OUTPUT FACT SHEET

Pilot actions (including investment, if applicable)

"PRODUCTION OF BIOCHAR AND ENERGY FROM WASTE WOOD"

Version 2

Project index number and acronym	CE1125CIRCE
Lead partner	ARPA VENETO
Output number and title	O.T3.3 Pilot actions to test the business model and quality standards verifications
Investment number and title (if applicable)	Not applicable
Responsible partner (PP name and number)	ATM, PP6
Project website	https://www.interreg-central.eu/Content.Node/CIRCE2020.html
Delivery date	02.2020

Summary description of the pilot action (including investment, if applicable) explaining its experimental nature and demonstration character

Pilot Case PRODUCTION OF BIOCHAR AND ENERGY FROM WASTE WOOD
In this pilot case the waste wood was transported to a regional gasification plant, where it gasified with the staged floating-fixed-bed technology. The produced gas is separated from the char particles (biochar) and is used in a combustion engine to produce electricity and heat. The biochar is collected for further usage, replacing activated carbon. Currently, the waste wood is transported to a waste incineration plant (WIP) and incinerated to produce electricity and thermal energy (heat). WIP ashes are disposed of. The transport processes for the ashes are excluded from the study.

The pilot cases has experimental nature and demonstration character. A pilot plant test run with an existing pilot plant was performed and accompanied by lab analysis of the outputs and by-products.

NUTS region(s) concerned by the pilot action (relevant NUTS level)

The Austrian pilot region is the administrative province of Tyrol (NUTS 2 AT33, Figure 1), which has a population density of 59 inhabitants/km² (746,153 inhabitants; 12,640 km²). The strongest economic sector in respect to the economic output (gross value added) is the tertiary sector (services), with 70.5%, followed by the secondary sector (manufacturing), with 28.7%, and the primary sector (forestry and agriculture) with 0.8%.

Investment costs (EUR), if applicable

No investments were performed within the pilot actions But the LCC-study of the pilot action showed the following potential investments and costs to be expected when installing the technology at full scale.

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Cost data

Cost data	Value	Unit
Pre-treatment	25	€/t
Transport wood wastes	4.50	€/t
Electric energy	0.07	€/kWh
Depreciation of SynCraft plant	166,667	€/a
Operation time (h/a)	7,500	h/a
Depreciation time (years)	15	a
Operation, maintenance p.a.	51,300	€/a

Expected impact and benefits of the pilot action for the concerned territory and target groups and leverage of additional funds (if applicable)

The expected impacts of the Pilot Case PRODUCTION OF BIOCHAR AND ENERGY FROM WASTE WOOD are:

- ⇒ Creation of a regional loop for waste wood from households and commercial sites collected at municipal recycling centres within the pilot area
- ⇒ Creation of the product "biochar" from waste wood for landfill leachate treatment in addition to the production of heat and energy from waste wood
- ⇒ Successful application of the product "biochar" in the treatment of landfill leachate
- ⇒ Increase the recycling rate of the waste stream "waste wood from households and commercial sites collected at municipal recycling centres" within the pilot area

Sustainability of the pilot action results and transferability to other territories and stakeholders.

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Concept and conclusions how the technology can affect the CE effect

A prototype of this technology using waste wood is implemented and produces bio-charcoal. To obtain activated bio-charcoal, which is the ultimate aim of the CE solution, more test runs are needed and the pre-processing needs to be refined.

PP's opinion of the technology

Compared to other alternatives for the valorisation of waste wood, this is one of the most promising CE technologies , because it extends the life cycle of waste wood by producing renewable energy and, at the same time, a valuable and useful co-product.

Lessons learned and added value of transnational cooperation of the pilot action implementation (including investment, if applicable)

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Possible limiting factors

Generally speaking, the more homogeneous the input material, the better it is for a stable gasification process.

There are three main challenges to run a stable gasification and to produce a quality product:

1. Quality of waste wood
   Of the four different quality categories of waste wood, only A1-A3 can be used. The differentiation of these categories is not always easy and, at waste wood collection stations, these might get mixed up.
2. Age of waste wood
   Waste wood, even if belonging to the same quality category, can have varying ages, from almost fresh to old and brittle. Rotten and brittle waste wood is already partially degraded and has a reduced energy content. This can compromise the gasification process.
3. Contaminants
   Waste wood is prone to higher amounts of contaminates. Apart from remaining metal parts (nails, braces, etc.), wood that exposed to the open air for a long timecan have absorbed air pollutants. These might be emitted during the gasification process.

Handling these challenges requires a very thorough pre-processing of the incoming waste material.

Contribution to/ compliance with:

- relevant regulatory requirements
- sustainable development – environmental effects. In case of risk of negative effects, mitigation measures introduced
- horizontal principles such as equal opportunities and non-descrimination

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Local and national regulation

The Austrian waste management system is already well developed, and proven circular solutions for the waste stream waste wood already exist (e.g.: production of chipboard). However, the Austrian PP decided to test a new and innovative technology, which is not yet established on the market, in order to add a CE technology solution with improved performance in terms of sustainability to those already available for the selected waste stream.

Therefore, several legal aspects still need to be clarified concerning the fulfilment of local and national regulations:

- It needs to be clarified with public authorities, whether the production of activated charcoal from waste wood constitutes a recycling process according to the definitions of the Austrian Waste Management.
- The charcoal resulting from the CE technology needs to get assigned the legal status of a product

Currently, analyses are performed to assess the pollutant content (soluble heavy metals, volatile organic compounds) of the produced charcoal, to serve as a scientific basis in order to obtain the legal status of a product.

References to relevant deliverables (e.g. pilot action report, studies), investment factsheet and web-links
If applicable, additional documentation, pictures or images to be provided as annex

D.T2.2.3 Report of PEF-compliance environmental scenarios by using LCA tools
D.T2.3.3 Report of mid-term economic scenarios to check profitability of new by-products markets
D.T2.4.1 Matrix of concrete circular economy machtmakings within each industrial area
D.T2.4.2 Analysis & interpretation and interpolation of remanufacturing donors & recipient companies
D.T2.4.3 Design of the circular economy business model as driver for the pilot tests (AT3.2) for each area
D.T3.2.1 Closing the loop & activation of secondary raw materal markets in the pilot areas
D.T3.2.2 Pilot actions infographics (one per each waste/flow)
D.T3.2.3 Report on implementation of the pilot actions
D.T3.2.4 Checkup service for verification of quality standards of by-products
D.T3.2.5 Performance Monitoring of pilot actions environmental & economic performance

Wiki-page: https://www.circe2020-wiki.eu/

Annex

Infographic pilot action 2°