

SUCCESS STORY

Eco-efficient AirPlus™ technology for a smart grid Lyse Elnett, Stavanger, Norway



SafePlus AirPlus medium-voltage gas-insulated switchgear with ABB's climate-friendly alternative to using SF₆ blend in with the smart grid demo project in the city of Stavanger, Norway.

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01 Stavanger is Norway's fourth largest city and known as the oil capital of Northern Europe. Photo courtesy of Lyse Elnett AS.

Project at a glance

- Customer: Lyse Elnett
- Segment: Utility
- ABB products: SafePlus gas-insulated switchgear with AirPlus insulation gas, Remote Terminal Unit RTU540, Network Manager SCADA system, InLine II ZHBM low-voltage fusegear

Customer challenges

Stavanger is facing the diverse challenges of an ageing power distribution grid in an evolving city: energy generation and consumption have become more volatile with renewable energy sources and electrical transport connected to the grid. As the existing medium-voltage equipment has been in operation for 40 years and needs to be replaced soon, the customer was looking for a future-proof concept for a smart distribution grid. Lyse Elnett also has a firm commitment to sustainable solutions and is keen to support new technologies for a greener future.

A three-year pilot project was to be run in a demo area of the city. The new equipment to be installed, needed to improve safety for operators, as well as efficiency and reliability of the power supply by using smart technologies and flexible equipment.

ABB solution

To ensure ease of use and the greatest benefits, ABB delivered an integrated solution, rather than loose components.

For an efficient and flexible operation of the network, SafePlus medium-voltage switchgear allow fully motorized operation and remote control from the control center. Thanks to their compact design, the switchgear fit into the limited space of the existing substations located in the city center.

To meet the customer's requirement of a greener choice, ABB and the customer agreed to equip some of the gas-insulated switchgear with the new AirPlus technology, a climate-friendly alternative to the traditionally used SF₆ gas. With sensor technology instead of conventional current and voltage transformers, also the losses are reduced.

All devices communicate to a Remote Terminal Unit, the RTU540, which in turn connects to the overlaying control system. The SCADA system has been upgraded to fully benefit from the new smart grid and allow the customer easy operation from the control center.



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01 Before: The substations were equipped with open medium-voltage cells, following an outdated safety concept.

02 After: The modernized substations comply with the latest safety standards and contain SafePlus switchgear with integrated smart grid technology and climate-friendly AirPlus insulation gas.

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Customer benefits

- Highest safety for personnel with arc-proof equipment following the latest standards
- Climate-friendly AirPlus technology for a green power distribution of the future
- Flexibility of network operation with motorized equipment
- Fast fault recovery and grid control by remote operation and full integration into the SCADA system
- Accurate low-loss measurements and easy data management with sensor technology
- Reduced life cycle costs from lower losses, shorter downtime and reduced maintenance needs
- Compact switchgear design allows fitting the new equipment into restricted spaces

About the project

Lyse Elnett actively approaches the upcoming challenges for their distribution grids. The city center of Stavanger is an ideal demo case to evaluate new technologies and gain experience of how to smoothly integrate the new solutions into existing systems and processes.

The shift towards electrical transport will have an enormous impact on the distribution network. The port of Stavanger is one of the largest cruise ports in Norway, and in this busy port shore-to-ship electrification will require huge amounts of power to allow turning off the diesel engines while docked at the harbor. On top of that, increasing amounts of electrical cars and buses will be powered from the grid.

For this reason, an area in downtown Stavanger was selected for a 3-year smart grid pilot project. There are 25 secondary substations in this area to be upgraded. By using new and climate-friendly technologies like the AirPlus insulation gas, the project is in part funded by the Norwegian government.

The first installation of the switchgear was done in the summer of 2017, and the findings so far are positive. The final results will determine the way forward not only for the city of Stavanger, but the experiences can also serve as a show case for other eco-efficient and smart city projects.