

Alps4GreenC: Implementation pathways for sustainable Green Carbon production in the Alpine Region

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AREA 1.1 Thermochemical Technologies

Introduction

The Alpine Region is characterized by a high density of biomass processing and conversion plants. Alps4GreenC sets the scene for transnational utilization of biomass residues in biochar-based value chains. The project aims at:

- Researching opportunities for conversion of biomass residues with focus on biochar production.
- Increasing awareness of citizens, plant owners, policy makers and all involved stakeholders.
- Establishing connection and coordination among Austria, Italy and Slovenia.

Project activities

- **International crowdsourcing campaign:** companies are invited to provide their biomass residues, to be tested for biochar production. The campaign's goals are to raise awareness and collect residues for testing.
- **Mapping of stakeholders and resources:** an interactive online map is compiled, in which industry and innovation stakeholders are geolocated, along with residues' pathways and other information (activity, contacts).
- **Practical testing and pilot production of green carbon:** 10 residues are selected for laboratory- and pilot scale tests (5 pyrolysis, 5 gasification). Biochar is analyzed and evaluated for possible uses.
- **Context and gap analysis:** the operating context for biochar production in the project countries is analyzed. Current performances are compared with the desired ones and policy recommendations are formulated.

Areas involved

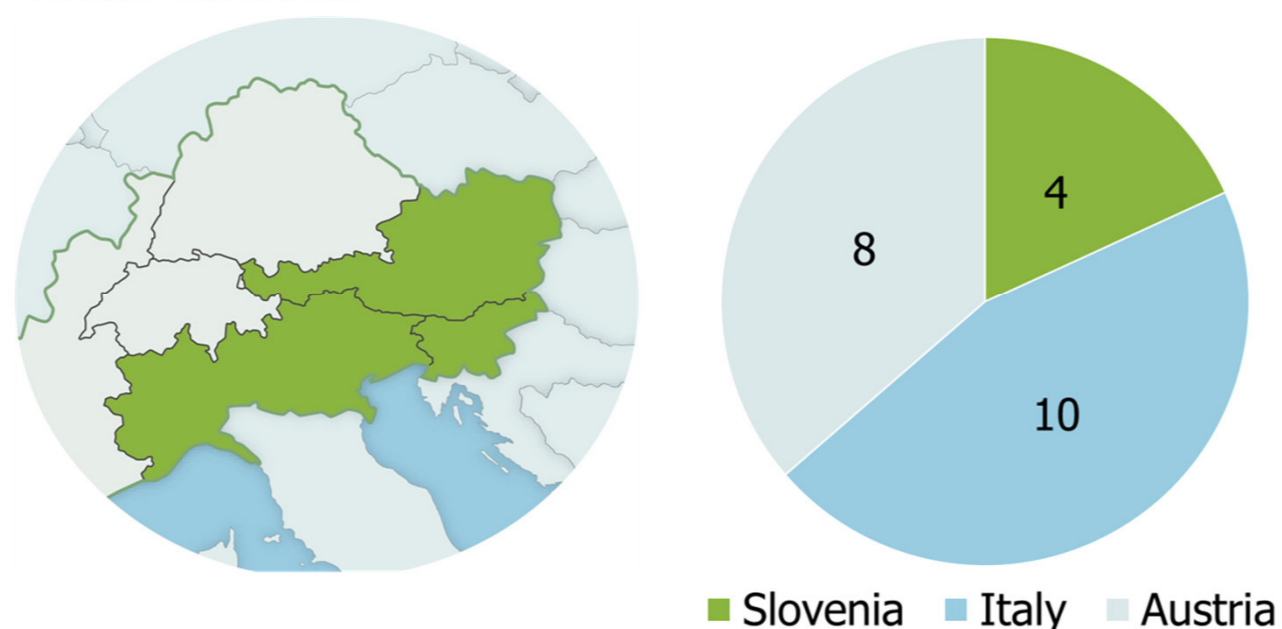


Fig. 1: Project area and participants per country

Implementation

22 companies participated to crowdsourcing, representing different sectors, i.e. wood production, food processing, forestry and agriculture. The 10 residues to be tested were selected based on technical criteria (particle size, water content, chemical composition, need of pretreatment). Moreover, priority was given to residues produced in large amounts and for which solutions are not available yet.

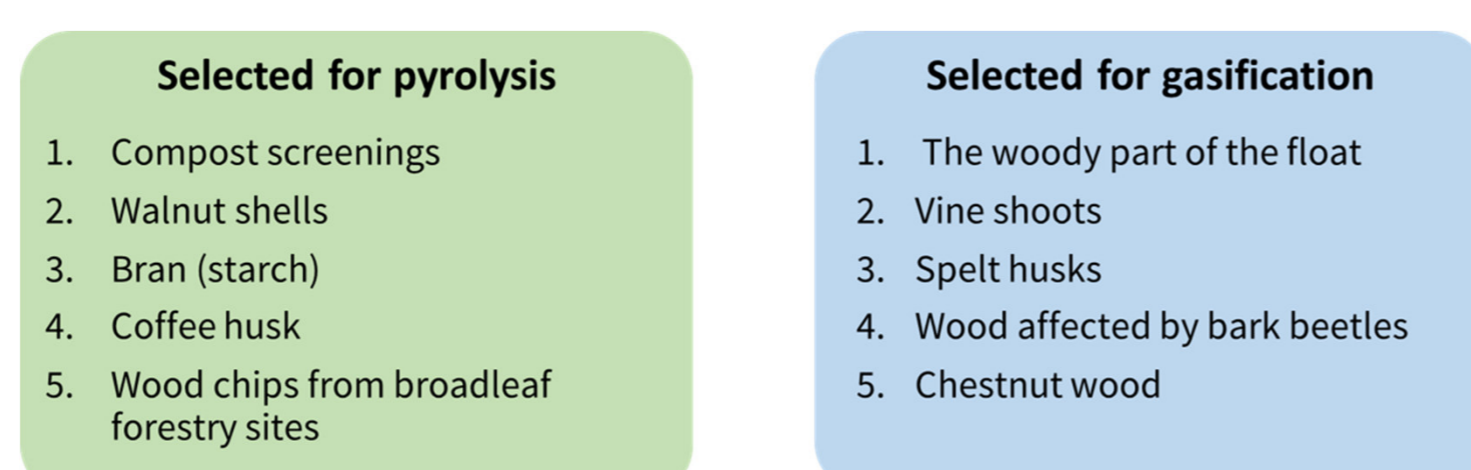


Fig. 2: List of selected residues

The following residues were selected for pyrolysis:

- **Walnut shells**, resulting from the cracking of walnuts at the Austrian company Nussland GmbH. 2/3 of the shells are fed to a drying plant, while 1/3 (30 tons/year) is not valorized yet and could be used for biochar production.
- **Bran**: the Austrian company Agrana Beteiligungs-AG produces 100 tons/day of bran as a residue in its biofuel plant. Bran is used as additive for animal nutrition, but Agrana is willing to experiment on more profitable uses.
- **Screen overflow from composting**: at a composting plant of Brantner Österreich GmbH, tree shavings are shredded and composted. Then, the composted material is sieved to a size <12 mm. The screen overflow remains as residue (10.000 tons/year). With particle sizes in the range 12-250 mm and water content ~40%, this residue needs cutting and drying before pyrolysis.
- **Coffee chaffs**: chaff is the epidermis of coffee beans that falls off during the roasting process. The company Atlantic DK d.o.o. (Slovenia) produces 250 kg chaffs/day, which are transported to a biogas plant in Italy, with high costs. Therefore on-site solutions are required to convert chaffs to energy and materials.
- **Woodchips** are gasified by the Italian company Biomass Green Energy srl to produce energy. However, the resulting biochar is not suitable for use in agriculture. Hence, woodchips will be tested via pyrolysis to evaluate differences between gasification and pyrolysis biochar.



Fig. 3: Residues selected for pyrolysis



Fig. 4: Biochar produced in preliminary tests

Next steps

The next step of this research is the testing of the selected residues. After a detailed laboratory analysis on the biochar samples, recommendations for possible uses of biochar will be provided, with focus on agriculture and steel industry.

Acknowledgement

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