

**FUELPHORIA DEMO 3:
Microalgae valorization
towards biodiesel production**

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**FUELPHORIA: Accelerating the sustainable production of advanced biofuels
and RFNBOs - from feedstock to end-use**

**HORIZON-CL5-2022-D3-02-08 - Demonstration of complete value chains for
advanced biofuel and non-biological renewable fuel production**

Duration: 1/10/2023 – 30/09/2027 (48 Months)

Budget/ EU contribution: €11,144,321.30/ €9,678,598.55

Coordinator: CERTH (Greece)

Beneficiaries: 22

Affiliated Entities: 3

Associated Partners: 1

FUELPHORIA DEMO 3

Main target

Justification of the feasibility of biodiesel production from microalgae cultivated in high N digestate

Tasks

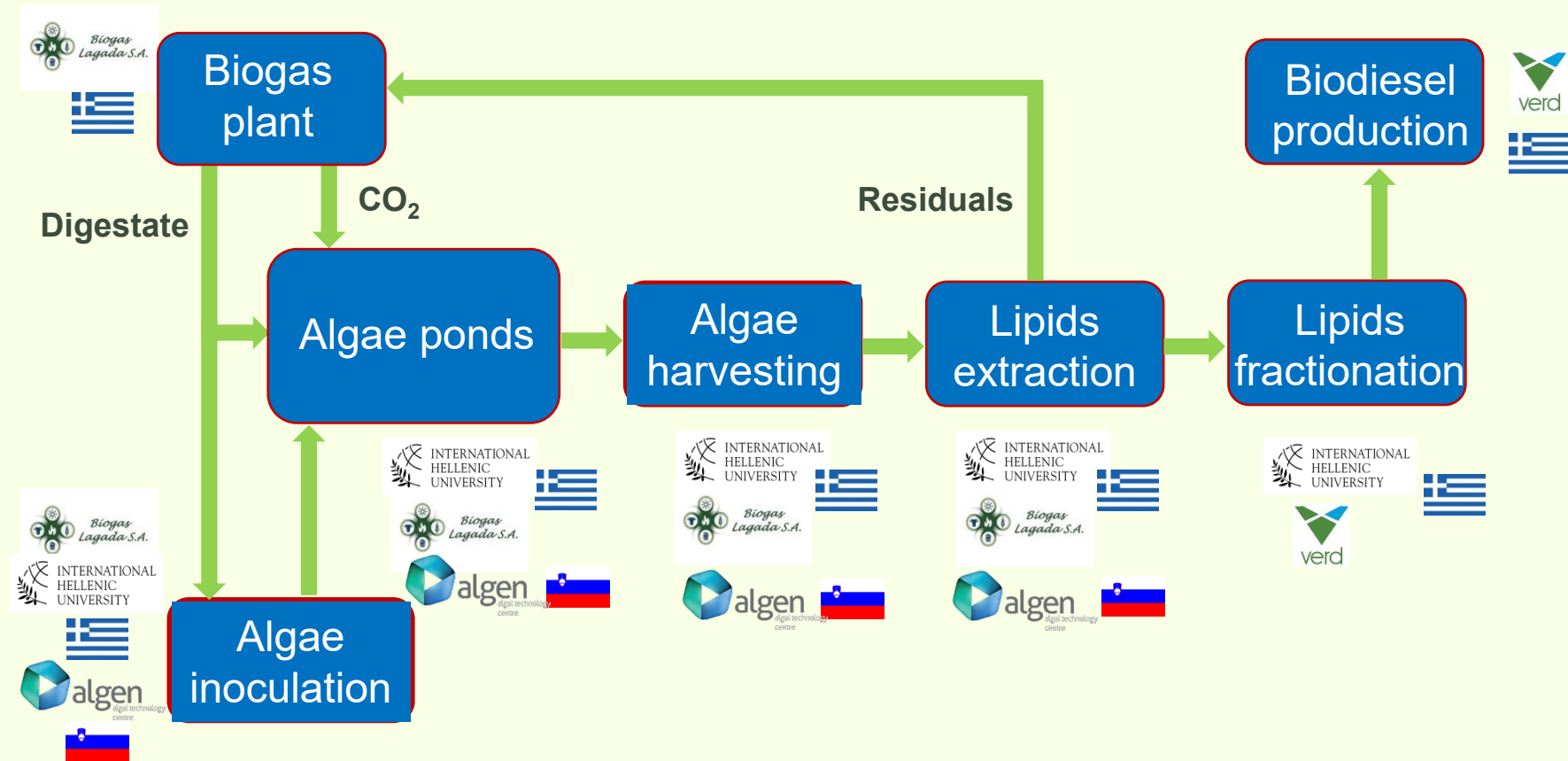
Construction and operation of a large scale microalgae system;

Monitoring and control for optimized performance;

Harvesting and lipids extraction from biomass;

Production of biodiesel with required properties.

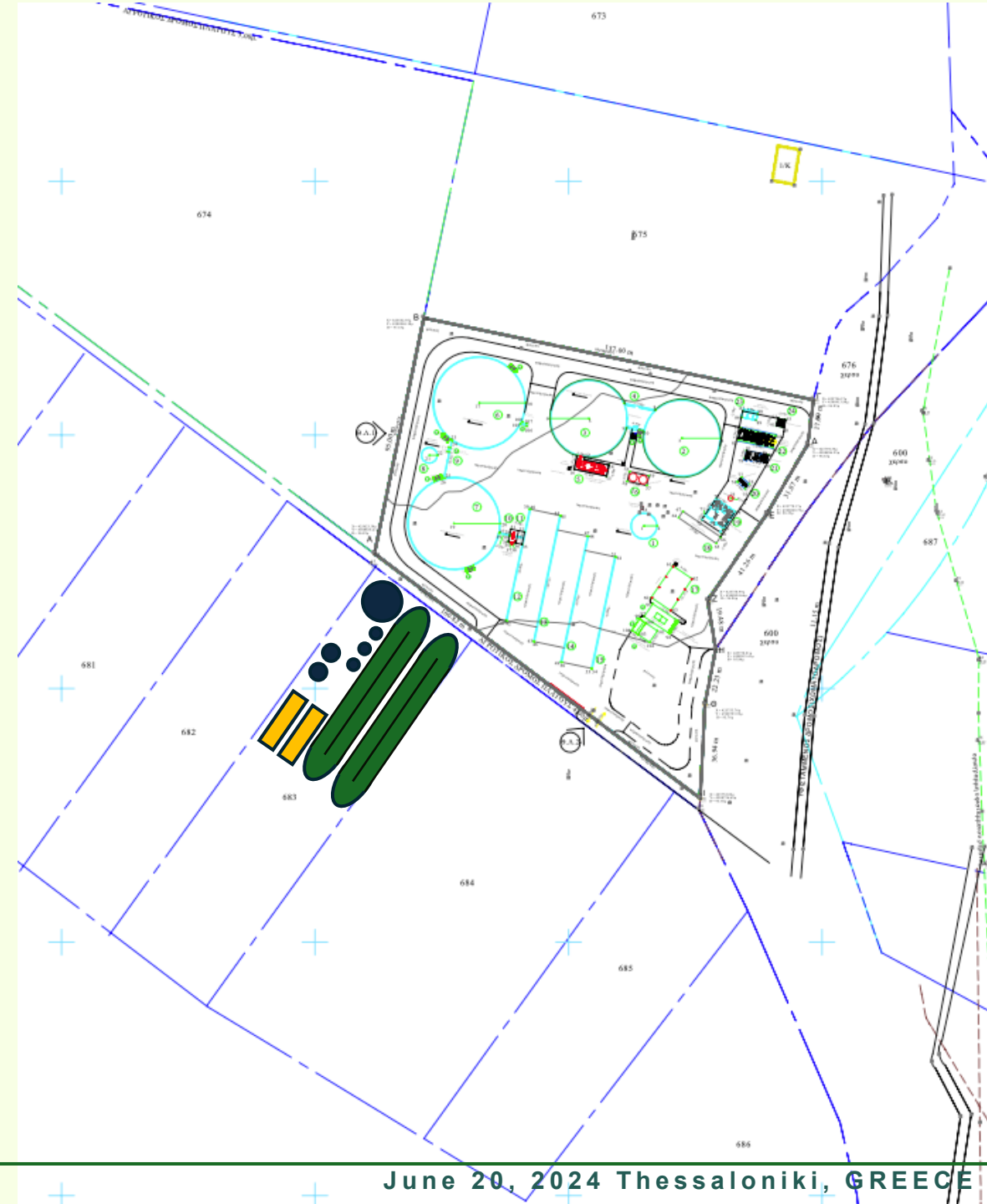
Microalgae from digestate to biodiesel - Conceptual Diagram



Design and construction of the microalgae system

- Two High Rate Algae Ponds (HRAP) with 1000 m² total surface;
- An 7,5 m² pond for inoculant preparation;
- A sedimentation tank for microalgae harvesting;
- An electro-coagulation flocculation unit as a backup process;
- An extraction unit employing circular extraction solvents;
- Sensors for process monitoring including IR cameras.

Modification/preparation of a 250 L esterification reactor for biodiesel production



Operation and optimization of the microalgae system

Operation of the 1000 m² HRAP and optimization:

- Adjustment of hydraulic flow, retention time, dilution rate;
- Operation in two periods: without and with addition of CO₂ flue gases from BLAG gas generator;
- ALBA kinetic model and AI-based monitoring system for optimum performance and predictive control.

Key Performance Indicators

- Production of 2500-5000 kg algae per y depending on weather conditions, culture changes etc;
- Extraction of 600-2000 kg oil per year;
- Production of 500 to 1700 kg biodiesel depending on oil yield;
- Estimated biodiesel production cost 1000 to 4800 €/t, depending on process efficiency;
- Treatment of 100 m³ digestate;
- Utilization of 1000 m³ flue gasses (minimum).

THANK YOU FOR YOUR ATTENTION

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