



GRID SOLUTIONS



g^3 is a revolutionary gas for the electrical transmission industry, offering the same technical performances as SF_6 with an **environmental impact reduced by more than 99%**

SF_6 IS A GREENHOUSE GAS WITH A STRONG GLOBAL WARMING POTENTIAL



9/10

of the warmest years on record occurred since 2000. Greenhouse Gases (GHGs) are the root cause of the „Greenhouse Effect“, causing climate change throughout the world.

The infographic illustrates the greenhouse effect with a sun, infrared rays, and a globe. It compares SF_6 and CO_2 on a scale, showing that 1 kg of SF_6 is equivalent to 23,500 kg of CO_2 . A box on the right states that 80% of all SF_6 used is in the transmission industry, 10,000 tons are installed yearly, 3,200 years is the number of years SF_6 remains in the atmosphere, and +20% is the SF_6 concentration in the last 5 years.

THE g^3 REVOLUTION



Replacing 1 kg of SF_6 with $\sim 1/2$ kg of g^3 results in a **Saving of 16 CARS** running one year (10,000 km each) OR a **Saving of 1 CAR** circling the Earth 4 times.



g^3 products operate under the same ambient conditions and temperature ranges as state-of-the-art SF_6 products. (-25°C and -30°C)

Same dimensions, same technical performance and safety with a drastically reduced impact of gas releases to atmosphere

THE BENEFITS OF g^3 OVER SF_6



Environmental impact of g^3 vs SF_6



Utilities can **adopt best practices** in terms of environment sustainability



Utilities can qualify for **tax reduction or incentives** related to greenhouse gas emissions reduction



The g³ technology and related applications are part of the GE **Ecomagination** portfolio. Ecomagination is GE's growth strategy to enhance resource productivity and reduce environmental impact.



g³ is an insulating gas mixture using Novec 4710™ Insulating Gases from 3M

g³ supply, g³ handling and g³ monitoring solutions are available with our partners

GLOBAL TREND TOWARDS MORE STRINGENT SUSTAINABILITY STANDARDS

40%
of utilities expect a

Tax on SF₆

Or an

Incentive for alternative gases

in 5 years

SF₆ becomes the main insulating medium for high voltage

GE's cooperation with 3M begins

New gas disclosed: g³

First g³ products

First energizations

1970's

2010

2014

2015

2017

1997

SF₆ is listed in the Kyoto protocol as a Greenhouse Gas

2006

EU F-gas regulation

California Global Warming Solutions Act

2009

COP 15: limit global warming to 2°C and reduce GHG emissions by 40 to 70% by 2050 (vs. 2010)

New EU F-Gas regulation: F-gas emissions have to be cut by two-thirds by 2030 (vs. 2014)

COP 21 Paris, 196 countries commit to reduce their GHG emissions through their intended "nationally determined contributions"

2020

EU target to cut GHG Emissions: By 2020: -20%
By 2030: -40%
By 2040: -60%
By 2050: -80%

More and more stringent environmental regulations are likely to speed up the g³ adoption

ADOPTION OF g³: SOME LEADING UTILITIES

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LEADING UTILITIES have decided to install equipment with g³



g³ Gas-Insulated Lines
420 kV, -25 °C
3 sites - 483 meters

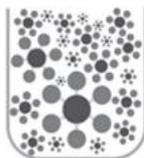
g³ Gas-Insulated Substations
145 kV, -25 °C
8 sites - 51 Bays

g³ AIS Current Transformers
245 kV, -30 °C
2 sites - 6 CTs

Example with 100 metres of 3-phase Gas-Insulated Line (GIL), considering gas emissions (average 0.4% p.a.) over 40 years

GIL filled with SF₆

6,157 tons
equivalent CO₂



GIL filled with g³

102 tons
equivalent CO₂



Example with a carbon tax at 25€/ton of CO₂

TAX SAVING

150 k€

20-30% of CAPEX



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