Project Fiche

| LIFE FREEDOM |
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| Section | Content description |
| Title | LIFE FREEDOM |
| Proponent | Coordinator: Agrosistemi S.r.l.Partners:CAP(CAP Holding SPA), Italy; Caffù (Impresa Caffù Costruzioni Generali S.r.l.), Italy; MONDO(MONDO PULITO D.O.O), Croatia; SYNGEN(SYNGEN SRL), Italy; CSIC(AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS), Spain; UNIPV(Università degli Studi di Pavia), Italy  |
| Location | Cassano D’Adda, in Milan  |
| Implementation status |  Project being carried out October 2020-September 2024 Planning phase complete Building of plant to begin shortly  |
| EU Taxonomy Classification / Strategic Building Block | EU Taxonomy:Strategic Building Block: Competitive industry and circular economy - Sewerage and waste management -Waste reuse, treatment and recycling |
| Description | Solving treatment of wastewater sewage sludge with new hydrothermal liquefaction technology (HLT) to produce hydrocarbons, asphalts and fertilizers.Biological sewage purification plant with integrated purification technology: HLT installed at water purification plant owned by CAP Holdings – manager of Lombardy integrated water treatment system. CAP Holdings will also monitor the environmental, social and economic impacts generated by the plant.Effluent water is subject to high pressure, temperature and segregation. Forms a type of carbide which can be used in various ways – producing Bio-Oil, mineral residue and phosphorus. When installed in a medium-sized purification plant, the HLT can process 4000 tons of sewage sludge. This project uses 1000 tons of this to produce around 380 tons of Bio-Oil.The Bio-Oil can be introduced into asphalt, to produce useable green asphalt – one of the targets of the project. Also as a combustible material – low grade fuel, similar to crude oil, can be used at a cement factory so as to reduce fossil fuel consumption. However, fuel production is not as key as the green asphalt production. The next stage of the process will be to recover phosphorus from the sewage sludge to use in agriculture. Mineral residue produced as final product can be used in the alkali activation process for the production of binders for building materials.This purification technology has been tested in the lab, however this is the first application in a pilot plant. Have proven the technology used in the purification plant to be profitable. The application of such technologies is not a common requirement, hence there is high possibility for its integration into purification plants. It can be applied to all types of sewage waste. Goal is to also understand if it is easily re-applicable – as it is a system that runs at high temperature and pressure, it is currently not easy to convince the wastewater treatment plants to implement it. |
| Output | Expected results:* Elimination of waste sewage sludge in the plant located in the Municipality of Cassano D’Adda, thus avoiding the landfilling/incineration of about 4 000 tons per year of biological sewage sludge
* 80% of the water contained in the sludge will also be recovered
* Sludge transport from the purifier plant to the disposal site will be avoided, with a saving of 13 160 kg of CO2 emissions per year due to fuel consumption
* A significant reduction of sludge management costs (currently EUR180/ton)

Instead of sludge disposal, the purifier is expected to produce the following materials: * 380 tons of hydrocarbons (bio-oil and tar) to be used in bituminous conglomerates for the production of 9 500 m2 per year of road surfaces (green asphalt)
* About 3 800 MWh for thermal energy use from Bio-Oil
* 250 tons of mineral residue for the production of binders
* 50 tons of phosphorus (as phosphate) per year for the fertilizer industry.
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| Cost | Total CAPEX: EUR1.4m – cost of HLT prototype EUR1.1.mTotal OPEX: EUR3mTotal cost: EUR4.4m |
| Financial structure | Project partners contribution: AGROSISTEMI EUR1.1m, CAP Holdings EUR0.12m, CSIC EUR0.13m, Caffu’ EUR0.1m, MONDO PULITO EUR0.02m, Syngen EUR0.36m, Universita degli studi di Pavia EUR0.12mEU LIFE programme contribution: EUR2.4m Reporting: LIFE programme requires technical and financial reporting. Technical report covers project progress and any publications. Financial report includes consolidated financial statement (income summary, cost summary, funds distribution etc.) and financial statement of individual beneficiary (covering individual transactions). At end of project, need to submit end of project report and After-LIFE Plans.Did not look for alternative source of financing beyond this. |
| Policy Measures | Supported by EU LIFE programme – EU funding instrument targeted at environmental and climate action projects  |
| Funding Schemes | 55% EU LIFE programme funded. Rest of funding contributed by partner companies  |
| Opportunities/Barriers to Financing  | Administrative barriers: bureaucratic and authoritative barrier to environmental projects – sees as a systemic barrier rather than one specific to the project. Onerous administrative process making implementation of innovative technologies slow and difficult. Obtaining authorization for a plant takes 3-4 years (minimum 1.5 years, dependent on province) in Italy, whereas in other European countries such as Croatia it takes 3-4 months. Waste treatment projects also have a very low chance of success for approval. This administrative burden is a particular challenge in the environmental sector.Regulatory uncertainty: Italian regulatory uncertainty greatest barrier to financing These activities are regulated by Environmental Decree 152, chapter 3 – wastewater and chapter 4 – waste. According to chapter 3, article 127 (based on EU directive), sewage sludge is not considered waste until the end of the purification process – at which point it requires authorisation. Because the treatment takes place within the purification process, the sludge is not considered waste and so the installation does not require a waste treatment authorization.Judicial barriers: following a case in 2018, when a court passed a sentence against the building of a sewage waste recovery plant, almost all the provinces terminated sewage recycling provisions. Loophole in definitions has led to problems such as one multi-utility disposing of waste on fields. Financial viability: country has lack of plants and waste treatment plants because they do not generate a return Lack of technological understanding among the authorities slows the approval process.Opportunities:Opportunity posed by the large availability of material. Currently 40-50% of sewage sludge goes to landfillFlexibility: other organic material can also be used as an input to the purifier. |
| Level of innovation  | HighSimilar plant in Australia – commercial operation transforming wood chip into biomethanol. Also a plant in Northern Europe is doing the same thing, using the bio-oil for winter sports infrastructure.  |
| Scalability potential | High |
| Source  | Interview with Fabio Cella (Agrosistemi) and Alberto Molignani<https://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=7687#EI><https://life-freedom-project.eu/life-programme/> <https://ec.europa.eu/easme/en/life>  |

[Climate Bonds Initiative](https://tracking.cirrusinsight.com/fa30069f-874c-4309-9ec6-4741dfc9e3aa/climatebonds-net1)