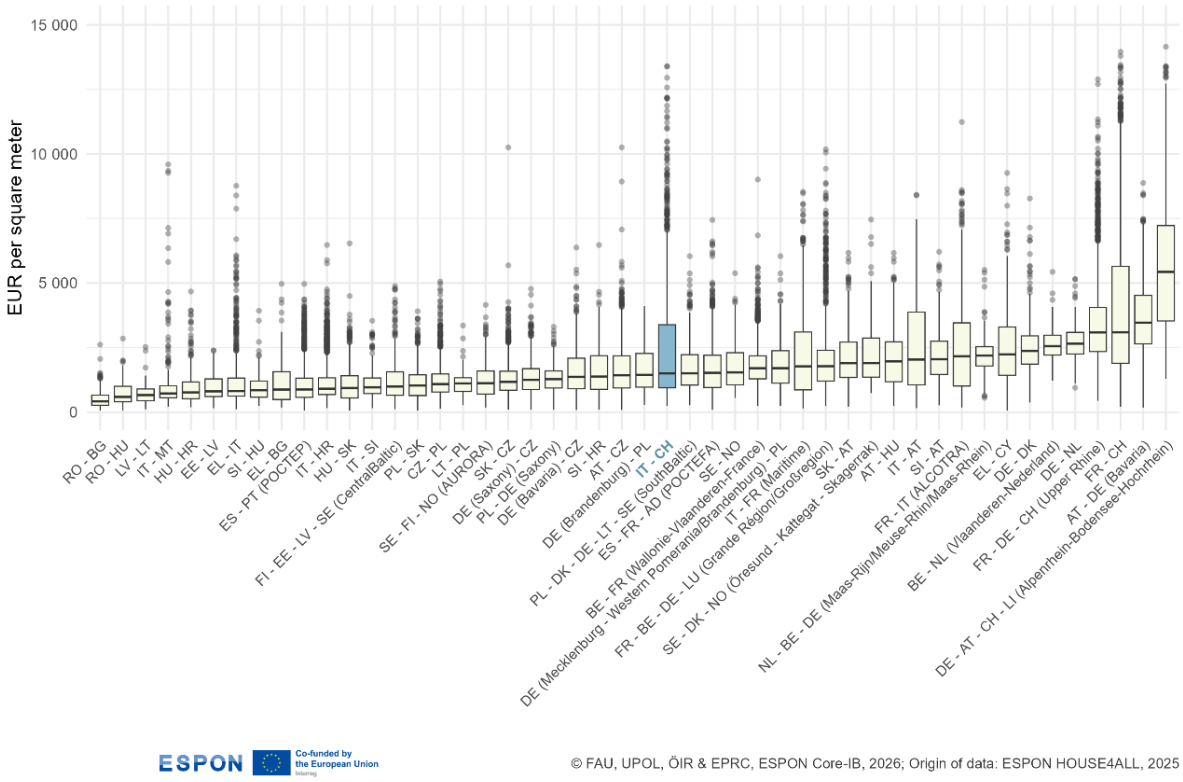


Figure 2.17 illustrates the distribution of sales prices across municipalities within the border area. The large interquartile range (IQR, represented by the box) indicates substantial variation, highlighting pronounced spatial disparities in sales prices within the border area. The boxplot also displays extreme values (shown as individual dots), with some municipalities recording prices of up to 13,000 €/m².

Figure 2.17: Advertised housing prices (comparison)



ESPON Co-funded by the European Union

2.2.4.2 Average internet speed

Indicator description

The indicator shows the population weighted average internet speed available at municipal level. It highlights differences in the "digital preparedness". In border regions, this indicator is particularly relevant for identifying digital infrastructure gaps that may hamper balanced development and cross-border integration.

- **Source/method of retrieval**: Processing of data provided by Speedtest by Ookla Global Fixed and Mobile Network Performance Maps, based on Ookla's analysis of Speedtest Intelligence data.
- **Temporal coverage**: 2022
- **Unit**: Download speed in Mbps

Please refer to the technical annex for more information.

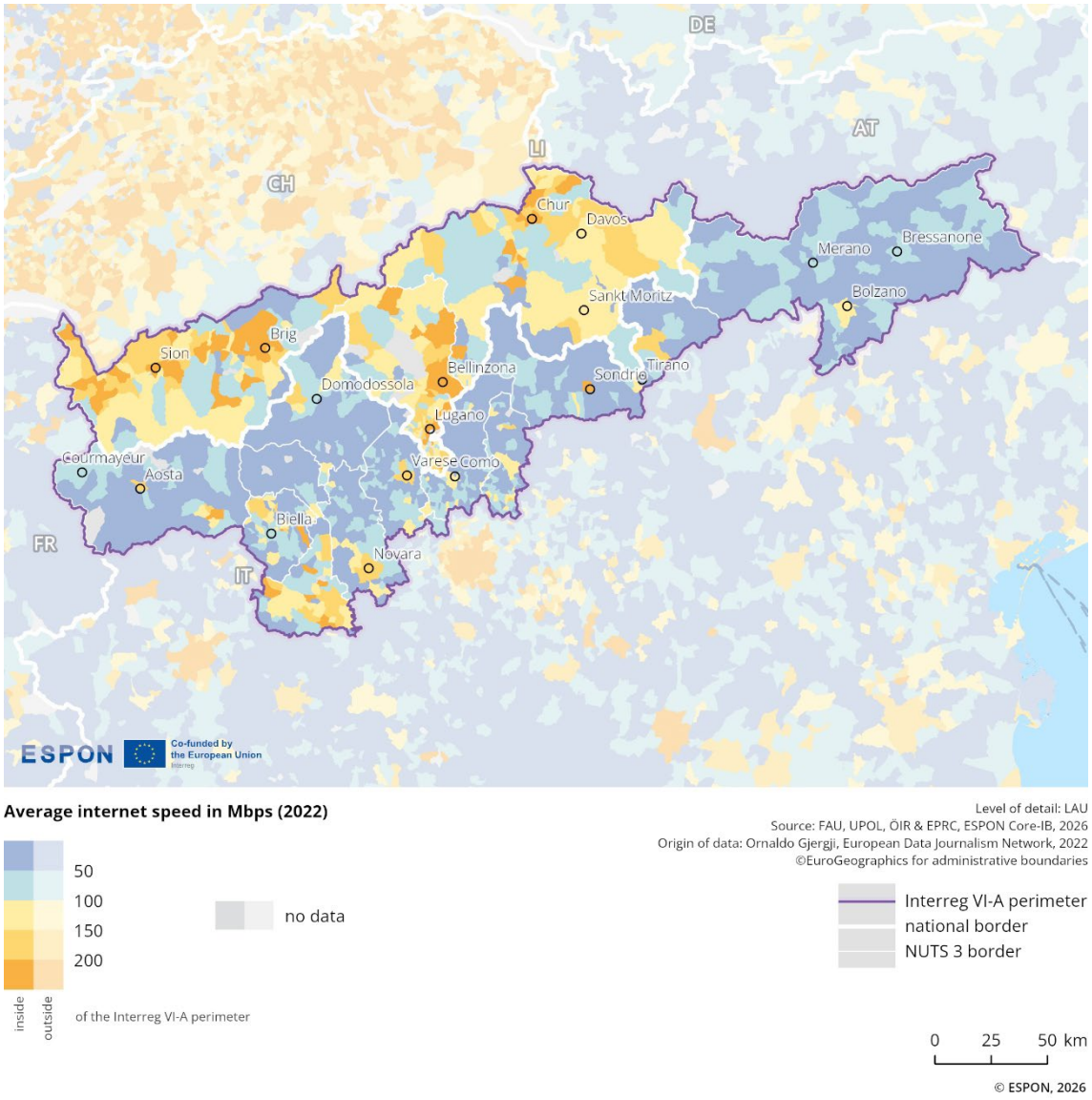
Digitalisation is a highly relevant issue in European border regions, with the overarching objective of ensuring appropriate digital access. It is widely recognised as a key precondition for successful regional and economic development. A major challenge in this process is preventing 'digital divides', i.e., avoiding significant disparities in economic, social, and spatial terms.

Average internet speed is a telling indicator of such disparities, highlighting differences in 'digital preparedness' at the local level. Figure 2.18 shows the average download speed at the municipality level. The colour scheme ranges from dark blue (very slow speeds) to orange (very fast speeds). The

data, prepared by OBC Transeuropa for EDJNet, is based on Speedtest Intelligence data from Speedtest/Ookla's Global Fixed and Mobile Network Performance Maps for the first quarter of 2022. The average download speeds are expressed in megabits per second (Mbps), not to be confused with megabytes per second (MBps).

The map reveals significant differences between urban and rural areas, with values ranging from under 50 Mbps to over 200 Mbps. Cities such as Aosta, Novara, Varese, Bolzano/Bozen, Sion, Lugano, Brig, Davos, and Sankt-Moritz report relatively high average speeds, while the surrounding areas tend to have significantly lower values. This may be due to the greater return on investment typically associated with digital infrastructure projects in urban areas compared to rural ones. However, not all urban areas in this border region have high download speeds, for example, Como, Tirano, and Merano/Meran do not stand out in this regard. In Switzerland, the average internet speed is significantly higher than in Italy. Italy's mountainous terrain clearly poses a challenge to providing high-speed internet, even though this does not appear to be the case in Switzerland.

Figure 2.18: Average internet download speed



2.2.5 Key messages on the economic dimension

The border region has a mixed, yet robust, socio-economic profile. This is shaped by structural strengths and significant cross-border differences.

Economic output is a particularly important feature. The GDP per capita within this border area is above the EU average. Within the region, income levels on the Swiss side are very high, far exceeding the EU average, while the Italian side performs above the national average. This highlights the asymmetries that shape labour flows and living conditions.

Employment patterns provide another layer of analysis. While the overall employment rate is high, it remains below European and Swiss averages, indicating structural challenges in labour markets, particularly on the Italian side. The stability of the economy across sectors, with manufacturing, trade, services and public functions dominating, underlines the region's diversity. At the same time, the gradual increase in knowledge-intensive and service-oriented jobs indicates adaptation to broader economic transitions.

Cross-border cummuting patterns illustrate the links between these disparities. Wage differences and variations in housing prices encourage significant cross-border commuting, particularly in areas such as Graubünden-Sondrio, Lugano-Como, and Verbano-Cusio-Ossola. Housing markets reflect stark contrasts: Italian areas are far more affordable than Swiss ones, but both exceed EU border averages. The 2023 telework agreement between Italy and Switzerland introduces a new dimension by enabling commuting patterns to be combined with remote working. These dynamics show how economic asymmetries create opportunities for cross-border integration, as well as posing challenges to local labour and housing markets.[10]

The working-age population within the border region is slowly shrinking, though less steeply than in Europe overall, indicating demographic pressure. Digital infrastructure further exacerbates these disparities, with high-speed connections in major towns, yet persistent gaps in rural and mountainous areas, particularly in Italy.

2.3 Green dimension

The green dimension highlights the environmental characteristics, vulnerabilities and sustainability-related interactions within the border region. The analysis provides insight into the environmental interdependence of border regions. Additionally, the spatial distribution of renewable and conventional energy infrastructure, alongside indicators of resources and the circular economy, reveals whether the border facilitates collaborative transitions towards sustainability.

2.3.1 Nature protection and pollution

This sub-dimension investigates cross-border functional links in protected areas and areas affected by air and water pollution. It analyses the presence of protected areas in order to identify cross-border ecological links and conservation efforts. It also highlights the extent to which air and water pollution affects people living in border regions.

[10] See also: European Commission 2024: Cross-Border Regional Labour Market Analysis, https://op.europa.eu/s/AazM

2.3.1.1 Protected areas

Indicator description

The indicator shows the presence and territorial coverage of protected areas based on the combination of 3 data sources, i.e., Nationally designated areas, Natura 2000 Network and Emerald Network.

- **Source/method of retrieval**: The indicator represents a combination of nationally designated areas, Natura 2000 and Emerald network – all data is provided by EEA (European Environment Agency) Geospatial data catalogue. As the EU Habitats' and Birds' directives do not apply for Switzerland, the Natura 2000 category is only relevant for Italian side.
- **Temporal coverage**: 2024
- **Unit**: n/a

Please refer to the technical annex for more information.

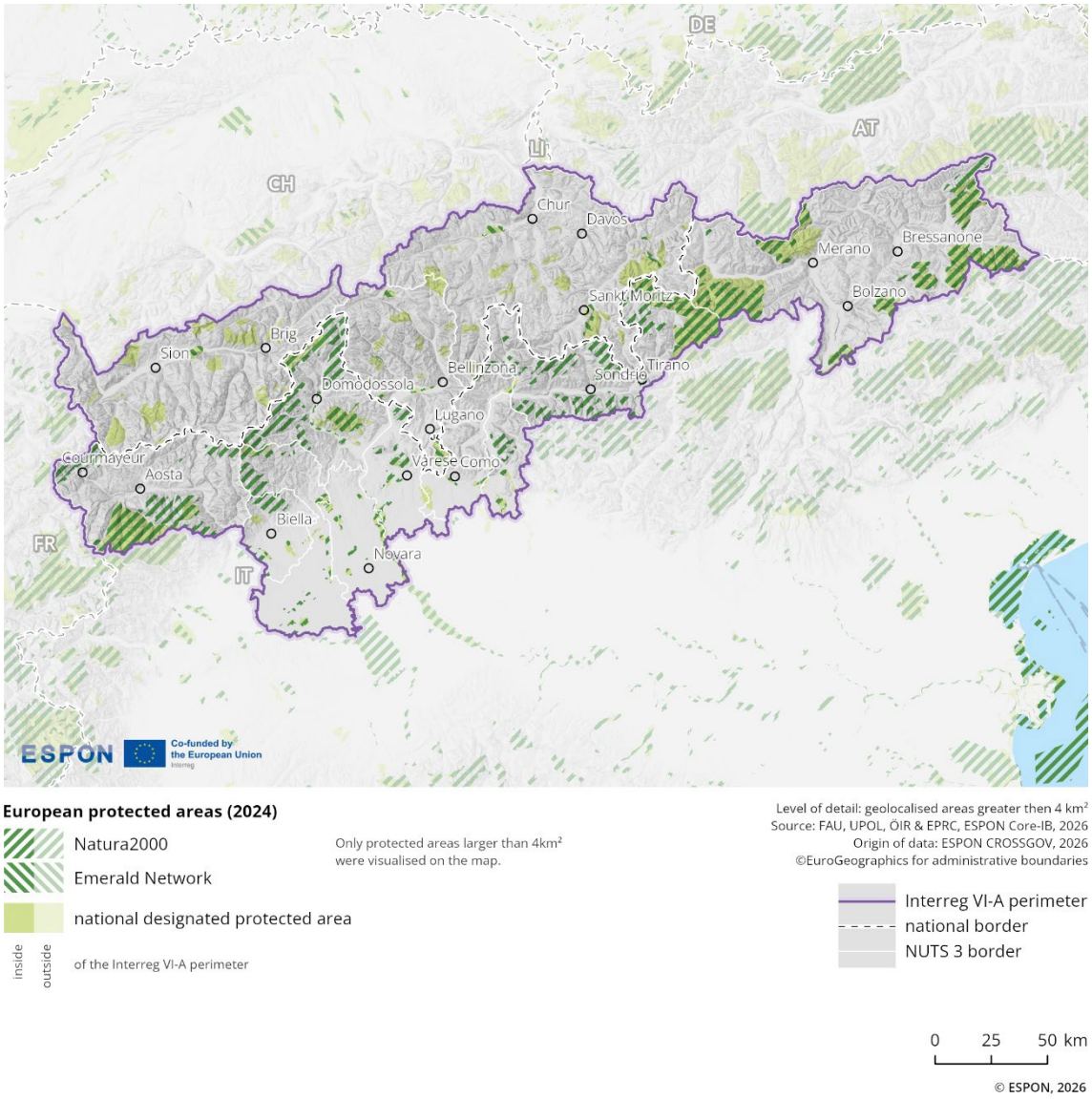
Figure 2.19 illustrates the distribution of protected areas in 2024 across the border region. The data differentiate between Natura 2000 sites, the Emerald Network, and nationally designated protected areas, with only protected areas larger than 4 km² displayed. [11]

Protected areas in the Alpine cross-border region between Italy and Switzerland are densely concentrated along the central and eastern parts of the Interreg area. The largest contiguous zones are found east of Sankt Moritz, with extensive overlaps between national designations and European networks. It can be observed that the protected areas are predominantly confined to Italy, with a less extense of a counterpart in Switzerland.

Fragmentation is lower in the mountainous zones and higher towards the southern plains around Novara and Como in Italy and Sion and Brig in Switzerland. Besides Sankt Moritz bigger protected areas can be found close to Merano/Meran, Bolanzo/Bozen, Aosta and along the border on the Italian side close to Brig. The Swiss side mainly has national designated protected areas to a much smaller extend than the Italian. These can be found close to Sion and Brig. Outside the Interreg region, several large, protected areas continue mostly seamlessly, particularly to the southeast and northeast.

[11] More detailed information on individual areas of the Natura 2000 network can be found on the following website: https://natura2000.eea.europa.eu/

Figure 2.19: Nature protected areas



2.3.1.2 Air pollution

Indicator description

The indicator shows the air pollution from fine particulates (PM2.5) at NUTS3 level. The data shows the population-weighted average air pollution level (µg/m³), providing an indication of the extent to which the regional population is affected by air pollution.

- **Source/method of retrieval**: Processing and analysis of European Environment Agency data
- **Temporal coverage**: 2022
- **Unit**: Population weighted average of µg/m³

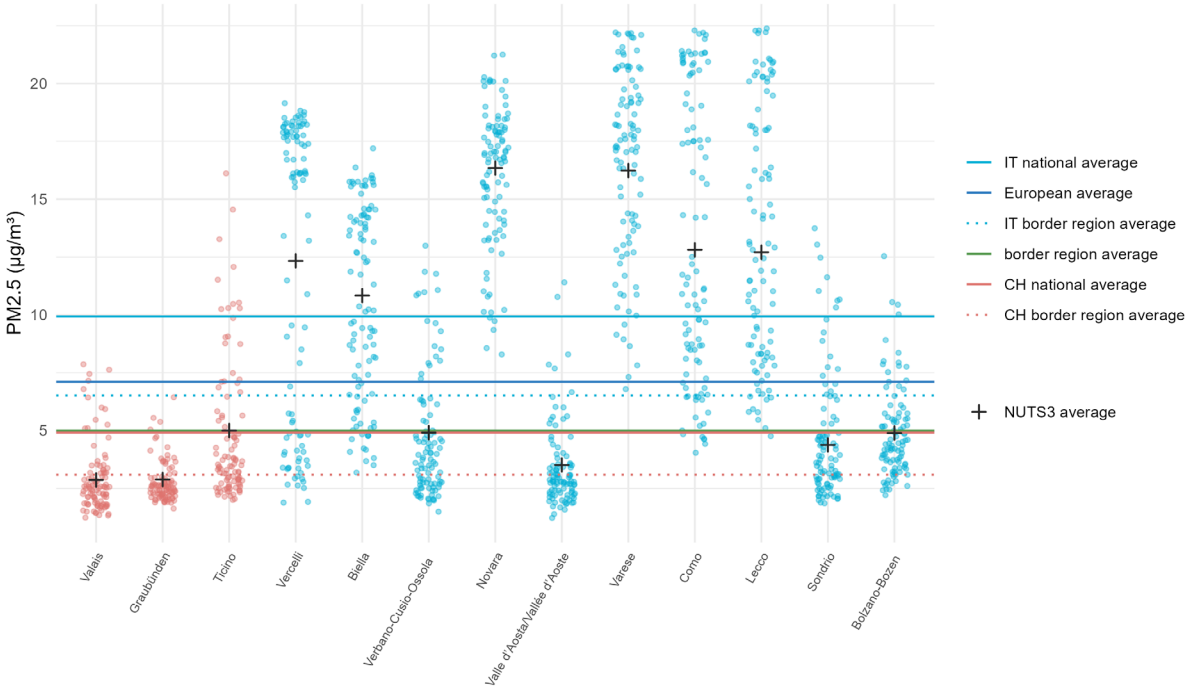
Please refer to the technical annex for more information.

Air pollution constitutes a significant environmental and public health challenge in general in the valleys of the European Alps and in the densely urbanized and industrialized corridor stretching from the Swiss border to Milan, where topographical constraints and high traffic volumes exacerbate the accumulation of pollutants. Figure 2.20 illustrates PM2.5 concentrations (in µg/m³) across NUTS3 regions in Italy and Switzerland. Each small dot represents an individual measurement, while the black crosses indicate the average PM2.5 concentration for each NUTS3 region[12]. The regions are aligned along the x-axis, with Swiss regions on the left (in red) and Italian regions on the right (in blue).

Italy exhibits notably higher PM2.5 values than Switzerland, both in individual regions as well as in the border region and national averages. In contrast, PM2.5 concentrations in Switzerland are consistently lower and show little variation across regions. Italian regions, on the other hand, display considerable variation, with some NUTS3 areas reaching levels exceeding 20 µg/m³.

The Swiss border average is lower than the national level, a pattern that also appears in the Italian averages. Both the Italian national and border region averages (which contain a number of industrial centres and are densly populated) exceed the European average, whereas the Swiss national and border region averages fall below it. The cross-border average is also below the European average and lies between the 2 countries' values, positioned notably closer to the Swiss national average.

Figure 2.20: Air pollution



[12] See Eurostat Statistical Atlas for NUTS3 (2021) regions: https://ec.europa.eu/statistical-atlas/viewer/?config=typologies.json&ch=NUTS&mids=BKGCNT,NUTS2021L3,CNTOVL&o=1,1,0.7&center=49.69576,14.3332,4&lcis=NUTS2021L3&

2.3.1.3 Water pollution

Indicator description

The indicator shows the ecological status or potential for coastal and river water bodies. It is based on an assessment of biological, hydro-morphological, chemical and physico-chemical quality elements.

- **Source/method of retrieval**: Processing and analysis of European Environment Agency data
- **Temporal coverage**: 2022 (supplemented by 2016 data)
- **Unit**: n/a

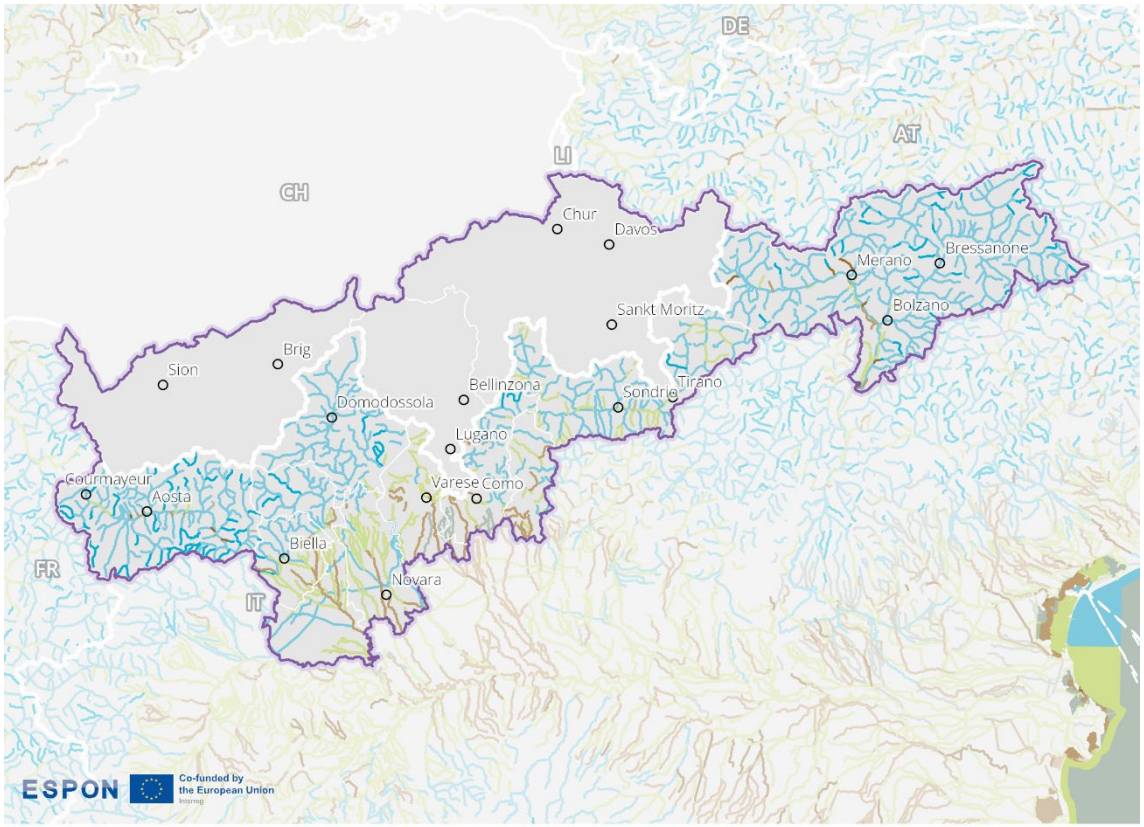
Please refer to the technical annex for more information.

In the Swiss part of the Interreg region the rivers are classified as "unknown", which limits the reliability of the data due to missing information[13].

In the Italian part of the Interreg region the water bodies are mostly classified as “good” to “high”. However, in the southernmost regions around the cities of Novara and Varese, the water quality is rated as “moderate” and partly “poor” (see Figure 2.21).

[13] For more information see the Water Framework Directive Reporting Guidance (2022): https://cdr.eionet.europa.eu/help/WFD/WFD_715_2022

Figure 2.21: Water quality patterns



Water quality (2022*)

- high
- good
- moderate
- poor
- bad
- unknown

inside outside inside outside of the Interreg VI-A perimeter

There is no data available for Switzerland.

Level of detail: geolocalised lines and areas
Source: FAU, UPOL, ÖIR & EPRC, ESPON Core-IB, 2026
Origin of data: © European Environment Agency, 2025
©EuroGeographics for administrative boundaries

- Interreg VI-A perimeter
- national border
- NUTS 3 border

0 25 50 km

© ESPON, 2026

2.3.2 Climate risks and resilience

This sub-dimension examines cross-border functional links relating to climate risks and resilience. It analyses exposure to natural hazards such as landslides, earthquakes, droughts and floods in order to identify vulnerabilities and risks.[14]

2.3.2.1 Natural hazard risks

Indicator description

The indicator shows the risk the border region is facing in relation to natural hazards (floods, droughts, landslides and earthquakes). The map highlights potential cross-border affectedness and allows to judge the relative relevance of each risk for the cross-border region.

- **Source/method of retrieval**: The indicator is based on geodata from the Disaster Management Risk Knowledge Centre/JRC. It provides the likelihood of specific natural hazard events at grid level.
- **Temporal coverage**: 2024
- **Unit**: n/a

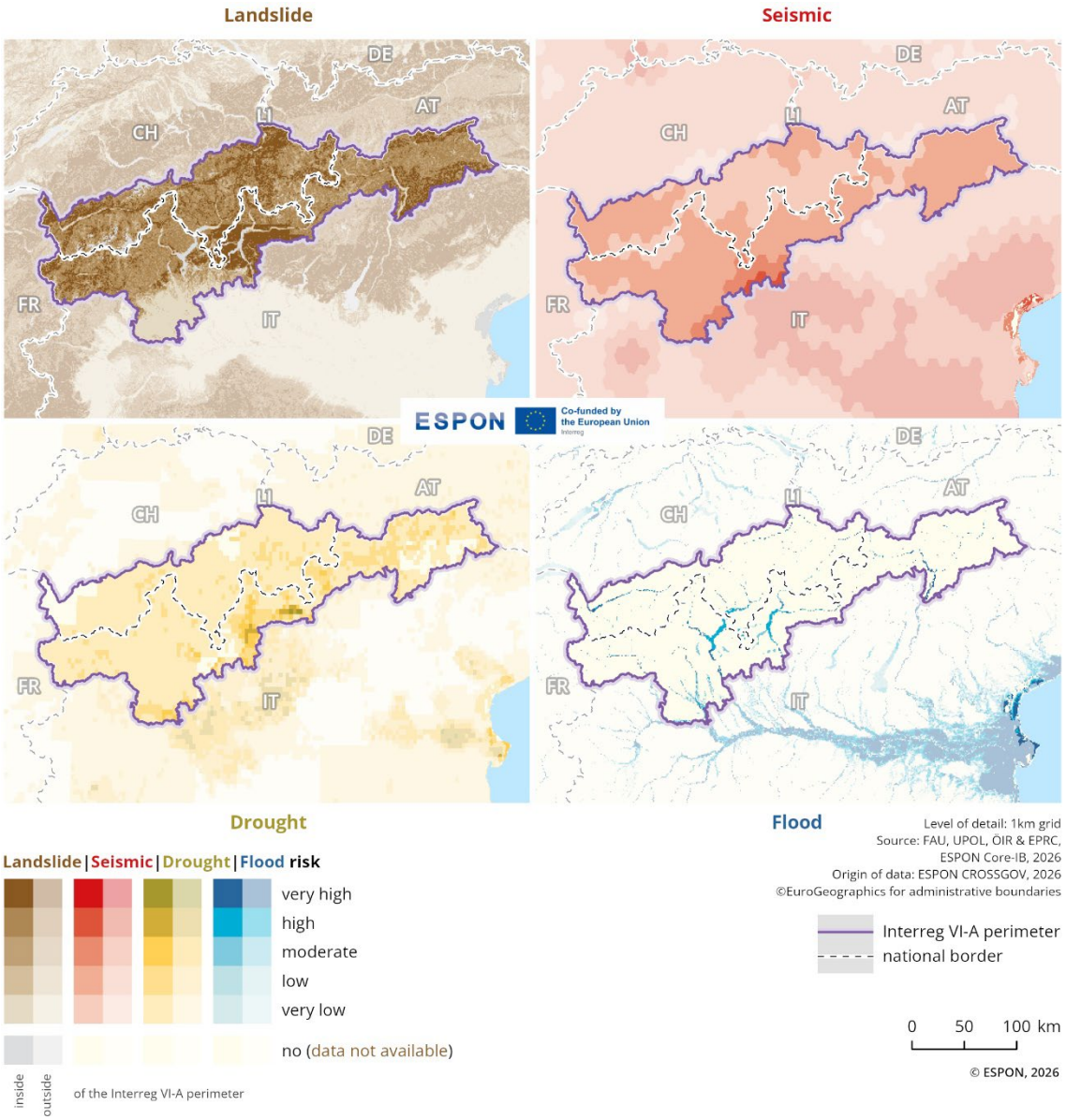
Please refer to the technical annex for more information.

Figure 2.22 illustrates the spatial distribution of natural hazards in the Italy-Switzerland region, highlighting areas where risks are shared across national boundaries and where risks are not necessarily cross-border relevant.

Landslides are a major concern for the region, as large parts are located within the Alps which are likely to see an increase in future risk linked to melting glaciers and permafrost. Vast parts of the regions on both sides of the border are classified as having a high or very high risk of landslides, with the southernmost part of the region on the Italian side, being the only exception. However, this area experiences the most seismic activities in the region. The risk of drought increases in the southern parts, but is less of a cross-border issue. The main risk of flooding comes from the bodies of water between Lake Maggiore and Lake Como, which are situated alongside the border.

[14] See also: European Commission 2024: Strengthening the Resilience of EU Border Regions, https://ec.europa.eu/regional_policy/sources/studies/KN-02-24-586-2A-N.pdf

Figure 2.22: Natural hazard risks



2.3.3 (Renewable) Energy and energy infrastructure

This sub-dimension assesses cross-border functional links in energy supply and infrastructure, focusing on existing connections and missing links. The distribution of power lines, energy infrastructure and power stations is analysed to identify supply patterns and potential integration gaps. The analysis reveals whether the border facilitates energy cooperation and connectivity, or if infrastructural differences create barriers.[15]

2.3.3.1 Power lines and energy infrastructure

Indicator description

The indicator shows the distribution of power lines and energy infrastructures in the cross-border region. The geodata highlights the existing links and gaps in the cross-border interconnections of the energy transmission network.

- **Source/method of retrieval**: Geodata on high-voltage energy infrastructure (100 kV and above) has been collected and processed from OpenStreetMap.
- **Temporal coverage**: 2025
- **Unit**: kV

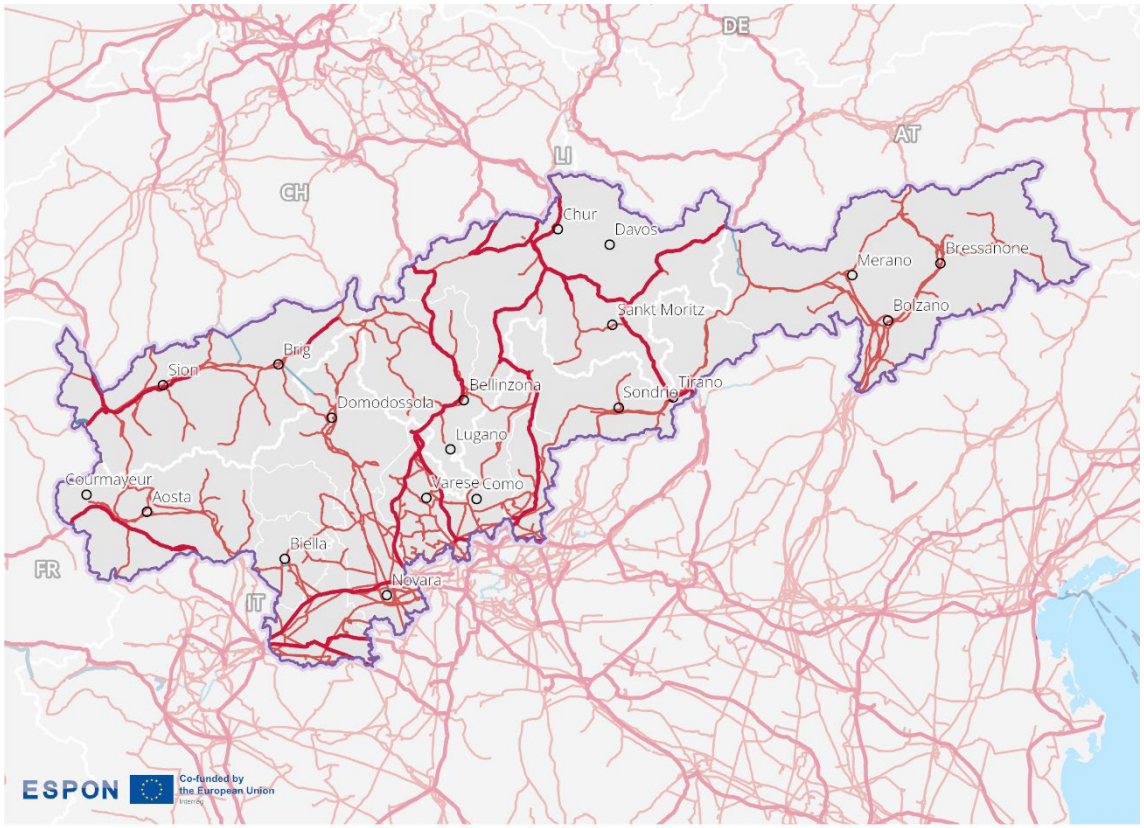
Please refer to the technical annex for more information.

Figure 2.23 illustrates the distribution of power lines and cables in 2025 across the border region. The data distinguish between overhead and underground power lies, further classified into high-voltage (100-230 kV), extra high-voltage (230-1,000 kV), and ultra-high voltage (above 1,000 kV).

The Italy-Switzerland cross-border region shows relatively dense extra- and high-voltage infrastructure considering the character of the landscape. Similarly as in other Alpine regions, the extra high-voltage lines are following the valleys, however, in the south part of the region, in Italy, the network becomes more complex. There are 3 direct cross-border connections via extra high-voltage lines – 2 in proximity of Lago di Como and Lago Maggiore in the middle part of the national boundary, and one in the more eastern part at the city of Tirano. High-voltage lines crosses the national border on several places along its course, and there is also one underground electricity cable that goes cross-border (from Brig in Switzerland towards Italy).

[15] See also: European Commission 2025: Handbook on Cross-border Energy Communities, https://ec.europa.eu/regional_policy/sources/studies/2025/Handbook_on_Cross-border_Energy_Communities.pdf

Figure 2.23: High-voltage transmission infrastructure



Overhead power lines (2025)

- High Voltage (100–230 kV)
- Extra High Voltage (230–1.000 kV)
- Ultra High Voltage (1.000 kV+)

Underground power cables (2025)

- High Voltage (100–230 kV)
- Extra High Voltage (230–1.000 kV)
- Ultra High Voltage (1.000 kV+)

inside / outside of the Interreg VI-A perimeter

ANSI Standard C84.1 was used for classification of power lines.

Level of detail: geolocated lines
Source: FAU, UPOL, ÖIR & EPRC, ESPON Core-IB, 2026
Origin of data: ESPON CROSSGOV, 2026
©EuroGeographics for administrative boundaries

- Interreg VI-A perimeter
- national border
- NUTS 3 border

0 25 50 km

© ESPON, 2026

2.3.3.2 Power stations

Indicator description

The indicator shows the location of power stations by type and energy production levels (coal, gas and oil, nuclear, hydro). It can indicate differences and complementarities in the national energy supply systems as well as highlight potential supply-demand links when viewed in conjunction with power lines infrastructure.

- **Source**: OpenStreetMap, Global Energy Monitor, JRC Hydro-power plants database
- **Temporal coverage**: 2025
- **Unit**: MW

Please refer to the technical annex for more information.

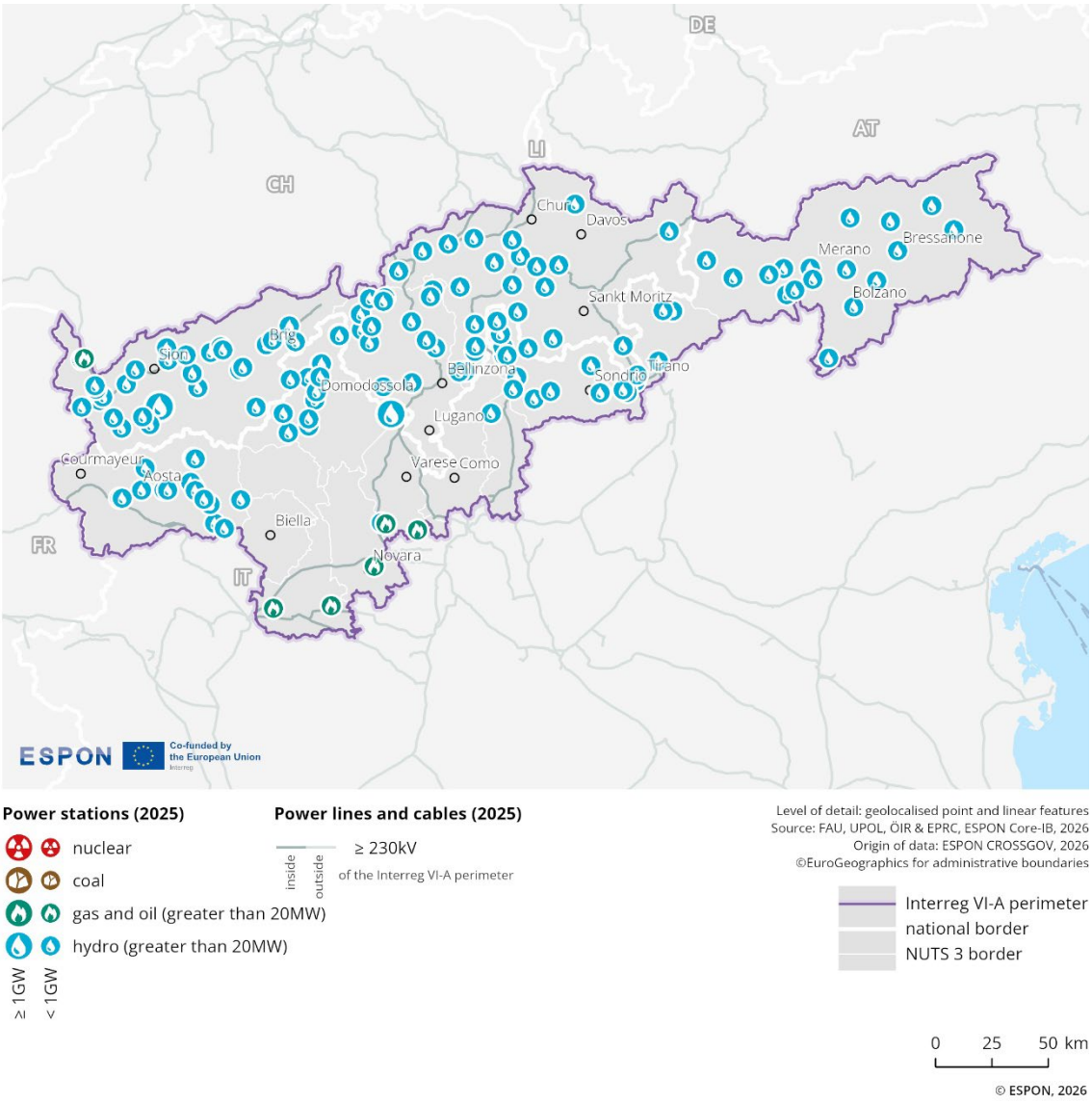
In the Italy-Switzerland cross-border region, in total, there are 156 locations with power stations and vast majority is represented by hydroelectric ones (see Table 1).

Table 1: Number and type of power stations

Power stations/plants	Less than 1GW	1GW and up
Nuclear	/	/
Coal	/	/
Gas and oil	6	/
Hydro	148	2

In Italy, 73 hydroelectric stations are in operation, while 77 in Switzerland (see Figure 2.24). There is one high-power hydroelectric power station in each of the 2 countries in the region, specifically on Lake Maggiore in Italy and the Lac des Dix dam in Switzerland in the western part of the region. There are 6 locations with oil and gas power stations, while only one of them is operated in Switzerland. The rest is located in Italy, in the southern part of the cross-border region around large cities (especially Milan, which is located just outside the region). No nuclear power plant or coal power stations are present in the whole region.

Figure 2.24: Power stations infrastructure



2.3.4 Resources and circular economy

This sub-dimension focuses on resource use patterns in the border region and their implications for circular economy practices. It analyses resource productivity and waste generation in order to evaluate the efficiency and sustainability of resource utilisation across the border.

2.3.4.1 Resource productivity

Indicator description

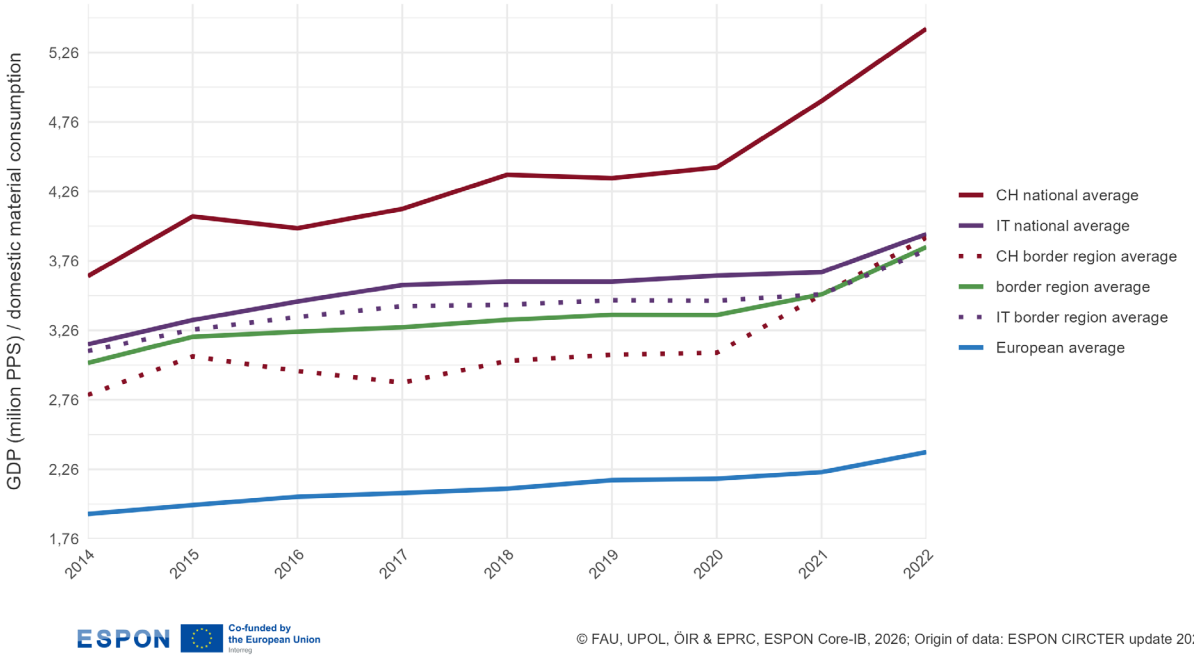
The indicator shows the economic value generated per unit of material consumed for each region within the cross-border area. Developments over time provide insights if the decoupling of productivity from resource use is progressing on regional level.

- **Source/method of retrieval**: Processing of Eurostat and ESPON CIRCTER (Circular Economy and Territorial Consequences) Update data
- **Temporal coverage**: 2014-2022
- **Unit**: PPS/tons

Please refer to the technical annex for more information.

Figure 2.25 illustrates the development of GDP per unit of domestic material consumption in million PPS/DMC (purchasing power standards per domestic material consumption) between 2014 and 2022. The data compare the national averages, the averages of their respective border regions, and the overall border regional average with the European average.

Figure 2.25: Resource productivity



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The Swiss national average of resource productivity is represented by the highest line in the graph, showing an increase over the period from approximately 3.76 in 2014 to over 5.26 million PPS/DMC in 2022. The Swiss border region average follows a similar trend but is notably lower, reaching around 3.76 million PPS/DMC in 2022. The Italian national average is lower than the Swiss national average but

higher than the Swiss border region average. The Italian border region average is slightly lower, but almost at the same level in 2022, at around 3.76 million PPS/DMC.

The European average lies notably below the Swiss and Italian values, as well as below the border region average. The border region average reflects the lower values of the Swiss border region and the higher values of the Italian border region. However, from 2020 onwards, the values converge significantly and are almost aligned by 2022.

2.3.4.2 Generation of waste per GDP

Indicator description

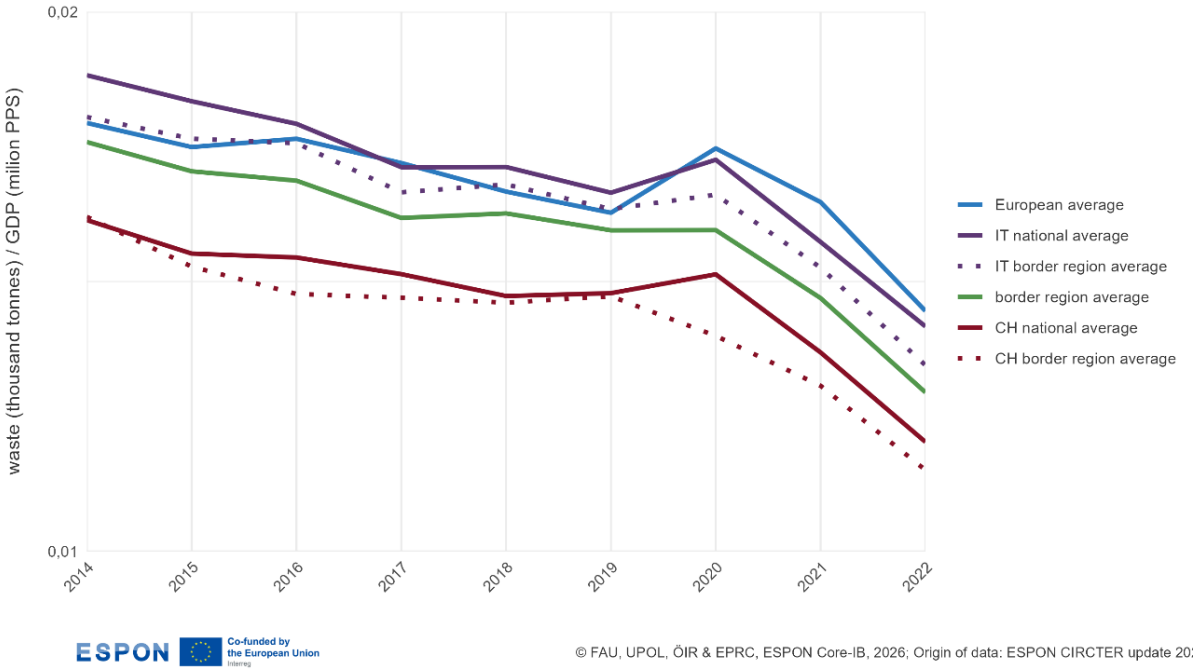
The indicator shows the regional distribution of waste creation in relation to the GDP development. Comparing waste generated to GDP reflects the waste intensity of the economy and provides a measure of "eco-efficiency". Observation of its change from year to year permits to assess whether the economy is able to produce more wealth while at same time generating less waste.

- **Source/method of retrieval**: Processing of Eurostat and ESPON CIRCTER Update data
- **Temporal coverage**: 2014-2022
- **Unit**: Tons/PPS

Please refer to the technical annex for more information.

Figure 2.26 illustrates the trend in waste generation relative to economic output, measured in tonnes of waste per million PPS (Purchasing Power Standard) of GDP from 2014 to 2022 Italy, Switzerland and their Interreg border region.

Figure 2.26: Waste generation per GDP



The Italian national average slightly decreases from around 0.018 in 2014 to 0.014 tonnes of waste per million PPS in 2022, with a small peak around 2020. The Italian border average consistently remains

below the national average and also gradually decreasing. The Swiss national average steadily decreases to below 0.013 in 2022. The Swiss border average follows a similar downward trend and remains slightly below the national average. Both Swiss lines show the lowest levels of waste per GDP in the graph.

The European average decreases gradually from around 0.018 in 2014 to about 0.015 tonnes of waste per million PPS in 2022. Italy's national and border region values remain slightly above the European average until 2020; after that, both fall below it. Switzerland's national and border values are consistently below the EU average. The combined border regional average for Italy–Switzerland steadily decreases to a value of approximately 0.014 tonnes of waste per million PPS in 2022 and remains, over time, between the higher values of the Italian border region and the lower values of the Swiss border region average.

2.3.5 Key messages on the green dimension

The Italy–Switzerland border region is strongly influenced by its Alpine setting, which affects environmental conditions, resource use, and infrastructure development. A notable feature is the high density of protected areas, particularly on the Italian side. Large, continuous zones to the east of St. Moritz and near Merano/Meran, Bolzano/Bozen and Aosta reflect national and European conservation priorities. Yet the continuity of protected zones beyond the Interreg area points to common ecological systems that transcend national borders.

Air quality is notably lower on the Italian side, where PM2.5 concentrations (in µg/m³) are higher and more variable, exceeding European averages. By contrast, Swiss regions report consistently lower values, reflecting differences in industrial activity, urban density, and environmental regulation. Natural hazards also pose significant risks: landslides are widespread on both sides due to the steep Alpine terrain, while seismic activity is concentrated in southern Italy and flooding risks are highest around the lakes near the border. These common yet unevenly distributed risks emphasise the imperative for coordinated cross-border risk management.

Another defining characteristic is the energy systems. The border region is closely linked by a relatively dense network of high-voltage lines running through Alpine valleys. There are 3 direct cross-border connections, as well as an underground cable. Hydropower dominates the energy mix, with almost an equal number of stations in both countries, including major plants at Lake Maggiore and Lac des Dix. Oil and gas stations remain marginal, mostly in Italy.

Furthermore, resource efficiency indicators demonstrate a gradual convergence. Resource productivity is high, particularly in Switzerland, while waste generation per GDP is steadily declining in both countries.

2.4 Socio-economic dimension

The socio-economic dimension examines patterns of social integration, tourism, and access to public services in the border region. It identifies how socio-cultural links, visitor flows and essential services influence development in the cross-border area. By examining interpersonal interactions via social media, language similarities, tourism intensity, and the accessibility of facilities such as secondary schools, grocery shops, hospitals, doctors, pharmacies and cinemas this dimension highlights both functional integration and potential socio-spatial differences.

2.4.1 Social integration

This sub-dimension evaluates the level of social integration in the border region by identifying areas with low or high cross-border interactions. It analyses social interactions and language similarities across and along national borders to evaluate the potential for cultural and social integration.

2.4.1.1 Cross-border connectivity in social media

Indicator description

The indicator refers to the existing connections between users of META social media (in particular Facebook) across the border. It aims at giving an overview of the degree of personal connectivity between inhabitants of the border area. Even though not all these internet connections will relate to real communication exchanges but sometimes just "following" content from other users, they give an overview of interpersonal and cultural knowledge of the social media landscape from across the border.

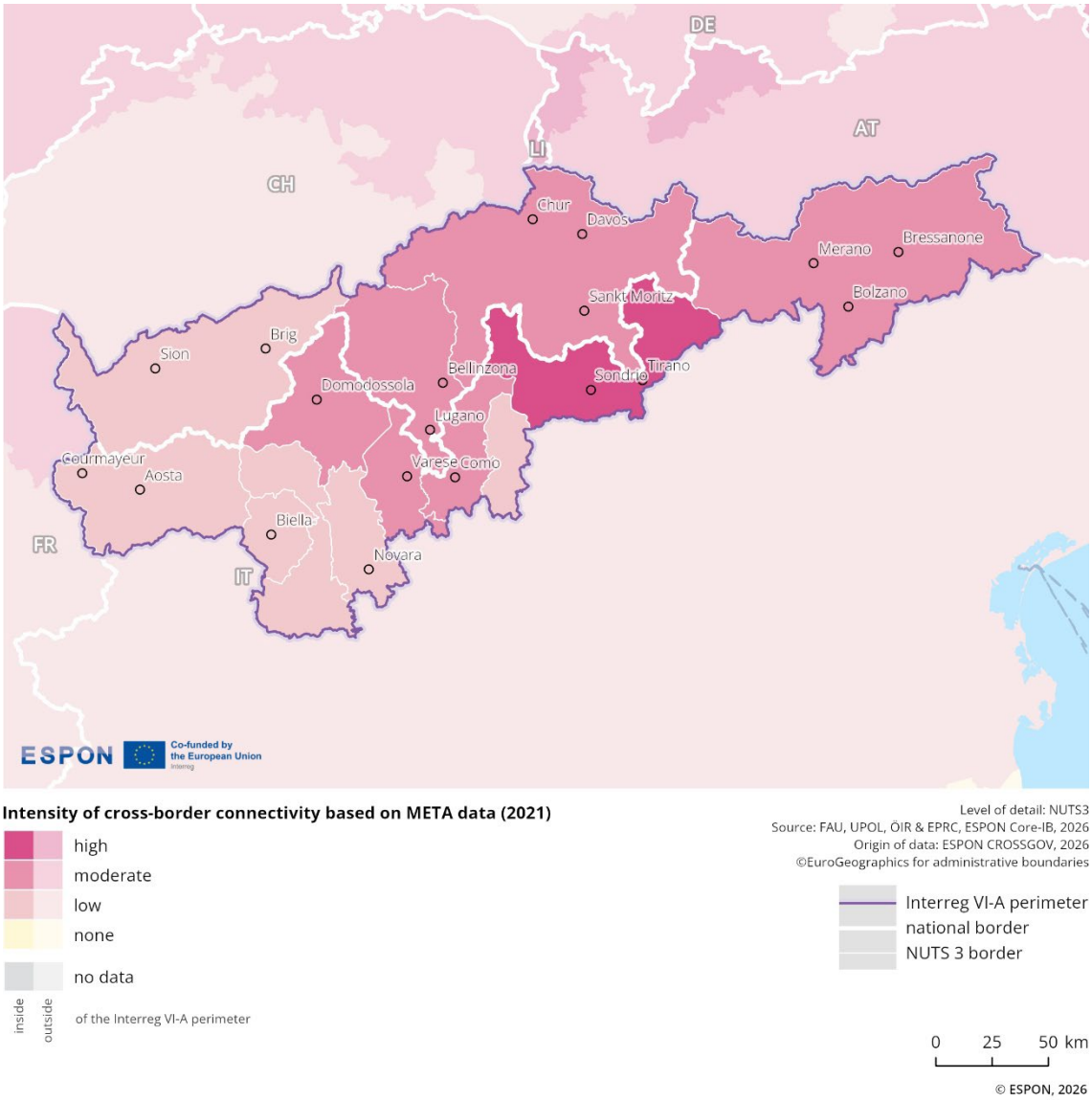
- **Source/method of retrieval**: Processing Facebook data on existing connections across the border (data for Good Meta)
- **Temporal coverage**: 2021
- **Unit**: n/a

Please refer to the technical annex for more information.

Figure 2.27 illustrates the spatial distribution of cross-border connectivity based on Facebook information in the border area. The different shades of pink indicate varying intensities of connectivity, ranging form low to high, with darker tones representing stronger intensity of cross-border connectivity in social media.

Low connectivity areas located in the western part of the region and increasing cross-border connectivity toward the east; however, no distinct differences are evident between the countries on either side of the border. In the Swiss part of the region, low cross-border connectivity is found around Brig and Sion, while the remaining areas display moderate levels (including cities such as Davos, St. Moritz and Lugano). Cross-border connectivity in social media in the Italian part is more variable: low values are recorded around Aosta and Novara, gradually increasing to moderate levels around Varese and Como, and reaching high levels in the area surrounding Tirano. In the eastern part of the Italian section of the region (around Merano/Meran and Bolzano/Bozen), cross-border connectivity remains at a moderate level.

Figure 2.27: Cross-border connectivity in social media



2.4.1.2 Language similarities along national borders

Indicator description

The indicator specifies whether the language is the same across the border, whether the respective national languages have commonalities, whether while different, there are local linguistic commonalities, and whether the language is different.

- **Source/method of retrieval**: ESPON cross-border public services (CPS) 2.0 database along border segments
- **Temporal coverage**: 2022
- **Unit**: n/a

Please refer to the technical annex for more information.

A mix of language similarities exists within the programme region, involving Italian (Ticino, Graubünden) and German (Graubünden, Autonomous province of Bolzano/Bozen) speaking communities. The mainly French-speaking region of Valais corresponds with the neighbouring Valle d'Aosta, which has Italian and French as its official languages. Overall, there are many similarities, but also local language barriers within the programme area.

2.4.2 Tourism

This sub-dimension identifies key tourism hotspots in the border region to highlight tourism dynamics. It analyses the number of nights spent in tourist accommodation establishments in order to evaluate the attractiveness of, and developments in, the tourism sector. Comparisons with the respective countries and the EU average provide context for understanding the region's dynamics.

2.4.2.1 Nights spent at tourist accommodation establishments

Indicator description

The indicator shows the number of nights a guest or tourist actually spends in a tourist accommodation establishment or non-rented accommodation (overnight stays). This may reveal the tourism attractiveness of a region and shed light on the role of tourism in the local economy, i.e., tourists/guests staying overnight may spend more in the region than one-day visitors.

- **Source**: Eurostat
- **Temporal coverage**: 2020-2023
- **Unit**: Nights per capita

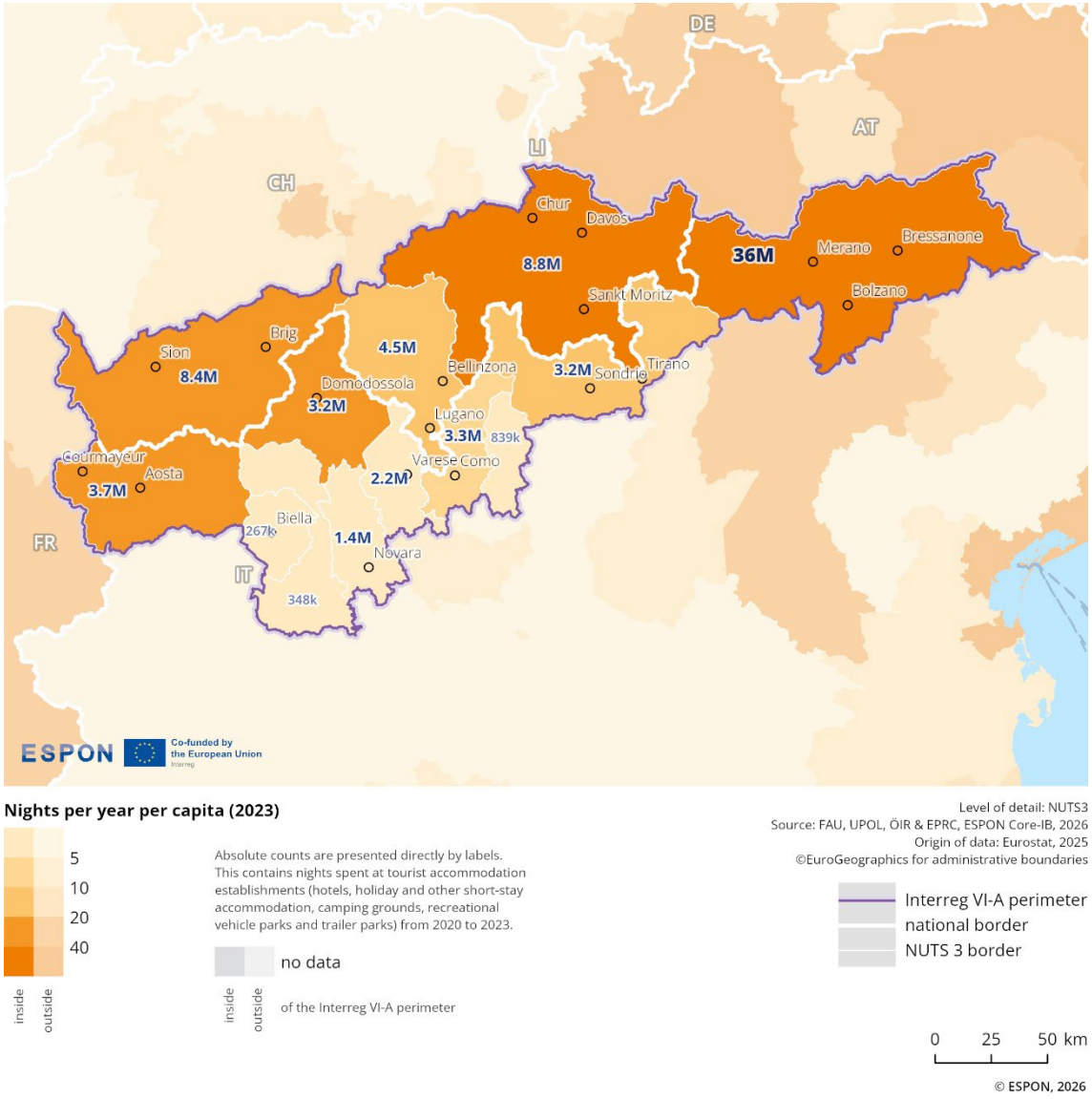
Please refer to the technical annex for more information.

The spatial distribution of overnight stays highlights the importance of key tourist destinations in border areas. Tourism contributes significantly to regional income, infrastructure development and employment, and thereby supports regional prosperity. At the same time, it affects environmental and living conditions, which may reduce local acceptance despite its economic benefits. This is in particular the case in places of overtourism, seasonal pressures, and increasing land-use conflicts.

Figure 2.28 shows the number of overnight stays per capita at tourist accommodation establishments in 2023. It includes hotels, holiday and other short-stay accommodation, as well as campsites, caravan

and trailer parks. The map uses a colour gradient, with darker shades indicating a higher number of nights spent per capita in 2023. It also shows the cumulative number of overnight stays from 2020 to 2023.

Figure 2.28: Overnight stays in tourism



A particularly high intensity of overnight stays is evident on both sides of the border. The NUTS3 regions Graubünden and Bolzano/Bozen exceed 40 nights per capita in 2023, where several popular UNESCO natural heritage sites in the Dolomites are located[16]. On the Swiss side, Wallis exceeds 20 nights per capita, same for Valle d'Aosta and Verbano-Cuiso-Ossola on the Italian side. The UNESCO natural heritage site Swiss Alps Jungfrau-Aletsch is located in the area between the Swiss cantons of Vallais and Bern, which also attracts many tourists.

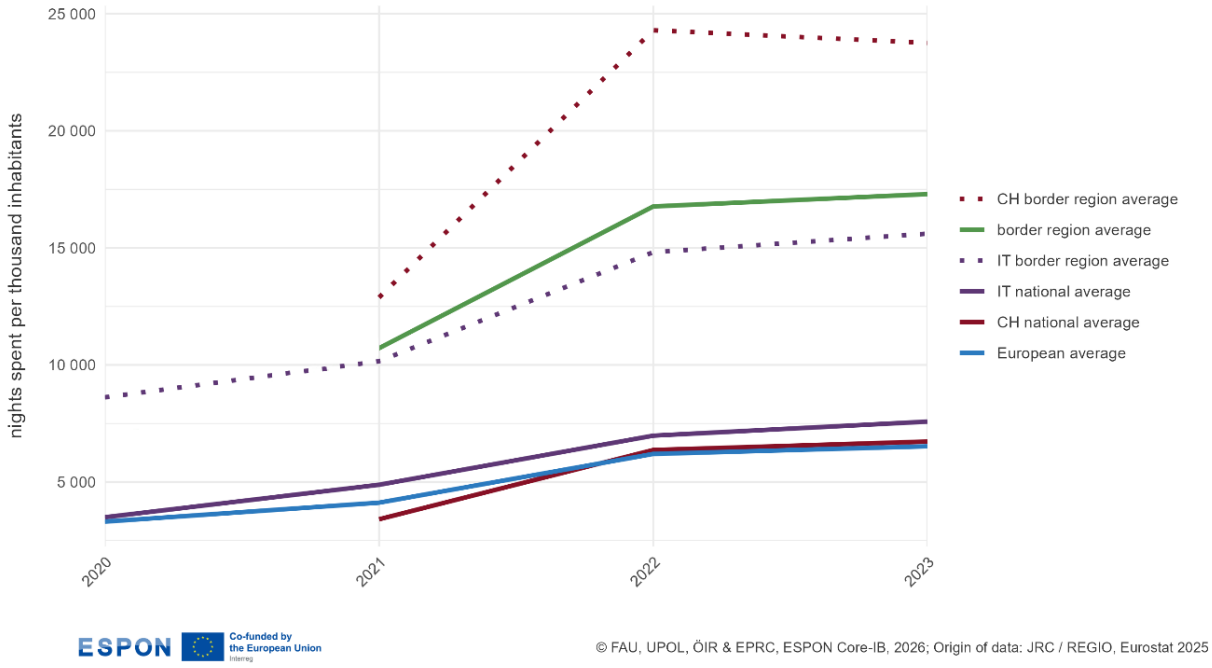
In terms of total overnight stays over the 3-year period, the leading tourism regions are located also on both sides of the border: Bolzano/Bozen (approx. 36 million), Graubünden (approx. 8.8 million), Vallais (approx. 8.4 million), Ticino (approx. 4.5 million) and Valle d'Aosta (approx. 3.7 million).

[16] See Eurostat Statistical Atlas for NUTS3 (2021) regions: https://ec.europa.eu/statistical-atlas/viewer/?config=typologies.json&ch=NUTS&mids=BKGCNT,NUTS2021L3,CNTOVL&o=1,1,0.7&center=49.69576,14.3332,4&lcis=NUTS2021L3&

Figure 2.29 illustrates the development of nights spent at tourist establishments per thousand inhabitants from 2020 to 2023. Over the entire period, the average for the Italy-Switzerland programme area is higher than the overall European average, which includes EU member states and the EFTA countries Iceland, Liechtenstein, Switzerland and Norway. In all years, the border regional averages of both countries are higher than their respective national averages. Additionally, the regional average for the Swiss border area is higher than that for the Italian throughout the given period.

Touristic patterns have a series of implications for spatial development on either side of the border. Transport infrastructure has to consider peak volumes and balancing recreating activities with socio-cultural as well as environmental heritage can be a challenge.

Figure 2.29: Overnight stays in tourism (comparison)



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2.4.3 Services of general interest

This sub-dimension looks at how accessible services of general interest (SGIs) are in the border region, identifying areas that are well-served and those that are more difficult to access. It analyses access to essential services such as secondary schools, grocery shops, hospitals, doctors, pharmacies and cinemas.

2.4.3.1 Accessibility to services of general interest

Indicator description

The indicator shows, for the below listed facilities and services, the average driving time to the nearest facility of a series of services of general interest.

- **Source/method of retrieval**: Processing and analysis of standardised travel-time accessibility to secondary schools, grocery shops, hospitals, doctors, pharmacies and cinemas available in the ESPON PROFECY Update (2022)
- **Temporal coverage**: 2021
- **Unit**: Minutes (in 2.5 x 2.5 km grid)

Please refer to the technical annex for more information.

Figures 2.30 to 2.35 visualise average car travel times to services of general interest within the programme area. The maps display accessibility to:

- Secondary schools (Figure 2.30)
- Grocery shops (Figure 2.31)
- Hospitals (Figure 2.32)
- Doctors (Figure 2.33)
- Pharmacies (Figure 2.34)
- Cinemas (Figure 2.35)

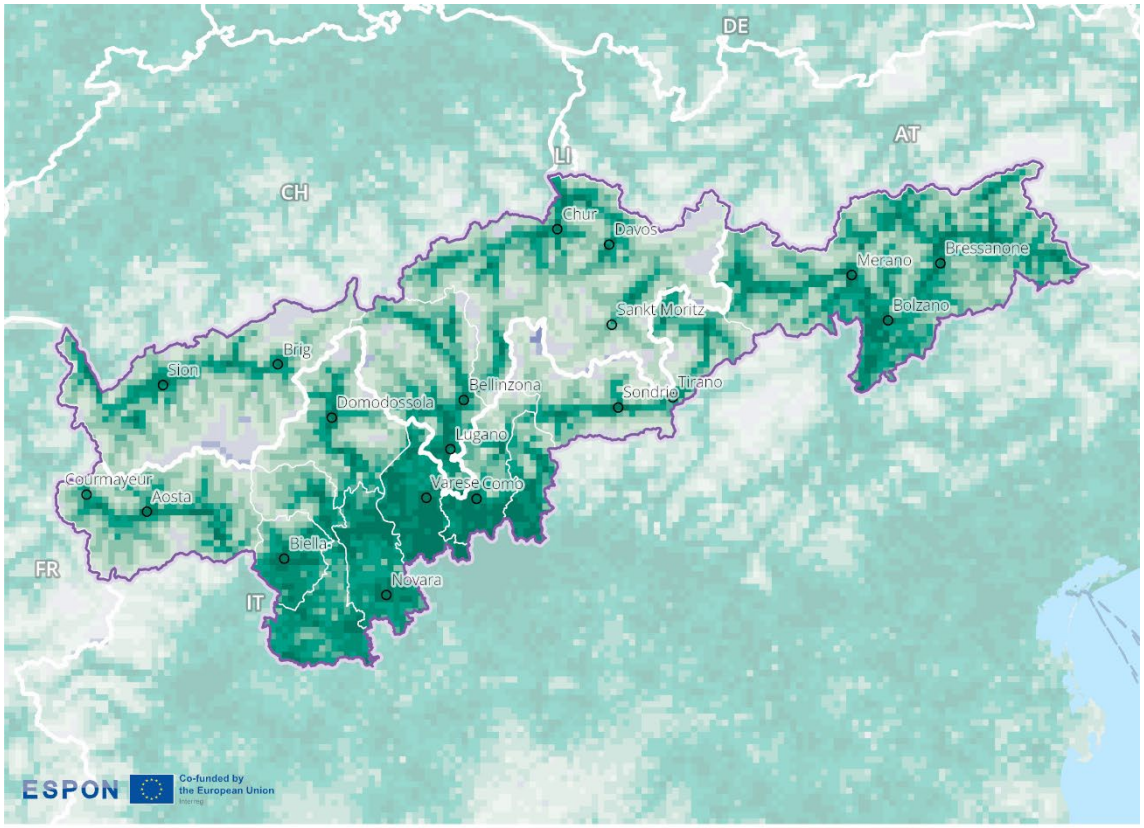
These indicators show how long, on average, it takes to reach the nearest facility by car. The data comes from the ESPON PROFECY Update project (2022) and is visualised based on a 2.5-kilometer grid.

In the Italy–Switzerland border area, essential services such as hospitals, doctors, pharmacies, schools, and grocery shops are evenly distributed in the southern Italian regions, resulting in generally good accessibility. In the Alpine regions of both Italy and Switzerland, these services are mostly concentrated in the main valleys, which are also relatively well accessible.

However, the mountainous terrain along the border creates accessibility challenges. Some areas located directly at the national border, such as between Aosta and Sion, are harder to reach. Steep mountains make it difficult to build and maintain transport infrastructure. Consequently, travel times to essential services are often longer in these regions.

Hospitals, as medical services, are mainly located in cities and more densely populated areas. This creates an urban–rural gradient, with shorter travel times in and near urban centres and longer travel times in rural or remote areas. The same holds true for cinemas as a cultural service.

Figure 2.30: Travel time to secondary schools



Car travel time to the nearest secondary school (2021)

5min
10min
15min
20min
30min
45min
1h
2h
3h
4h
6h
12h

inside outside of the Interreg VI-A perimeter

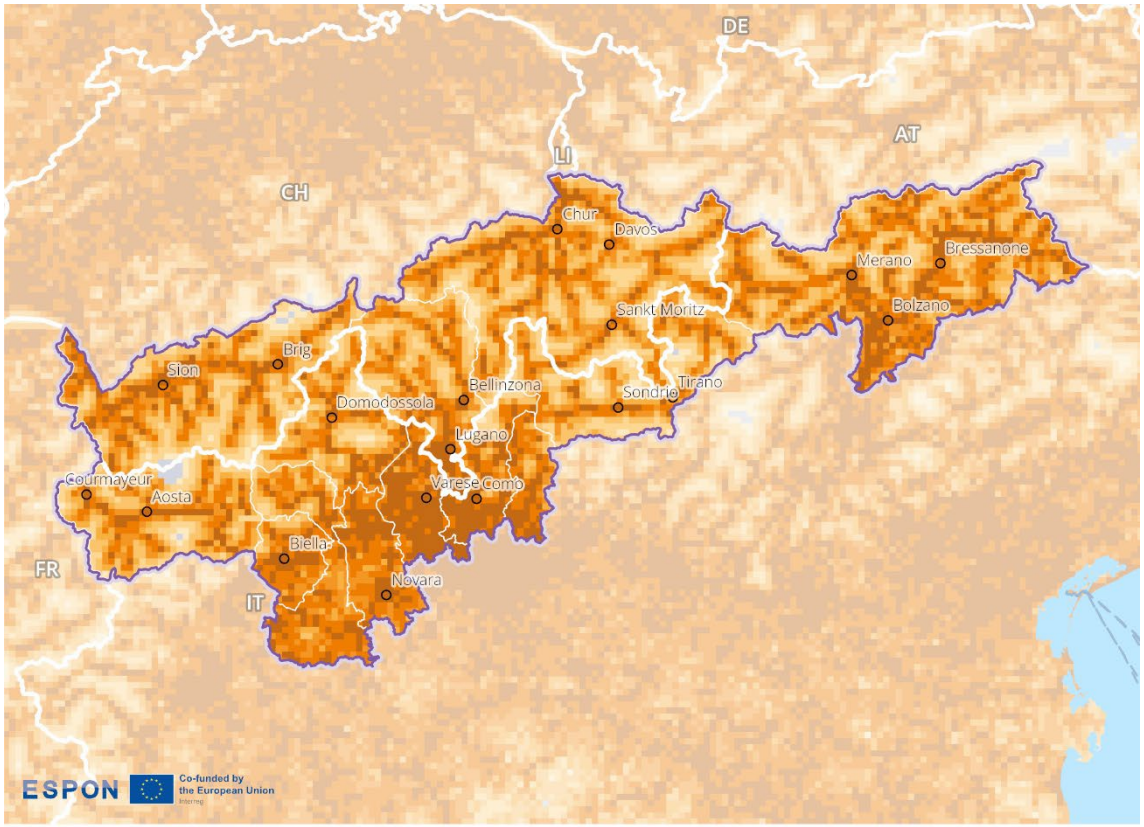
Level of detail: 2.5km grid
Source: FAU, UPOL, ÖIR & EPRC, ESPON Core-IB, 2026
Origin of data: ESPON PROFECY Update, 2022
©EuroGeographics for administrative boundaries

Interreg VI-A perimeter
national border
NUTS 3 border

0 25 50 km

© ESPON, 2026

Figure 2.31: Travel time to grocery shops



Car travel time to the nearest shop (2021)

5min
10min
15min
20min
30min
45min
1h
2h
3h
4h
6h
12h

inside outside of the Interreg VI-A perimeter

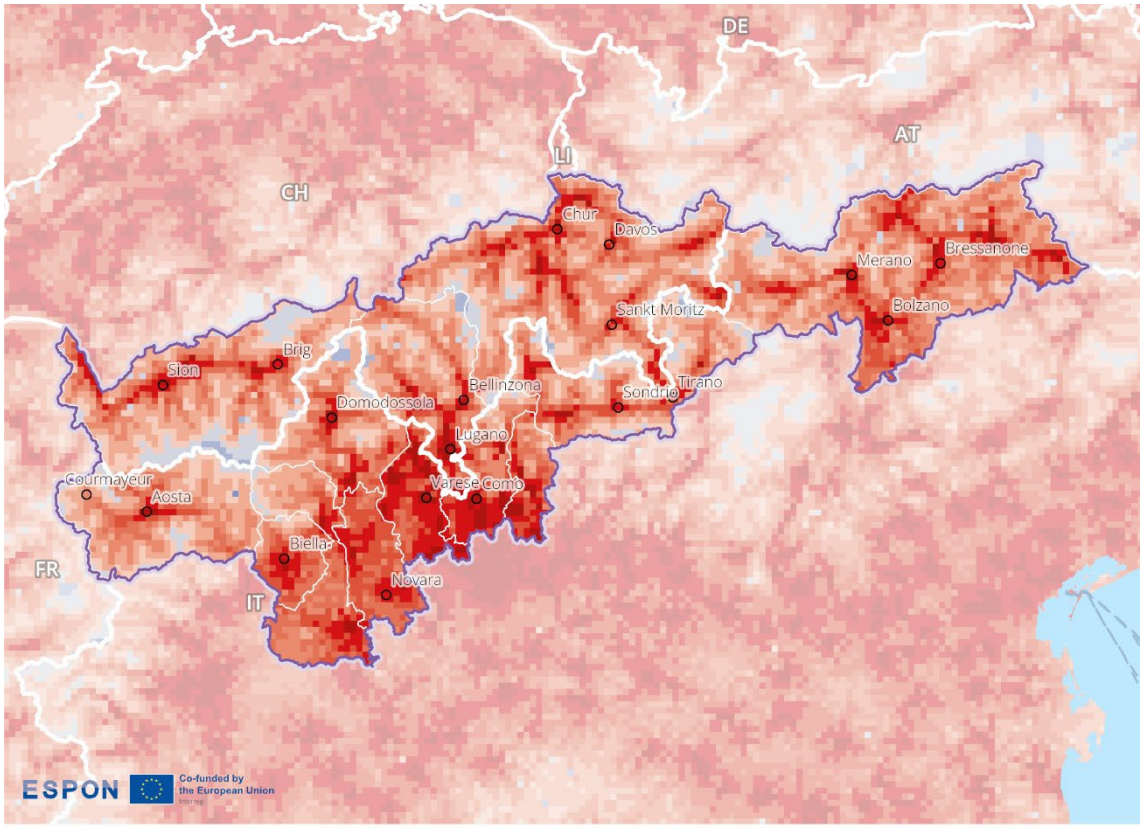
Level of detail: 2.5km grid
Source: FAU, UPOL, ÖIR & EPRC, ESPON Core-IB, 2026
Origin of data: ESPON PROFECY Update, 2022
©EuroGeographics for administrative boundaries

Interreg VI-A perimeter
national border
NUTS 3 border

0 25 50 km

© ESPON, 2026

Figure 2.32: Travel time to hospitals



Car travel time to the nearest hospital (2021)

5min
10min
15min
20min
30min
45min
1h
2h
3h
4h
6h
12h

inside outside of the Interreg VI-A perimeter

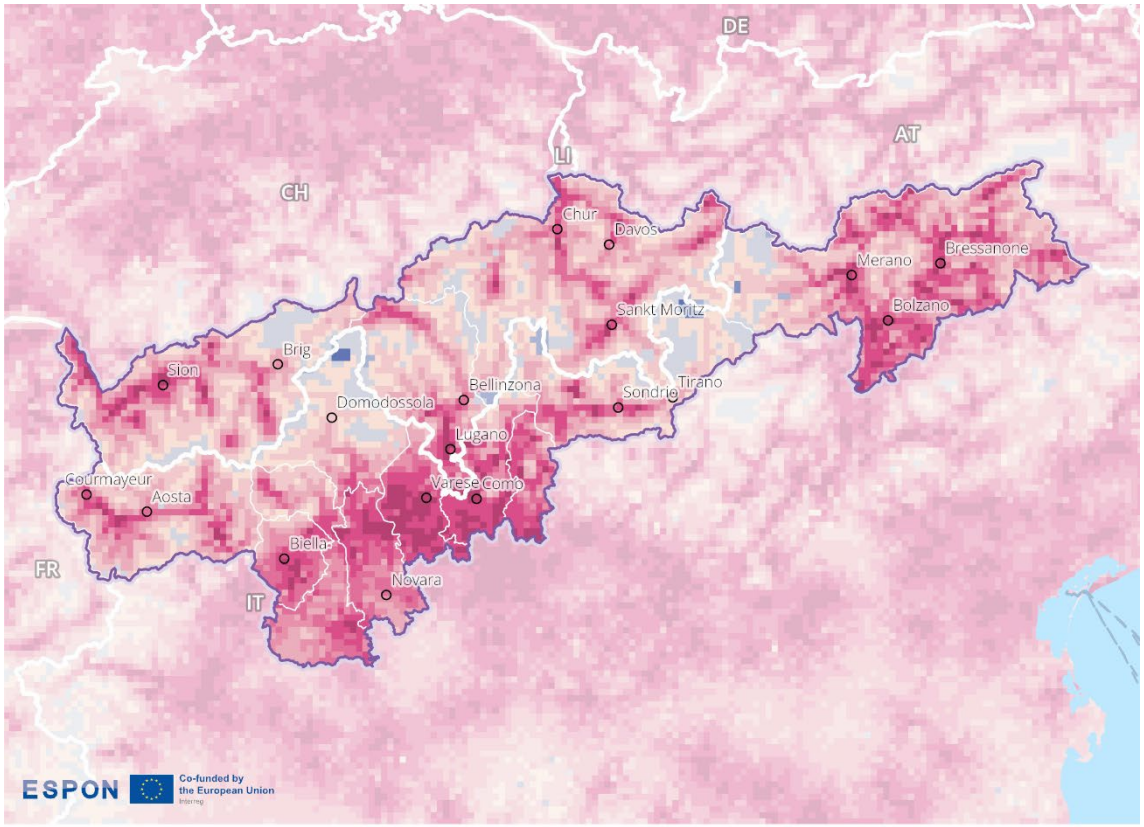
Level of detail: 2.5km grid
Source: FAU, UPOL, ÖIR & EPRC, ESPON Core-IB, 2026
Origin of data: ESPON PROFECY Update, 2022
©EuroGeographics for administrative boundaries

Interreg VI-A perimeter
national border
NUTS 3 border

0 25 50 km

© ESPON, 2026

Figure 2.33: Travel time to doctors



Car travel time to the nearest doctor (2021)

5min
10min
15min
20min
30min
45min
1h
2h
3h
4h
6h
12h

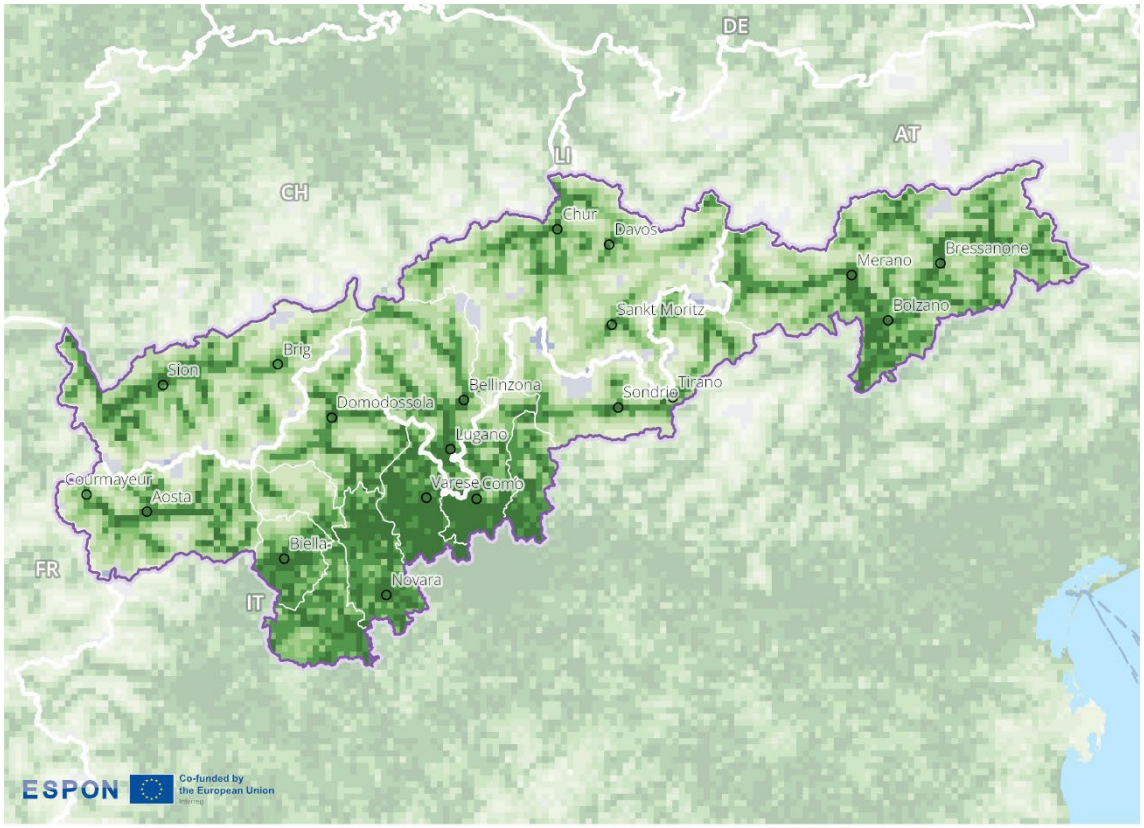
inside outside of the Interreg VI-A perimeter

Level of detail: 2.5km grid
Source: FAU, UPOL, ÖIR & EPRC, ESPON Core-IB, 2026
Origin of data: ESPON PROFECY Update, 2022
©EuroGeographics for administrative boundaries

Interreg VI-A perimeter
national border
NUTS 3 border

0 25 50 km

Figure 2.34: Travel time to pharmacies



Car travel time to the nearest pharmacy (2021)

5min
10min
15min
20min
30min
45min
1h
2h
3h
4h
6h
12h

inside outside of the Interreg VI-A perimeter

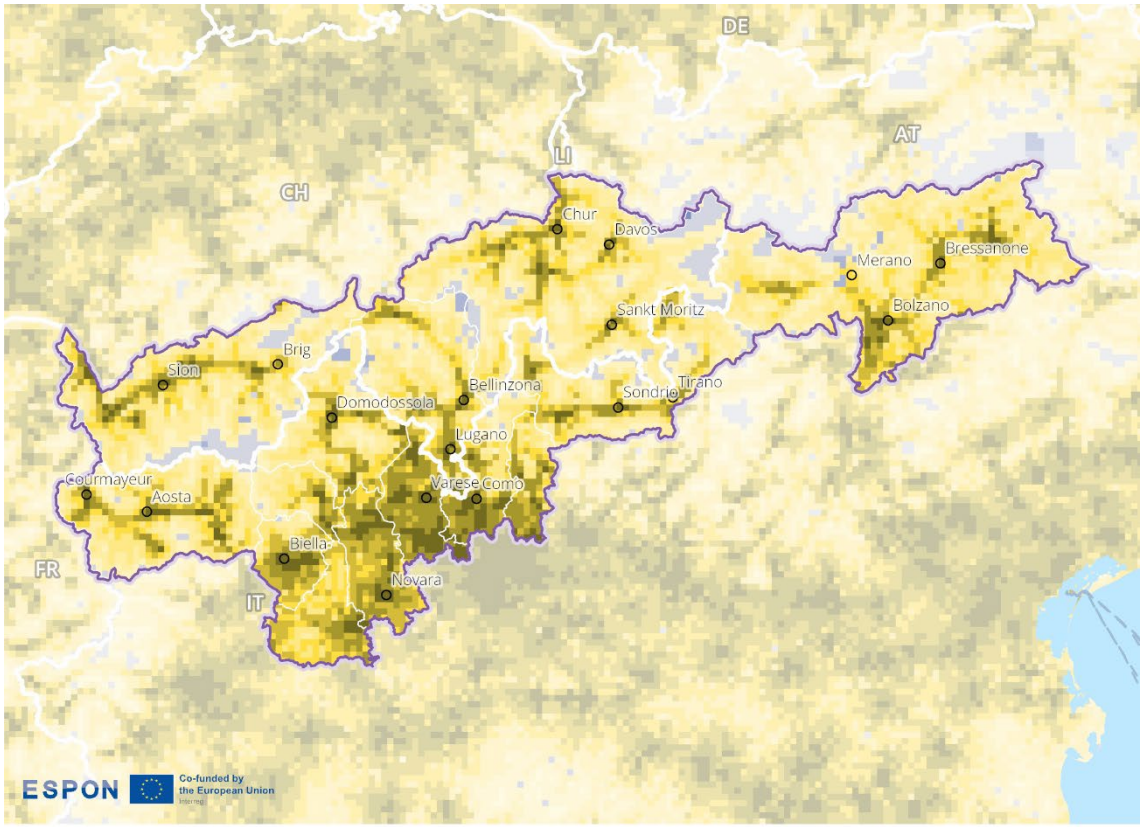
Level of detail: 2.5km grid
Source: FAU, UPOL, ÖIR & EPRC, ESPON Core-IB, 2026
Origin of data: ESPON PROFECY Update, 2022
©EuroGeographics for administrative boundaries

Interreg VI-A perimeter
national border
NUTS 3 border

0 25 50 km

© ESPON, 2026

Figure 2.35: Travel time to cinemas



Car travel time to the nearest cinema (2021)

5min
10min
15min
20min
30min
45min
1h
2h
3h
4h
6h
12h

inside outside of the Interreg VI-A perimeter

Level of detail: 2.5km grid
Source: FAU, UPOL, ÖIR & EPRC, ESPON Core-IB, 2026
Origin of data: ESPON PROFECY Update, 2022
©EuroGeographics for administrative boundaries

Interreg VI-A perimeter
national border
NUTS 3 border

0 25 50 km

© ESPON, 2026

2.4.4 Key messages on the socio-economic dimension

The border region is characterised by strong social and cultural ties, as well as by geographical and linguistic differences. Social interaction across the border varies: it is generally moderate to high, particularly in the eastern areas around Tirano, but lower in the west, especially near Brig, Sion, Aosta and Novara. Notably, these variations do not align with national borders, but rather reflect local conditions, including settlement patterns, accessibility, and economic links.

Language plays a central role in these dynamics. There are multiple linguistic similarities that facilitate cross-border exchange (Frenach-, Italian- and German-speaking areas). However, local language barriers also act as a obstacle to interaction. These linguistic differences partly explain why social integration appears less challenging in some areas than in others.

Tourism is another defining characteristic of the region. The Alps host some of Europe's most popular destinations, with Bolzano/Bozen and Graubünden registering extremely high numbers of overnight stays per capita. While tourism brings jobs, infrastructure and income, it also creates tensions: seasonal peaks put pressure on housing markets and transport systems, and overtourism risks compromising environmental quality and local acceptance. These challenges highlight the two-sided role of tourism, acting as both an economic driver and a source of spatial and social pressures.

While inhabitants of lowland Italian areas benefit from short travel times to schools, shops and healthcare, those living in more mountainous areas, such as the region between Aosta and Sion, face longer travel times. The concentration of hospitals and cultural services in cities intensifies an urban-rural imbalance.

2.5 Border security and safety

This dimension shows the security and safety conditions in border regions. It analyses the number of days on which border control is temporarily reintroduced at internal borders, using this as an indicator of security concerns and restrictions on cross-border movement.

2.5.1 Temporary reintroduction of border controls at internal borders

Indicator description

The indicator shows the number of days of temporary reintroduction of border control at internal borders, including the official reasons behind. The reintroduction of border control at the internal borders must be applied as a last resort measure, in exceptional situations, and must respect the principle of proportionality. The scope and duration of reintroduced border control should be restricted to the bare minimum needed to respond to the threat in question.

- **Source/method of retrieval**: Processing and analysis data of European Commission information pursuant to Article 25 and 28 et seq. of the Schengen Borders Code
- **Temporal coverage**: 2006-2025 (cut-off: 08 May 2025, in order to allow data treatment before work package completion)
- **Unit**: Days per year

Please refer to the technical annex for more information.

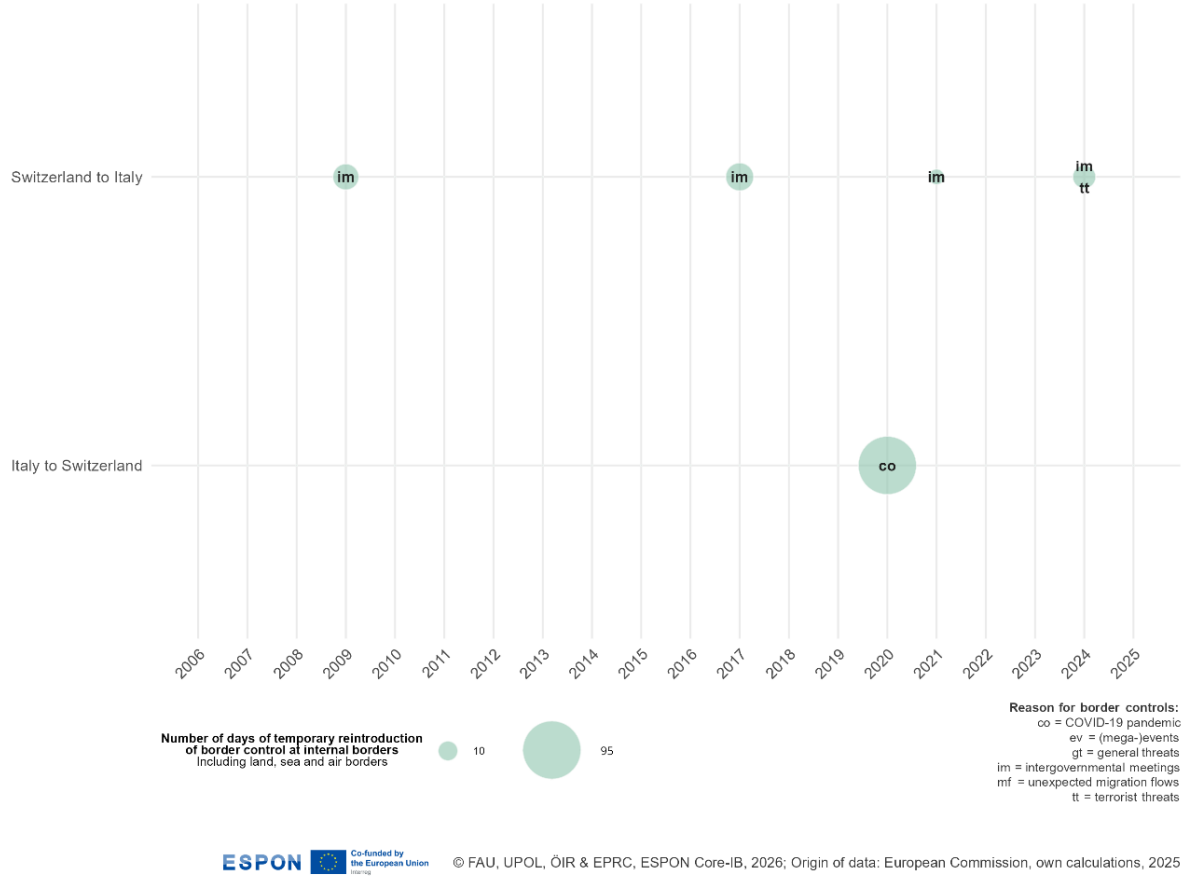
Figure 2.36 illustrates the number of days during which temporary border controls were reintroduced at internal borders within the Schengen Area. Each bubble represents a specific year with bubble sizes indicating the number of days the respective border was under control. The categories of reasons for reintroducing controls include:

- co – COVID-19 pandemic
- ev – (Mega-)events
- gt – General threats
- im – Intergovernmental meetings
- mf – Unexpected migration flows
- tt – Terrorist threats

The data spans from 2006 to 2025 (cut-off: 08 May 2025) and is based on notifications from the European Commission information pursuant to Article 25 and 28 et seq. of the Schengen Borders Code. In line with Schengen rules, the reintroduction of controls is to be used only as a last resort, for exceptional circumstances, and with strict adherence to the principle of proportionality—both in duration and scope.

Italy had already been part of the Schengen Area by 2006, while Switzerland joined in 2008 for land borders and in 2009 for air borders.

Figure 2.36: Temporary reintroduction of border controls



The Italy-Switzerland border area is characterised by a slightly asymmetric pattern:

- Crossing the border from Switzerland to Italy: Temporary border control occurred in 4 out of 20 years, mainly driven by intergovernmental meetings like G7/G8 summits (2009, 2017, 2021, 2024).
- Crossing the border from Italy to Switzerland: Temporary border controls occurred in 1 of 20 years, tied to COVID-19 (2020).

In general, these controls tend to have a tangible effect on the smooth functioning of cross-border flows, especially commuting and logistics, as they introduce delays and unpredictability.

From a comparative perspective, Italy has had border controls in place for more years than Switzerland, although Switzerland controlled the border for a longer period of days within that time. Overall, the reintroduction of temporary border controls in this area is not significant.

2.5.2 Key messages on the border security dimension

Temporary border controls have been rare and limited in scope, highlighting the smooth overall functioning of cross-border mobility. Over the past 2 decades, Italy has reintroduced controls more frequently than Switzerland, but only in relation to specific events, such as international summits. By contrast, Switzerland only applied controls once, during the 2020 pandemic.

Despite their occasional occurrence, the impacts of controls are tangible. Even short-term reintroductions can disrupt commuting patterns, hinder logistics chains and create uncertainty for

businesses and residents in the cross-border area. In a region characterised by daily cross-border mobility for work, trade and tourism, such interruptions are more noticeable than in less interconnected areas.

At the same time, the low overall number of days under control illustrates the resilience of the Schengen framework in this region. The functioning of the border reflects a broader pattern: cooperation and integration dominate everyday life, while restrictions remain rare and exceptional. The balance between security needs and the principle of free movement has so far been preserved, indicating the functional relevance of the border region for cross-border integration.

2.6 Governance dimension

The Italy Swiss border is covered by a range of different and partially overlapping strategic frameworks, from the Italy-Swiss bilateral diplomatic relations (including dialogue on cross-border cooperation), the ARGE-ALP Working Community on the eastern side of the border, to the recently signed Roadmap between Canton Ticino and Lombardia. They all aim at improving policy coordination and develop common approaches in economic, cultural, environmental domains. The territory also had 9 cross-border risk and resilience agreements in place.

2.6.1 Cross-border cooperation

This sub-dimension identifies the extent of cross-border cooperation in the border region. It illustrates areas of high cooperation intensity and identifies functional links in governance structures across borders. It also identifies areas with high awareness of obstacles and the willingness and support services to overcome them, as well as areas where Interreg cooperation intensity is already strong.

2.6.1.1 Cross-border governance structures

Indicator description

The indicator shows active institutionalised cooperation that act as cross-border entities. It includes cooperation formats such as Eurocities, Euroregions, EGTC, cross-border associations, cross-border councils, etc.

- **Source/method of retrieval**: Localisation and categorising of cross-border cooperation formats (Eurocities, Euroregions, EGTC, cross-border associations, cross-border councils, conferences, working communities), based on desktop research.
- **Temporal coverage**: Status as of October 2025
- **Unit**: n/a

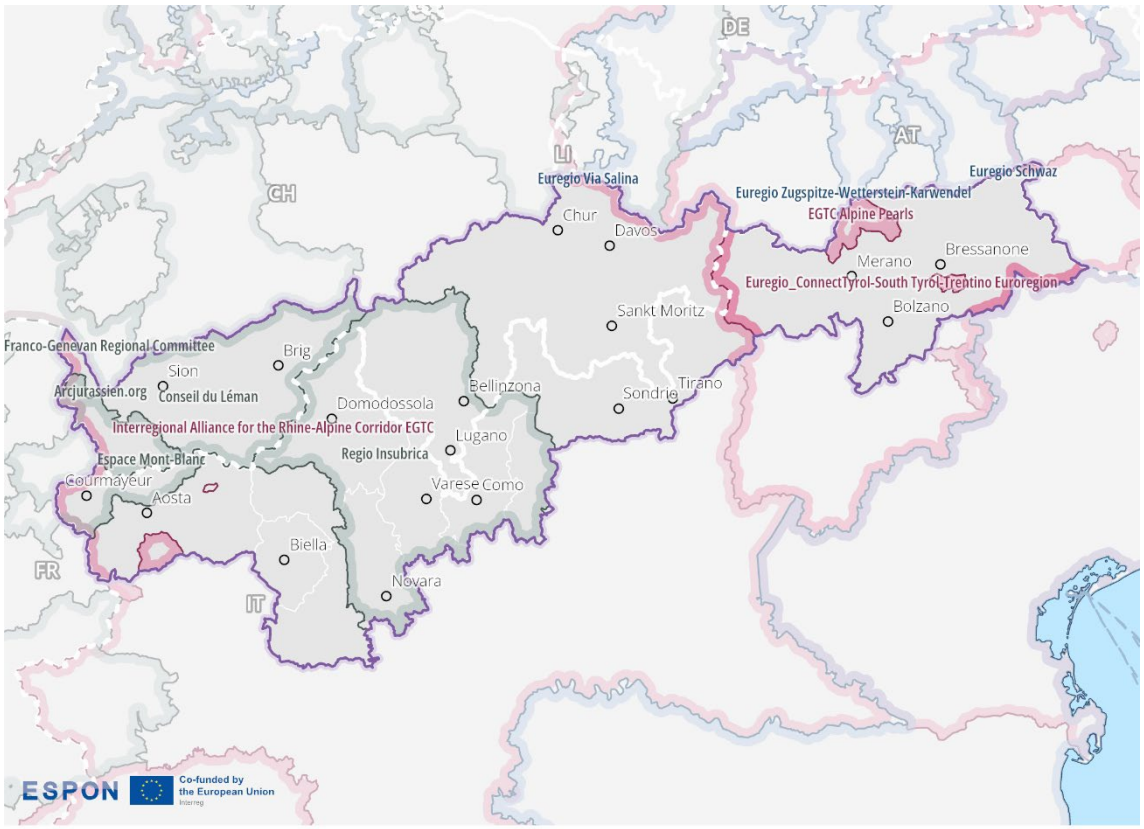
Please refer to the technical annex for more information.

Figure 2.37 shows the different types of institutionalised cooperation. These governance structures either function as cross-border entities or bring together stakeholders from the cross-border region around shared topics. The governance structures covered include Eurocities, Euroregions, European Groupings of Territorial Cooperation (EGTCs), cross-border associations and councils. Project-based cooperation is not included.

The coloured markings on the map indicate different types of institutionalisation: EGTCs are shown in red, Eurocities in yellow, Euroregions/Euregios/Europaregions/Eurodistricts in blue, and other formats in grey.

The multi-level governance structure in this programme area displays broad spatial coverage along the borders. Overall, the region demonstrates a high level of institutionalised cross-border cooperation. EGTCs are the most prevalent format.

Figure 2.37: Cross-border governance structures



2.6.1.2 Cross-border public services

Indicator description

The indicator shows different services specialised on cross-border challenges and development potential, including their domain of operation. As a specific form of services of general interest, cross-border public services (CPS) address joint problems or development potentials of border regions that are located on different sides of one or more national borders.

- **Source**: ESPON cross-border public services (CPS) 2.0 database
- **Temporal coverage**: 2022
- **Unit**: n/a

Please refer to the technical annex for more information.

Figure 2.38 depicts the geographical extent of cross-border public services in the border area in 2022. Different thematic areas are represented by distinct symbols and colours, indicating services such as disaster management, health care, transportation, education, environment, energy, job placement, and culture. The visualisation highlights where these services operate across the national boundary.

Cross-border public services in the Alpine Italy–Switzerland–region are concentrated around Varese, Como, Sankt Moritz, and Brig, with strong emphasis on transportation.

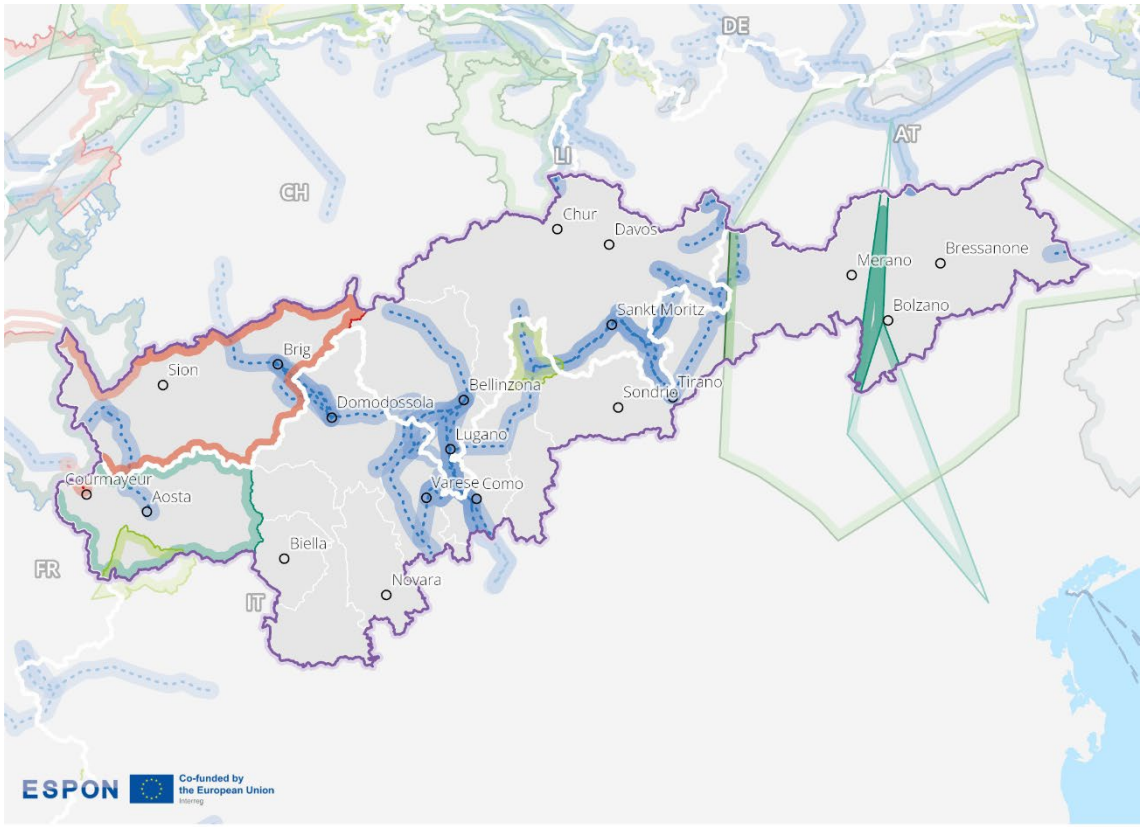
The transportation network is the most extensive theme, forming a corridor through the Alps. It connects Brig, Sankt Moritz, Tirano, Varese, Como, crossing national borders at multiple points.

Disaster management services are active mainly between Swiss and French regions.

Education & research services are limited but visible, especially between Bolzano/Bozen and areas across the Austrian border. Some tourism & information and environment & water services appear in the Aosta Valley and South Tyrol.

Notably, public services concentrate along well-defined alpine transit corridors, with minimal outreach into peripheral or remote mountainous zones. A tourism & information sector stretches from Austria across south Tyrol, exceeding the Interreg Area.

Figure 2.38: Cross-border public services



Geographical extent of cross-border public service themes (2022)

areal linear character of the service

- Disaster management
- Health care
- Transportation
- Tourism & information
- Education & research
- Environment & water
- Heating & energy
- Job placement
- Culture

inside outside inside outside of the Interreg VI-A perimeter

Cross-border public services covering more than one theme have been assigned only to one. Furthermore, some polygons have been excluded because they were only approximately and not accurately spatially defined.

Level of detail: geolocalised lines and areas
Source: FAU, UPOL, ÖIR & EPRC, ESPON Core-IB, 2026
Origin of data: ESPON CPS, 2022
©EuroGeographics for administrative boundaries

- Interreg VI-A perimeter
- national border
- NUTS 3 border

0 25 50 km

2.6.1.3 Perceived cross-border obstacles in b-solutions

Indicator description

The indicator shows cases of legal or administrative obstacles selected in the framework of the b-solutions initiative. This indicator lists the number, location and nature of suggested solution of cases in the b-solutions initiative, including the topic and parties involved.

- **Source/method of retrieval**: Processing and analysis of the b-solutions initiative data
- **Temporal coverage**: 2018-2025 (first quarter)
- **Unit**: n/a

Please refer to the technical annex for more information.

The b-solutions initiative is a European Union project that supports the resolution of legal, operational and administrative cross-border obstacles. It offers funding for pilot actions and legal expert advice in border regions. A high level of cross-border integration often reveals strong barriers of cross-border functioning. In order to exploit the cross-border potentials, these obstacles have to be overcome or at least addressed. Both the number of reported obstacles and the general interest in solutions serve as important indicators of cross-border interaction.

As part of the ESPON CROSSGOV project, all b-solutions initiatives were analysed to deepen the understanding of the thematic focus of the perceived cross-border obstacles across different border regions and the suggested solution. For the case of the Italy-Switzerland programme area, no participation in b-solutions projects has been reported yet.

2.6.1.4 Institutionalised advice centres for cross-border issues

Indicator description

The indicator shows where institutionalised advice centres on cross-border issues are located, including their thematic focus and geographical perimeter.

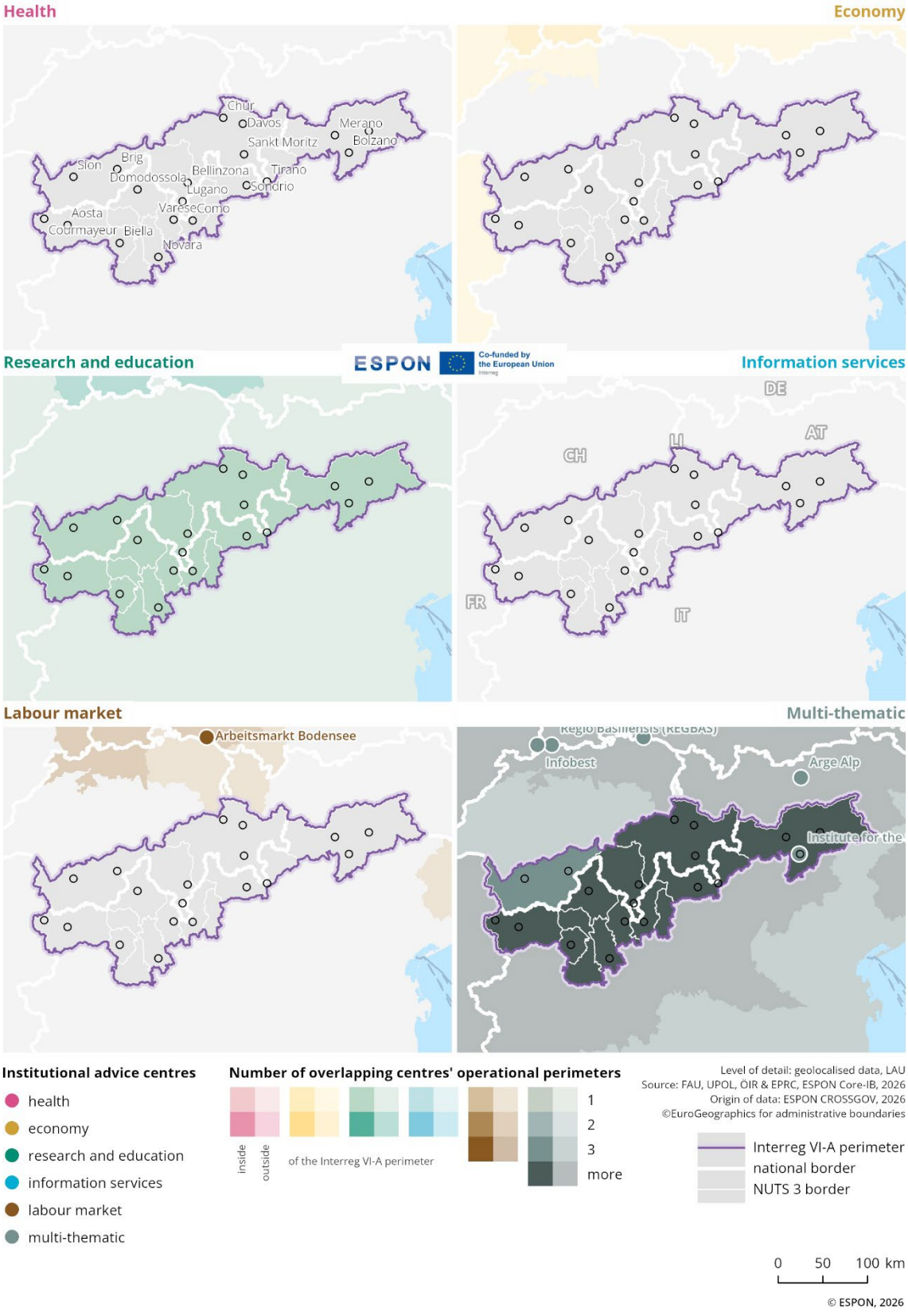
- **Source/method of retrieval**: Localisation and thematic focus of advice centres for cross-border issues are identified via desktop research.
- **Temporal coverage**: Status as of February 2025
- **Unit**: n/a

Please refer to the technical annex for more information.

Figure 2.39 shows the locations and types of institutionalised advice centres, along with their operational domains, in the cross-border Interreg region between Italy and Switzerland. These centres throughout Europe provide support in various fields such as health, economy, research & education, information services, the labour market, and multi-thematic issues. The operational domains of these centres are also indicated by coloured shading on the map. The more intense the colour, the stronger the influence of that specific domain in the corresponding area.

There is one multi-themtic institutionalised advice centre located in the Italian part of the Interreg region, in Bolzano/Bozen, called the Institute for the Study of Alpine Regions and Mountain Areas (EURAC Research).

Figure 2.39: Institutionalised cross-border advice centres



2.6.2 Outline of Interreg activities

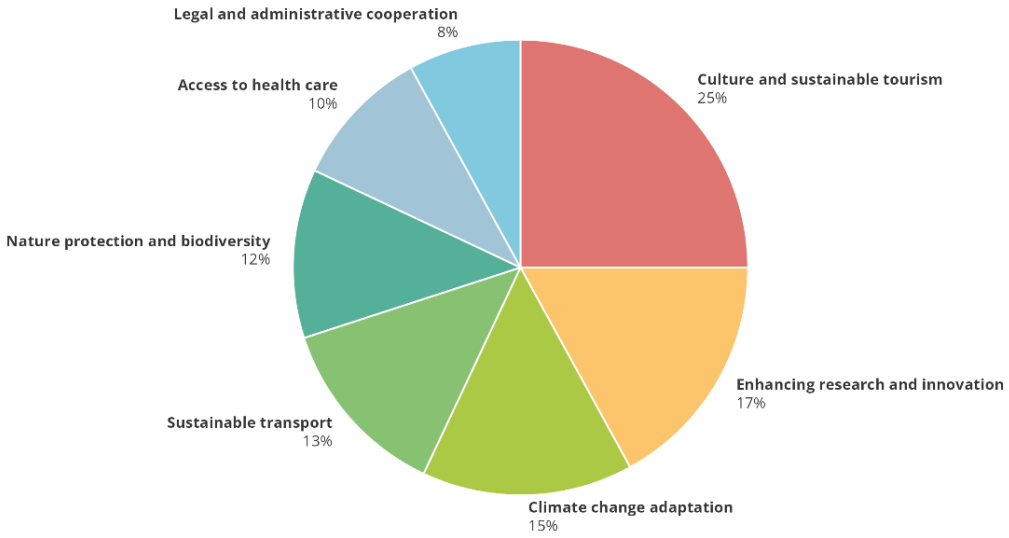
The following section outlines the key Interreg activities in the 2021-2027 programming period. The aspects included concern the development opportunities and challenges identified (see Table 2), the budget available and split of allocation (Figure 2.40), overlapping Interreg programmes and the key aspects drawn from the programme.

Table 2: Interreg VI (2021-2027): Opportunities and challenges

Topic	Key development opportunities and challenges identified for Interreg 2021-27
Physical Environment	▪ Alpine border - an important physical barrier capable of strongly influencing aspects such as mobility and the possibility of economic and social exchanges
Education	▪ Productive structure of the area which is characterised by the presence of a significant manufacturing sector ▪ Pharmaceutical and chemical production, and the relevance, on both sides of the border, of the healthcare, tourism-hotel and public administration services sectors ▪ High-quality universities and research institutes
Population and labour	▪ Areas of low population density ▪ Demographic aging ▪ Cross-border commuters are an important resource for the Swiss economy, ▪ Level of access to social and health services is good throughout the territory, but there are still large areas with reduced accessibility
Transport	▪ Accessibility of the different sub-areas very heterogeneous ▪ Territories that have an above-average accessibility located near the international airport of Milan-Malpensa and Zurich airport
Environment	▪ 1/6 of the total surface area of the territory is made up of natural areas, 30 of which are classified as "protected". ▪ Water, both surface and underground, including annual flows of snow and rain that feed streams and rivers, glaciers and the natural lakes ▪ Natural resources in the border area also constitute an important development opportunity linked to tourism and recreational activities ▪ Impact of climate change on the Alpine climate and environment is severe and linked to risks such as flooding and landslides.

Total Budget: EUR 102,933,342.98

Figure 2.40: Split of Interreg allocation



ESPON Co-funded by the European Union

Table 3 shows the number of Interreg 2021-2027 cross-border and transnational programmes which share at least one NUTS3 region with the border area. Each programme has its own distinct rationale, value and territorial focus. However, for the purposes of, for example, planning and capitalisation activities it is potentially helpful for programmes and programme stakeholders to be aware of and connected to other Interreg programmes with which they share a direct territorial link.[17] The 4 Interreg C programmes Interreg ESPON, Interact, Interreg Europe and URBACT (Urban Action) cover the whole EU territory and provide a range of joint services and initiatives.

Table 3: Shared geographies with other cross-border and transnational programmes

Interreg A (cross-border)	Interreg B (transnational)
4	4

Key aspects

- The programme focuses on enhancing innovation and ecological transition of production systems, sustainable use of resources and adaptation to climate change, accessibility and quality of mobility services, usability and capillarity of care systems, and institutional capacity building processes.
- The programme area contains territories which are also covered by some other Interreg Programmes. These include the Interreg B Alpine Space, Central Europe, Euro Med and Adriatic Ionian Programmes and the Interreg A Italy-Austria, Germany-Switzerland-Austria- Lichtenstein, France-Italy, and France-Switzerland Programmes.

[17] It is noted that synergies and links with a wide range of other territorial cooperation and sectoral programmes and initiatives are also valuable and this is reflected in the wider analyses presented in this border profile, but not specifically covered in this table.

2.6.2.1 Interreg cooperation

Indicator description

Based on the keep.eu database, this indicator illustrates the network density of Interreg V-A (2014–2020). It is derived from the geographical location of all partners within a project consortium and reflects the intensity of cooperation between them. For the analysis, project networks were visualised by drawing lines between the locations of partners within a consortium. These connections were subsequently aggregated and spatially abstracted by calculating line density using GIS software. Dark red areas indicate a high density of connections between project partners, while yellow areas represent a lower density of cooperation links.

An additional element in this section is the development of project partner numbers between Interreg IV-A (2007–2013) and Interreg V-A (2014–2020), based on data from the keep.eu database. The datasets were cleaned to remove duplicates, using the partner names as reported in keep.eu. For both programming periods, keep.eu indicates a high level of data completeness[18]. Nevertheless, this development should be interpreted as indicative, as variations in partner name reporting and general limitations regarding the representativeness of the dataset affect the robustness of the results.

- **Source/method of retrieval**: Processing and analysis of the keep.eu database
- **Temporal coverage**: 2007-2013 (Interreg IV-A), 2014-2020 (Interreg V-A)
- **Unit**: n/a

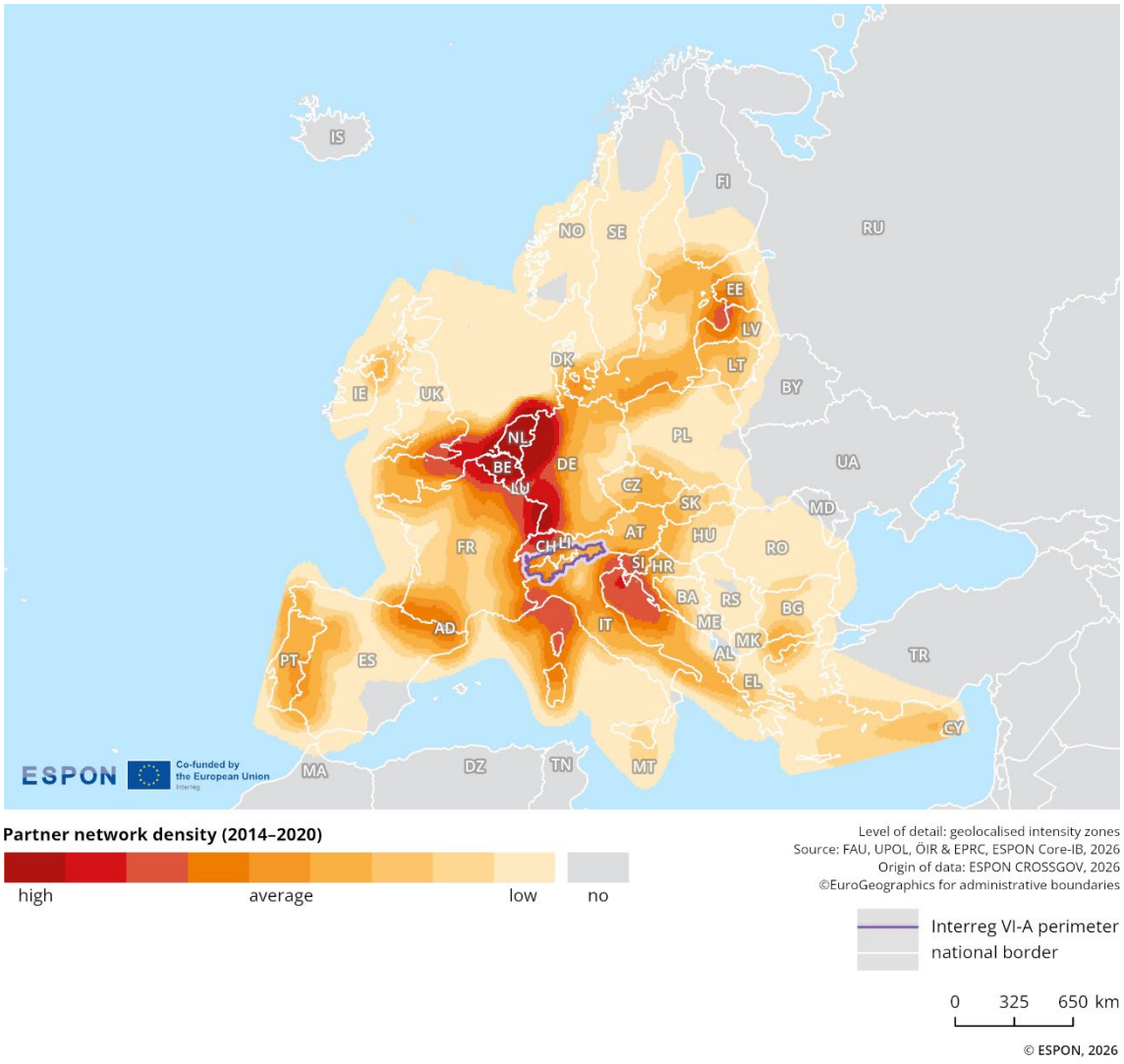
Please refer to the technical annex for more information.

Cooperation activities and networks are among the most meaningful types of information for delineating cross-border functional areas. As such, the indicator on cooperation through Interreg can help to identify networks among cross-border actors and highlight the density of cooperation in specific border segments.

Figure 2.41 shows the density of Interreg V A (2014–2020) partner networks. The indicator includes the location of, and links between, Interreg project partners within a project consortium. From a European perspective, partner network density in the Italy-Switzerland border area appears quite evenly spread. No specific border segments within the programme area show significantly higher or lower network levels than others. The partner network density in this border area is close to the European average. Based on the keep.eu database and excluding duplicates, the number of project partners increased from 436 in Interreg IV-A (2007–2013) to 574 in Interreg V-A (2014–2020), an increase of about 25%. It is important that these changes are considered in the context of factors such as change in programme budgets between 2007-2013 and 2014-2020, emphasis on targeting impact, and numbers of strategic projects.

[18] see Keep.eu representativeness: Interreg, Interreg-IPA and ENI cross-border

Figure 2.41: Interreg V-A partner network density



2.6.3 Key messages on the governance dimension

The Italy-Switzerland border region is characterised by a dense network of cooperation structures and cross-border public services, reflecting its long-standing tradition of cross-border exchange. Institutionalised formats such as Euroregions and working communities cover much of the territory, creating a strong multi-level governance framework. Compared to other European border regions, the region's institutional presence is both extensive and well-established, demonstrating the strong integration of cross-border cooperation in the region.

Cross-border public services complement these governance arrangements, though they are not evenly distributed. The most visible cooperation can be seen in the transport sector, where corridors linking Brig, Sankt Moritz, Tirano, Varese and Como provide essential connections across the Alps. Disaster management services are also present in valley locations such as Sion-Brig, whereas cooperation in education, tourism, water management and environmental services is more fragmented and localised. A clear pattern emerges: cross-border services concentrate along transit corridors with strong functional links, whereas remote mountain areas are less covered. This highlights the significant influence of geography and accessibility on the intensity and scope of cooperation.

Institutionalised advice centres provide another layer of integration, though in a more selective manner. These centres emphasise the importance of research, education, and advisory services in sustaining cooperation beyond infrastructure and governance.

Interreg plays a central role in supporting and expanding these networks. The Italy-Switzerland border area is involved in wider European initiatives on innovation, ecological transition, mobility and institutional capacity, and is embedded in overlapping Interreg frameworks such as Alpine Space or Central Europe. The region's cooperation density matches the European average, but the steady increase in project partners and interlinkages indicates growing engagement.

3 Summary and key observations

To support the strategic dialogue on cross-border cooperation beyond 2027, this territorial analysis provides harmonised and comparable information. Its data-driven evidence helps to inform the future direction of cross-border cooperation by facilitating alignment with EU priorities and the evolving regulatory framework. The Core-IB border profiles adopt a harmonised methodology and provide programme areas with access to recent European data. As this approach comes along with limitations, member states may hold additional or more detailed data which can further enrich or contextualise the findings beyond the Core-IB project (see final report and technical annex of this project). These national sources are essential for refining and validating territorial evidence in policymaking processes, including: a) regional, fine-scale data and b) insights from political processes related to prioritisation and objective setting. The study's findings are analytical and are intended to support reflection and discussion. They do not create regulatory or policy obligations for Member States, the European Commission, or programme authorities.

Table 4 provides 2 types of information. Firstly, it summarises the key analytical findings for the border region, as discussed earlier in this profile. Secondly, it suggests policy options based on the analytical findings. These options are intended to provide a practical and informative basis for the strategic dialogue among programme bodies, managing authorities and the European Commission.

Generally speaking, the aim of cohesion policy is to promote harmonious territorial development (also) across borders. The objective is to mitigate the impact of borders and achieve 360° functionality, thereby enhancing the quality of life and fostering prosperous development on both sides of the border. The upcoming Interreg period offers an opportunity to address these objectives and potentials through targeted cooperation projects.

Table 4: Evidence-based conclusions

Territorial dimension	
Key analytical findings	• The Italy-Switzerland border region (4.4 M inhabitants) is sparsely populated overall, with denser clusters around key urban hubs; population growth is weak or declining, and ageing trends place pressure on services, labour, and housing; • Settlement expansion is concentrated in lowland and urban centres (e.g., Como, Novara, Bolzano/Bozen), while mountain areas remain static, reflecting competing land-use demands from tourism, housing, transport, and nature protection; • Accessibility is uneven: while rail links (e.g., Brig–Domodossola) support integration, many areas face long travel times and limited service access, leaving regional development dependent on a few key centres.

Territorial dimension	
Policy options	**Population and settlement related aspects** • A relevant policy option is to address the pressures on shrinking and ageing communities via cooperation projects in service provision, housing planning and access to labour markets in those areas affected by demographic decline and ageing; • A focus could be on balancing housing demand, tourism development, transport infrastructure and nature protection in areas where population growth is concentrated around hubs such as Como, Novara and Bolzano/Bozen. **Accessibility related aspect** • Cooperation projects could address the issue of reliance on a limited number of rail corridors and peripheral centres by coordinating mobility planning and sharing services. **Cross-cutting aspect** • The demographic decline, accessibility constraints and environmental protection could be addressed in an integrated manner through cross-border coordination, strategy development and knowledge exchange.

Economic dimension	
Key analytical findings	• The Italy–Switzerland border region is highly prosperous, with GDP per capita well above EU averages, but economic growth is modest; strong income levels on the Swiss side contrast with more moderate but above-average performance on the Italian side; • Labour markets are diversified and adapting towards services and knowledge-intensive sectors, yet wage gaps and housing disparities drive intense cross-border commuting and telework, creating both integration opportunities and local pressures; • Demographic decline, housing affordability contrasts, and uneven digital infrastructure, particularly in Italian rural and Alpine areas, highlight persistent cross-border asymmetries despite strong functional ties.

Economic dimension	
Policy options	**Competetiveness related aspects** • A focus could be on cross-border economic approaches to support long-term competitiveness and labour supply in the context of ageing and shrinking populations, despite GDP per capita levels remaining well above the EU average; • The wage and housing asymmetries can be transformed from structural imbalances into drivers of functional integration through coordinated cross-border policies and initiatives; • Digitalisation initiatives in Italian rural and Alpine areas could be addressed to support telework and strengthen cross-border connectivity and economic participation.

Green dimension	
Key analytical findings	• The Alpine setting influences the border region, with dense protected areas (especially in Italy) and shared ecological systems, but differing national approaches to conservation and uneven environmental pressures, including poorer air quality in Italy and varied natural hazards; • Energy systems are highly interconnected, dominated by hydropower with cross-border plants and grids, while fossil fuels remain marginal; this supports a shift toward clean energy use in both countries; • Resource efficiency is improving, with Switzerland leading in productivity but both sides showing declining waste generation, indicating gradual convergence towards more sustainable practices despite asymmetries.

Green dimension	
Policy options	**Climate risks and resilience related aspects** • Strategy development, pilot projects and knowledge exhange can explore the potentials of cross-border risk management by addressing common vulnerabilities such as landslides and floods; • Cross-border coordination in biodiversity protection, landscape management and ecological connectivity could be specifically focused on by aligning governance frameworks across densely protected areas, particularly on the Italian side. **Cross-cutting aspect** • Policy learning and cross-border coordination could be addressed to accelerate convergence towards sustainable practices, building on Switzerland's leadership in resource productivity and the ongoing waste reduction efforts in both countries.

Socio-economic dimension	
Key analytical findings	• The border region shows strong but uneven social cross-border connectivity shaped by local settlement patterns, accessibility, and especially linguistic diversity, Italian- and German-speaking areas integrate more easily; • Tourism is a major economic driver, with hotspots like Bolzano/Bozen and Graubünden, but also creates seasonal pressures on housing, transport, and the environment, highlighting its dual role as opportunity and challenge; • Service accessibility reflects Alpine constraints: Italian lowlands enjoy good provision, while many cross-border mountain areas face long travel times and urban-rural divides in healthcare and cultural services.

Socio-economic dimension	
Policy options	**Cross-cutting aspects** • A focus could be on social cohesion and accessibility across linguistically diverse Alpine territories via multilingual governance approaches and coordinated service provision; • Cooperation projects could focus on cross-border tourism strategies in hotspots such as Bolzano/Bozen and Graubünden to balance economic benefits with housing affordability, transport capacity and environmental protection; • Cross-border access to healthcare, cultural and digital services can be improved to reduce spatial inequalities and enhance quality of life, particularly in mountainous areas with long travel times compared to Italian lowlands.

Border security and safety dimension	
Key analytical findings	• Temporary border controls in the Italy-Switzerland region have been rare, with Switzerland reintroducing them more often than Italy, usually for high-level events, while Italy's controls were limited to the COVID-19 pandemic; • Even brief controls can disrupt commuting, logistics, and daily life, highlighting the significance of cross-border mobility in this highly interconnected area; • Overall, the low frequency of restrictions underscores the resilience of the Schengen framework, with cooperation and integration dominating everyday cross-border interactions.
Policy options	**Cross-cutting aspects** • The impacts of border controls on cross-border commuting and logistics can be mitigated through coordinated and institutionalised cross-border policy dialogue; • The mitigation of border control effects can form part of cross-border cooperation projects in various sectors. Economic networks, transport infrastructure initiatives and tourism-related actions can incorporate considerations related to the impacts of border controls.

Governance dimension	
Key analytical findings	• The Italy-Switzerland border area features a dense network of cross-border cooperation, including Euroregions, and working communities, reflecting long-standing political and social cooperation; • Cross-border public services, especially in transport, disaster management, and selective education, tourism, and environmental initiatives, concentrate along transit corridors, while remote Alpine areas remain less integrated.
Policy options	**Cross-cutting aspects** • Governance frameworks could focus to move beyond corridor-based cooperation and integrate remote Alpine areas through strategic spatial development, knowledge exchange and joint initiatives; • Cross-border services in healthcare, education and environmental management could be scaled up, building on the successful cooperation in transport and disaster management to foster a coordinated service provision.

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