

OUTPUT FACT SHEET

Pilot actions (including investment, if applicable)

Version 2

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	Output O.T3.1 - 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)	2 - ETRA spa
Project website	https://www.interreg-central.eu/Content.Node/CIRCE2020.html
Delivery date	12.2019

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

(Max. 3.000 characters)

The target waste in this business model is the EWC 190703 (landfill leachate), generated by a closed municipal waste landfill sited in Campodarsego, within the Italian pilot area. In the post-operation authorisation is reported that the landfill leachate has to be treated before the discharge in the sewage system. Therefore the current managerial solution (direct discharge) is not more suitable. This obligation is consistent with technical aspects related to the management of the downstream waste water treatment plant. The reduction of the pollution load is appropriate because ammonia concentration in landfill leachate further exceeds "standard" capacity of the plant; moreover, with future addition of new sewage users the situation could worsening. For other parameters, leachate quality is similar to municipal wastewater, with low metals concentrations.

Leachate management represents one of the most challenging activity within the workload of a landfill owner. The possibility to recover valuable material represents an interesting shift from a challenge to a business opportunity, according to circular economy principles.

The envisaged CE solution consists in a treatment plant within the landfill gate. The leachate is stored in fixed tanks before the chemical treatment. The addition of caustic and acid substances in consequential steps allows reducing the amount of dissolved nitrogen in the wastewater stream. The core of the treatment consists in a stripping process exploiting the equilibrium of ammonia in aqueous and air matrix. The stripped ammonia is concentrated in a solution of ammonium sulphate, potentially valuable as either liquid or solid salt fertilizer in agriculture.

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

(Max. 500 characters)

Country (NUTS 0) : IT

Region (NUTS 2) : ITH3, Veneto

Sub-region (NUTS 3) : ITH36, Padova

Investment costs (EUR), if applicable

Not applicable

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

(Max. 2.000 characters)

The main managerial advantages for the landfill owner are:

- Downstream discharge of treated leachate in sewage system, avoiding the need of the transport service.
- Reduction of acetic acid and electricity consumption at wastewater site due to quality enhancement of the landfill leachate
- Recovery of valuable material (ammonium sulphate), suitable for agricultural uses; the quality of the output is comparable with the traditional product, as demonstrated by internal analysis.
- The valorisation of the heat generated by the motors burning landfill biogas

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

(Max. 2.000 characters)

ETRA has internal resources and competences to manage and optimize the treatment plant. The solution increases the inner capacity of the multiutility, decreasing its dependency on external suppliers (for the service of transportation and treatment of landfill leachate). The number of trips in/out the landfill site is minimized; in fact, there is no more need for the transport of landfill leachate. There are relevant economic benefits consisting in the internal shifting of the leachate management. Since the financial investment is covered by public funds, the operative saving per unit of treated leachate is immediately accountable. In the studied context, the choosing technology (stripping) shows a better environmental performance respect to the other suggested technology (membrane separation - osmosis). It allows to recover a valuable material (ammonium sulphate, solid or liquid) from landfill leachate. Moreover, the management of generated waste results less complex (chlorine-enriched solution generated by membrane processes difficulty finds a proper and viable disposal destination). The innovative solution positively tested for the local landfill could be open to other similar effluents, for example the plant could treat other leachate flows generated in nearby landfill sites. The existing plant targets a key pollutant of the effluent. New contaminants are under lens and new limits could be set by competent authority (e.g. emerging pollutants, micropollutants, etc.). Additional treatment can be customized in series to the stripping module in order to ensure a compliant discharge in the sewage system of the landfill leachate.

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

(Max. 1000 characters)

Landfill has been a widespread waste managerial solution around Europe. Therefore, a lot of landfill sites (more or less controlled) exist where a similar plant could be installed for the recovery of a valuable resource. The sustainability of each circular solution must be accurately assessed. Specific environmental hotspots (consumption of specific reagents) could worsen the whole profile of the scenario, suggesting efforts to reduce consumption or to substitute the raw materials. It is suggested to perform the economic assessment of the project over long term perspective considering possible decreasing of the key input flows, such as leachate or biogas (thermal recovery from combined heat and power motors).

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-discrimination

(Max. 2.000 characters)

The project has been conceived to be compliant with new authorization requirements. The plant is designed to respect specific quality parameters. The recovery of ammonium sulphate is an added value that has to be classified within a clear legislative framework. This deepening is an ongoing procedure with competent authority. The reduction of waste and pollution load are key aspects of the project with direct environmental benefits, even if from a LCA perspective the consumption of specific reagents in the plant decreases the profile of the studied scenario.

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

(Max. 1.000 characters)

Deliverable D.T3.2.1 - Closing the loop & activation of secondary raw material markets in the pilot areas

Deliverable D.T3.2.2 - Pilot actions infographics (one per each waste/flow)

Deliverable D.T3.2.3 - Report on implementation of the pilot actions

Deliverable D.T3.2.4 - Checkup service for verification of quality standards of by-products

Deliverable D.T3.2.5 - Performance Monitoring of pilot actions environmental & economic impact

Factsheet in wikiweb: <https://www.circe2020-wiki.eu/landfill-leachate>