

German Environment Agency

Umwelt
Bundesamt 

Relevance of the F-gas regulation for the European energy system

The necessity for a phase-down of sulfur hexafluoride (SF₆)

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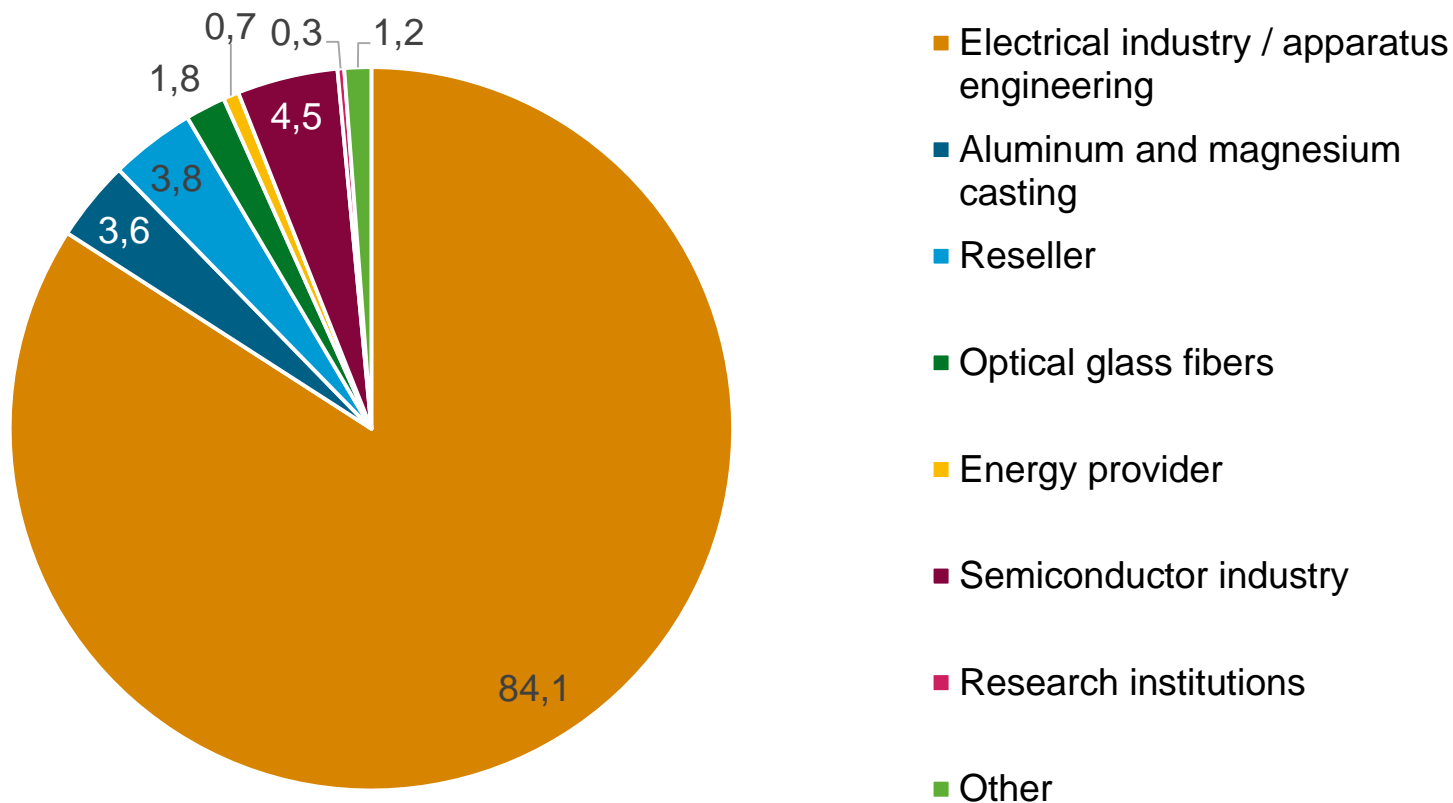
The necessity for a phase-down of SF₆

Outline

- 1 SF₆ – INDUSTRIAL APPLICATION
- 2 SF₆ – ENVIRONMENTAL ASPECTS
- 3 REGULATION (EU) 517/2014
- 4 EMISSIONS OF SF₆
- 5 SUMMARY

Highest demand of SF₆ in electrical industry

Demand sectors of SF₆ in Germany according to the field of application in 2016 (%)



Source: Destatis 2017

The necessity for a phase-down of SF₆

SF₆ is the most potent greenhouse gas on earth

DUE TO ITS CHEMICAL PROPERTIES SF₆ IS A CROSS-GENERATIONAL ENVIRONMENTAL BURDEN

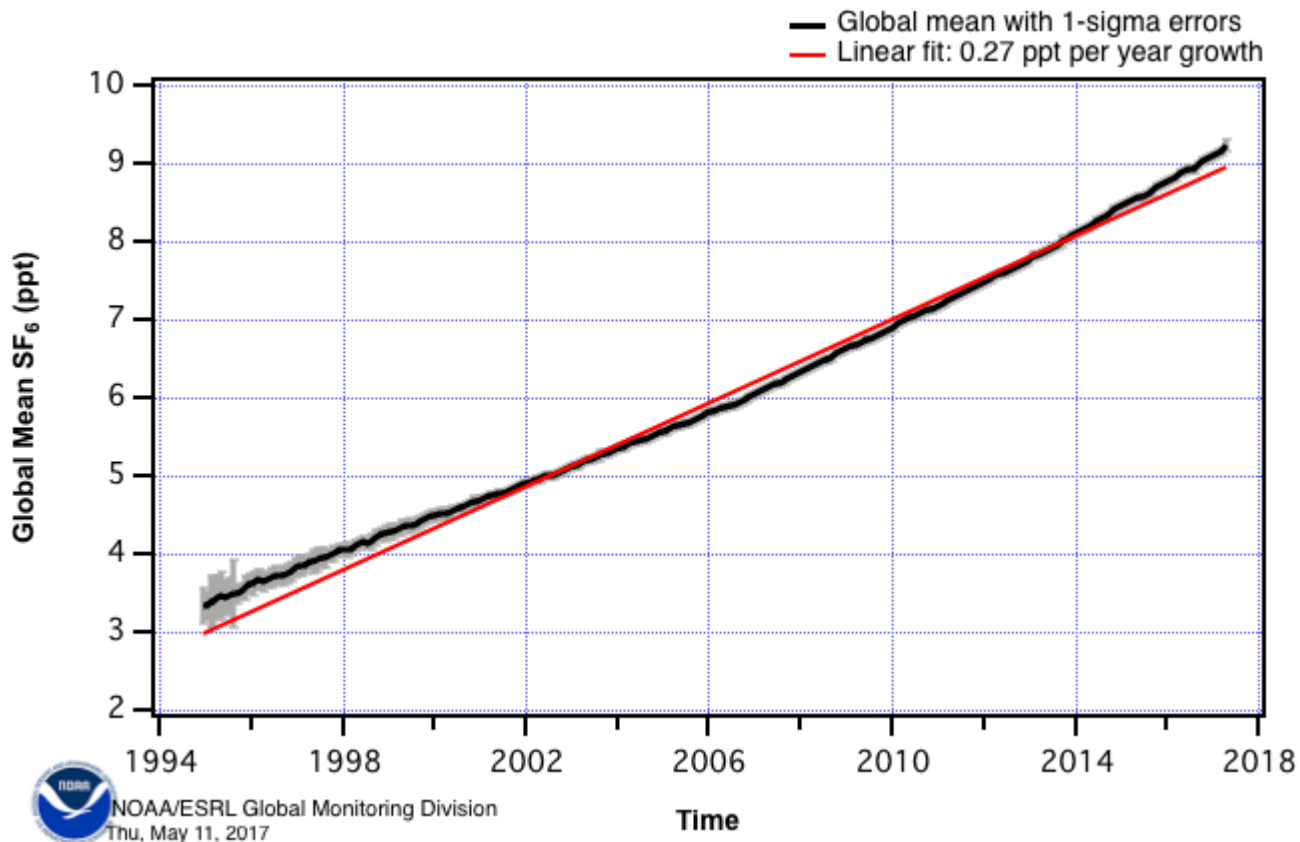
Substance	Global warming potential (GWP; 100 years)	Atmospheric lifetime (years)
SF ₆	22.800	3.200
CFC-11	4.750	45
CFC-12	10.900	100
HFC-134a	1.430	14

Source: IPCC, 2007: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment. Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 996 pp.

The necessity for a phase-down of SF₆

Emission of SF₆ is a global problem

IN 1997 SF₆ WAS CATEGORIZED AS ONE OF SIX GREEN-HOUSE GASES IN THE KYOTO PROTOCOL



Source: US Department of Commerce; National Oceanic & Atmospheric Administration; Earth System Research Laboratory; Global Monitoring Division

Regulation (EU) 517/2014

ARTICLE 21

(4) No later than **1 July 2020**, the Commission shall publish a report assessing whether cost-effective technically feasible energy-efficient and reliable **alternatives exist**, which make the replacement of fluorinated greenhouse gases possible, **in new medium-voltage secondary switchgear...**

Source: Regulation (EU) 517/2014 of the European Parliament and the Council

POSITION OF THE ELECTRICAL INDUSTRY

- „For specific applications SF₆-free technologies already exist.“
- „Ecological balance of SF₆ is critical..., however the percentage of total emissions is small.
- „Industrial sector tends towards a continuous emission reduction of SF₆ and the development of alternative solutions.“

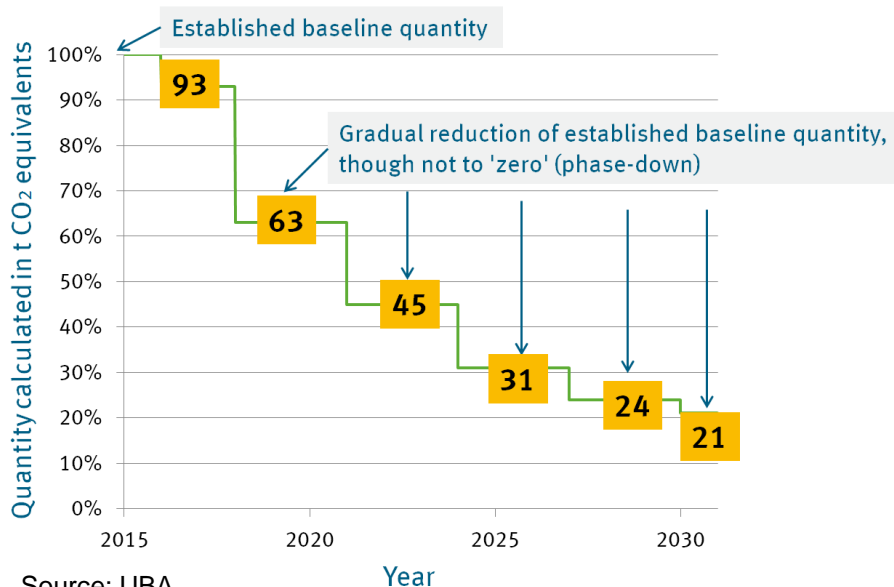
Source: Ecofys Progress Report: “Concept for SF₆-free transmission and distribution of electricity”

The necessity for a phase-down of SF₆

Position and mission of the German Environment Agency

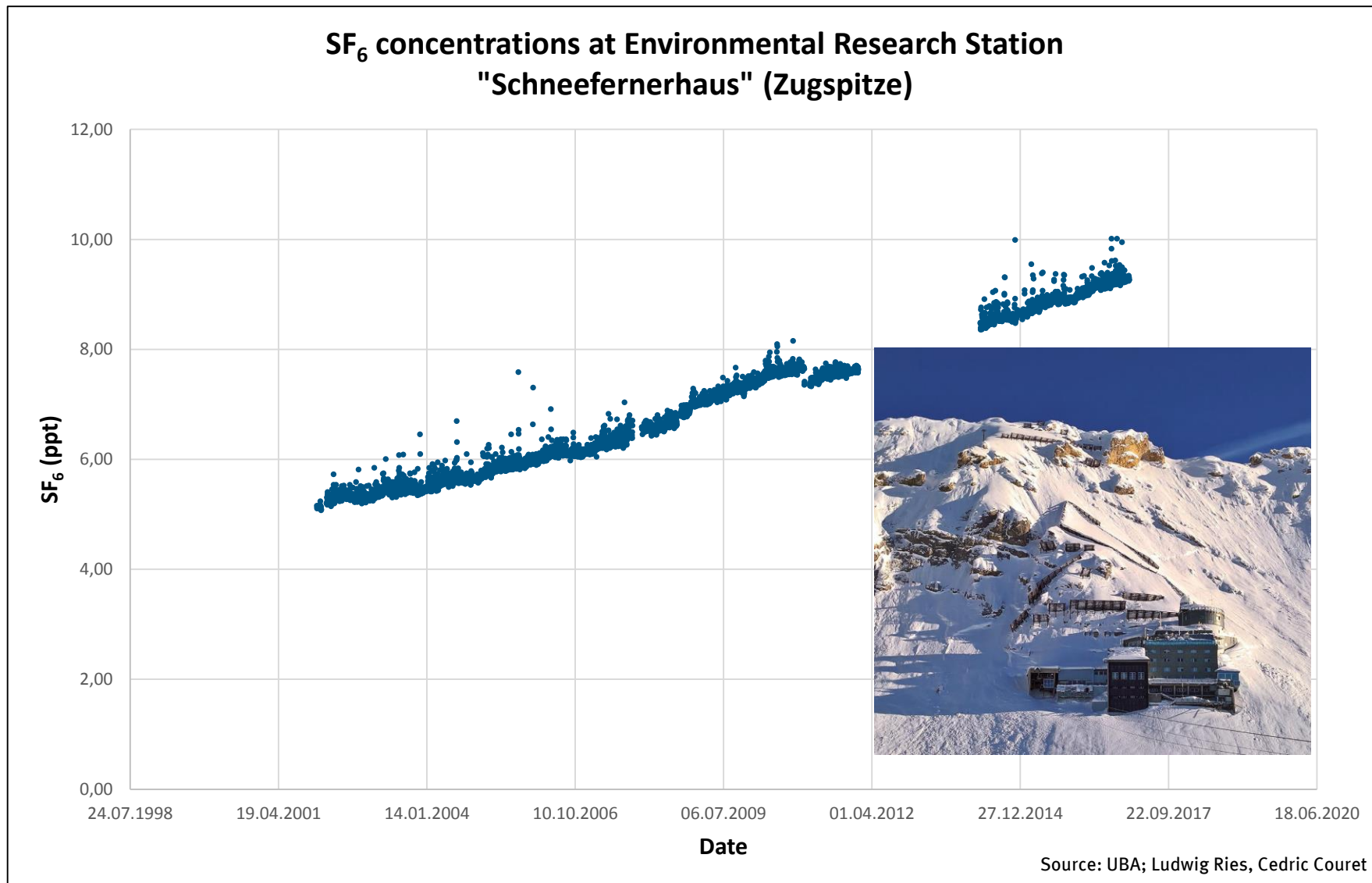
INTENSIVE EFFORTS FOR THE REDUCTION AND REPLACEMENT OF OZONE DEPLETING AND GREENHOUSE GASES

- The Montreal Protocol bans CFCs and halons and is the key factor for a recovery of the ozone layer
- The Regulation (EU) 517/2014 and Kigali amendment regulate future phase-down of HFCs
- First steps for the reduction of SF₆-based technologies are already done
- Still intensive need for SF₆-free alternatives and further investigation



Source: www.unep.org

Strategies and tasks of the German Environmental Agency



Strategies and tasks of the German Environmental Agency

The screenshot shows the website of the German Environmental Agency (Umwelt Bundesamt). The header includes navigation links for 'The UBA', 'Topics', 'Press', 'Publications', and 'Green Economy in the Alpine region - Start'. The main content area is titled 'Switchgear' and features a technical illustration of a gas-insulated switchgear. Below the illustration, there is a text block explaining the use of Sulphur hexafluoride (SF₆) and mentioning a voluntary industry commitment to reduce emissions. A sidebar on the right contains a 'Topics' menu with expandable categories like 'Economics | Consumption', 'Products', and 'Fluorinated Greenhouse Gases and Fully Halogenated CFCs'. At the bottom, there is a 'Table of Contents' section with a link to 'Study on possible alternatives to SF₆' and a 'Links' section with references to a voluntary agreement and a UBA web page on fluorinated greenhouse gases. A footer banner asks for helpful hints about the website.

Umwelt Bundesamt

The UBA | Topics | Press | Publications | Green Economy in the Alpine region - Start

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Search

Home > Topics > Economics | Consumption > Products > Fluorinated Greenhouse Gases and Fully Halogenated CFCs > Application domains and emission reduction > Switchgear

Switchgear

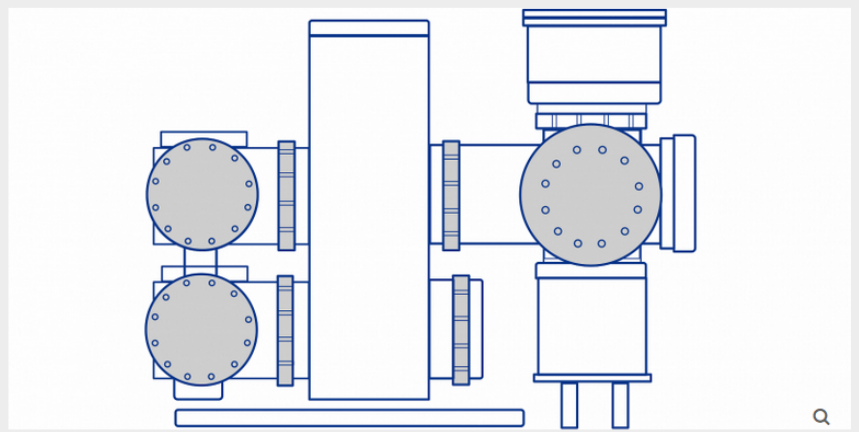


Illustration of a typical gas-insulated switchgear
Source: Ecofys

Sulphur hexafluoride (SF₆), which has a very high global warming potential, is used for insulation and arc interruption in switchgear. SF₆ emissions have been successfully reduced thanks to a voluntary industry commitment. Alternative products to substitute SF₆ in various applications are developed.

17.07.2017 ★ 322 times rated as helpful

Table of Contents

- Study on possible alternatives to SF₆
- Publication of progress report

Links

- voluntary agreement for switchboards (PDF, in German)
- UBA web page: EU Regulation on fluorinated greenhouse gases

Helpful hints about our website?

How can we improve our website?

Summary

- Due to its technical benefits SF₆ is still of central importance in the electrical industry.
- SF₆ possesses the largest reported GWP₁₀₀ for a chemical substance on earth.
- It is highly persistent in the troposphere and stratosphere and has therefore a cross-generational environmental impact.
- This implies the necessity for a further development of alternatives to SF₆-based technologies.
- A consistent framework of requirements and regulations provides reliability. Together with efforts from manufacturers, researchers and users of switchgear smart and efficient solutions are feasible and the establishment of a sustainable transmission and distribution of electricity is possible.

Thank you for your attention

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<https://www.umweltbundesamt.de/en/topics/economics-consumption/products/fluorinated-greenhouse-gases-fully-halogenated-cfcs/application-domains-emission-reduction/switchgear>

