

IT WOULDN'T BE GREEN

WITHOUT A STORAGE SYSTEM

A battery storage system supports the sustainable production of hydrogen

TESVOLT
Free to go green.



PROFILE

Client:

Polish Petroleum Mining and Gas Joint Stock Company (PKN ORLEN S.A., PGNiG)

Business:

Energy industry

Special characteristics:

Pilot plant for the production of green hydrogen

Region, country:

Odolanów, Poland

THE BACKGROUND

In Odolanów, 80 km northeast of Wrocław, the Polish Petroleum Mining and Gas Joint Stock Company (PKN ORLEN S.A., PGNiG) operates a natural gas plant. It eliminates nitrogen from natural gas produced in Poland. A by-product is helium – PGNiG is its largest producer in Europe. The plant also produces liquefied natural gas. As part of a large-scale hydrogen initiative, PGNiG would like to start producing green hydrogen, i.e. hydrogen that is produced exclusively with renewable energies.



THE CHALLENGE

The potential transition to a hydrogen economy poses a variety of challenges for industry. In conventional gas infrastructure, hydrogen can lead among other things to material embrittlement processes. Because of its atomic size, it diffuses into the existing crystal lattice of metals, where it creates internal stresses that can lead to cracks and subsequent material defects.

With this in mind, PGNiG intends to use the pilot plant in Odolanów to investigate not only the production of green hydrogen but also its impact on the plant infrastructure. Furthermore, the plant will be used to test weather-dependent production of hydrogen and to parametrise the process.

To enable the production of completely green hydrogen, PGNiG decided to build a photovoltaic installation with a capacity of 490 kWp to power the hydrogen electrolyser. The installation of an energy storage system was necessary to ensure a stable energy supply around the clock and “zero

feed-in” linked to connection conditions from the distribution grid operator.

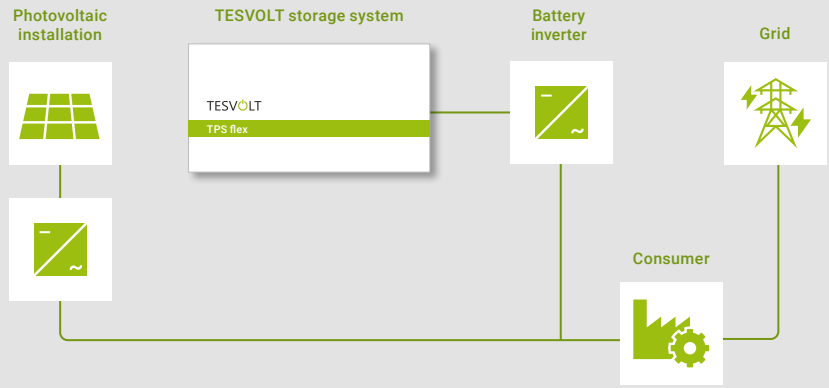
Requirements for a storage solution:

- Maximum safety in a zone with a high risk of gas explosion
- Maximum usable capacity with high charging efficiency (min. 90%)
- Stable and multifunctional energy management system (EMS) with cloud located in Europe



THE SOLUTION

PGNiG was looking for a proven storage system already providing reliable service across many industrial projects around the world. The company prioritised production in the EU and thus quality, speed of delivery and availability of spare parts. The choice of components and the construction of the hybrid system was entrusted to Neo Energy Storage – a certified TESVOLT partner firm in Poland. The system used was a TPS Flex with an output of 180 kW and a usable capacity of 403.2 kWh.



“I am proud that we at Neo Energy Storage were able to undertake such an ambitious project. TESVOLT has contributed significantly with its high-quality storage systems.”

Dariusz Perkowski, Operational Managing Director at Neo Energy Storage

“The efficient implementation of this part of the investment will allow us to move on to the next phase, namely the construction of an island research network.”

Maciej Łapiak, Project Manager at PGNiG

THE BENEFITS

• Safe and long-lasting

The system boasts an above-average lifespan of up to 30 years thanks to extremely robust Samsung SDI battery cells and the one-of-a-kind battery management system. This optimises cells not only within a single module, but also between modules within a cabinet.

• Powerful

Thanks to the battery management system, TESVOLT's storage systems make the energy they accumulate fully available. TESVOLT storage systems are 1C-capable, meaning they can be fully charged or discharged in one hour with the proper configuration. As a result, even high-performance consumers such

as the electrolyser can be kept running when the sun isn't providing enough power.

• Price arbitrage

In spite of zero feed-in, the energy management system supplied with the storage system makes it possible to charge the storage system from the utility grid and effect price arbitrage, i.e. charge it at a cheaper rate and discharge it when energy is expensive. For example, when the photovoltaic installation is not yet operating at full capacity in the morning, the plant draws energy and the storage system then returns it.

FACTS AND FIGURES

Storage system	TESVOLT TPS Flex
Energy/output	403.2 kWh / 180 kW
Cell	Lithium NMC prismatic (Samsung SDI)
Efficiency (battery)	up to 98%
Expected cycles	6,000–8,000 (0.5C to 1C at 23°C +/-5°C with 100% depth of discharge)
Operating temperature	-10 to +50°C
Battery inverter	SMA Sunny Tripower Storage 60
Installer	Neo Energy Storage Sp. z o.o.

TESVOLT AG

Am Heideberg 31 | 06886 Lutherstadt Wittenberg
 Deutschland | Germany
 Phone +49 (0) 3491 8797 100
 info@tesvolt.com | www.tesvolt.com

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