

The LIFE Blue GIS 420 kV project:

Delivering SF₆-free clean-air switchgear with a digital low power instrument transformer

*Life*Blue
Project
GIS 420 kV



Co-funded by
the European Union

Project objective

Almost all high-voltage electrical switchgear in the last fifty years has used SF₆-gas for insulation. SF₆ is extremely climate-hostile, with a global warming potential (GWP) of 24,300.

Clean air insulation and vacuum switching technology, both of which have a GWP of zero, are increasingly used in 72.5 kV and 145 kV switchgear as an alternative to SF₆. Until now, however, these have not been commercially available in 420 kV equipment. Both technologies stand for zero compromise in respect of the environment, health and safety.

The aim of the LIFE Blue project is to demonstrate for the first time the economic viability of a climate-friendly 420 kV gas-insulated switchgear (GIS) completely free of fluorinated greenhouse gases (F-gases) and intentionally free of PFAS with a digital low power instrument transformer (LPIT).

Backed by EU funding and in partnership with Elia, operator of the electricity transmission network in Belgium, this Blue GIS will be installed at the transmission system operator (TSO) Elia site in Vilvoorde.

Project stages

The GIS will be extensively tested and monitored on an ongoing basis; a summary of the project's various work packages is provided below.



The power of partnership

Collaboration is key in all of our projects. Here we are working closely with the EU Programme for the environment and climate action (LIFE) who have provided substantial funding, and Elia, Belgian's electricity system operator and a valuable customer for many years.

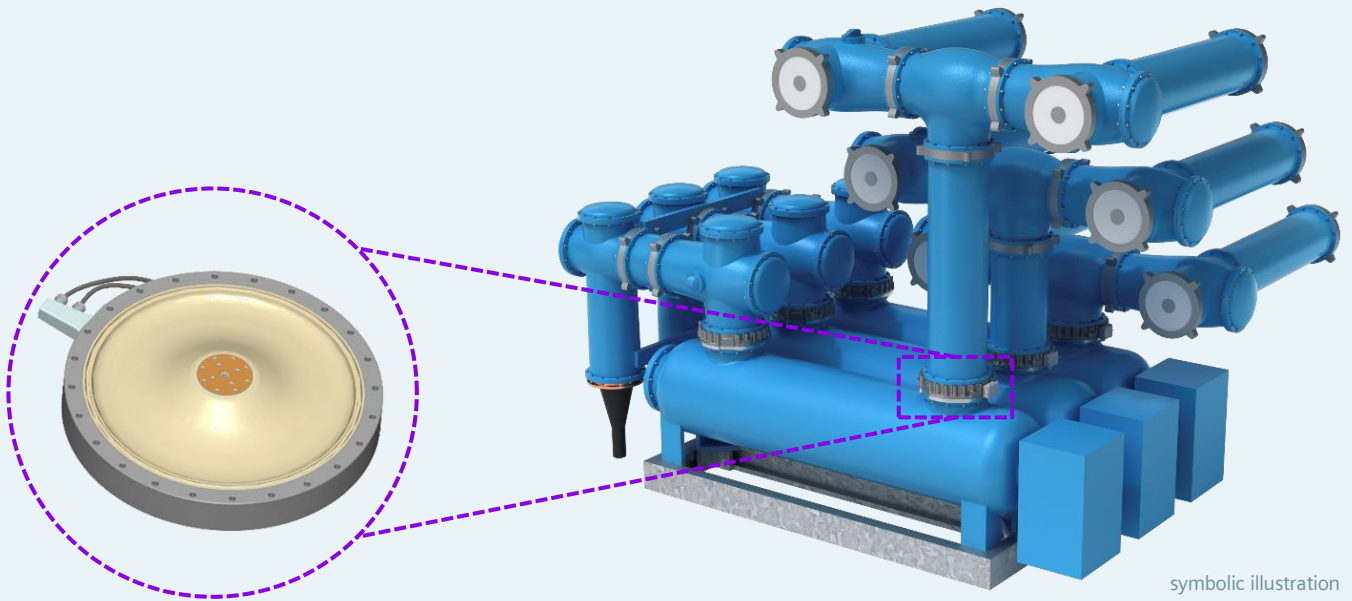
This joint project began on October 1, 2024, and is scheduled to continue until September 30, 2028.

Learn more about the LIFE Blue project [here](#).



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Project management and coordination

- Efficient project management, including timely reporting to the European Commission (EC), auditing, risk management, and monitoring of progress and costs
- Updating of the project management plan, organizing meetings, ensuring that deliverables and milestones are met, and appointing an independent auditor
- Procurement activities and permission processes for the pilot installation

Product and technology development

- Development and validation of the low power instrument transformer (LPIT) technology through extensive type and qualification tests
- Equipment testing under high-voltage conditions, monitoring of transient response performance and electromagnetic compatibility, plus temperature and vibration tests
- Preparation of LPITs for pilot application and interoperability testing with various Intelligent Electronic Devices (IEDs).

Pilot realization

- Detailed planning, manufacturing, and installation of the pilot site at the TSO Elia substation
- Site preparation, civil works, removal of existing switchgear, and integration of the new SF₆-free Blue 420 kV GIS technology
- Delivery, installation, and commissioning of the pilot bay, ensuring minimal outages during implementation

Pilot operation

- Operation and monitoring of the Blue 420 kV GIS under real operational conditions
- Evaluation of performance during seasonal variations, monitoring of system reliability, and collection of data on the durability of components and operational efficiency
- Maintenance activities and specific test protocols to ensure a thorough evaluation of the pilot's performance

Impact monitoring and evaluation

- Assessment of the technological, environmental, and socio-economic impacts of the project
- Analysis of testing and operational data, plus life cycle assessment (LCA) to quantify environmental benefits
- Evaluation of the project's contribution to job creation, market trends, and awareness of climate-neutral technologies

Sustainability, replication and exploitation of project results

- Dissemination of project results, fostering links with other EU-funded projects, and ensuring replication and commercialization of the Blue 420 kV GIS technology
- Creation of a business plan, development of a replication strategy for future installations, and continuing dissemination and exploitation efforts after the project concludes

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