

Cape town microgrid applications

In South Africa's capital, Cape Town, and near the Namibian port city of Walvis Bay, so-called microgrids will contribute to a sustainable and emission-free power supply. These systems combine electrolyzers for green hydrogen production with fuel cells for its reconversion to electricity: the microgrids store electricity generated from solar and wind power as hydrogen and convert it back to electricity when needed. In Walvis Bay, a local school will use the oxygen produced during electrolysis to treat wastewater for irrigation purposes in its cultivation areas.

The HyTrA project will ensure a stable power supply for Alu-Cab, a manufacturer of aluminium vehicle bodies for off-road applications, in Cape Town. The company has photovoltaic systems and will utilize the excess energy to produce and store hydrogen locally. This hydrogen will be used for reconversion to electricity whenever no electricity is available from the grid. The lightest and most abundant chemical element, hydrogen, fully exploits its advantages as an energy storage medium here. Renewable electricity will be available precisely when needed, thanks to intermediate storage. Additionally, HyTrA will serve as a showcase for new business models and will be available for training and educational purposes.

HyTra is a corner stone for building bridges between Africa and Europe via hydrogen. Unlike megawatt and gigawatt projects of big investors, this project is designed for hydrogen utilization in Africa, aiming to foster local acceptance and enable value creation through this innovative technology.

Both sides will benefit from this approach of a partnership on equal terms in the long run. Initially, systems and know-how come from Germany, but local partners will become increasingly involved. Industry, academia, and society will have numerous opportunities to utilize this microgrid to derive future utilization or action possibilities.

In particular, the participating medium-sized companies and scientific partners can gather valuable experiences and usage data for further development through the practical application of the system. It also provides a basis for the application-oriented training of urgently needed skilled workers. Appropriate scaling on both sides can turn hydrogen into an export commodity for Africa while substantially supporting Germany's energy transition. The project participants hope to contribute to equal economic relations and emphasize the great potential for increased collaboration between German and African companies.

HyTra is the first hydrogen pilot project from the Export Initiative of the German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety (BMUV). The hydrogen-based microgrid is the first of its kind in southern Africa to be used for a specific industrial application. Dr. Ulrike Beyer from Fraunhofer IWU says, "We would like to express our gratitude to all project participants who have passionately made the start of this important project possible, especially Ms. Nilgün Parker from the BMUV."

HygO, another promising hydrogen project, is ready for launch. In addition to the functionalities of the HyTrA system, HygO will also utilize the oxygen generated during electrolysis. The plan is to use it for wastewater treatment.

Starting from the end of 2023, HygO's first place of operation will be at the Namibia University of Science and Technology (NUST). The final deployment will begin in mid-2024 in a remote area in the Erongo District. HygO will generate electricity and treat water there. Discussions in this sense with the governor of the region have just begun. According to the current plan, a school in Nanibeheb will receive this further-developed microgrid. About 300 students would benefit from reliable electricity during their classes, and the school garden could be irrigated with rainwater of suitable quality as needed. The NUST will provide scientific support for the project.

Fraunhofer IWU, Stellenbosch University, and NUST will cooperate closely in the future and make their findings available to local companies to accelerate the dissemination of hydrogen technologies.

Source: Fraunhofer-GesellschaftFraunhofer Institute for Machine Tools and Forming Technology - 2023: Fraunhofer IWU sees great potential in hydrogen projects with partners in Namibia and South Africa

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Bringing a modern, sustainable technology solution to a historically significant site, ABB has provided a microgrid system to integrate solar energy and supply power to Robben Island, the place where Nelson Mandela spent 18 years in prison during the apartheid era. Now a living museum and World Heritage Site, Robben Island lies 9 kilometers off the coast of Cape Town and previously relied on fuel-thirsty, carbon-emitting diesel generators as the only source of electric power.

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