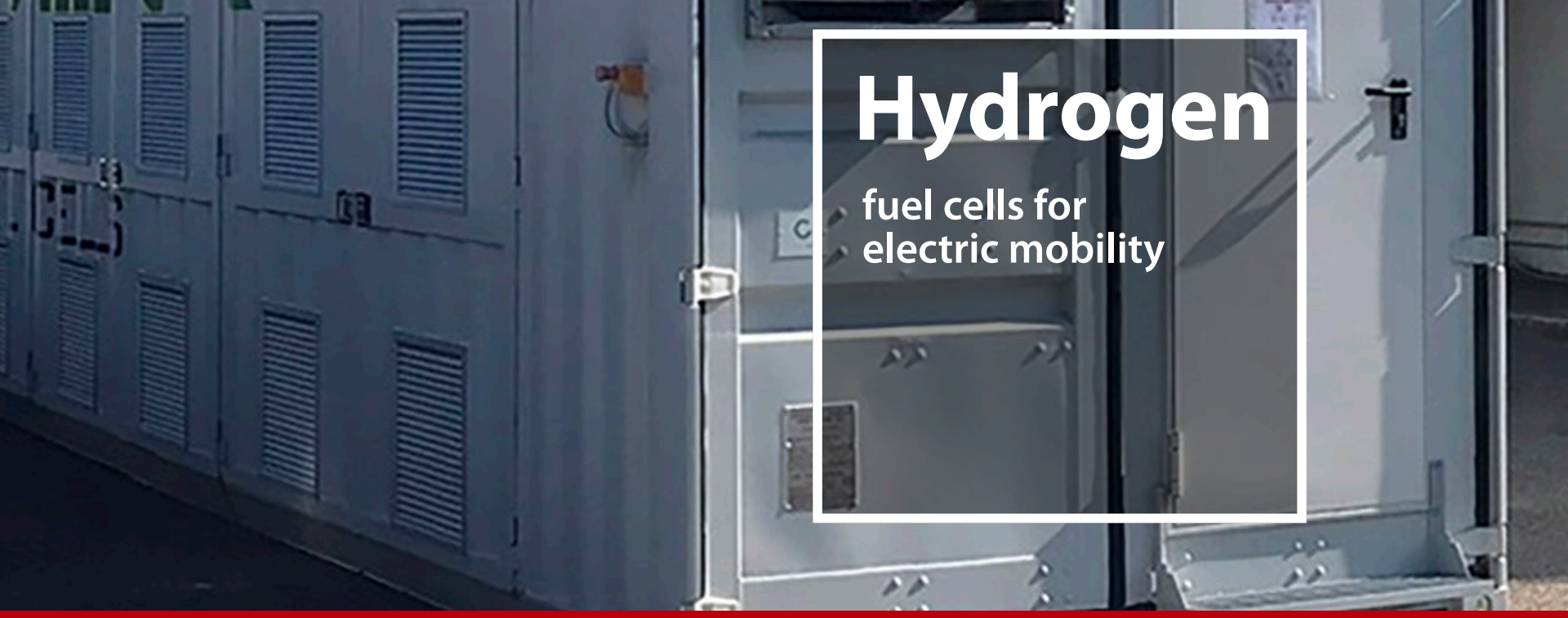
ENGINEERING
TOMORROW

Case story | VACON® NXP DC/DC Converter
VACON® NXP Grid Converter

Fuel cells for **electric transportation of the future**



Hydrogen

fuel cells for electric mobility

The situation

Nuvera Fuel Cells solutions successfully support many applications such as replacing battery packs of electric forklifts, converting big port trucks from diesel to hydrogen, and electrical mobility for buses. In the innovative laboratory of Nuvera Fuel Cells, the VACON® NXP series contributes to evaluating the performance of E-45 and E-60 fuel cell engines for electrical mobility under authentic conditions.

Fuel cells are heavily penetrating the electrical transportation market at different levels, in particular high-power vehicles such as buses, delivery vans, trucks and port equipment.

These applications require highly reliable components which perform consistently under the most demanding environmental conditions.

The challenge

The aim to achieve maximum reliability and efficiency led Nuvera Fuel Cells to develop an innovative laboratory to stress test its fuel cell products designed for the mobility market.

Nuvera Fuel Cells is a subsidiary of the Hyster-Yale Group focused on power generation module development made from on PEM (Proton Exchange Membrane) fuel cells. Its fuel cells based on metal bipolar plates rather than graphite ones guarantee better performance in terms of efficiency, robustness and volume.

"We wanted eight test benches, flexible and independent from each other, capable of safely running 24 hours a day, 7 days a week, under authentic conditions"

Paolo Zucchi, Engineering Manager at Nuvera Fuel Cells

Test benches must run safely and reliably

24/7

The solution

Nuvera offers solutions for electrical mobility based on fuel cells with compact engines providing 45 kW and 60 kW net power output, making them very appealing for mobility applications.

They test their fuel cell engines for long-term durability in an experimental laboratory located inside the industrial site of SIAD S.p.A., near Bergamo, Italy, where hydrogen is produced.

The new lab infrastructure enables them to optimize products on the basis of power cycles simulating the real vehicle applications of their customers."

"Power management has been the most demanding part of the project. Danfoss AC drives were compact enough to fit in

the limited space, flexible, and most importantly, suited for this application."

Paolo Zucchi, Engineering Manager at Nuvera Fuel Cells

The outcome

Power control in the lab adapts voltage level delivered by the fuel cells, which varies according to the power of the load and current delivered. It also recovers electricity generated during the test cycles, returning it to the grid.

"Sustainability was another essential requirement of the project," underlines Fabio Nassi, Electrical Engineer at Nuvera, "And thanks to the expert support of Danfoss Drives engineers, we have developed a configuration for maximum flexibility in defining the test cycles, and complete energy recovery."

The electrical cabinets were supplied directly by Danfoss, who oversaw construction and commissioning together with its partners.

"A single point of contact for the construction of the electrical panels was of great advantage. Danfoss Italy proved to be of great help."

Fabio Nassi, Electrical Engineer, Nuvera Fuel Cells

Read the full story **here.** Or to learn more about hydrogen fuel cells for electric mobility, visit our **website.**

ENGINEERING
TOMORROW

Any information, including, but not limited to information on selection of product, its application or use, product design, weight, dimensions, capacity or any other technical data in product manuals, catalogues descriptions, advertisements, etc. and whether made available in writing, orally, electronically, online or via download, shall be considered informative, and is only binding if and to the extent, explicit reference is made in a quotation or order confirmation. Danfoss cannot accept any responsibility for possible errors in catalogues, brochures, videos and other material.
Danfoss reserves the right to alter its products without notice. This also applies to products ordered but not delivered provided that such alterations can be made without changes to form, fit or function of the product.
All trademarks in this material are property of Danfoss A/S or Danfoss group companies. Danfoss and the Danfoss logo are trademarks of Danfoss A/S. All rights reserved.

© Copyright Danfoss Drives | 2022.01