

WATER BATTERY

1ST CYCLE INTEGRATED PROJECT IN ELECTRICAL AND COMPUTER ENGINEERING

When a photovoltaic (PV) solar panel generates surplus energy beyond the needs, currently there are two options: **selling the extra energy to the grid** (low profitability) or **storing it in batteries** (very expensive).

But wait, we have a **NEW SOLUTION!**

OUR APPROACH

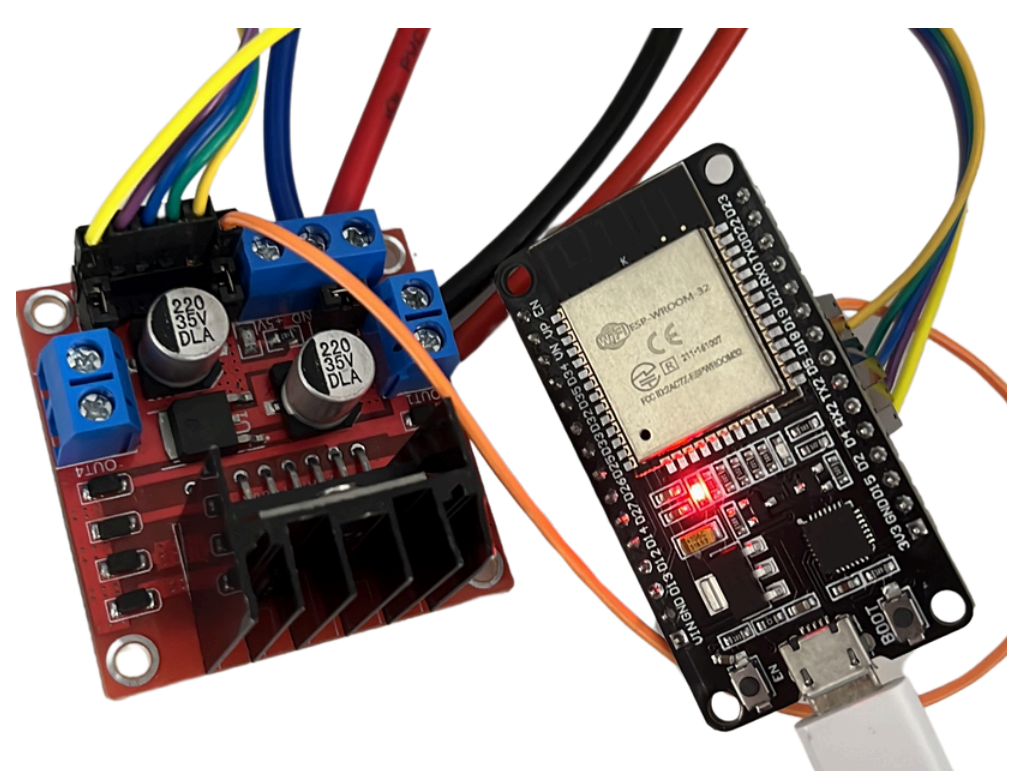
We propose a solution that efficiently heats water using surplus solar energy. With a smart controller, we regulate energy delivery to the water tank, optimizing utilization and storing surplus energy in heated water format.

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

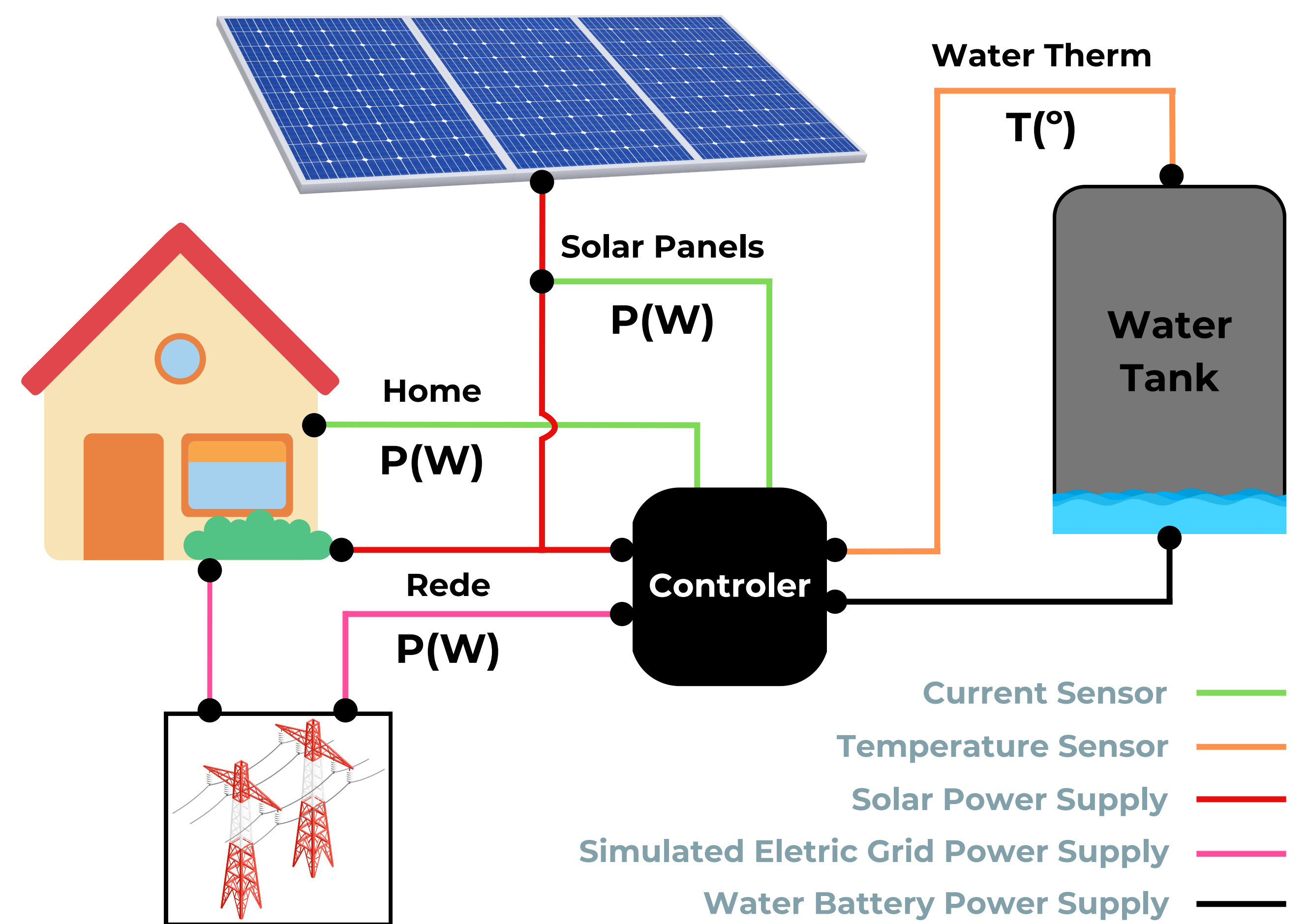
Our system integrates solar panels, as the source of energy, and a water tank with a heating element. It utilizes surplus **solar energy** to heat water up to 80°C, storing energy in the heated water format that **can be used later**.



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.

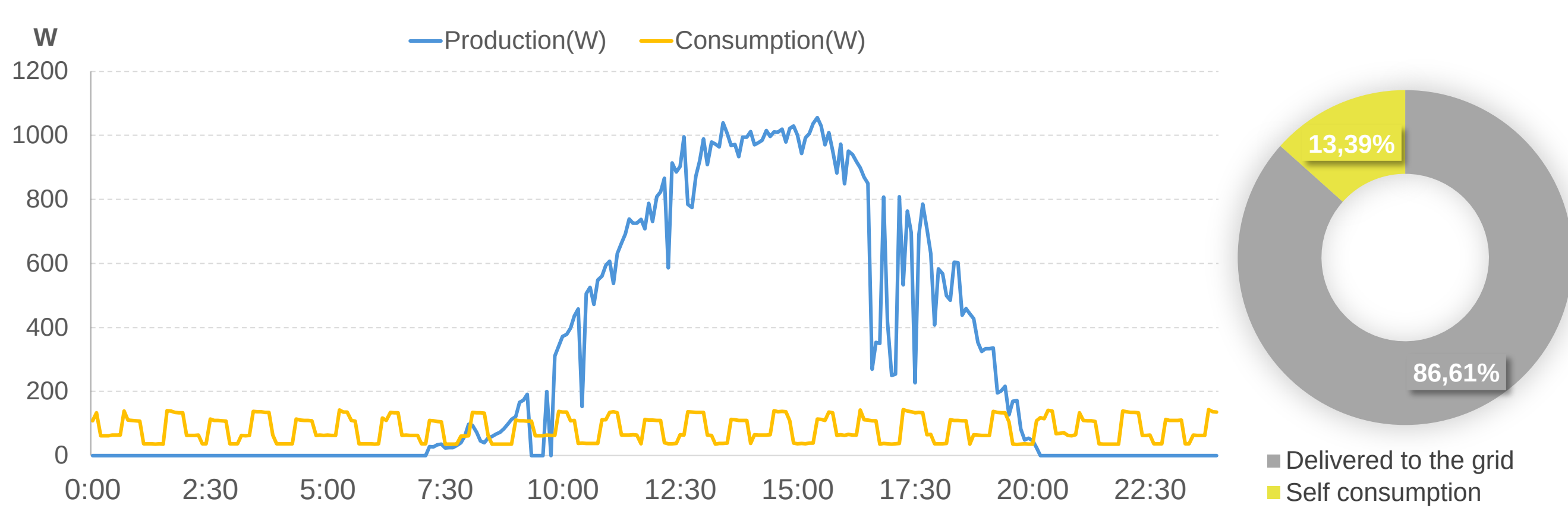
$$P_{solar} \geq P_{Load} \rightarrow P_{Water} = P_{solar} - P_{Load}, T_{Water} \leq 80^{\circ}C$$

$$T_{Water} \leq T_{min} \rightarrow P_{Water} = P_{solar} \text{ or } P_{Grid}$$

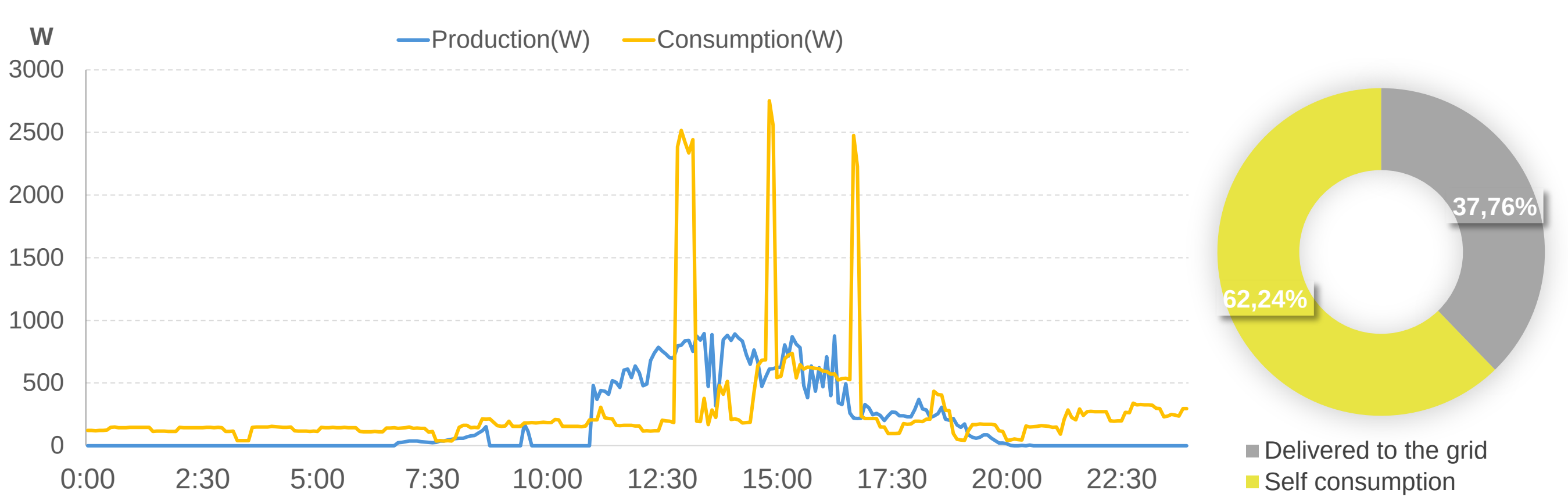


ANALYSIS

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



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



COMPARISON

Over the past few years, the amount of surplus energy injected into the grid has been increasing (as we can see in the graph on the right). New sustainable and economical ways of storing energy are necessary. This is where our **Water Battery** solution comes into play!

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€	

