

SELF-SUFFICIENT

THANKS TO HYDROGEN

Municipal real estate without grid connection



PROFILE

Client:
Municipal council of Vårgårda

Industry:
Municipally owned real estate

Special characteristics:
Microgrid with hydrogen cycle

Region, country:
Vårgårda, Sweden

THE BACKGROUND

Vårgårda is a small Swedish town 70 km north-east of Gothenburg with just over 5,000 inhabitants. Sweden is a trailblazer in climate conservation, and the Vårgårda municipal council is likewise taking innovative action to reduce its dependence on fossil fuels. It has launched a public housing project to demonstrate that even municipalities can successfully plan, build and operate living space which is independent of the public power grid.



THE CHALLENGE

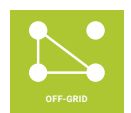
The project comprises 172 residential units in six buildings. The aim is to make them self-sufficient on heat, hot water and electricity and as energy-efficient as possible right from the start. At the same time, they should provide comfortable living spaces with modern architecture. Together with the Swedish off-grid experts Nilsson Energy AB, the municipality therefore planned to use hydrogen as an efficient source of energy.

Hydrogen is particularly well suited to countries at high latitudes, where photovoltaic installations yield very little energy in the winter months due to the low angle of incidence of the sun. In the summer, hydrogen can be easily produced in an electrolyzer using excess renewable energy and stored in tanks. In the winter, fuel cells can then be used to convert the hydrogen back into electricity for heating in conjunction with heat pumps.

The annual consumption of one of the project's buildings is 35,000 kWh. That includes lighting, lifts, ventilation, hot water production, and heating. In the winter, the project will use a 5 kW fuel cell, but this will only cover the baseload. For higher peak loads, and to enable the use of solar power during summer nights, the houses need storage for electrical energy.

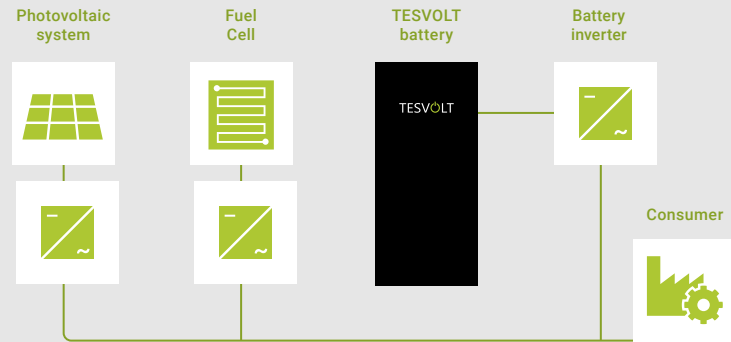
Requirements for a storage solution:

- Powerful storage systems with a high depth of discharge and high number of guaranteed cycles to ensure a sustainable and durable investment
- Easy installation and safe operation in conjunction with the hydrogen cycle



THE SOLUTION

Nilsson Energy AB was responsible for electrification with the hydrogen cycle. Technical Director Hans-Olof Nilsson persuaded the municipal council to opt for TESVOLT. TESVOLT lithium-ion battery storage systems are designed for safe use over multiple decades in industrial applications. Nilsson Energy AB is fitting each of the six buildings with a TS 48 V which provides an energy content of 187 kWh and a capacity of 54 kW.



“We run a full charging cycle every day in the housing blocks. So we’re very happy to have found TESVOLT’s storage systems, which can handle this level of operation for decades and provide outstanding performance.”

Hans-Olof Nilsson, Technical Director at Nilsson Energy AB

“It feels good to be able to offer residents sustainable long-term prospects that result in 100% fossil-free energy. Even our fire safety officers were very pleased with the safety of TESVOLT’s storage systems.”

Jan Thorsson, CEO Vårgårda Bostäder AB, municipal operating company

THE ADVANTAGES

- **Saving money on heating and electricity costs** thanks to the increase in self-consumption
- **Reliable and durable**
The system boasts an above-average service life of up to 30 years thanks to highly robust Samsung battery cells and the unique battery management system, which optimizes cells not only within a single module but also between the modules in each cabinet.
- **Expandable**
TESVOLT systems can be expanded or exchanged at any time – not just after the first few months of operation, but even many years later.
- **High-performing and fast-reacting**
Thanks to the battery management system, TESVOLT’s storage systems make their energy fully available. TESVOLT storage systems are 1C-capable, meaning they can be completely charged or discharged within an hour with the proper configuration. This enables them to run even powerful equipment when the sun or fuel cells can’t provide enough energy alone.

PROJECT: FACTS AND FIGURES

Storage system	TS 48 V
Energy content	187 kWh
Discharge power	54 kW
Cell	Lithium NMC prismatic (Samsung SDI)
Efficiency (battery)	up to 98 %
Cycles	6.000–8.000 (0,5C- to 1C at 23 °C +/-5 °C with 100 % depth of discharge)
Operating temperature	-10 °C to 50 °C
Battery inverter	SMA Sunny Island
Installer	Nilsson Energy AB

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