

# Environmental and socio economic impact assessment of F-gas free medium voltage GIS application

The study will analyze the use of the potent greenhouse gas SF6 and of F-gas free alternatives in medium voltage grids. The study is intended to support the COP 21 Paris Agreement, and industry's sustainability commitments towards the nature and the planet.

The study focuses on medium voltage (MV) switchgear of electricity grids in the European Union.

## 1 Objectives

The objective of the Project is to assess various scenarios to analyze the climatic, environmental and socio-economic impact by the use of vacuum interrupter technology and natural gases for medium voltage GIS application. The Project is limited to compare SF6 and natural gases as reference cases for possible future investigations. Other alternatives based on F-gases are not in the scope.

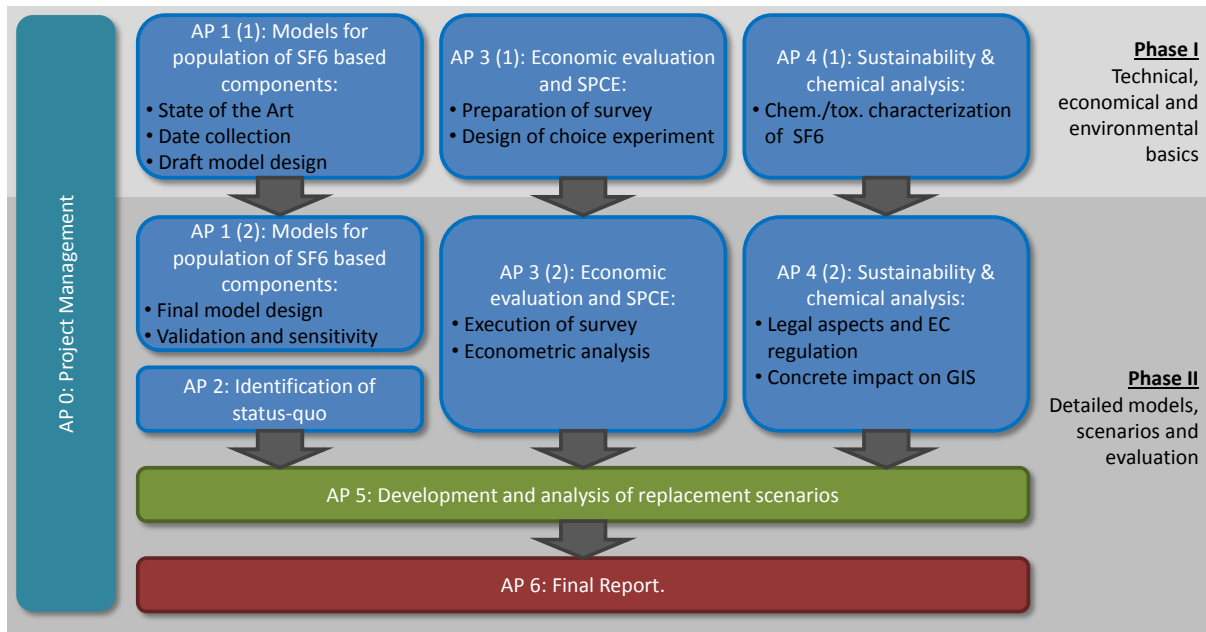
The Project will focus on medium voltage power grids including public grids as well as private & industrial grids meaning market segment such as Utility, Commercial & Industrial Building, and Industrial sites.

The following institutions/ consultants will perform the Project:

- Fraunhofer Institute for Energy Economics and Energy System Technology IEE: analysis of grid topologies, creation and evaluation of models, estimation of SF6 population, simulation of different replacement scenarios, sensitivity analysis.
- Grenoble Ecole de Management (GEM): conduct of a survey, including stated preferences choice experiments (SPCE) to assess the most preferred alternative to SF6 based on hypothetical choice scenarios where alternatives and to assess the interest in the use of labels.
- External consultant (Jean-Marc Biasse): Expertise and long-time experience as project manager and technical manager in the field of Medium Voltage Switchgear and Engineering as well as in MV & HV standardization.

The Project is initially sponsored by Siemens and Schneider Electric and will be joined by additional third parties as the case may be. They will provide technical data, market information and contacts for market survey and to the extent permissible under applicable antitrust laws.

## 2 Approach and methodology



The Project is divided into two successive phases.

In **Phase 1** the fundamentals and tools will be drafted, on which the analysis of replacement scenarios for SF6 based components is performed in Phase II. Data and information for the model design are collected. Furthermore the market survey is prepared and a basic chemical/toxicological characterization of SF6 is performed, along the full life cycle.

In **Phase 2** the model is completed. Various replacement scenarios will be established and evaluated by means of the model. Most essential is the compilation of actual used switches and circuit breakers in medium-voltage applications as well as the development of appropriate models which map switches and circuit breakers in real medium voltage grids. Since an accurate register of these components is not available and impossible to build up, assumptions, simplifications and experience should be used in order to generate the models. In parallel economic investigations will be performed in order to identify the user acceptance, needs and market for GIS components. Furthermore, environmental and toxic impacts of SF6, respectively the environmental relief in case of SF6 avoidance will be investigated based on publicly available information.

Finally, the results are compiled in a whitepaper.

## 3 Membership

Power grid stakeholders who have strong interest in MV power equipment and sustainability are invited to join this research study.

Study participants might contribute with their specific knowledge and will have preferential access to the results. They can choose from three membership options with different rights and financial contributions.

### 1) Full Members

Full Members may support the Researchers by providing data and information.

They are Members of the Steering Committee and have voting rights. In their capacity as a Member of the Steering Committee they have access to the Deliverables already before examination by the Steering Committee. Their logo will be added to the publications made by Fraunhofer under the project agreement.

Applications for full membership are open until 31 May 2019.

2) Participating Members

Participating Members may support the Researchers by providing data and information. They are represented in the Steering Committee, but do not have voting rights. In their capacity as a Member of the Steering Committee they have access –for information purpose only- to the Deliverables already before examination by the Steering Committee. Their logo will be added to the publications made by Fraunhofer under the project agreement.

3) Study Supporters

Study Supporters have the rights to receive the Deliverables after examination by the Steering Committee. Study Supporters are named in the publications made by Fraunhofer under the project agreement with ability to add their logo to those publications.

## 4 Membership fees

Members contribute financially to the project and pay the following fee/share:

- Full Member: Portion of the residual amount, (see Project Agreement Section 2.3 “Remuneration”). This is a maximum of € 129.000 for any new Full Member and is reduced by the accession of any additional member or supporter.
- Participating Member: EUR 30.000
- Study Supporter: EUR 20.000

## 5 Contact

For more information, please contact:

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