



SUNLIGHT GROUP

INTRODUCTION

From the Special Projects Department, we have had the opportunity to carry out our first project in collaboration with our colleagues from the Switzerland office. Specifically, this project was carried out for Sunlight Group, a prominent Greek company with over 30 years of experience, specializing in the production and development of advanced energy solutions, focusing on industrial and lithium batteries.

Sunlight's mission is to develop high-quality products that meet current and future energy needs, supporting key sectors such as logistics, electric mobility, and renewable energy. Among its main products are industrial batteries for forklifts, stationary energy storage systems, and cutting-edge lithium batteries.

The growing global demand for energy storage is driving the emerging lithium battery market, considered key to the energy transition and the mass adoption of electric vehicles. This market, with a projected double-digit growth rate in the coming years, is also crucial for integrating renewable energy into the grid and reducing dependence on fossil fuels. However, this boom presents technical and logistical challenges, such as the need for manufacturing environments that ensure maximum quality and efficiency.

TEAM

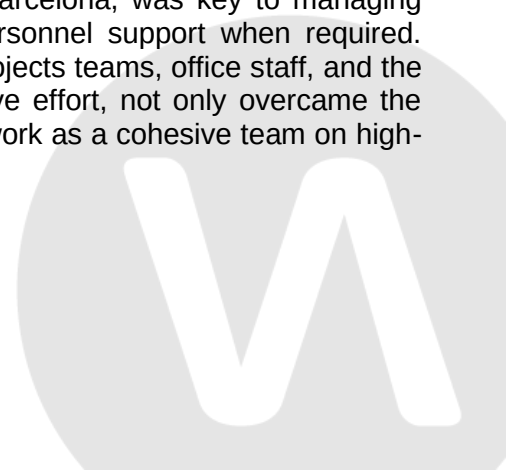
For the execution of this project, we had a remarkable team of professionals who, from different areas, worked collaboratively to achieve exceptional results.

The engineering team, composed of Karolina Danko, Ivan Royo, Rocio Cerezo, Miguel Gomez, Patrick Landis, and Stefano Lejarraga, led the design from the conceptual phase to the construction phase, providing continuous technical support and solutions tailored to the project's needs.

Meanwhile, the production and site team, formed by Damian Sadowy, Julian Muñoz, David Quintana, Juan Francisco Robles, Vicente Álvarez, and Jaime Gamero, was responsible for the development and management in the field, ensuring that execution met the highest standards of quality and precision.

We also received invaluable support from the transversal teams, including Esther Fortes and Montse Castillo, as well as the specialists in drafting, Jayrald Sanchez and David Mena.

The collaboration between offices, including Madrid and Barcelona, was key to managing material purchases and logistics, as well as providing personnel support when required. Coordination between our Switzerland office, the Special Projects teams, office staff, and the site team was a real challenge that, thanks to our collective effort, not only overcame the complexities of the project but also reinforced our ability to work as a cohesive team on high-demand projects.



INSTALLATION

The project, named Litharaki, takes place at Sunlight's current plant in Xanthi, Greece, a small town located in the north of Greece near the border with Bulgaria and Turkey.

This is the first phase, a pilot plant for the creation of Li-ion cells that will supply the battery assembly area also located at the same plant.

Pilot line Li-Ion



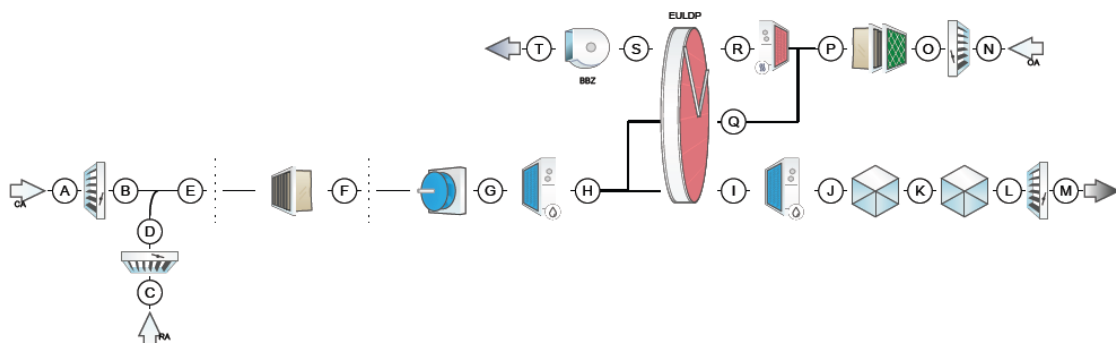
Battery Assembly



This first phase of the project will have a production capacity of 100 MWh/year, with an expandable target of 100 MWh/year. The design and construction of this pilot line aim not only to validate production processes on a smaller scale but also to lay the groundwork for establishing a mass production line with a capacity of 8 GWh/year.

One of the biggest challenges in lithium battery production is the strict control of humidity within the manufacturing facilities. Relative humidity above the permitted levels can cause unwanted chemical reactions in hygroscopic materials like lithium, leading to the formation of oxides or hydroxides that degrade the electrochemical properties of the electrodes and can even generate irreversible defects in the cells. Likewise, particles can cause quality issues by interfering with the contact between the materials that form the cell.

In this project, we designed a cleanroom with ISO8 and ISO7 environmental classifications (UNE-EN 14644), with an HVAC system that maintains relative humidity levels below 9.5% (dew point below -10°C) in the anode and cathode generation rooms, and below 1% (dew point below -40°C) in the cell assembly rooms. To achieve these low humidity levels in the room, we have installed silica rotor dehumidifiers with a chemical composition in the drying wheel different from those used in the pharmaceutical industry, which increases the hygroscopicity and also uses part of the process air or dry air to dry the regeneration air.



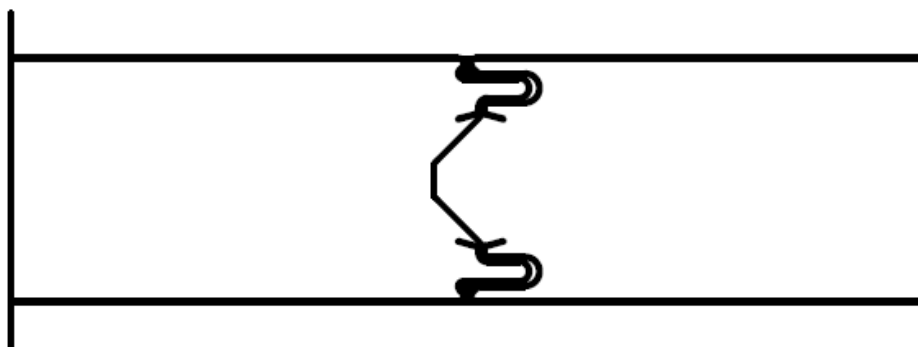
The absolute humidity values we reach in the supply air with this type of dehumidifier are 0.02 g/kg, and we can reach 0.002 g/kg.

Through these dehumidification systems, we precisely control the humidity and pressure of the rooms, and a Fan Filter Unit (FFU) system installed in the ceiling filters and generates the necessary air changes per hour in the rooms, even controlling the room temperature through water-cooling batteries installed at the air intake.

This hybrid solution allows for reducing the flow rate of the dehumidification system equipment, thus optimizing both the size and cost of the equipment, as well as improving the system's energy efficiency.



Within our scope, we constructed approximately 5,000 m² of cleanroom area, with room heights ranging from 3.5 meters to 9.5 meters, using a panel system sealed with butyl that increases the room's airtightness, allowing us to maintain such low humidity levels.

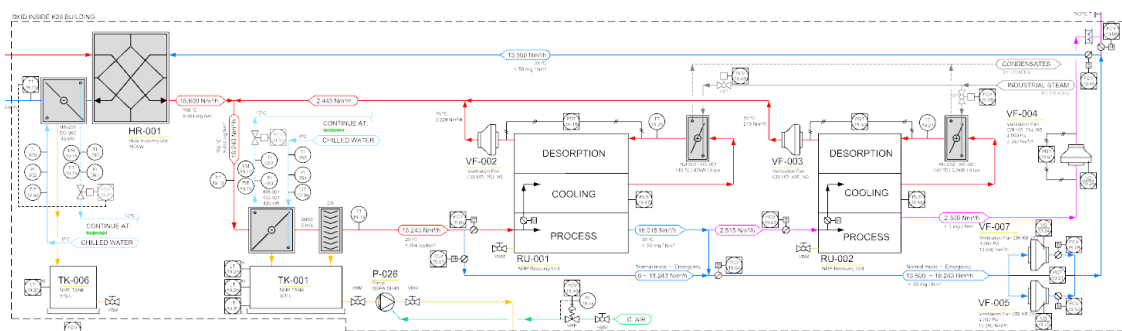


The climate control system consists of:

- 6 dehumidifiers for over 80,000 m³/h
- 6 air conditioning units for over 110,000 m³/h
- 160 FFUs for a total of 260,000 m³/h
- Rooftop system for temperature and humidity control in the warehouse
- Direct expansion system and extractions for comfort in office and technical areas.

In addition to the original scope, we secured the contract to implement the gas recovery system for the ovens where the mixture forming the anode and cathode of the cells is dried. This design, developed by the Switzerland office and led by Thomas Krauss, enables the recovery of solvents evaporating from the drying process. This is particularly critical in the cathode section, where the solvent used is NMP (N-methyl-2-pyrrolidone), a highly toxic organic compound that is harmful to the health of workers. Its emission into the atmosphere is regulated, and its concentration must be below 1 mg/Nm³.

Due to the high flow rates managed in this facility, it is not feasible to use an activated carbon filtration system to reduce concentration. Therefore, a recovery system for NMP was developed using cold batteries to condense the NMP and rotors to capture the NMP, with a design concept like that of the dehumidifiers.





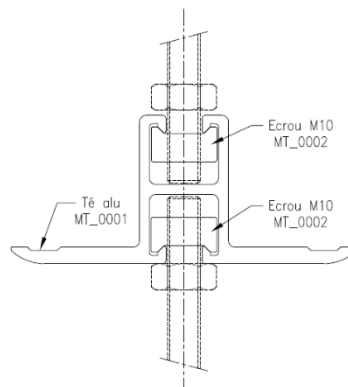
CHALLENGES

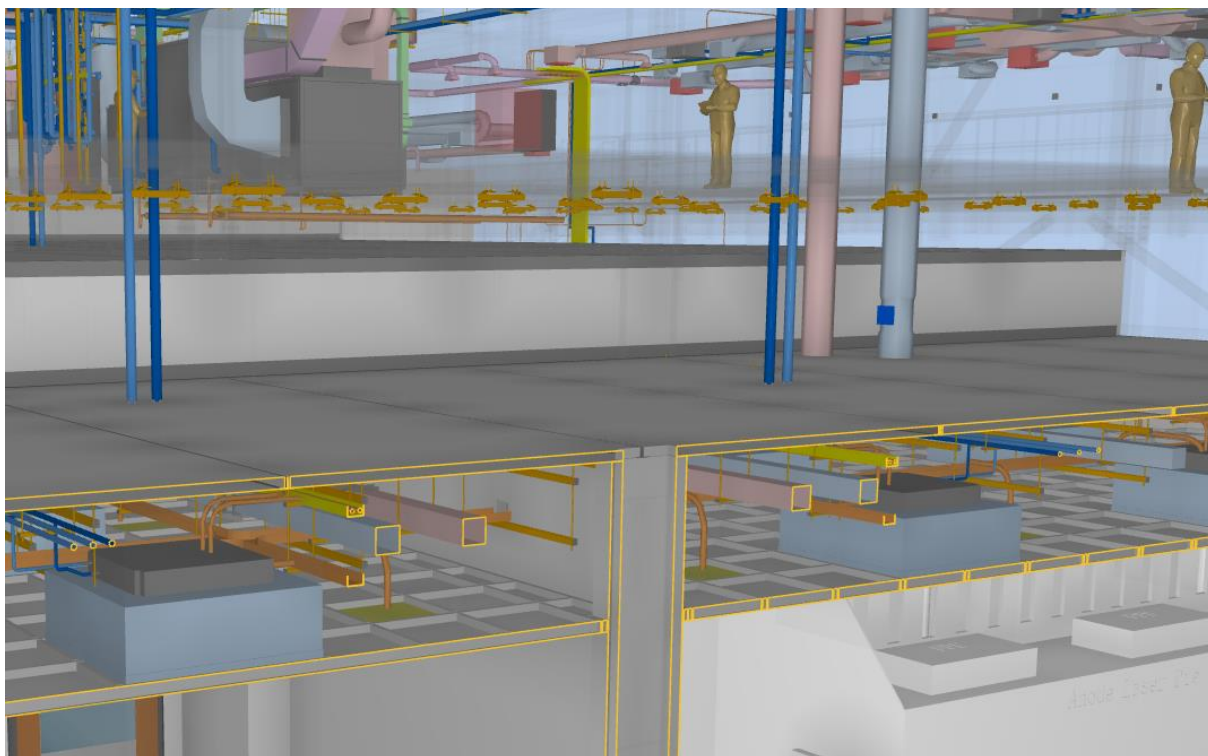
Among the various challenges we faced in this project, one of the highlights was the implementation of the Dalux software tool, not only for managing design and graphic documentation but also for its application in the field. In the design phase, Dalux allowed us to centralize and manage models and plans efficiently, ensuring smooth communication between all teams. However, the real challenge was integrating its Field functionality in the logistics and commissioning stages. This tool became a key asset in coordinating deliveries, tracking in real-time, managing incidents, and ensuring that each team on-site had up-to-date and accurate information. Although the learning curve was steep, its implementation marked a turning point in efficiency and process control, helping us meet the demanding deadlines and standards of the project.



Another challenge was ensuring the airtightness of the cleanroom, particularly due to the industrial nature of the facility and the large number of conduits and services that needed to pass through the room's walls and ceilings. Each of these penetrations posed a potential risk to the strict humidity conditions of the room.

To address this, a secondary support system was designed and installed within the plenum. This system allowed for the distribution of interior installations while reducing the number of penetrations to one or two per system.





To ensure airtightness, the design was reinforced with sealed installations, such as Roxtec-type cable glands and emergency doors with rubber seals that prevent uncontrolled air from entering the facility.





We are currently in the project's commissioning phase, aiming to finalize the validation at the beginning of next year.

This project has represented a significant effort for the entire team, not only because it is our first experience but also due to the implementation of an innovative technological solution that has challenged our capabilities.

This project has allowed our department to grow, adding new colleagues, and we are proud of the achievements made so far. We are confident that this will be the first of many projects that continue to consolidate our experience and position in the sector.

