Establishing the Life Cycle Inventory of the Anaerobic Digestion process enhanced with nanoparticles (SQUEEZER).

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Description
The master thesis proposal is included in the framework of the project *Nanomaterials to squeeze anaerobic digestion: boosting methane content and converting carbon dioxide to methanol* (SQUEEZER), that will start on December 2022.

The **hypothesis** of the **SQUEEZER project** is that it is possible to further improve the process of anaerobic digestion under a global perspective by i) increasing the methane content in the biogas through the addition of nanomaterials in the anaerobic digester and ii) converting part of the carbon dioxide present in the biogas to methanol by catalysis. Next Figure schematically describes the **SQUEZEER** proposal.
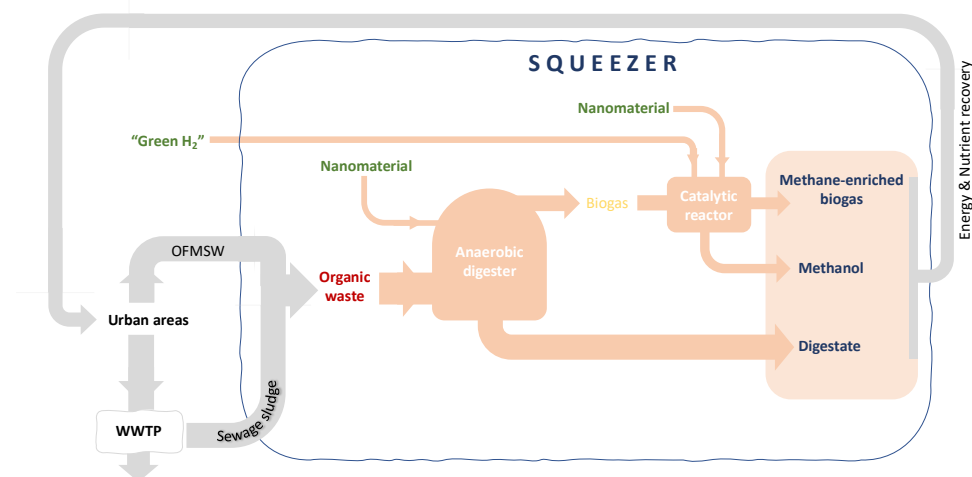
Thus, the main objective of the SQUEEZER project is to maximize the energy that can be obtained from the anaerobic digestion process by using nanomaterials, both enhancing the biological process and converting part of the carbon dioxide present in the biogas to methanol.

Specifically, the Master Thesis proposal is focused on the analysis of the performance of the entire process by obtaining the mass and energy balance of the process and performing the greenhouse gases accounting and establishing the Life Cycle Inventory. In this transversal activity, it will be necessary to perform material and energy balances to support research and design decisions throughout the project.

Ideally, a tool (e.g. based on excel) should be developed during the Master thesis, allowing the automatic recalculation of the mass and energy balances when a data is modified. From this tool the Life Cycle Inventory will be established, and a greenhouse gases accounting will be performed to determine the potential effect of the SQUEEZER project on climate change mitigation.