



## PROJECT INFO

**Project number:** 101091980  
**Project name:** Single Photon source and detector based on novel materials for the detection of endocrine disruptors  
**Project acronym:** GREENER  
**Call:** HORIZON-CL4-2022-RESILIENCE-01  
**Duration:** 1 January 2023 – 31 December 2025  
**Project website:** [greenerproject.eu](http://greenerproject.eu)

## PARTNERS:

TECHNISCHE UNIVERSITAET CHEMNITZ | FRAUNHOFER | ASOCIACION CENTRO DE INVESTIGACION COOPERATIVA EN BIOMATERIALES - CIC biomaGUNE | AUREA TECHNOLOGY | THE CIRCLE | WARRANT HUB SPA | SOFTJAM SPA | IFU GMBH PRIVATES INSTITUT FUR UMWELTANALYSEN



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## European funded Project GREENER aims to help water monitoring with new compact spectrometer technology.

GREENER project aims to develop a new, compact, and robust spectrometer that can measure extremely low concentrations of contaminants in water, including hormones. Despite increasingly strict regulations, contamination of water remains a major problem worldwide, posing a significant health risk to humans and animals. The project will last for 36 months and seeks to provide a ready-to-use device that will enable the layperson to monitor water safety and quality on-site without additional infrastructure or trained personnel, with a total allocated budget of 3.759 104,00 Euros.

With 8 Partners from 4 European countries, the GREENER project's goal is to develop new, environmentally friendly quantum dots (QDs) capable of emission at wavelengths up to 2  $\mu\text{m}$ . These QDs will be singulated by the DNA origami method and integrated into an LED layer stack to synthesize a novel kind of single-photon source. Advanced single-photon detectors enabled by new detector materials that do not require expensive cryogenic coolers but rely on simple thermoelectric cooling will also be developed. This will create a setup for low-loss, low-noise, and high-performance absorption spectroscopy for the NIR range.

This innovative technology includes electrically pumped single-photon sources (SPS) and a highly efficient single-photon detector (SPD) that provide enhanced performance for the measurement of lowest absorptions. This marks the first time that an electrically pumped, quantum dot based single photon source, which operates at room temperature, has been applied to spectral sensing, taking advantage of the significant noise reduction provided by the spectrometer system including intelligent data processing and AI algorithms, thus enabling a low-noise detection method.

The resulting biosensor will subsequently be evaluated for the detection of critical (endocrine disrupting) contaminants in water in fisheries and aquaponics. The GREENER biosensor will be capable of measuring extremely low concentrations in the sub ng/L range, making it a valuable tool for water monitoring in the context of nature conservation and various branches of industry.

The GREENER project's innovative technology will revolutionize the water monitoring industry, providing an environmentally friendly and cost-effective solution that can be used by anyone to monitor water safety and quality. The project will contribute significantly to protecting our natural resources and improving public health.

The innovative use of quantum technology in spectral sensing marks a significant step forward in the field of water monitoring and will contribute to protecting natural resources and improving public health.

### Contacts

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