

EIS 2025

Engineering a smarter, cleaner SF₆-free grid

SF₆ Whole Life Strategy

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nationalgrid



Contents

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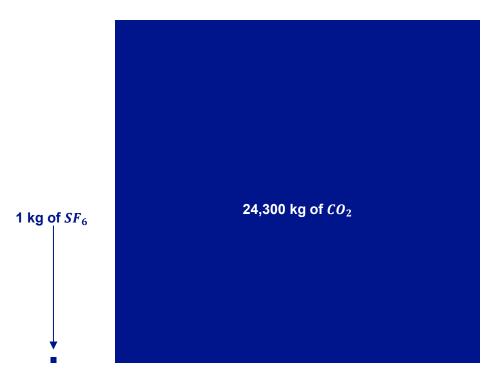


Work packages and deliverables

Impact, benefits and engagement

Looking Ahead – Q&A

SF₆ in the GB Power Sector



Annual Emissions of SF_6 between 2012 and 2022 rose by

~47%

SF₆ inventory within GB transmission substations

1100 tonnes

% of National Grid's scope 1 emissions from SF_6 leakage (excluding losses)

92%

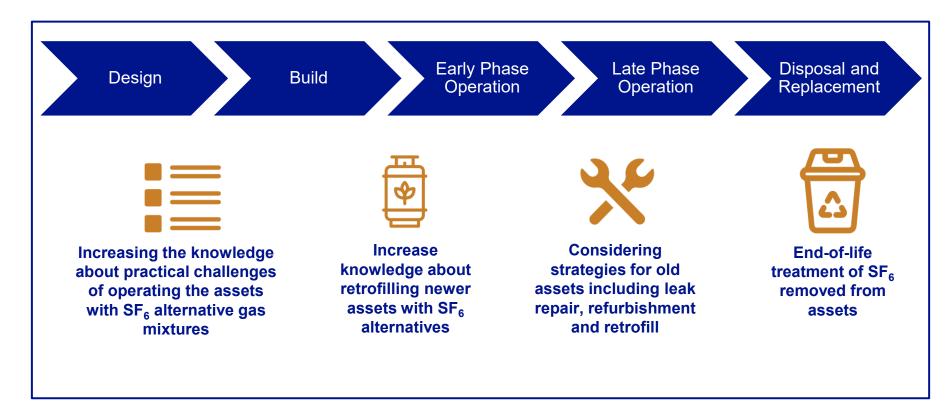
National Grid has the ambition to reduce SF_6 emissions by

50% by 2030

And committed to Net Zero by

2050

SF₆ Whole Life Related Challenges



National Grid

Project Consortium for Beta Phase

Funding – The project is funded by network users & consumers under the Strategic Innovation Fund (SIF), an Ofgem program managed in partnership with UKRI.

Project Lead national grid

Project Partners



Technical Advisory Board (open to additional members, contact prem.ranjan@nationalgrid.com)



Project Summary

WP1

Title: Site Handling of Non-SF₆ Gas Mixtures

Objective: Assess the behaviour and stability of non-SF₆ gas mixtures across different sites and asset types.

Lead: NGET

WP4

Title: Visibility of SF₆ Leakage

Objective: Enhance leakage monitoring by installing new sensors and developing predictive models for SF_6 leakage.

Lead: NGET and Univ of Manchester

WP2

Title: Retrofill Solutions

Objective: Develop and implement retrofill solutions for older equipment that lack OEM support, including cost-benefit analysis and testing.

Lead: DNV and NGET

WP5

Title: Project Management and Governance

Objective: Ensure effective project management, reporting, and dissemination of results through regular meetings and workshops.

Lead: DNV

WP3

Title: Lifecycle Management of SF₆ and Alternatives

Objective: Demonstrate innovative methods for the disposal of SF₆ and compare their performance and energy efficiency.

Lead: University of Manchester

WP6

Title: Technical Advisory Board

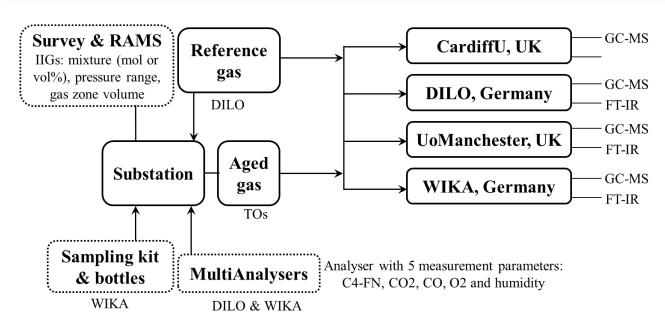
Objective: Provide technical oversight and review progress to ensure the project meets its core objectives.

Lead: NGET

WP1 Site Handling of Non-SF₆ Gas Mixtures

Scope – Sampling of in-situ SF₆ alternatives in a larger targeted population of assets with varying asset types and age.

Output – Verify the stability and define the sampling procedure and frequency of non-SF₆ gas blends in network and check if any differential leakage.

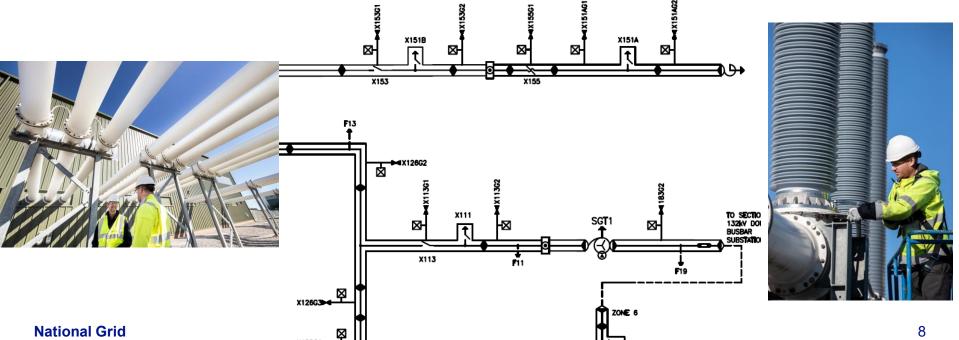




WP2 Retrofill Solutions

Scope – Develop and test solution for non-OEM supported retrofill. Includes Stagegates to ensure that solutions meets necessary KPIs.

Output – Define the feasibility of retrofill for non-OEM supported assets. Developed & tested solution for rolling-out retrofill through regulatory funding.

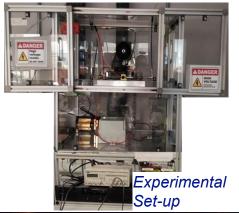


WP3 End of Life Management of IIGs

Scope – Proving the viability of large-scale demonstration of Packed Bed Plasma Reactors and developing the TRL.

Output – Greener way to dispose non-recyclable/reusable SF₆ coming out of the network.





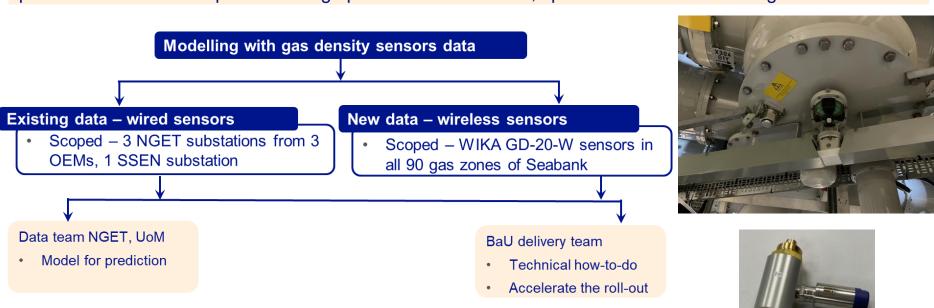


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WP4 Visibility of SF6 Leakage

Scope – Develop the process for gathering and analysing SF₆ leakage rate data to enhance leakage forecast capabilities.

Output – Provide access to existing data across substations (solution rolled out through regulatory funding), open-access software to predict leakage performance of assets, option of wireless monitoring of assets.



Stages of Project

April 2023 Oct 2023 Dec 2024 2029 2030 2030

Jiscover

Involvement in project from a multidisciplinary team of network owners, academia, consultancy,

Developed list of intervention strategies and carry out techno-economic analysis on example sites to better understand trade-offs.

Alpha

Explored opportunities and barriers to SF₆. interventions defined in Discovery

Topics included developing a machine learning approach to SF₆ leakage assessment, site handling of gasses, laboratory testing of disposal methods and understanding system access implications.

3eta

Large scale
demonstration of
interventions
effectiveness in-situ,
followed by developing
a holistic rollout
strategy for other
eligible sites, ensuring
scalability and
applicability across
electricity networks.

siness-as-usual

Implementation of strategies refined in Beta phase across GB

Updated site handlings procedures for SF₆ alternatives

Retrofill solutions for non-OEM supported assets

Lower cost/carbon disposal methods

Reliable leakage rate data for determining optimal intervention

Total cost – £132,899 SIF Funding – £119,607 Total cost – £448,124 SIF Funding – £403,311

Total cost – £9,790,949 SIF Funding – £8,500,724

Disseminate findings to increase adoption rates, inform commercial strategies and understand impact of regulatory changes

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