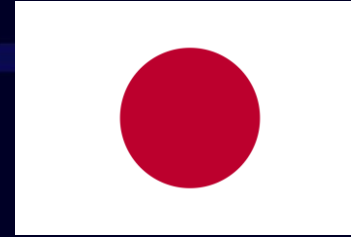


Paris Session 2022



Extension of GIS/GIB in 275 kV AIS for reliable grid separation of interconnecting large power sources

SC B3

PS2 / Q.1

Koichi Taketa, Japan



Kansai Transmission and Distribution

Question and our contribution

Question PS2.1

- What are **the management challenges** to maintaining existing substations in both the short term and long term. What **new ideas and concepts** will provide insight on asset life extension and reduced cost while improving reliability?

Answer

✓ **The management challenges**

- When interconnecting large power sources, it was necessary to add bus sections and a bus coupler to the substation, but **there was no space to install them.**
- **Site expansion and the relocation of the transmission towers were required.**

✓ **The New ideas and concepts**

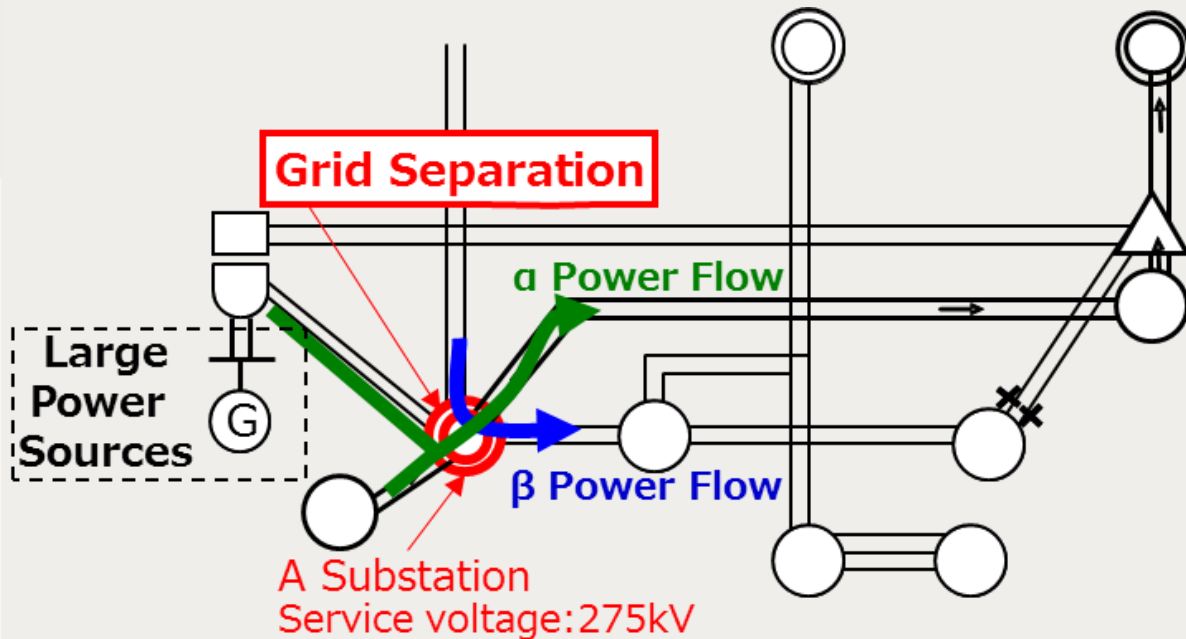
- **Bus section/coupler extension to existing AIS by installing GIS/GIB**

Group Discussion Meeting

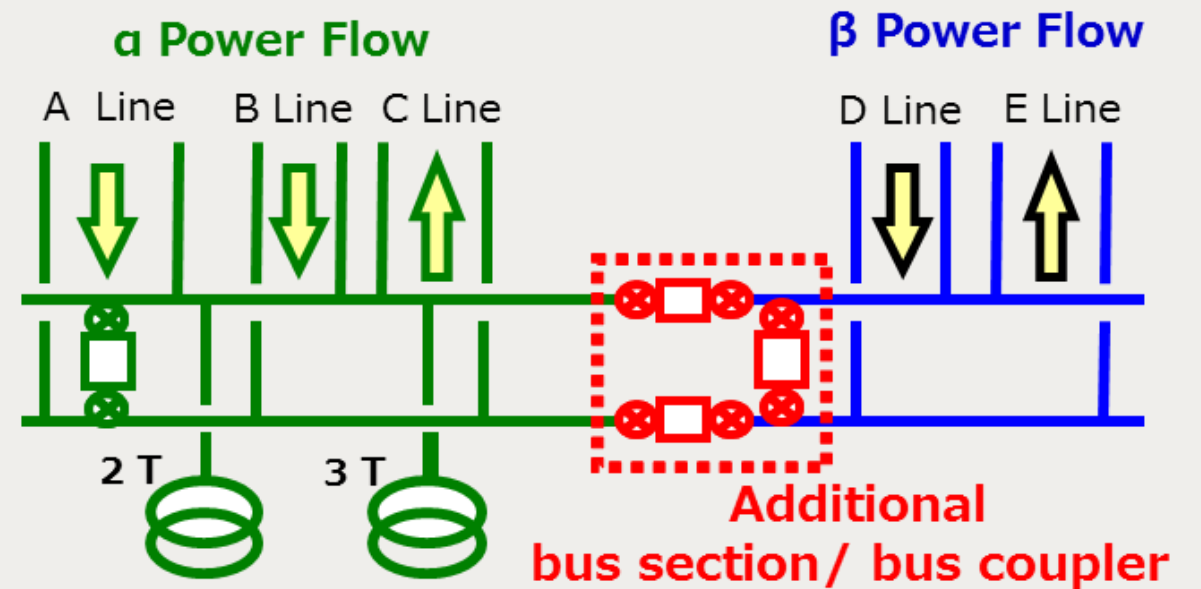
Concept of bus section/coupler extension to existing 275 kV AIS

- ✓ In order to improve the reliability when interconnecting large power sources, it was necessary to add bus sections and a bus coupler to the substation.

○ Power Grid



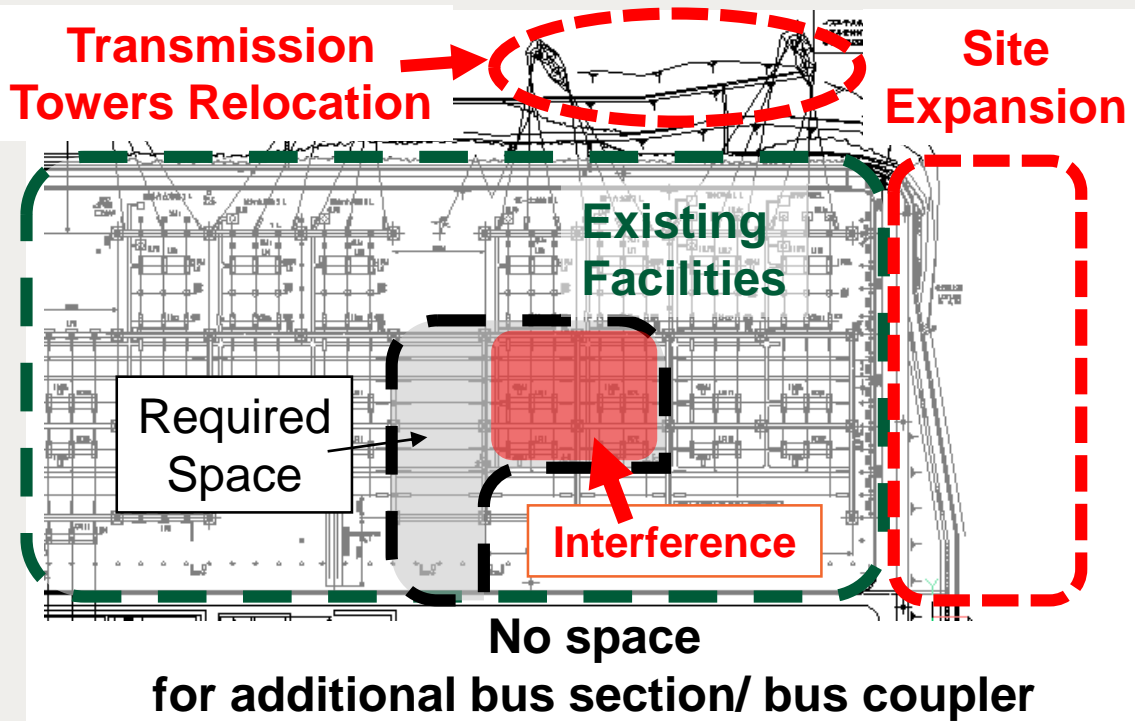
○ Single line diagram



Issues with bus section/coupler extension to existing 275 kV AIS

- ✓ Since there was no space for the installation, site expansion and transmission towers relocation were required.

○ Ground Plan



□ In the case of air insulated facilities, the following project were required

- Site expansion : Over 4,000 m^2 (Land acquisition is needed.)
- Transmission towers relocation

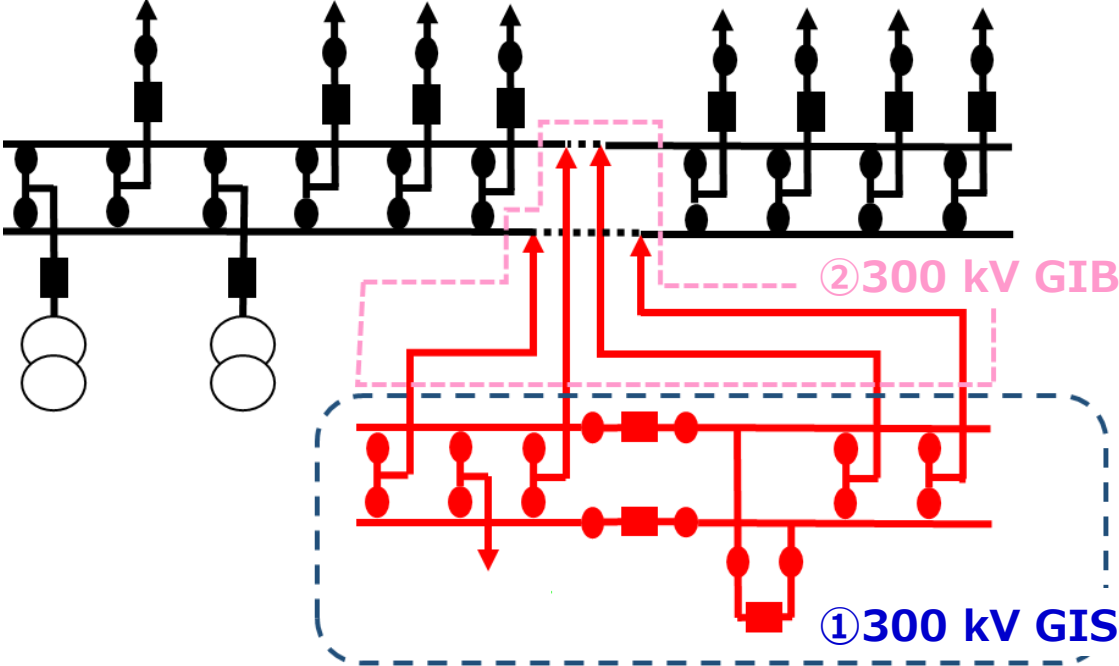
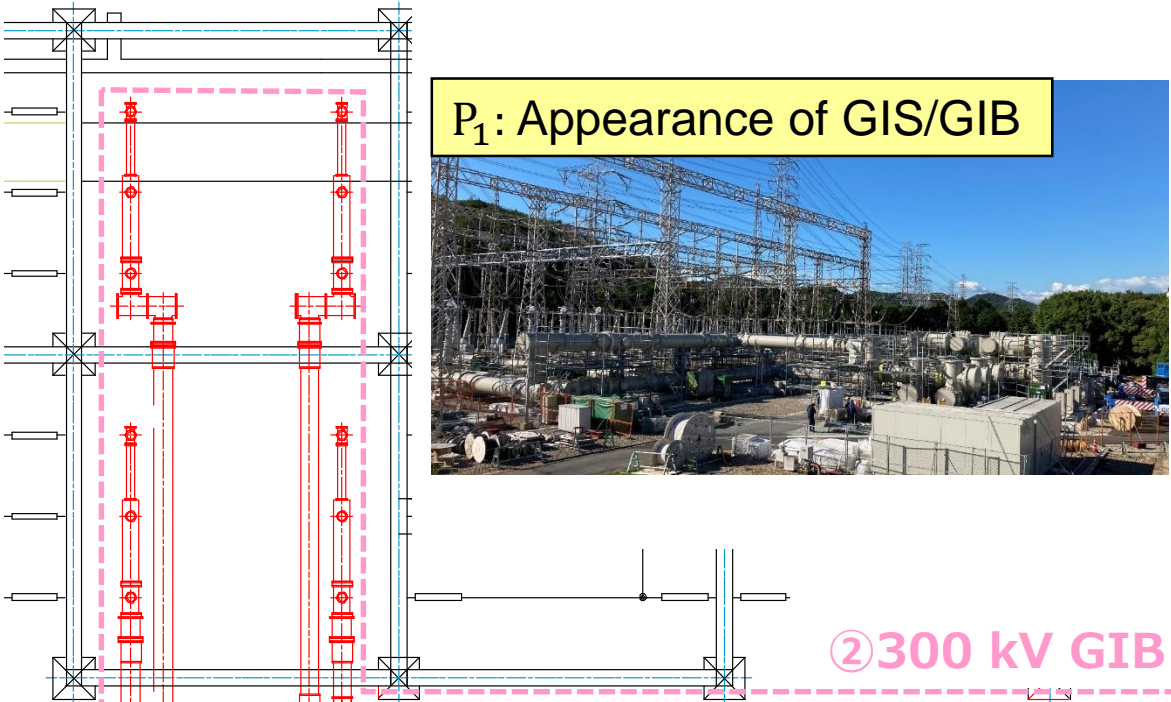
□ Issues with this approach

- The costs other than substation facilities would become expensive.
- The project would take long-term (over 5 years).

To solve these Issues, GIS/GIB were installed in existing AIS.

300 kV GIS/GIB extension

P₁: Appearance of GIS/GIB



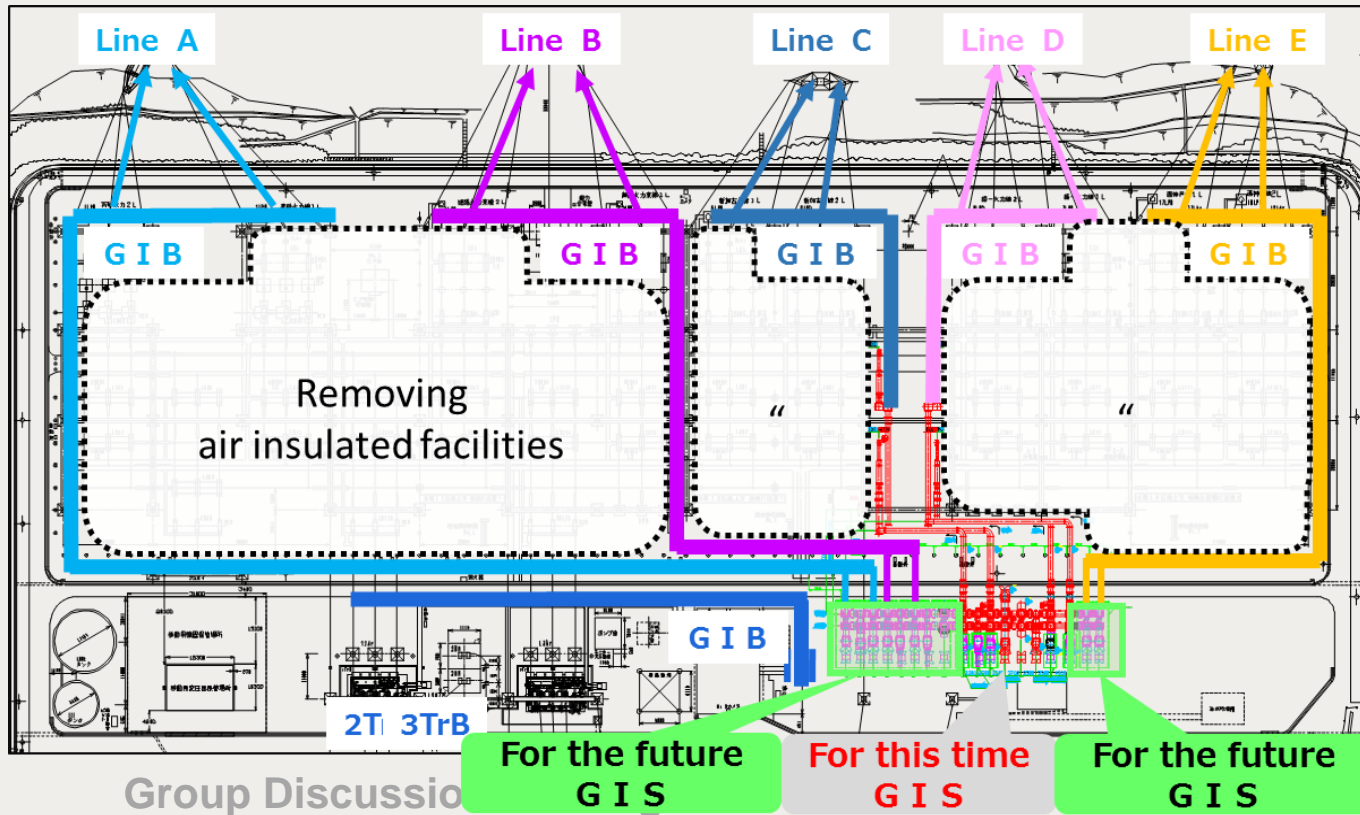
Red : Now construction
Green : For the future

GIS/GIB allowed to add bus sections and a bus coupler **WITHOUT** the site expansion and transmission towers relocation.

Reduced the cost and shortened the project period (2.5 years)

The Future Plan of GIS/GIB Substation

- Based on the GIS/GIB construction work, the future vision of the substation was examined.
- GIS/GIB substation has a following advantage over air-insulated facilities.



Advantage of GIS/GIB

- Improve reliability.
- It's possible to renew the substation equipment while maintaining existing facilities.
- Minimize the outage period during renewing.
- Elimination of air-insulating facilities will be able to allow removal of the salt pollution cleaning equipment.

Conclusion

- When interconnecting large power sources, it was necessary to add bus sections and a bus coupler to AIS, but **there was no space to install them.**
- **Site expansion and transmission towers relocation were required.**
- To solve the issues, **GIS/GIB were installed in existing AIS.**
- This approach improved the grid reliability, minimizes the outage period, and made effective use of the existing air-insulated facilities.