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CERVINO

Alpine Space

CERVINO

Creating an Energy data exchange and Visualization
Tool for the alps

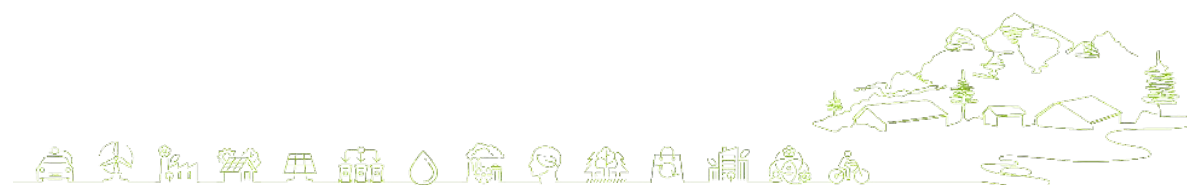
Report D1.3.1

Lead Partner: Regional Agency for Infrastructure development, building Renovation and Energy of Liguria – IRE spa (Lead partner)

Activity 1.3 Conducting the new Survey and validation of the developed tool

Leader Organization: KSSENA

February 2024



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Project Lead and editing provided by IRE spa.

Manuscript completed in February 2024

This document is available on: alpine-space.eu/project/cervino/

Document title	Report on Energy Survey updated
Work Package	WP1 – A 1.3
Document Type	Deliverable
Date	February 2024
Document Status	Draft version

Acknowledgments & Disclaimer

This project is co-funded by the European Union through the Interreg Alpine Space programme.



Preface

EUSALP needs reliable consolidated energy data to facilitate the decision-making process at macro-regional level. The Alpine Macro-region benefits from important energy flows among its regions, which can lead to the development of transnational energy projects that can greatly contribute to reach the 2030 & 2050 EU energy and GHG emissions targets. To define, implement, and monitor the effectiveness of energy policies, reliable energy data at different spatial and temporal scales are required. These data need to be collected and analysed on a regular basis.

The macro-regional Strategy for the Alpine region (EUSALP) was launched by the European Union in 2015, as “an integrated framework to address common challenges faced by a defined geographical area”. This area includes and surrounds the Alps, embracing five European member states plus Switzerland and Liechtenstein. It covers more than 440.000 km² (nearly 10% of the EU-28 plus Switzerland and Liechtenstein). The EUSALP Action Group 9 has the mission to “make the EUSALP territory a model region for energy efficiency and renewable energy”. For this reason, in 2016, it developed the online EUSALP Energy Survey, meant to be sent to each territory’s representative, to collect data on the energy production mix, consumption sectors, energy policy strategies and defined energy policy targets. The EUSALP Energy Survey 2017 developed by the EUSALP Action Group 9 is the first attempt to offer a clear and systematic overview of the EUSALP energy data, both on the consumption and production side¹. The Energy survey was updated and implemented again in 2019.

Now, the CERVINO project aims to facilitate a new approach to energy data exchange within the Alpine territory by setting up a reliable system to collect, manage, update, and use energy data, thus modernising the EUSALP Energy Survey. CERVINO project tackled the following challenges:

- reshaping, upgrading and improving the existing Energy Survey structure/framework based on the lessons learned, to ensure optimal data homogenization, reliability and consistency;
- developing a simplified, user-friendly and open-source tool for energy data collection, management and visualisation;
- testing the tool by conducting the reshaped Energy Survey and validating the developed solutions;
- developing a Roadmap that will create the conditions for the durability of the tool, allowing for the regular update of the Energy Survey and ultimately leading to the establishment of an Alpine Energy Observatory;
- raising awareness about the developed tool with all its features to EUSALP decision-makers.

For the first time in the Alpine Macro-region, a new system was set up allowing energy data exchange among regions thanks to the creation of a modern, automated, cost-effective, and regularly updatable tool. This report focuses on the process of conducting the new EUSALP Energy Survey 2023, which also acted as validation for the newly adopted tool. The process required months-long communication with the Alpine regions, from establishing initial contact with the regions (May 2023) to maintaining a level of interest and motivation throughout the data collection process until its completion at the end of 2023.

The Energy Survey achieved an overall very good response rate. 22 regions participated in the survey and provided input for over half of all the required indicators. Regions have indicated very high levels of satisfaction with respect to fulfilling expectations of the new survey (methodology and approach), quality of communication and, above all, the functionality of the CERVINO data platform.

¹ EUSALP Energy Survey 2017, AlpGov project: [LINK](#)



Nevertheless, several barriers related to technical and data management, organisational aspects and communication and engagement challenges persist.

The non-uniformity of governance structures in EUSALP regions and the systems for data statistics for these territories prevent a standardised approach applicable to the entire Alpine area. These also imply non-trivial weaknesses in terms of ensuring open access to data indicators via publicly accessible databases. A severe fragmentation of data sources makes it necessary to facilitate work intensive processes related to data sourcing and acquisition on the level of organisations representing individual regions. The provision of such services (researching data indicators on energy at various levels of complexity) is not usually foreseen in the existing scope of activities for which regional organisations have the jurisdiction, responsibility or personnel and professional capacity.

The severity of the above-mentioned weaknesses varies significantly between regions and strongly correlates to the overall response rates (in terms of data indicators obtained). This ranged from over 80% of all indicators for most successfully engaged regions to practically no data entries on the other extreme.

While the CERVINO platform allows for high-level integration and automatization for data collection processes at all levels, its functionality cannot be fully exploited without first solving the above mentioned (and several other) systemic deficiencies. These challenges are beyond the scope of the CERVINO project (data availability and monitoring systems in place, dedicated personnel and other organisational capacity, heterogeneity of territorial governance and management, etc.) and should be addressed on the transnational and regional policy levels in the next years.



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1 | EUSALP Energy Survey 2023

Reliable energy data forms the foundation for policymakers to define, implement, and evaluate the impact of energy policies. To enact a comprehensive macro-regional energy strategy tailored to the specific challenges and obstacles of the Alpine Space territory, Action Group 9 has devised the EUSALP Energy Survey. This survey aims to gather regional and national energy data, consolidating them into macro-regional data, aligned with the medium and long-term policy objectives outlined by the functional units within the region.

Macro-regional strategies provide a framework for cooperation, coordination, and consultation between and within states and regions. They depict an opportunity for greater regional cohesion and more coordinated implementation of European sectoral policies in transnational territories that are confronted with common challenges and opportunities.²

EUSALP Energy Survey was first implemented in 2017, representing the first step towards establishing a consistent monitoring system for the energy data within the Alpine macro-region. A subsequent effort was launched in 2019, with the aim of ensuring periodic updates of the macro-regional energy data for the Alpine space. In 2023 this challenge was undertaken by the partners of CERVINO (Creating an EnerGy data exchange and VisualizatioN tOol for the alps), this time implementing the survey by setting up a stable and reliable system to enable consistency in data collection, as well as better management, update, and use of energy data.

Moving away from the method of online questionnaires used in the 2017 and 2019 iterations of EUSALP Energy Survey, the project attempted to modernise the processes. Through the CERVINO project, a state-of-the-art online tool has been developed in the form of a user-friendly digital platform. The objective was to establish an Energy Data Management Tool that would facilitate improved data collection, processing, and visualisation of key energy data, addressing several of the challenges and difficulties encountered in previous energy survey campaigns. End of May 2023, the **CERVINO Alpine energy data platform** was launched and made publicly available. This marked a new milestone for the EUSALP Energy Survey, increasing its relevance and potential impact on the decision-making processes concerning energy and climate challenges across the Alps.

In the following months, the project successfully enacted a transnational data acquisition and analysis, the EUSALP Energy Survey 2023. This campaign engaged regional stakeholders in the majority of EUSALP regions through the project's online platform. Besides its primary objective of obtaining energy data in the territory, the implementation of the survey was predominantly focused on the validation and improvement of the newly adopted tool, i.e. in its capacity to facilitate a highly efficient system to conduct periodical transregional surveys in the future.

The renewed approach introduces improved automation, cost-effectiveness, and lays the groundwork for more efficient periodic updates of energy data in the following years.

² EUSALP Energy Survey update - 2019, AlpGov project ([LINK](#))

1.1 EUSALP Energy Survey 2023 reshaped

By identifying the strengths and weaknesses as well as considering other relevant experience gained during the application of the previous iterations of the surveys in 2017 and 2019, the 2023 EUSALP Energy Survey was reshaped. This required drafting a new set of information and data requirements, setting up the methodology for data collection and providing comprehensive guidelines to ensure data homogenization and consistency. AG9 members and other stakeholders were engaged at various points throughout this process to provide valuable input.

The process of reshaping EUSALP Energy Survey consisted of:

- Analysis of the original Energy Survey and of its update (2017 and 2019 respectively).
- Research systems currently used to collect energy data in some EUSALP regions by distributing a brief questionnaire to project observers and active members of EUSALP AG9. The results offered valuable insights into the variability of both the types of collected data and data collection methods across the regions.
- Updating the selected data to be included in the reshaped Energy Survey.

One of the primary aims of the CERVINO project was to redesign the energy survey to maximise regional involvement and participation. The main results of the analysis suggested prioritising the selection of indicators with high levels of data availability for the new version of the Energy Survey. This involved addressing key issues related to the energy data requirements that had posed challenges in previous surveys (2017 and 2019). The analysis of the previous EUSALP Energy Surveys highlighted the importance of selecting indicators for the reshaped survey based on the level of data availability, limiting the number of indicators, and minimising the issue of missing data. Moreover, it's required to put more emphasis on the quality of the data by requiring information on the data sources. Addressing these limits was crucial for the improvement of the reshaped Energy Survey in the framework of the CERVINO project.

Furthermore, it was determined to categorise the selected indicators into two groups:

- “core” data, essential for comparing energy profiles among EUSALP regions (including a limited number of indicators, that were selected according to their relevance considering the data availability – both present and future), and,
- “additional” data, which provide useful information to the core ones while not being fundamental to the overall applicability of the Energy Survey (including optional indicators providing more in-depth insights and ensuring this information is not overlooked in regions where data are available)

In the 2023 EUSALP Energy Survey only the category with core data was mandatory. The decision to divide indicators into these groups was made to address shortcomings identified in previous versions of the Energy Survey, particularly for mitigating challenges related to missing or unavailable data and reducing the effort required from regions to complete the survey.

The reshaped Energy Survey has been structured in the following categories:

1. Energy Balance

Overview of the region's energy situation (flow and use of energy within a region).

2. Gross Final Energy Consumption

Gross final energy consumption of the region, divided by different energy sources.

3. Gross Electricity Production

Detailed overview of the primary sources used to produce electricity in the region.

4. Gross Energy Production for heating and cooling

Detailed overview of the primary sources used for heating and cooling in the region.

5. Final Energy Consumption

Final energy consumption of the region, divided by different sectors.

6. Energy Transition

Emerging trends in the regional energy sector related to the energy transition.

A comprehensive description of the Energy Surveys status quo analysis as well as the revision of investigated data points, sources and collection approach is provided in D.1.1.1 *“Reshaping, upgrading and improving the existing Energy Survey structure based on the lessons learned³”*.

³ Deliverable 1.1.1 - Reshaping, upgrading and improving the existing Energy Survey structure based on the lessons learned CERVINO project ([LINK](#))

2 | Data collection process

The EU Strategy for the Alpine Region (EUSALP) is the fourth macro-regional strategy endorsed by the Council in 2015. It covers a territory inhabited by 80 million people and includes 48 regions from seven countries of which five countries are EU member states, namely, Italy, Austria, Germany, France, Slovenia, Switzerland and Liechtenstein.

The EUSALP regional categorization follows closely the division into territorial units at NUTS 2, which correspond to regions. It was known at the onset of the survey development that not in all cases the data would be accessible on the NUTS2 level because of geographical factors or lack of regional government or essential monitoring services. In particular:

- Switzerland, which is included as a single region even if it normally gathers seven NUTS2 regions. However the access to pertinent data on NUTS2 territorial scope is limited, so it was only collected at NUTS0 (country) level;
- Slovenia, which is formed by two NUTS2 regions, but does not have any regional governmental structure actually in place. Therefore, as Switzerland, the whole country is considered as one region and data was collected on NUTS0 level;
- French and German data were collected at NUTS1 level (groups of regions or states) because of NUTS2 level being less used in terms of administrative organisation;
- Liechtenstein, which does not divide further into regions.

At the onset of the survey preparation, CERVINO elaborated a monitoring datasheet which identified several contacts (representatives of EUSALP regions which would actively participate in the survey activities) in the following territories (see also Figure 1):

Country	Code	Name	Country	Code	Name
AT	AT11	Burgenland	FR	FR43	Bourgogne-Franche-Comté
AT	AT12	Niederösterreich	FR	FR71	Auvergne-Rhône-Alpes
AT	AT13	Wien	FR	FR82	Provence-Alpes-Côte d'Azur
AT	AT21	Kärnten	FR	FRF	Grand Est
AT	AT22	Steiermark	IT	ITC1	Piemonte
AT	AT31	Oberösterreich	IT	ITC2	Valle d'Aosta/Vallée d'Aoste
AT	AT32	Salzburg	IT	ITC3	Liguria
AT	AT33	Tirol	IT	ITC4	Lombardia
AT	AT34	Vorarlberg	IT	ITH1	Provincia Autonoma di Bolzano
CH	CH0	Switzerland	IT	ITH2	Provincia Autonoma di Trento
DE	DE1	Baden-Württemberg	IT	ITH3	Veneto
DE	DE2	Bayern	IT	ITH4	Friuli-Venezia Giulia
LI	LI00	Liechtenstein	SI	SI	Slovenija



Figure 1: EUSALP territories (source: EUSALP ENERGY SURVEY UPDATE – 2019 Report)⁴.

The 2023 campaign of EUSALP Energy Survey was officially kick-started by an online event on May 31st, 2023, presenting the survey’s purpose and introducing the newly developed online tool. The communication process began by involving regional contacts from previous energy surveys and collaborating closely with AG9 members. In the subsequent months, persistent communication and

⁴ The map of the EUSALP territories indicated in figure 1 does not include Grand Est: Bas-Rhin and Haut-Rhin ([LINK](#))

outreach efforts were necessary, often making it necessary to identify new regional contact persons in addition to those involved in previous iterations in 2017 and 2019. The data collection process involved sending reminders and providing extensive support as well as bilateral interactions to maintain the level of interest and motivation throughout the data collection process until its completion at the end of 2023.

Similarly, as with the past Energy surveys in 2017 and 2019, the data collection was primarily focused on representatives of EUSALP territories as its core source of data input. The identified persons were part of various kinds of organisations, including regional governments, ministries, statistical offices and regional and national energy agencies. A very significant role was undertaken by specific members of EUSALP Action Groups particularly from AG 9 (Energy). The project aimed to establish a self-sustaining system by moving beyond online questionnaires offering a user-friendly method to data providers to improve engagement and response rates. However, this was achieved successfully only to a certain extent. Several exogenous factors, mainly related to data fragmentation and data unavailability, led to time-consuming sourcing and intensive work from contributors that limited the potential of the redesigned approach. Despite the platform and the ambition of the CERVINO project being very well received by the majority of persons contacted, allocating personnel resources on the side of regional representatives proved to be a key barrier which became evident in the first data collection attempt after the Surveys launch. The identification process and preliminary communication with potential respondents was an ongoing process carried out continuously from the inception of the project onward in advance of the official launch of the Survey in Q3 2023. In order to mitigate this risk, the CERVINO project consortium proposed a methodical process with several iterations and monitoring points allowing the managers of the Survey to identify and address weaknesses on an ongoing basis. The proposed process is presented in Figure 2:

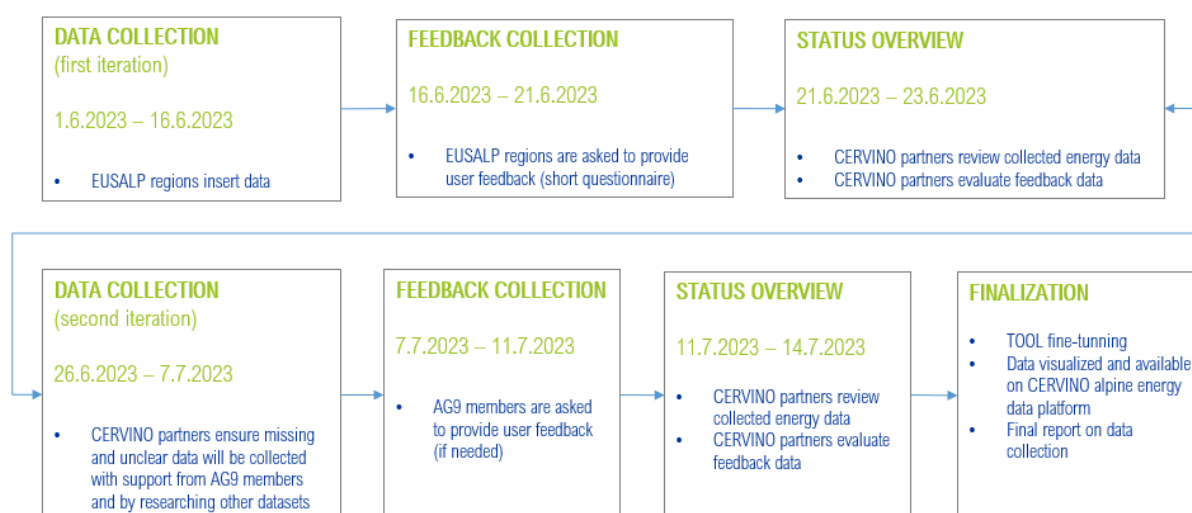


Figure 2: Data collection process and timeline as originally proposed prior to the Survey launch (source: CERVINO project)

The data collection process was structured into two main phases, with each phase involving both data collection and a status overview. During the latter, CERVINO partners assessed the status of the collected data and made necessary adjustments accordingly. Following the initial phase of data

collection, it became evident that additional bilateral support and more extensive efforts were required to motivate regions to participate actively. This involved fostering their interest and helping them recognize the added value of the newly developed tool, as well as providing support in the data collection process. Additionally, during the second phase, CERVINO partners invested extra effort in guaranteeing the consistency of the already entered data and addressing issues arising from incomplete surveys. Additional support was requested from AG9 members to identify new contact persons, as initial communication attempts with certain regions yielded no results.

Following the second phase of data collection, partners revisited the validation of the collected data. The level of success in regional cooperation differed between countries and regions. To validate the data collection process, CERVINO partners developed two questionnaires, initiating the feedback phase:

- Partner Feedback Questionnaire: Designed to gain a deeper understanding of the experiences of CERVINO partners in communicating and collaborating with the regions.
- Regions feedback questionnaire: designed to gather feedback from regions regarding their experience with the newly developed tool and the process of completing the EUSALP Energy Survey 2023.

The responses to the questionnaires are summarised in Section 4 (*Partners' feedback on regional cooperation*) and Section 5 (*Regions' feedback on EUSALP Energy Survey 2023*).

3 | Status of collected data

Out of 26 individual territorial units a total of 20 regions provided data for the 2023 EUSALP Energy survey⁵. The resolution and scope of data availability varied substantially in accordance with local/regional specifics of established systems for data monitoring and analysis, access to regional stakeholders and their capacity to provide data as well as other aspects.

The figures presented in this Section indicate 3 groups in which the data was categorised: 1. “Not completed” stands for data that has not been entered; 2. “Not-available” indicates data that was marked as not being available by the respondents and 3. “Available” means data, which has been entered, checked for inconsistencies and validated in subsequent analysis.

Overall, with regards to all analysed 26 regions throughout the entire duration of the analysis (4 years), the respondents to the Survey provided data inputs for 29% of the indicators, while for 18% of the indicators, the regions indicated unavailability of data. Finally, the remaining 52% of the indicators were not entered.

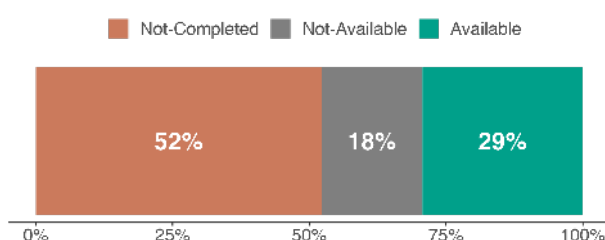


Figure 3: Overview of total Energy Survey respondents over the 4-year analysed period (source: CERVINO project)

The data collection covered a four-year period (2018-2021) to address inconsistencies in data availability across different periods for participating regions and to account for extreme events (e.g. COVID 19) that had a severe impact on the energy statistics. Overall, the share of data availability across 4 years remained moderately constant - just over 30% throughout 2019 until 2021, with 2018 being an exception with the share reaching as low as 23%. The results are presented in Figure 4.

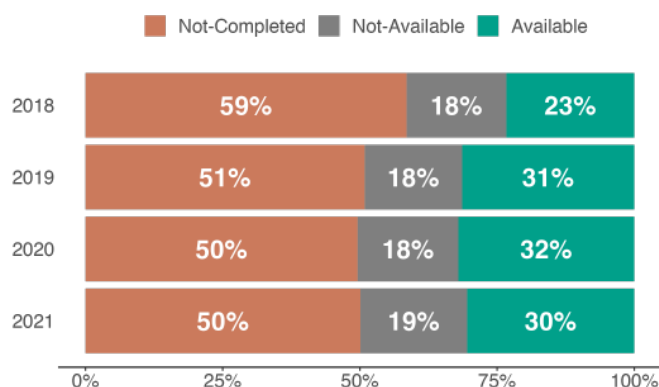


Figure 4: Overview of total Energy Survey respondents on a yearly basis (source: CERVINO project)

⁵ Regions which have ensured the access to data of adequate scope (more than 50% of data requested)

Very high deviances between regions were observed, with certain regions exhibiting high response rates while others provided no data during the formal implementation of the Energy Survey, despite the proactive involvement of Cervino partners at various levels of the data collection (including efforts to identify additional survey respondents and manually input data from existing sources). An overview of achieved results for each region is presented in Figures 5 – 35. As a remark, figures for the regions ITH3 Veneto and, LI Liechtenstein and CHO Switzerland are not included since no data was entered.

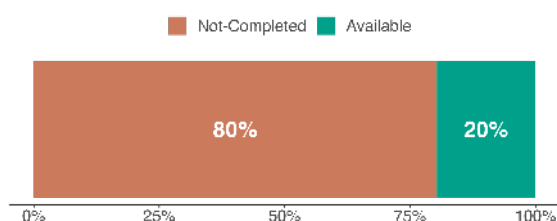


Figure 5: Overview of the share of collected data in **AT11 Burgenland** (source: CERVINO project)

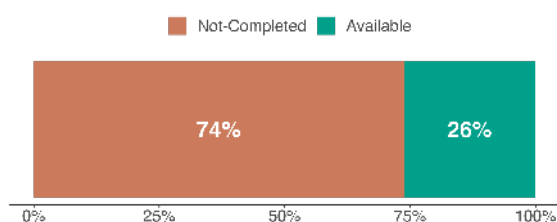


Figure 6: Overview of the share of collected data in **AT12 Niederösterreich** (source: CERVINO project)

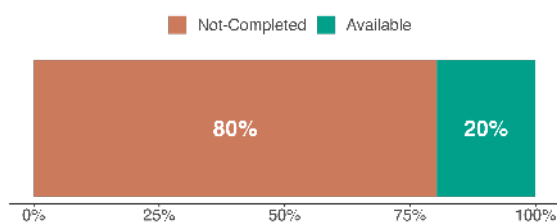


Figure 7: Overview of the share of collected data in **AT13 Wien** (source: CERVINO project)

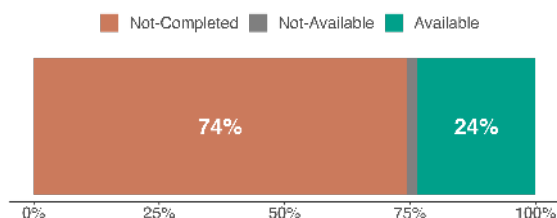


Figure 8: Overview of the share of collected data in **AT21 Kärnten** (source: CERVINO project)

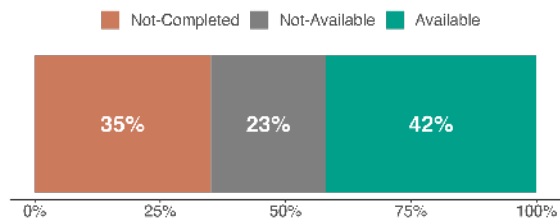


Figure 9: Overview of the share of collected data in **AT22 Steiermark** (source: CERVINO project)

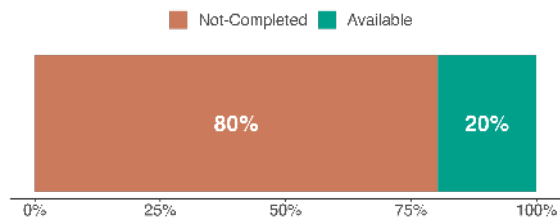


Figure 10: Overview of the share of collected data in **AT31 Oberösterreich** (source: CERVINO project)

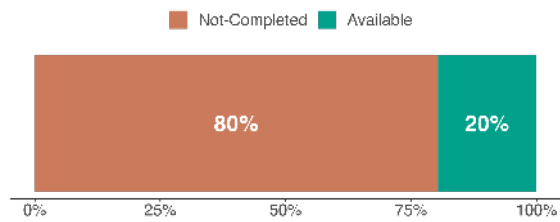


Figure 11: Overview of the share of collected data in **AT32 Salzburg** (source: CERVINO project)

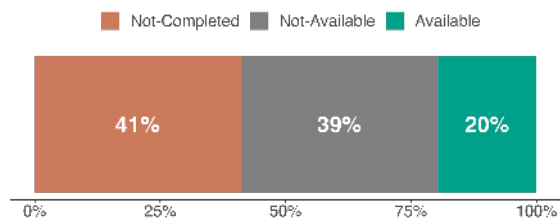


Figure 12: Overview of the share of collected data in **AT33 Tirol** (source: CERVINO project)

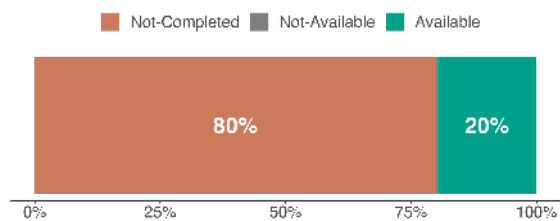


Figure 13: Overview of the share of collected data in **AT34 Vorarlberg** (source: CERVINO project)

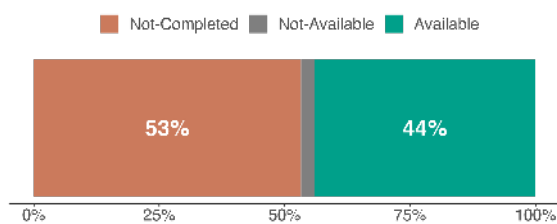


Figure 14: Overview of the share of collected data in **CHO Switzerland** (source: CERVINO project)

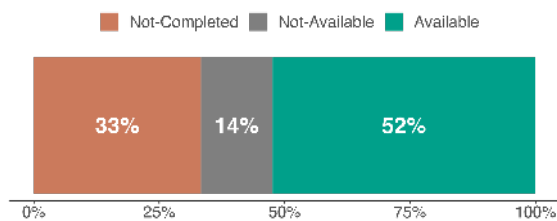


Figure 15: Overview of the share of collected data in **DE1 Baden-Württemberg** (source: CERVINO project)

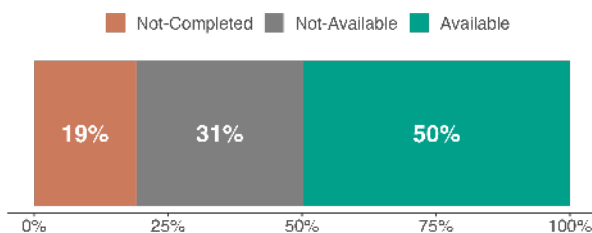


Figure 16: Overview of the share of collected data in **DE2 Bayern** (source: CERVINO project)

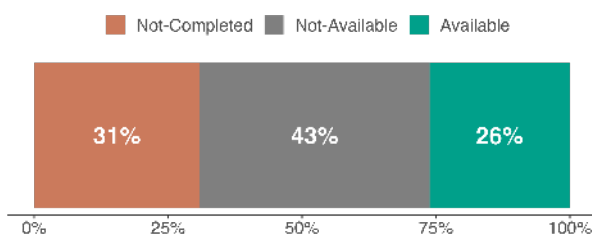


Figure 17: Overview of the share of collected data in **FR43 Franche-Comté** (source: CERVINO project)

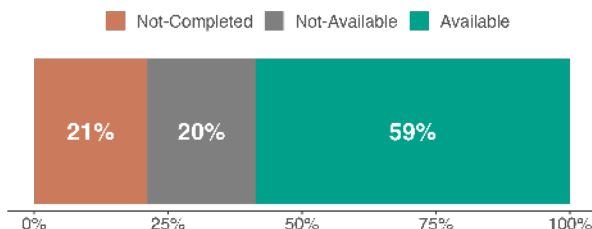


Figure 18: Overview of the share of collected data in **FR71 Auvergne-Rhône-Alpes** (source: CERVINO project)

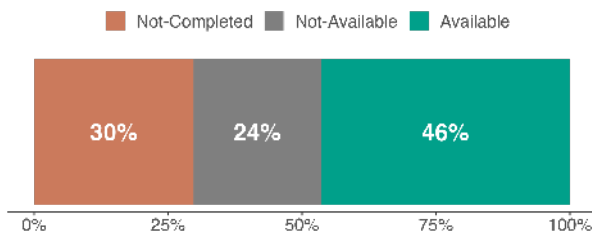


Figure 19: Overview of the share of collected data in **FR82 Provence-Alpes-Côte d'Azur** (source: CERVINO project)

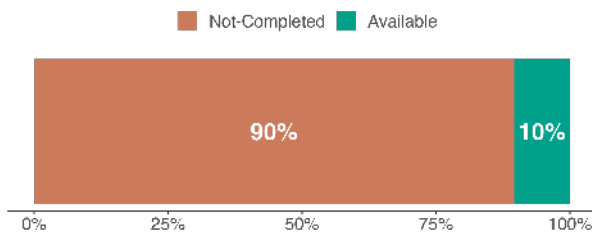


Figure 20: Overview of the share of collected data in **FRF1 Grand Est** (source: CERVINO project)

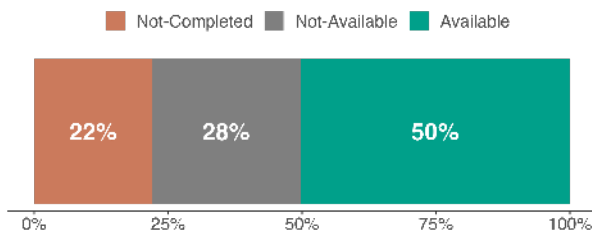


Figure 21: Overview of the share of collected data in **ITC1 Piemonte** (source: CERVINO project)

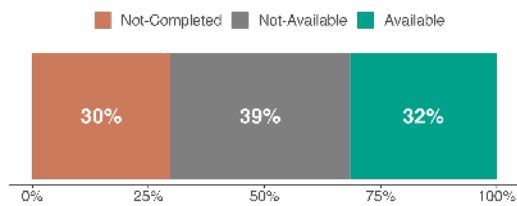


Figure 22: Overview of the share of collected data in **ITC2 Valle d'Aosta** (source: CERVINO project)

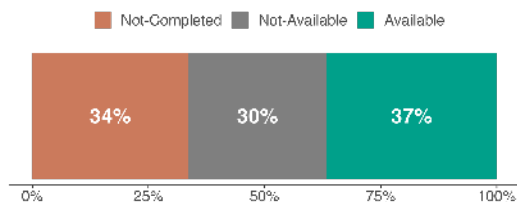


Figure 23: Overview of the share of collected data in **ITC3 Liguria** (source: CERVINO project)

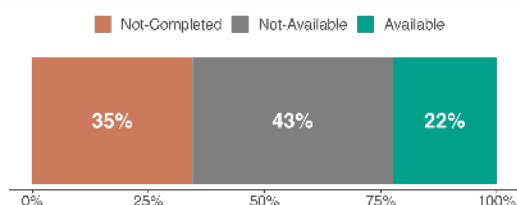


Figure 24: Overview of the share of collected data in ITC4 Lombardia (source: CERVINO project)

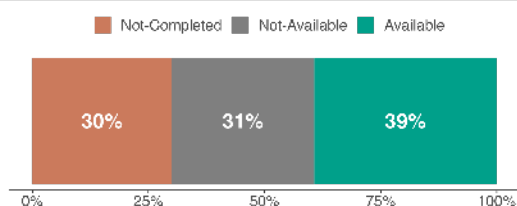


Figure 25: Overview of the share of collected data in ITH1 Provincia Autonoma di Bolzano (source: CERVINO project)

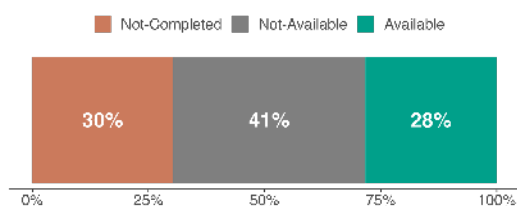


Figure 26: Overview of the share of collected data in ITH2 Provincia Autonoma di Trento (source: CERVINO project)

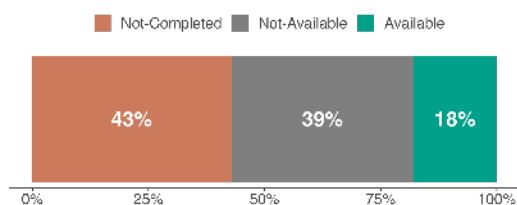


Figure 27: Overview of the share of collected data in ITH4 Friuli Venezia Giulia (source: CERVINO project)

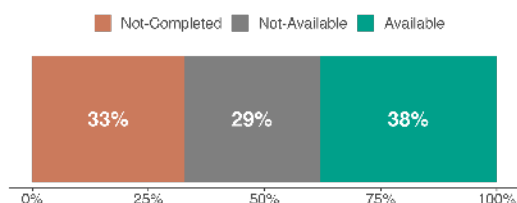


Figure 28: Overview of the share of collected data in SI Slovenia (source: CERVINO project)

With regards to the **availability for different groups of data**⁶, the shares also varied significantly (from a maximum of 54% data indicators fulfilled to only 11%). The highest availability of data was obtained

⁶ Data categorization defined in D1.1.1 “Reshaping, upgrading, and improving the existing Energy Survey structure based on the lessons learned”.

for the categories of *Energy balance*, *Gross electricity production*, *Final energy* and *Gross final energy consumption*. Data within these groups are generally well documented and standardised, thus allowing good access across various territories. On the other hand, much lower levels of availability was obtained for data in groups *Gross energy production for H&C* (an overview of primary source used for heating and cooling) and *Energy transition* (indicating regional trends related to the transition of the energy sector).

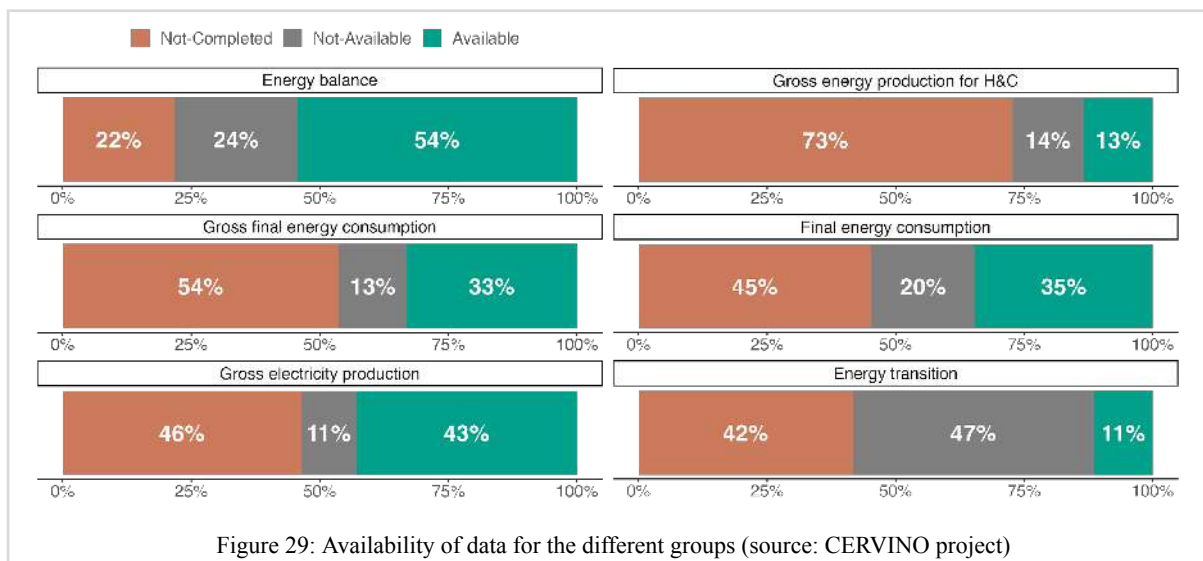
These two groups of data are focused on less covered areas that go beyond the conventional energy statistics. Several factors limit the capacity to collect this specific data and, therefore, a certain level of restricted access was foreseen at the onset of the survey. The former group of data (heating and cooling) includes, for example, the actual annual energy consumption by individual sources (categorised further between various types of fossil fuels and RES) as well as the installed capacity for heat pumps and solar thermal. These data indicators face inherent barriers related to systematic monitoring for several reasons:

- It is not yet possible to accurately monitor the end-use of specific types of energy sources, such as woody biomass.. Within the Alpine regions there exists several citizens with access to forests (farmers, other private owners or otherwise) for which no pertinent data is collected.
- Final use of oil (heating oil) is only monitored on the macro level which is subject to seasonal variability (no data is collected on unutilized reserves in storage).
- Non-renewable waste is often burned in thermal power plants, some of which also feature cogeneration units. Moreover, several thermal power plants operate as major or complementary sources to district heating systems that often feature other energy carriers (heating oil, natural gas). Without comprehensive analysis of the operations of individual energy sites (yearly reports), it is not possible to derive accurate data about the share of energy supplied from either category.
- Heating produced from solar thermal is generally not monitored. For most surveyed territories , very limited data about installed capacity of solar thermal is available (several solar cadaster are more than 10 years old).
- In several surveyed territories, no reliable access to installed capacity of heat pumps is easily available.
- Even considering the simplified assumption that all heat produced from heat pumps is renewable (disregarding the factual energy mix of local grids at any given time), the actual production/supply is highly dependent on dynamic variables (e.g. COP) and seasonal variability. Only very rough extrapolations are possible for the majority of surveyed territories.

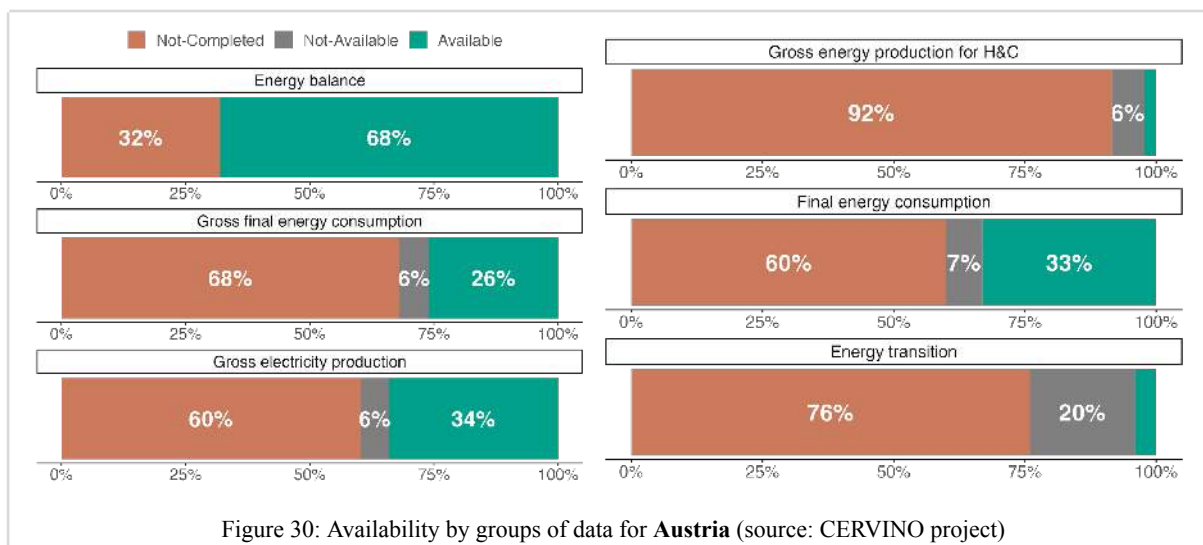
The list above is non-exhaustive as several other barriers related to heating (and cooling) persist.

Moreover, in relation to the second group of data (Energy transition) whereby information on hydrogen production, energy communities and electric mobility was collected, an adequate potential access is only ensured for the latter category (related to mobility). In the areas of both hydrogen production and energy communities, the available data is scarce and mostly requires in-depth analysis of a high number of different projects (from pilot-demonstrations to fully scaled) at different levels of development.

The generalised overview of availability relative to different groups of data is indicated in Figure 29.



The availability of data was also substantially diverse on the national level of surveyed territories. From the regions actively engaged in the Energy Survey, the highest overall availability was documented for regions in Germany, France, Slovenia and Italy. The availability by different groups of data in the participating countries is presented in Figures 30 – 35.



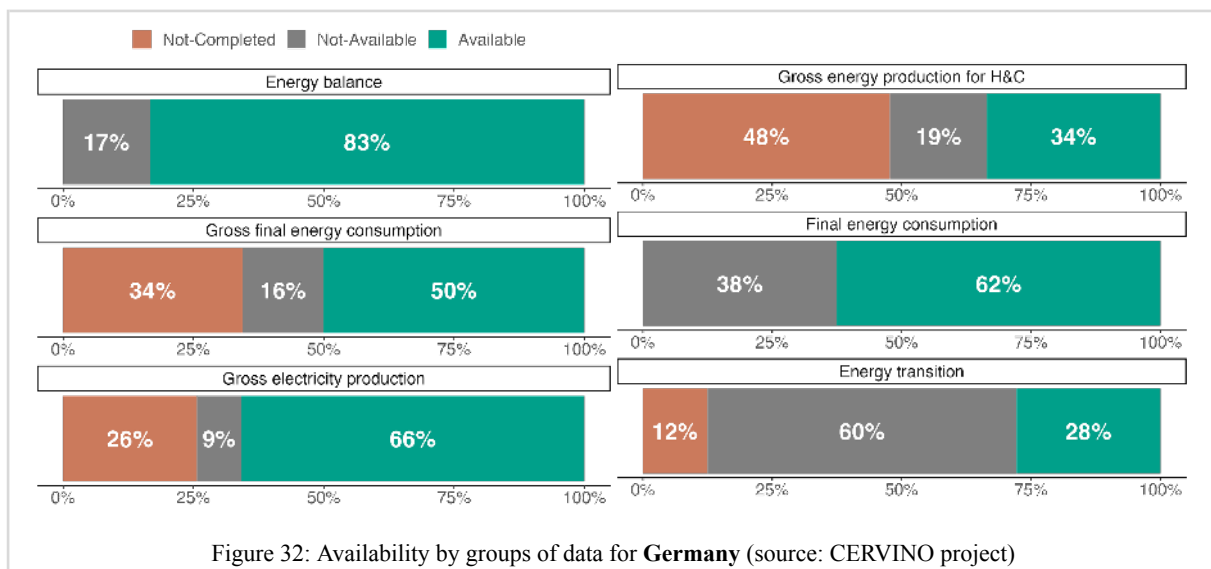
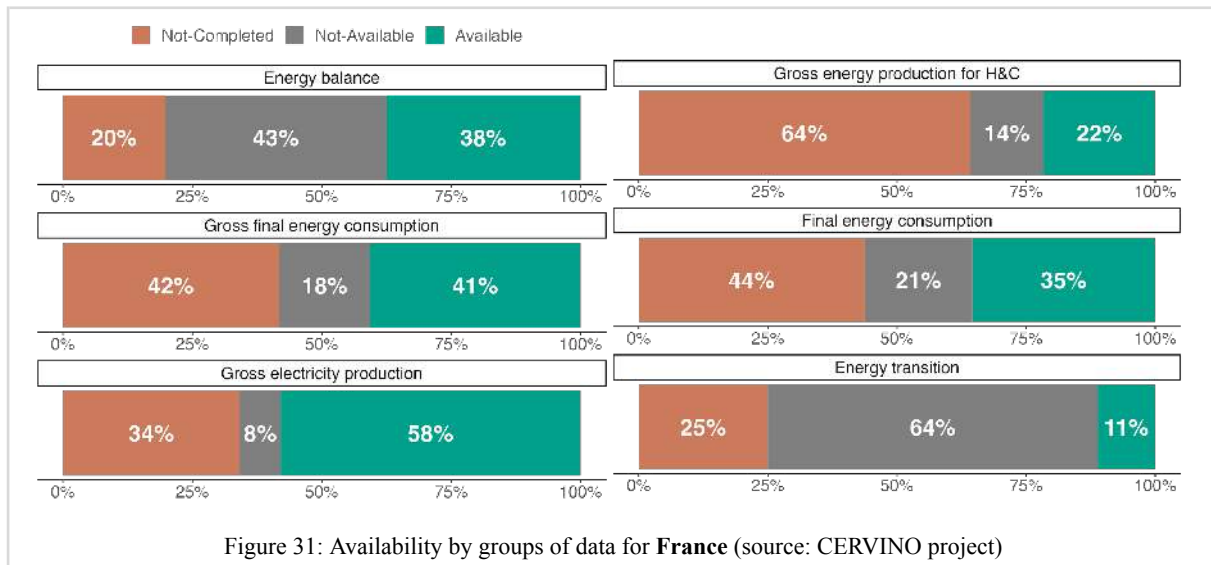




Figure 33: Availability by groups of data for **Italy** (source: CERVINO project)

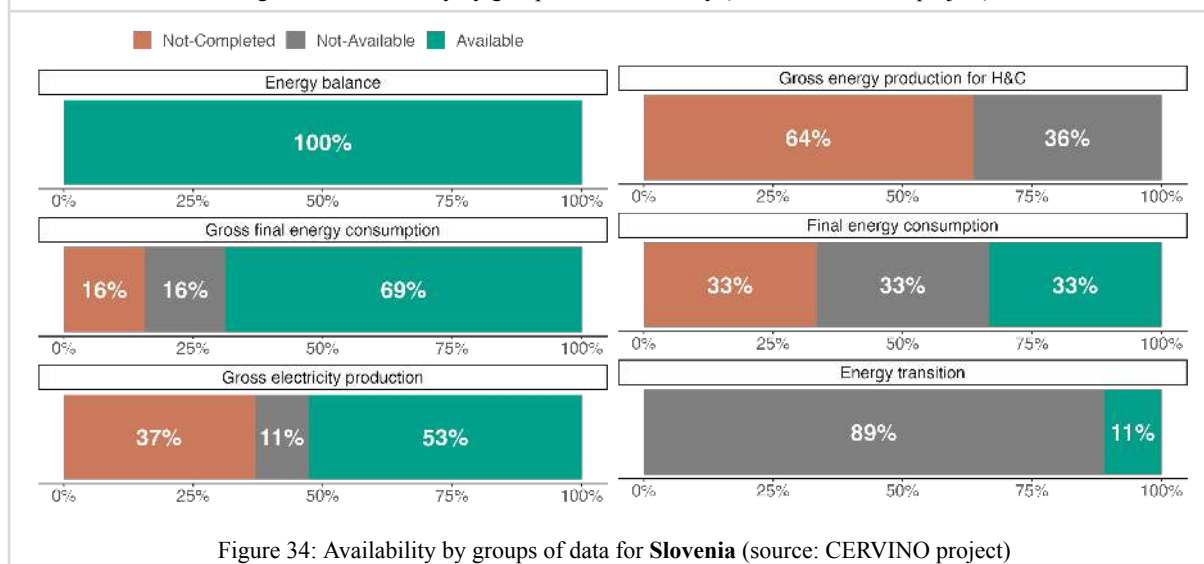
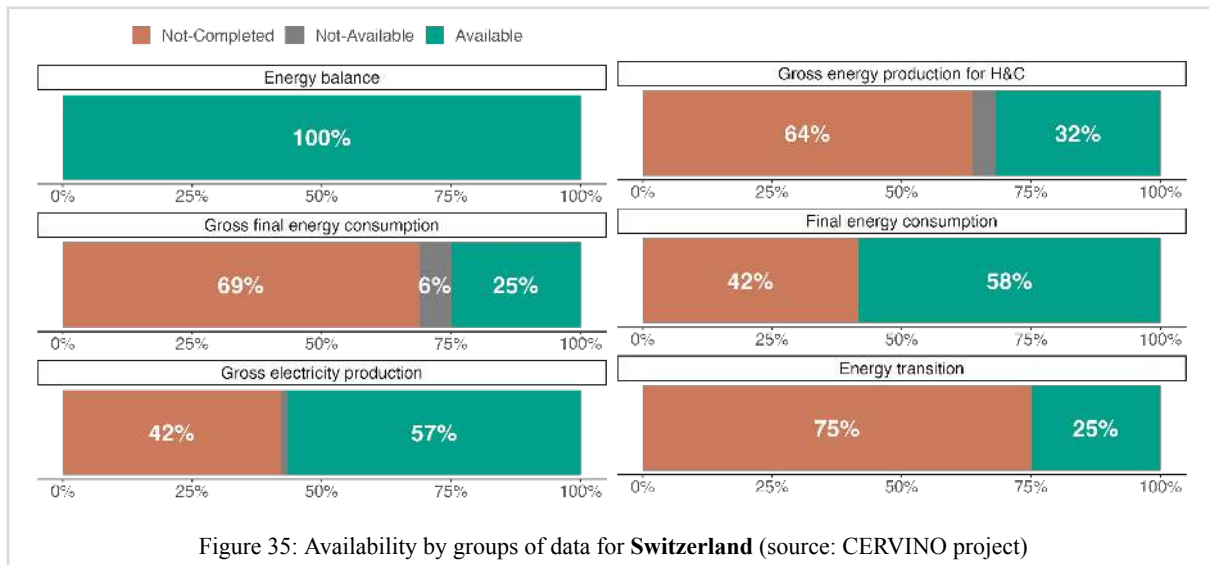


Figure 34: Availability by groups of data for **Slovenia** (source: CERVINO project)



The overview of data availability on the levels of regions successfully engaged in the Energy Survey is available in the Annex.

4 | Partners' feedback on regional cooperation

The data collection process for the EUSALP Energy Survey 2023 was intensive and demanded significant effort from the CERVINO partners. The deficiencies of existing data management services - including a lack of capacity on the level of personnel - on the regional level did not allow the full utilisation of CERVINO data platform functionalities and potential. Significant challenges and barriers were identified already at the inception stage of the project and certain steps were more challenging than expected (e.g. initiating effective communication channels with the Alpine regions). Frequently, the process demanded communication with several organisations and their representatives as potential contributors of data, which however did not lead to active engagement and data acquisition. Considerable data inputs have been done through desk research and manual inputs from the side of CERVINO consortium partners.

To provide a better understanding of the data collection process from the perspective of the regions' willingness and motivation, CERVINO partners were asked the following questions:

- *What was the level of responsiveness from the regions?*
- *How many times did you need to communicate with regions to establish a cooperation?*
- *What was the level of interest and motivation from the regions that were responsive?*
- *What could be considered the primary obstacles and constraints encountered by the regions when contacted for the purpose of EUSALP Energy survey?*

The purpose of the partners' feedback survey was to establish a deeper understanding of what it takes to be able to put in place a broader cross-regional data collection system, considering the different levels of regional motivation and their understanding of the necessity of such a tool. With our focus on building a solid foundation for the coming years and periodical iterations of EUSALP Energy Survey in the future, this provided us with better understanding of where we stand today and the effort that will be needed in the future to establish a solid stream of communication as well as stronger commitment from the regions. The answers are summarised below.

4.1 Italy

Responsible partners: EURAC and IRE

The responsiveness of Italian regions varied significantly from one region to another. Apart from the project observers, who promptly provided the required data, some regions responded positively and swiftly. However, for some other regions, the designated contact person(s) had to be contacted multiple times or, alternatively, a different contact person altogether had to be found. Ultimately, only one Italian region did not provide any data for the Energy Survey.

Establishing a solid stream of communication in the initial phase varied from region to region: with the more responsive ones, the initial contact was successful (although subsequent communication was needed to support them in completing the survey), while for others, the reference person(s) had to be contacted multiple times. The responsive regions demonstrated a considerable level of interest in Italy. One primary concern raised was the importance of utilising the same data sources among

regions within the same country to maintain consistency in values. Some regions suggested exploring the possibility of directly collecting data from national energy authorities. This approach would not only ensure consistency among regional data but also eliminate the need to periodically request regions to fill out surveys every two years.

4.2 Germany

Responsible partner: EWO

The responsiveness of Baden-Württemberg was exceptionally high. Upon reaching out to the State Ministry of Environment, a commitment to provide the necessary data was promptly received. The ministry efficiently collected all the data and inserted it into the database. However, in Bavaria, the level of responsiveness was much lower. Initially, the individual within the state Ministry of Economic Affairs who was responsible for providing the required raw data, had to be located. Due to capacity limitations at the Ministry, it was not possible to directly input the data into the database, so additional effort was required from responsible partners. However, it's important to highlight the invaluable support received from Bayern Innovativ, which efficiently provided the mobility data.

In Baden-Württemberg, positive feedback was received on collaboration right from the initial contact enquiry. However, in Bavaria, it required several attempts before receiving a response from the ministry, indicating a lower level of motivation to participate in the survey. Fortunately, Bayern Innovativ (mobility cluster) promptly supported our request upon the first inquiry.

The actual interest and motivation for Baden-Württemberg can be described as moderate, although there was an immediate willingness to support the survey. Bavaria showed less interest since there are already similar platforms of the state and regional level, for example, the Energy Atlas of Bavaria⁷ and the Charging Atlas of Bavaria⁸. The need to compare data across the Alpine regions was not yet recognised by the German regions.

4.3 France

Responsible partner: AURA-EE

The responsiveness was satisfactory for three out of the four regions, as AURA-EE was able to personally reach out to individuals responsible for energy data in these regions and request their participation in the survey. However, for the fourth region (Grand Est), very little feedback was received from the initial contacts. Furthermore, another challenge arose from the regional energy data produced by different regions, as the data did not always adhere to uniform methodologies, resulting in variations in the indicators produced. Resolving this issue required an additional effort from CERVINO partners.

Initiating communication can be regarded as somewhat satisfactory, although it necessitated several reminders to elicit enough interest from the regions for their participation. Ultimately, the responsive regions expressed interest in the project's outcomes and the forthcoming platform, as well as interest in the possibility of comparing data between regions and utilising aggregated data.

⁷ Energy Atlas of Bavaria ([LINK](#))

⁸ Charging Atlas of Bavaria ([LINK](#))

4.4 Slovenia

Responsible partner: KSENA

The data collection process in Slovenia was distinctive due to the absence of regional administrations and the country's small size. Consequently, energy data in Slovenia was gathered at a national level. Three national institutions were contacted—the Slovenian national agency Energy Agency, Ministry for Infrastructure, and The Statistical Office of the Republic of Slovenia—to determine the availability and sources of energy data. This effort provided us with a clearer picture of the energy indicators accessible for the EUSALP energy survey. KSENA took charge of the data collection process, deeming it more manageable to handle internally using the data sources identified from the three national institutions. However, certain energy indicators proved inaccessible due to either their absence or lack of collection at a national level.

Even though the mentioned national institutions were not directly engaged in filling out the survey, their readiness to provide us with data sources demonstrated their interest in the project right from the start. This was further evident as they requested to be regularly updated on the progress of the project and its final outcomes.

4.5 Austria

Responsible partner: KSENA

The responsiveness from Austrian regions was notably low. All Austrian regions were contacted through the existing contacts from the previous iterations of the EU Energy survey, resources found online, or through other identified contacts. In general, initial feedback was more promising than the actual outcome, as most of the Austrian regions did not fill out the survey in the end. Only a few regions provided accurate values, while some were completely unresponsive. A share of the regions were willing to participate, but due to time (personnel capacity) constraints left the surveys incomplete. After engaging in persistent and months-long communication, it was determined that the most effective course of action would be for CERVINO partners to independently gather and finalise the data from the available national energy databases.

Establishing initial contact with Austrian regions proved to be particularly challenging. It required reaching out to numerous individuals for each region to pinpoint the suitable contact person, and in some instances, this process took several months of persistent effort. In the end, only a handful of regions demonstrated willingness to participate, but even with some of the more responsive regions, the actual motivation and interest could not be considered particularly high. This might be attributed to time constraints and possibly to the already well-established regional data collection systems that are in-place in Austria. As a result, our contact persons may not have recognized the additional value that the CERVINO Alpine energy data platform provides.

4.6 Switzerland

Responsible partner: AURA-EE

In the case of Switzerland, the initial endeavour to identify the appropriate contact person proved fruitless, and several months passed before the right individual was found through EUSALP Swiss Presidency. The energy data was compiled for the country as a whole.

4.7 Liechtenstein

Responsible partner: EURAC

The communication with Lichtenstein was fruitless as it was not possible to identify a suitable contact person willing to participate in the survey.

4.8 The underlying challenges of establishing effective cooperation with the regions

To understand the underlying challenges of establishing effective communication and cooperation with the regions, the final question was posed at the conclusion of the data collection process: *what could be considered the primary obstacles and constraints encountered by the regions when contacted for the purpose of the EUSALP Energy survey?* The answers could be summarised as follows:

- **Time constraints** emerged as the primary challenge, given that the survey requires a significant amount of time, effort, and some research to be completed accurately. The limited capacity of regions to invest personnel resources and time outside of their mandatory scope of work responsibilities puts a limit on the degree to which any contact point can engage and contribute to the data collection process.
- Time constraints combined with the **non-mandatory nature of the task**, relying solely on voluntary participation and willingness, oftentimes was a recipe for poor outcome. In instances where cooperation was deemed satisfactory in the end, it often necessitated additional efforts from our end to nurture and solidify the cooperation after the initial contact was established.
- The third challenge revolved around the **lack of recognition of the added value of the Alpine energy data platform**. Many regions failed to grasp the benefits of having a standardised and structured tool for data collection and visualisation. This was partly due to the presence of already well-established regional data collection systems within their countries. In the future, it's crucial to emphasise the advantages of being able to compare data across all Alpine regions and aggregate data effectively, which is the main purpose of the Alpine energy data platform.

Other important findings:

The complexity of energy statistics poses significant challenges in ensuring quality, reliability, comparability, and geographical representation. Energy data collection spans diverse regions and involves various territorial statistical units, leading to significant differences in how data is acquired, monitored, and documented. This non-uniformity makes it difficult for individuals without technical

expertise to contribute relevant information to the platform without conducting prior research and education. For instance, determining the relevance of specific data points and ensuring they accurately represent the values investigated by the Energy Survey requires considerable effort. This situation further compounds capacity constraints, as conducting the survey effectively demands a substantial investment of time, effort, and research to ensure accuracy.

Non-uniformity of territorial units and data monitoring (statistics) systems is likely one of the most evident shortcomings of the current data management chain. Although closely following NUTS 2 classification (most pertinent division of territories for the purpose of the Energy Survey), the EUSALP regions do not comply with any standard approach that would be directly comparable or interchangeable. Moreover, even if the Energy Survey would focus on a standard classification such as NUTS 2, in some cases, energy data is not collected on this level (e.g. Slovenia). The statistical framework of the EU and the EUSALP should comprehensively and homogeneously build on the agreed standard classifications and ensure the collection (and access to) data for these statistical levels (from Local administrative units LAU to NUTS).

Positive engagement: The regions that responded tended to be those with a higher initial interest and motivation in the project. Their feedback often reflected a recognition of the value provided by the survey and the tool, highlighting the importance of targeted engagement and the potential benefits of the project's outcomes. Emphasising and promoting the benefits of the Energy Survey approach, within and beyond EUSALP, should be considered a priority.

Perceived value of data collection: The feedback underscored the importance of periodic and systematic data collection as a foundation for informed decision-making in energy policy and regional planning. Regions recognizing this value are more likely to invest time and resources into participating in future surveys, suggesting a need for continued emphasis on the benefits of data collection and analysis.

Applicability of the CERVINO data platform: Very few regions highlighted any challenges in using the developed tool (e.g. navigational difficulties, data input issues). This indicates that, on the side of the usability, user experience and clarity of the UI, the platform has performed very well and is not to be considered a shortcoming related to unrealized responses from regions.

5 | Regions' feedback on EUSALP Energy Survey 2023

Gaining a comprehensive understanding of the value of the newly developed tool and the significance of periodic data collection within the Alpine macro-region necessitates soliciting feedback directly from the users.

With only 8 collected responses, the feedback may not be fully representative, indicating a lack of regional motivation and willingness to follow up, as suggested by the low response rate. However, the collected responses offer valuable insight, particularly as they were mainly provided by regions that demonstrated higher interest and motivation from the beginning, seeing a value in the efforts of the CERVINO project.

The questions were structured into three sets, each addressing different aspects of the tool. The responses are depicted in a graph format. In certain cases, regions provided additional comments, which are summarised at the end of each set of questions.

5.1 Functionality of the energy data collection tool

The tool was intuitive and user friendly. (1 meaning not user friendly, 5 very user friendly)

8 responses

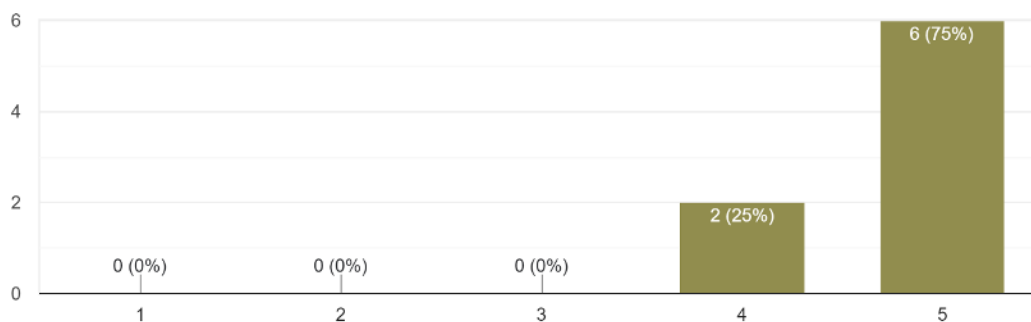


Figure 29: Results of the regional feedback survey – tool usability (source: CERVINO project)

Definitions of the terms and data required by the survey were clear.

8 responses

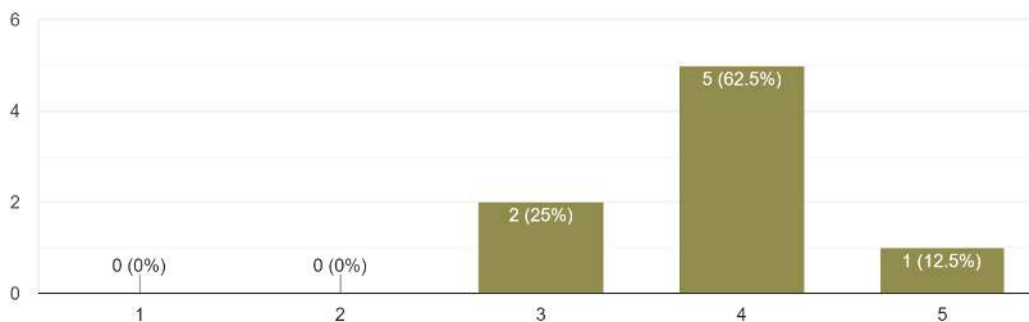


Figure 30: Results of the regional feedback survey – survey structure and scope (source: CERVINO project)

The tool is useful for the future iterations of EUSALP Energy Survey.

8 responses

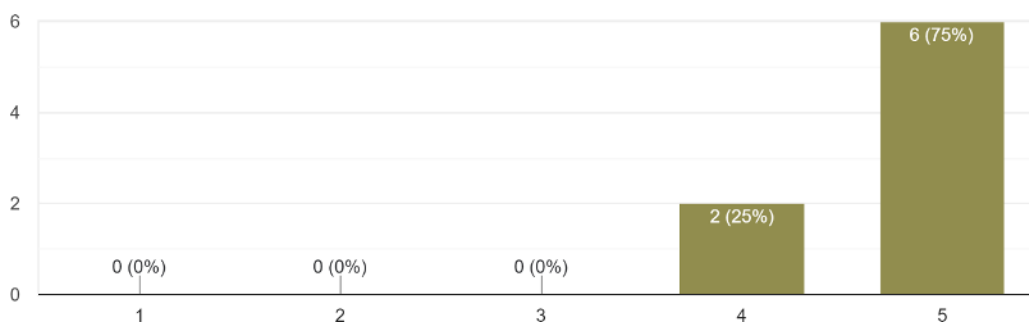


Figure 31: Results of the regional feedback survey – tool potential for future iterations (source: CERVINO project)

Additional comments provided by the regions:

- It's suggested that all publicly available data should already be uploaded in the tool, allowing users to only check the pre-entered data. This would save time and enhance the standardisation and quality of the data.
- There was confusion regarding the inclusion of both gross final energy consumption and final energy consumption. This can be attributed to the aforementioned complexity of energy statistics as well as non-uniformity in how data is documented in different countries, making comparability harder in some cases.
- The tool serves as a valuable instrument for comparing data across different regions effectively. However, there's a need for clearer definition of the data to be included in certain

items, especially concerning the distinction between direct consumption and consumption from transformation (e.g., heat from district heating).

5.2 Usefulness of the EUSALP Energy survey

We were able to provide most of the energy data required by the survey for our region.

8 responses

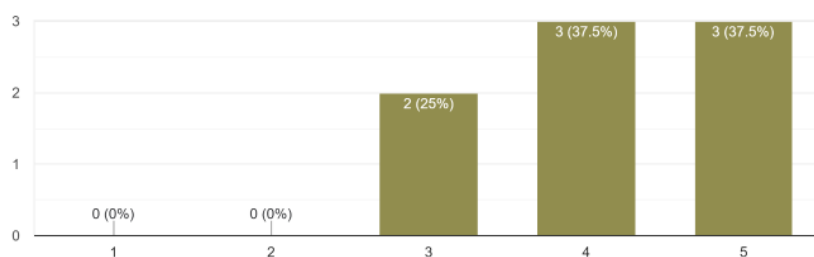


Figure 32: Results of the regional feedback survey – capacity for the input of required data (source: CERVINO project)

I find regular continuation of the EUSALP Energy Survey in the future useful.

8 responses

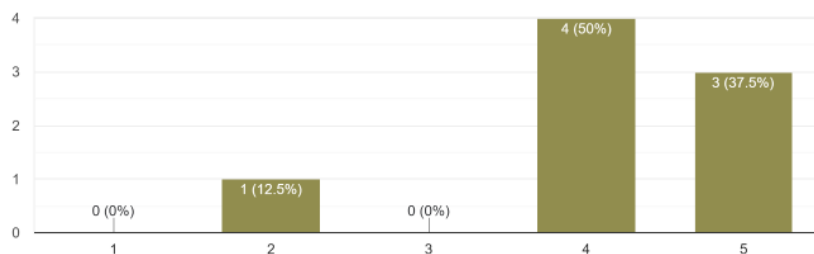


Figure 33: Results of the regional feedback survey – relevance of the EUSALP Energy Survey (source: CERVINO project)

The third question in this section necessitated input from the regions, answering the question **»What kind of regional energy indicators (or combination of indicators) would you find useful visualised on the CERVINO Alpine Energy Data Platform once published?«**

The regions provided the following suggestions:

- Energy autonomy indicators
- Per capita data for consumption / production per activity sector
- Energy balance
- Final energy consumption from RES
- Electricity production from RES
- Energy transition

- Gross electricity production by source
- Gross energy production for H&C

Additional comments provided by the regions

- It could be interesting to investigate the energy flows between EUSALP regions and with other regions, both inbound and outbound.

5.3 Communication and support

It was well communicated what was needed from me in the EUSALP Energy Survey.

8 responses

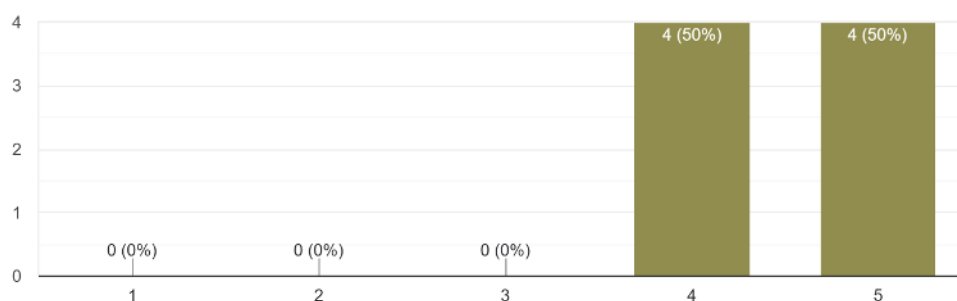


Figure 34: Results of the regional feedback survey – clarity of instruction of the Energy Survey (source: CERVINO project)

It was well communicated why this energy data is being collected and what is the purpose of it.

8 responses

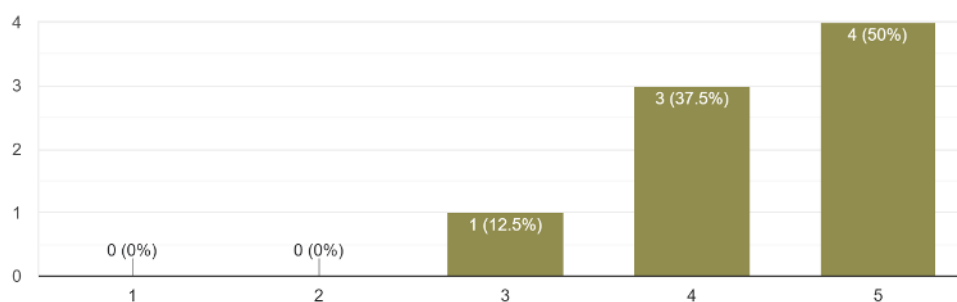


Figure 35: Results of the regional feedback survey – clarity of instructions of the survey 1/2 (source: CERVINO project)

The tool functionalities were presented to me in an understandable manner.

7 responses

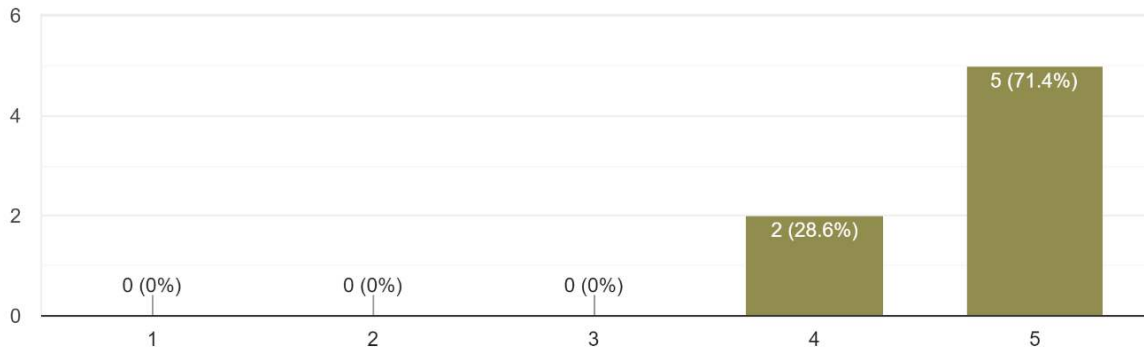


Figure 36: Results of the regional feedback survey – clarity of instructions of the survey 2/2 (source: CERVINO project)

Enough support was given to me in the process of filling out EUSALP Energy Survey.

8 responses

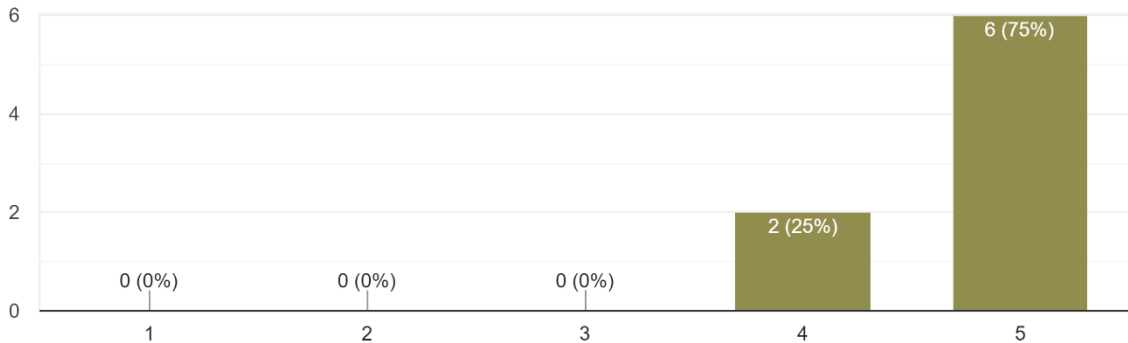


Figure 37: Results of the regional feedback survey – quality of support provided (source: CERVINO project)

Enough time was given to me to fill out the EUSALP Energy Survey.

8 responses

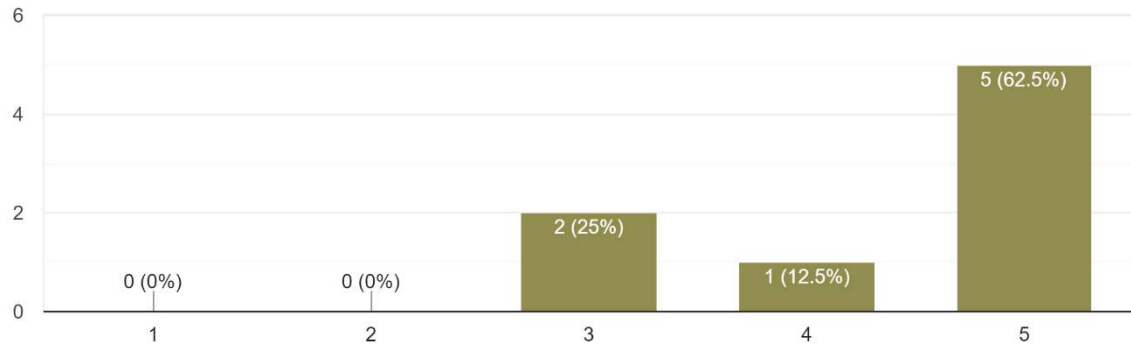


Figure 38: Results of the regional feedback survey – availability of time for the survey (source: CERVINO project)

6 | Conclusion

Generally, there was a wide spectrum of responsiveness among the regions. Some demonstrated high levels of enthusiasm and commitment, actively participating in the data collection process, while others displayed minimal engagement. The variability in responsiveness underscores the importance of understanding regional priorities and constraints to tailor engagement approaches effectively. Additionally, establishing cooperation required persistent and multifaceted communication strategies. In several instances, partners had to engage with multiple organisations and representatives, which often did not yield the expected level of data contribution. This experience pointed to the necessity of developing more targeted and persuasive communication tactics, emphasising the mutual benefits of participation in the survey. Finally, the level of interest and motivation among responsive regions varied, with some regions recognizing the strategic value of the EUSALP Energy Survey in driving their energy transition goals. This feedback suggests that enhancing the perceived value of the survey and illustrating its direct benefits to regional energy strategies could be pivotal in boosting engagement levels.

The CERVINO project encountered several significant hurdles in fostering regional cooperation for the EUSALP Energy Survey 2023. These challenges were multifaceted, but could be addressed within three core pillars that represent some of the main limiting factors of the CERVINO approach:

- **TECHNICAL AND DATA MANAGEMENT**

Many regions faced limitations due to outdated data management systems and insufficient digital infrastructure. This hindered their ability to effectively participate in the survey and leverage the CERVINO data platform's full capabilities. The technical disparity across regions underscored the need for tailored support and capacity-building initiatives.

- **ORGANISATIONAL ASPECTS**

A recurrent issue was the limited availability of personnel dedicated to energy data management within regional administrations. This scarcity often translated into prolonged response times and reduced the efficiency of data collection efforts. Additionally, the heterogeneity in organisational structures across the regions added another layer of complexity to establishing uniform data collection and management practices.

- **COMMUNICATION AND ENGAGEMENT**

Initiating and maintaining effective communication channels with the regions proved to be more challenging than anticipated. Despite multiple attempts, the engagement levels varied significantly, with some regions showing limited interest in providing data or actively participating in the survey process. This variability highlighted the need for more robust and innovative engagement strategies to foster a sense of ownership and commitment among regional stakeholders.

Building on the feedback and experiences from the 2023 survey, several strategies can be adopted to enhance future regional cooperation. This could include providing targeted technical assistance and capacity-building workshops to regions with limited digital infrastructure, which could help mitigate technical barriers and encourage more active participation. Secondly, developing tailored engagement strategies that consider the unique cultural, organisational, and technical landscapes of each region could improve responsiveness and participation levels. Moreover, sharing success stories and clear demonstrations of how the survey contributes to regional energy objectives can enhance the perceived value of participation among regional stakeholders. Finally, fostering long-term

relationships with regional entities through regular updates, workshops, and collaborative projects can cultivate a sense of community and shared purpose.

References

- [1] Adriano Bisello, Silvia Tomasi, Giulia Garegnani, Chiara Scaramuzzino, Amy Segata, Daniele Vettorato, Wolfram Sparber; EUSALP Energy Survey 2017: Report (2017).
- [2] Adriano Bisello, Antonio Novelli, Valentina D'Alonzo, Giulia Garegnani, Martina Boschiero; EUSALP Energy Survey update (2019).
- [3] Valentina D'Alonzo, Claudio Zandonella Callegher, Aaron Estrada, Isabella Siclari, Samuele Zilio, Report D1.1.1: Reshaping, upgrading, and improving the existing Energy Survey structure based on the lessons learned (2023).
- [4] Energy Atlas of Bavaria – online portal on the energy transition of Bavaria, State government of Bavaria (2023)
- [5] Charging Atlas of Bavaria - Bayerische Gesellschaft für Innovation und Wissenstransfer mbH (2023)

Annex

AVAILABILITY OF INDICATORS BY DATA GROUPS ON REGIONAL LEVEL

Figure A1: Availability by groups of data for **AT11-Burgenland** (low data availability) – *page 35*

Figure A2: Availability by groups of data for **AT12-Niederösterreich** (low data availability) – *page 36*

Figure A3: Availability by groups of data for **AT13-Wien** (low data availability) – *page 37*

Figure A4: Availability by groups of data for **AT21-Kärnten** (low data availability) – *page 38*

Figure A5: Availability by groups of data for **AT22-Steiermark** – *page 39*

Figure A6: Availability by groups of data for **AT31-Oberösterreich** (low data availability) – *page 40*

Figure A7: Availability by groups of data for **AT32-Salzburg** (low data availability) – *page 41*

Figure A8: Availability by groups of data for **AT33-Tirol** – *page 42*

Figure A9: Availability by groups of data for **AT34-Vorarlberg** (low data availability) – *page 43*

Figure A10: Availability by groups of data for **CH0-Switzerland** – *page 44*

Figure A11: Availability by groups of data for **DE1-Baden-Württemberg** – *page 45*

Figure A12: Availability by groups of data for **DE2-Bayern** – *page 46*

Figure A13: Availability by groups of data for **FR43-Franche-Comté** – *page 47*

Figure A14: Availability by groups of data for **FR71-Auvergne-Rhône-Alpes** – *page 48*

Figure A15: Availability by groups of data for **FR82-Provence-Alpes-Côte d'Azur** – *page 49*

Figure A16: Availability by groups of data for **FRF1-Grand Est** (low data availability) – *page 50*

Figure A17: Availability by groups of data for **ITC1-Piemonte** – *page 51*

Figure A18: Availability by groups of data for **ITC2-Valle d'Aosta** – *page 52*

Figure A19: Availability by groups of data for **ITC3-Liguria** – *page 53*

Figure A20: Availability by groups of data for **ITC4-Lombardia** – *page 54*

Figure A21: Availability by groups of data for **ITH1-Provincia Autonoma di Bolzano** – *page 55*

Figure A22: Availability by groups of data for **ITH2-Provincia Autonoma di Trento** – *page 56*

Figure A23: Availability by groups of data for **ITH3-Veneto** (no data) – *page 57*

Figure A24: Availability by groups of data for **ITH4-Friuli Venezia Giulia** – *page 58*

Figure A25: Availability by groups of data for **LI-Liechtenstein** (no data) – *page 59*

Figure A26: Availability by groups of data for **SI-Slovenia** – page 60

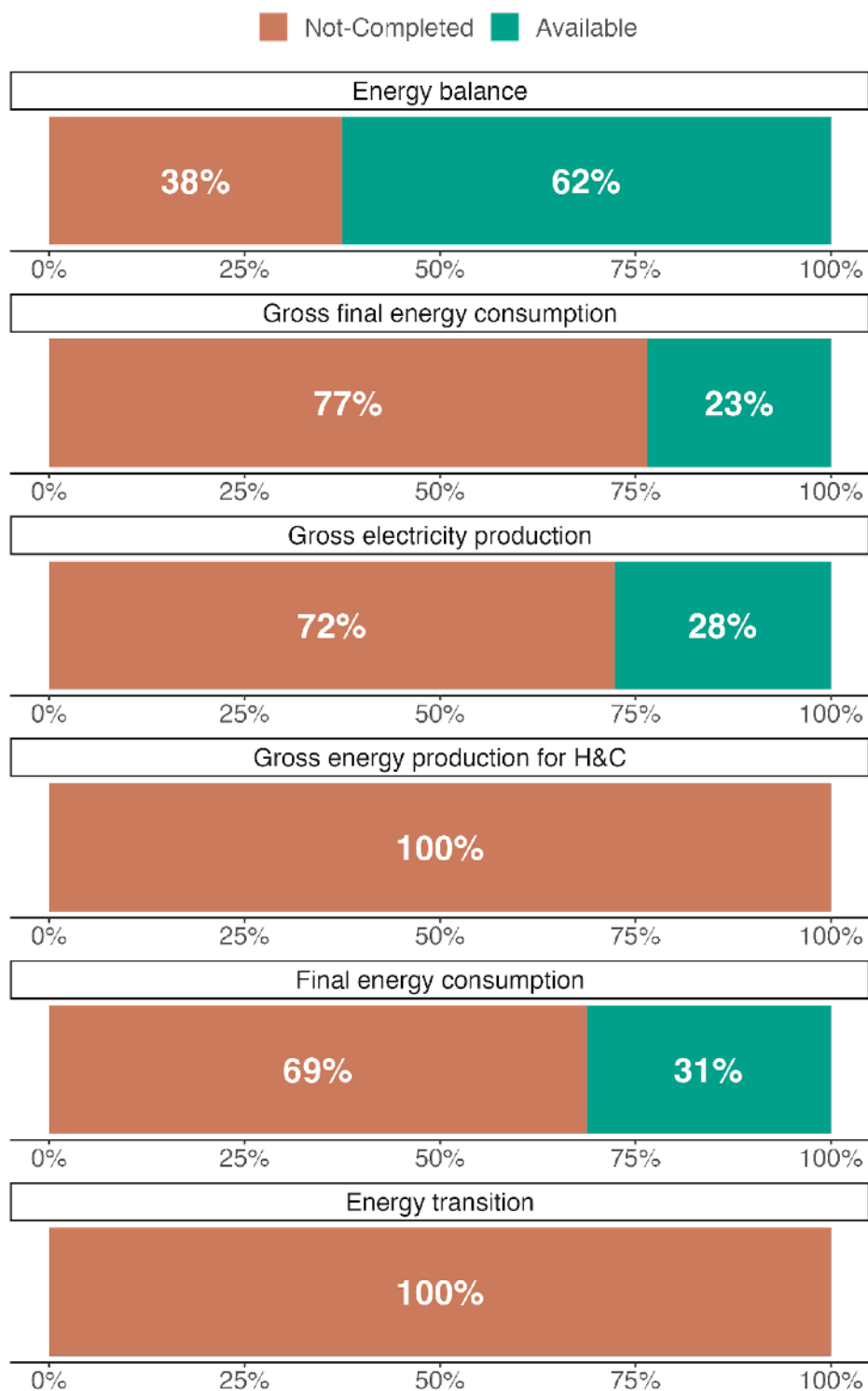


Figure A1: Availability by groups of data for **AT11-Burgenland** (source: CERVINO project)

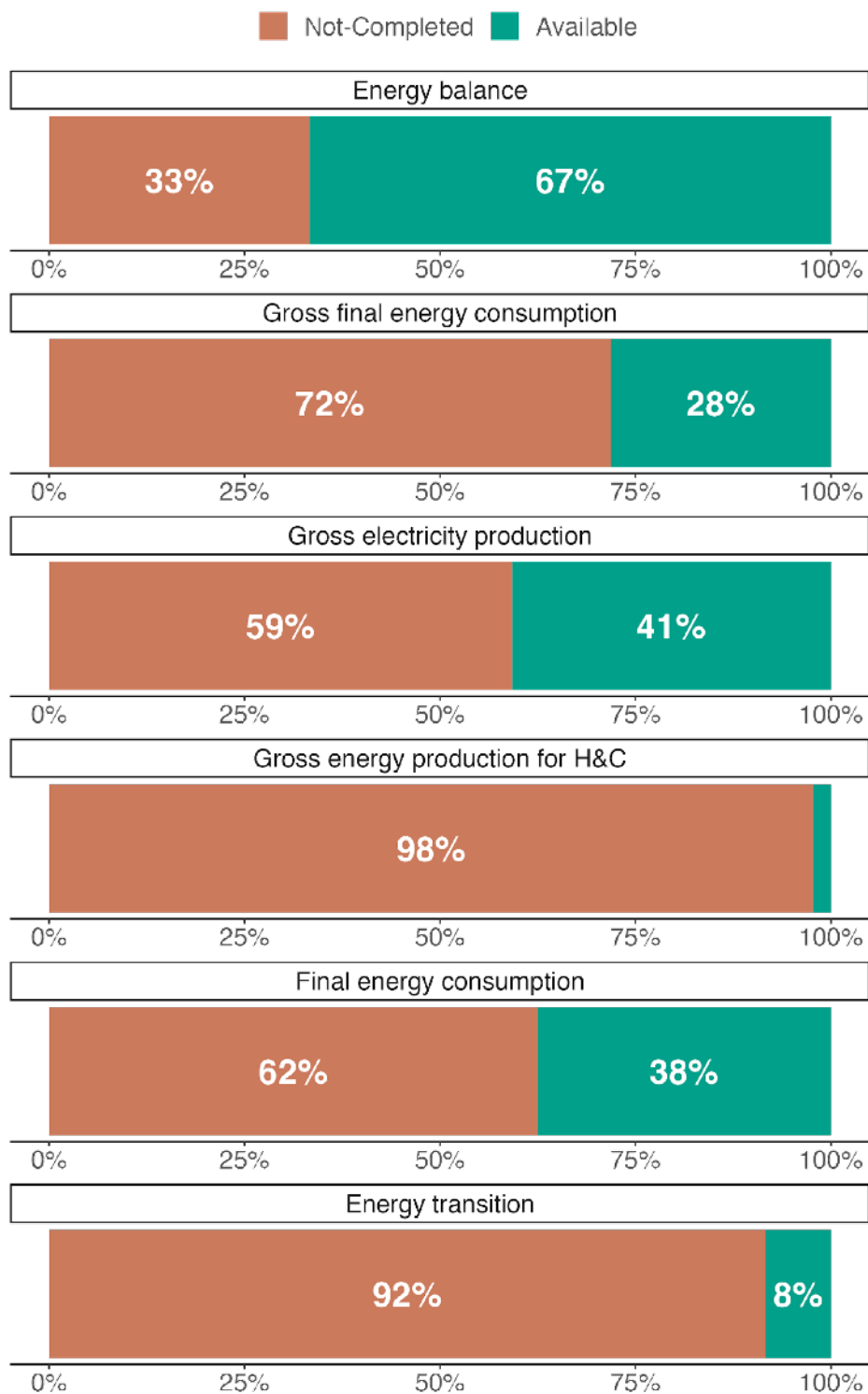


Figure A2: Availability by groups of data for **AT12-Niederösterreich** (source: CERVINO project)

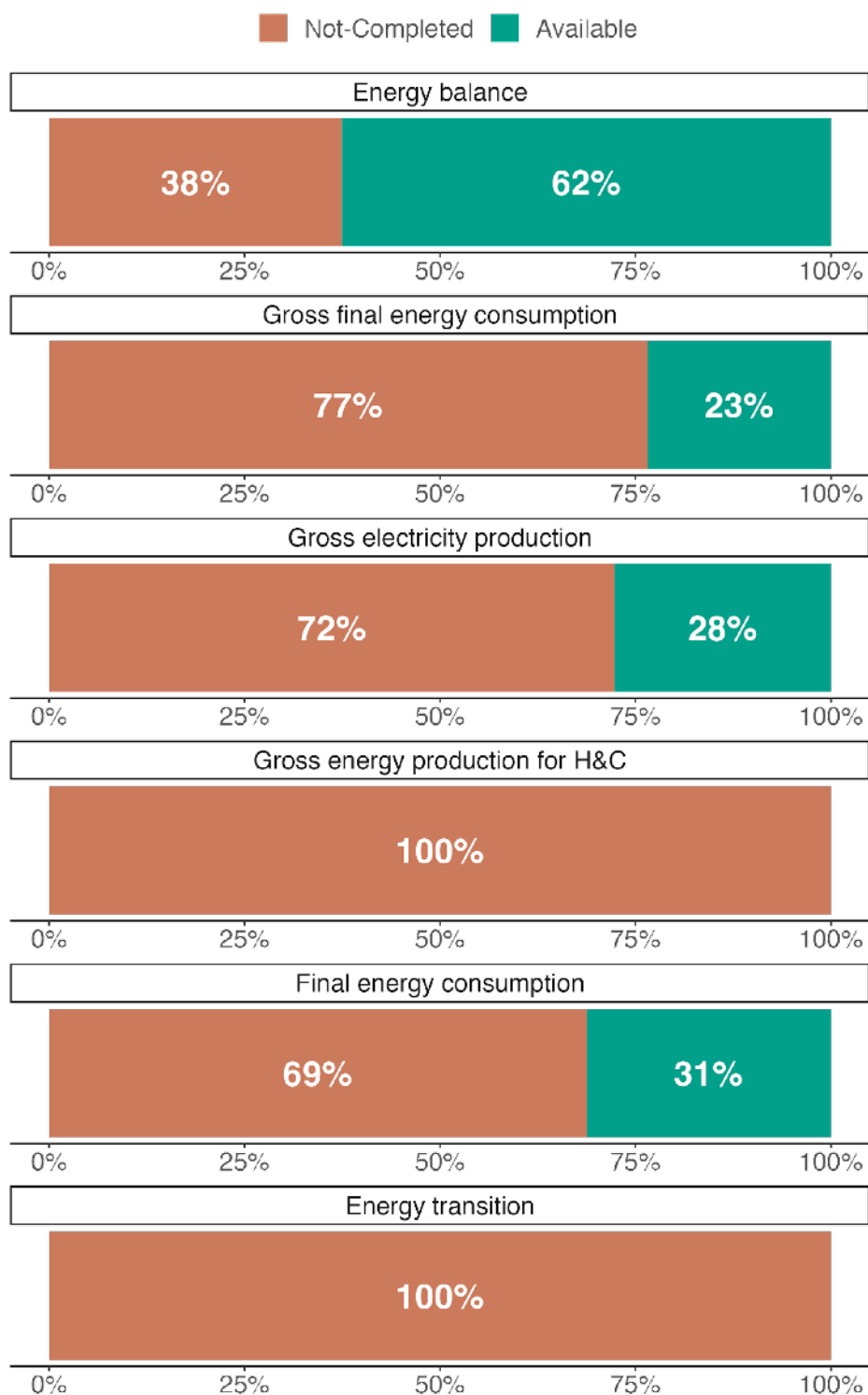


Figure A3: Availability by groups of data for **AT13-Wien** (source: CERVINO project)

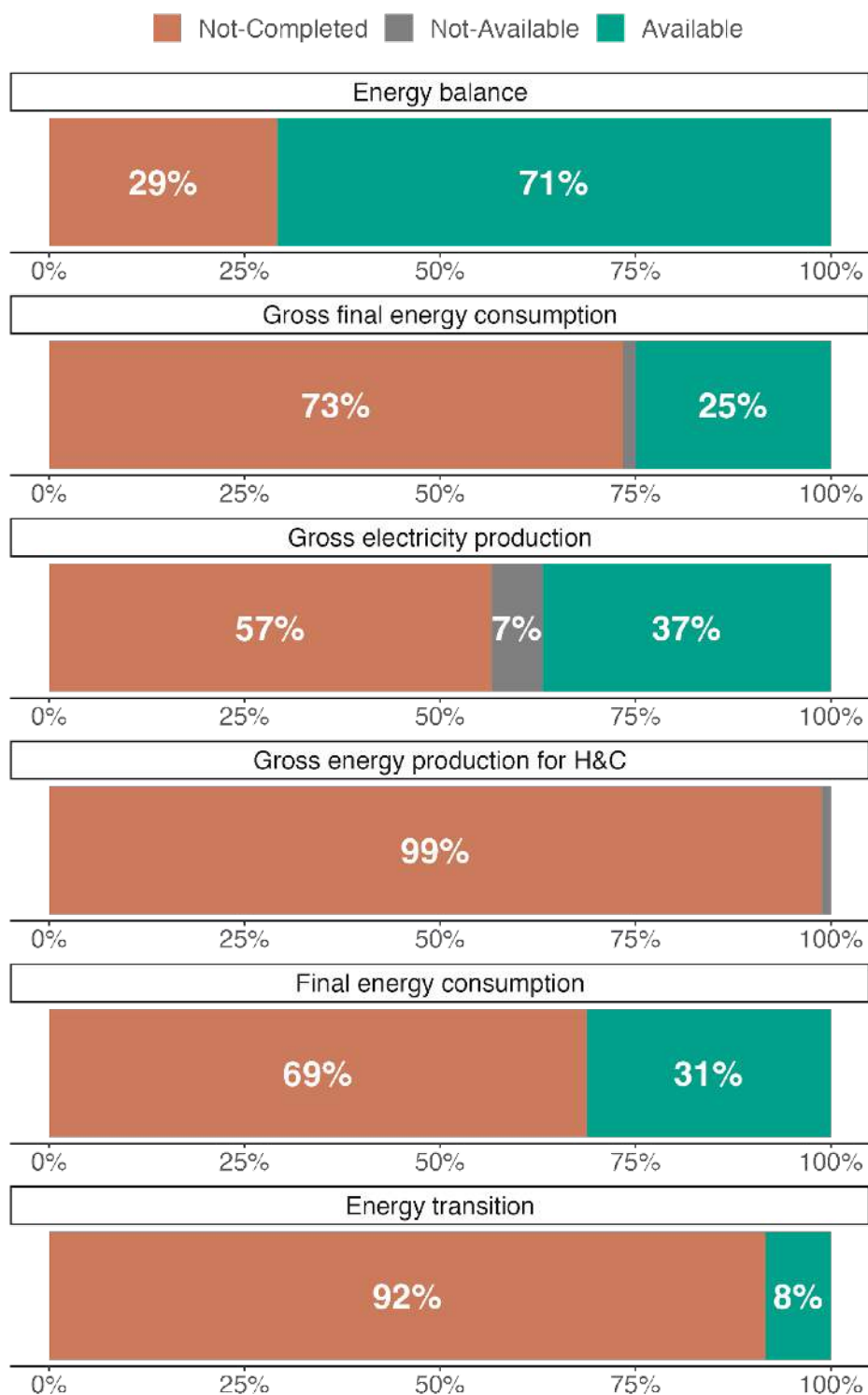


Figure A4: Availability by groups of data for AT21-Kärnten (source: CERVINO project)

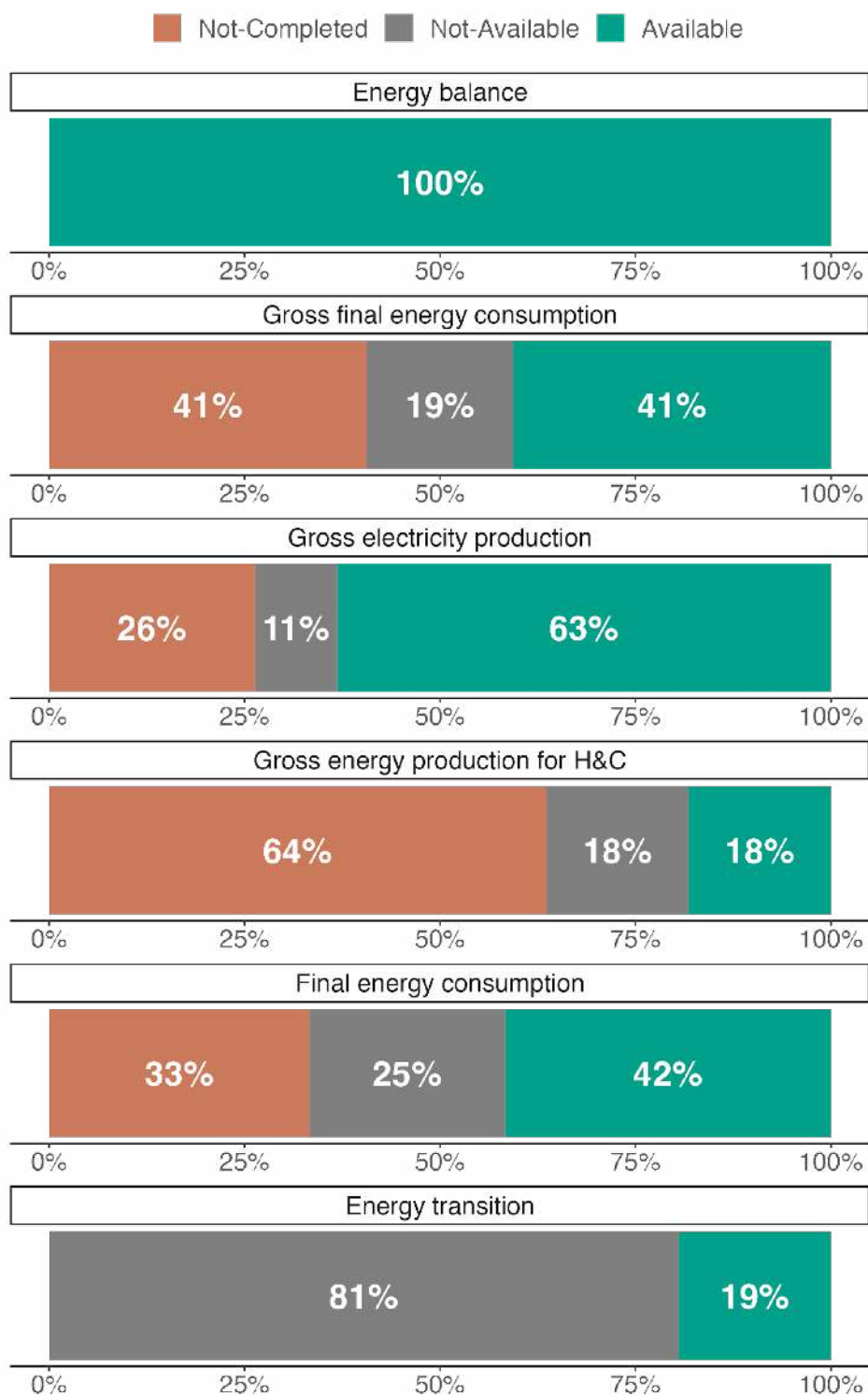


Figure A5: Availability by groups of data for AT22-Steiermark (source: CERVINO project)

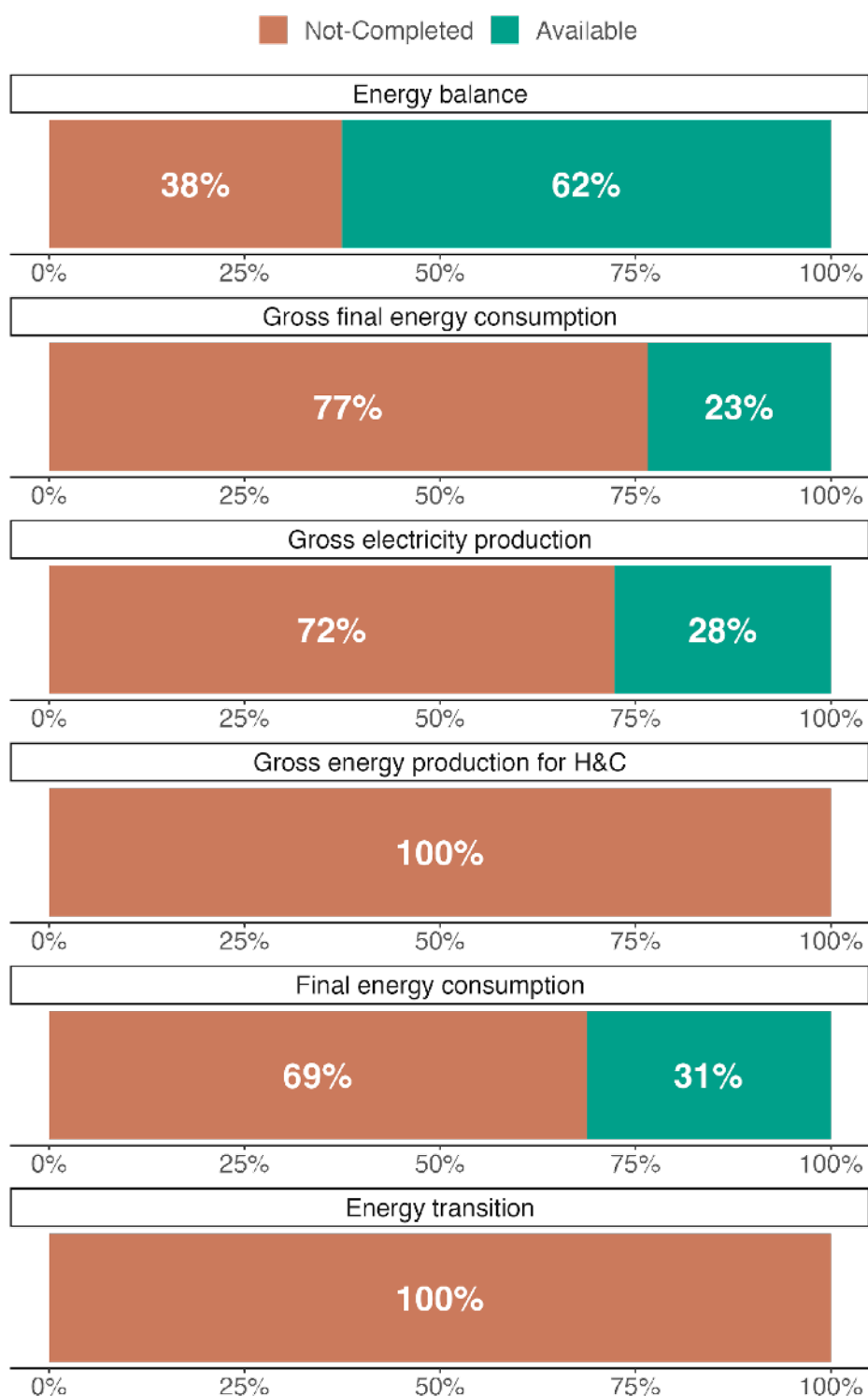


Figure A6: Availability by groups of data for **AT31-Oberösterreich** (source: CERVINO project)

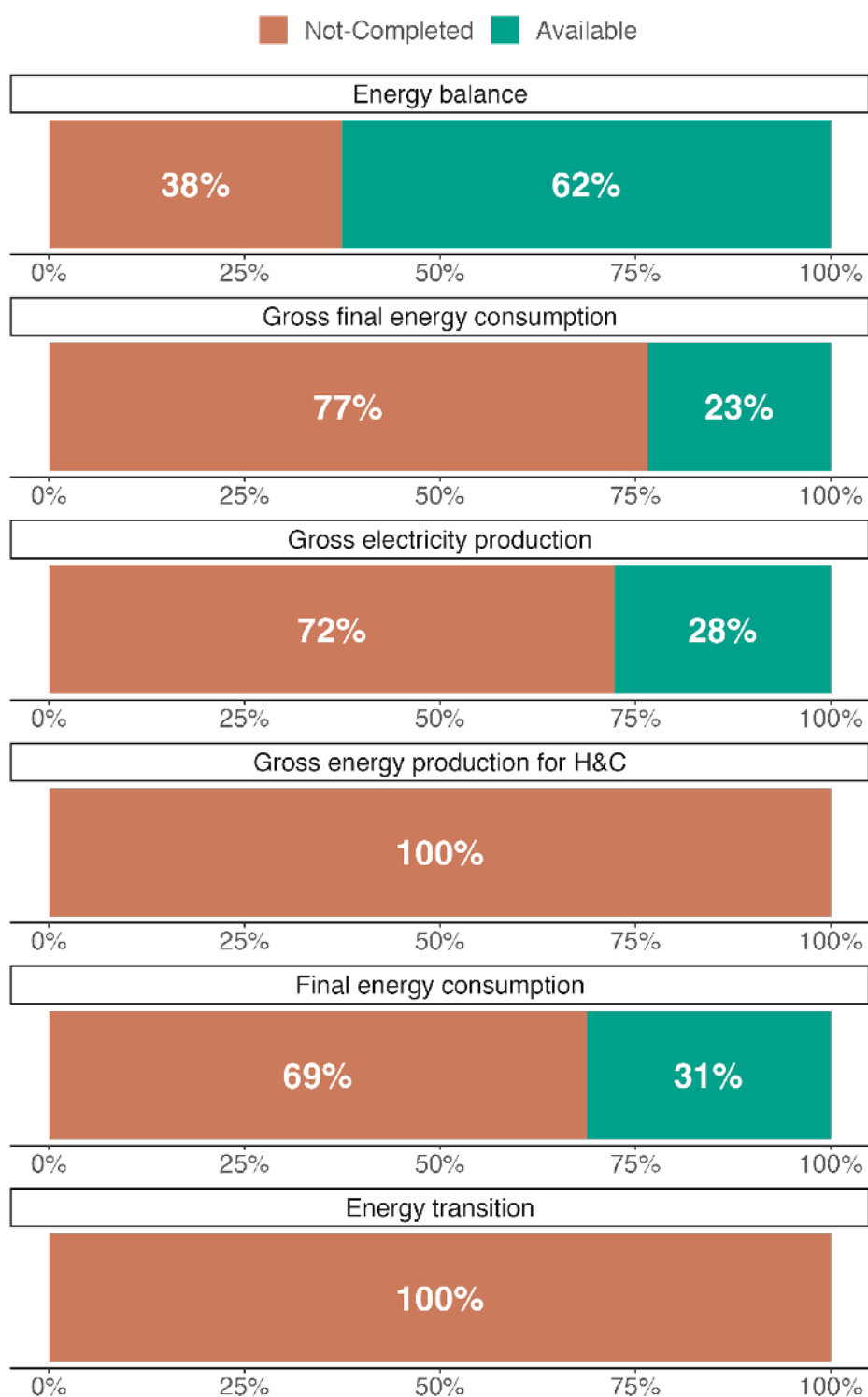


Figure A7: Availability by groups of data for **AT32-Salzburg** (source: CERVINO project)

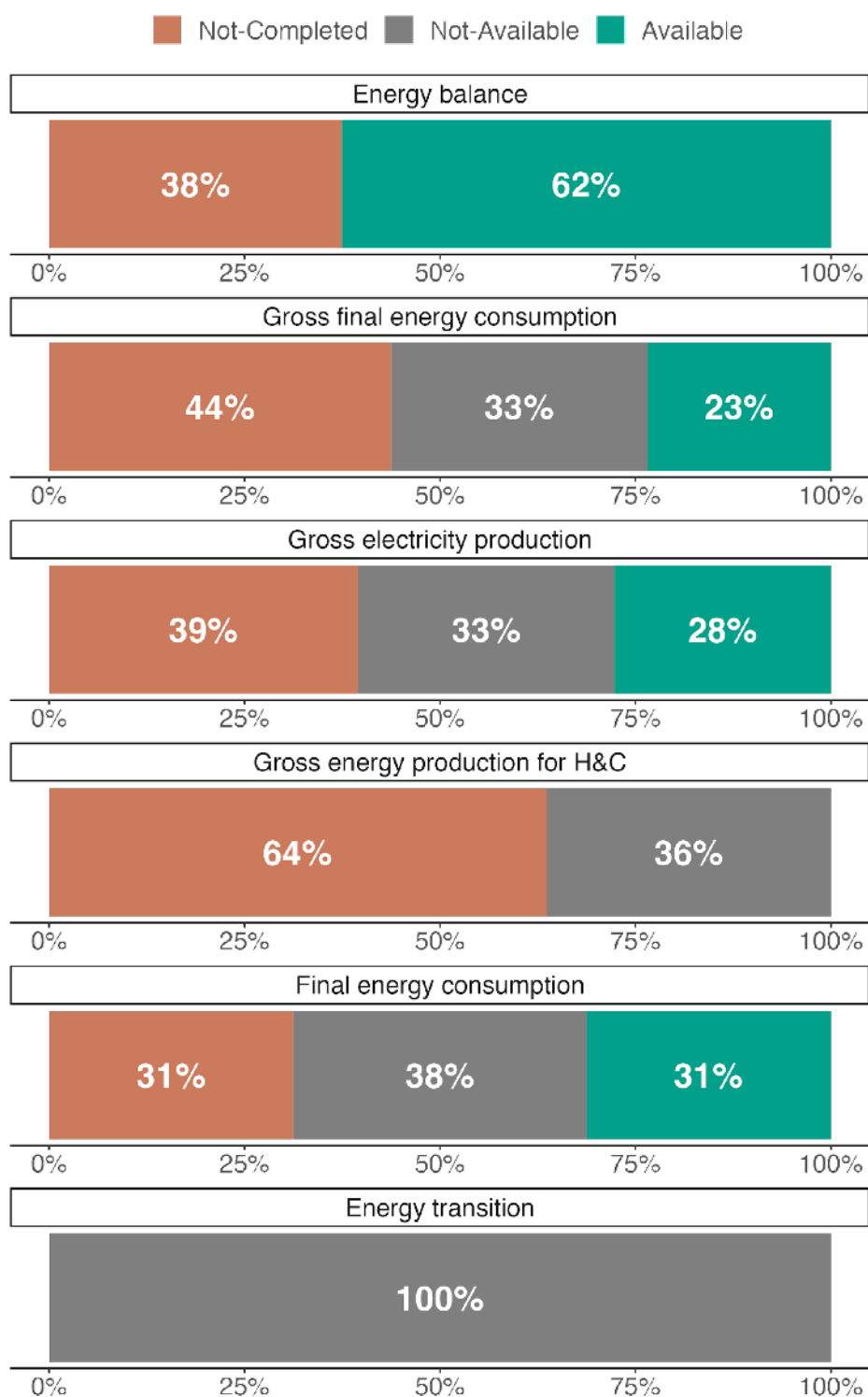


Figure A8: Availability by groups of data for AT33-Tirol (source: CERVINO project)

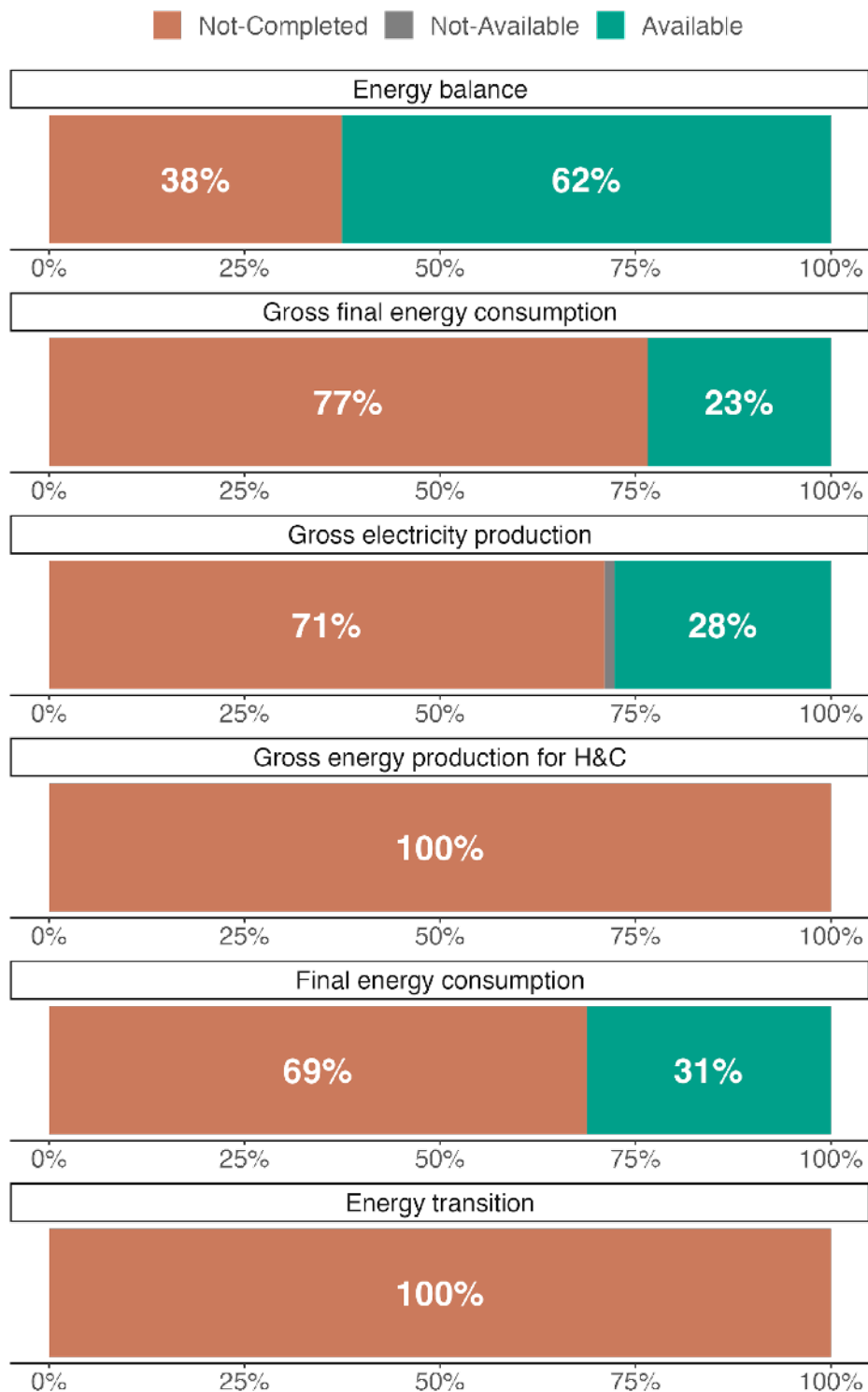


Figure A9: Availability by groups of data for **AT34-Vorarlberg** (source: CERVINO project)

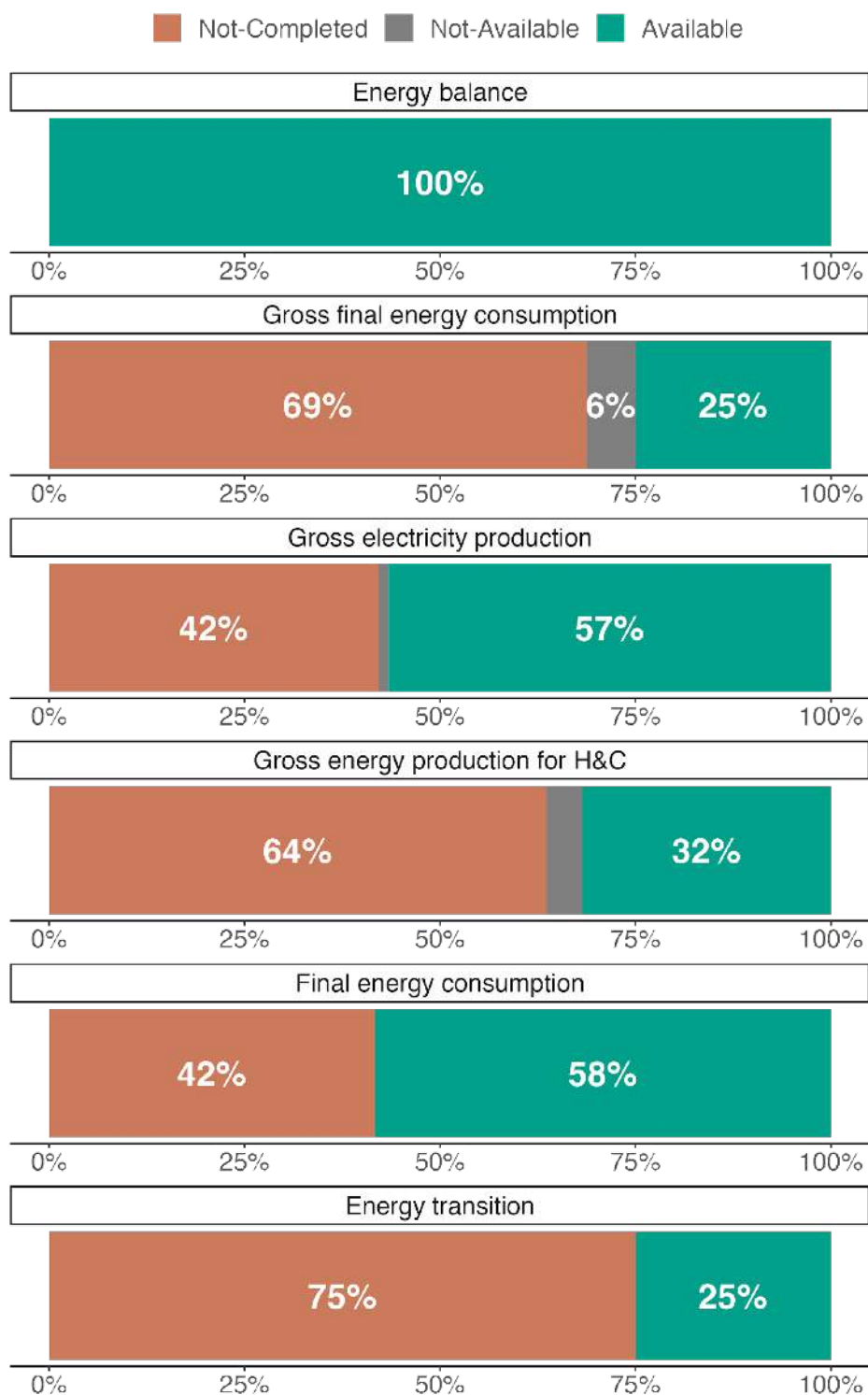


Figure A10: Availability by groups of data for **CH0-Switzerland** (source: CERVINO project)

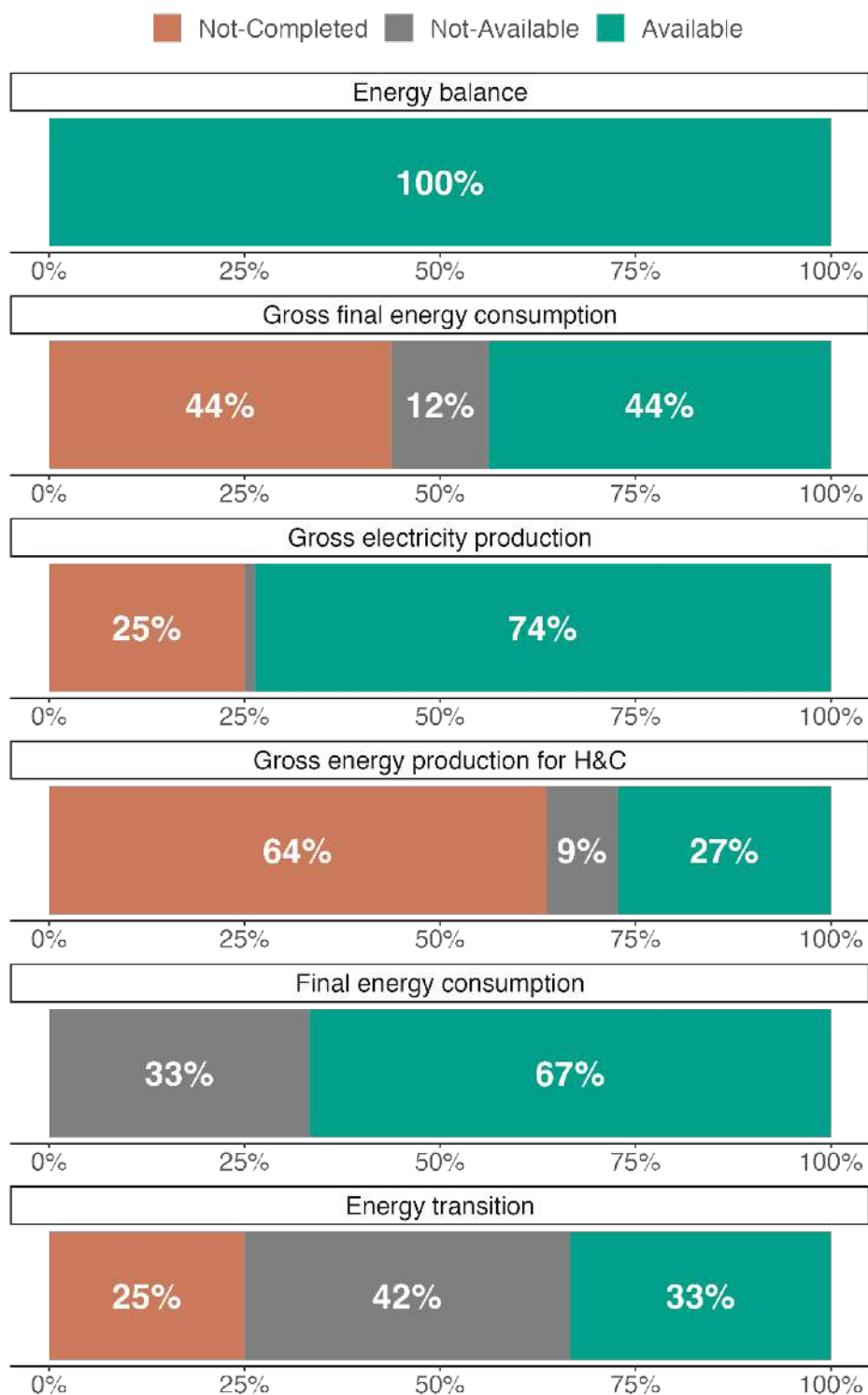


Figure A11: Availability by groups of data for DE1-Baden-Württemberg (source: CERVINO project)

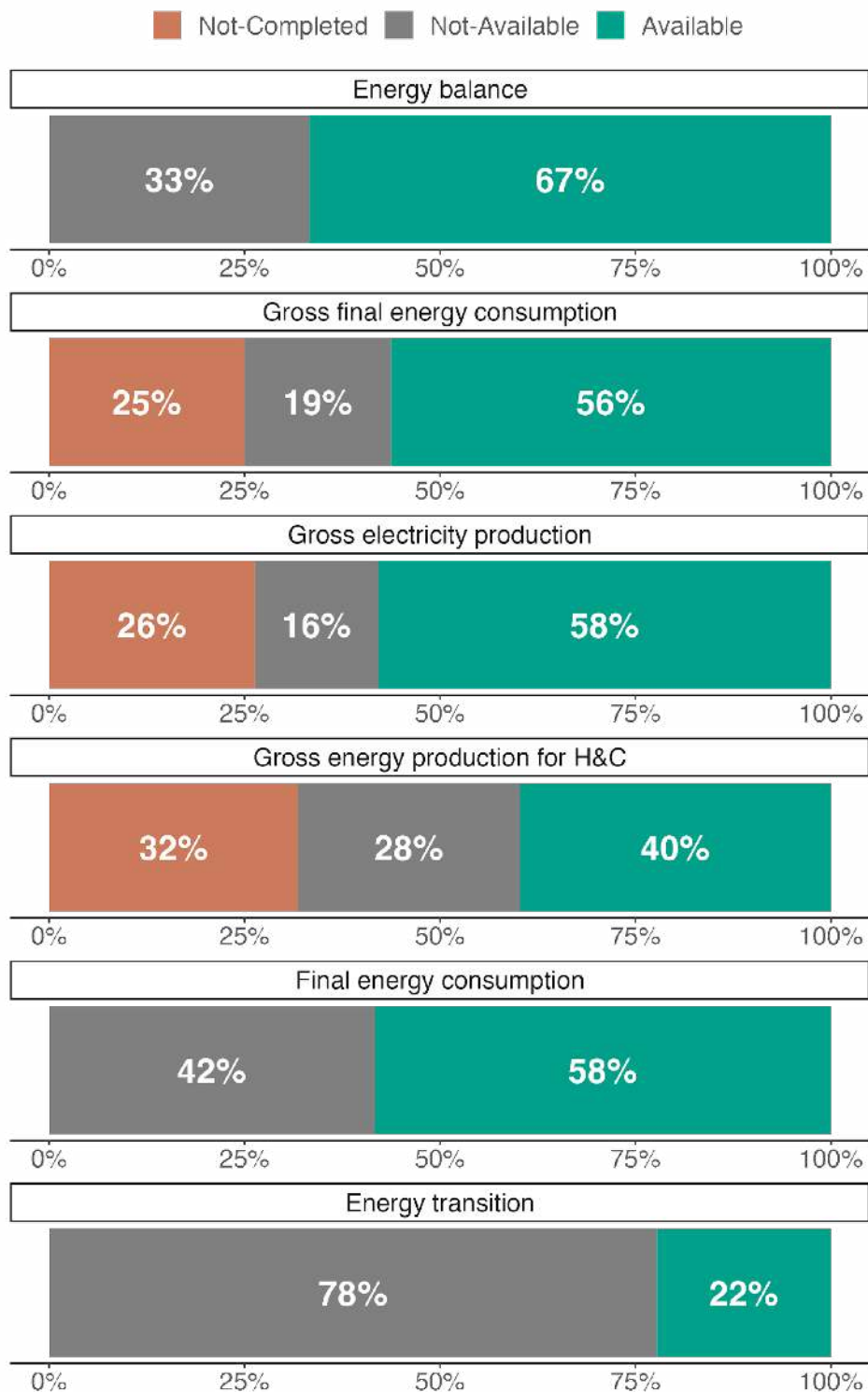


Figure A12: Availability by groups of data for DE2-Bayern (source: CERVINO project)

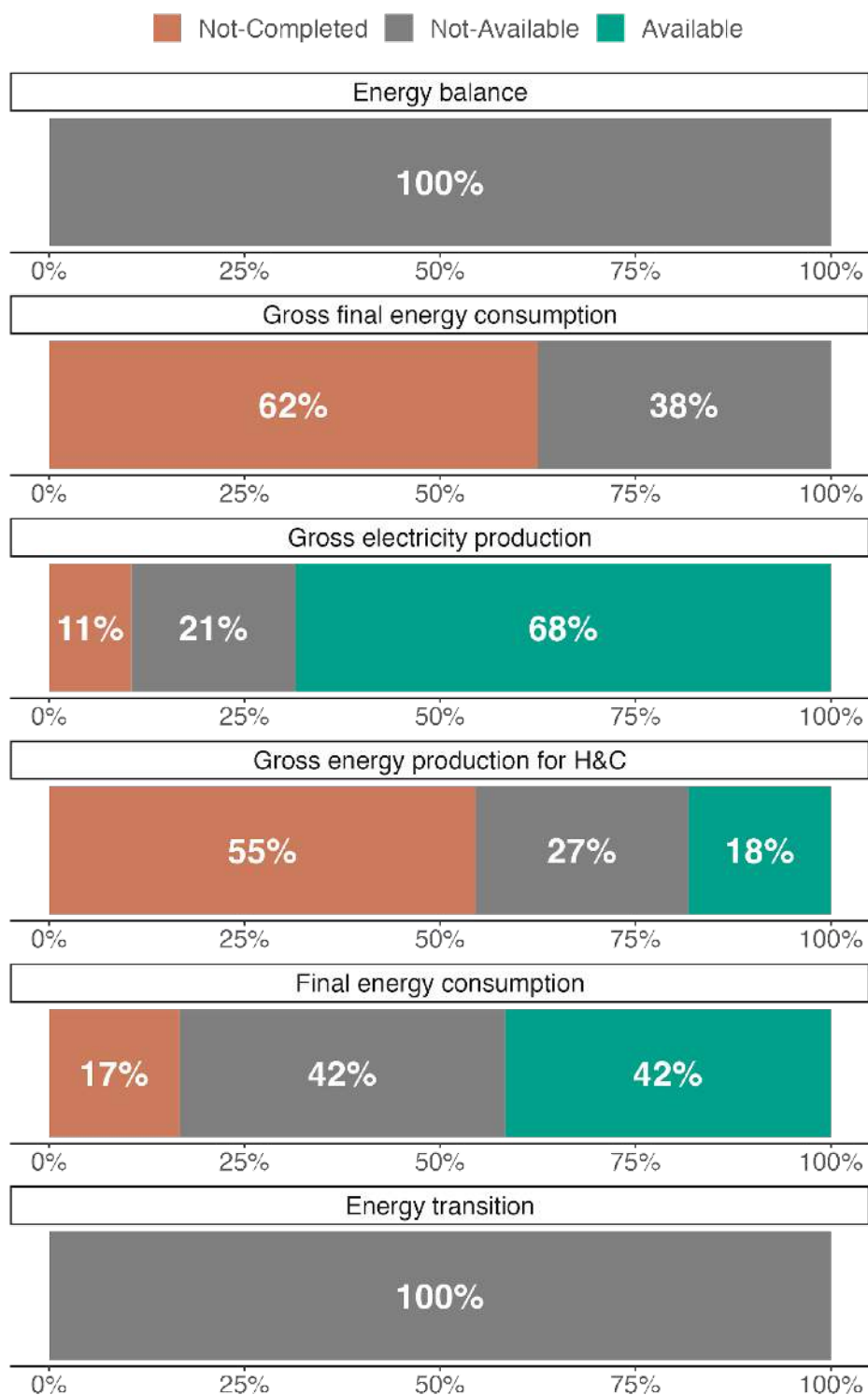


Figure A13: Availability by groups of data for FR43-Franche-Comté (source: CERVINO project)

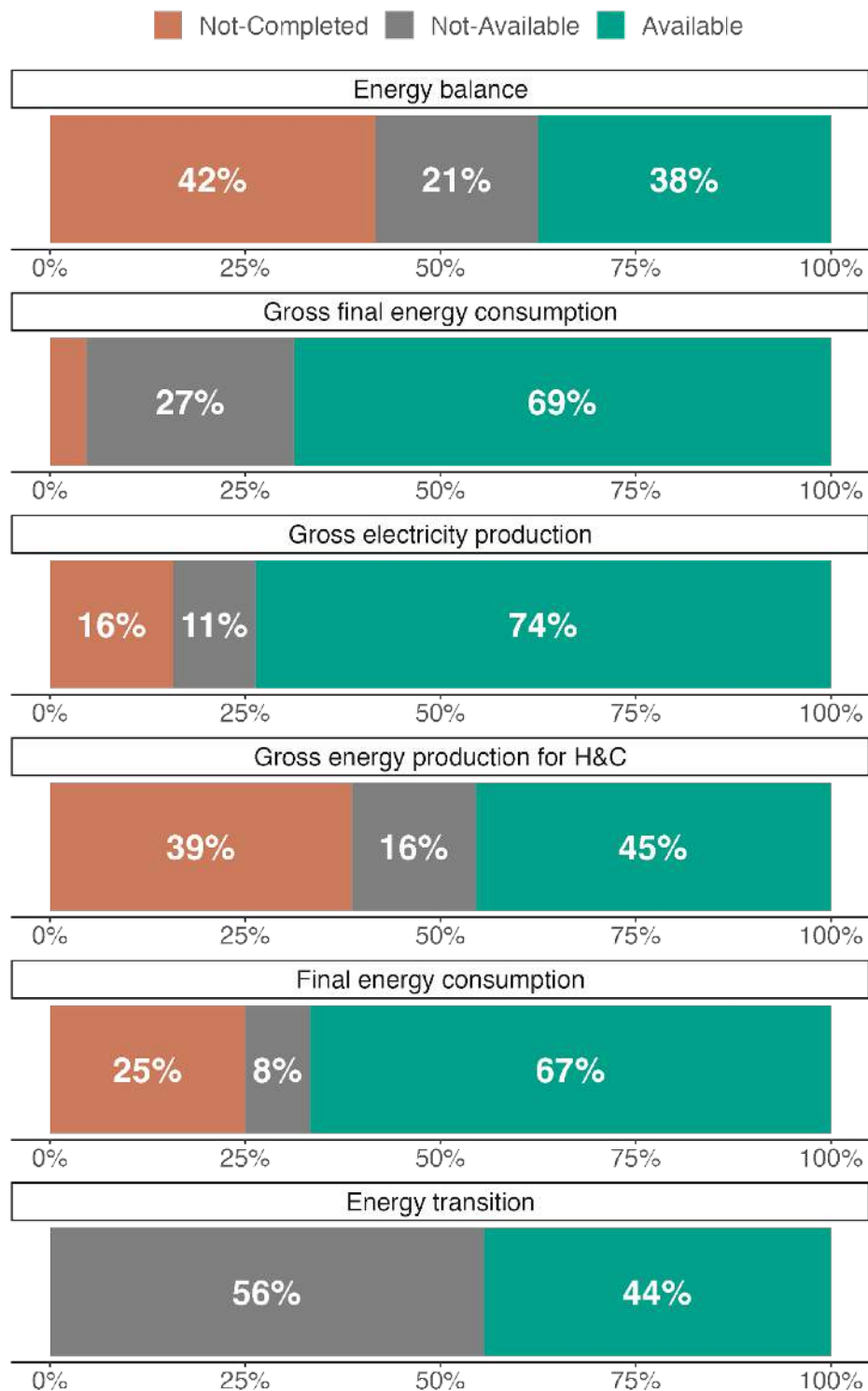


Figure A14: Availability by groups of data for FR71-Auvergne-Rhône-Alpes (source: CERVINO project)

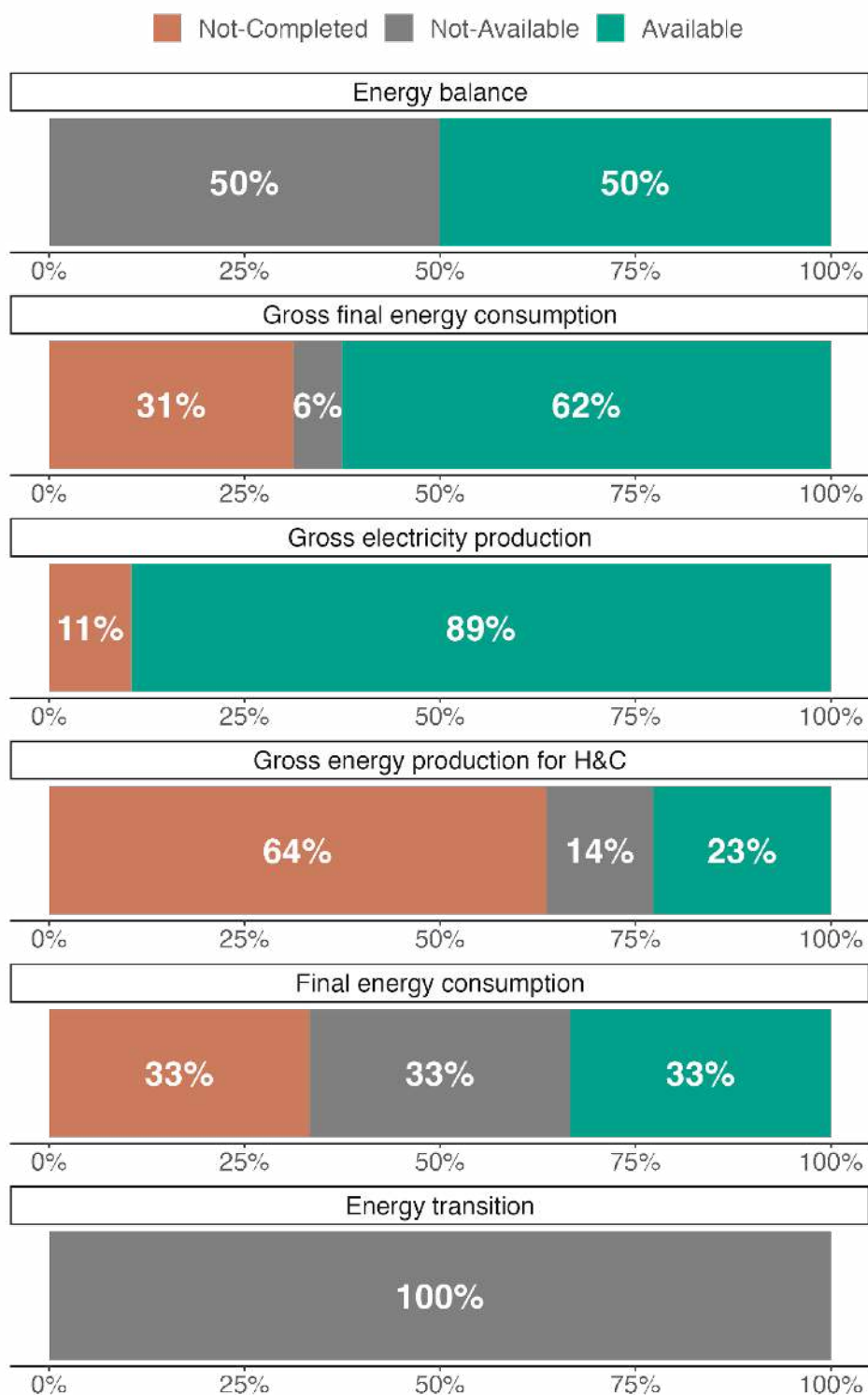


Figure A15: Availability by groups of data for FR82-Provence-Alpes-Côte d'Azur (source: CERVINO project)

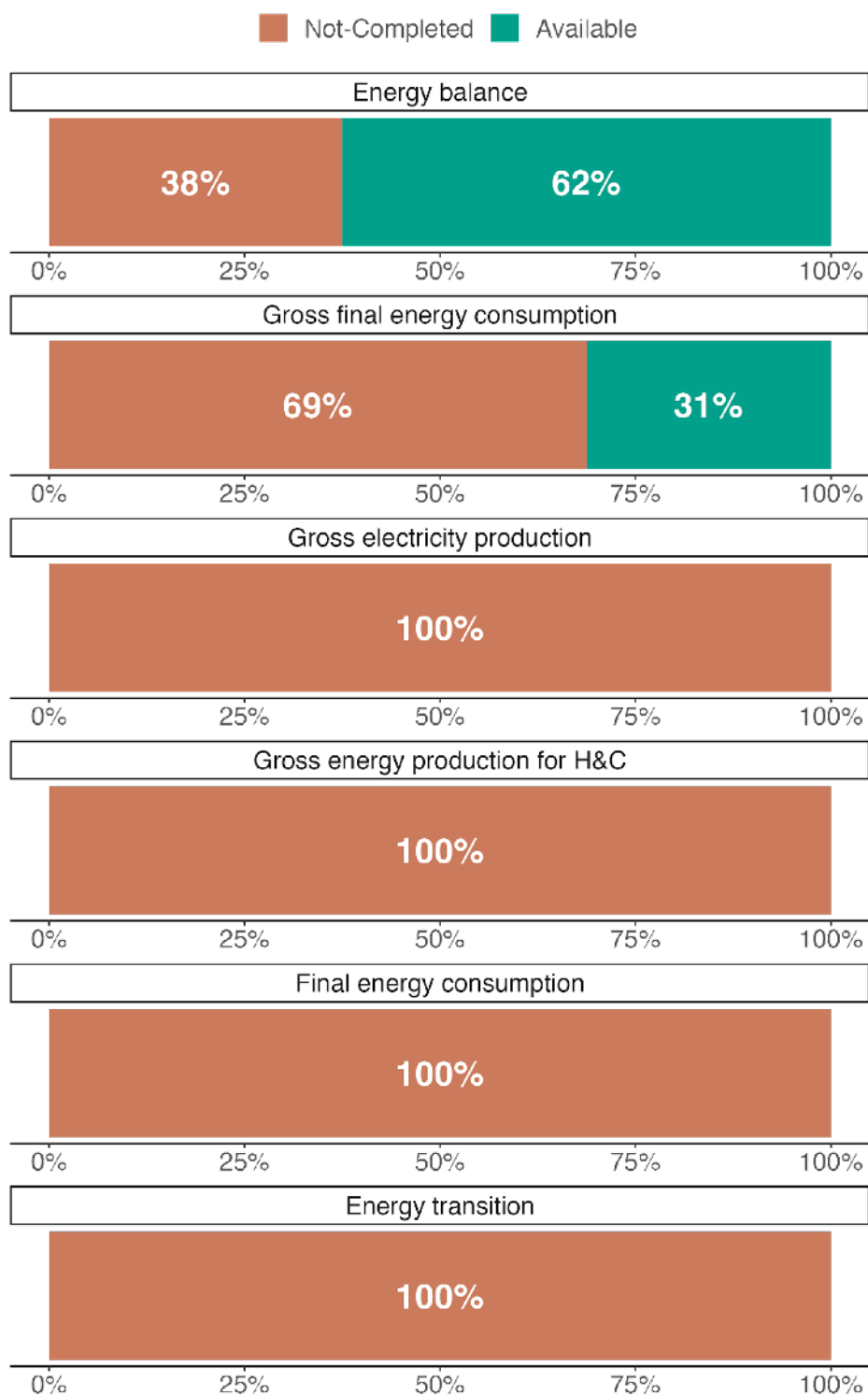


Figure A16: Availability by groups of data for **FRF1-Grand Est** (source: CERVINO project)

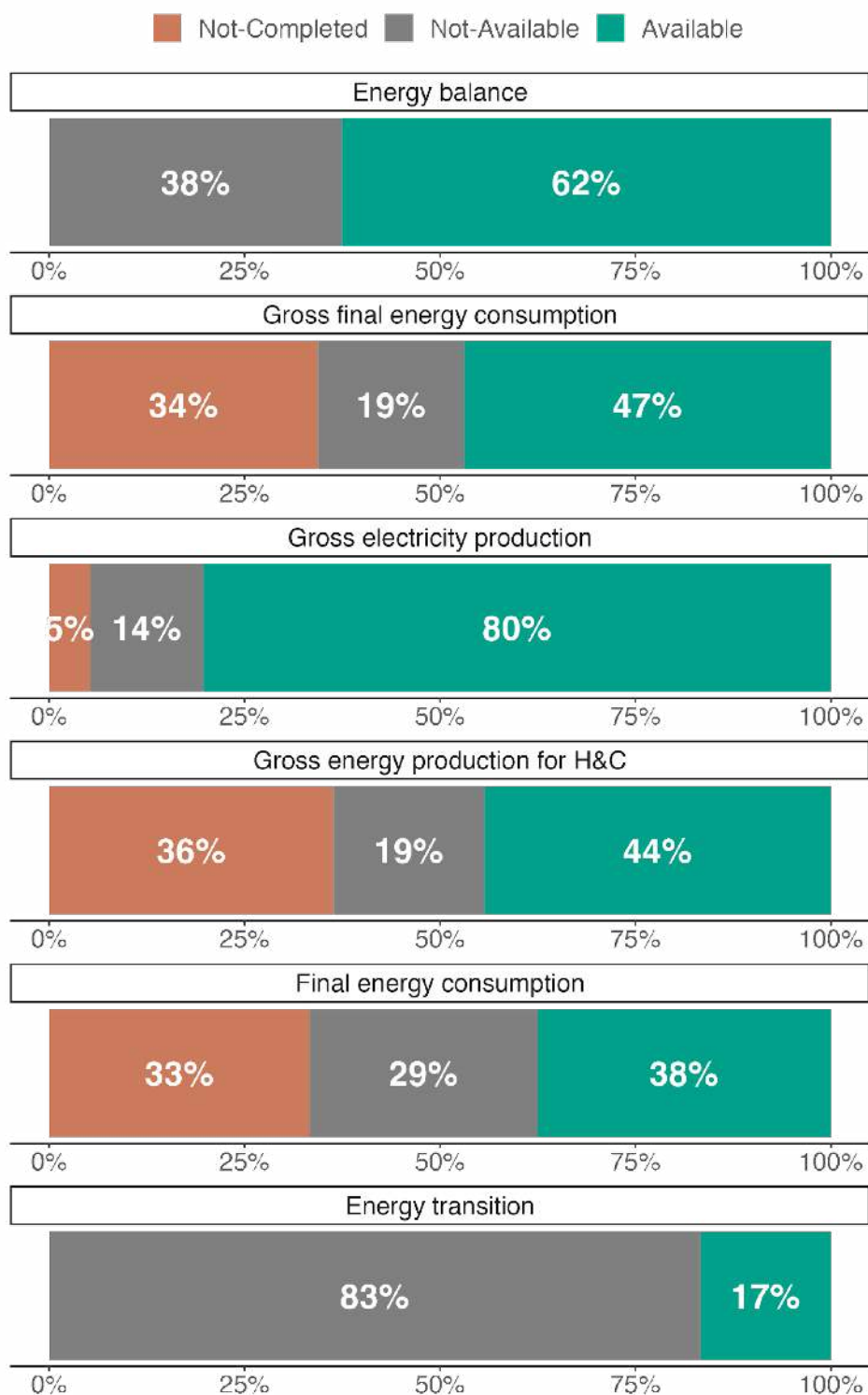


Figure A17: Availability by groups of data for ITC1-Piemonte (source: CERVINO project)

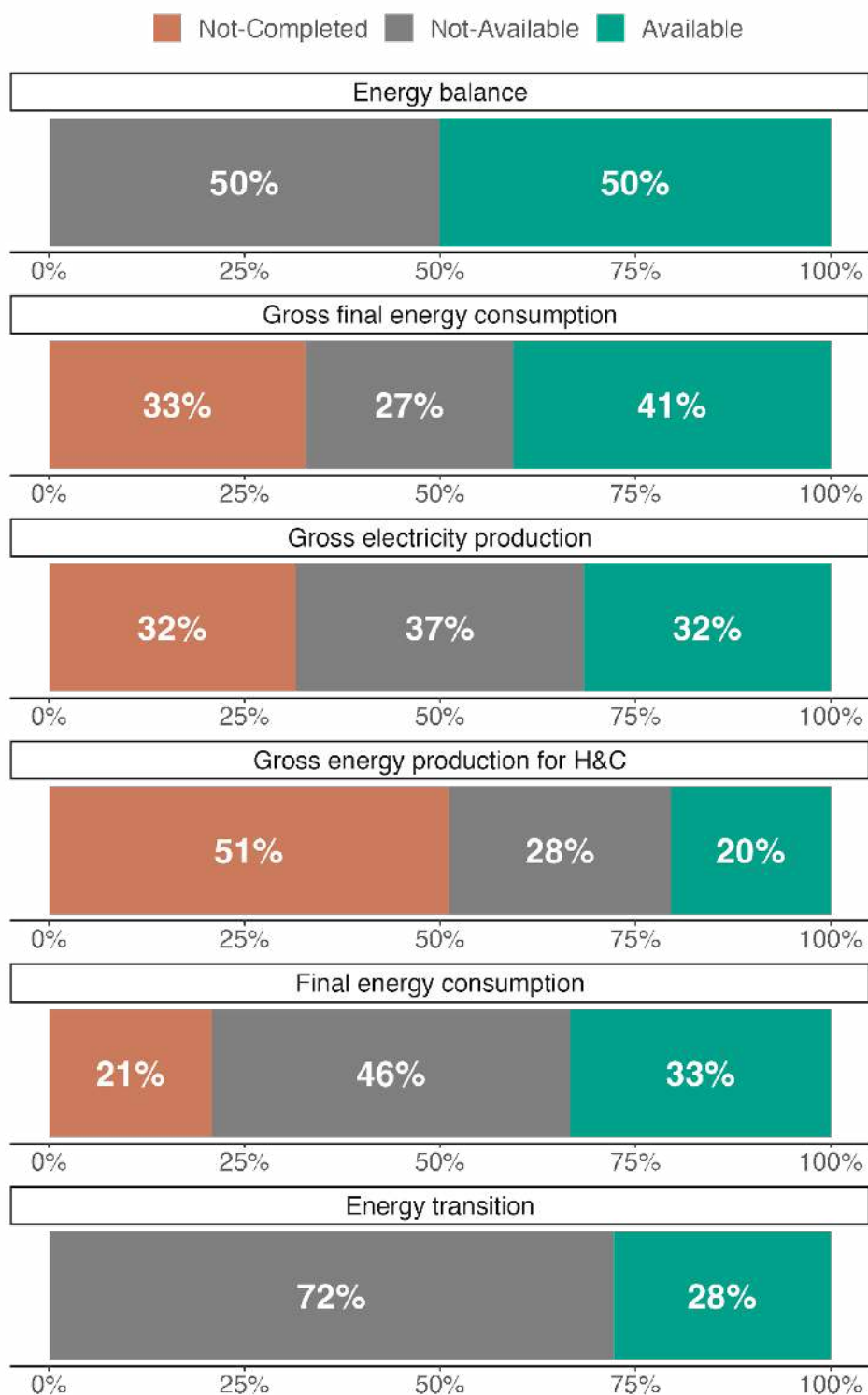


Figure A18: Availability by groups of data for ITC2-Valle d'Aosta (source: CERVINO project)

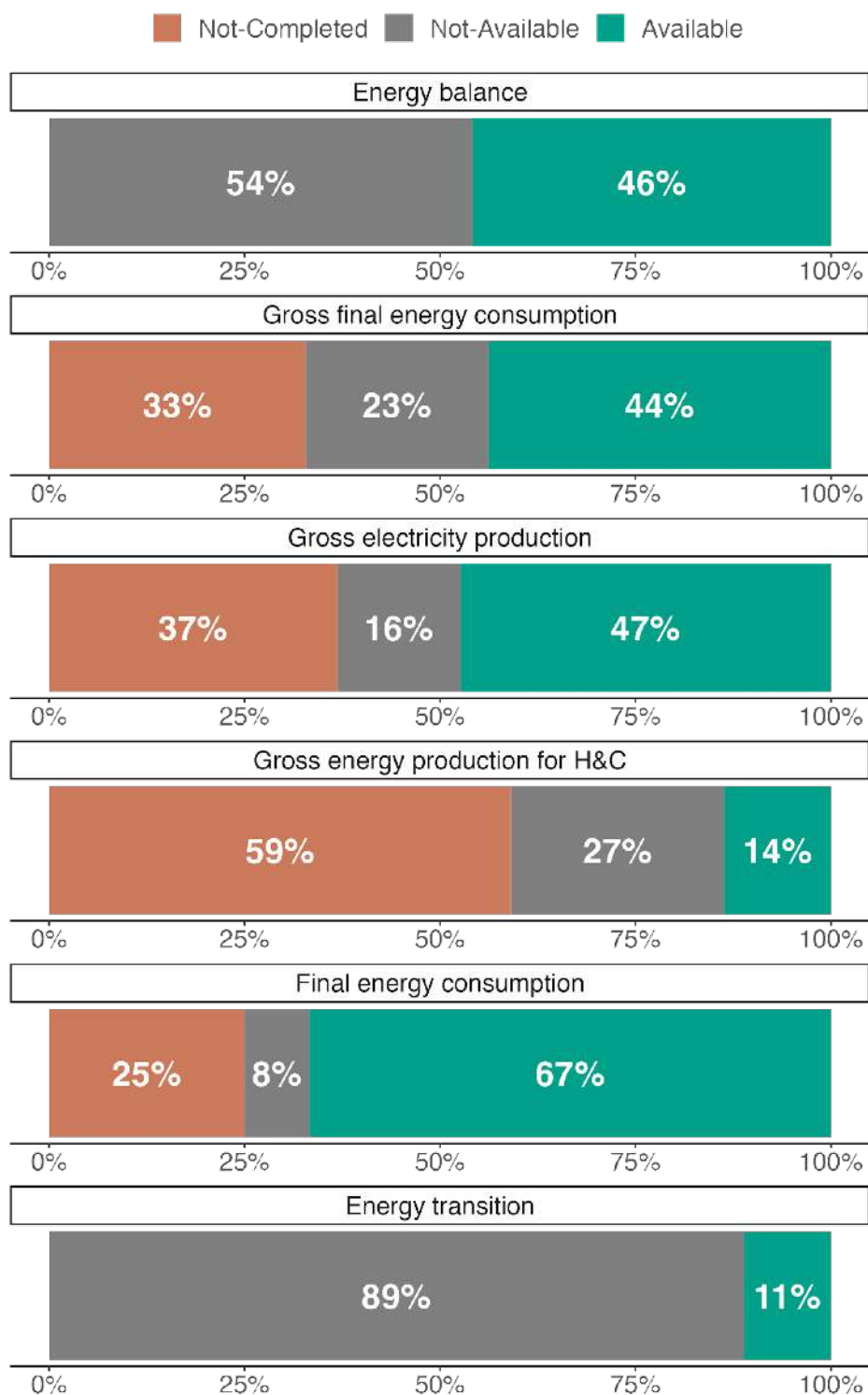


Figure A19: Availability by groups of data for ITC3-Liguria (source: CERVINO project)

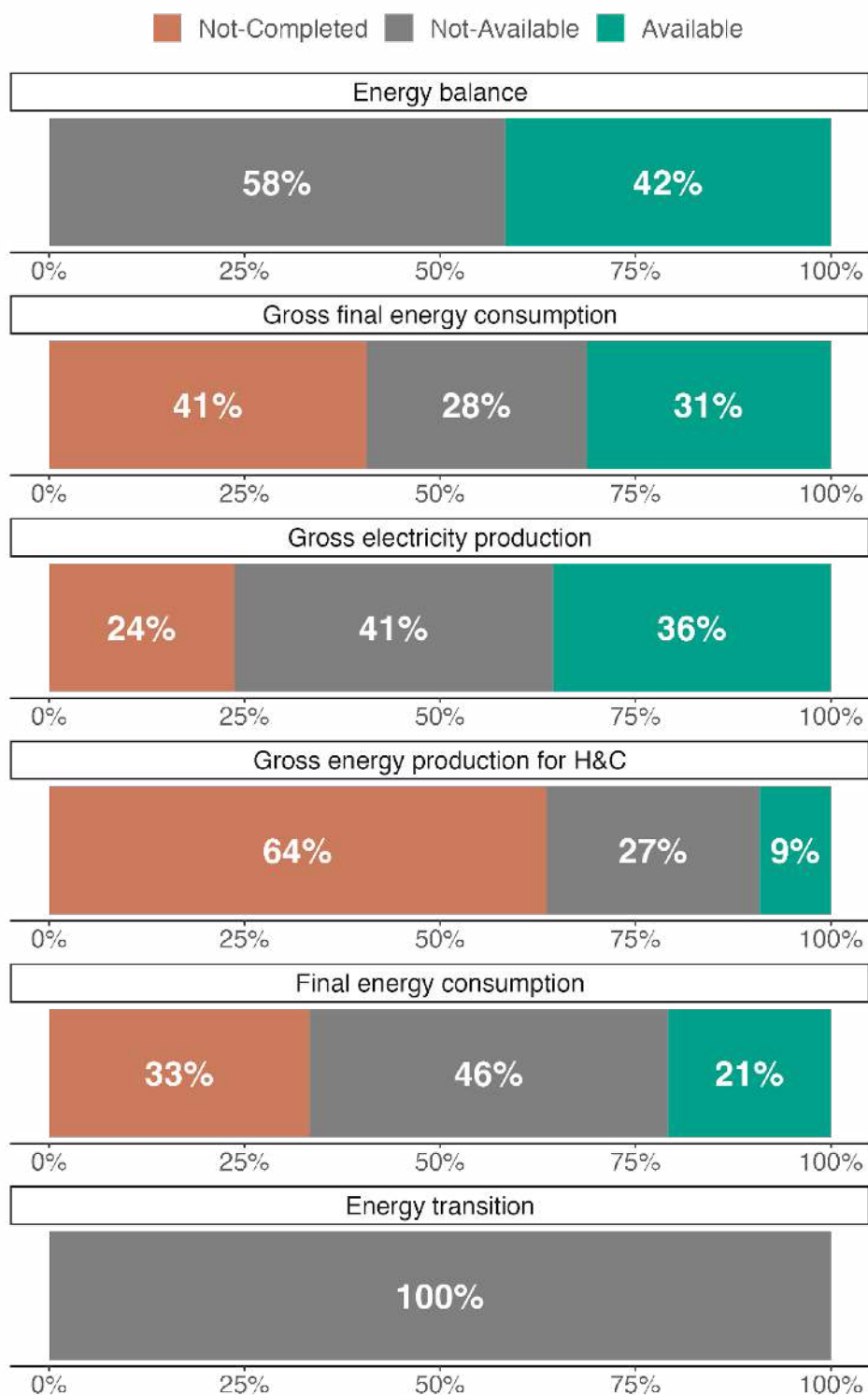


Figure A20: Availability by groups of data for ITC4-Lombardia (source: CERVINO project)

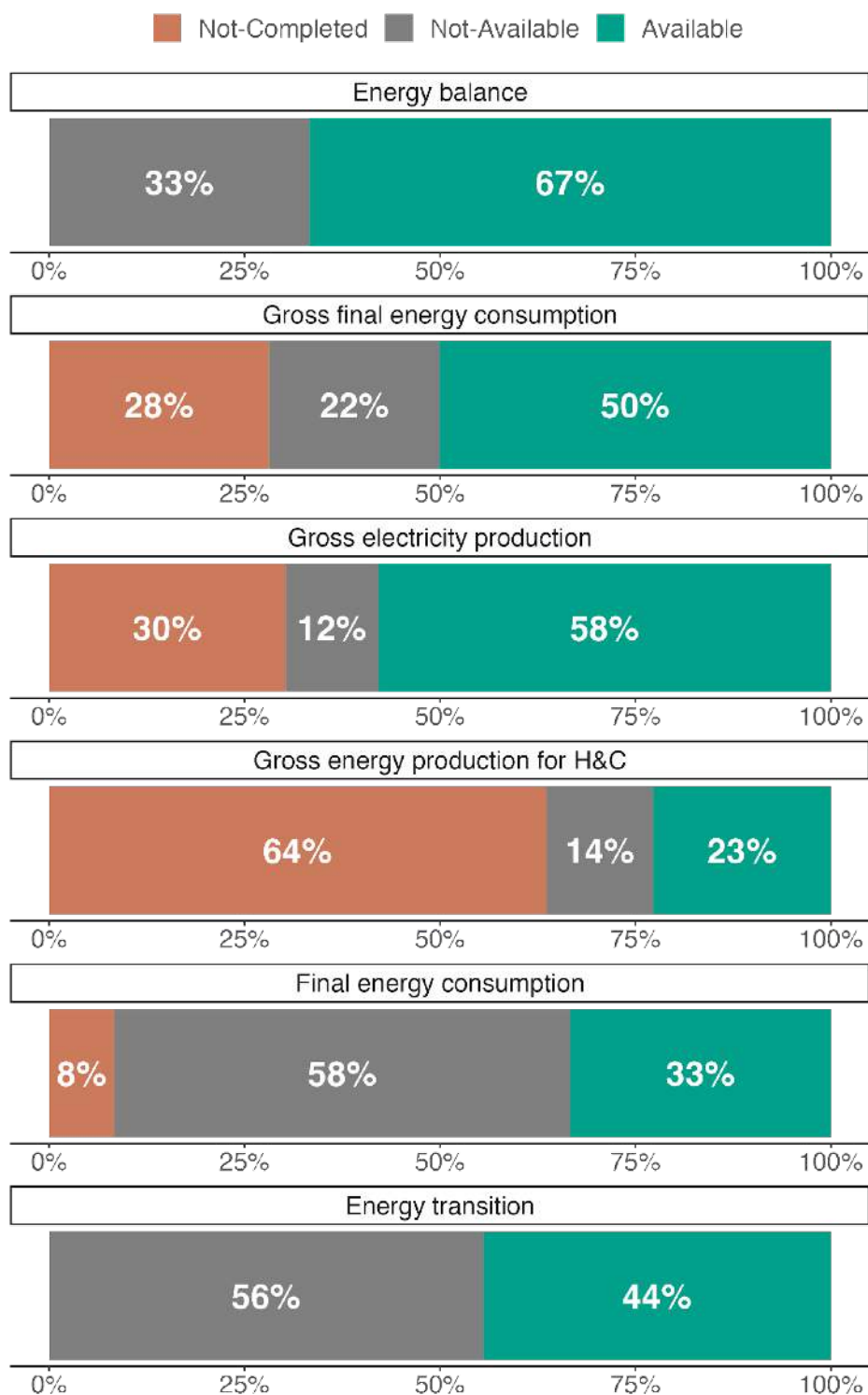


Figure A21: Availability by groups of data for ITH1-Provincia Autonoma di Bolzano (source: CERVINO project)

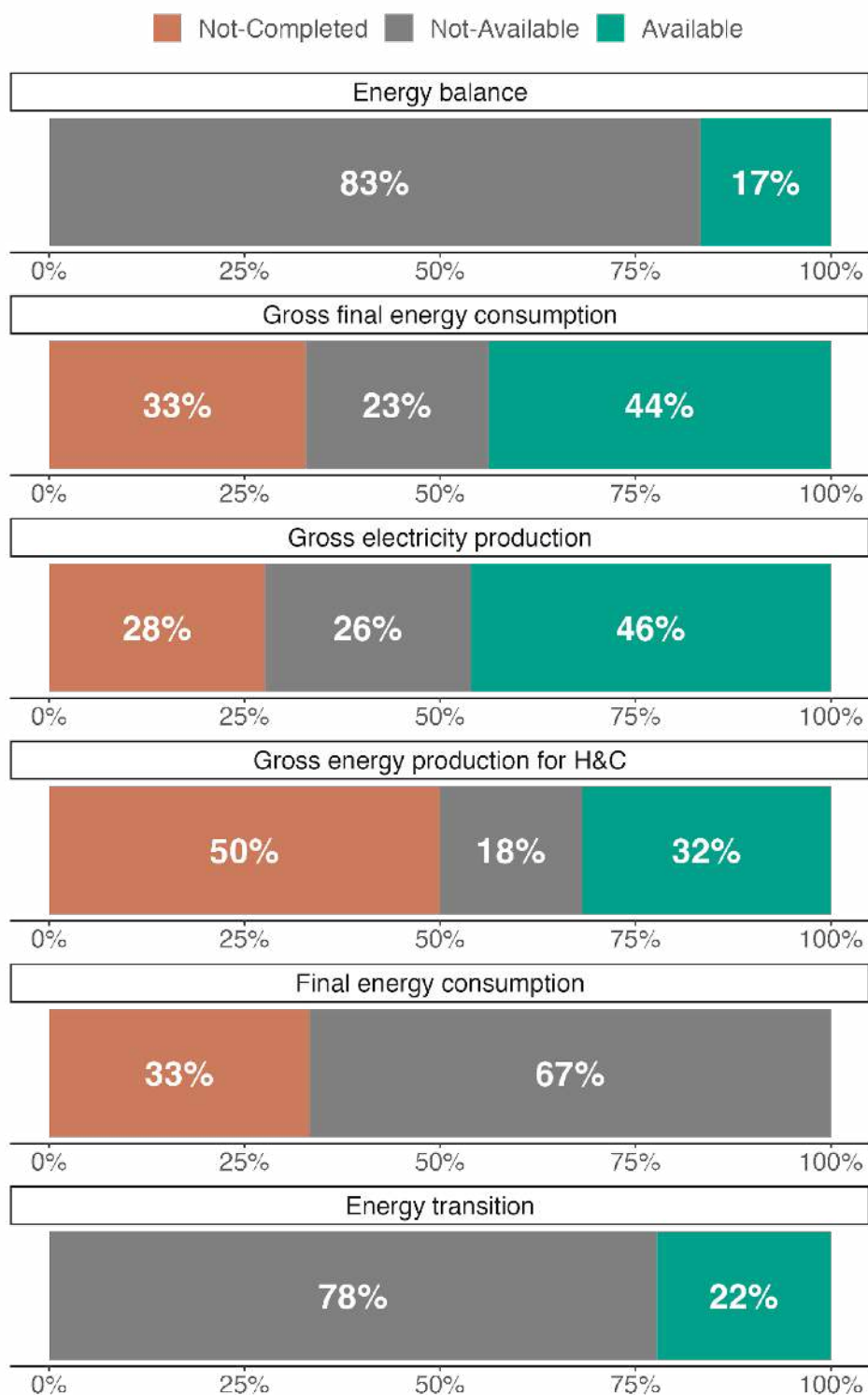


Figure A22: Availability by groups of data for ITH2-Provincia Autonoma di Trento (source: CERVINO project)

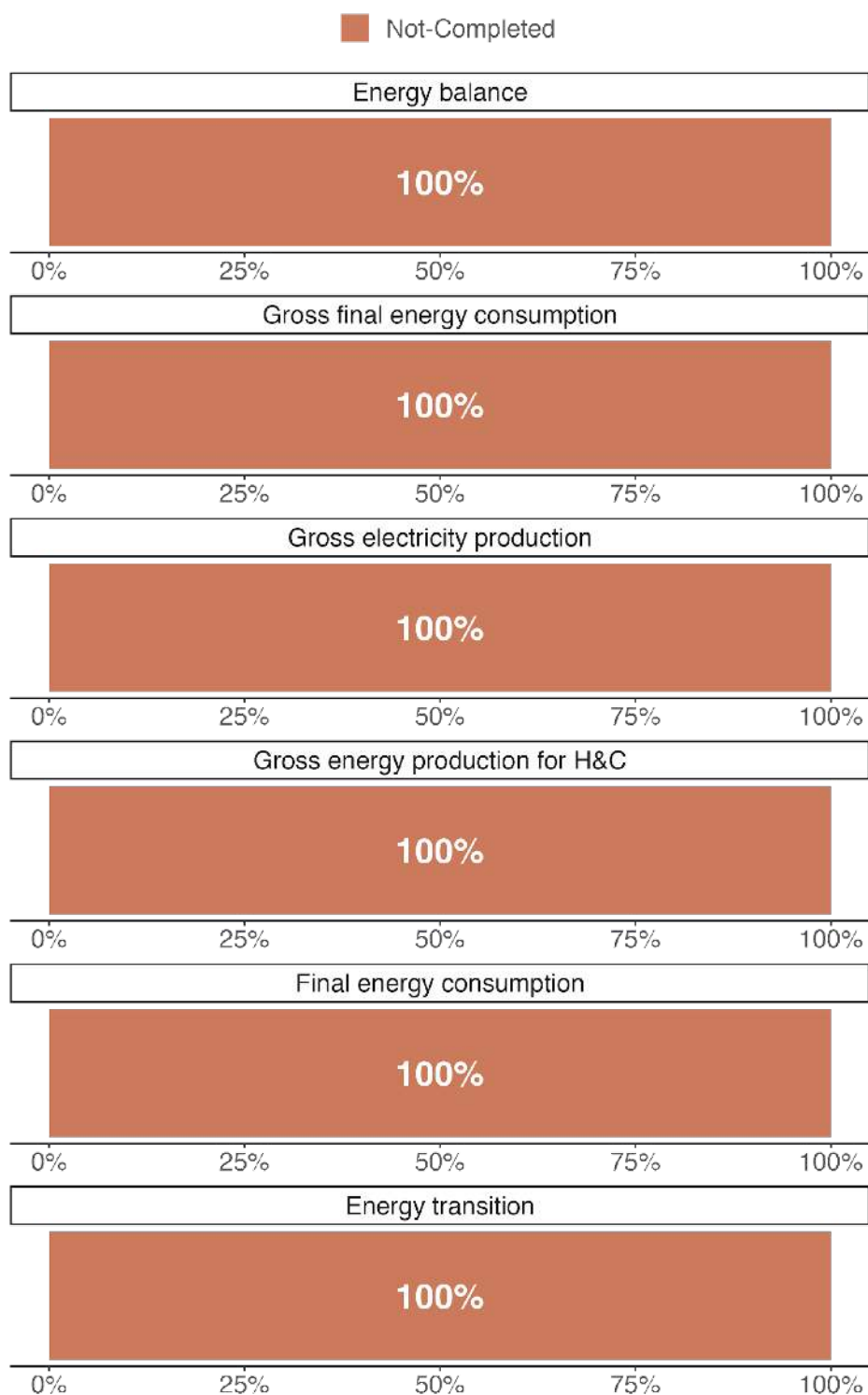


Figure A23: Availability by groups of data for ITH3-Veneto (source: CERVINO project)

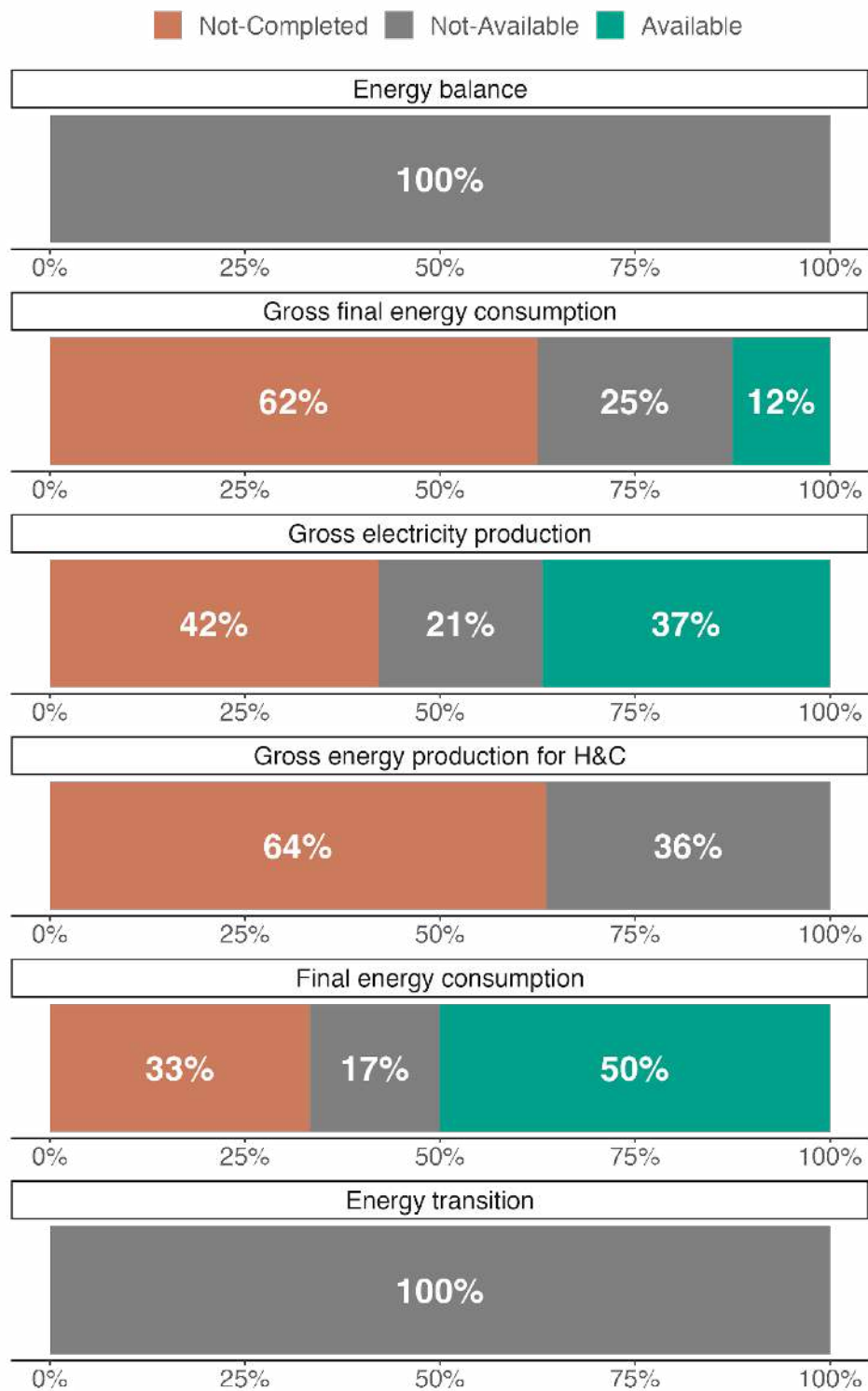


Figure A24: Availability by groups of data for ITH4-Friuli Venezia Giulia (source: CERVINO project)

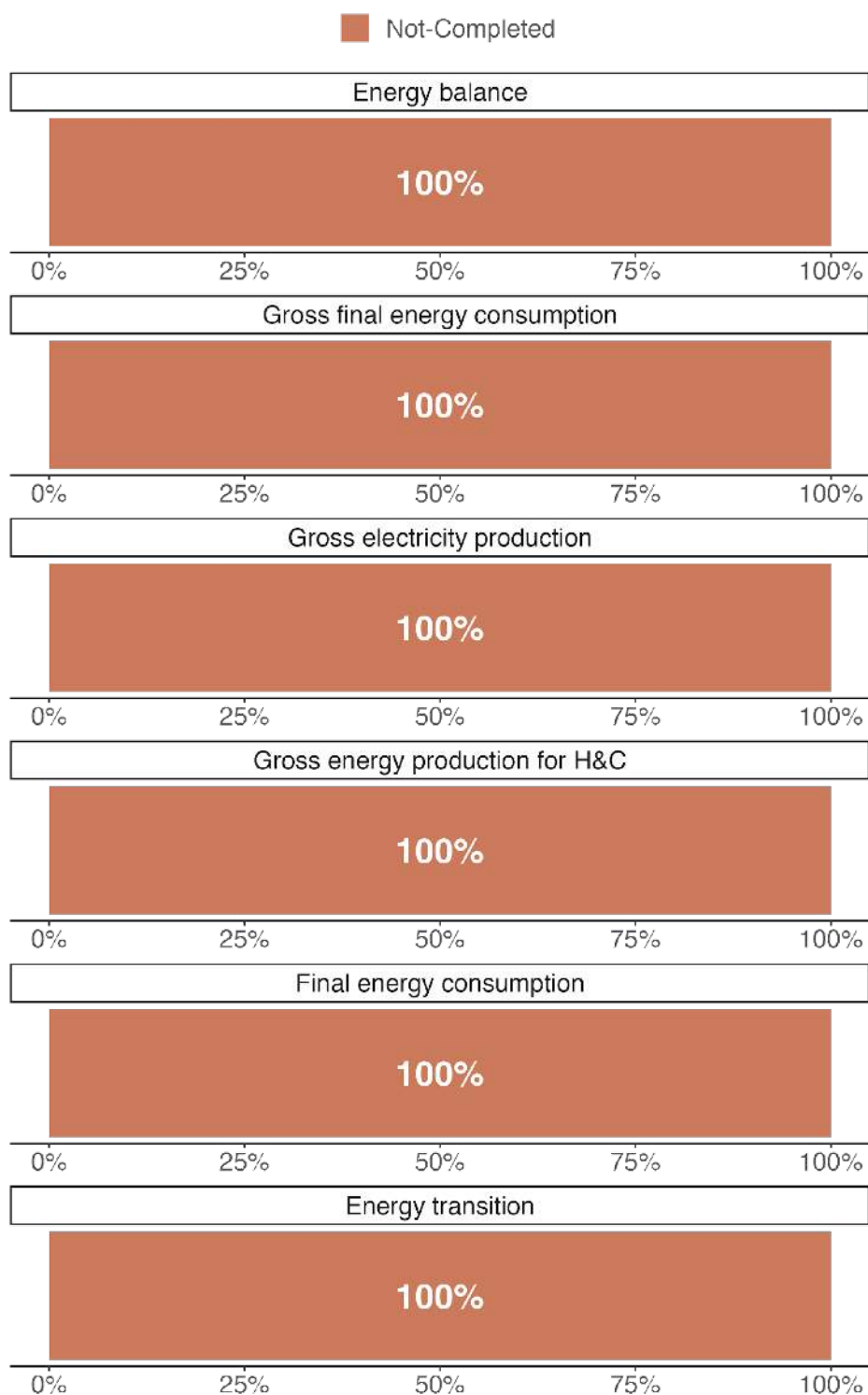


Figure A25: Availability by groups of data for LI-Liechtenstein (source: CERVINO project)

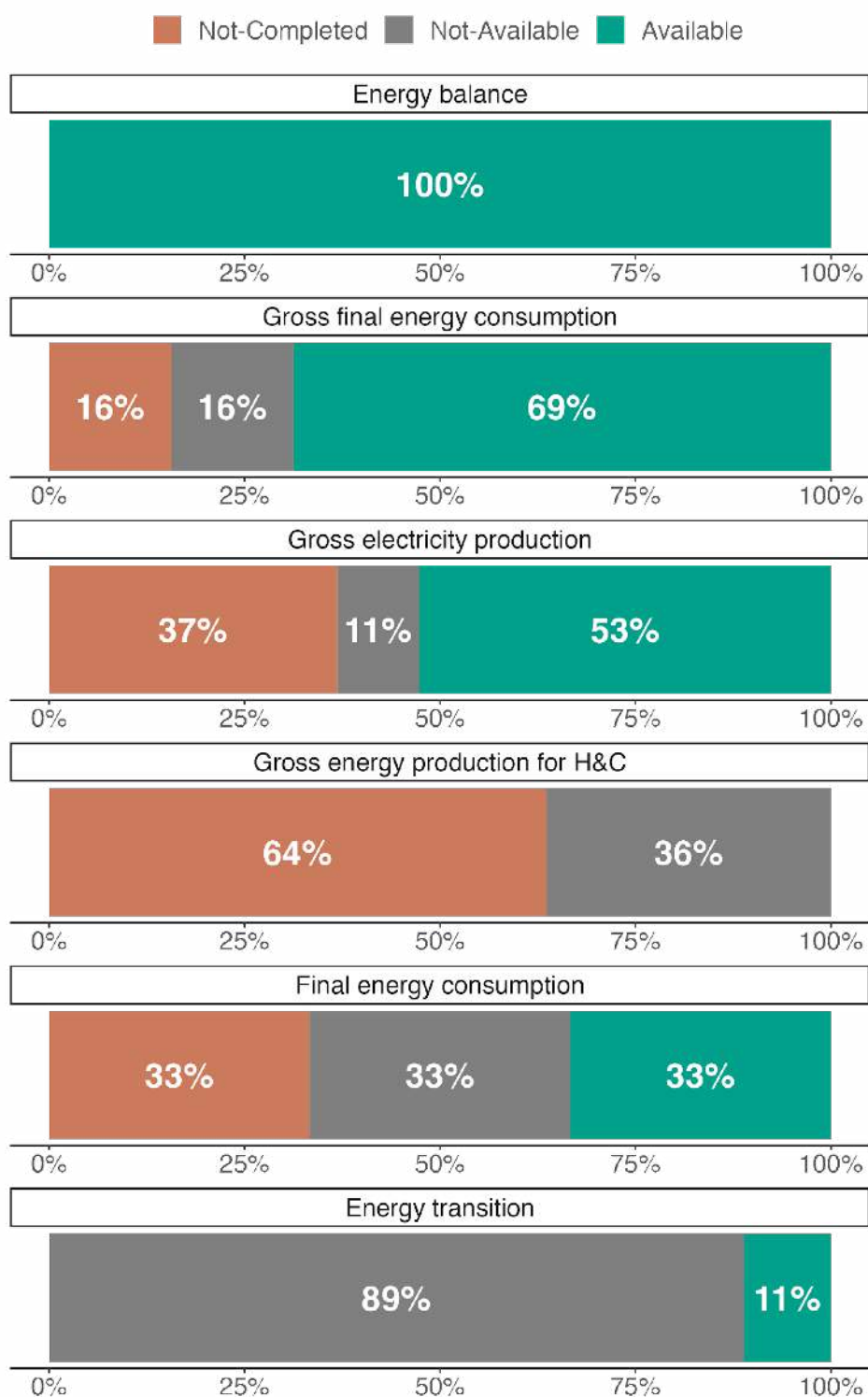


Figure A26: Availability by groups of data for SI-Slovenia (source: CERVINO project)