Port of spain energy storage for microgrids

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From 2023, the Duisburg Gateway Terminal (DGT) will go into service as Europe"s largest tri-modal (road, rail and water) inland container terminal. Powering the terminal carbon-neutrally is the goal of Enerport II, the research project being funded by the Federal Ministry for Economic Affairs and Climate Action until 2025. Port operator Duisport has forged partnerships not only with Rolls-Royce Power Systems, but with the Fraunhofer Institute for Environmental, Safety and Energy Technology (UMSICHT) and energy providers in the region.

In the future, most of the electrical energy required to power the port"s operations will be generated on demand on site using hydrogen. The power installation will comprise two cogeneration plants based on mtu Series 4000 hydrogen engines (2 MW total installed capacity) and three mtu fuel cell systems (1.5 MW total installed capacity). "The power plant we"re supplying is able to cover both base and peak loads," explained Armin F?rderer, head of sustainable customer solutions at Rolls-Royce Power Systems.

As electrical engineer F?rderer goes on to explain, each technology in the mix will play a specific role: Proton-exchange membrane fuel cells (PEMFC), whose use in such projects has been the focus of intensive research by Rolls-Royce over the last three years, can respond flexibly to fluctuations in the power demand. "Their dynamic response capabilities make fuel cells the optimal solution for covering load peaks," elaborated F?rderer.

"We"ve been developing and delivering natural gas-powered cogeneration plants for decades," explained Armin F?rderer. Just like the fossil fuel natural gas, the hydrogen is combusted by spark ignition to convert it into mechanical and thermal energy. "Obviously, technical changes are needed to the engines, and particularly to the combustion process," explained F?rderer, head of hydrogen-based power solutions at Rolls-Royce Power Systems. Besides hydrogen, it will soon be possible to use HVO (hydro-treated vegetable oil) as an eco-friendly fuel in co-generation plants.

For Rolls-Royce Power Systems, the Duisburg project is an example for other ports, and not just inland ports,

to follow: "The integrated applications set up in the port of Duisburg can be implemented just as well in maritime container ports and cruise ship terminals," explained F?rderer. The demand, he insisted, is there. But while many ports are interested in increasing their capabilities, the capacity of the electrical power grid is not that easy to scale up.