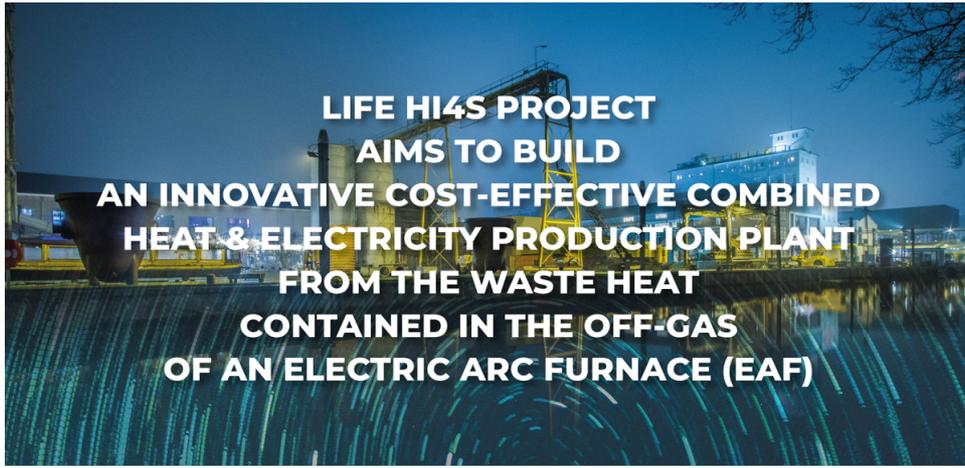




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The challenges of pilot plant design



Designing a processing plant is the professional goal of many engineers. On the other side, a “pilot plant” design can be underestimated by many companies and professionals, mostly because of one misjudged aspect, the plant size (processing capacity, physical space, budget, etc.). A large processing plant involves more complex aspects throughout any of the steps of its definition (conceptual and detailed design, procurement, building, etc.) but, nonetheless, designing and building a pilot plant is also a challenging process. It may involve

less workforce and smaller coordination efforts, but the technical and management implications are still there.

From a technical point of view, the main challenge comes from the lack of information and resources.

In reference to the information, if you were lucky, when a project like this comes to your table, you will receive the production capacity goal that shall be achieved by the pilot plant, as well as a bunch of old (often, too old) blueprints of the location where the plant will be placed. So, as you could foresee, designing a pilot plant only with this information is a huge challenge, and therefore, the conception process must be iterative and shall involve a huge amount of creativity and breakdown of engineering skill.

In reference to the resources, besides the obvious budget limits that are normally already set when the designing process starts, there are other constrains such as the space availability, the existing deadlines, the presence of qualified personnel. Additionally, since a pilot plant typically is related to non-standard processes and relatively small processing capacities, sometimes it can be difficult to find adequate market solutions for some equipment and instruments (normally found in larger scales or laboratory scales). In this sense, it is a great advantage to have partners in your team which are manufacturing companies specialized in the required equipment, but also with the flexibility to adapt their solutions to the size, characteristics, and goals of the pilot plant. **LIFE HI4S' team is formed by different highly skilled companies with the vision of providing tailored-made solutions for this project.**

Regarding the management challenges, it is important to point out that these are normally more closely related to the technical development activities compared to a standard engineering project. Management involves many aspects, such as: collecting the right information for the technical team; interacting with possible suppliers to find suitable solutions for the project; control of documentation; properly communicate with other project partners to adapt their solutions to the process in a feasible way; manage personnel; etc. A single drawing or document that could normally take few weeks to be issued in a standard engineering project, might take a few months in a pilot plant design because of all the constant modifications in the information; an even when it is already issued, it can suffer critical changes in future revisions. The design of a pilot plant is in the edge between R&D and engineering, so many elements will be modified from the initial conception of the plant to the actual design of it.

Despite being a very challenging work, designing a pilot plant can be very rewarding from a professional perspective.

LIFE HI4S partners are working closely and very hard to finish the designing stage to be able to start the installation and then the operation of the plant.

ECO DESIGN PRINCIPLES: how are they applicable to LIFE HI4S technology?



As we explained the evolution of pilot plant design, LIFE HI4S partners would like to introduce our readers to the Eco design principles and how they will fit in our developments.

First of all, what is Eco-design? Eco-design enables the incorporation of environmental considerations into product development processes, by balancing technological and environmental criteria.

In the framework of LIFE HI4S project eco-design principles will be introduced to evaluate and improve the environmental performance of the LIFE HI4S system's main components during the design and development of the pilot plant.

Eco design principles and LCA methodology are applied by LIFE HI4S partner Life Cycle Engineering (LCE) to benchmark the environmental impacts of different materials fulfilling the same functional and technical needs. **The main goal is to minimize negative environmental impacts without altering the performance.** For this purpose, the study will be carried out by LCE with the assumption that all the analysed materials are equivalent from a technical and functional point of view, with the aim to focus on environmental aspects only.

Technical criteria have been provided by LIFE HI4S partners in order to approach some benchmark analysis: for instance, the first elements analysed in this process are the fluorinated gasses and the steel required to build the scrap drier. The environmental indicator considered is the GWP-100, that represents their global warming impact relative to the impact of the same quantity of carbon dioxide over a 100-year period.

The preliminary results of the analysis have brought some new perspectives to be discussed among partners to properly address the best design and development.

Second plenary meeting



On 7-8th June 2022, all LIFE HI4S project partners met for their second consortium meeting, the first one finally held in person after Covid 19 travel restriction rules. It has been great to meet in person after one year of online collaborations. The meeting took place **in Vigo, in the Galicia region of Spain**, and it has been hosted by SDEA Solutions.

The gathering has been a great opportunity to strengthen collaborations, catching up about **the development progress of the cost-effective heat&electricity production plant** that will be set up this year. The next meeting is coming soon, the LIFE HI4S partners will meet at the end of January 2023 in Italy, hosted by Life Cycle Engineering SpA.

LIFE HI4S EU Project

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