

All-gas

Newsletter

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All-gas main facts

The **All-gas** Project demonstrates the sustainable large-scale production of biofuels based on the low-cost cultivation of microalgae. The complete process chain is designed for a cultivation area of 10 hectares, with the goal of wastewater treatment becoming energy self-sufficient.

The Project (n° ENER/FP7/268208) is co-financed by the EU FP7 program with € 7,1 million.

Project participants

FCC Aqualia (Spain) as coordinator, BDI-Bio Energy International (Austria), Fraunhofer-Umsicht (Germany), HyGear (The Netherlands), University of Southampton (United Kingdom), Volkswagen (Germany).



More info:

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New partner in the All-gas project: VW will test biomethane in cars

In order to manage the fleet demo activities, **Volkswagen** joined the **All-gas** consortium in 2014. The VW environmental commitment includes the use of novel fuels which decrease greenhouse gas emissions in the 'Well to Wheel' concept.

First estimates show that bio-methane can reduce up to 80% of the CO₂ emissions in comparison with an engine fueled by fossil gasoline. Preliminary studies indicate that biofuels produced in the **All-gas** project will be enough to run about 20 vehicles per hectare of algae surface, with an Energy Return On Investment (EROI) higher than 2.



VW as a new partner in All-gas will test four cars, two Golf TGI and two Eco-Up to be run 30.000 km each.



Prototype operation

In September 2014, FCC Aqualia started the operation of the prototype at Chiclana de la Frontera, with cultivation area of 1000m². At this scale, the whole process of microalgae cultivation and harvesting operation is coupled with the anaerobic digestion and biomass solar drying for lipids production (BDI).

The productivity of microalgae depends on weather conditions and is lower in winter and spring, but varied between 15 and 20 g/m² day, with a very low Hydraulic Retention Time (HRT) of 3 days. According to pilot results, productivity doubles in summer to exceed the target of biomass production of 90 Ton/hectare year.

Furthermore efficient harvesting of biomass with a low energy dissolved air flotation unit has been demonstrated, generating simultaneously an effluent that fits the most restrictive limit of discharge (to be reused for golf irrigation), and a concentrated biomass (up to 4%) that can be fed directly to the anaerobic digesters.

Regarding biogas production through anaerobic digestion of microalgae, a biomethane yield up to 250 mL CH₄/g VS_{added} was reached for thermophilic operation.

During summer 2015, a larger anaerobic digester with 25 m³ volume will be finished, together with a biogas upgrading process. The first biomethane will then be ready for the fleet demo phase, as a fuel dispenser will also be provided to make use of an estimated initial biofuel yield of 5 kg CH₄/d.



General Assembly in Graz. BDI facilities

In November 2014 the consortium held its 10th meeting in Graz in order to evaluate new results obtained by the partners, and prepare the 3rd Period Report. The following was presented:

- **FCC Aqualia:** a new approach to grow microalgae, based on a low energy algae reactor (LEAR) built in 500 m² prototype.
- **University of Southampton:** a new paddle-wheel to reduce energy consumption for pond mixing, with some other relevant results on algae digestion.
- **BDI:** treatment and disruption of the cells in the process to produce biodiesel. Those results could give the opportunity to develop new processes to grow and concentrate microalgae, in order to increase lipids content in the biomass.

• **HyGear:** results on biogas upgrading. The integration of methane and CO₂ separation with the site requirements will be developed in next months.

• **Fraunhofer-Umsicht:** comparison of Life Cycle Analysis between All-gas technology and as reference, fossil fuels and conventional wastewater treatment.

Next meeting will be held in HyGear offices on May 21st 2015 in Arnhem (The Netherlands).

