

Paris Session 2022



Solutions to remove SF₆ leaks and reduce equipment environmental footprint

Gas Insulated Substations

Sustainability Management Challenges in Substations

Question PS2.2

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Question and our contribution

Question B3-PS2-Q2

- Much development has taken place to reduce SF₆ impact on the environment from utility application for electrical insulating and interrupting equipment. What are likely to be the enduring initiatives to prevent SF₆ gas leaks and find a possible alternative to SF₆ for GIS applications?

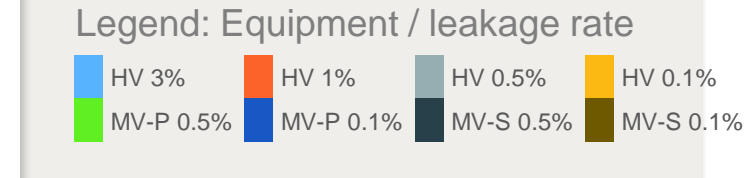
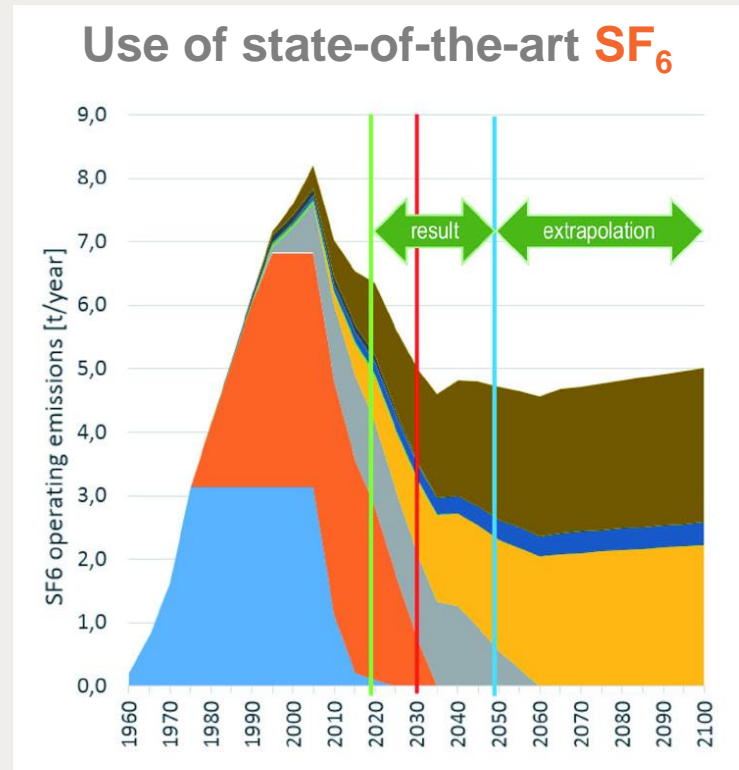
Our contribution

- Published data regarding SF₆ leakage models is presented. Scenarios regarding solutions to reduce or remove these emissions are given. Finally, important challenges regarding SF₆ replacement are commented.

SF₆ use will always result in high CO₂-equivalent emissions

ZVEI Scenarios

- Analyses based on data for Germany
- SF₆ equipment has considerably improved regarding SF₆ leaks
- Old equipment replacement is necessary to reduce SF₆ losses
- Growth of GIS applications make SF₆ incompatible with long-term CO₂-equivalent reduction, due to incompressible remaining leaks



Group Discussion Meeting

Options to reduce SF₆ emissions

- What are the options for end-users to reduce SF₆ leakages?

Minimize

- **Identify and quantify** losses to prioritize actions
- **Repair leaks** by cleaning/replacing sealings or non-intrusive solutions

Improve

- **Retrofill:** Fill existing equipment with another gas
- **Retrofit:** Fill existing equipment with another gas with small modifications

Replace

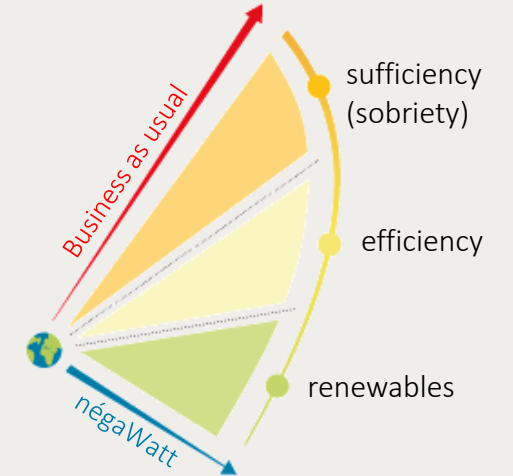
- **Optimize requirements**, avoiding oversize (e.g., for a short-circuit rating)
- **Systemize LCA use** to compare and evaluate technologies and solutions
- **Replace:** Switch to SF₆-free product, possibly with a dual-gas approach/transition

Global approach to reach Paris Agreement's objective



Avoid pollution transfer

- SF₆ is the major CO₂-equivalent emission source
- When removed, other factors dominate: material, civil work...
- LCA is the correct tool for environmental impact



Time is of the essence

- Apply the technical and commercially-available solutions in the network, fill the missing gaps of product portfolio
- Delay in action will lead to even more challenges later, transition away from SF₆ shall start today

Group Discussion Meeting

