ALPS4GREENC INTERACTIVE STAKEHOLDER & RESOURCES MAP

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Alpine Space

Alps4GreenC

Project	Alps4GreenC – Implementation pathways for sustainable Green Carbon production in the Alpine Region
Action	1.2 - Mapping stakeholders & resources
Deliverable	1.2.1 - Alps4GreenC Interactive stakeholder & resources map
Leading partner	AIEL – Italian Agri-forestry Association[1],
Involved partners	BioBASE GmbH[2], Štajerska gospodarska zbornica[3]
Authors	Diego Rossi[1], Valter Francescato[1], Matteo Favero[1], Giulia Rudello[1], Thomas Timmel[2], Tanja Berglez Krivec[3]
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Summary

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Foreword

Wood residues from forest management and agricultural production are widespread in the Alpine area and can often be underutilized due to the lack of knowledge of users (businesses and consumers) of the possibilities of sustainable use of such residues. At the same time, the companies that produce innovative systems have trouble to stand out because users are not looking for innovative solutions but are exclusively directed towards standard solutions, usually fossil-fuel based.

The action is focused on identifying and profiling stakeholders related to the supply chain of wooden residues from forest sustainable management, wood industry, agriculture, and agri-food industry.

The final goal of the action will be, not only to identify and profile those stakeholders, but to map the resources and the actors involved throughout the supply chain.

The action will also involve a cooperation with the Horizon project BioRural to direct, stakeholder who participate in the Alps4GreenC project in the BioRural toolkit in order to contribute to create one European platform that will host all of the EU bioeconomy related stakeholders.

Abstract

This study presents a comprehensive methodology for mapping and categorizing economic activities in Europe concerning lignocellulosic residues' supply chain relevance. Initially, companies of interest were identified based on lignocellulosic residue availability and product demand. European companies were then mapped and weighted based on their relevance and territorial presence. Economic activities were classified using NACE Rev. 2 and FAME/Cronos Eurostat classifications, while territorial classification utilized NUTS 2021. Residue classification followed EN ISO 17225-1:2021 guidelines, categorizing residues into woody, herbaceous, and fruit biomass. Economic activities were scored on a scale of 0 to 5 based on their significance in small-scale residue exploitation. Territorial indices were defined for agriculture, forestry, and industry/services sectors. Statistical data from Eurostat were employed, with three indicators used due to the diverse nature of economic activities. The territorial index, incorporating NACE_Index, F_GEO, and F_HDD for heating degree days, was calculated to assess economic activity potential in given regions. Stakeholders in the supply chain were identified, recognizing the complexities of residue production. An interactive map was developed, facilitating the classification of economic activities at national and regional levels, showcasing relevance for residue production and utilization. The map provides insights into specific economic sectors, average and specific indices, by-products, and residue-related products. Raw data download and methodological consultation options are also available.

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Material and methods

In the first part of the project, the types of companies that could be interesting were identified based on two main factors:

1. The availability of lignocellulosic residues that could be exploited within the supply chain;
2. The need for products that can be obtained from lignocellulosic residues.

Subsequently, these companies were mapped on the European territory and a weight was given to each type based on the relevance of the company and its presence on the European territory.

Data classification

Business classification

Relevant economic activities were classificated by Nace Rev. 2 classification, the *statistical classification of economic activities in the European community*.

NACE is the European standard classification of productive economic activities and consist of a hierarchical structure code in which:

I. a first level consisting of headings identified by an alphabetical code (sections),
II. a second level consisting of headings identified by a two-digit numerical code (divisions),
III. a third level consisting of headings identified by a three-digit numerical code (groups),
IV. a fourth level consisting of headings identified by a four-digit numerical code (classes).

The classification used in the mapping was on the second (division) level as it is the lower level for which statistical data are available from Eurostat at NUTS-2 territorial unit.

Business classification for Agricultural activities

For agriculture (Nace Rev. 2 code: A01) an additional level of classification was taken into account. Agricoltural economic activities are critical components for circular economy and residues exploitation, for that reason an in-depth analysis was made.
For the in-depth classification of Agricultural economic activities, the FAME/Cronos Eurostat classification was used.

Territorial classification

For territorial classification NUTS 2021 classification was used. NUTS is the *nomenclature of territorial units for statistics*, is a hierarchical system for dividing up the economic territory of the EU and the UK for socio-economic analyses of the regions. The classification is divided into three level:

- NUTS 1: major socio-economic regions,
- NUTS 2: basic regions for the application of regional policies,
- NUTS 3: small regions for specific diagnoses.

For the purposes of the mapping, NUTS 0 (*member states*) and NUTS 2 level was take into account.

NUTS 2 level of classification is the lower level of the classification for which economical data was available.

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Residue classification

The classification of residue was based on EN ISO 17225-1:2021, three major category was taken into account:

I. Woody biomass,
II. Herbaceous biomass,
III. Fruit biomass.

Economic activities that produce as byproducts such residues were identified, classified, and the type of available residues listed in the database.
The identification of the relevant activities was made by project partners mostly in the first half of the project during meetings or event, directly contacting stakeholders or through bibliographic research and previous experiences.

Product classification

The project is focused on biochar, but the goal of the activity is to map lignocellulosic residues. Consequently, four major categories of products were defined in order to classify all the economic activities that are potential users. The defined categories of products are:

I. Virgin raw wood: Roundwood, solid wood, timber, etc.
II. Biomass residues:
    a. Biomass residues for various uses (woodchips, straw, etc.),
    b. Biomass residues used as biofuels[1] (woodchips),
III. Biochar.

Statistical data

In order to evaluate the potential of the economic activities on a given Region, statistical data from Eurostat were used. It was not possible to use a single indicator for all the economic activities, as there aren't any statistical indicators which covers all the NACE Rev. 2 economic activities, for that reason three indicators were use:

I. For A01 NACE Rev. 2 activities (Agriculture): Economic accounts for agricolture, PROD_BP[2]
II. For A02 NACE Rev. 2 activities (Forestry): Structural business statistics, V16110[3]
III. For all the other codes (Industry/services): Land cover and land use, landscape, LCC[4]

As it was not possible to use a common indicator the tree database are not comparable but it was still possible to create sectorial maps, for agriculture, forestry and industry/service.

Data analysis

The goal of the activity was to create a reliable rating system, for all the economic activities in order to map the activities that are critical for the circular economy, and the territories that are more suitable for the production of certain residues or for the consumption of certain related products.

[1] Biomass residues were further divided as for biofuel potential uses, average HDD regional level were used in order to establish the potential.
[2] Production value at basic price – MIO EUR
[3] Persons employed - number
[4] Forest land cover – KM2

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Definition of the business index (NACE_index)

All the economic activity were rated on a scale ranging from 0 to 5, going from the activity less significant to the activity more significant in the small scale residue exploitation.

The score was assigned as follows:

TABLE 1: LIST OF APPLICABLE RATING CATEGORIES

Code	Description	Score
B-U	The activity produces both a byproduct and use a related product in the process.	4
B	The activity produces a byproduct, but it does not use any residue-based product.	2
U	The activity uses a residue-based product but does not produce any byproduct.	2
M	An activity classified B-U produces a byproduct that can be upgraded to be used in the same process.	1

The economical activity to score 5 points must produce a residue (es. Prunings from a vineyard) and such residue must be compatible with the production of a product needed in the same activity (es. Biochar for soil fertilization).

Definition of the territorial index for agriculture (F_GEO_{Agr})

For agriculture the sector size was defined by the average (2017-2021) production value at basic price expressed in MIO € (PROD_BP). To turn It into a relative number for each value (same NUTS code, same CRONOS code) the values were converted into a classification ranging from 1 to 5 where:

- 1 point was given to the values higher than 0 and lower or equal to the 0,2 percentile,
- 2 points was given to the values ranging from the 0,2 to the 0,4 (included) percentile,
- 3 points was given to the values ranging from the 0,4 to the 0,6 (included) percentile,
- 4 points was given to the values ranging from the 0,6 to the 0,8 (included) percentile,
- 5 points was given to the values higher than the 0,8 percentile.

Definition of the territorial index for Forestry (F_GEO_{For})

For forestry the sector size was defined by the average (2009-2018) forest land cover expressed in Km_2 (LCV).). To turn It into a relative number for each value (same NUTS code, same NACE Rev. 2 code) the values were converted into a classification ranging from 1 to 5 where:

- 1 point was given to the values higher than 0 and lower or equal to the 0,2 percentile,
- 2 points was given to the values ranging from the 0,2 to the 0,4 (included) percentile,
- 3 points was given to the values ranging from the 0,4 to the 0,6 (included) percentile,
- 4 points was given to the values ranging from the 0,6 to the 0,8 (included) percentile,
- 5 points was given to the values higher than the 0,8 percentile.

Definition of the territorial index for Industry/service (F_GEO_{IS})

For all the economic activities, different from A01 and A02, the sector size was defined by the average (2016-2020 Employees and self-employed persons in local units - number (V16110). To turn It into a relative number for each value (same NUTS code, same NACE Rev. 2 code) the values were converted into a classification ranging from 1 to 5 where:

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- 1 point was given to the values higher than 0 and lower or equal to the 0,2 percentile,
- 2 points was given to the values ranging from the 0,2 to the 0,4 (included) percentile,
- 3 points was given to the values ranging from the 0,4 to the 0,6 (included) percentile,
- 4 points was given to the values ranging from the 0,6 to the 0,8 (included) percentile,
- 5 points was given to the values higher than the 0,8 percentile.

Heating degree days factor application for biofuels

For the use of residues as biofuels, to define a correct geographical distribution of potential annual HDD (Heating Degree Days) were considered. Data was downloaded from the Agri4cast database of the JRC and a ten-year (2002-2022) average value was used. As already done for F_GEO, the values has been relativized in order to serve as a proxy for potential biofuels demand in the given territory. The values were converted into a classification ranging from 1 to 3 where:

- 1 point was given to the values higher than 0 and lower or equal to the 0,4 percentile,
- 2 points was given to the values ranging from the 0,4 to the 0,6 (included) percentile,
- 3 points was given to the values higher than the 0,6 percentile.

Calculation of the territorial index (GEO_Index)

The territorial index is composed of the NACE_Index adjusted according to the penetration on the region of a certain economic activity (F_GEO) and the heating degree days (F_HDD) if the given activity has an heating demand. The calculation of the average GEO_Index in a in a certain territory is performed as follows:

$$GEO\_Index = \frac{\sum_{i=1}^{n} NACE\_Index_i + F\_GEO_i + F\_HDD_i \cdot K\_HDD_i}{n}$$

Where:

K_HDD: is the coefficient of relevance of the F_HDD factor. The coefficient is equal to 0 when the economic activity does not use any residue-based biofuels. The coefficient is equal to 0,5 when the activity may use a residue-based biofuels but is also relevant for other residue-based product (e.g. Biochar). The coefficient is equal to 1 when the economic activity may use a residue-based and is not relevant for any other residue-based product.

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Stakeholders' identification

Stakeholders in a defined supply chain are all those subjects who, for various reasons, have a direct or indirect interest in the development of the supply chain.

When referring to residues, complexity increases on the production side as these materials do not derive from a destined supply chain but are generated involuntarily and without particular attention to market demands and quality within other supply chains.

For this reason, in the specific case, from the point of view of the production of residues, the different supply chains that generate or could generate woody biomass that can be used for various reasons in the process must be identified.

Stakeholders on residue production and distribution

Wooden residues are mostly used for combustion, pyrolysis, and gasification and for a proper classification of origin and source of such materials the ISO 17225-1 can be taken as a reference.

ISO 17225-1 is the international standard that sets general requirements for solid biofuels and specifically, in Table 1, made a classification of origin and sources of solid biofuels, the classification is organized around four major branches.

First branches are related to the type of raw material, whether is wooden based or herbaceous and so on (see Table 1).

TABLE 2: CLASSIFICATION FOR TYPE OF RAW MATERIAL (SOURCE: ISO 17225-1:2021)

Reference	Type of raw material
1.	Woody biomass
2.	Herbaceous biomass
3.	Fruit biomass
4.	Aquatic biomass
5.	Blends and mixtures

Woody biomass production and distribution

Referring to woody biomass production and considering the classification, origins of raw materials will be mostly related to sustainable forest management and wood industry (see table 2).

TABLE 3: ORIGIN OF WOODY BIOMASS (SOURCE: ISO 17225-1:2021)

Reference	Origin of raw material
1.1	Forest plantation and other virgin wood
	Whole trees and stemwood unfitted for wood processing industry
	Brushwood and prunings
1.2	By-product and residues from wood processing industry
	Sawdust
	Wood chips
	Wooden trimmings
1.3	Used wood[1]
	Sawdust

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	Wood chips
	Wooden trimmings
1.4	Blends and mixture

[1]Legality of use and specific permission vary from country to country

Stakeholders related to production of woody biomass from the above-mentioned origins are:

TABLE 4: STAKEHOLDERS FOR WOODY BIOMASS PRODUCTION

Sector (NACE Rev. 2)	Description (NACE Rev. 2)	Stakeholder	Type of biomass
A.01.21	Growing of grapes	Farmers	Prunings and whole trees (at the end of life)
A.01.23	Growing of citrus fruits	Farmers	Prunings and whole trees (at the end of life)
A.01.24	Growing of pome fruits and stone fruits	Farmers	Prunings and whole trees (at the end of life)
A.01.28	Growing of spices, aromatic, drug, and pharmaceutical crops	Farmers, Garden centers	Residues
A.01.29	Growing of other perennial crops	Farmers, Garden centers	Unsold Christmas trees and other ornamental trees
A.02.10	Silviculture and other forestry activities	Forest owners, forestry companies	Residues from forest cutting derived from cultural practices
A.02.20	Logging	Forest owners, forestry companies	Residues and wood unfitted for timber industry
C.16.10	Sawmilling and planning of wood	Transformation, sawmills, and timber industry	Woodchips, sawdust, wooden trimming, and other residues
C.16.21	Manufacture of veneer sheets and wood-based panels	Sawmills and timber industry	Sawdust, wooden trimming, and other residues[1]
C.16.22	Manufacture of assembled parquet floors	Sawmills and timber industry	Sawdust, wooden trimming, and other residues[1]
C.16.23	Manufacture of other builders' carpentry and joinery	Sawmills and timber industry	Sawdust, wooden trimming, and other residues[1]
C.16.24	Manufacture of wooden containers	Sawmills and timber industry	Sawdust, wooden trimming, and other residues[1]
C.16.29	Manufacture of other products of wood; manufacture of articles of cork, straw, and plaiting materials	Sawmills and timber industry	Sawdust, wooden trimming, and other residues[1]
C.17.11	Manufacture of pulp	Paper industry	Residues[1]
C.17.12	Manufacture of paper and paperboard	Paper industry	Residues[1]

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C.31.00	Manufacture of furniture	Furniture manufacturers	Sawdust and wood residues, chemically treated sawdust and wood residues
C.32.20	Manufacture of musical instruments	Goods manufacturers	Sawdust and wood residues, chemically treated sawdust and wood residues
C.32.30	Manufacture of sports goods	Goods manufacturers	Sawdust and wood residues, chemically treated sawdust and wood residues
C.32.40	Manufacture of games and toy	Goods manufacturers	Sawdust and wood residues, chemically treated sawdust and wood residues
C.32.91	Manufacture of brooms and brushes	Goods manufacturers	Sawdust and wood residues, chemically treated sawdust and wood residues
D.35.11	Production of electricity	Hydroelectric generation	Floating wooden residues
E.36.00	Water collection, treatment and supply	multi-utilities	Floating wooden residues
E.37.00	Sewerage	multi-utilities	Floating wooden residues
D.38.11	Collection of non-hazardous waste	Waste management companies	Paper derived non-recyclable waste
F.41.20	Construction of residential and non-residential buildings	Construction companies	Chemically treated and untreated wooden residues
F.42.00	Demolition and site preparation	Construction companies	Raw wood derived from site preparation activities
F.42.00	Demolition and site preparation	Construction companies	Chemically treated and untreated wooden residues
F.43.30	Building completion and finishing	Construction companies	Chemically treated and untreated wooden residues
N.81.30	Landscape service activities	Multiutility companies, Gardeners	Prunings, branches and whole trees

[1]*Residues may contain paints, glues, and other chemical additives.*

Herbaceous biomass production and distribution

Referring to fruit biomass production and considering the classification, origins of raw materials will be mostly related to agriculture sector (see table 4).

TABLE 5: ORIGIN OF HERBACEOUS BIOMASS (SOURCE ISO 17225-1:2021)

Reference	Origin of raw material
2.1	Herbaceous biomass from agriculture and horticulture
	Straw
	Brushwood and prunings
2.2	By-products and residues from food and herbaceous processing industry
	Leaves and other herbaceous biomass
	Herbaceous residues from cultivation and processing
	Herbaceous residues from landscape services activities

Stakeholders related to production of woody biomass from the above-mentioned origins are:

TABLE 6: STAKEHOLDERS FOR HERBACEOUS BIOMASS PRODUCTION

Sector (NACE Rev. 2)	Description (NACE Rev. 2)	Stakeholder	Type of biomass
A01.11	Growing of cereals	Farmers	Straw
A01.12	Growing of rice	Farmers	husks
A.01.16	Growing of fiber crops	Farmers	Biomass residues
A.01.19	Growing of other non-perennial crops	Farmers	Biomass residues
C.10.83	Processing of tea and coffee	Beverage companies	Leaves
N.81.30	Landscape service activities	Multiutility companies, Gardeners	Prunings, branches and whole trees

Fruit biomass production and distribution

Referring to fruit biomass production and considering the classification, origins of raw materials will be mostly related to agriculture and agri-food industry (see table 6).

TABLE 7: ORIGIN OF FRUIT BIOMASS (SOURCE ISO 17225-1:2021)

Reference	Origin of raw material
3.1	Orchard and horticulture fruit
	Pinecones
3.2	By-products and residues from food and fruit processing industry
	Kernels (olives, peaches, apricot, etc.)
	Shells (hazelnuts, almonds, walnut, pine nuts)
3.3	Blends and mixture

Stakeholders related to production of woody biomass from the above-mentioned origins are:

TABLE 8: STAKEHOLDERS FOR FRUIT BIOMASS PRODUCTION

Sector (NACE Rev. 2)	Description (NACE Rev. 2)	Stakeholders	Type of biomass
A.01.21	Growing of grapes	Farmers	Seeds, skins, and stalks
A.01.23	Growing of citrus fruits	Farmers	Skins
A.01.24	Growing of pome fruits and stone fruits	Farmers	Husks and kernels
C.10.41	Manufacture of oils and fats	Oil mills	Husks and kernels
C.10.83	Processing of tea and coffee	Beverage companies	Residues from torrefaction
C.11.01	Distilling, rectifying, and blending of spirits	Distilleries	Stalks
C.11.02	Manufacture of wine from grape	Winemakers	Seeds, skins, and stalks

Technology and R&D stakeholders

Under the macro-category of the technology and R&D stakeholders falls all the actors who have a role in the development of technical solutions.

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The macro-category includes all the actors from the development of a technology to the installation and maintenance.

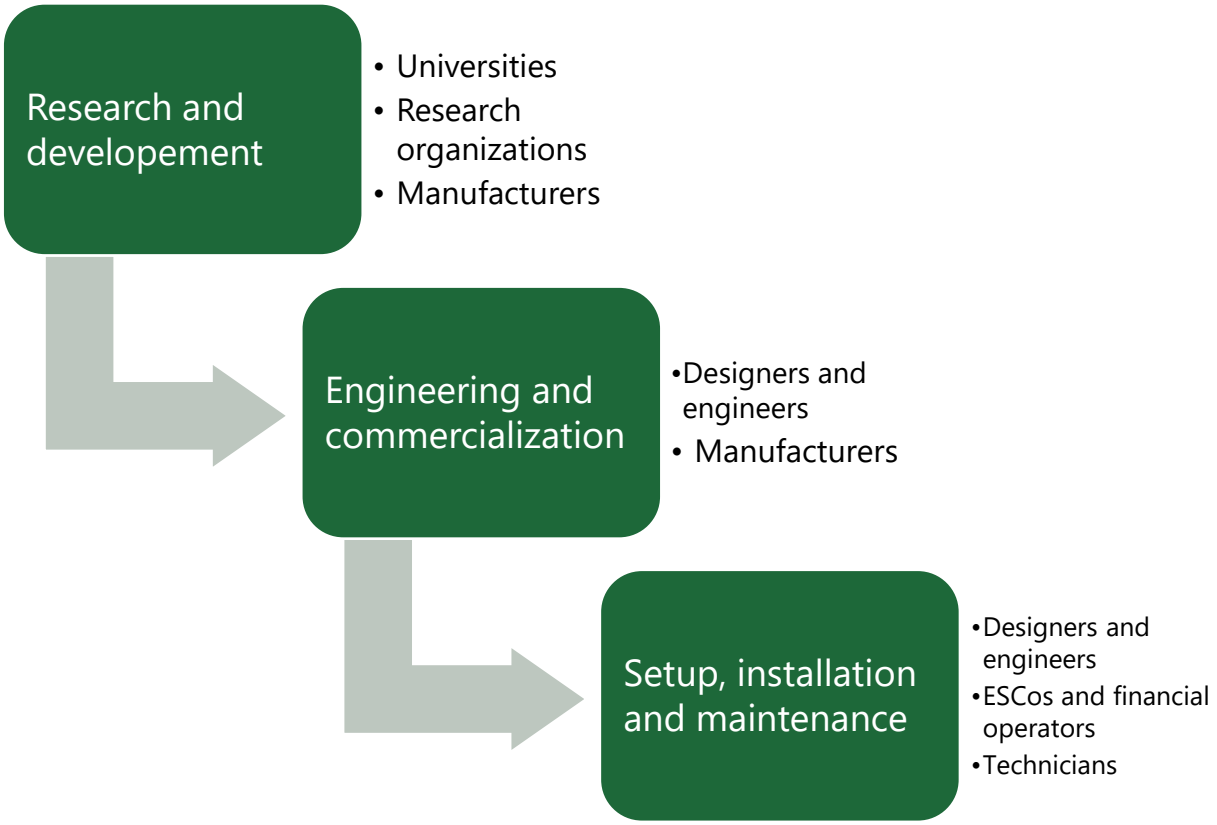

FIGURE 1: PRODUCT DEVELOPMENT SCHEME AND RELATED STAKEHOLDERS

Sector (NACE Rev. 2)	Description (NACE Rev. 2)	Phase of development
C.27.51	Manufacture of electric domestic appliances	Engineering and commercialization
C.27.52	Manufacture of non-electric domestic appliances	Engineering and commercialization
C.28.21	Manufacture of ovens, furnaces, and furnace burners	Engineering and commercialization
F.43.22	Plumbing, heat, and air-conditioning installation	Setup, installation, and maintenance
M.71.12	Engineering activities and related technical consultancy	Setup, installation, and maintenance
M.72.19	Other research and experimental development on natural science and engineering	Research and development

Final users

Final users, and most importantly, potential final users of wood residues for biobased solutions or energetic proposes are the most important stakeholder in a sector in which innovative technological solutions mostly exist but are mostly unknown to final users.

Concurrently, both companies and private end users are the most difficult to reach, especially if they are not actively searching for alternative solutions to conventional raw materials and energy sources.

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The interactive map is critical to understand which category of economic activity, depending on region, would be interested to use a residue.

Final users will be following classified for economy sectors and for usage and potential use of biobased raw materials.

Classification of business end users will be done by referring to Statistical classification of economic activities in the European Community (NACE *Rev 2*).

"NACE is a four-digit classification providing the framework for collecting and presenting a large range of statistical data according to economic activity in the fields of economic statistics (e.g., production, employment, and national accounts) and in other statistical domains developed within the European statistical system (ESS).

NACE Rev. 2, a revised classification, was adopted at the end of 2006 and, in 2007, its implementation began. The first reference year for NACE Rev. 2 compatible statistics is 2008, after which NACE Rev. 2 will be consistently applied to all relevant statistical domains. (Source: Eurostat 2016)

TABLE 9: BUSINESS END USERS CLASSIFICATION AND PRODUCTS (SOURCE: EUROSTAT 2008)

Sector (NACE Rev. 2)	Description (NACE Rev. 2)	Type of biomass	End use
A.01	Crop and animal production, hunting, and related service activities	Biochar	Soil fertilization
A.01	Crop and animal production, hunting, and related service activities	Woodchips Class B1, B2 (ISO 17225-4:2021)	Mulching
A.01.13	Growing of vegetables and melons, roots, and tubers	Biofuels (quality depends on boiler)	Greenhouse heating in vegetables production, mushrooms farm heating
A.01.19	Growing of other non-perennial crops	Biofuels (quality depends on boiler)	Greenhouse heating in flower production
A.01.19	Growing of other non-perennial crops	Woodchips Class B1, B2 (ISO 17225-4:2021)	Mulching and substrate for flowerpot
A.01.29	Growing of spices, aromatic, drug, and pharmaceutical crops	Biofuels (quality depends on boiler)	Greenhouse heating in flower production
A.01.29	Growing of spices, aromatic, drug, and pharmaceutical crops	Woodchips Class B1, B2 (ISO 17225-4:2021)	Mulching and substrate for flowerpot
A.01.41	Raising of dairy cattle	Biochar (certified PAHs free)	Biochar for cattle feeding
A.01.42	Raising of other cattle and buffaloes	Biochar (certified PAHs free)	Biochar for cattle feeding
A.01.43	Raising of horses and other equines	Sawdust and hogfuels	Litter

C.10.32	Manufacture of fruit and vegetable juice	Biofuels (quality depends on boiler or gasification)	Biofuels for drying fruits and vegetables, biofuels for cold production, gasification for electric production
C.10.51	Operation of dairies and cheese making	Biofuels (quality depends on boiler or gasification)	Biofuels for process heat or for heating and electric energy production trough gasification
C.10.71	Manufacture of bread; manufacture of fresh pastry goods and cakes	Biochar (certified PAHs free)	Food colorant
C.10.72	Manufacture of rusks and biscuits; manufacture of preserved pastry goods and cakes	Biochar (certified PAHs free)	Food colorant
C.10.83	Processing of tea and coffee	Biofuels (quality depends on boiler or gasification)	Biofuel for teal leaf curing
C.11.05	Manufacture of beer	Biofuels (quality depends on boiler or gasification)	Biofuel for process heat
C.12.00	Manufacture of tobacco products	Biofuels (quality depends on boiler or gasification)	Biofuel for tobacco curing
C.13.96	Manufacture of other technical and industrial textile	Biochar	Fabric additive for textile
C14.12	Manufacture of workwear	Biochar	Thermal insulation for functional clothing
C.17.11	Manufacture of pulp	Raw wood for paper production	Paper production
C.20.10	Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastic and synthetic rubber in primary forms	Biochar filled with nitrogen-fixing organisms	Fertilization
C.20.20	Manufacture of pesticides and other agrochemical products	Raw chestnut wood	Tannin extraction
C.23.32	Manufacture of bricks, tiles and construction products, in baked clay	Biochar	Biochar as an additive for insulation, humidity regulation, protection against electromagnetic radiation
C.23.00	Manufacture of other non-metallic mineral product	Biofuels (quality depends on boiler)	Biofuels for process heat

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C.23.61	Manufacture of concrete products for construction purposes	Biochar	Biochar as an additive for insulation, humidity regulation, protection against electromagnetic radiation
C.23.63	Manufacture of ready-mixed concrete	Biochar	Biochar as an additive for insulation, humidity regulation, protection against electromagnetic radiation
C.24.00	Manufacture of basic metals	Low quality biochar	Biochar as a substitute of charcoal
C.31.00	Manufacture of furniture	Solid wood, chipboard and veneered wood	Component for furniture
C.32.20	Manufacture of musical instruments	Solid wood, chipboard and veneered wood	Component of musical instruments
C.32.30	Manufacture of sports goods	Solid wood, chipboard and veneered wood	Component of sports goods
C.32.40	Manufacture of games and toy	Solid wood, chipboard and veneered wood	Components of games and toys
C.32.91	Manufacture of brooms and brushes	Timber and raw wood	Handle component
E.36.00	Water collection, treatment and supply	Biochar	Biochar for water treatment
E.37.00	Sewerage	Biochar	Biochar for water treatment
E.38.21	Treatment and disposal of non-hazardous waste	Raw lignocellulosic material	Structuring for compost
E.39.00	Remediation activities and other waste management services	Biochar	Biochar for water treatment
F.41.20	Construction of residential and non-residential buildings	Timber and raw wood	Wood for building construction
F.41.20	Construction of residential and non-residential buildings	Straw presses	Straw presses for building insulation
F.43.30	Building completion and finishing	Timber	Timber for building finisching
F.43.31	Plastering	Biochar	Biochar as plastering additive
I.55.10	Hotels and similar accommodation	Biofuels (quality depends on boiler)	Biofuels for heating and process heat for swimming pools and SPA
I.55.90	Other accommodation	Biofuels (quality depends on boiler)	Biofuels for heating

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J.63.10	Data processing, hosting and related activities; web portals	Biofuels (quality depends on boiler)	Biofuels for server cooling
O.84.11	General public administration activities	Biofuels (quality depends on boiler)	Heat production for municipalities, school, hospices, etc.
S.96.01	Washing and (dry-)cleaning of textile and fur products	Biofuels (quality depends on boiler)	Steam production

Policy makers

Policy makers are key stakeholders to direct the project results both for the contribution they could give in terms of identification of administrative obstacles and multiplier of results and possible solutions in their territories.

Definition and classification of policy stakeholders will be done at national level to take into consideration territorial specificities. However, the definition of competencies is trans-national and is defined in the following table.

TABLE 10: DEFINITION OF RELEVANT ADMINISTRATIVE COMPETENCIES

Competencies
Agriculture
Forestry
Energy
Economic development/Industries
Environment
Green transition
Energy efficiency
Waste management
RDPs (Rural Development Programs)
CAP (Common Agricultural Policy)

According to the relevant administrative competencies the following policy stakeholders were evaluated to be crucial in the development of the sector.

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Austria

Policy makers

Name of the administration	Competences[5]	NUTS level	Description
Ministry of Agriculture and Forestry	Agriculture and Forestry	0	Legislative organization in the national government
Chamber of agriculture and forestry	Association of farmers	0	Supporting the consulting activities for farmers
Federals state of Lower Austria	Regional legislation competence in Lower Austria	2	Regional contact point for governments and farmers with no individual power for legislation
Federals state of Styria	Regional legislation competence in Styria	2	Regional contact point for governments and farmers with no individual power for legislation
Austrian Agency for Health and Food Safety GmbH	Monitoring of food safety, laboratory of the national government	0	preventing and containing potential risks for humans, animals and plants and thus ensuring greater safety for consumers in Austria

[5] See table 7

Italy

Policy makers

Name of the administration	Competences[6]	NUTS level	Description
Ministry of Agriculture	Agriculture, Forestry	0	The Ministry has the competence of defining national policy in agriculture and forestry and in relation to the project define the national legislation on fertilizers (additionally to R(UE) 1009/2019).
Ministry of the Environment and Energy security	Energy Environment Green transition Energy efficiency Waste management	0	The Ministry has the competence of defining the national plan for energy and climate. Furthermore, has the legislative power on waste management and on definition of incentives related to energy efficiency and green transition.
Ministry of enterprises and made in Italy	Economic development/Industries	0	The Ministry has the competence of defining incentives for enterprises, definition of regulatory framework for innovative enterprises and market control.
Regions	Agriculture, Forestry Energy Environment Waste management RDP CAP	2	Regions has territorial legislative competencies in energy, environment, agriculture and forestry and competencies on definition of RDP and CAP for the area of competence. Furthermore, Regions grant clearance for start-up of economic activities related to waste management.
Provinces	Environment Economic development/Industries	3	Provinces has control competences in environment and grant clearance for start-up of economic activities which have impacts on environment.
Municipalities	development/Industries	-	Municipalities has competencies on granting clearance for start-up of economic activities on the area of competence.

[6] See table 7

Slovenia

Policy makers

Name of the administration	Competences[7]	NUTS level	Description
Ministry of Agriculture, Forestry and Food	Agriculture, forestry, CAP, Rural Development Programs	0	The Ministry holds the authority to establish the national policies concerning agriculture and forestry. A national legislative framework for the use of soil improvement agents, fertilizers, and substrates is currently under preparation.
Inspectorate of the Republic of Slovenia for Agriculture, Forestry, Hunting and Fisheries		0	The Inspectorate of the Republic of Slovenia for Agriculture, Forestry, Hunting and Fisheries plays a vital role in the implementation and enforcement of the legal regulation for the field of soil improvement agents, fertilizers, and substrates once it is established. The Inspectorate carries out inspections, investigations, and enforcement activities to ensure that the regulations are being followed correctly.
Ministry of Environment, Climate and Energy	Energy, Environment, Energy efficiency, Waste management, Green transition	0	Ministry of the Environment, Climate and Energy are responsible for addressing the challenges of modern Slovenian society in the fields of environment, energy, and climate. The Ministry is tasked with ensuring efficient energy supply and implementing modern energy policies, with a particular emphasis on accelerating the increase of the share of renewable energy sources.
Ministry of Economy, Tourism and Sport	Economic development	0	The Ministry of Economic Development and Technology provides support necessary to further strengthen the international competitiveness of Slovenian companies and change the

[7] See table 7

			composition of the Slovenian business sector so that it is adapted to the requirements of the global economy to the greatest possible extent.

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Interactive map development

FIGURE 2: SCREENSHOT OF THE INTERACTIVE MAP

The interactive map (Figure 2) was developed from a database that combines all the relevant information to map and categorize economic activities in Europe based on the relevance in the supply chain of lignocellulosic residues.

The map is divided in three sector (Figure 3) Agriculture, Forestry and Industrial/service) and for each sector is possible to classify at national level, and at regional level (NUTS 2) the relevance of the region for the production and use of residues

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State	Region	GEO_IND...
Österreich	Niederösterreich	6,0
Österreich	Oberösterreich	5,3
Österreich	Burgenland	5,0
Österreich	Steiermark	4,9
Österreich	Vorarlberg	4,3
Österreich	Kärnten	4,2
Österreich	Tirol	4,2
Österreich	Salzburg	4,1
Österreich	Wien	3,9

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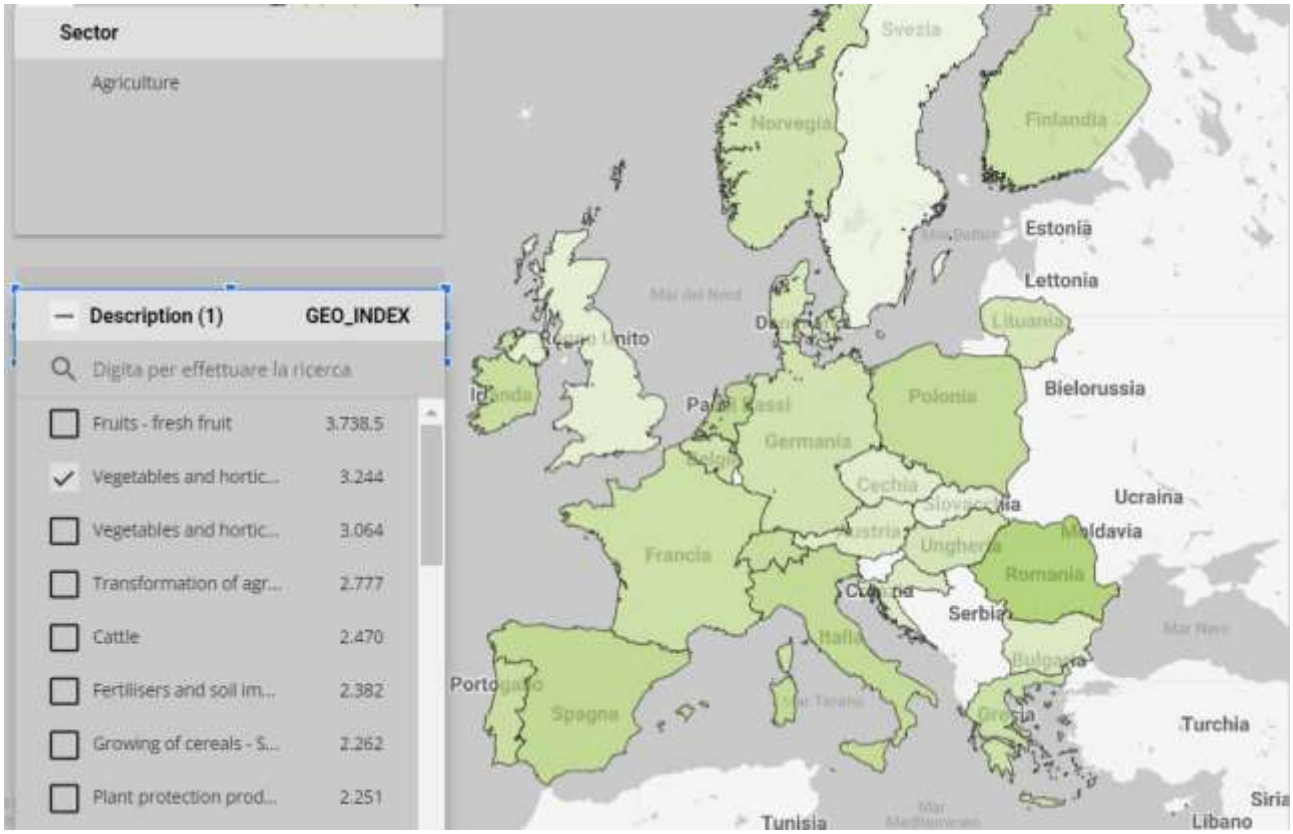
FIGURE 3:TERRITORIAL CLASSIFICATION IN THE INTERACTIVE MAP

It is also possible to select a specific economic activity or several economic activities to evaluate the relevance of specific economic sectors (Figure 4).



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State	Region	GEO_IND...
Ελλάδα	Πελοπόννησος	9,0
España	Andalucía	9,0
España	La Rioja	9,0
Deutschland	Darmstadt	9,0
France	Pays de la Loire	9,0
France	Provence-Alpes-Côte d'Azur	9,0
Belgique/België	Prov. Antwerpen	9,0
Italia	Puglia	9,0
Belgique/België	Prov. Oost-Vlaanderen	9,0

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Description	Byproducts_desc	Product_desc	GEO_INDEX
Vegetables and horticoltural products - fresh vegetables	residues	Biochar for fertilization and biostimulation	7,7

FIGURE 4: RESULTS OF A RESEARCH FOR A SPECIFIC ECONOMIC ACTIVITY

For each economic activities it is possible to see the average index and the specific index in the mapped regions, it is also possible to see the by-products that can be produced by the activities and the residue related products with major applications.

The map also offers the possibility to download the raw data (excel file) and to consult materials and methods (PDF file).

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Geolocation software

Introduction

Activity 1.2 requires providing a deep analysis of the industry and innovation stakeholders, the identification of the category/main activity and specific information on the stakeholder.
Once identified, stakeholders should be geolocated in the interactive map.
For individual stakeholder's geolocation AIEL has evaluated both developing a map and utilizing an existing software/platform. In this document the process of definition of the software and the final decision are explained.

New platform or existing platform

The first evaluation that AIEL has made as leading partner of the activity is whether to realize a new platform or to depend on an existing platform.
A new platform offers advantages in terms of customization and adaptability but also involves problems related to maintenance after the end of the project.
In contrast, an existing and reliable platform offers the possibility to rely on an already launched instrument, with problems related to the adaptability of the platform to the scope of the project.
As the project was short-lived the partner decided to work parallel on drafting a platform structure and searching for an already existing platform that could fit the needs of the project.

Definition of the major aspect to be evaluated in an existing platform

Major aspect evaluated on an existing platform was:

1. The platform must be free.
2. The platform must be related to the project topic.
3. The platform must allow Geo localization of the stakeholders.
4. The platform has to be interactive, allowing interaction between stakeholders.
5. The platform must be available in all the countries involved in the project or must be available for implementation in the countries involved in the project.

Identified platforms

The following list includes a list of existing platforms which were evaluated by AIEL to choose the best option. The key aspects were evaluated in a level (from 1 to 5)

Name of the platform	website
V4 Biochar	https://v4biochar.czu.cz/en
BioBase Kompass	https://biobase.at/biobase-kompass/
Biochar zero	https://biochar-zero.com/
BIORural Toolkit	https://biorural-toolkit.eu/
Biomass trade	https://www.biomass-trade.eu/
BIORaise GIS	http://bioraise.ciemat.es/Bioraise/home/main
Environmental paper network map	https://environmentalpaper.org/tools-and-resources/mapping-bioenergy/
USBI Arcgis Biochar map	https://www.arcgis.com/apps/webappviewer/index.html?id=829a902f8a7b490384697ec81a5

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V4 Biochar

The platform is very related to the project and allows stakeholders (through a complicated and long process) to become members, however, the platform is not known or present in the countries related to the project.

BioBASE Kompass

The BioBASE Kompass is a bioeconomy related allowing actors of the bioeconomy to evaluate the possible supply chain starting from a definite raw material. The platform is active in Austria but would be available on opening to new countries.

Biochar-zero

Biochar-zero.com is a commercial platform allowing you to get in contact with biochar producers and biochar plant manufacturers, it is a very interesting platform in terms of commercial relations between users and producers of biochar. However, the platform does not allow different actors (research or policy makers, etc.) to join.

BIORural Toolkit

The BIORural Toolkit is a new platform born in 2023 from an ongoing horizon project (BioRural). The platform allows all the stakeholders to join and is open to all the bioeconomy sector, opening a wide range of stakeholders and allowing a large audience. The platform is interactive, has a presence in the countries involved and allows publication of articles and news.

Biomass trade

Biomass trade is a commercial platform allowing to commercialize residue from a process. It led to contact between demand and supply, but it does not allow the registration of non-commercial actors, nor present a Geo localization map.

Bioraise GIS

The bioraise gis platform is a platform that allows to calculate the availability of biomass in some European countries and to map stakeholders related to the production and the use of biomass.

Environmental paper network map

Bioenergy plant related map, not interactive, created to localize the biomass consumption for energy proposes.

USBI Global Biochar Activities web map

USBI map is a free, very simple map to trace all the biochar stakeholders worldwide. Although it is an aged map and registration is simple, it presents only 13 registrations worldwide.

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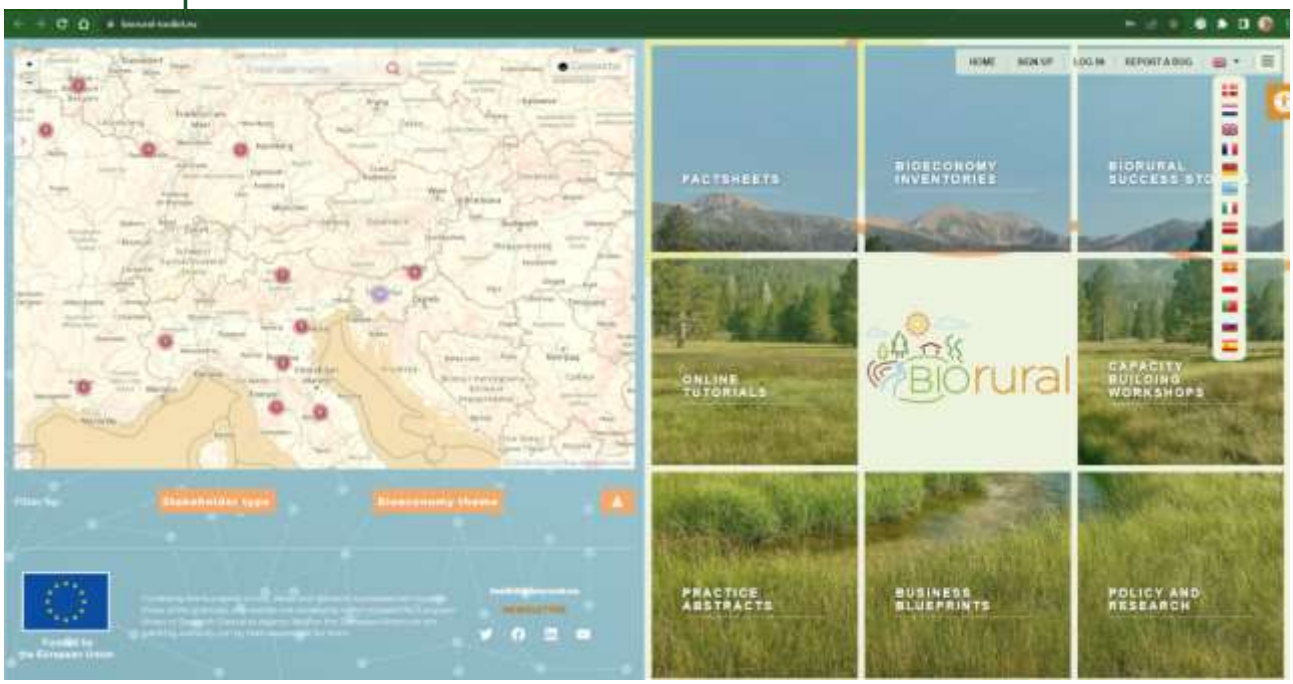
Chosen option



The most promising platform is the BIORural Toolkit. Infact, the platform has been developed (and it is still under construction, but already on-line) under an ongoing horizon project. It is not a commercial platform, but a knowledge exchange platform allowing stakeholders to connect and interact, to publish articles, news, best practice, filtering for sector in the rural bioeconomy. The platform is already translated in all the languages related to the Alps4GreenC project and the BIOrural project, being still ongoing offer the possibility to interact and to bring feedback for upgrading the platform to be more effective in answering the needs of the project.
The relation with the project is ensured by AIEL which is partner in both project although does not receive any found for realizing the platform.
One of the most important aspects related to the platform is that the project foresees a plan in order to finance the maintaining of the platform even after the end of the project. In that way, the network developed under the Alps4GreenC project could live and even grow even after the end of the project.
Cooperation with other projects in BIORural is expected and welcomed, as the project has a specific action related to project cooperation.

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