

TEMPLATE

Output factsheet: Strategies and action plans

Version 1

Project index number and acronym	CE1125 CIRCE2020
Lead partner	ARPA VENETO - Agenzia Regionale per la Prevenzione e Protezione Ambientale del Veneto
Output number and title	OT2.4 Circular economy business models supporting cross value chain by-products remanufacturing
Responsible partner (PP name and number)	ATM PP6
Project website	https://www.interreg-central.eu/Content.Node/CIRCE2020.html
Delivery date	08.2019

Summary description of the strategy/action plan (developed and/or implemented)

The following document “O.T.2.4 Circular Economy business models supporting cross value chain by-products remanufacturing” represents a summary of D.T2.4.3 Business Model Case Study N° 1 (Energy Recovery of a Low Calorific Fraction of a mechanical waste treatment plant) and N° 2 (Production of biochar and energy from waste wood) of the industrial pilot area “Mid Tyrol”. D.T2.4.3 is based on the results of the environmental and economic assessments of Case Study N° 1 and N° 2 (D.T2.2.3 and D.T2.3.3.).

The aim of the present document is to describe the business plan related to the introduction of a modification, whether technological or managerial, in this specific industrial process and its consequences in terms of circularity improvement. This business plan derives from a series of analysis and evaluations carried out during the CIRCE2020 project taking into account different aspects affecting the manufacturing process when the circular solution is implemented.

In a short way, this document summarizes the process that leads to the adoption of a new technology or managerial solution and to its actual implementation in the pilot phase.

NUTS region(s) concerned by the strategy/action plan (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%.

Expected impact and benefits of the strategy/action plan for the concerned territories and target groups

The expected impacts of the implementation of the circular economy solution of Case Study N°1 are:

- ⇒ Creation of a regional loop for the organic fraction of the low calorific fraction (LCF) of a mechanical waste treatment plant within the pilot area, instead of exporting it to another federal state in Austria, where it is thermally treated
- ⇒ Substitution of source separated organic waste, which until now is used as co-substrate in WWTPs. These organic wastes would then be available for digestion and composting in a mono bio-waste treatment facility. Subsequently land application of the produced fertilizer, closing local nutrients and carbon loops is possible.
- ⇒ Increase of the regional overall biogas production potential, when the organic fraction of the LCF is used as an additional co-substrate in WWTPs
- ⇒ Enable glass recycling of the heavy fraction of the LCF, which currently ends in thermal treatment

The expected impacts of the implementation of the circular economy solution of Case Study N°2 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 developed or implemented strategy/action plan and its transferability to other territories and stakeholders

Case Study N°1:

- a larger amount of biowaste can be treated locally (the organic components of the LCF additionally to biowaste from separate collection)
- as a consequence, more bio-energy (electricity and heat) can be produced and distributed locally
- clean biowaste from separate collection can be treated (by AD and composting) separately in a specifically built mono treatment facility, enabling the application of the produced digestates and composts regionally. This can substitute and save imported resources like fertilizers, and improving soil quality.
- The CE-scenario can generate new jobs, p. ex. in plant construction and maintenance, and related areas.

Case Study N°2:

- The CE scenario presents itself as an option to prolong the life cycle of wood by producing a valuable

product, charcoal, which can be used as a filter material for contaminated effluents, p.ex. in wastewater treatment plants.

- The produced charcoal has only 25% of the surface of conventional activated carbon, and therefore, has a reduced capacity. Even if considering a fourfold amount of charcoal, to achieve the same effect as from 1 kg conventional activated carbon, the costs sum up to 2,00 €/kg compared to 7.00 €/kg - 10.00 €/kg for conventional activated carbon.

Transferability:

Both Case Studies have high potential of being transferred to other regions. Still, regional structures (waste management systems, transport systems and distances, etc.) highly influence the economic benefits and environmental performances of the CE-solutions compared to the Business as Usual Systems. Also the legal framework of the country/region considered need to be checked, when planning to implement the CE-solutions of the two case studies.

Lessons learned from the development/implementation process of the strategy/action plan and added value of transnational cooperation

Possible limiting factors Case Study N° 1:

- Costs: Reliable data on costs and revenues not yet available.
- Degree of implementation at local scale: Project is scheduled to be implemented at local scale (date unknown)
- Other stakeholders involved: MWTP, WWTP, waste transport firms, local landfill.

Possible limiting factors Case Study N° 2:

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:

- 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.
- 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.
- Contaminants Waste wood is prone to higher amounts of contaminants. Apart from remaining metal parts (nails, braces, etc.), wood that exposed to the open air for a long time can 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.

References to relevant deliverables and web-links If applicable, 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
- <https://www.circe2020-wiki.eu/>
<https://www.interreg-central.eu/Content.Node/CIRCE2020.html>