Partner profile for HORIZON-CL6-2023-CircBio-02-1-two-stage
Circular Cities and Regions Initiative (CCRI)'s
circular systemic solutions

General info

Legal name	*Polyeco S.A.*
Legal status	*Industry (for profit)*
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Website	*https://polyeco.gr*

Background/expertise

Founded in 2001, **Polyeco** is a fully licensed waste management and valorization industry located in Greece. Polyeco produces alternative fuels and alternative raw materials from hazardous and non-hazardous waste, recovered by the cement industry. Polyeco aims to boost key technologies and solutions underpinning EU policies and Sustainable Development Goals through robust partnerships in EU programs in the fields of hazardous waste management, plastics chemical recycling, batteries waste management, critical metals recovery from waste, CO2 capture, new age fuels, biofuels, and soil and groundwater remediation technologies.

Facilities

The main industrial facility is located on a privately owned site of 35,000 m2 in the industrial zone of Aspropyrgos, Attica. A second industrial facility is located on a privately owned site of 11,000 m2 in the industrial zone of Mandra, Attica. Also, Polyeco owns a unit for temporary waste storage which is located in the industrial area of Sindos, Thessaloniki, Northern Greece. Waste, which is not treated on company's premises, is firstly stored in Aspropyrgos facility, and then forwarded to one of the 45 licensed facilities in Europe that cooperate with Polyeco.

Fully equipped physicochemical laboratory for waste characterization

The laboratory determines various environmental parameters to industrial, hazardous, and non-hazardous waste, ensures quality at the production process and contributes to the selection of the most effective treatment and/or recovery methods. The laboratory is equipped with modern analytical systems, including ICP – AES, Mercury Analyzer based on Cold Vapor Atomic Absorption technique, Total Organic Carbon Analyzer, Ion chromatography for anions and cations, GC – ECD, GC – FID, GC – MS, automated Kjeldahl apparatus, automated Soxhlet apparatus, automated Calorimeter, FTIR, spectrofluorometer,

spectrophotometer, EOX – AOX analyzer, Flash point (open cup), Flash point (closed cup), microwave oven and various other equipment necessary for sample pretreatment. Most of the instrumentation is fully automated (accompanied by autosamplers), resulting in the capability to handle up to 20 samples per day for time consuming analyses, e.g., metals, and even more samples for less time-consuming analyses. Over the years, different methods were developed based on ISO, ASTM, APHA or EPA standards, covering the determination of a wide range of parameters. Other analyses such as BOD, COD, flash point determination, AOX determination in water samples, identification of unknown compounds by GC – MS, photometric methods etc. are also conducted periodically. Laboratory performance and quality is assured via ISO 17025 Quality System, ISO 9001 and EMAS 14000. In accordance with ISO 17025, specific guidelines are established for the frequent maintenance and upgrade of instrumentation, as well as the accuracy of analyses results.

Treatment/production lines in full operation:

1. **Alternative Solid Fuels:** Converting organic hazardous and industrial waste to alternative Solid Fuel for the cement industry through physicochemical treatment methods.
2. **Alternative Raw Materials**: Treating and converting inorganic hazardous waste to Alternative Raw Materials for the cement industry through stabilization/ solidification processes.
3. **Alternative Liquid Fuels**: Treatment of liquid waste rich in organic content, including refinery sludges, tank cleaning sludges and liquids. The system applies physical and chemical methods to separate oil rich phase from water and sludge.
4. **Physicochemical Unit**: Treating inorganic liquid waste. The treated water of the unit is used for technical purposes within the facility and the produced dewatered sludge through a filter press is used in the alternative solid fuel production line.
5. **Waste battery**: Treatment unit for portable (<5kg) batteries. This unit treats mechanically (sorting, crushing, screening) alkaline and zinc carbon batteries and accumulators. The residues from the treatment are sent for further treatment and recovery. The products of the recycling process are steel, black mass and a plastic and paper rich stream.
6. **Fluorescent lamp recycling**: Treatment and preparation unit for recycling of fluorescent lamps. The facility operates incorporate all required operations, including, logistics, lamp segregation, crushing and depollution. Mercury from the lamps is separated with the vapors to be forced into a high efficiency activated carbon filter. Available processing lines are: A- Strait fluorescent lamps recycling line, b) B-Compact fluorescent lamp recycling line, c) C-Led lamp recycling line. The facility is WEELABEX certified.
7. **Solutions for flue gas emission control**: Production of high quality aquatic solutions of ammonia 24,5% and urea 40% for both industrial and shipping sectors.

8. **Hexavalent Chromium reduction in cement** (ferrous sulphate). Supply of sulphate such as monohydrate, heptahydrate, tetrahydrate or a mixture of different qualities in free-flowing form to achieve easy handling and maximum reduction efficiency.

Affiliated companies

MegaEco: Production industry of organo-humic fertilizers and soil improvers offering solutions for non-hazardous waste management (disposal/utilization), such as poultry manure, non-hazardous organic waste from food industries, unsuitable batches of products, bio waste, agricultural waste). The activities of the company are:

- Utilization of organic solid non-hazardous waste by converting it into soil improvers.
- Utilization of liquid non-hazardous waste by converting it into soil improvers.

ECO-recovery: Production of solid secondary fuels (Refuse Derived Fuel - RDF, Solid Recovered Fuel - SRF) from solid non-hazardous waste. The company's main objective is the treatment of non-recyclable industrial and commercial packaging waste for the production of solid secondary fuel, of high specifications, which is utilized through energy recovery, by industries with high energy requirements in their production process (e.g. cement industry), in substitution of conventional fossil fuels. The company has at its disposal two fully licensed Solid Secondary Fuel Production Units (SRF/RDF), in Thessaloniki and Tanagra, Greece.

Value-adding role in Horizon Europe proposals

- **Expertise in** treatment, management, recovery, decontamination, transport, and disposal of all types of hazardous and non-hazardous industrial waste in company's premises.
- **Staff** of 200 people, 36 of which experienced scientists and engineers professionally trained experts.
- **Engineering workshop and design department** to design and construct new pilot machinery for the waste management industry (custom-made machinery that optimizes waste recovery and recycling, reduces waste generation fitting circular economy solutions).
- **Knowledge of waste policies, regulations and conventions** to secure the necessary permits and consents for waste recovery and can provide valuable insights which can help to shape the development and implementation of effective waste management strategies.
- **Experience in international tenders** conducted by reputable organizations such as the United Nations, the World Bank, etc.

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Research collaborations & participations in national R&I projects

REMPLASMA (in collaboration with the Institute of Chemical Engineering Sciences FORTH/ICE-HT). Goal: Development of a semi-continuous or continuous soil feed system for the removal of organic pollutants from heavily polluted soils through the advanced oxidation processes of cold plasma.

PHOTOREC (in collaboration with Schools of Chemical Engineering and Mining & Metallurgical Engineering of National Technical University of Athens). Goal: Management of EOL-PV in a circular economy concept.

OZOREMSOIL (in collaboration with the Institute of Chemical Engineering Sciences FORTH/ICE-HT). Goal: Development of a mobile ozonation unit for the remediation of contaminated soils and oil-drilling cuttings.

Topic of interest in Horizon Europe

Topic ID	Topic title	Expertise in the topic	Role in the proposal
HORIZON-CL6-2023-CircBio-02-1-two-stage ***Deadline:*** ***28 March 2023***	**Circular Cities and Regions Initiative (CCRI)'s circular systemic solutions**	Key stakeholder in the circularity of a wide range of products value chains on a regional and international scale. Expertise in treatment of hazardous waste streams generated by MSW streams (Municipal Solid Waste)	Contributing to the sorting and reusing of materials in a local or European level and creating business opportunities in circular economy. Polyeco's network in public and private sector holder (municipalities, organizations, authorities, institutions, etc.)