

Hitachi Energy on F-Gas Regulation

Letter to Distribution and Transmission System Operators

Zurich, February 2023

Dear valued customer,

On 5 April 2022, the European Commission proposed an update of the F-gas regulation. Hitachi Energy fully supports the EU Green Deal and the objective of the F-gas regulation to mitigate the impact of fluorinated greenhouse gases on climate change and replace SF₆ in switchgear as swiftly as possible.

In view of the discussions in the European Parliament and the European Council on how to shape the Commission's proposal for high-voltage switchgear (52 kV and higher), Hitachi Energy would like to clarify its position.

Effectively, the Commission's proposal would prohibit the installation of electrical switchgear using fluorinated gases with GWP above 10, unless "no suitable alternative is available based on technical grounds". This would have serious and detrimental consequences for distribution and transmission system operators and the countries and communities they serve. Some key impact points include:

- More than 50% increase in the size of high-voltage substations, compromising the key features of compactness and robustness and reducing their public acceptance
- Almost double the aluminum required, which will increase the carbon footprint instead of decreasing it
- Excessive costs that will ultimately be passed on to EU's electricity consumers
- Limiting the choice of operators to a single, early-stage, technology

While the use of vacuum circuit breakers and technical air is common in medium voltage, this operating and reliability experience from medium voltage cannot be extrapolated to high voltage. For the main transmission voltage in the EU (400 kV) which is the backbone of our power grid, the feasibility and reliability of this technology is not proven and still a futuristic concept.

To avoid betting on a single, undemonstrated, technology, the F-gas regulation should be technology-open and set a GWP threshold of 1000 for high-voltage switchgear.

The majority of European high-voltage gas-insulated switchgear manufacturers with engineering centers, factories and strong service capacity in Europe have chosen a mixture with 3 to 5% of C₄-FN, a fluorinated nitrile, to replace SF₆. These mixtures comprise more than 95% natural gases and have GWP of between 400 and 600. To include these in the solution mix has the following environmental and economic benefits:

- High-voltage substations can remain the same size as with SF₆ and do not require precious additional space
- Products will have the lowest possible carbon footprint (no additional aluminum and larger buildings)
- The technology is available now with products which cover the main transmission network voltage
- Free competition is maintained among the European and global suppliers of high-voltage equipment, including cost and performance competition among diverse technologies, ensuring strong economic benefits to grid operators and European electricity consumers.

On December 20, 2022, 3M, our current C₄-FN supplier, announced a repositioning and adaption of their portfolio. While emphasizing that per- and polyfluoroalkyl substances (PFAS) can be safely made and used and are important for modern life, 3M is exiting from manufacturing of PFAS by the end of 2025. 3M's decision opens the opportunity for

Hitachi Energy to adopt a multiple sourcing approach, and to develop a European manufacturer. Hitachi Energy has started the qualification process.

On February 7, 2023, the European Chemical Agency (ECHA) published a proposal by five countries to restrict all the 5,000+ PFAS used in many consumer and high-end industrial products, including many components of the renewable energy value chain. Hitachi Energy will work constructively with ECHA to provide scientific data about the non-harmful character of the dilute high-voltage gas mixtures. Its physical properties are such that it cannot accumulate in water, plants, or the soil, and, if it accidentally escapes, it will fully decompose over 30 years.

Hitachi Energy will continue to develop eco-efficient EconIQ™ high-voltage products and services which reduce the global warming impact compared to SF6 by a factor of 100 without increasing the size of the equipment. These solutions allow the fastest and most reliable replacement of SF6, providing substantial climate and environmental benefits.

The F-gas regulation proposal does not yet reflect the core interests of distribution and transmission system operators, electricity consumers, and EU citizens regarding:

- Technology and vendor competition
- Immediate and cost-efficient mitigation of climate change
- Limiting the space requirements of high-voltage substations

Hitachi Energy is available for continued support and engagement with all stakeholders. We remain committed to supporting the EU in achieving its decarbonization goals in the most efficient manner in line with our purpose statement of contributing to a sustainable energy future for all.



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