



**AGICAL+ - Validation of an environmentally friendly system, combining CO<sub>2</sub> capture and biofuel production based on algae culture for industrial exhaust application**



<b>Expedient</b>	LIFE10 ENV/BE/000696	<b>Date</b>	01-NOV-2011 to 30-SEP -2016	<b>Location</b>	Bruxelles
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<b>Consortium</b>	Carmeuse Research and Technology SA, Belgium				
<b>Objective</b>	<p>The AGICAL+ project proposes to implement an innovative solution, based on algae culture and biomass production, which will allow for the CO<sub>2</sub> capture of lime or glass furnace fumes and the production of biofuel that can be used within the furnaces during the production process. At pilot scale (1 ha of algae culture), the final aim of this project is to demonstrate that the environmental impact of industries can be reduced up to 360 tonnes/year of carbon dioxide (CO<sub>2</sub>) emissions and up to 2 460 GJ/year of fossil fuel in the case of lime and glass production processes. To reach these ambitious environmental objectives, two implementation steps will be necessary. Firstly, the project will launch a pilot prototype, and apply the experience gained from this, to further refine a second pilot. In the first step, the aim is to reach a capturing of 270 tonnes/year of CO<sub>2</sub>, and a production of 1 800 GJ/year of biomass. The project will demonstrate the technical economic viability in two representative industrial processes: (i) the implementation of the algae culture pilot for glass production furnace – the first pilot – will validate the process for fumes with moderate CO<sub>2</sub> concentrations and high fume temperatures (600-650 °C) with many pollutants; and (ii) the lime application – the second pilot – will validate the process for high CO<sub>2</sub> concentration and low temperature (100-125 °C) fumes. To optimise the overall environmental benefit, the energy consumption of the process will be limited as much as possible and thermal energy that is available on the production site will be used to power the pilot plants. This will be especially critical for the lime pilot because of the limited amount of thermal energy available on the site. In order to limit the operational costs, water that is recovered when harvesting the algae will be recycled and re-injected upstream.</p>				
<b>Expected results</b>	<p>The expected outcome is the pilot scale validation of an innovative environment friendly CO<sub>2</sub> capture system combined with a biofuel production process. This system will:</p> <ul style="list-style-type: none"><li>○ Reduce CO<sub>2</sub> emissions by capturing CO<sub>2</sub> using micro-algae;</li><li>○ Produce biofuel from the algae to fuel the industrial furnaces and reduce fossil energy consumption; and</li><li>○ Maximise the use of excess heat from the production process to reduce the energy needs of the installations.</li></ul>				