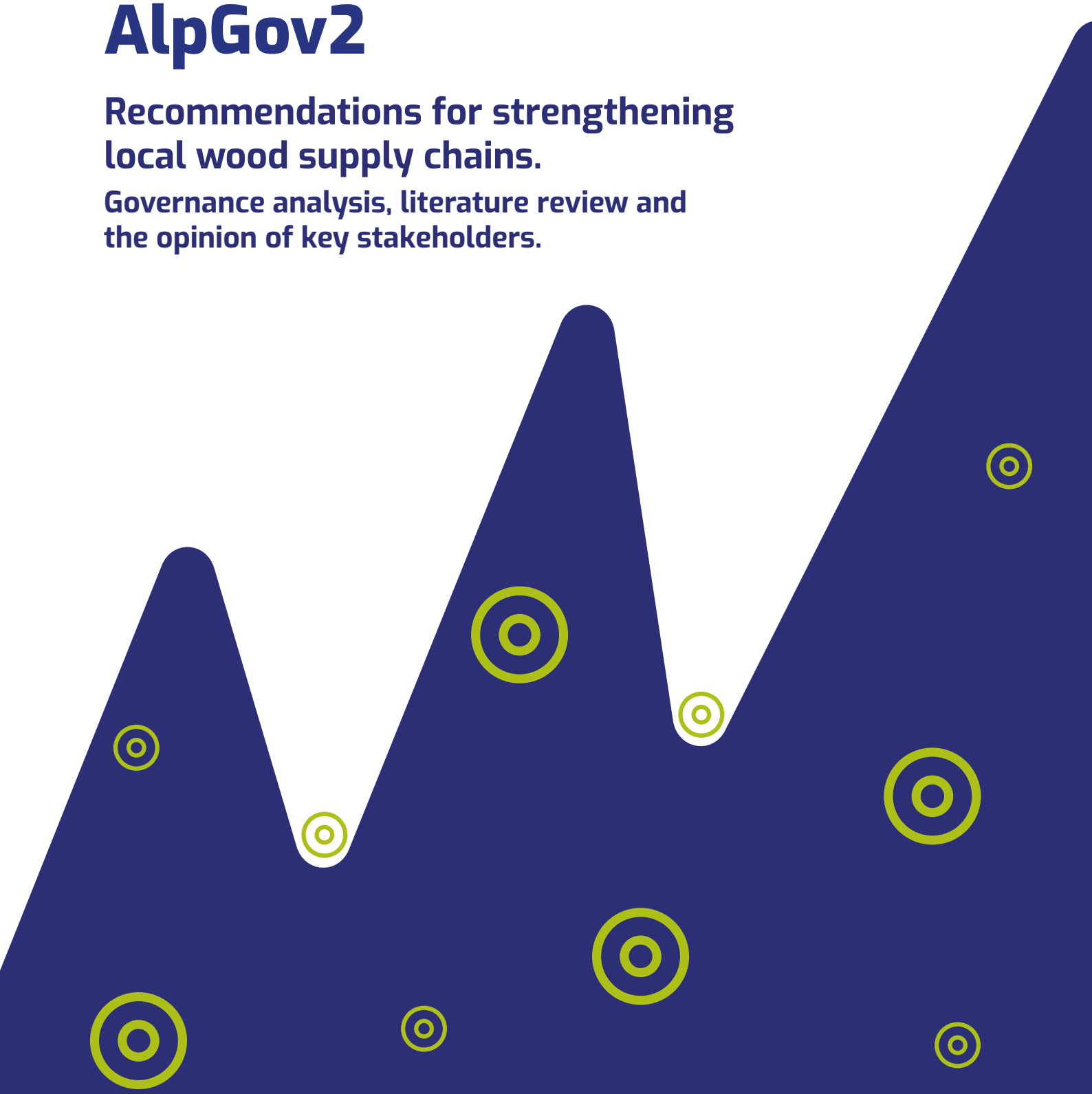
Alpine Space Project AlpGov2

Recommendations for strengthening local wood supply chains.

Governance analysis, literature review and the opinion of key stakeholders.



Interreg Alpine Space AlpGov

EUROPEAN UNION

ESTÀ Economia e Sostenibilità

Interreg Alpine Space Programme - Alpine Space Programme
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Research activities concerning the implementation of EUSALP policy recommendations, the development of business models in the timber supply chain and the role of young people in EUSALP with regard to recovery and resilience plans (project code 06_00181).

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INTRODUCTION & METHODOLOGI-CAL NOTE

UNDERSTANDING THE TARGET: CIRCULAR ECONOMY OR LOCAL SUPPLY CHAIN?

In tackling a study that aims to help optimise the system revolving around the wood supply chains and promote circularity, the first problem the researchers had to deal with was that of the exact definition of the topic. A problem common to many fields, carefully defining the boundaries of the system within which one studies and acts is a preparatory and necessary operation, but in the case of the circular economy it appears more delicate than elsewhere.
In fact, the circular economy model enjoys great attention at the cultural, entrepreneurial and political-administrative level for a number of very good reasons: the possibility of integrating answers to concerns of both an environmental and economic nature is one of the elements that arouses attention to the topic; another stimulating aspect is the opportunity to create relations between private companies and public actors - the main actor in the model is private, but without a public director, relations between those who produce waste and those who use it as a new material would not take place.
However, this generalised success also conceals a number of pitfalls: the temptation to use the model in an uncritical and passepartout manner is directly proportional to its popularity and risks deviating from its aims. The question that seems right to ask as a preliminary step is therefore: are there specificities of the wood chain that must be analysed ex ante before investigating its potential in terms of the circular economy? And are these specificities such that the model may be narrow and in need of adaptation?
The questions are not meant to be theoretical: **the very possibility of devising a public policy or intervention is linked to a careful reading of the characteristics of the relevant sector**, as the following lines will try to argue.
In general, many production chains could be organised in such a way as to meet the basic requirements of the circular economy model. According to the Ellen MacArthur Foundation[1], in fact, the circular economy is a model for the production, circulation, consumption of goods and management of their waste, oriented by the principle of preserving the social and economic value of objects and realised through the design of basically closed economic systems in which the use of renewable energy is privileged. In general, conserving the value of goods means minimising the entropy of the matter of which goods are made, in order to maintain their utility and price, reduce the rates and times of transformation into waste, and promote ways of recycling waste. The temporal preservation of socio-economic value thus stimulates environmental conservation by reducing the tendency to produce pollutants, solid, liquid and gaseous. **Circularity is the specific mode of operation that best fulfils the principle of preserving economic value by reintroducing what is rejected back into the production or utilisation cycle.** The existence of services for reuse, repair, and regeneration of goods reinforces the preservation of the social and economic value of goods, preventing the formation of waste.
The possibility of carrying out the above operations is strongly influenced by the design of the goods themselves in terms of the materials used, their planned lifetime and the ease with which their parts can be reused and/or recycled. The insertion of circular economic systems within defined political-spatial frameworks and on a local scale allows for greater collective control over both the way in which the entire cycle is managed, overall economic, social and environmental costs (favouring the minimisation of monetary and environmental costs related to transport), and over the destination and use of the values produced.
Without prejudice to this general description, however, it must be added that **the wood-based economic system is profoundly different from other production systems**, whether based on biological materials (the food system, for example) or based on different materials (think of electrical devices). Beyond some obvious differences (trees are not the subject of design, unlike electrical devices), the most important element is the spontaneous tendency of the wood supply chain to act in a circular way, at least partially: the processing waste in each of the different links of the chain tends to be homogeneous, so it is not a problem if it is mixed; it does not need complex processing to be reused; it is not very perishable. The combination of these physical characteristics makes it simple and economically convenient to reintroduce waste into a subsequent circuit, up to combustion which, unlike that of other terminal waste, can be directed towards uses with a non-negligible level of economic added value (see pellets). Given the intrinsic nature of the wood supply chain, the problem and the reference model

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1. Ellen MacArthur Foundation (2012): Toward a circular economy

for dealing with it are another matter; **the central issue is the poor connection between the places where wood is produced and the places where it is processed**, and some data from the Alpine area are sufficient to show its relevance: Italy imports 16% (compared to the quantity produced) of energy wood and 53.8% of timber for construction; in Slovenia the percentages are 13.7% and 25.5% respectively, while Austria imports more timber for construction than it produces. And this is ignoring qualitative considerations related to the places of origin of these imports linked to the poor compliance with environmental (or even legal) standards that often accompany the flows.
Given these premises, **the ideal model towards which to aim and towards which to direct policy interventions can be better defined by the concept of local supply chains**, rather than that of a circular economy. In local supply chains, the entire production system is in fact realised within a space defined by common socio-economic and cultural characteristics, allowing a better coordination of policies; at the same time, the spatial integration between the phases of wood production from forests and the subsequent processing phases allows for the reduction of a series of negative impacts: environmental and economic costs of transport and, above all, risks of using wood that does not respect environmental and legality standards. Within this ideal model, the circular economy becomes a part of the system and not an alternative to it, optimising all the advantages that each of these processes brings. Of course, this is a goal to strive towards, with all the problems that the continuation of this study shows, and not a ready-made model to apply, but in any case the different terms used refer to analyses and policy decisions that can also have very different outcomes, and their precise definition becomes an issue that cannot be overlooked.
The objective of the first chapter of this work is to analyse the structure of forest governance in the Alpine space.
This work has been carried out by analysing the main data characterising the biotic and ownership spheres of forests in the macro regions of the Alpine space. In the same chapter we will then present some examples of forest chain organisation that, as recognised in the literature and by some interviews carried out, represent organisational models to be replicated with different degrees of scalability as they refer to diametrically opposed forest ownership structures.
The second chapter will propose policy recommendations organised by thematic area of reference. The chapter opens with an analysis of a number of quantitative indicators that allow us to correctly frame the social and economic space we refer to, delving into manufacturing specialisation, entrepreneurial structure and employment structure. The analysis of these indicators is provided in a double graphic display: the first proposes the display of the indicators on the entire map of the Alpine Space allowing a comparison between regions. Below, the second visualisation mechanism proposes the individual indicators for each region (NUTS2) of the Alpine Space, allowing a detailed comparison of the indicators on the territories.
The analysis of the quantitative indicators is followed by a qualitative section in which some policy indications for strengthening local wood supply chains are proposed. These indications are the result, on the one hand, of the literature analysis and capitalisation of relevant EUSALP projects and, on the other hand, of the interviews conducted with some central actors in the timber supply chains of the various Alpine countries. On this opportunity, we would like to thank them once again for their availability and the information they offered us:

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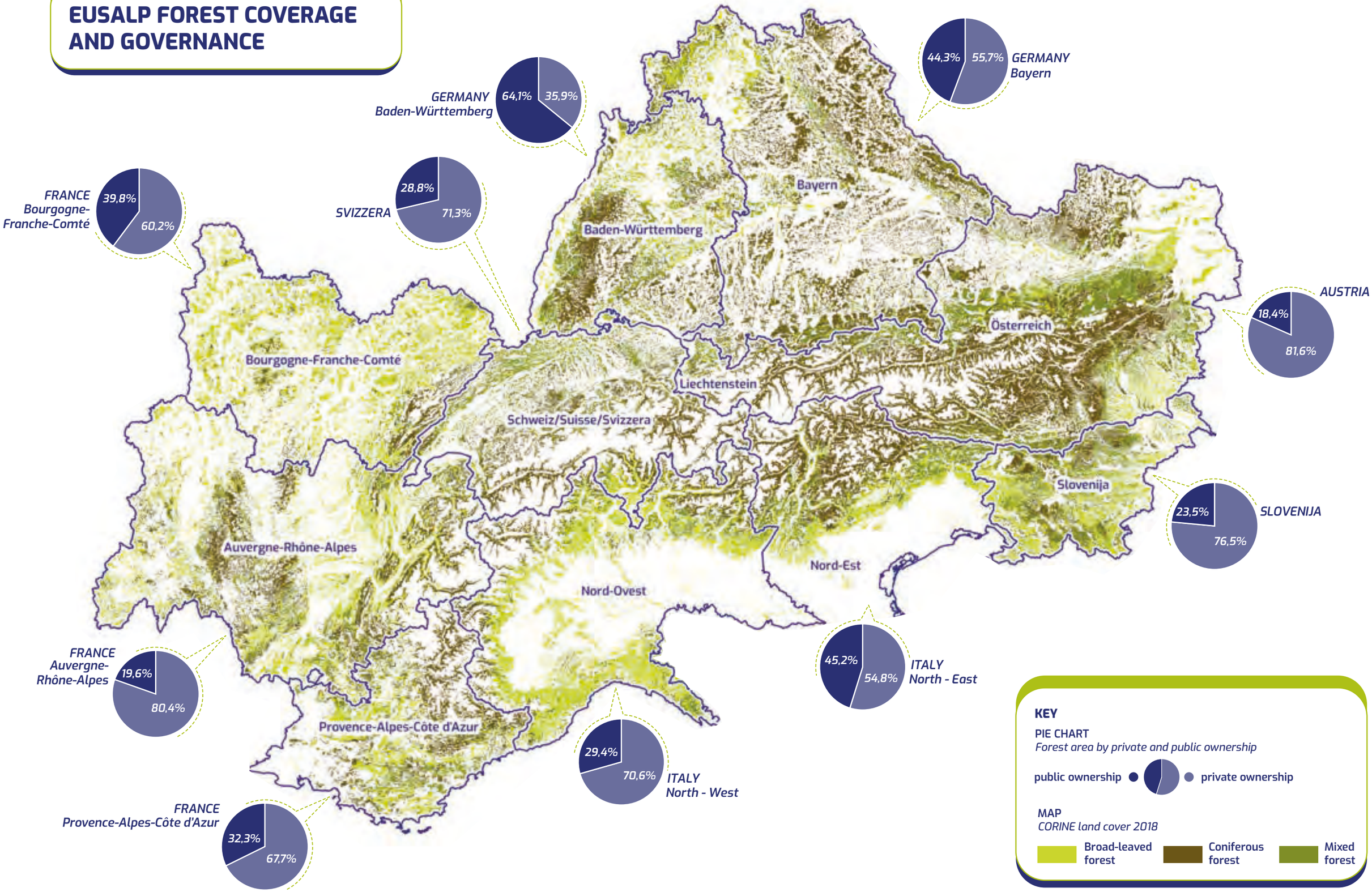
Finally, the paper presents some concluding reflections that attempt to synthesise the indications resulting from the variety of voices, writings, data and comparisons that constitute the richness of the EUSALP project and method.

GOVERNANCE OF NATURAL RESOURCES

EUSALP FOREST COVERAGE AND GOVERNANCE



KEY

PIE CHART
Forest area by private and public ownership

public ownership ● ◔ ● private ownership

MAP
CORINE land cover 2018

Broad-leaved forest | Coniferous forest | Mixed forest

GOVERNANCE OF NATURAL RESOURCES

1. THE BIOTIC CHARACTERISTICS OF ALPINE FORESTS AND THE PREVAILING FORM OF OWNERSHIP

The forest is an essential element of the Alpine habitat with an ever-increasing influence on its landscape characteristics and ecological functions. The reforestation trend that has taken place since the second half of the last century and has affected all European countries has in fact been concentrated almost exclusively in mountainous areas. This has been a natural process, driven by the **progressive expansion of wooded areas** to the detriment of meadows, pastures and cultivated areas, and consequent to the abandonment of the mountains by local populations following the profound socio-economic transformations that followed the rapid industrialisation of lowland areas and valley bottoms (McDonald, et al., 2000).
Especially mountain agriculture, characterised by low yields and low economic returns, and, secondly, extensive livestock farming have undergone a drastic reduction, often triggering phenomena of impoverishment of the socio-economic fabric that have in turn speeded up the process of population displacement. A vicious circle of abandonment that leads to the emigration of younger generations, the consequent impoverishment of the social and productive fabric and the further loss of attractiveness of the territory for new investments. Even today, many of the areas considered most at risk of abandonment in Europe are precisely those in the Alpine arc, as a consequence of **a complex interaction between a plurality of natural and socio-economic factors** (Dax, et al., 2021). The issue of abandonment naturally has many facets and differences between different geographical areas, which would require an ad hoc in-depth study to understand its dynamics. In fact, it must be said that the Alps are also characterised by a **strong polarisation between locations with a high tourist and manufacturing development and other more peripheral ones.** A picture, therefore, more punctiform than homogeneous (Conto, Fagarazzi). However, in this context, the trend of forest advancement has been general, leading forest cover to exceed 40% in recent years.

The enhancement of the forest can be a significant element in the economic and social vitality of mountain areas. The forest is in fact a habitat that can provide a plurality of ecosystem services that have a more or less profound impact on the different dimensions of the Alpine economy. The forest is undoubtedly a net provider of regulatory services, often unrewarded, such as water supply, slope protection, habitat conservation for biodiversity and CO_2 sequestration from the atmosphere (Jenkins and Schaap, 2018). Alongside these, services of a cultural nature are also produced, such as landscape quality and tourist attractiveness, which are among the main drivers of economic development in many areas. Finally, the timber production service, on which this study focuses, can also be a factor in **the development of the mountain economy and in safeguarding the social cohesion of its communities through the creation of local timber supply chains,** from forest management to sawmills and finished product companies. This activity is all the more important as this raw material becomes relevant in European development strategies, particularly in contexts, such as those of several Alpine countries, characterised by a clear imbalance between production and imports, in favour of the latter.
Looking ahead, in fact, we can expect an increasing push both towards the use of wood for energy purposes, as a renewable resource with a lower impact than fossil resources, and, above all, towards its use for construction purposes, aimed in particular at building, with the replacement of materials with a higher climatic impact and the immobilisation of the carbon stored in wood for long periods.

1.1 Forest type, management method and related value chains

Map 1 shows the distribution of forest types in the extended Alpine space (covering the Alpine areas at NUTS 2 level, i.e. regions with their own flat areas) divided into broadleaf, coniferous and mixed forests. This mapping is significant for the close relationship that exists between these types and forest management methods and between these and the wood supply chains.
The most typically mountainous typology is that of **conifers.** A complex of tree species that occupy the highest altitudinal levels in the Alps, albeit in a complexity that significantly widens their distribution range. From the low altitudes

occupied by the silver fir, often in association with the beech, to the higher altitudes that are the conquest grounds of the stone pine and the larch. Passing through the spruce, a species that occupies the intermediate altitudes of the inner valleys and is one of the main species used in the production of timber for industrial use in the Alpine area.
The dominance of conifers also brings with it a **precise approach to forest management,** that of the tall-tree or coniferous forest. These terms are used to indicate a forest composed of individuals born from seed and left to develop freely up to the prescribed age, without intermediate cuts. These would in fact be impossible in the case of conifers, which physiologically do not have the ability to shoot suckers from the base as broadleaf trees are able to do. The forest can be either even-aged or uneven-aged (the latter represents the closest model to a natural forest) and presents itself as a complex of more or less dense single arboreal stems that allow a shrubby and herbaceous layer to develop underneath, depending on the brightness of the undergrowth.
Due to the characteristics of the wood produced in this way, **the supply chain that is most closely linked to the high forest is the one that from the sawmills directs the semi-finished product towards the construction and other durable wood uses,** at most with the recovery of the waste towards the energy supply chain. In fact, the roundwood extracted from the forests has significant dimensions and such characteristics that it is certainly more profitable to use it industrially rather than to use it for other purposes. Broadleaves can be managed as deciduous forests while conifers necessarily are. For this reason, mapping the presence of coniferous and mixed forests can be significant in **identifying the presence of the biotic bases necessary for the creation of valuable wood supply chains.** Map 1 shows that coniferous forests dominate in particular the inner areas of the mountain range, at higher altitudes and characterised by a continental climate. The highest concentration occurs in the eastern area of the mountain range, between the Italian regions of Trentino Alto Adige and Veneto and Austria. Considering the extended Alpine region, including the southern and northern Pre-Alps and several lowland areas, the prevailing forest type is undoubtedly **broadleaf forest,** especially in the pre-Alpine areas (both south and north of the mountain range) and in regions without mountain peaks or which are more influenced by the sea, such as parts of Slovenia, the forests of Provence and Liguria. The broadleaf forest certainly allows greater versatility of management, as both coppice and high-trunk management are possible. Over the centuries, however, the former has often prevailed, with different forms and cutting shifts but with a mostly energetic orientation. Today, a large part of the coppices is started in high-trunk, more due to spontaneous abandonment of management practices than to conscious choices by local administrations. Where active forest management still prevails, however, coppicing still prevails, consisting in the cutting of trees according to time shifts. This generates the renewal of the forest from the stumps of the cut individuals, through the emission of suckers that form a crown of small stems around the original cut. The quality of the wood, in this way, is undoubtedly inferior to that of the high-trunk forest, both in terms of diameter and wood characteristics. For this reason, **the main destination is the energy supply chain,** followed by other uses such as fencing and natural engineering, particularly in areas heavily characterised by valuable agricultural activities such as viticulture and fruit growing. As an example, although limited to a single Alpine country, in Italy, out of a total of approximately 9 million m3 of wood extracted annually on the national territory, 66% is destined for firewood and 90% comes from broadleaf forests and in particular from mixed oak woods. Of the 34% destined for industrial and construction use, 60% comes from the North-East regions (Trentino Alto Adige and Veneto), i.e. those most characterised by coniferous forests with tall trees (National Forest Strategy, Annex 2).
Therefore, **not all forest assortments can be addressed to the same supply chains:** wood species, characteristics and forms of governance strongly influence the possibility of developing one supply chain rather than another, and this constitutes the basis, we would say biotic, on which to set a development strategy.

1.2 Forms of forest ownership

Map 1 shows a second data point of great significance with regard to the construction of timber supply chains: that of the **distribution of ownership between public and private.** If the biotic sphere is indeed the basis for the existence of a supply chain, the capacity to use the resource is necessarily its second level. This capacity is the reflection of several social factors: the presence of an active community in the area, infrastructures suitable for timber harvesting and transport, the existence of a market for the products obtained

from it, and the ability to strategically plan the harvesting and use of the resource. It is precisely this last factor that is directly linked to the forms of forest ownership, which often represent an insurmountable obstacle for the organisation of an efficient supply chain. Many studies and interviews conducted in this paper (Andrighetto, Brun, Klaus) show that **one of the main bottlenecks in the timber sector in the Alpine region is the pulverised ownership structure.** What prevails is in fact private property, often very small in size, the result of centuries-old hereditary divisions. A size that is too small for owners to be encouraged in its active management by an economic incentive. And this, together with the phenomenon of the abandonment of alpine areas which has led many owners and heirs to become disinterested in their land, has led a large part of the forest areas to the cessation of all forms of management. On the other hand, even when owners are known and aware of their property, it can be seen that the smaller they are, the more they prevail in the logic of conservative management deriving from the prevalence of the bequest, cultural and ecological value they attribute to the forest. Large landowners generally take an approach of economic exploitation of the wood resource: managing several thousand hectares of forest, they are able to plan cutting shifts, open and maintain the road system necessary for vehicles to reach the sites, maintain relations with other players in the chain and develop sales strategies. Land ownership, whether public or private, is an important driver in determining the presence of dynamics such as those described above.

In general, due to the size of the land, **public land ownership allows for better planning of the exploitation of natural resources,** compensating for the aforementioned difficulties existing in contexts dominated by pulverised private ownership. As can be seen from Map 1, the distribution of these types of property in the Alpine macro-regions is rather differentiated, although with a **clear predominance of private over public ownership.**

In Italy, a difference emerges between the North-West, which is characterised by a prevalence of private ownership (over 70% of the total), and the North-East, which on the contrary shows a greater weight of public ownership. Liguria shows the highest rates of private prevalence, with 86.1% of the total land, while in the North-East the situation is reversed. In this case, it is mainly Trentino that shows a clear prevalence of public ownership, accounting for 73% of the total forests. South Tyrol shows a profoundly different figure (only 30.8% public ownership) partly surprising given the proximity of the two autonomous provinces, but in line with what happens across the border. Austria, in fact, is the Alpine country with the highest rate of private ownership (81.4% of the total) and a similar figure is also reported for neighbouring Slovenia (76.5%). The German Alpine regions show a greater balance between the two figures with a clear prevalence of public ownership in Baden-Württemberg. In Switzerland and France, the net prevalence of private ownership returns, exceeding 80% of the total in Auvergne Rhône-Alpes.

2. FORMS OF OWNERSHIP AGGREGATION AND TIMBER SUPPLY CHAINS

The data from Map 1 on the regional distribution of public and private ownership in the Alpine region raises some important question marks. From the productivity data also reported in this study, we know that the most developed wood industries are located in the eastern part of the mountain range, namely between Austria, Trentino Alto Adige and Veneto, and Slovenia. However, as can be seen from the map, these territories respond to profoundly different ownership distribution logics. In Italy, the public one clearly prevails, while in Austria, in a specular manner, the private one. We therefore try below to give **some examples of land organisations that have been able to express successful development models** in these very different territories.

2.1 Collective properties in Trentino (eastern Alpine arc)

In Trentino Alto Adige and Veneto, the predominance of public property over private property often derives from very ancient forms of organisation, dating back to the Middle Ages, which have preserved the collective ownership and civic uses of forests and pastures, handing down their integrity to the present day. **Community land management** arose from the need of mountain populations to live in isolated and marginal territories, characterised by an unfavourable climate and low land productivity. It is a way of rationalising the available resources by regulating their exploitation, which mostly concerned and still concerns forest and pasture areas. The

link between limiting factors and this organisation of the land structure is also demonstrated by the prevalence of private ownership in the more productive agricultural land on the valley floor and in the more favourable areas. There are many forms of collective property but they are all characterised by two different types of rights that can be exercised over them: rights of use and rights of decision. The former include rights of access to pasture or forest, harvesting and exploitation. The latter include management rights (modifying resource management plans), exclusion rights (being able to exclude an individual from access to the resource), and alienation rights (i.e. transferring rights to a third party). Decision rights are the most strictly political ones, which are exercised by participating in the organisation's assembly and other decision-making bodies. An individual only truly participates in the collective ownership of a good when he or she possesses both rights (Gatto, 2017).

For centuries, Trentino Alto Adige is a mountainous region that was part of the Republic of Venice, as an inland and peripheral area. The communities in medieval and modern times (1200-1800) consisted of small villages of about 500 inhabitants each and the passage from one valley to another was often long and difficult due to the need to cross high Alpine passes. The orography of the land has always made farming complicated (only 8% of the surface area was considered arable in 1800) and consequently communities drew their livelihoods mainly from meadows removed from the forest, which typically surrounded the village, and from the forest itself (about half of the surface area was forest and one third pastureland). In general, timber and livestock provided the main resources for the population's livelihood, both as direct use and as commodities for export and exchange with neighbouring communities and regions. Arable and wine-growing areas were always privately owned while the others were exploited through collective mechanisms (Casari, 2007). The first formalisations of this management date back to the 13th century with the emergence of the "*Carte delle Regole*": by 1800 about two thirds of the communities in Trentino had adopted **a charter to regulate the use of their common property.** The era of the Charters officially ended in 1805 with their abolition by Napoleon, following the conquest of northern Italy. The charters were the formalisation of the ancient rules that the village assemblies had given themselves over time to organise the exploitation of resources, determining the quotas due to each and the location of withdrawals. This applied to summer grazing and haymaking as well as to logging, thus avoiding overexploitation of the areas closest to the village or watercourses (which would have been the most convenient and reachable) and **sustainably distributing exploitation over the entire community territory.**

2.2 The example of the "Magnifica Comunità di Fiemme"

The birth of the 'Magnifica Comunità di Fiemme' is dated to the stipulation of the *Ghebardini Pacts* of 1111, in which the Fiemme community, until that time independent, was enfeoffed under the authority of the Prince-Bishop of Trento, who imposed certain duties on the valley (mainly payments in kind and money and concessions on the administration of justice). Although in all other respects the valley could consider itself independent, that pact was the end of the community's complete freedom and paved the way for continuous sovereignty disputes between Trento and Fiemme in the following centuries (La Magnifica Comunità di Fiemme, 2008). This system had begun operating in a Fiemme Valley that was very sparsely populated, compared to today's numbers (around 20,000 inhabitants). It is estimated that at the end of the 14th century, the number of inhabitants was between 1,500 and 2,000, rising to around 6,000 in the 17th century and over 9,000 in the 18th century. **Timber production and processing was already the focus of the Magnifica's activities at that time.** In 1500, it is estimated that there was an annual production of around 80,000 logs: this was an enormous amount for the time and led to the impoverishment of the valley's forests.

The history of the Community found its great upheaval in the political events that marked Europe at the beginning of the 19th century with the succession of Habsburg, Bavarian, Napoleonic and again Habsburg administrations. However, throughout the 19th century, it managed to cope with numerous attempts to disrupt the order of the common good by subdividing the land between municipalities and between private individuals and also to complete important public works such as the road that still today links all the valley municipalities by 47 km and the hospital in Cavalese. An initial legal reorganisation was completed with the Provisional Statute of 1908 and then with the Fascist Statute of 1935.

In the post-war period, a final front was opened to divide the

communal properties until the 1960 Supreme Court ruling certifying their indivisibility and the *sui generis* nature of the Community[1].
The latest version of the Statute[2] was approved in 2017, defining the community in Article 2: "*The Community of Fiemme's Vicini* [neighbours] *is the universality of the Vicini* [neighbours]*, to which the collective patrimony belongs, in its original title, and which is articulated in the Regole* [rules]".
The community still consists only of *Vicini* [neighbours]: one is a *Vicino* [neighbour] by birth in families of *Vicini* [neighbours], by adoption or by residence for a period of more than 25 years in the territory of one of the *Regole* [rules].
The collective patrimony is made up of intangible assets, consisting of the **values of solidarity belonging to a compact vicinal unit settled on its own territory** that is always well safeguarded, as well as the assets constituting the historical and artistic patrimony; by the tangible assets, consisting of the lands with prevalent sylvan-pastoral destination of original vicinal acquisition, or acquired also subsequently and having identical destination, which constitute the universal community patrimony, which is inalienable, indivisible, imprescriptible; by the tangible assets, movable and immovable, which do not have the nature of universal community patrimony and which are freely available, inasmuch as they are instrumental and destined for administration.
On the distribution of annuities, Article 11 specifies that: "*The use of the income obtained from the management of the collective assets, administered by the Institution representing the Community of Vicini* [neighbours], *shall be governed by specific regulations in order to ensure the participation of all the Vicini* [neighbours] *in the enjoyment of the income, firstly by means of solidarity interventions in support of the neediest social strata, and also by means of interventions aimed at the social, cultural and economic progress of the entire Community of Vicini* [neighbours]".
Elective bodies continue to be the original ones: a *Regola* [rule] Council for all 11 municipal *Regole* [rules] consisting of one representative for every 500 *Vicini* [neighbours] (the term of office is increased from the old days and is now four years). The council elects the "*Regolano*", who acts as a representative to the council and with it expresses its opinion on the management of the municipality's assets, the distribution of benefits and the rules of operation of the community.
The Council is composed of the eleven "*Regolani*" and

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1. MCF - Palazzo Magnifica Comunità di Fiemme
2. Prot (mcfiemme.eu)

constitutes the administrative body of the Magnifica with the task of appointing the "*Scario*", who is the Secretary general of the Community. It also approves the budgets of the body and of the affiliated companies and acquires the opinions of the controlling bodies. It defines the distribution of income, investments, salaries and office allowances. It also approves amendments to the Statute and all strategic choices regarding the management of the collective assets.
Today, the *Magnifica Comunità di Fiemme* continues to administer a large heritage of collective assets[3] located in Val di Fiemme through the *Azienda Agricola Forestale* [Forestry Farm]. It manages 20,000 hectares of land consisting of 69% forest and 28% pastureland; more than 200 rural buildings such as mountain huts and alpine pastures; and over 400 km of forest roads. The management of the company is carried out through the *Ufficio Tecnico Forestale della Magnifica* [Forestry Technical Office], composed of a manager, three forestry technicians, eight forestry agents, a gamekeeper and, during the summer period, four gamekeepers. The manager is directly accountable to the Council and the Secretary General.
The forests represent the greatest wealth of the Magnifica heritage: more than 13,000 hectares, 9,000 of which are in productive use, divided into 10 districts for each of which the Technical Office prepares forest management plans that are revised every 20 years. The estimated capital is 3,700,000 m^3 of standing timber, of which 44,000 m^3 is harvested each year on an annual growth of 64,000 m^3, and the timber is doubly certified FSC and PEFC.
Logging is entrusted to local specialised companies and the timber is then partly exported and partly destined for the sawmill in Ziano, which is also part of the Magnifica[4].
In addition to the forest, there are pastures, covering some 6,500 hectares, used for cattle grazing and some 20 alpine pastures for sheltering animals and processing dairy products.
The activities of the Magnifica Comunità di Fiemme create **jobs in the valley and an economy that remains flourishing over time, even in these last few years following the Vaia storm,** which led to significant damage to the forest heritage and the spread in the following years of the "*bark beetle*", a beetle that attacks spruce and takes advantage of the presence of dead wood on the ground, which caused just as much damage to the surviving trees. Although this calamity undoubtedly has significant long-term repercussions, to date the economic consequences still do not seem to weigh heavily on the Magnifica budgets; in fact, according to the

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3. Patrimonio Forestale | MCF (mcfiemme.eu)
4. Patrimonio Forestale | MCF (mcfiemme.eu)

2021 results published in June 2022, the economic balance sheets remain very positive with a turnover of around 20 million euros and around 2 million in profits from the Farm, the Real Estate and the Sawmill (La Magnifica, 2022).

2.3 The Austrian example of private management

As noted in map 1, Austria is the Alpine country with the highest proportion of private land to its total land area: over 80 per cent, which is a very high ratio considering the normal public land in each European state and the presence of protected and nature areas. However, this country is a major timber producer and the forestry sector makes a significant contribution to the national GDP and job creation. According to data[5] from 2021, timber production was close to EUR 2.2 billion in value for about 18 million cubic metres of material removed, generating employment for more than 20,000 workers.
Forests in Austria cover about 48% of the national territory with 4 million hectares and there are approximately 145,000 private owners. As is the case in other Alpine countries, **this private property is mostly small and in the hands of individuals who for the most part do not derive their main income from forestry or agricultural activities.**
Indeed, almost half of them (45.5%) own less than 5 ha of forest, while between 5 and 20 ha are owned by more than a third of the sample (39%) and owners of average extensions between 20 and 200 ha are only 14% of the total and even fewer large owners over 200 ha (1.2%). Overall among forest owners, farmers, i.e. those who derive their main income from agricultural activity, are 20% of the sample, a minority figure but very high compared to other similar Alpine contexts. Another 20% are considered part-time farmers, thus supplementing agricultural income with other types of income and dominating the former. The remaining part is made up of individuals who live in small and medium-sized towns and do not make agriculture their main economic activity. In the table from the Country Report "Forest Land Ownership Change in Austria" of Cost it is possible to highlight even better this distribution in the ownership structure in which the clear prevalence of private property and the residuality of regional (1.87%) and federal (15.68%) property is highlighted; rather represented, although marginal, is that of common property with about 10% of the total. According to this same report, there are no clear trends in the composition of ownership, as the land market, and in particular the forest market, is very stable with very few changes of ownership. However, while the subjects of ownership are not changing, their nature is changing. While about 80% of forests are in the hands of farmers, with an almost stable proportion over the decades, these have declined sharply in number (from 400,000 in 1960 to about 200,000 today) and with a tendency to shift from full-time to part-time farmers.
85% of the wood extracted and marketed each year in Austria is made up of conifers and the remainder of hardwoods, of which 60% of the total is construction wood, 15% pulp and 25% energy (Austrian Forest Owner Cooperative, 2019). Austria undoubtedly enjoys a particularly favourable context, as it has a large wooded area with good accessibility and is dominated by tree species suitable for the construction timber industry, most of which are governed by a high proportion of forests. However, such a fragmented ownership structure poses a high management risk, common, as already mentioned, to many Alpine territories that find in this segment of the supply chain the real bottleneck that prevents an economically profitable use of the forest resource.
In Austria, however, a model of particular interest has emerged that can support forest owners in managing their forests and facilitating their access to markets.
It is a system of public and private law bodies that unite the various actors in the agricultural and forestry chain by facilitating the dissemination of knowledge, the representation of interests, access to resources and the marketing of timber. On the one hand, there is the representation of the interests of workers in the agricultural sector, which the Austrian Constitution delegates to the Chambers of Agriculture, one for each Länder into which the Austrian federal state is divided and falling under state jurisdiction and regulation, i.e. the Länder themselves. Registration with the Chambers is compulsory everywhere for owners, family members, self-employed farmers and agricultural and forestry cooperatives. In some states, such as the Tyrol, employees are also members of the same chamber, creating a special case of corporatism in which the same institution represents the interests of both employers and employees. Elsewhere, the two categories belong to two different Chambers[6]. The chambers are responsible for representing the interests of the agricultural and forestry sector to the state and professional associations.

→ 5. Economic accounts for forestry at national level - STATISTICS AUSTRIA - The Information Manager (statistik.at)

→ 6. CHAMBERS OF AGRICULTURE | Eurofound (europa.eu)

In addition, they provide technical support for draft laws, give opinions on technical figures in the private and public sector, maintain relations with agricultural cooperatives and weave relationships with them in order to work in synergy. In addition, the chambers promote schools and technical education initiatives in the area and act as advisors for drafting bills and supporting the administrative bodies of the state[7]. The apex of the organisation is the Standing Committee of the Presidents of the Chambers of Agriculture, which unites all the state chambers at the federal level and is the union's ultimate political steering and lobbying body. Operating alongside the chambers are the sector cooperatives, which bring together agricultural and forestry producers and look after their interests. Representing them is the Austrian Forest Owners' Cooperative. It is an emanation of the chambers, and similarly to them is articulated at state level with top-level representation at federal level. It brings together more than 70,000 owners with a total forest area of 1,060,000 ha and 3.3 million cubic metres of timber marketed annually. This organisation works on behalf of forest owners through several actions. Firstly, it provides advice, technical support and logistical support. It also advises on obtaining the main wood certifications, and finally supports members in its marketing. At the federal level, it also has a representative and lobbying role in defending the interests of foresters. The cooperative states its objectives as follows:

- Increasing the added value of members;
- Implement joint marketing of timber;
- Bring logging closer to the annual increase and mobilise logging reserves;
- Providing forestry services;
- Broadening basic skills, such as utilisation planning, timber harvesting, logistics management and marketing;
- Encouraging participation in logistical projects;
- Offering a sustainable, customer-oriented and demand-driven supply of raw materials for all customers;
- Reducing imports.

This system, which is **based on private ownership** but which is **supported by public and trade union organisations** that are able to represent the world of small-scale farmers with credibility and provide services of great importance, is clearly a very strong element that contributes to the success of the Austrian forestry sector.

→ 7. The main tasks of the Austrian Chamber of Agriculture |Landwirtschaftskammer Österreich (lko.at)

3. OTHER FORMS OF ORGANISATION OF FOREST PRODUCERS

3.1 Land associations

This is a development model already widespread in France and taken up by several Italian Alpine regions that promotes, also through the use of European EAFRD funds, the associationism between owners of agricultural and forestry land in order to combat fragmentation, generate planning, income and work, without interfering with private property rights. In essence, it encourages, through public calls for tenders and distribution of resources, a process of land re-aggregation, which is the *conditio sine qua non* for revitalising certain agricultural and forestry sectors, without expropriating them but basing the initiative on the voluntariness of the owners themselves. The association is characterised by being a free, non-profit association with its own statutes and representative and decision-making bodies. Each landowner who joins retains full ownership of the property, which is not usucaptible, and the right to withdraw from the association. The decision-making boards are responsible for the unitary management of the properties conferred on the organisation, identifying the best technical and economic solutions for their utilisation, identifying and hiring technicians and labour to carry out operations. They may also sell the land, in a unitary form, for rent to third parties or to their own associates, chosen by them on the basis of the investment and management plans submitted. With the proceeds of management or rent they may provide for maintenance and land improvement works[8].
One of the reference models for land associations is the French pastoral "*Association foncière*". These are forms of associationism that have long existed in France and can be either stipulated under public law, by prefectorial decree, or the result of a free association between owners. These associations are possible in inland and mountainous areas, where the income from land, pastures and forests is low and the union between different properties can be an incentive to their use.

→ 8. Cosa sono le associazioni fondiarie? | Regione Piemonte

3.2 Forest Agreements

The forest agreement tool was born in Italy on the impetus of territorial associations. It was in 2020 that Slow Food launched the initiative at the Oltreterra conference, defining the fight against land fragmentation in the forestry sphere as urgent and imperative. The tool was introduced into Italian legislation with Decree 77 of 31 May 2021, later converted into law (108/2021). The forest agreement is defined as the instrument necessary to "*enhance public and private areas with an agro-sylvo-pastoral vocation and for the conservation and provision of ecosystem services provided by forests*". Forest agreements do not constitute an autonomous figure but are included in the productive districts and enterprise networks regulated by DL 5/2009.
The forest agreement is a highly flexible legal instrument that must arise from the willingness of several owners to adhere to it. Building a mindset of cooperation is undoubtedly the main stumbling block to using the instrument. Once the grouping has been defined, the instrument can be applied.
It takes the form of a contract between private individuals in which the purpose, obligations and rights of the contracting parties are defined, the actions and activities envisaged, the objectives of each of them and, possibly, the individuals delegated to roles in the execution of the contract.
Aggregation can take place either vertically, through different agents in the same chain (e.g. from foresters to sawmills) **or horizontally** (between several foresters who decide to merge properties). However, each contracting party remains the full owner of the property, with a right of withdrawal and does not lose its entrepreneurial freedom. The model thus more closely resembles that of a consortium or network than that of a company merger.
The advantages of the agreement are a. the **ability to make strategic choices over a wide area, in the medium and long term,** b. to join forces to **plan resource management** and maintenance or infrastructure works, c. to **increase investment capacity** at each step of the chain, d. to participate jointly in calls and tenders. In terms of taxation, then, it enjoys special benefits, comparable to those enjoyed by business networks (Rete Rurale Nazionale, 2022).

4 NEW EU FOREST STRATEGY 2030[9]

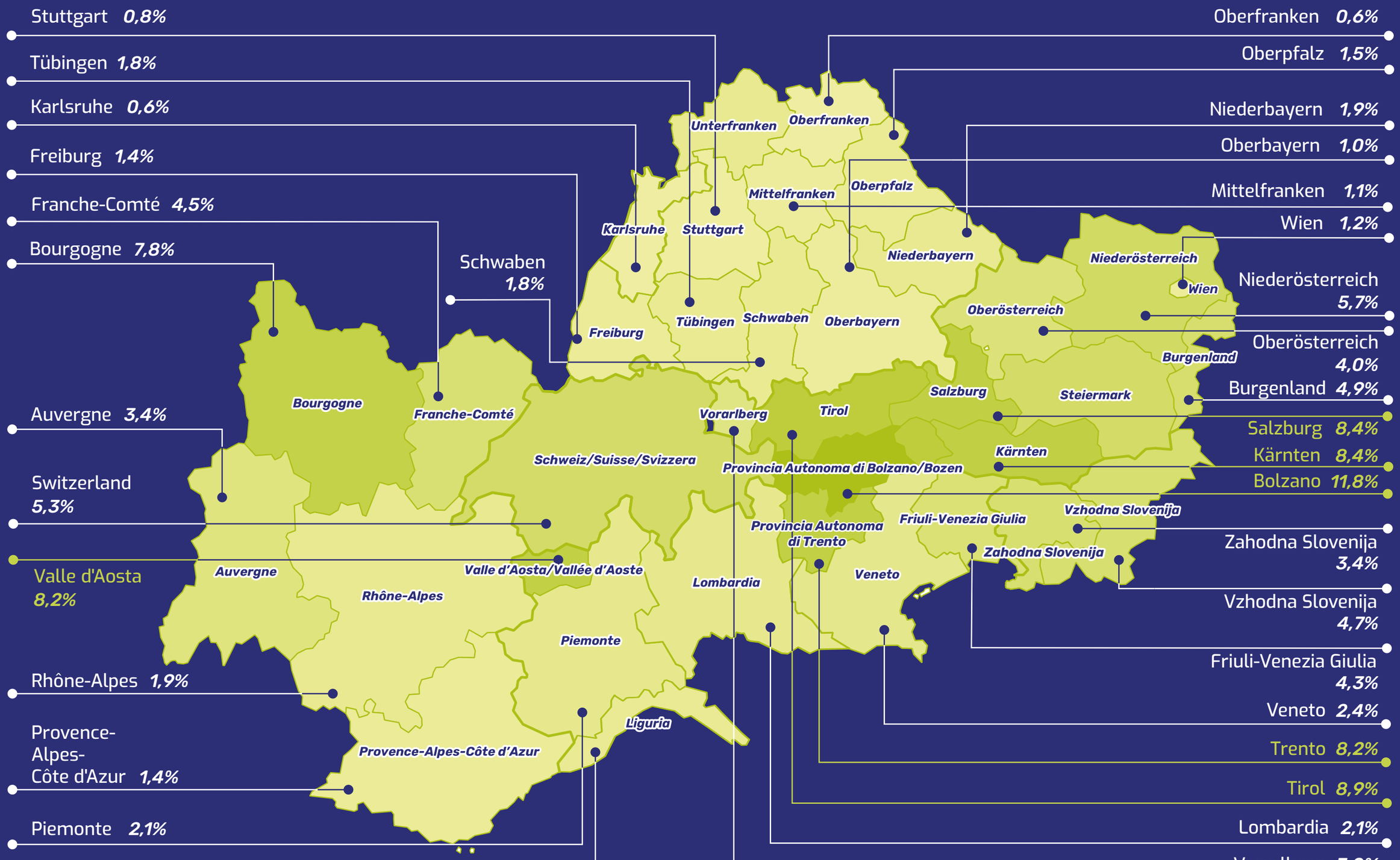
Once the forms of organisation have been examined, the following is an analysis of the framework of the strategies and in particular a quick review of the main points that constitute the new European forestry strategy.
On 15 January 2020, in its resolution on the European Green Deal, the European Parliament welcomed the Commission's intention to adapt the European Forestry Strategy, which was due to expire that same year. This leads to the issue of the "New EU Forestry Strategy 2030" published in a Communication from the Commission to the Parliament on 16 July 2021.
The strategy considers climate change aspects in particular: from the threats it represents for forest areas (diseases and atmospheric events) to emission reduction targets, as envisaged by Fit for 55% (-55% emissions by 2030, a strategy that also includes the improvement of natural carbon sinks). Deeply linked to these objectives is the support expressed in the strategy for the timber industry, a sector to be incentivised and promoted from an environmental point of view as its products are accounted for as net carbon removals - as provided for in Reg. 841/2018. The strategy also considers the global trend of forest area loss, promoting legislation to help non-European countries with conservation and reforestation programmes and to increase control over the origin of imported timber.
Point 2.1 expresses at length **the intention to make the building sector increasingly a carbon sink, through the extension of the use of wood** to replace cement, in connection with the "Renovation Wave" strategy and the "New European Bauhaus" initiative. In this sense, the document considers it necessary to act on both the quality of supply and demand, promoting research on materials and uses of wood in construction.
A second major issue, addressed in section 2.2, is the use of wood for energy purposes, which today accounts for 60 per cent of the EU's renewable energy consumption. The strategy aims to maintain the role of this source while increasingly regulating the quality of the wood used (reducing the use of whole trees, for example) and the efficiency of the production system. This is followed by the wider forestry economy, including ecotourism and the development and dissemination of skills in the sector. For each of these objectives, the Commission is committed to developing standards,

→

9. https://eur-lex.europa.eu/legal-content/IT/TXT/HTML/?uri=CELEX:52021DC0572&from=EN

regulations and instruments to support them.
The third point of the strategy concerns the expansion of forest areas and their protection against the threats posed by climate change. Specific objectives of this chapter are the protection of the last remaining patches of primary forest on the continent and sustainable management aimed at strengthening forest ecosystems, e.g. by promoting mixed and uneven-aged forests.
The sustainability principles of forest management are those enshrined in FOREST EUROPE, on which the Commission bases its interpretation. Among the priorities of this chapter is also reforestation. While in natural forests this is determined by spontaneous processes, which are the most favourable, there are urban and peri-urban areas where intervention must be anthropogenic. Hence the need, noted in the strategy, to control the genetic material used and the link with the Biodiversity Strategy 2030, which envisages the planting of three billion trees in the EU by 2030.
Payments for ecosystem services (PES) linked to forest biodiversity is also an issue addressed in this section. This is a public good that is not remunerated by the market and for which the strategy aims to promote public and private payment instruments, including but not limited to the CAP. Among the interventions envisaged by the Commission on this chapter will be both cognitive tools and definitions linked to protection systems (such as those for ancient or primary forests or for special management practices) as well as advice and assistance e.g. linked to PES. In addition, the strategy aims to increase funding for forest biodiversity protection and sustainable practices within the CAP under discussion.
The fourth point of the strategy deals with the issue of data collection, **assessing the accuracy of data collection as insufficient, also due to the choice of management practices.** This is why the Commission is committed to providing a clearer framework on monitoring parameters and to funding the European Forestry Information System (FISE) in order to strengthen its role in harmonising data from member states.
The fifth point concerns research, which is considered fundamental both for managing forests and for determining and rewarding their value through knowledge and the definition of eco-systemic services. Among the instruments made available by the Commission is the Horizon Europe programme, in which forestry issues will be promoted.
The sixth point deals with forest governance. The Commission intends to promote a new instrument of governance for forests, capable of coordinating the policies of individual countries in a complex and multidisciplinary perspective, capable of bringing together the many similarities between the forestry strategy and other European initiatives, first and foremost the Green Deal with its objectives.
The seventh and last point of the strategy concerns the European acquis on forestry issues and deals with a strengthening of enforcement actions. From compliance with directives (Habitats, Birds) to the prosecution of logging offences in protected areas to the assessment of environmental impacts of public and private works.

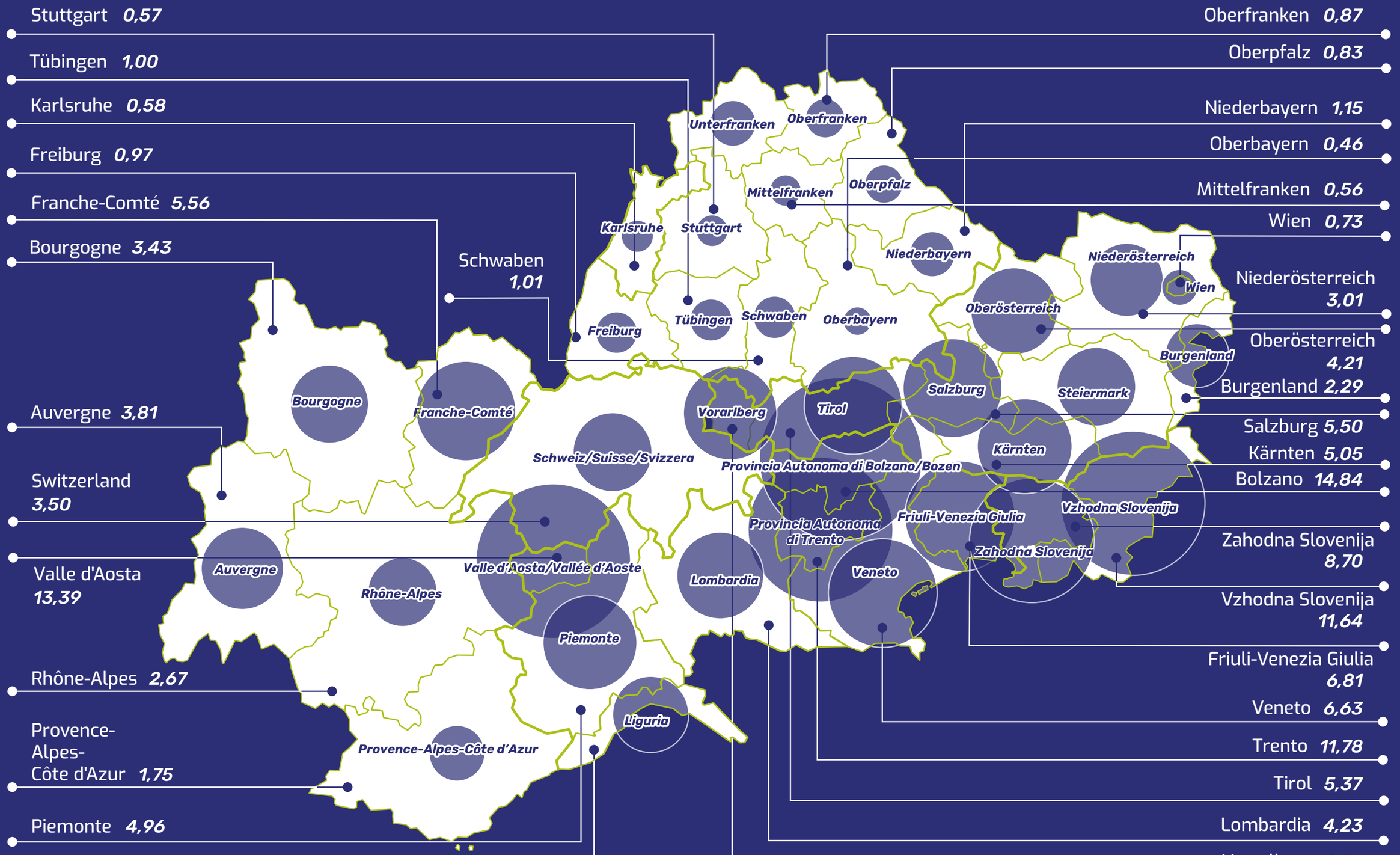
POLICY RECOMMENDATIONS FOR TIMBER VALUE CHAINS IN THE ALPINE SPACE



MAP 2

WOOD MANUFACTURING SPECIALISATION IN EUSALP REGION

compares the number of persons employed in the wood processing sector with the total number of persons employed in the manufacturing sector



MAP 3

DENSITY OF ENTERPRISES IN WOOD MANUFACTURING ACTIVITIES

refers to the number of local units of enterprises per 10,000 inhabitants

Stuttgart *11,94*

Tübingen *27,09*

Karlsruhe *6,57*

Freiburg *16,88*

Franche-Comté *22,14*

Bourgogne *23,94*

Schwaben *22,23*

Auvergne *15,66*

Switzerland *42,39*

Valle d'Aosta *32,01*

Rhône-Alpes *9,33*

Provence-Alpes-Côte d'Azur *3,32*

Piemonte *18,07*

Oberfranken *7,89*

Oberpfalz *21,14*

Niederbayern *24,64*

Oberbayern *8,95*

Mittelfranken *12,54*

Wien *3,83*

Niederösterreich *38,07*

Oberösterreich *48,46*

Burgenland *25,66*

Salzburg *58,65*

Kärnten *56,11*

Bolzano *83,07*

Vzhodna Slovenija *30,97*

Zahodna Slovenija *53,96*

Friuli-Venezia Giulia *39,64*

Veneto *27,95*

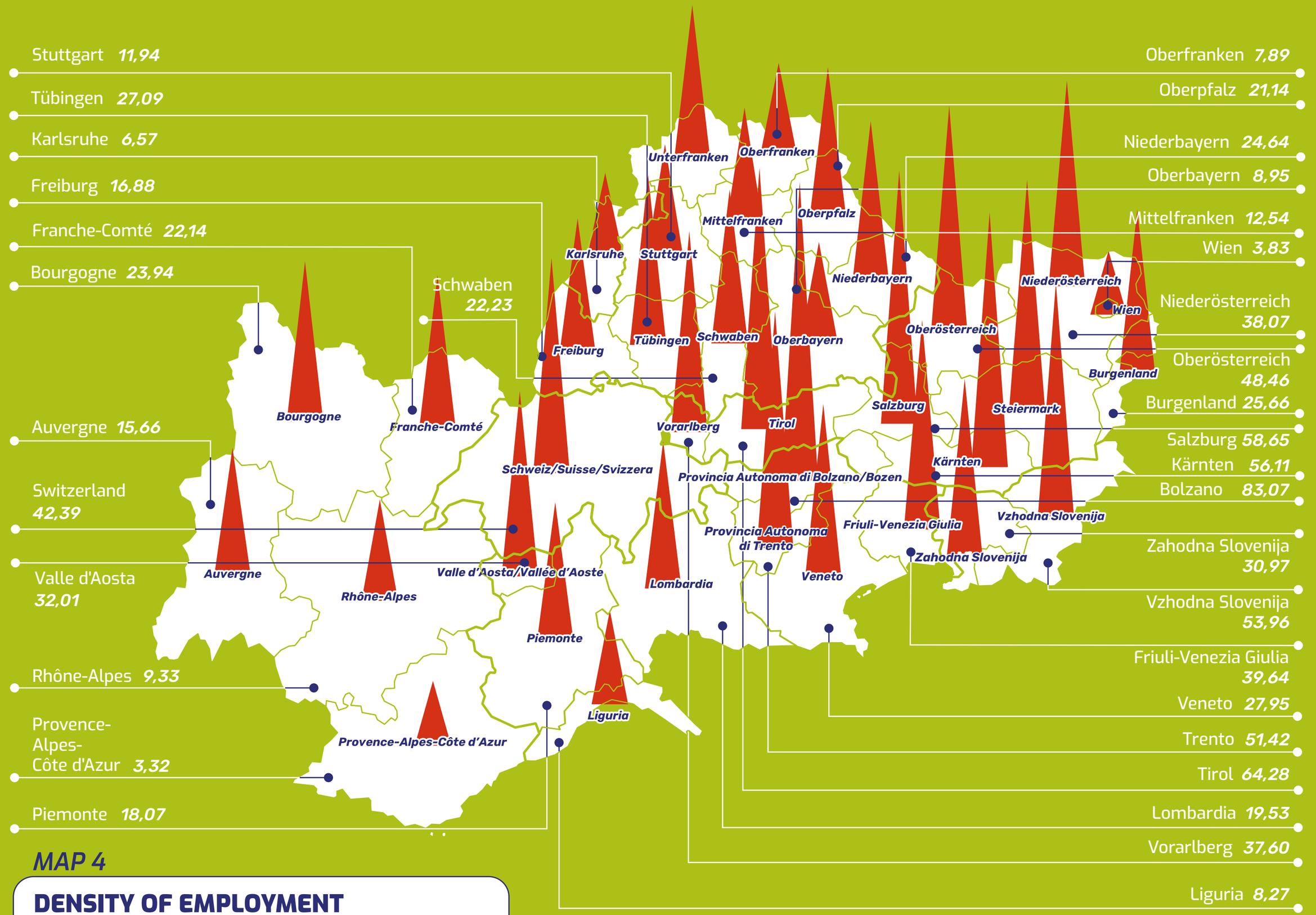
Trento *51,42*

Tirol *64,28*

Lombardia *19,53*

Vorarlberg *37,60*

Liguria *8,27*



MAP 4

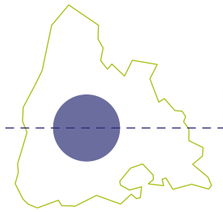
DENSITY OF EMPLOYMENT IN WOOD MANUFACTURING ACTIVITIES

refers to the number of employed per 10,000 inhabitants

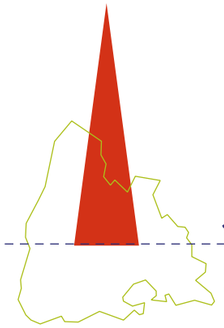
GERMANY

Freiburg

1,4%
Wood Manufacturing Specialisation



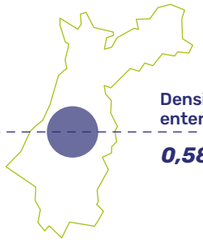
Density of enterprises
0,97



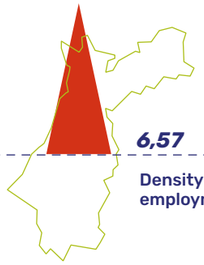
16,88
Density of employment

Karlsruhe

0,6%
Wood Manufacturing Specialisation



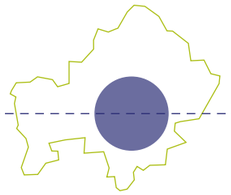
Density of enterprises
0,58



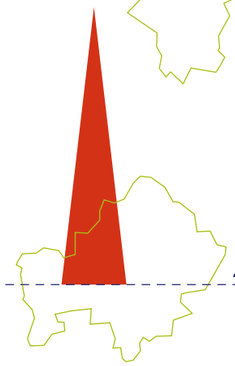
6,57
Density of employment

Unterfranken

1,9%
Wood Manufacturing Specialisation



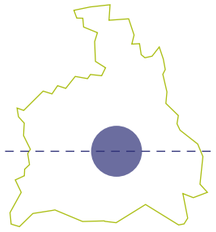
Density of enterprises
1,18



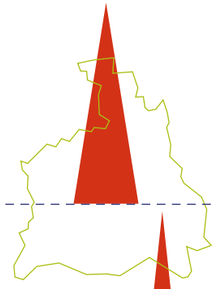
22,26
Density of employment

Stuttgart

0,8%
Wood Manufacturing Specialisation



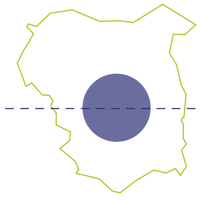
Density of enterprises
0,57



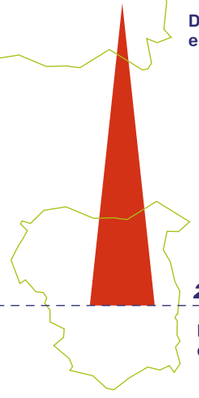
11,94
Density of employment

Tübingen

1,8%
Wood Manufacturing Specialisation



Density of enterprises
1,00

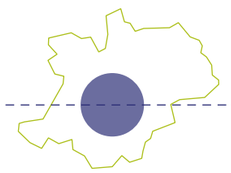


27,09
Density of employment

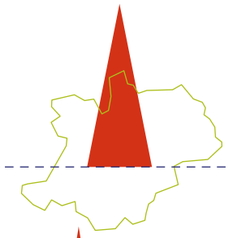
GERMANY

Oberfranken

0,6%
Wood Manufacturing Specialisation



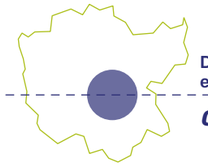
Density of enterprises
0,87



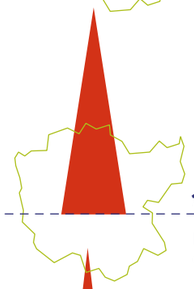
7,89
Density of employment

Mittelfranken

1,1%
Wood Manufacturing Specialisation



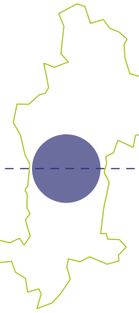
Density of enterprises
0,56



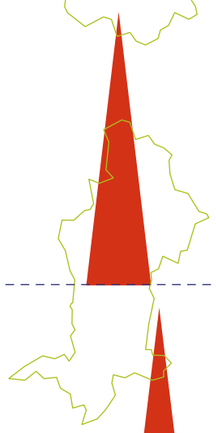
12,54
Density of employment

Schwaben

1,8%
Wood Manufacturing Specialisation



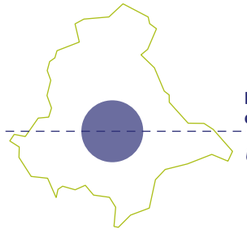
Density of enterprises
1,01



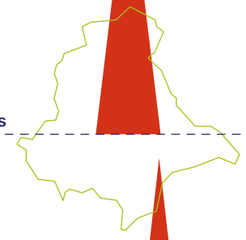
22,23
Density of employment

Oberpfalz

1,5%
Wood Manufacturing Specialisation



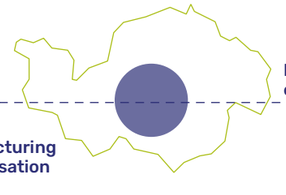
Density of enterprises
0,83



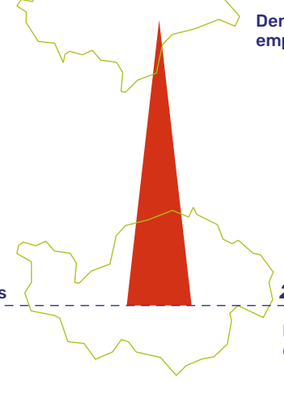
21,14
Density of employment

Niederbayern

1,8%
Wood Manufacturing Specialisation

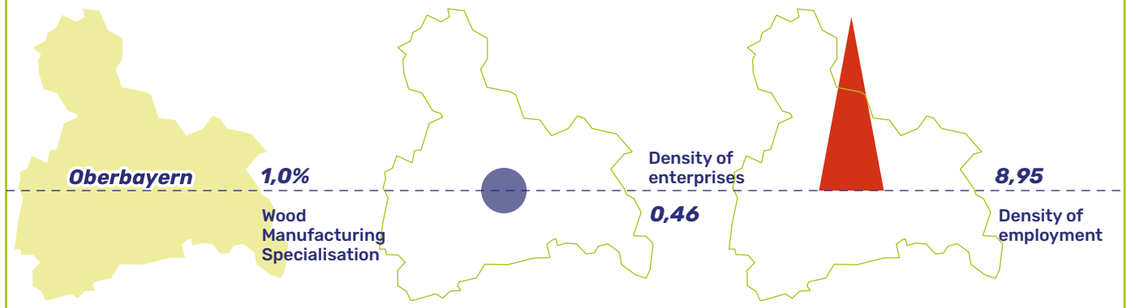


Density of enterprises
1,15

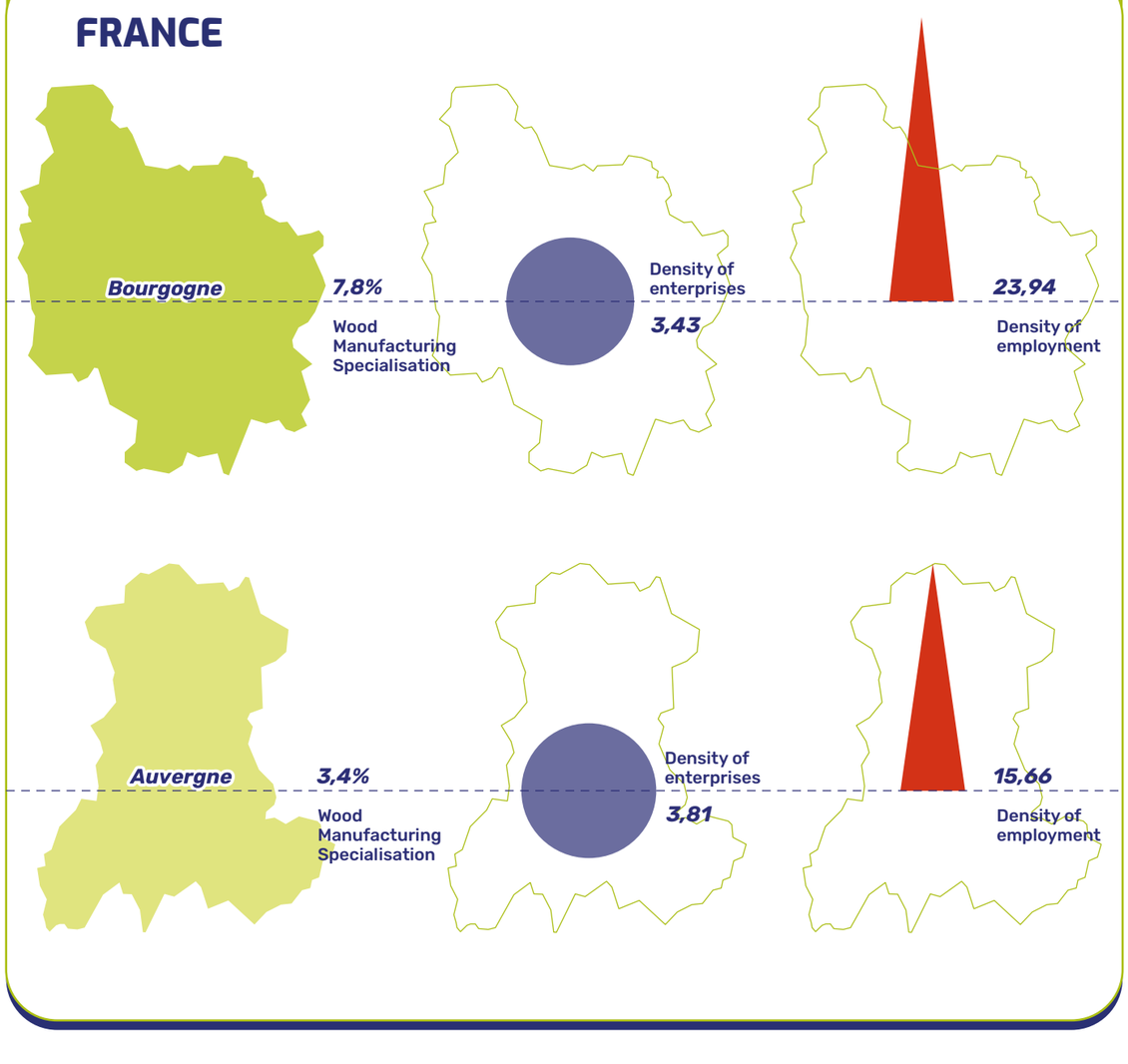


24,64
Density of employment

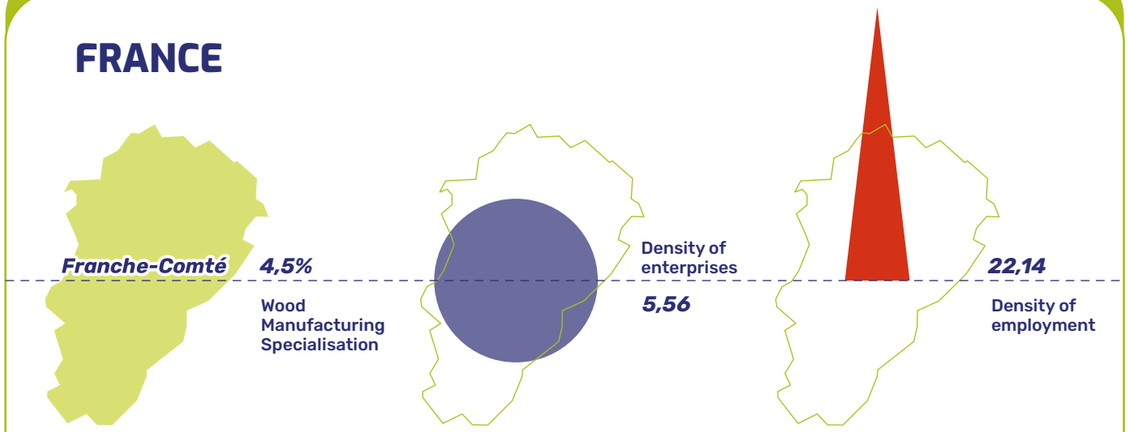
GERMANY

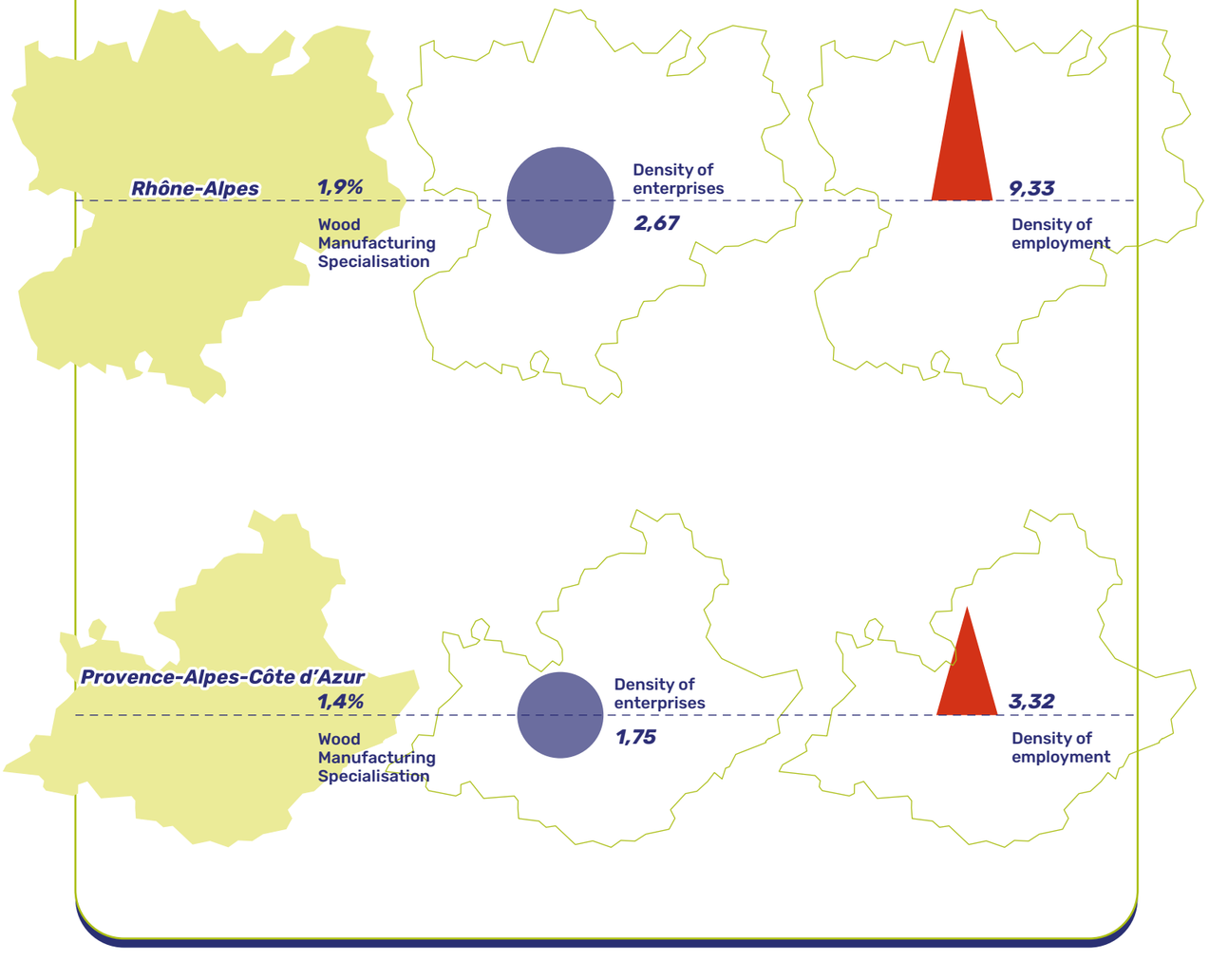


FRANCE

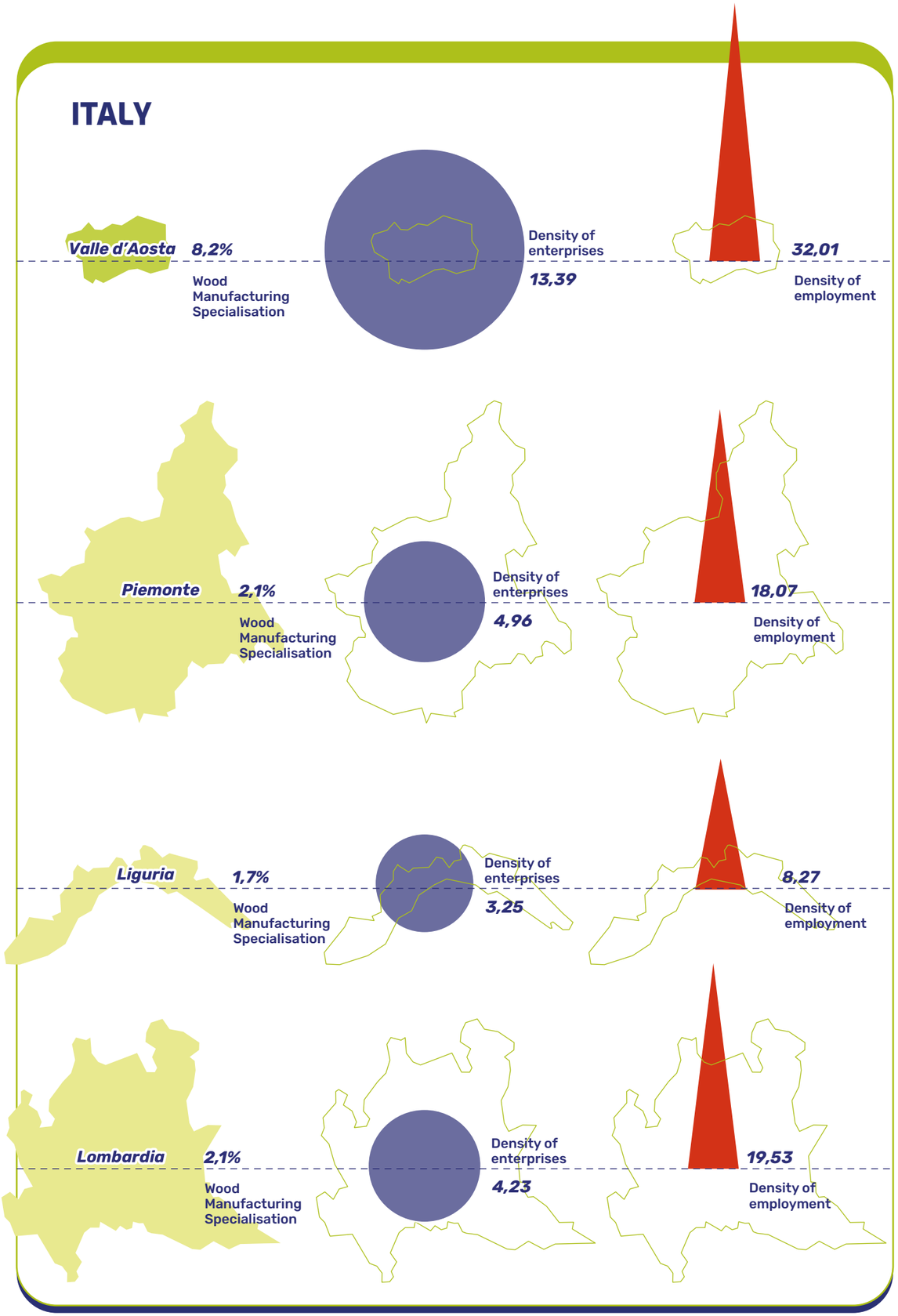


FRANCE

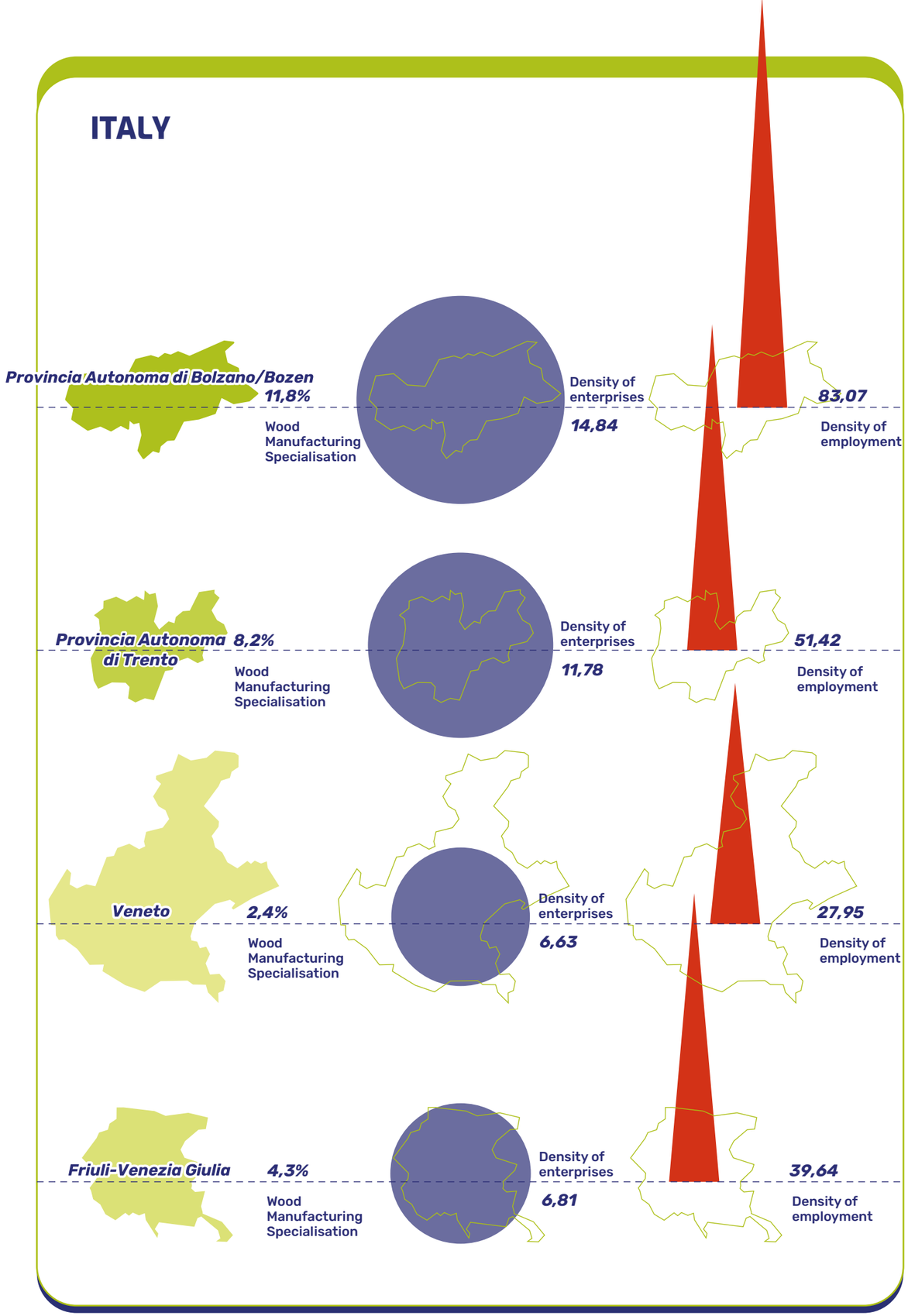




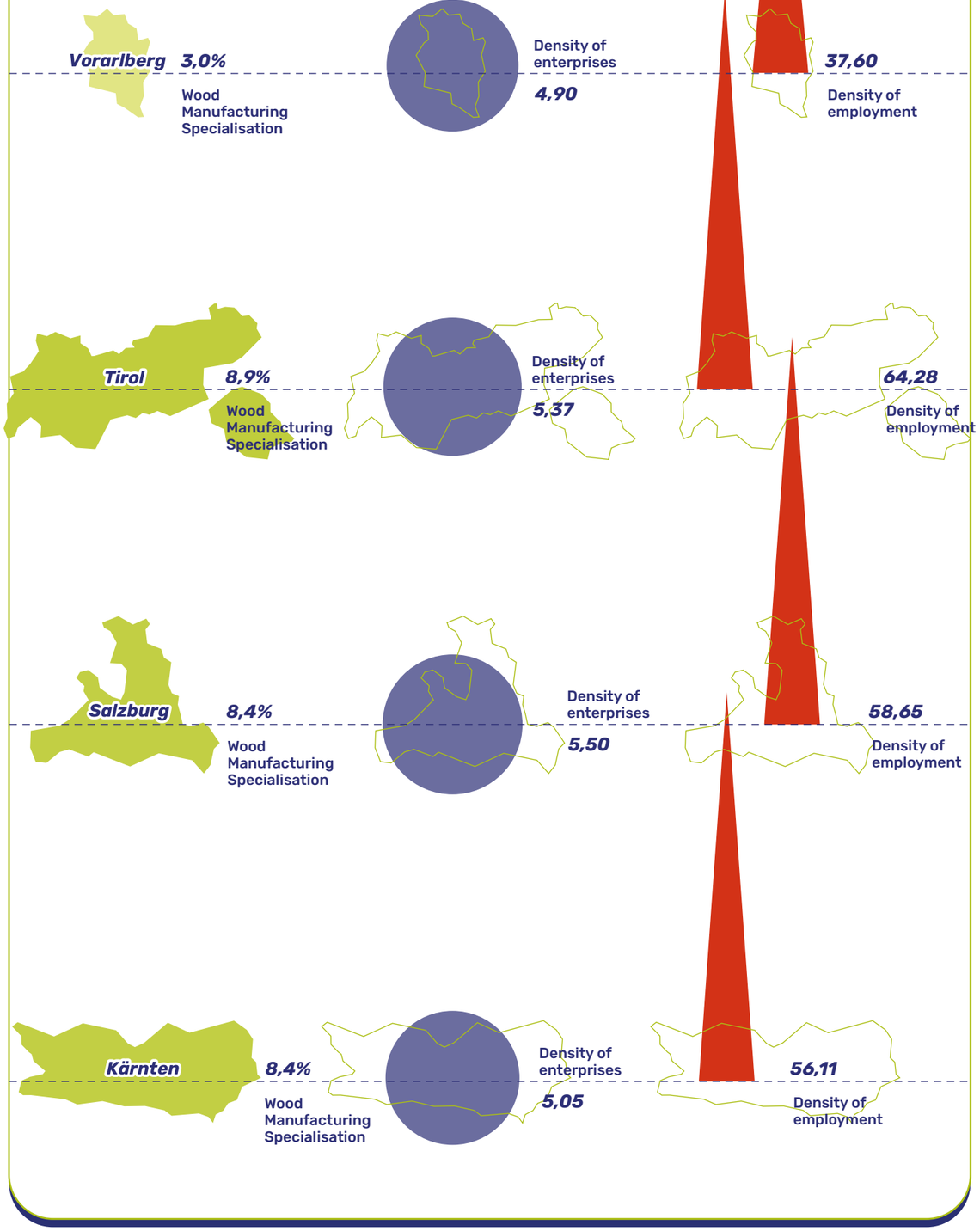
ITALY


Valle d'Aosta
8,2%
Wood Manufacturing Specialisation
Density of enterprises
13,39
32,01
Density of employment
Piemonte
2,1%
Wood Manufacturing Specialisation
Density of enterprises
4,96
18,07
Density of employment
Liguria
1,7%
Wood Manufacturing Specialisation
Density of enterprises
3,25
8,27
Density of employment
Lombardia
2,1%
Wood Manufacturing Specialisation
Density of enterprises
4,23
19,53
Density of employment

ITALY


Provincia Autonoma di Bolzano/Bozen
11,8%
Wood Manufacturing Specialisation
Density of enterprises
14,84
83,07
Density of employment
Provincia Autonoma di Trento
8,2%
Wood Manufacturing Specialisation
Density of enterprises
11,78
51,42
Density of employment
Veneto
2,4%
Wood Manufacturing Specialisation
Density of enterprises
6,63
27,95
Density of employment
Friuli-Venezia Giulia
4,3%
Wood Manufacturing Specialisation
Density of enterprises
6,81
39,64
Density of employment

AUSTRIA



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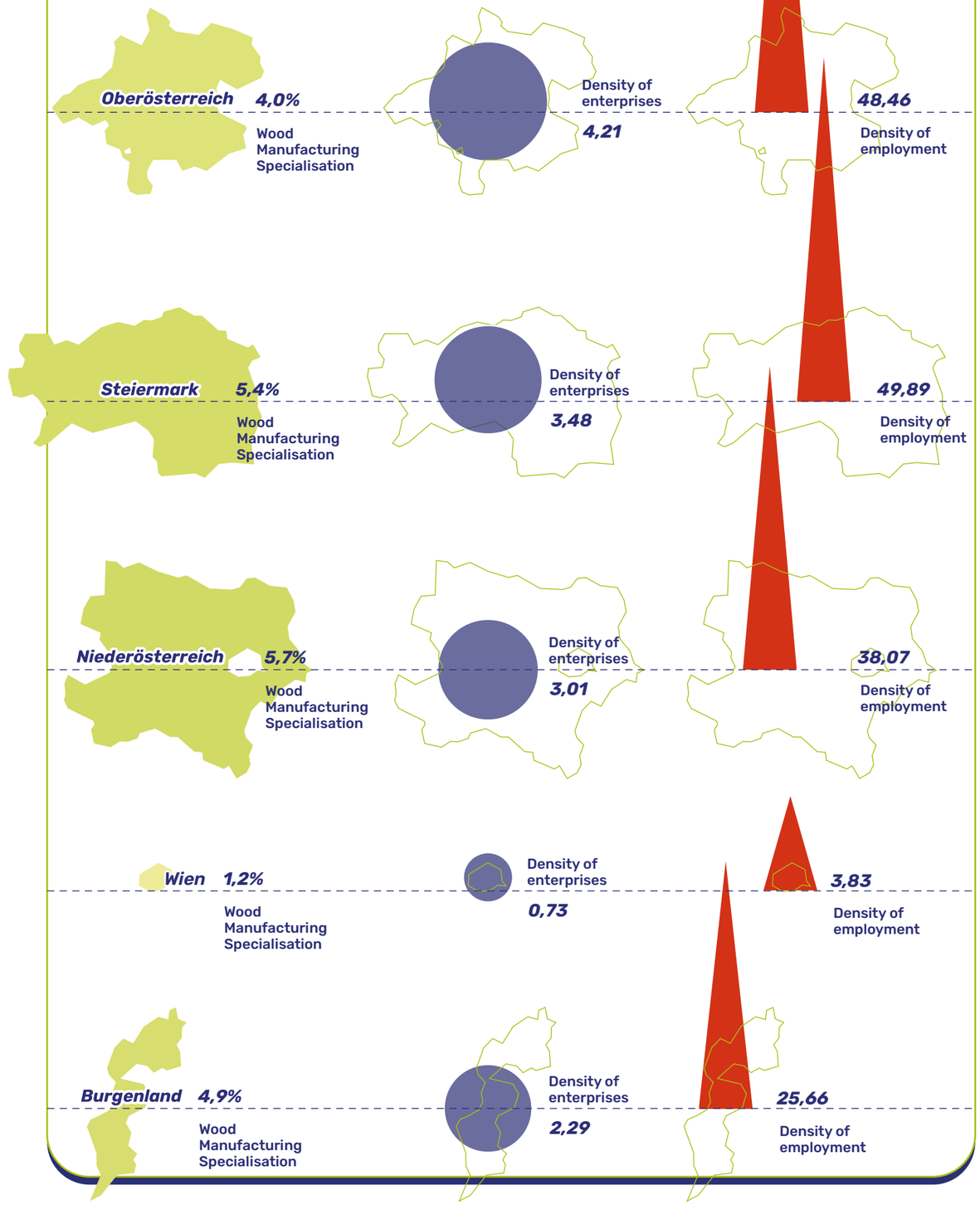

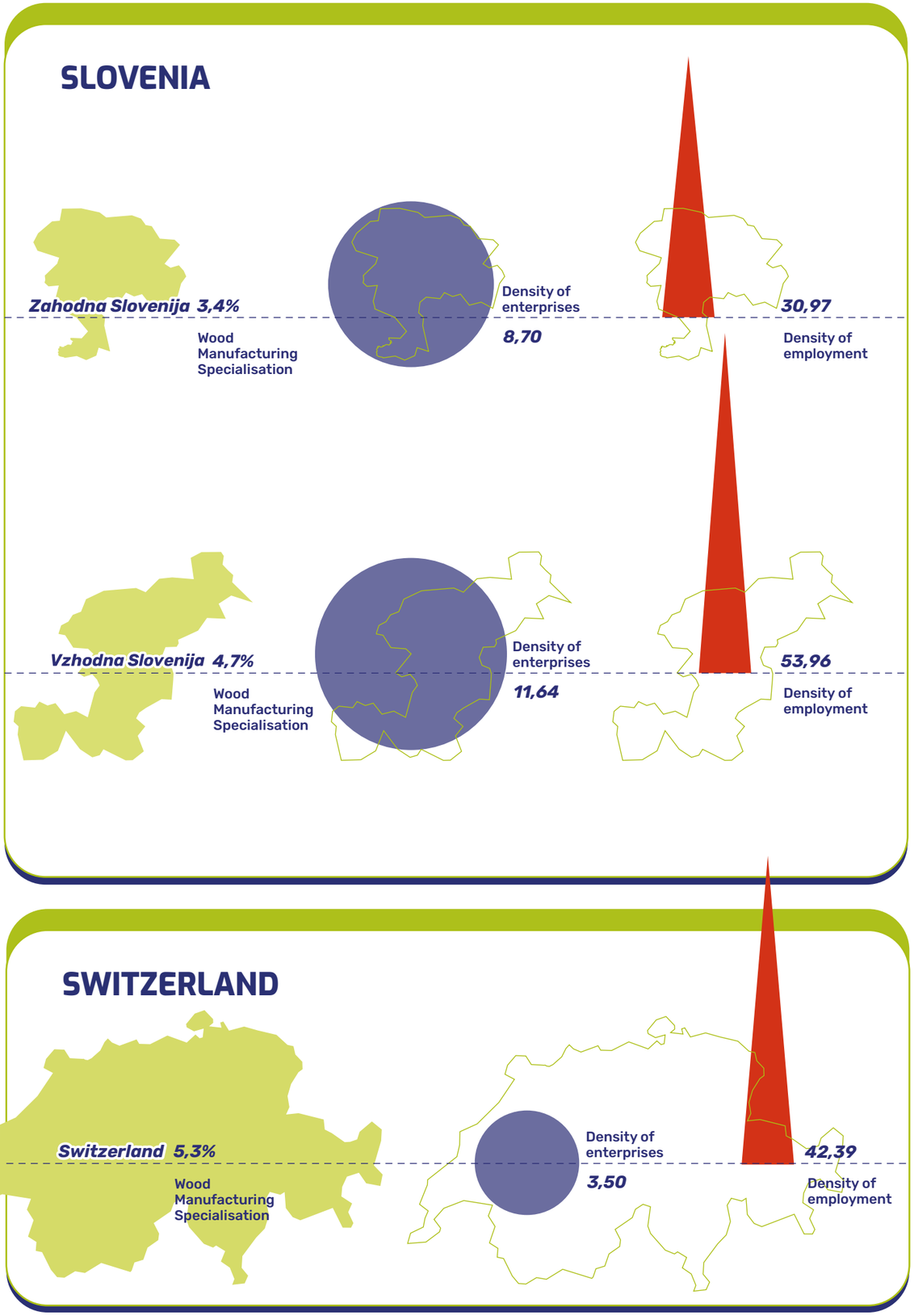

POLICY RECOM-MENDATIONS FOR TIMBER VALUE CHAINS IN THE ALPINE SPACE

POLICY RECOMMENDATIONS FOR TIMBER VALUE CHAINS IN THE ALPINE SPACE

1. KEY SOCIO-ECONOMIC INDICATORS

The combination of the three maps constitutes the second complex mapping of this report. These maps are intended to represent two socio-economic indicators: enterprise density and employment density in the wood industry (wood manufacturing activities) in the EUSALP regions.
The first visualisation (Map 2) "Specialisation of wood production in EUSALP regions" is an important starting point for the representation of the two indicators. In fact, the visualisation concerns the manufacturing specialisation of the regions and compares the number of persons employed in the wood processing sector with the total number of persons employed in the manufacturing sector. The regions with a **high specialisation, above 8%, of manufacturing employment in activities related to the production of wood** products are: the Autonomous Province of Bolzano (11.8%), Tyrol (8.9%), the regions of Carinthia and Salzburg (8.4%) and the regions of Valle d'Aosta and the Autonomous Province of Trento (8.2%).
The socio-economic indicators shown in Map 3 and Map 4 allow us to understand **how timber production activities are distributed and located in the Alpine Space area.**
The "density of enterprises in wood manufacturing" (Map 3) refers to the number of local units of enterprises per 10,000 inhabitants. Specifically, this indicator is a summary of the ratio between the number of local units for the wood manufacturing sector and the value of the resident population on 1 January of each year in each region. In order to obtain a measure of density, it was decided to use the indication of the resident population, and not that of the total regional surface area, for two specific reasons: firstly, to try to overcome the difficulties related to the heterogeneity in terms of surface area of the NUTS2 regions and, secondly, to represent the relationship existing in the territory between enterprises and inhabitants, and therefore between economic activity and territory.
In 2018, there is a **strong wood industry in Slovenia** (more than 10 units per 10,000 inhabitants), particularly in the Vzhodna Slovenija region (11.6 units). This is followed by Italy (5.4 units), with the Valle d'Aosta (13.4 units) and the autonomous provinces of Bolzano and Trento (14.9 and 11.8 units respectively) playing a central role, and Austria (3.3 units), especially in the regions of Salzburg (5.5 units), Carinthia (5.1 units) and Tyrol (5.4 units). **Wood production enterprises in the three countries of the southern and eastern EUSALP area, together with Switzerland, account for more than 80% of the entire Alpine area.** On average in the EUSALP area there are 3.3 companies engaged in wood production for every ten thousand inhabitants: the German Alpine area and the French regions are far below the EUSALP figure with an average of 0.7 and 2.8 per 10,000 inhabitants, respectively. Overall, wood production is concentrated in areas with an important manufacturing tradition, which is certainly also linked to land management and the forest ecosystem. Wood production is structured through a **manufacturing industry closely linked to the characteristics of the territory in which the companies are located.**
The second proposed indicator (Map 4), "employment density of wood manufacturing activities", incorporates the method and objectives used for the previous indicator. The latter analyses the ratio of those employed in wood manufacturing activities to the population of each region. The objective is to observe how and with what intensity the inhabitants of a given territory participate in the labour market and thus in the structuring of the various value chains. Employment density is an indicator of the production specialisation of each area.
A reading of the data shows that **production in the sector is specialised in the south-eastern part of the Alpine arc,** i.e. in the Italian, Austrian and Slovenian regions. In the autonomous province of Bolzano, more than 80 employees per 10,000 inhabitants are engaged in wood production, followed by the Austrian regions of Tyrol, Salzburg and Carinthia, Vzhodna Slovenija and the autonomous province of Trento. All these regions have an employment density of more than 50 per 10,000 inhabitants. On average, around 23 employees per 10,000 inhabitants are employed in the wood sector in the EUSALP area, with lower than average values in the French regions (especially Provence), the German regions (especially Oberfranken and Karlsruhe) and the Vienna region. Regions with a relatively low density of employees in the wood sector may have a more pronounced specialisation in other production sectors, which we could define as strictly manufacturing (or, in the case of Vienna, in non-manufacturing sectors, such as the tourism industry).

2. POLICY RECOMMENDATIONS

The interpretation of the socio-economic indicators, the interviews with some actors of the wood industry and the analysis of the scientific literature on the topics of the project allow us to provide some strategic indications to policy makers and to the actors of the industry themselves in the Alpine Space. These indications are categorised according to six dimensions that we have found to be of primary importance in today's economic and political context: **public policies, the structure of the supply chain, the issue of data, the structure of companies and land ownership, the main actors and the role of communication.**
This work represents an approach to collect and systematise the opinions, indications and data from a wide variety of actors playing different roles in the supply chain. For this reason, the indications that follow may sometimes be conflicting, but precisely for this reason they offer an articulate interpretation of the multiple interests at stake in the Alpine Space timber supply chain.

2.1 Public policies

1. Regulatory instruments at transnational, national, regional and local levels have the task of **making forest management convenient/obligatory for all types of actors, public and private.**

In the mapping of policies in support of sustainable forest management, FAO's Global Forest Resources Assessment, a focus - both in policies and in national strategies of the Alpine Space States - on all classification categories is evident, with the exception of traceability systems in Germany. At the regional level, the situation is more uneven, also in relation to the administrative and competence system of each state.

→

1. Switzerland is not considered in the FAO Assessment.
2. Sustainable forest management.
* National
** Sub-national

Tab 1 - Policies, legislation and national platform for stakeholder participation in forest policy

	Policies supporting SFM[2]		Legislations and regulations supporting SFM		Platform that promotes or allows for stakeholder participation in forest policy development		Traceability system(s) for wood products	
	N*	SN**	N*	SN**	N*	SN**	N*	SN**
Germany	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*no*	*no*
France	*yes*	*yes*	*yes*	*no*	*yes*	*yes*	*yes*	*yes*
Italy	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Slovenia	*yes*	*no*	*yes*	*no*	*yes*	*no*	*yes*	*no*
Austria	*yes*	*yes*	*yes*	*yes*	*yes*	*no*	*yes*	*no*

Source: Global Forest Resources Assessment, FAO 2023

2. **Financing policies for agroforestry use have a responsibility to steer the development of forestry supply chains**; an imbalance in public funding towards agriculture, and in particular European funding through the CAP, poses the risk of disincentivizing and making difficult the development and sustainable management of forestry supply chains.
3. The regulatory framework and the interventions to regulate the European market by the institutions at the various levels of competence must take into consideration the **protection effects of the PEFC and FSC certification system and the effects of the certifications of local supply chains.** An intervention to strengthen the recognition and dissemination of certifications can strengthen the progressive independence from foreign timber imports, with positive effects on local economies and the reduction of transport-related emissions. Furthermore, it is important to remember that regulatory interventions to regulate the market could have a negative effect on exports if there is no concomitant policy to **protect domestic/foreign demand in favour of certified wood.**
4. The introduction of **premium price mechanisms** can stimulate the recognition of timber certification by companies and consumers. In this case, it is not only a matter of stimulating capital investments, but above all of communication and promotion of what sustainable forest management can produce.
5. **Support programmes for the use of wood** (e.g. for use in construction) must take into account the origin of wood in order to produce positive effects on the establishment of short supply chains. In this sense, certifications, both international and local, can have a decisive effect in favouring the wood product on the basis of its geographical origin and consequently determine a positive impact on the reduction of transport-related emissions.
6. Forest policies should broaden the focus from the exclusive productive service of forests to **other services of a regulatory and cultural nature,** by providing remuneration instruments that offer greater incentives to owners for their management; this means abandoning the exclusive perspective on the productive services of forests that makes forest management of limited interest to small owners, who are discouraged by the burdensome nature (in terms of time or economic risk) of management.

The Climate Action Plan 2.0 of the Alpine Convention emphasises the close correlation between optimised forest management and Alpine climate protection.
In order to further strengthen optimised management of mountain forests, the Alpine Conference recognises in particular the importance of the following actions, as proposed by the Alpine Climate Advisory Committee:

- Developing and implementing "alpine guidelines" for the conversion of forests to more resilient and nature-friendly forest ecosystems, based on a stakeholder approach and taking into account other sectoral activities under the Climate Action Plan 2.0;
- Enhancing the exchange of knowledge on mountain forests as protection against natural hazards;
- Increasing the regional wood value chain in the framework of the circular economy and bio-economy.

The governance study "Innovations for forest ecosystem service provision - Insights from an EU-wide survey" (Mann et al., 2022) focuses precisely on the relationship between governance and the strictly productive use of forests. The findings of the analysis show that the majority of governance innovation activities are largely oriented towards biomass production, i.e. management optimization and technological improvement are mostly oriented towards the provision of supply services and thus income generation.

"The reasons are rooted in a market-oriented economic logic focused on timber production, a lack of financial resources to compensate for other FESs provisions, or a lack of institutions providing support and security for forest owners and managers to engage in innovation development." (Mann et al., 2022)

The study also highlights the strong influence that the size of ownership and forest areas have on the development of governance innovation.
In general, both public and private owners are oriented towards technological innovations for biomass production. On the other hand, a difference is shown between the strategies of national and regional public forest owners and those of local public forest owners: for the latter, forest innovation strategies are more similar to those of private owners.
Even when considering forest size, technological innovations are mostly aimed at improving biomass production; the study found for smaller properties a greater tendency towards innovation in the management model for the provision of other ecosystem services.
Overall, the analysis confirms that innovations related to forestry practices continue to fuel the long history of focus on the material aspects of forestry, through the development of effective practices to meet local or industrial needs and create an effective wood-based value chain.
Nevertheless, the low profitability of the other FESs hinders innovation in the forestry sector. According to the authors of the study, individual and institutional changes are needed to overcome this obstacle:

- At the individual level, leadership can be a crucial factor for innovations with other EDFs. This type of innovation requires an evolution of the "organisational culture" to make it open to the demands of society;
- At the institutional level, transfers of benefits (economic and otherwise) to FES providers must accompany the evolution of the FES demand structure.

"What is evident is that at present it is mainly public forests that undertake innovation activities for better service provision, while most private forest owners innovate to a large extent only in relation to biomass production, following established market incentives. Considering the large share of forest area in Europe in private hands, leaving these actors out of the solution process is a missed opportunity." (Mann et al., 2022)

7. **Wood assortment** improvement policies make the best possible use of resources from cascading wood utilisation. Furthermore, promotion and **incentives for renewable energy plants** must also take into account the type of forest management and favour energy use only for coppice management and waste materials from industrial wood processing. Incentives that finance renewable energies are not neutral and can cause distortions in local economies that penalise quality and industrial production with higher added value. In general, policy and regulatory frameworks need to strike a balance between encouraging positive climate impacts and ensuring a hierarchy of wood uses, giving priority to **long-lasting material uses.**
8. **The mountain areas of the Alpine Space represent a very interesting laboratory for European policies** through the integration of social policies with environmental issues, climate change adaptation and local ecosystem protection.

One of the most interesting examples, specifically concerning the energy supply chain, is provided by the Austrian Energy Agency in its report "Regional Value Creation and Employment through Solid Biomass Energy" (Austrian Energy Agency, 2015). The study, analysing the case of the Hartberg region (Styria), states that the use of wood instead of oil and gas reduces energy imports and creates jobs and added value in the region. The use of bioenergy has a strong regional impact on employment because it involves various steps in the wood refining process: from forest maintenance to transport and the production of logs or wood chips. It is estimated that to generate the heat for a single-family house with local heating from biomass, 24 man-hours are needed entirely within the region, whereas with an oil heating system only 3 man-hours are needed within the region. The study deals in an innovative way with the specific analysis of value creation in heat generation in a region. This is precisely the Hartberg climate and energy model region with approximately 12,600 inhabitants. The region serves as a model, on the one hand, because the proportion of urban and rural population is approximately the same and, on the other hand, because the current heating energy mix consists of almost half of generation by wood from the region (43%) and the remainder largely by fuel oil (57%). In the region:

- The wood biomass heating sector employs 31 people, the fossil fuel heating sector 4 people;
- Every year citizens spend 7 million euro to heat with fossil fuels and 1

million euro to heat with wood;
- 31,100 tonnes of CO_2 are emitted annually from oil and natural gas heating systems and 800 tonnes of CO2 are emitted from wood, woodchip and pellet heating systems.

The results of the study offer important evidence even when considering extreme scenarios: if the Hartberg region heated only with fossil fuels, 9 jobs would remain, the cost of purchasing energy would rise to EUR 15 million, and CO_2 emissions would increase to 58,500 tonnes per year; conversely, if Hartberg heated only with woody biomass, the number of jobs would increase to 61, costs would fall to EUR 1.6 million, and CO2 emissions would be 1,600 tonnes per year.

In the article "Assessment of the Development of Forest-Based Bioeconomy in European Regions" (Barañano et al., 2022), the authors argue that European regions, as territorial units that often present their own political and socio-economic strategies, are often indicated as the most suitable targets for the implementation of the (forest-based) bioeconomy in Europe. The forest bioeconomy is closely related to the notion of **bioregionalism**, a concept through which the idea of greater sustainability of socio-economic and political systems is supported when organised according to naturally defined areas, called bioregions. In particular, the European Commission argues that the transition to a model based on the bioeconomy can take place gradually through the enhancement of local and regional initiatives. The BERST[3] tool identified four factors identifying the readiness for bioeconomy processes for a given region: a. biomass availability and land use, b. demography and quality of the workforce, c. employment and business structure, d. innovation. Hence, when assessing the potential of a given region in developing forest-based bio-economy systems, consideration must be given to: on the one hand, the ability to consistently and sustainably generate the required bio-based raw materials; on the other hand, local innovation experiences and the entrepreneurial and employment structure. Other crucial factors at regional level are existing and future legal frameworks, economic infrastructure, social needs and, last but not least, the regional culture and history of utilising renewable natural bio-resources.

→ 3. Dashboard - Delft en Westland (databank.nl), EU Horizon 2020 "Building Regional Bioeconomies"

2.2 The supply chain structure

1. The **"bio-sawmill"** model makes it possible to systematise the different actors in the wood supply chain by exploiting the potential of **cascading use of the raw material.** As such, the bio-sawmill gathers around it different economic actors who use different parts of wood in their business processes, but who turn to the bio-sawmill by using it as a single hub for meeting the demand for raw material and waste materials. This model would make it possible to valorise the different phases of the cascading use of wood in a circular sense, diminishing the information asymmetries typical of a linear economic model.

The main obstacles affecting the cascading use of wood have been categorised in the report **"Circularity concepts in forest-based industries"** (UNECE & FAO, 2021) into three groups:
- Technical barriers: wood typically suffers a loss of quality at each processing stage and is prone to the accumulation of contaminants when recycled due to past applications of preservatives, paints and glues;
- Market barriers: market barriers for wood and wood derivatives are often related to the lack of coordination between the users of these multifunctional materials. Therefore, better cooperation and a better understanding of the needs of the actors involved in the successive stages of the value chains are essential to effectively implement the principle of cascading use. Consequently, building the necessary infrastructure to link the different sectors is crucial to improve material efficiency and economic viability;
- Governance barriers: the lack of an international classification for post-consumer wood and a dedicated policy framework for material reuse further prevents cascading use from reaching its full potential.

In the document **"Guidance on the cascading use of biomass with selected examples of good practice on woody biomass"** (European Commission, 2019), the Commission proposes a set of principles for overcoming obstacles in the cascading use of biomass, closely addressing possible developments in the forestry sector. The five principles guiding the document are listed below:

SUSTAINABILITY
- Sustainable wood exploitation is a necessary condition for the creation of sustainable biovalue chains (e.g. return of ash from woody biomass in the form of forest fertilisers);
- Cascading use of wood can maximise climate change mitigation potential (e.g. use of wood in construction);
- Incentives (or disincentives) for economic spatial planning (e.g. clustering) can influence the sustainable use of woody biomass in its environmental and social aspects;
- Assessing the sustainability implications of using woody biomass.

EFFICIENT RESOURCE USE
- Exploiting all main and secondary streams of woody biomass in a resource-efficient manner;
- Preventing and minimising waste (e.g. more precise cutting method, bark as a resource);
- Improving market functioning to enable resource-efficient biomass allocation;
- Encouraging industrial clustering, cooperation and symbiosis;
- Innovating to find more effective ways of utilising woody biomass.

CIRCULARITY IN ALL FLOWS AND AT EVERY STAGE
- Designing with life-cycle thinking (e.g. non-toxic wood treatments, demolition);
- Encouraging collection, recycling and reuse;
- Develop extended producer responsibility schemes (e.g: Rilegno[4]);
- Strengthening the internal market for woody biomass circularity.

NEW PRODUCTS AND NEW MARKETS
- Innovating to use new technologies and transforming secondary and waste streams into new products;

→ 4. Rilegno | Consorzio Nazionale per la raccolta il recupero e il riciclaggio degli imballaggi di legno

- Involving consumers in the creation of new markets by focusing on international (e.g. PEFC, FSC, EU ecolabel) or local (Holz von Hier/Low Carbon Timber) certifications.

2. In the Alpine Space, the geographical location of sawmills and processing plants has an important impact on **timber logistics** and the creation of local supply chains. In this sense, very often supply chains are developed across borders to enable primary producers and processors to exploit economies of scale. This is the case for producers in southern Germany (Bavaria), who mainly turn to large Austrian sawmills. It is clear that logistics plays an important role in the structuring of the supply chain and the **development of infrastructures** (by public authorities as well as private operators) plays a central role in the development of supply chains in the territory.
3. The **cross-border perspective** of the timber supply chains makes it possible to take into account the issues of adaptation to climate change by promoting a dialogue between different institutional actors. Similarly, this perspective also has the potential to act on changing value chains by shifting the focus from purely economic aspects to social and environmental aspects.
4. In addition to policy and regulatory instruments, there are at least two other important instruments, with a bottom-up approach, to be considered in structuring a local timber supply chain: the **communication tool** (which we will elaborate on later) and **market instruments** (e.g. premium price mechanisms). The communication and market tools evidently go hand in hand: an informed consumer is willing to pay a higher price. In this sense, political intervention is appropriate at a later stage, i.e. when the operation of the bottom-up approach produces negative externalities. In general, the political or legislative instrument must intervene to incentivise forestry uses that increase the availability of resources at the local level.
5. With regard to the cascading use of wood, it is important to recognise the work that operators in the Alpine economy are already doing. In many cases, **logging companies tend to fell whole trees,** then use the waste for the production of wood chips. The utilisation of the residue takes place from the first stages of the value chain in the forest, although the wood chips obtained are not of high quality (dirty and very wet wood chips) and are not appreciated in the energy market. On the contrary, sawmills (second processing) and carpentries (third processing) produce wood chips that are already dry, have few inclusions, and are of excellent quality.

In their manifesto **"EU FOREST-BASED INDUSTRIES 2050: A vision of sustainable choices for a climate-friendly future"** (CEPI et al., 2019), the extended wood-based industries indicate among the major challenges to be overcome:

- acceptance of European recyclability protocols;
- the change in the perception of wood and wood-based products as an old and traditional industry and not yet as a cutting-edge, innovative and future-oriented industry;
- the need for technological solutions (breakthroughs) that radically alter production processes;
- overcoming market distortions due to subsidies that hinder a level playing field;
- the shortage of skilled labour in the pulp and paper, printing, wood and furniture sectors;
- gaps in the data and knowledge base.

THE ENERGY SUPPLY CHAIN

In order to better understand the functioning of the fuel wood and construction wood supply chains, two infographics aim to illustrate the main steps that make up the wood supply chain.

The infographic "Wood chain for energy production" illustrates the value chain of the wood-energy chain. Each tree trunk produces woody materials with different qualities that can enter the bioenergy value chain. On the other hand, bioenergy production is considered a part of the cascading use of wood resources. Forestry and wood-processing industries create residues and secondary raw materials, such as wood chips, sawdust and bark, which can be used to produce bioenergy or be processed into biofuels. In this scenario, wood recycling for energy purposes can be considered the final stage of the wood utilisation cascade and should not be regarded as a separate value chain.
From a circularity and resource-efficiency perspective, the best scenario is for wood to remain in one stage of its life cycle for as long as possible before cascading to another use. Resource-efficient use of wood for bioenergy in a circular bioeconomy occurs when wood residues are derived from the industrial processing of wood from sustainably managed forests and when no other use of woody biomass is economically viable or environmentally beneficial compared to bioenergy production.
Therefore, it is clear that bioenergy production is an intrinsic aspect of the wood processing value chain. This is particularly relevant when considering that wood cannot be recycled in perpetuity, which means that cascading utilisation principles must be applied and that, being bio-based, bioenergy can be part of the carbon cycle of the biosphere.
The graphs illustrate the relationship between domestically produced firewood in each country (absolute quantities are shown on the left, with Germany, France and Austria in the lead) and imports and exports of the same type of wood. Compared to what will be observed for industrial wood, the percentages of imported and exported firewood in relation to domestically produced firewood are lower and thus indicate a lower importance of foreign trade and a greater use of domestically produced wood. With regard to imports, Italy (16.0 %) and Slovenia (13.7 %) are the countries with the largest share of imported firewood, while France and Switzerland close the ranking with remaining shares of less than 1 %.
With regard to exports, Slovenia is the country with the largest share of exported firewood in the total amount of domestically produced firewood compared to the other countries (20.0 %).
In addition to the regional effects that a woody biomass energy production model can produce (see the Hartberg region's experience mentioned above), it can be stated that the **use of woody biomass for heat production can reduce CO_2eq emissions by between 89 and 94% compared to traditional fossil fuels**. In fact, even taking into account logging, transport, wood processing and the construction of energy conversion plants, the CO eq emissions of fossil fuels, for the same amount of energy produced (1 MWh), are still significantly higher than wood fuels: diesel emits 326 kg of CO eq into the atmosphere, LPG 270 kg, methane 250 kg, while **pellets and firewood emit 29 kg of CO eq and 25 kg of CO eq respectively**[5].
The energy transition to renewable energy sources has a major impact on the **independence of European countries from fossil fuel imports.** In addition to energy generation from biomass combustion plants, heat from woody biomass, as part of an energy mix that makes the most of the

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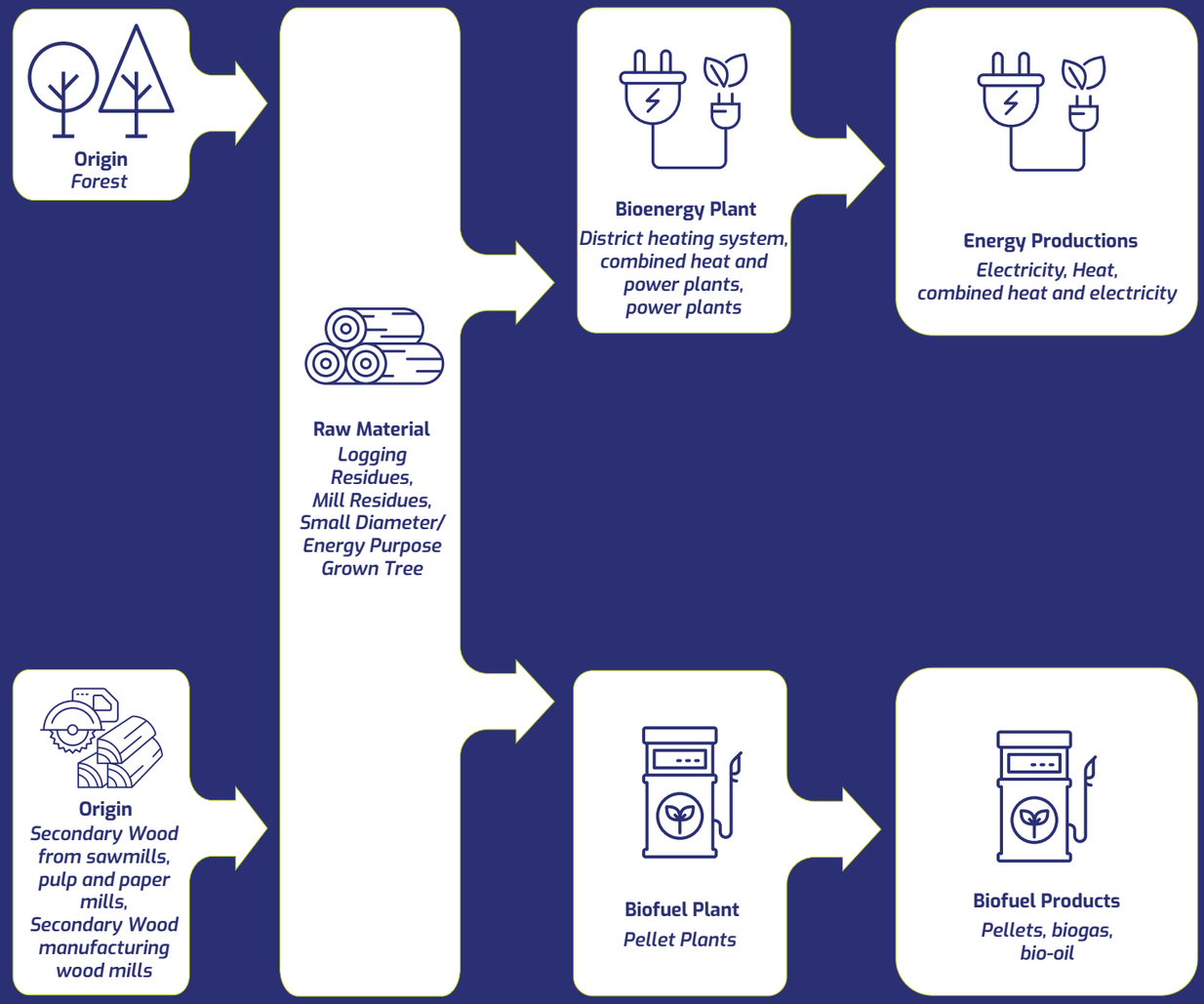
5. Biomasse legnose, tra le soluzioni più praticabili ed economiche per la decar-bonizzazione | QualEnergia.it

WOOD CHAIN FOR ENERGY PRODUCTION



RELATIONSHIP BETWEEN FIREWOOD PRODUCTION BY COUNTRY AND IMPORT/EXPORT

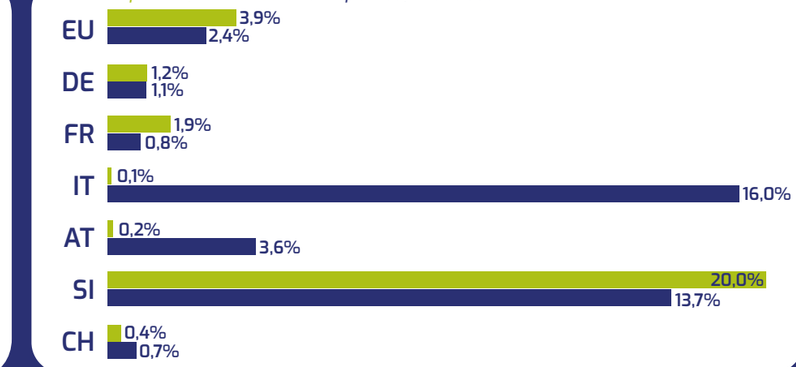
Fuelwood production by country

2020 - thousand cubic metres

European Union	114 K
Germany	22 K
France	23 K
Italy	4 K
Austria	5 K
Slovenia	1 K
Switzerland	2 K

RATIO

Exported/Produced and Imported/Produced



characteristics of each technology, can offer a viable solution to the issue of decarbonisation (especially in the wood and paper sectors, as shown in Figure 3) and can contribute to a socially just, and cost-efficient, transition.

Firewood removals in the Alpine regions, both from coniferous and non-coniferous trees, almost decreased or remained stable between 1990 and 2020 (Figures 1 and 2), with the exception of German (coniferous and non-coniferous) and Austrian (coniferous) removals, which increased markedly during the period under consideration.

As far as the use of woody biomass for heat production is concerned, in terms of environmental impact, one cannot overlook the fact that there is a high degree of **geographical coherence between areas of predominant biomass production (such as the Alpine arc) and those with higher heat demand.** This ensures the sustainability of the supply chain, with biomass needing to be transported within 500 km (RSE, 2019).

In 2010, the leading countries in biomass heat production included **Germany** (11,513 ktoe) and **France** (10,840 ktoe) - as well as Sweden, Finland and Poland. In terms of the number of installations, 60% of all installations at EU level are located in **Austria, Germany, France**, Finland and Sweden. **Austria ranks first in Europe in terms of total installed systems**, especially for heating appliances, but the overall size of Austrian systems remains one of the smallest in Europe (Paletto, et al., 2019).

The study "Assessment of environmental impact of biomass power plants to increase the social acceptance of renewable energy technologies" (Paletto, et al., 2019) shows that the **origin of the raw material** (roundwood and wood chips) is the main lever for reducing the environmental impacts of using woody biomass for energy production. Consequently, in order to increase the **social acceptance of biomass energy plants**, it is useful to highlight the role of the short wood supply chain in the procurement of the raw material, in particular by highlighting its positive impacts on the growth of employment and the local economy. In addition, the **involvement of the local community** is a key aspect of reducing social-political conflict in relation to energy issues: this requires a communication and information plan that highlights the impacts of different energy sources on the health of humans, ecosystems and resources.

Fig 1 - Fuelwood (including wood for charcoal) removals (coniferous, thousand cubic metres)

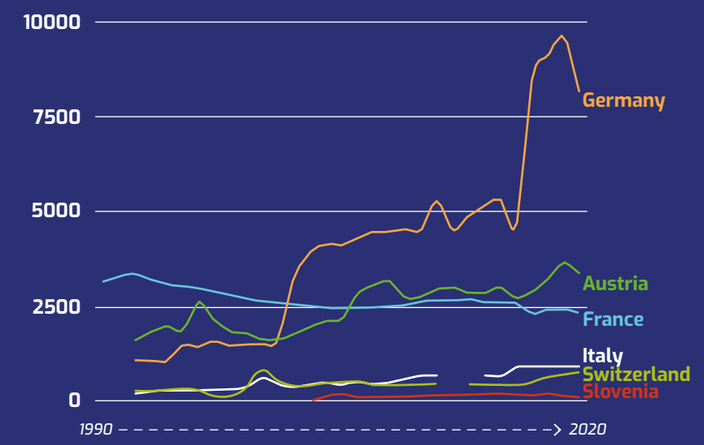


Fig 2 - Fuelwood (including wood for charcoal) removals (non-coniferous, thousand cubic metres)

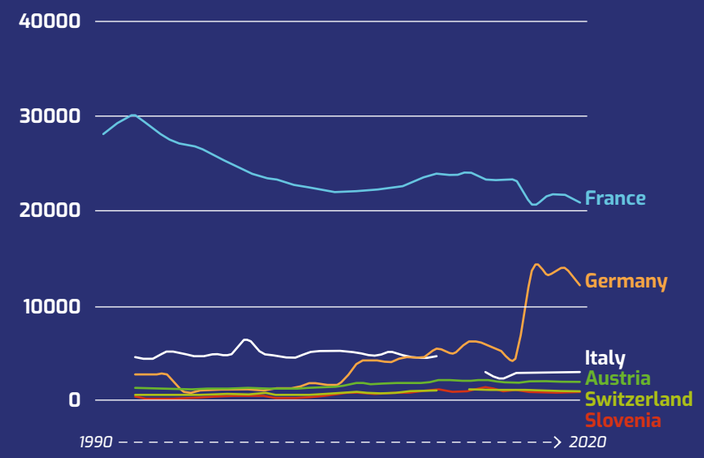
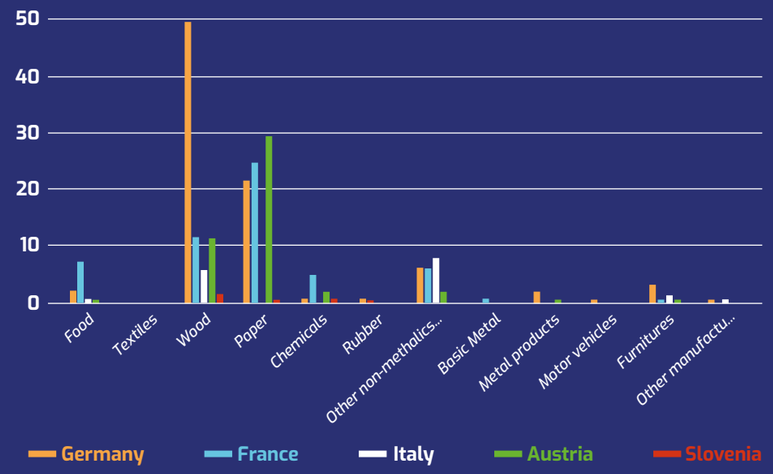


Fig 3 - Final energy consumption in manufacturing from primary solid biofuels (Terajoule)



Source(FIg.1,2,3): Eurostat

THE INDUSTRIAL WOOD SUPPLY CHAIN

The infographic "Wood Production Chain" illustrates the value chain of wood processing. The woodworking sector is derived from NACE 161 and comprises:

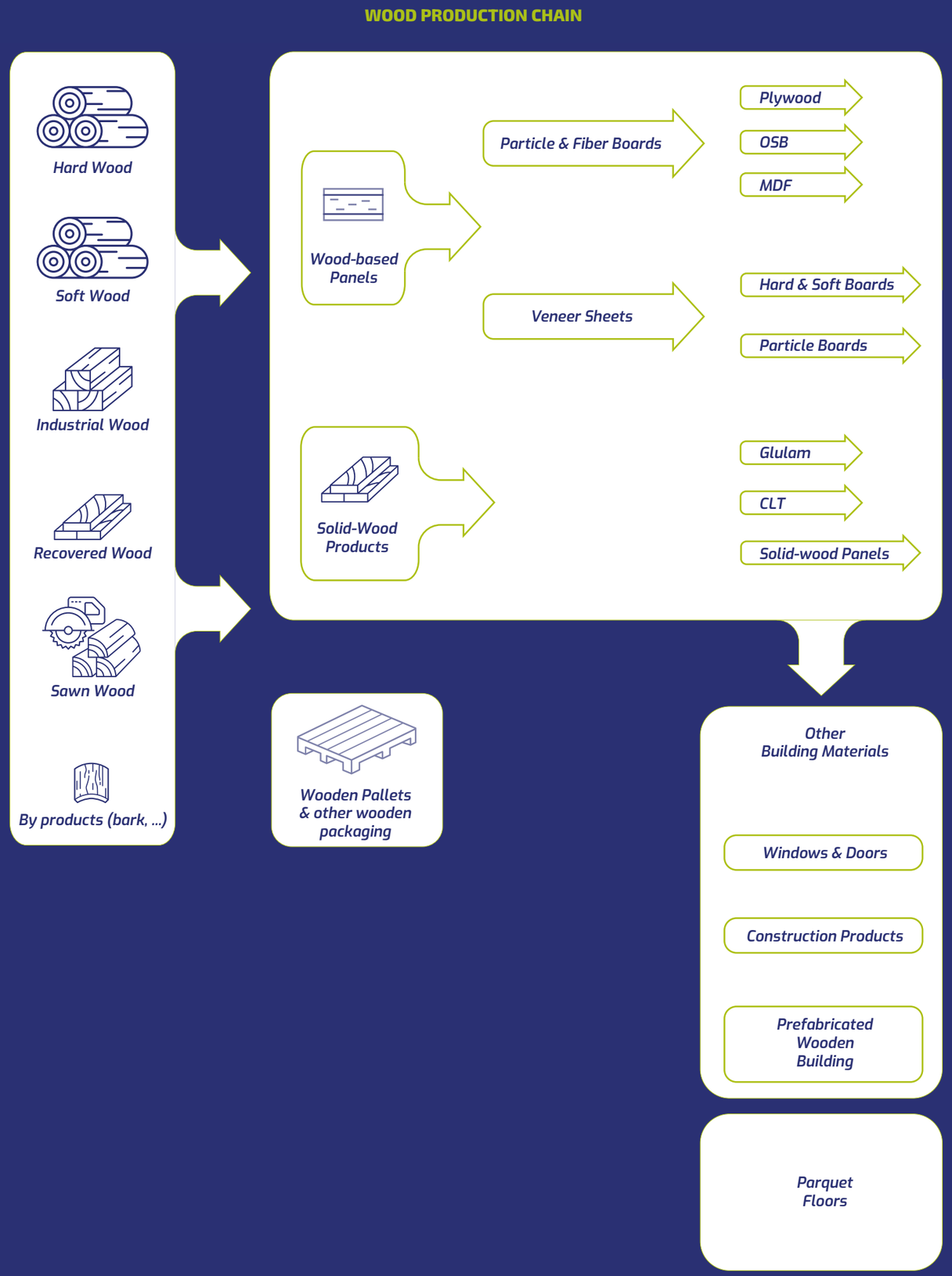
- The first processing leading to the production of sawn timber;
- The second processing includes wood-based panels, solid wood products, wood pallets and other wood packaging and bioenergy products;
- Third processing for the production of carpentry and joinery products and wood flooring.

Materials entering the wood processing value chain include hard and soft wood, industrial by-products (such as bark, chips and sawdust) and used materials (post-consumer recovered wood). Our focus is on the use of wood in construction as a driver for implementing circularity in the building sector. This requires that the entire lifecycle of wood (from primary to tertiary processing) is taken into account in the construction of new buildings to enable a more efficient use of co-products (e.g. recovered wood). However, while actions to increase the durability of wood can contribute to the long-term use of wood in construction, they can also affect the prospects for re-use of recycled materials. For example, treating wood to increase its durability makes reuse more difficult and may also contribute to increased pollution. Increasing the use of wood and other renewable materials can, in this context, help reduce dependence on carbon-intensive materials such as cement and metals. However, to realise circular projects in construction, key players in the sector must think beyond the business-as-usual. The success of the circular economy in construction depends on the sector's ability to identify and exploit new markets, exploring new opportunities both within and outside the sector's networks and value chains.

The graphs compare the use and trade balance of industrial wood for each Alpine country (source: Eurostat). The graphs thus represent the ratio between industrial wood produced (on the left the quantity in absolute terms, with Germany, France and Austria in the lead) and industrial wood imported and exported. In particular, it can be seen that Austria imports more wood than it produces (ratio of 107.3%), a sign of a highly developed manufacturing industry that requires more wood than the country's forests are able to produce. In Italy, the amount of imported wood is also considerable and represents more than half of the wood the country is able to produce. As far as exports are concerned, among the countries with the highest ratio of exported wood to domestically produced wood is Slovenia: exported wood is almost as much as half of the country's domestically produced wood. This figure indicates a strong propensity of the Slovenian wood industry trade towards exports.

With regard to industrial roundwood removals, Figures 4 and 5 show a clear difference in removal levels between coniferous and non-coniferous species. For the first species, the harvesting trend is stable over the period considered with the exception of Germany, which shows an upward trend from 2016 onwards. In Italy in 2018 there is an increase (which stops in 2020, however) that can be correlated to the harvesting following the Vaia storm that hit the north-east of the country.

However, looking specifically at the intensity of harvesting per square kilometre of coniferous trees on the countries' territory, a strong Slovenian harvesting activity can be seen compared to that of the other countries.



The upward trend is confirmed for Germany, while France sees a decrease in the intensity of withdrawals between 2009 and 2018.
The removal of industrial roundwood from non-coniferous species is lower than from coniferous species and shows a decreasing trend for all countries concerned. In this context, it is worth mentioning that if we consider that the wood industry for non-energy uses (from harvesting to further processing) generates waste in the order of 40-50% (RSE, 2019), which can be readily used for energy purposes, **the low utilisation of wood for non-energy uses also brings with it a limitation to energy uses.**
Industrial wood harvesting levels clearly have an impact on the **use of wood in the building sector.** This sector, in particular, plays a central role in strengthening a system of circular economy of wood in the area both for innovations related to building design and the ability to reuse demolition waste.
As far as design is concerned, according to the study **"Innovative forest products in the circular bioeconomy"** (Hassegawa, et al., 2022), the replacement of non-renewable materials (concrete, masonry, steel) with laminated timber leads to a reduction of between 20 and 50 percent of greenhouse gas emissions in timber construction over a 100-year period. In addition, the study shows how the construction of timber buildings in urban environments could store 36.7 to 2495.6 Mt CO2-y-1, depending on the scenario and the area per capita.
From the perspective of the economic value of the construction industry, according to the study "The Future of Wood Construction: Opportunities and Barriers Based on Surveys in Europe and Chile" (Leszczyszyn, et al., 2022) within all construction companies, **wood construction in Europe accounts for 19% and 15% of the workforce and turnover respectively.**
With regard to public policies supporting the timber industry, the case of Finland represents a best practice. Indeed, the government programme has defined a clear framework for timber construction with the aim of: a. doubling the use of wood as a building material during the four-year term of parliament (share of public buildings made of wood from 15% in 2020 to 45% in 2025); b. setting targets for the use of wood in public buildings; and c. improving the know-how and overall development of the timber construction value chain.
The French government's "Programme national de la forêt et du bois 2016-2026" also defined forest policy guidelines for the use of wood in the construction sector. In addition, the French timber industry stakeholders presented the **"Plan Ambition Bois Construction 2030[6]"**, by setting the following objectives: a. double the market share of wood in new collective dwellings; b. increase the share of single-family wooden houses from 10 to 15%; c. increase the share of wood used in renovations to 15% and 20% in collective buildings and individual dwellings respectively.
In general, beyond public policy initiatives, the study highlights the existence of certain **barriers to increasing the use of wood in construction**, such as the political context (the one with the greatest impact), technical opportunities, economic opportunities (especially in southern Europe) and social opportunities, which are, however, considered the least important factors for the development of wood construction. Finally, the study recalls the importance of an information plan to overcome widespread misconceptions about the low performance of timber buildings, fire risk and dampness: **timber constructions should be promoted on the basis of their technical and economic advantages rather than their social ones.**
Concerning the end-of-life of building materials, wood waste from construction accounts for 20-30% of all waste generated and is the

→ 6. Plan Ambition Bois 2030 - Fédération Nationale du Bois (fnbois.com)

RELATIONSHIP BETWEEN FIREWOOD PRODUCTION BY COUNTRY AND IMPORT/EXPORT

Industrial roundwood production by country

2020 - thousand cubic metres

European Union	375 K
Germany	62 K
France	24 K
Italy	5 K
Austria	11 K
Slovenia	3 K
Switzerland	3 K

RATIO

Exported/Produced and Imported/Produced

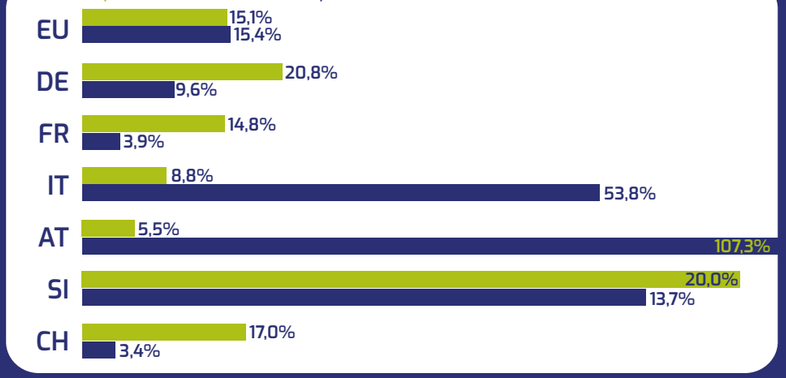


Fig 4 - Industrial roundwood removals (coniferous, thousand cubic metres)

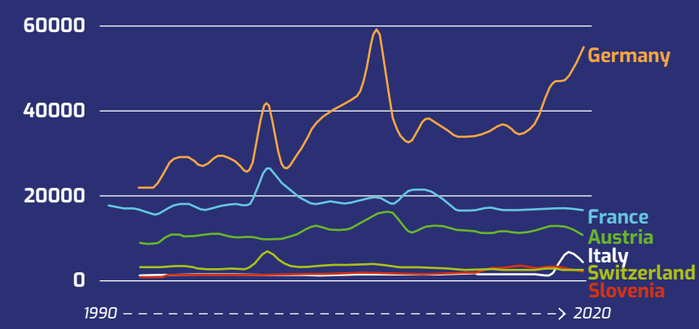
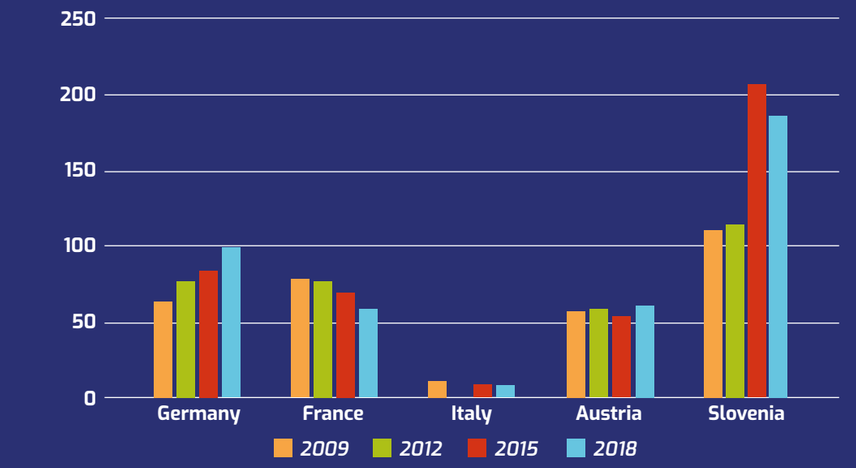


Fig 5 - Industrial roundwood removals (Coniferous, cubic metres per coniferous woodland km²)



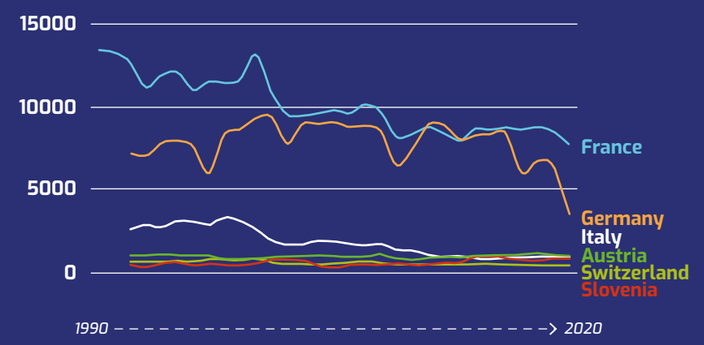
Source(Fig.4,5): Eurostat

second largest component of construction waste (after cement) globally. A study carried out in the UK shows that only 10-15% of wood used in new construction ends up in recycling (UNECE & FAO, 2021). This is an important indication to make the construction sector more circular, including the use of waste wood as part of a larger system cycle. To facilitate the re-integration of more post-construction wood into the supply chain, systemic developments are needed to improve sorting, separation and recovery options (demolition phase).
Another approach to improve the circularity of the construction sector concerns the design of solid wood buildings for a longer service life, such as measures to keep materials in place for longer, to extend the service life of wood in order to reduce the demand for new materials and to standardise modular timber building elements that could be reused and recycled more easily. The design aspect in construction thus extends to the same business models that enhance the concept of "design for disassembly".

"The degree to which a building can be reused, modified or upgraded in a sustainable manner during its lifespan depends on how all the materials used in its construction can be either reused, recycled or upcycled at the end of their lifecycle."
(UNECE & FAO, 2021)

Although, therefore, many technical and regulatory challenges remain, according to a comparative study of the literature on the circular economy of the construction sector (Pomponi, et al., 2019), the real obstacles for the realisation of a more circular built environment are, on the one hand, **cultural and financial/market issues** and, on the other hand, the adoption or not of a collaborative approach of construction companies with the entire supply chain.

Fig 6 - Industrial roundwood removals (non-coniferous, thousand cubic metres)



Source(Fig.6): Eurostat

2.3 Data dissemination and disclosure

One of the issues on which there is a high convergence of interests is certainly that of **data availability and quality.** In fact, the very topics addressed by the AlpGov2 project represent a major gap in environmental, social and economic statistics and systematic data collection. The creation of public policies that are attentive to the needs of territories requires up-to-date data with a high degree of geographical disaggregation. In the absence of these, even the various research activities dealing with the Alpine Space and, in particular, with the timber sector, find it difficult to systematise the different experiences of the territories, thus **hindering the dissemination of good practices.** EUSALP plays a central role here as an actor capable of systematising the knowledge and skills of local actors and consequently offering a space for collecting and organising information to be placed in the public domain.

The study "Basic Steps to Promote Biorefinery Value Chains in Forestry in Italy" (Tamantini, et al., 2021) shows how, even in the case of data on woody industrial residues useful for proposing local biorefinery models, **an accurate estimate of biomass availability and supply is highly necessary**, precisely because the values provided by forest inventories are not sufficient given the heterogeneity of the purposes with which they were collected. Concerning the evaluation of the real availability of wood residues, the article showed that few geographical regions in Italy are ready to implement new forest-wood value chains because they have all the necessary data. Trentino is certainly one of the regions where it is possible to raise awareness of new opportunities for innovation, thanks to the available forest management plans, a strong timber market and a high percentage of public ownership.

The issue of missing or inappropriate data also directly affects the uses of forests and its services. Indeed, the integration of ecosystem services into policies and decision-making processes depends on the availability of spatially explicit information on the demand and supply of ecosystem services. Since those ecosystem services for which a market price can be established are more influential in resource management, monetary valuation has been used as a tool for raising awareness and communicating the importance of ecosystems and biodiversity to policy makers (Häyhä, et al., 2015). However, economic instruments fail to remunerate externalities related to social and environmental issues, so **the communication tool must be stimulated to address issues of social equity and fairness in the use of ecosystems.**

Furthermore, the lack of data, as stated in the policy recommendations of the Interreg Alpine Space CaSCo project[7], severely affects the objective of **tracking the origin of timber and the distance travelled.** One of the most useful tools for reducing the distance of timber transport is to have a clear view of timber flows in Europe. To improve the current visibility it is essential:

- Making available existing data on timber trade;
- Collecting data at all levels of governance, from public and private institutions;
- Create timber flow diagrams visualising timber flows with the aim of better informing decision-makers and stakeholders in the sector, building global strategies and ultimately reducing the distance travelled by timber in Europe.

2.4 Enterprise and ownership size

1. **The size of the enterprise is an important variable in the forest economy of the Alpine Space,** as the ability to absorb the biophysical resource of the territory (in quantity and quality) in the first and second transformation phases determines the ability to develop the value chain in the territory. In many cases, there is a **structural disconnect between forest management and industrial use** (currently characterised by many imports), as industry tends to overlook the structural difficulties of the primary sector. In the energy supply chain, for example, virtuous initiatives very often fall within a strictly local dimension, without having a strong power to scale to larger geographical dimensions.
2. **The small size of the property has a strong influence on the possibility of wood utilisation** (see in-depth discussion in the first chapter of the report), which, if we also consider the structural difficulties in tracing the subject to the landowner, make forest management planning impossible. The small size also has an effect on the costs of felling design, discouraging forest management by smallholders who are unable or do not find it profitable to bear these costs. Thus, while **the prevalence of economic interest is directly proportional to the increase in the area of ownership,** for smallholders different interests such as cultural, heritage or land protection aspects come into play. This is because the management of the non-economic dimensions of forest property requires residual active participation and no risk exposure.
3. In some regions (e.g. Piedmont) there is a **contradiction between the availability and use of wood.** A high percentage of forest use in the region corresponds to a very low level of utilisation. This dynamic is very often linked, in addition to the structural problems already mentioned and discussed below, to the high fragmentation of land ownership, which in most Alpine regions is privately

→

7. CaSCo - Alpine Space Programme (alpine-space.eu)

owned (see map 1).

2.5 Actors in the supply chain

1. **Systematising valuable initiatives in order to make sustainable forest management something normal (and not just something episodic)** requires a great deal of effort to promote the available resources on the ground. The availability of economic resources to fund forest management plans is not a major issue (given also the allocation of European and national recovery and resilience plans), but it is the readiness of actors to create a system of relationships.
2. For the dissemination of good practices at transnational level, EUSALP can take charge, in continuity with the work of the TF MFSUT, of **setting up comparison tables between homologous regions;** two groups in particular can be identified, which highlight certain common aspects of forestry culture and established economic exchange relations:
   - The **North East regions:** Austria, Slovenia, North East Italy and South Germany;
   - The **North-West regions:** France, North-West Italy and Switzerland.
3. In recent years, a real **change in the type of forest owner can be seen.** Whereas previously, forest owners shared an agricultural or agro-forestry work culture and therefore had an exclusively or predominantly economic perspective, in recent years we are witnessing an important cultural change in owners (also thanks to generational turnover and the renewed interest of the younger classes in mountain environments), who come from other worlds of interest, such as commerce or environmental protection. There is, therefore, a **different and more complex awareness of the use of the forest.**
4. Among the most interesting actors noted during the survey are:
   - Mayors or representatives of **local communities**;
   - **Trade associations**: land associations, business associations;
   - **Clusters** and innovation poles.

2.6 The communication tool

Certification is not the only tool for vertical integration of the supply chain (from owner to consumer). An important tool, and one that is considered to need further development, is communication. The need for a **communication strategy** appeared clear in many policy statements and there is a general consensus on it among the interviewed actors and the literature, in all topics concerning the timber supply chain. In general, the objective to be pursued is to reduce the structural disconnect between the land resource and its use in industrial, energy, cultural and other ecosystem services. In the current geopolitical context, bringing the forest resource closer to its use can have a disruptive effect on the decrease of non-certified wood imports and on the development of local communities. Here too, the Alpine Space macro-strategy has a major role to play in promoting communication internally, through the link between research and the landowning or industrial world, and externally, through targeted campaigns in education centres and in spaces of dialogue with consumers.

In particular, the REDIAFOR project is a communication innovation tool with a strong impact on conflict management in the Alpine Space through the promotion of dialogue between experts, forest stakeholders and local administrations.
The communication kit[8], developed as part of the project, aims to foster dialogue between society and mountain forest communities by making forestry language, which is sometimes difficult to understand because it is very technical and scientific, more accessible. The tool:

"invites all stakeholders to recognise and share this common heritage and to overcome tensions triggered by sometimes diverging interests in order to strengthen the resilience of the Alpine forest as a whole." (REDIAFOR, 2021)

The kit can be used in Alpine areas by policy makers, owners, associations or other actors in the supply chain to be shared with the general public as much as possible.
At the link Tool Kit Communication | Rediafor[9] you can find the facilitation materials for communication actions.
Updating it with regard to the topics of this project (governance of the energy and construction timber supply chain) could offer new scope for action for innovation in the Alpine supply chain.

→

8. factsheet_rediafor.pdf (alpine-region.eu)
9. Tool Kit Communication | Rediafor

REFLECTION & CONCLUSIONS

As we have shown in this work, the concept of the local wood supply chain in the Alpine Space assumes particular relevance in the context of circular economy models. The circularity of the wood supply chain is intrinsic to the nature of production activities involving wood biomass, as the entire production cycle is structured to ensure that each process makes the most of the available resource, creating waste that in turn serves as an available resource for other processes. **If the production process,** thus, **inherently has mechanisms to optimise the use of the resource, market and policy intervention is required to diminish the information asymmetries** affecting the entire value chain, thus remedying the underutilisation of available resources.
In particular, the lack of information causes inefficiency in the use of resources in **two segments of the value chain: the first, that of the organisation of land ownership, the second, that of the organisation - or vertical integration - of the production-consumption relationship.**
In the first case, the analysis proposed in chapter one once again highlights how fragmentation and the high presence of private individuals in forest ownership have important repercussions on the efficient use of natural resources. In this case, the solutions that are proposed concern both public intervention, through the integration of forestry policies and the coordination of the supply of services, and private initiative, aimed at the creation of associationism or stable organisation of relations between actors. On the whole, it appears that the integration of public-private-associative management tools can be the ideal framework within which the multiplicity of forestry experiences in the Alpine Space can find a broad and coherent channel for development.
In the second case, the analysis of socio-economic indicators, scientific literature and the indications of the actors interviewed show that to ensure the prosperity of the local timber supply chains, forms of vertical integration are necessary, i.e. recognisability devices that can be economic or other, and that create multidirectional communication between the different actors in the chain, especially between those actors at the ends of the chain: producers of the resource and consumers of the resource. In this case, the proposed instruments mainly concern private and market initiative and public intervention is necessary in creating good framework conditions for value chains to flourish across administrative boundaries.
The further element to which this work draws attention is the need to overcome the single focus of attention on the exclusively productive dimension of the forest resource (still preponderant in public policies and forest management). This overcoming, in particular, represents both a need and an opportunity for all actors in the supply chain: a. for smallholders who do not currently deploy the necessary resources for sustainable forest management, b. for the local economic actors that through differentiation of activities can increase their resilience and c. for the end users of the value chain, who in addition to being mere consumers would gain the opportunity to be protagonists of the territory they live in. Perhaps, then, the greatest opportunity that all actors cannot miss is the coordinated valorisation and protection of the forests, if they are to continue to represent the central resource of Alpine societies.

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