

### 3.1 Broadening the Perspective – From Biolinks to a Bioeconomy Masterplan for the Alpine Space

Michael Keller<sup>[1]</sup>

The development of the Value Chain Generator (VCG) and the paralleling initiation of real-world experience with bio-based value chain ideas had a distinctively practical focus. The daily work of collecting and processing data and, even more so, applying it during the project's piloting phase, was experienced as an empirical immersion into the vast opportunity of the bioeconomy within and across the participating regions. In order to put this empirical approach on a broader analytical basis, the AlpLinkBioEco consortium paralleled its practical work with research- and policy-oriented activities throughout the project duration.

Under the lead of Hub Innovazione Trentino, a Whitepaper was drafted early on in the project to outline the benefits and opportunities of bio-based value chains in the Alpine Space. The following section in this chapter gives an overview of the analysis for the four main target sectors: agriculture, wood, packaging and chemistry.

Further detail on existing bio-based value chains in the Alpine Space has been documented in a cluster mapping report under the lead of Poly4Eml hosted by Anteja ECG, providing an overview of relevant activities and cluster actors.<sup>[2]</sup> In addition, an inventory of existing regional strategies and policies related to the bioeconomy has been created and summarized in a policy synthesis report.<sup>[3]</sup>

The results from these research activities provided a picture complementary to the empirical experience made with the data-driven VCG development and the practical field work on concrete business opportunities: the potential for bio-based value chains in the Alpine Space is immense, well-

anchored in existing alpine capacities and resources, and addressing alpine specific economic, societal and environmental challenges. And the potential is relevant at different levels of granularity:

- as a source for new markets and revenues between individual businesses (biolinks),
- as a source for cluster transformation, diversification and growth,
- as a source for regional and macro-regional development, competitiveness and resilience.

In other words, bio-based economic interactions between individual businesses –biolinks – are a sign pointing towards even bigger opportunities. Bio-based value chains can spark the transformation (bioeconomisation, so to speak) of complete clusters and form the nucleus of regional and macroregional development. The piloting phase of the AlpLinkBioEco project has demonstrated that biolinks can grow. In order to fully benefit from the bioeconomy potential, a joint strategic approach among Alpine Regions needs to ensure that biolinks are sowed and bear fruit across the fertile bioeconomy soils of the Alps.

This is, of course, no easy undertaking. In spite of all the significant complementarities and synergies, the Alpine Space remains a diverse territory, marked by almost as many regional borders as watersheds, home to a multitude of languages, regional specificities and identities and a variety of administrative and political contexts.

In order to move closer towards a joint approach, the participating regions of the AlpLinkBioEco project have engaged their policy stakeholders in a policy dialogue culminating in an Alpine Policy Forum, conducted online on February 16, 2021 and uniting more than 125 participants.

Under the responsibility of Fraunhofer Italia, regional policymakers and bio-based industry stakeholders have been questioned on the main challenges to overcome in order to foster a common macro-regional bioeconomy approach and invited to share best-practice examples of cross-regional settings. The results were summarized in a Roadmap available on the project website<sup>[4]</sup>, and

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[2] <https://www.alpine-space.eu/projects/alplinkbioeco/en/project-results/cluster-mapping-report>

[3] <https://www.alpine-space.eu/projects/alplinkbioeco/en/project-results/policy-synthesis-report>

[4] <https://www.alpine-space.eu/projects/alplinkbioeco/en/project-results/roadmap-for-a-common-alpine-space-policy-on-circular-bio-based-economy>

formed the basis for the debates at the Alpine Policy Forum organized by BIOPRO Baden-Württemberg GmbH and Poly4Eml. Based on all these inputs, a masterplan to move towards a joint bioeconomy strategy in the Alpine Region has finally been drafted. The complete masterplan is available on the project website<sup>[5]</sup> and its key elements are presented in the next chapter.

With its masterplan, and in complementarity to its hands-on, data driven and practical approach with the Value Chain Generator (VCG), the AlpLinkBioEco project hopes to promote the valorization of bioeconomy potential at a larger, macro-regional scale across the Alps. Not only does it contribute to recognizing and documenting the benefits and opportunities of bio-based value chains in the Alpine Space, but it proposes concrete fields of action and recommendations oriented towards a joint bioeconomy strategy for the Alpine Space.

## Benefits and Opportunities of Bio-based Value Chains in the Alpine Space

Elisa Morganti<sup>[6]</sup>

The regions of the Alps are recognized to have significant biomass resources, strong industry sectors, and knowledge centers and expertise in bio-based fields. In addition, regional strategies and policies are conducive to the development of bio-based value chains. The main benefits and opportunities that a bio-based economy can bring to stakeholders of the Alpine Space (AS) regions have been summarized in a Whitepaper, available on the project website,<sup>[7]</sup> including suggestions on how to generate new business opportunities and recommendations for stakeholders.

The analysis focused on bio-based industries within the sectors “Agriculture” (Agro), “Wood”, “Packaging” and “Chemistry” and assessed their strengths and importance in the participating project regions in comparison to their overall economies.

The investigated sectors have great relevance in the

[5] <https://www.alpine-space.eu/projects/alplinkbioeco/en/project-results/joint-masterplan-on-circular-bioeconomy>

[6] Hub Innovazione Trentino

[7] <https://www.alpine-space.eu/projects/alplinkbioeco/en/project-results/white-paper>

regional strategies in terms of available feedstocks, market value, competences and excellence involved. The covered regions produce more than 35 million m<sup>3</sup> of wood per year and employ more than 1.4 million people in the agri-food sector. Alpine regions also have a good track record in chemistry production with good potential for growth in the bio-based chemistry. Collected data show that only in few Alpine regions biomass and waste from agriculture, wood and food industry are used for bio-based packaging and polymers production.

Clusters play a fundamental role in generating new business opportunities within and/or across the regions in the Agricultural, Wood, Packaging for Food and Pharma and Chemistry sectors. The crucial role of Clusters has been extensively addressed by two Interreg projects during the last years, S3-4AlpClusters<sup>[8]</sup> and DanuBio ValNet<sup>[9]</sup> and by a Cluster Mapping report drafted within the AlpLinkBioEco project.<sup>[10]</sup> Clusters represent important local concentrations of bio-based capacities, entrepreneurial resources, cross-sectoral connectivity and actors of the quadruple helix. Nevertheless, some white spots and challenges have been identified:

- There is a lack of experience among the regions on how to use clusters and how to develop implementation tools to fully benefit SMEs in bio-based value chains
- Alignment between and knowledge about other regions’ strategies are very limited
- The Cluster initiatives focusing on bio-based industries are facing significant challenges as they operate within an emerging industry with specific demands that cannot be properly addressed by traditional networking and matchmaking

The following paragraphs give additional insights into the four covered sectors.

### **Wood sector (infographic page 71)**

All the participating project regions are active within the Wood sector and the available resources are mostly the same for all the regions, i.e. cork, straw,

[8] <https://www.alpine-space.eu/projects/s3-4alpclusters/en/home>

[9] <http://www.interreg-danube.eu/approved-projects/danubiovalnet>

[10] <https://www.alpine-space.eu/projects/alplinkbioeco/en/project-results/cluster-mapping-report>

## CHAPTER 3

The Masterplan – Towards a Joint Bioeconomy Strategy for the Alpine Space

timber, beams, and boards, residual biomass from sawmill processing, end-of-life wood, waste from wood processing. For instance, in the Canton of Fribourg they are used as feedstocks for manufacturing products of wood, cork, straw and plaiting materials, moreover, the lignin extracted from the starting biomass is used for bioplastic production; in Autonomous Province of Trento the timber, beams and boards are used for pallets, while the wood industry residuals are used for bioenergy production, even if sometimes it is used as mulching and as bedding for cattle; Lombardy region owns expertise also in the paper manufacturing from wood waste; in Slovenia the wood-based products are exploited for energy applications.

Source: AlpLinkBioEco Policy Memo #01<sup>[11]</sup>

### **Agricultural sector (infographic page 72)**

In general, Agriculture is one of the most developed sectors, especially in Autonomous Province of Trento, Lombardy, Auvergne-Rhône-Alpes and Bavaria. In the Autonomous Province of Trento, the agricultural residuals (from apples and vines) and the animal manure, the wastewater and dry sludge represent the most abundant resources; the animal manure is mainly used in Biogas plant. In the Lombardy region, the wastewater/sewage sludge, corn silage, autumn-winter cereal silage, livestock animal waste, grass, flour products, glycerine, vegetable oils and urban waste of organic nature are the most abundant resources which are treated and used for biogas production. The Auvergne-Rhône-Alpes region produces biomass especially animal dung, intermediate cultures between two main crops and waste from the agro-food industries. In Bavaria cereals (wheat and barley), corn, silage maize and manure are mainly exploited for the Biogas production.

Source: AlpLinkBioEco Policy Memo #01<sup>[12]</sup>

### **Packaging sector (infographic page 73)**

As for the Wood sector, also Packaging sector activities are widespread among regions. Biomass and waste from agriculture, wood and food industry are used for bio-based packaging and polymers production. For instance, in the Canton of Fribourg,

[11] [https://www.alpine-space.eu/projects/alplinkbioeco/policy-memos/alplinkbioeco\\_policymemo-01.pdf](https://www.alpine-space.eu/projects/alplinkbioeco/policy-memos/alplinkbioeco_policymemo-01.pdf)

[12] [https://www.alpine-space.eu/projects/alplinkbioeco/policy-memos/alplinkbioeco\\_policymemo-01.pdf](https://www.alpine-space.eu/projects/alplinkbioeco/policy-memos/alplinkbioeco_policymemo-01.pdf)

Bavaria and Switzerland companies produce packaging material for the food industry; or in Baden-Württemberg the companies are using bio-based polymers for specific packaging applications.

Source: AlpLinkBioEco Policy Memo #01<sup>[13]</sup>

### **Bio-based Chemistry (infographic page 74)**

According to the research carried out, the chemistry industry is developed in all the regions, especially in Austria and Bavaria regions. In Austria, the fine chemicals production is well developed, such as acetic acid, furfural, magnesium lignin sulfonate, Omega 3 fatty acids, succinic acid which can find applications in different fields like food, refining and printing industries. In Bavaria, the chemistry industry is one of the most powerful bio-based economy. The biomasses are used for the production of fine chemicals which can find application in drug production, biocatalysts, biofilms and biodegradable plastics.

Source: AlpLinkBioEco Policy Memo #01<sup>[14]</sup>

[13] [https://www.alpine-space.eu/projects/alplinkbioeco/policy-memos/alplinkbioeco\\_policymemo-01.pdf](https://www.alpine-space.eu/projects/alplinkbioeco/policy-memos/alplinkbioeco_policymemo-01.pdf)

[14] [https://www.alpine-space.eu/projects/alplinkbioeco/policy-memos/alplinkbioeco\\_policymemo-01.pdf](https://www.alpine-space.eu/projects/alplinkbioeco/policy-memos/alplinkbioeco_policymemo-01.pdf)

# Implementing Value Chains in a Bio-Based Economy: RECOMMENDATIONS



#AlLinkBioEco



## WOOD SECTOR

one of the most abundant resources in the Alpine region

**35M m<sup>3</sup>**  
harvested wood each year



# Implementing Value Chains in a Bio-Based Economy: RECOMMENDATIONS

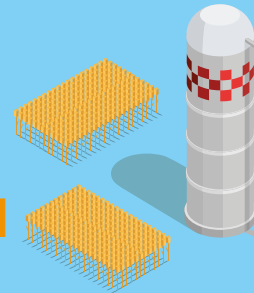


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## AGRICULTURAL SECTOR

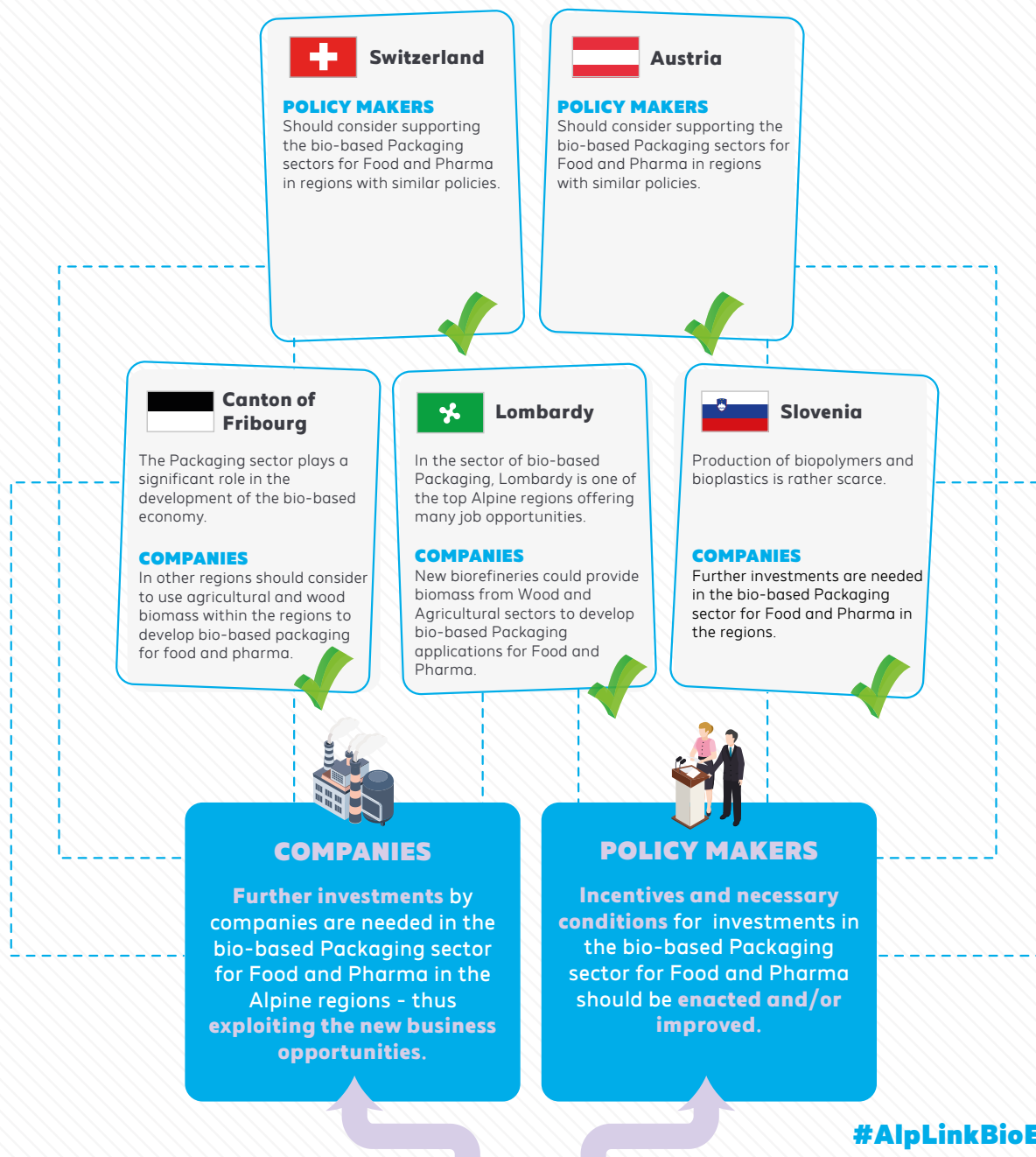
one of the most developed sectors in the Alpine region

**1.400.000** employees | **€ 140** BILLION revenue





# Implementing Value Chains in a Bio-Based Economy: RECOMMENDATIONS



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## PACKAGING SECTOR FOR FOOD & PHARMA

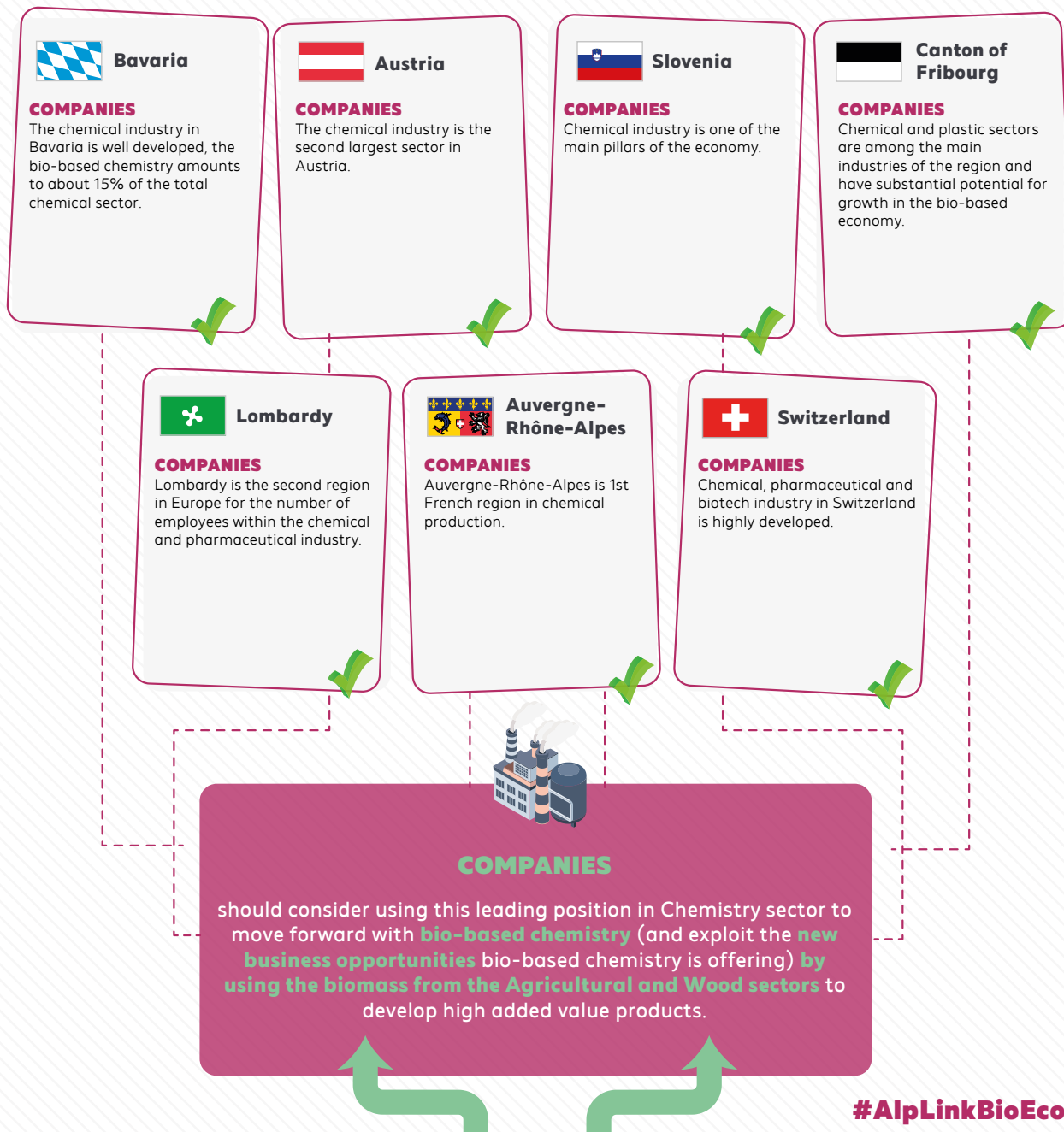
represents a white spot



data show that only in some of the Alpine regions, biomass and waste from Agriculture, Wood and Food industry are used for bio-based packaging and polymers production



# Implementing Value Chains in a Bio-Based Economy: RECOMMENDATIONS



## CHEMISTRY SECTOR

represents a white spot

Alpine regions have a good track record in chemistry production and some of the regions already have substantial potential for growth in the bio-based chemistry

