Newsletter 11/2018

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 up to 10 hectares, making wastewater treatment energy self-sufficient, and recycling the nitrogen and phosphorus from wastewater into microalgae biomass.

The Project (n° ENER/FP7/268208) is co-financed with \in 7,1 million by the EU Commission within the FP 7 programme: "ENERGY.2010.3.4-1: Bio-fuels from algae".

Project participants

Aqualia (Spain) as coordinator, BDI-Bio Energy International (Austria), Fraunhofer-UMSICHT (Germany), HyGear (The Netherlands), University of Southampton (UK).





More info: www.all-gas.eu innovacion@agualia.es

Algae Biofuel for Vehicles Becomes a Reality

On December 1st, 2017 the demonstration plant for algae biofuel was inaugurated by the European Union Commissioner for Energy and Climate Action, Miguel Arias Cañete in Chiclana, Spain, in the presence of the Mayor, Jose Maria Roman, and representatives of the various levels of government. The All-Gas project has now started its final phase, demonstrating the production of quality biomethane, and its use in various vehicles. Since 2016, the first All-Gas car has already completed a distance equivalent to once around the world, using only biogas produced from microalgae.

Miguel Arias Cañete mentioned his great satisfaction to support this project, and the responsibility of everyone to contribute to the EU target of "zero carbon" by 2050. "We are aware of the challenges of these complex projects that involve various companies - but decarbonisation in the European Union is now unstoppable."



Miguel Arias Cañete in Chiclana, Spain, in the presence of the Mayor, Jose Maria Roman, and representatives of the various levels of government.

Let's run the World on Green gunk

Full scale results show that algae fuel is four times more efficient than the best conventional biofuels: sugar ethanol or palm oil diesel can only power up to 5 cars per hectare (ha), whereas all-gas fuels 20 cars per ha. In contrast to biofuels from agricultural crops, no fresh water, no arable land and no artificial fertilizers are used. In addition, wastewater nutrient recovery - and disinfection for reuse - is achieved for free - while producing a sustainable fuel with a positive energy balance. To fuel all the 30 M cars in Spain, only an area half the size of Belgium (15.000 km²) would be necessary – Andalusia alone has almost 90 000 km².

	FP 7 ALLGAS WASTEWATER TO BIOMETHANE	13,000kg CH4/ha yr 120 cars/ha* Wastewater treatment and Nutrient recycling No competition with food Positive greenhouse balance
JV	PALM OIL TO BIODIESEL SUGARCANE TO BIOETHANOL	5,000L/ha yr 5 cars/ha* Biodiversity risk Food insecurities
	*20,000 km/year each car	

aqualia BDI 😋 🗾 Fraunhofer MITGEAR Southampton







Valuable visits

The All-gas project has been visited by personalities from different fields. In addition to the European Commissioner for Climate Action and Energy, the former Spanish Minister of the Environment, Cristina Narbona Ruíz, visited the facilities in June.

Various potential clients of Aqualia's operations in Extremadura, Oman and Portugal have shown their interest on site. Public

Awesome Achievements

In Chiclana, the complete biofuel process has been built with an algae cultivation area of 2 ha, making wastewater treatment energy self-sufficient, and capable of powering an average of 40 cars. In addition to producing bio-energy and reuse water, nitrogen and phosphorus is recycled with the microalgae biomass as fertilizer.

Energy balances from one full year of continuous operation have shown very low operational expenses in the demo plant: electricity Currently, as the last step of the project, a fleet demonstration is taking place, where 4 production Compressed Natural Gas vehicles are clocking up more than 70 000 km to show that the wastewater biofuel from algae is meeting all vehicle standards for biomethane (according to European Regulation EN 16723-2). Other vehicles of the municipal services are also using the free and clean biofuel. The next algae plant is under planning with the new H2020 project Sabana, where up to 5 ha of cultivation should yield, in addition to biofuel, biomass for a biorefinery, producing biofertilizers.

administrations as well as water companies from Sweden and Norway, including the Association of Water Supply and Sanitation of Andalusia (ASA-A) have visited the facilities.





consumption three times less than conventional wastewater treatment (0.6 kWh el./m³ – McCarty et al, 2011). A Llfe Cycle Assessment by FhG Umsicht determined an EROI (energy return on investment) of 1,9 for the All-gas process: the system generates almost twice more energy than it needs, while producing efficient and sustainable biofuel, biofertilizer and reuse water. Per ha of algae cultures, electricity equivalent to the consumption of 20 households is saved by not using aeration for wastewater treatment.

