# What did we do?

- Gap analysis on Innovation projects – defining scope of the project

- Analysis of SF_6 leakage rates across asset – quantification of leakage rates and corresponding intervention

- Gap analysis on end of life of SF_6 – low carbon intensive SF_6 disposal method

- Review of documents for Insulating and Interrupting gases (IIGs) strategy

- Cost benefit analysis – quantification of interventions

Gas Blend Alternatives and Challenges

- Alternatives to SF_6 - different gas blends

- Mixture of insulating F-gas with carrier gases CO_2, N_2 or O_2

- Difference in molecular sizes unlike single compound SF_6

- Permeation and absorption at different rate - different leakage rate

- Composition and individual gases 'topped-up' - good data management

- New and not much experience → seeking solutions

- Different documents as a guidance for IIGs equipment
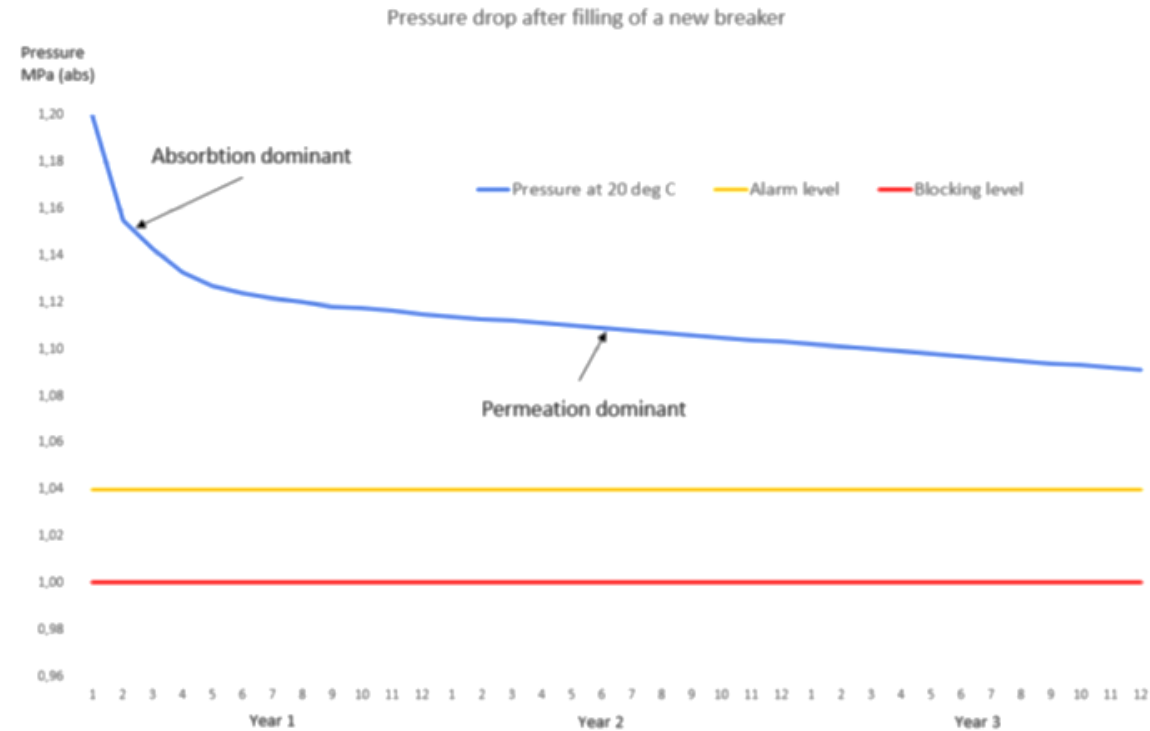
Effects of permeation and absorption over time

Cost Benefit Analysis

- Two substations selected with different profiles in terms of age, SF_6 leakage rate

- Calculated NPV for scenarios involving combinations of:

  - Retrofill
  - Leak repair
  - Refurbishment
  - Early replacement

- Costs include carbon credits and societal cost of carbon

- Comparison of different intervention options to inform understanding of suitability for different substation profiles

Substation A – relatively old

Substation B – relatively new

Indicative prices and conceptual results with further work needed

Looking Ahead - Implementation

Discovery

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

Explore opportunities and barriers to SF_6 interventions defined in Discovery.

Topics include developing a machine learning approach to SF_6 leakage assessment, site handling of gas blends, laboratory testing of disposal methods and understanding

Beta

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.

Business-as-usual

Implementation of strategies refined in Beta phase across GB.

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

Q&A