

# ElectroCap Pitch Deck

# Water Battery

## Challenge 34



TÉCNICO LISBOA

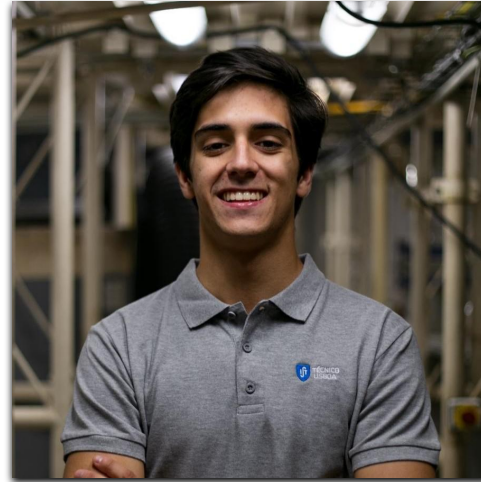




# Team Members



João Silveira



Guilherme Lopes



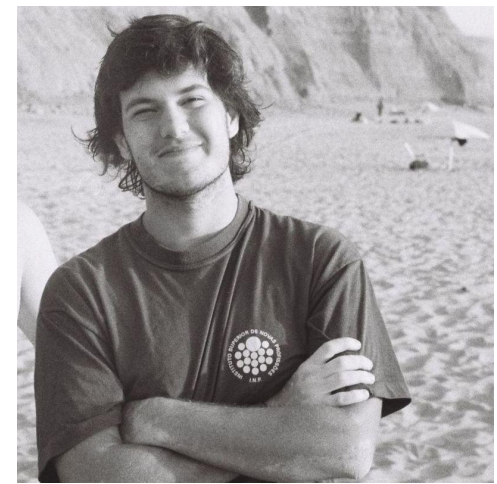
David Peixoto



Diogo Matias



Carlos Esteves



Tomás Garrido

# Mentor and Scientific Advisor



**Mentor:** Prof. Duarte de Mesquita e Sousa



**Scientific Advisor:** Prof. João Guilherme Raimundo Garcia

# Problem definition

When a photovoltaic (PV) solar panel generates surplus energy beyond the needs, there **are two options**

Storing it in lithium batteries

More expensive (€€€)

Selling the extra energy to the grid

Provides very low profitability





# Our Approach

We propose a solution that efficiently heats water using surplus solar energy. With a smart controller, we regulate energy delivery to the water tank, optimizing utilization and storing surplus energy in heated water format.

# Solution Beneficiaries

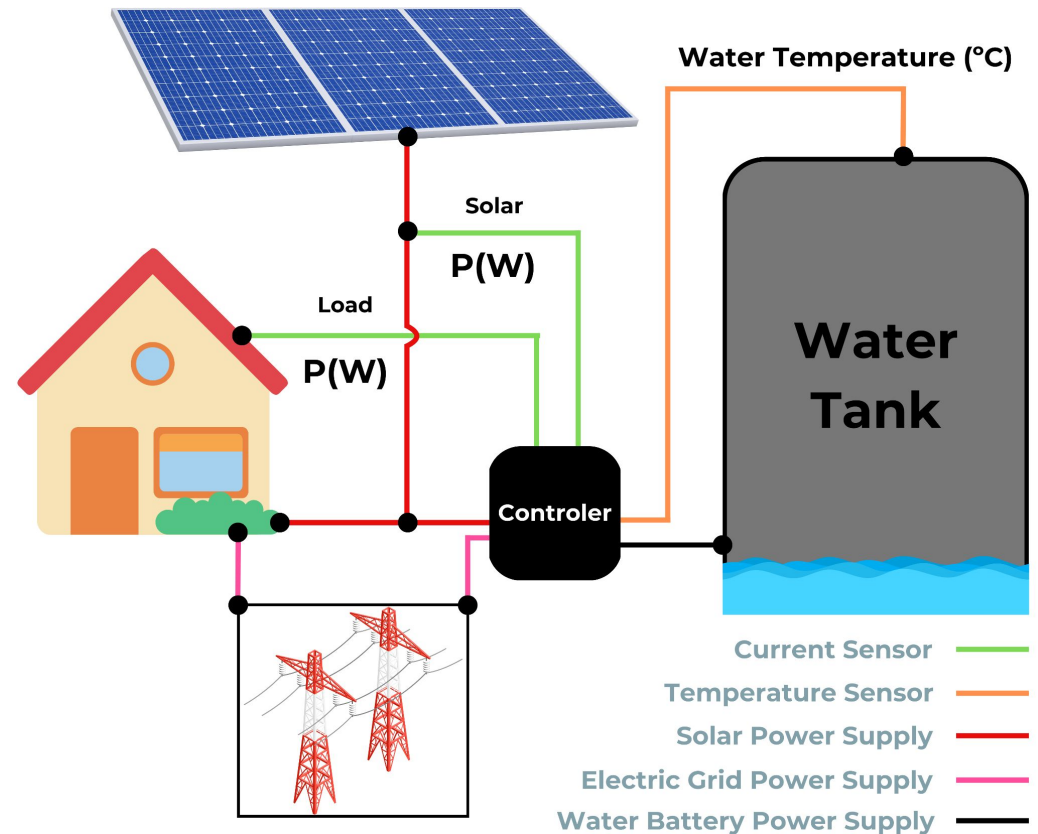
Our system is **ideal for homeowners with PV systems**. It offers a practical way to utilize surplus solar energy, maximizing the value of their investment by efficiently heating domestic hot water.



# Technological solution

Our system integrates solar panels, as the source of energy, and a water tank with a heating element. It utilizes surplus **solar energy** to heat water to 80°C, storing energy in the heated water format that **can be used later**.

If the water temperature drops near the minimum reference and there is no surplus energy available, it switches to other energy sources. This ensures **efficient use of renewable energy** while maintaining **consistent** water temperatures.



# Competitors and previous work

## Competitors

Our competitors include companies specializing in battery solutions, such as **Huawei**, and energy companies like **EDP, Endesa**, etc.

Understanding these established technologies is crucial for our project's success, allowing us to identify opportunities to make our approach stand out.

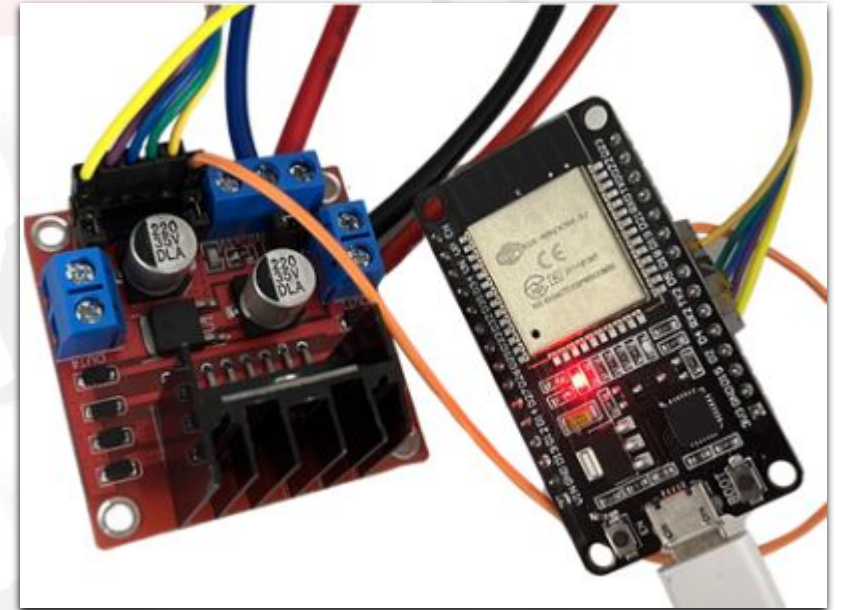
## Previous work

Technologies such as **water heaters** and **water heating control systems** are really important for the development of our project.

Acknowledging the Technologies used in water heaters is important for the design of the tank where we will store water and for the procedure employed in water heating.

# Achieved results / Analysis

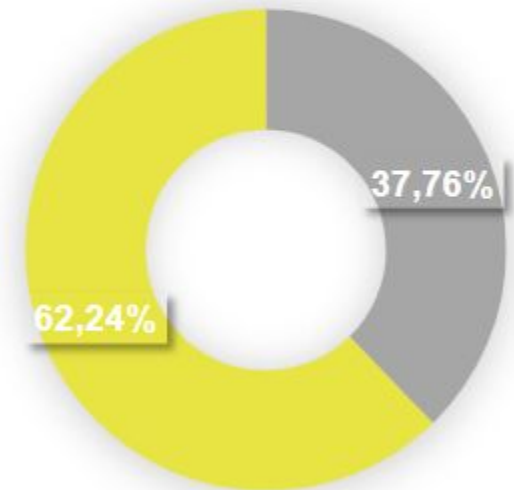
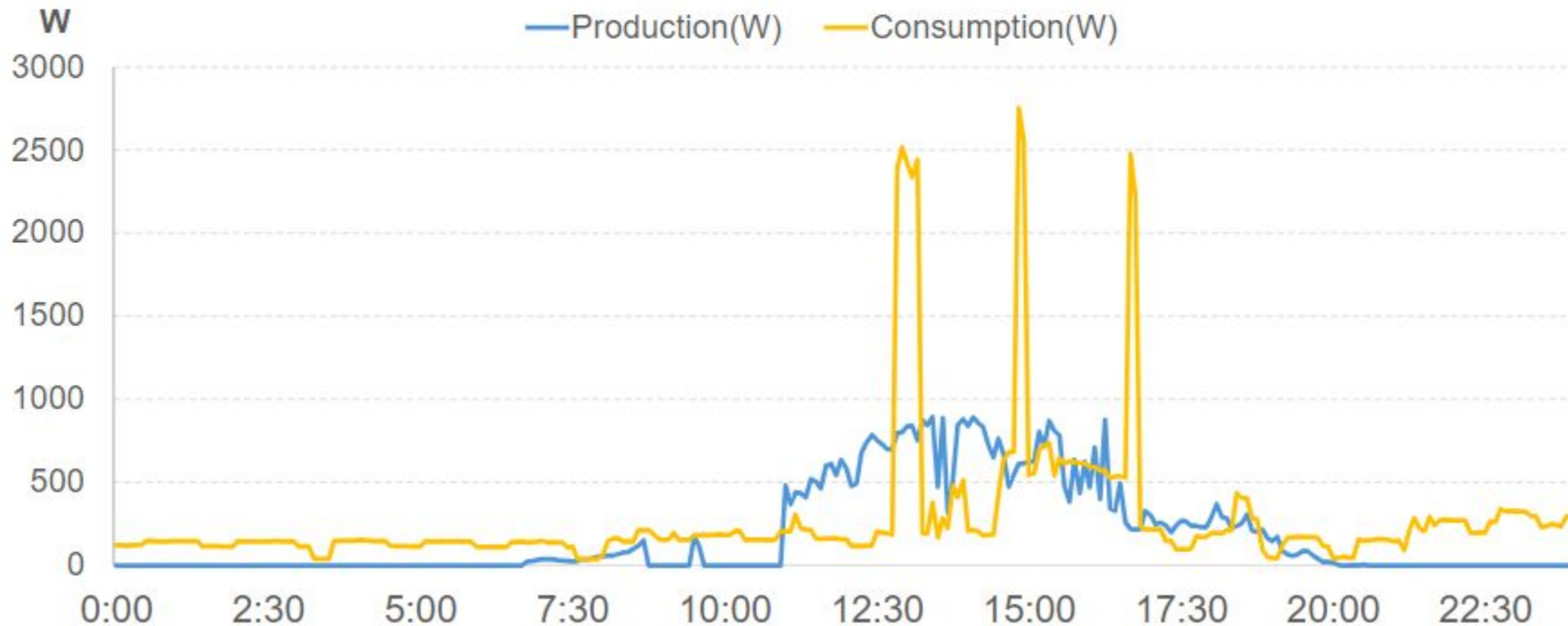
- We collected data and researched energy production with solar panels by monitoring a real solar panel system installed in a house.
- We were able to make a prototype of our project that simulates its operation by managing the energy of a small setup of solar panels.
- We successfully made the required Landing Page, the promotional video and the poster.





# Analysis (1)

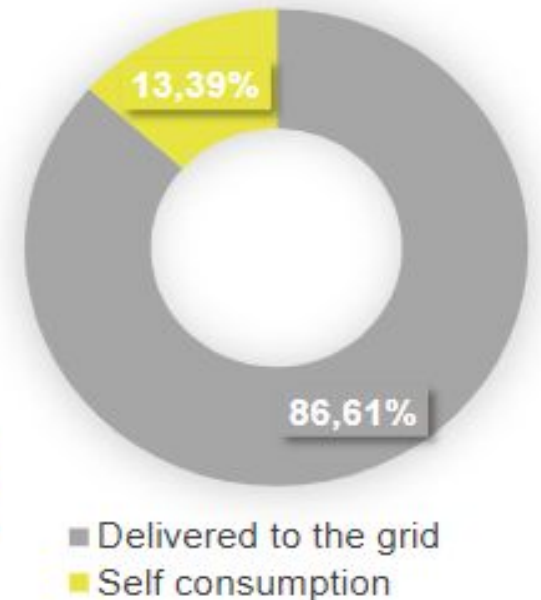
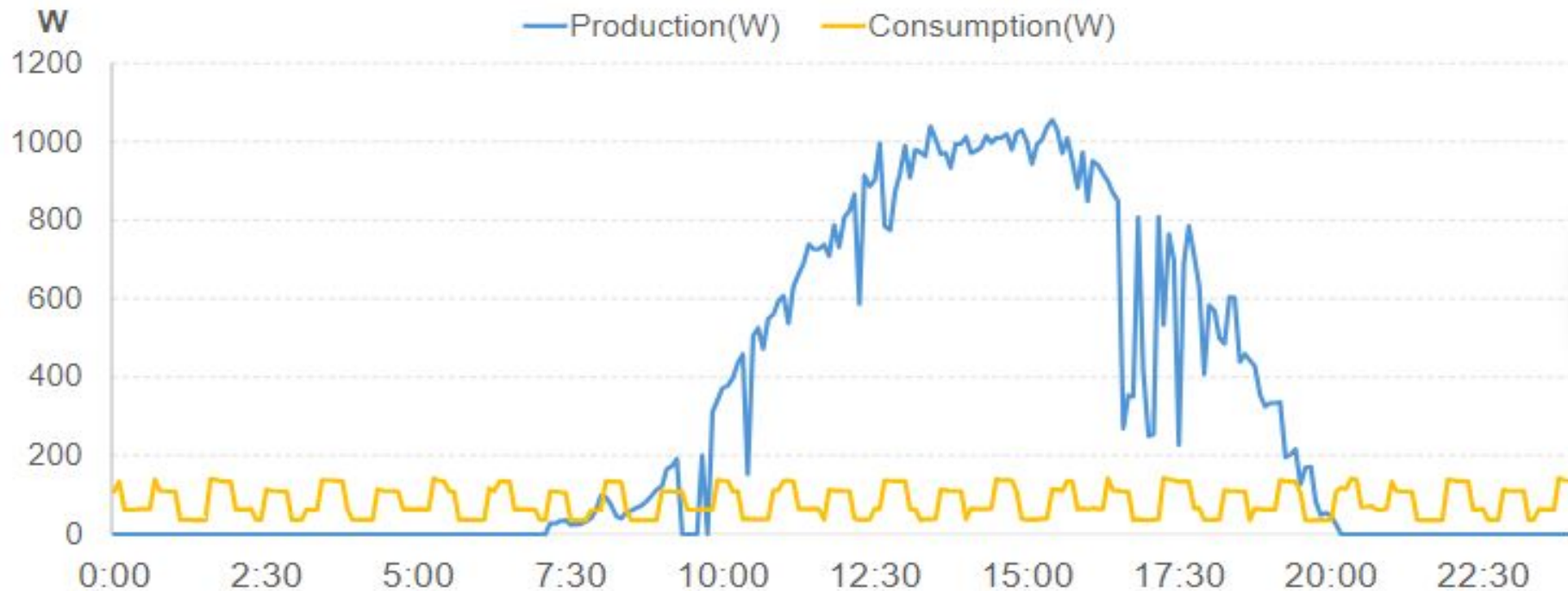
## Energy Production and Consumption in a Real-Life Scenario with an occupied house (Visible Peaks in Load Consumption)



■ Delivered to the grid  
■ Self consumption

# Analysis (2)

## Energy Production and Consumption in a Real-Life Scenario with an unoccupied house



# Contribution of each team member (1)

João Silveira	Diogo Matias	Guilherme Lopes
Website	Website	Website
Materials List	Materials List	Materials List
Blog update	Researches	Researches
Video	Solution Implementation	Video
Poster	Pitch Deck	Poster



# Contribution of each team member (2)

Tomás Garrido	David Peixoto	Carlos Esteves
Materials List	Solution Implementation	Materials List
Video	Researches	Researches
Blog update	Video	Blog Update
Solution Implementation	Poster	Solution Implementation
Pitch Deck	Pitch Deck	Pitch Deck

# Cost and Benefits

Our water battery provides the most economical and efficient alternative for utilizing surplus solar energy. With a significantly lower initial cost of €100 (plus the cost of a water tank), it maximizes the value of photovoltaic investments by converting excess energy into hot water for domestic use. Unlike traditional batteries, which are expensive and require maintenance, or selling to the grid, which offers low returns, our solution ensures maximum utilization at minimal cost.



Power	Battery	Sell to the grid	Water Battery
5Kw	3835€	0,2€ to 0,4€	100€ + Water Tank
10Kw	5283€	0,4€ to 0,8€	
15Kw	7328€	0,6€ to 1,2€	

# Links

- **Project landing page:** <https://web.tecnico.ulisboa.pt/ist1102892/>
- **Blog:** <https://web.tecnico.ulisboa.pt/ist1102892/blog.html>
- **Solution demonstration video:** <https://www.youtube.com/watch?v=iVWi7isNxng>

