



## **PHD RESEARCH PROPOSAL**

**Doutoramento em Engenharia da Refinação, Petroquímica e Química (EngIQ)**

### **ESTABLISHING A COMPARATIVE FRAMEWORK FOR ALGAE PRODUCTION AS A CCU/CCS MECHANISM WITHIN THE BENCHMARK REGULATIONS**

#### **Summary / Framework**

Algae production is comparable to agriculture. The industrial production of these aquatic photosynthetic organisms requires the same basic components – sunlight, nutrients and carbon dioxide (CO<sub>2</sub>). The reduction of the latter has become a major component of the GHG emissions mitigation efforts worldwide. Algae can also supply value-added compounds to several sectors of the economy, namely food, feed, pharma, cosmetics, energy, and can replace raw materials in several major consumption industries. It is therefore of critical interest to evaluate how the industrial production of algae can help this world effort and how it compares with other Carbon Capture and Utilization (CCU) / Carbon Capture and Storage (CCS) mechanisms in efficiency. This PhD research programme will congregate a 1) clear understanding and knowledge of different algae industrial processes, technologies, operations and economics, 2) a comprehensive and practical approach to methodologies for performing Life Cycle Analysis (LCA) and LCAs comparative frameworks and a 3) deep understanding of the ever-evolving CCS/CCU regulatory frameworks, with particular focus in the EU and US. In the junction of these three areas lies the key to assess the potential of algae to increase the sustainability and circularity of the CO<sub>2</sub> cycle in human activity.