

Paris Session 2022



Introduction policy of SF₆ gas alternative technology considering the current evaluation

Study Committee B3
PS 2/ Q2.2

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Group Discussion Meeting

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Question and our contribution

Question PS2 Q2.2

- 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?**


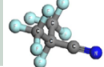
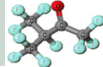

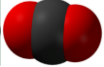
Answer

- The current policy for introduction of SF₆ gas alternative technology is **to support solutions using natural origin gases in our company.**
- For the evaluation, **safety is our top priority**, and we have also **taken into consideration the development trends of domestic manufacturers.**

Group Discussion Meeting

Detail of evaluation for decision of the policy

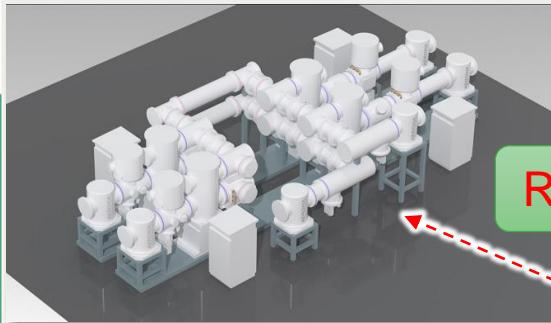
- Each solution was evaluated based on the “Seven requirements” from Japan.
- From the viewpoint of accountability to stakeholders, the evaluation of environmental health and safety (EHS) and especially its toxicity, was our top priority.

No.	Category	F-gas			Natural origin gas	
		SF ₆ 	C4-FN 	C5-FK 	N ₂ /O ₂ (synthetic air) 	CO ₂ /O ₂ 
1	EHS ; GWP/TWA*	25200 / 1000 ppm	2100 / 65 ppm	1 / 225 ppm	0 / infinite	1 / 5000 ppm
2	Service condition ; liquefaction temperature	> -20 °C	> -25 °C	> 5 °C	> -183 °C	> -78.5 °C
3	Stable supply	multivendor	single-vendor	single-vendor	multivendor	multivendor
4	Gas handling ; mixture and control	single-gas	mixed-gas	mixed-gas	natural-gas	mixed-gas
5	Life cycle cost	present standard	up	up	up	up
6	Footprint	present standard	same	same	up	up
7	Voltage coverage	present standard	same	same	down	down

*EHS: Environment, Health and Safety, GWP: Global warming potential, TWA: Time-weighted averages

Plans for introduction into the field

- A synthetic air-insulated 72 kV switchgear equipped with a vacuum interrupter will be installed at the **Fuchu-substation in December 2022**.
- The newly installed equipment is about the same size compared to the aged GIS to be replaced, so the foundation can also be reused.
(Larger in size compared to the latest SF₆ gas-insulated switchgear)



Replace



Fuchu-substation (Google Earth)



New GIS

	New GIS	Existing GIS
Overview		
Bay length	5595 mm (82%)	6850 mm (100%)
Bay height	3550 mm (100%)	3538 mm (100%)
Bay width	1600 mm (80%)	2000 mm (100%)
Weight per bay	11.6 tons (97%)	12.0 tons (100%)

Conclusion and future work

- At this time and as a result of the evaluation of alternative gas solutions at TEPCO PG, we have supported natural origin gas solutions and introduced the field launch of a 72 kV synthetic air-insulated GIS in December 2022. The decision considers both the seven requirements for SF₆-alternatives and the development trends of domestic manufacturers.
- Japan regulator will introduce a new tolling system (revenue cap system) for regulating T&D energy network businesses in FY2023 that includes items such as "consideration for the environment". Therefore we will continue to build a comprehensive evaluation system that uses environmental incentives such as measures that contribute to carbon neutrality and efforts to reduce greenhouse gas emissions as indicators.

