

General Technical Specifications of Frequency Converters for Tokyo-Chubu Interconnection Project

Note: It is possible that the contents of these specifications may be changed according to our detailed studies.

Present basic specifications of frequency converters (Higashi-Shimizu 600MW, Shin-Sakuma (tentative name) 300MW) are as follows. This project is planned to be commissioned in the fiscal year 2027.

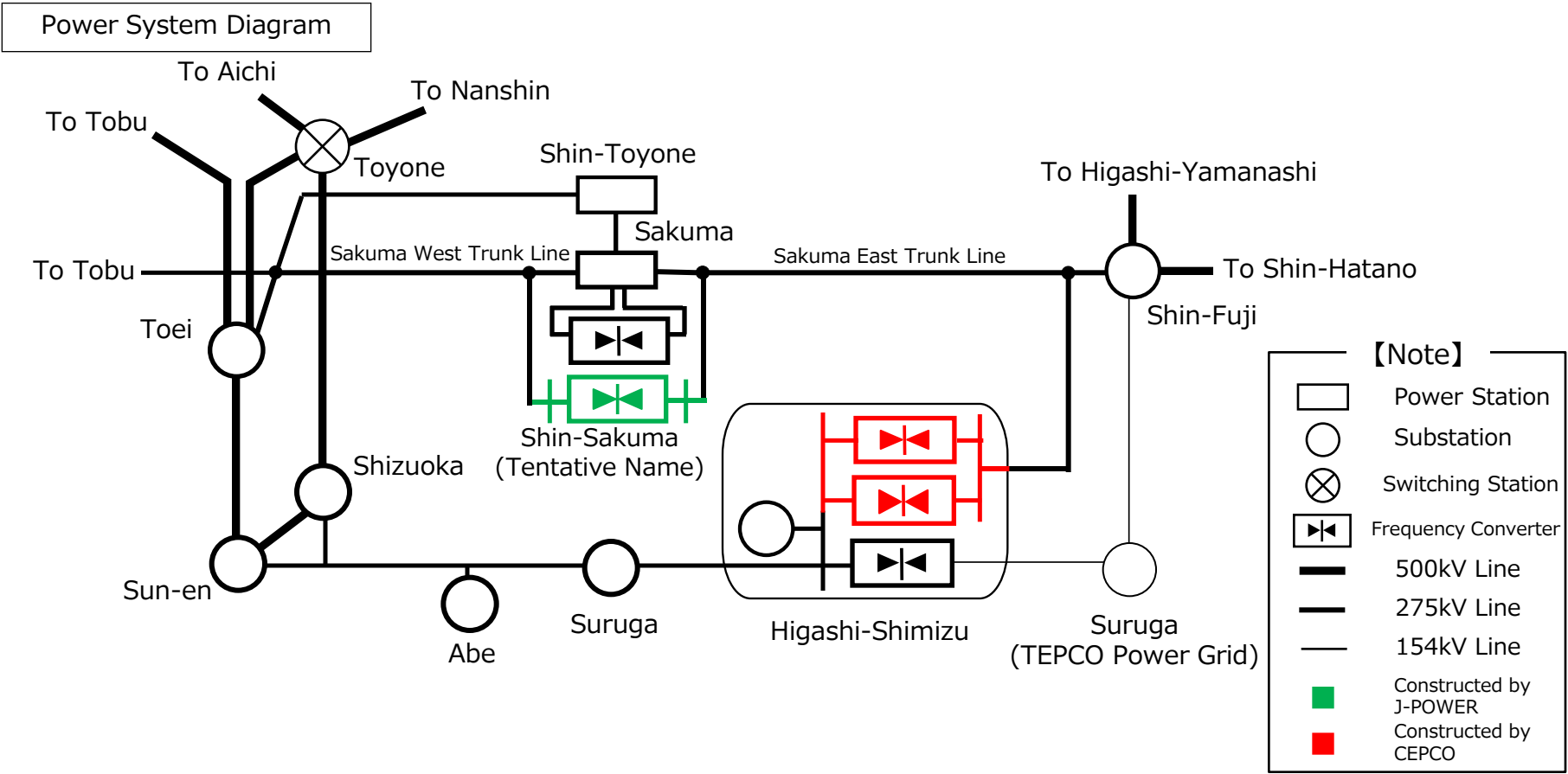
- ❑ Procurement by Chubu Electric Power Co., Inc.
 - Converter Type: Voltage-Sourced Converter
 - Rated Power: 600MW (300MW x 2Units)
 - Frequency: 50Hz (Tokyo Side)/60Hz (Chubu Side)
- ❑ Procurement by Electric Power Development Co., Ltd.
 - Converter Type: Voltage-Sourced Converter
 - Rated Power: 300MW (300MW x 1Unit)
 - Frequency: 50Hz (Tokyo Side)/60Hz (Chubu Side)

Chubu Electric Power Co., Inc. (CEPCO)
Electric Power Development Co., Ltd. (J-POWER)

1. Outline of Frequency Converters for Tokyo-Chubu Interconnection Project

[900MW Increase]

➤ This project is planned to be commissioned in the fiscal year 2027 and three (3) frequency converters (300MW x 3units) are scheduled to be installed.



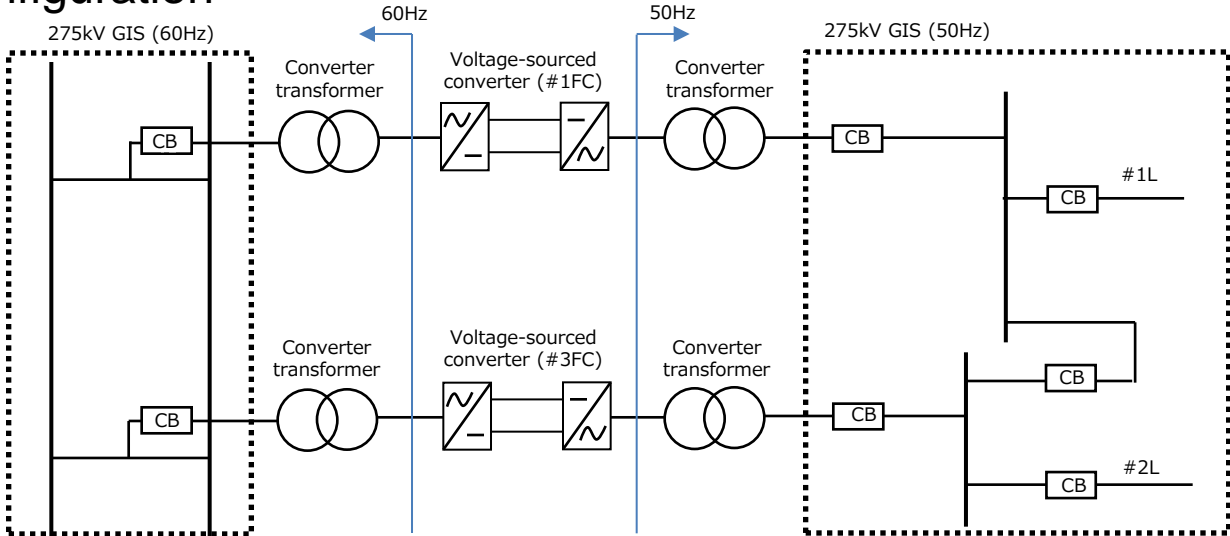
2-1. Outline of Frequency Converter (Higashi-Shimizu S/S)

Frequency Converter (Higashi-Shimizu S/S, CEPCO)

◇ List of Equipment

	Equipment	Quantity
Frequency converter	<ul style="list-style-type: none"> - Voltage-sourced converter - Converter transformer - Buffer reactor (Valve reactor) - AC filter - Shunt capacitor, Shunt reactor 	300MW x 2Units 4Units (50Hz: 2Units, 60Hz: 2Units) Installed when necessary, based on the bidder's proposal Installed when necessary, based on the bidder's proposal Installed when necessary, based on the bidder's proposal
AC equipment	<ul style="list-style-type: none"> - 275kV GIS (50Hz, outdoor) - 275kV GIS (60Hz, outdoor) - AC switchgear - Station power supply system - Generator system for emergency 	2bays for line, 2bays for converter transformer, 1bay for bus section 2bays for converter transformer (out of scope from this open bidding) Installed when necessary, based on the bidder's proposal except for the above GIS

◇ Circuit Configuration



※Out of scope from this open bidding

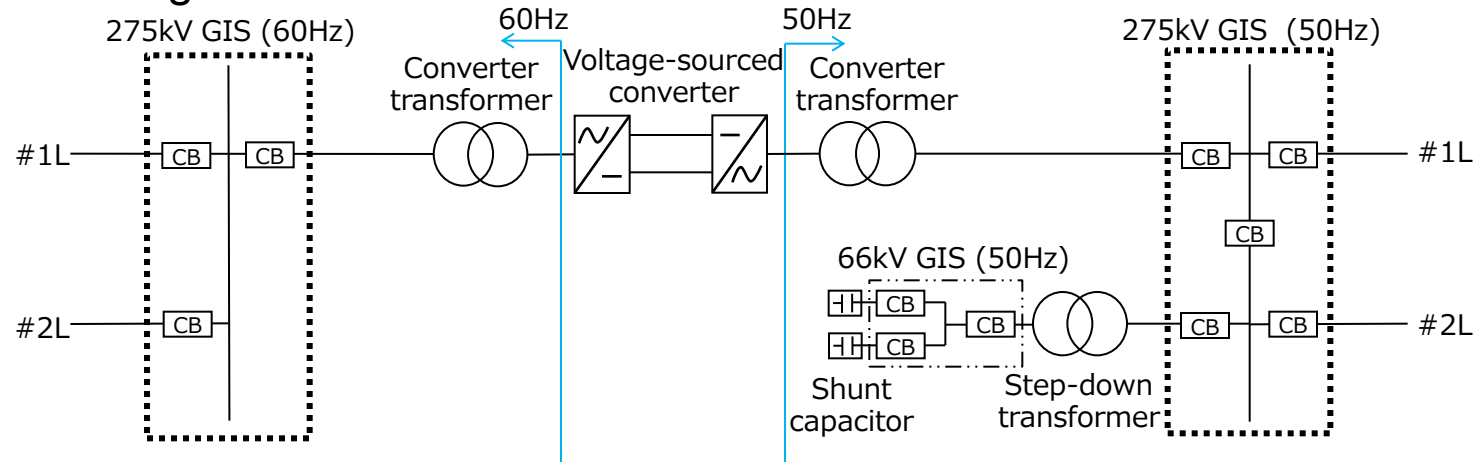
2-2. Outline of Frequency Converter (Shin-Sakuma FC)

Frequency Converter (Shin-Sakuma FC, J-POWER)

◇ List of Equipment

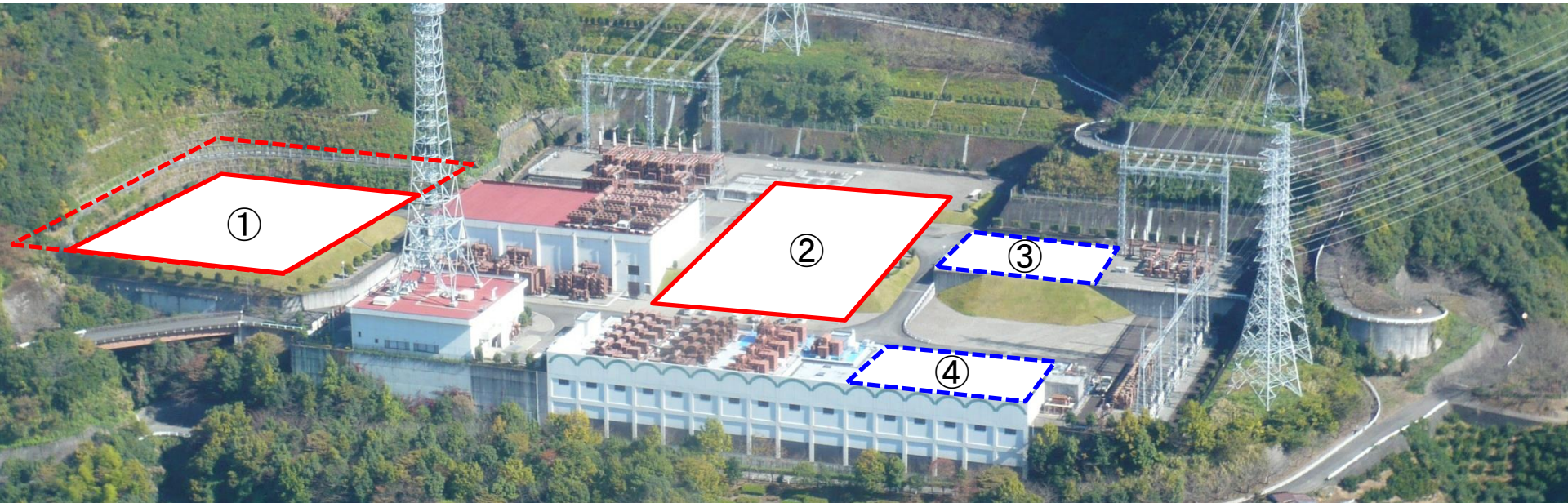
	Equipment	Quantity
Frequency converter system	<ul style="list-style-type: none"> - Voltage-sourced converter - Converter transformer - Buffer reactor (Valve reactor) - AC filter 	300MW x 1Unit 2Units (50Hz: 1Unit, 60Hz: 1Unit) Installed when necessary, based on the bidder's proposal Installed when necessary, based on the bidder's proposal
AC equipment	<ul style="list-style-type: none"> - 275kV GIS (50Hz, outdoor) - 66kV GIS (50Hz, outdoor) - Step-down transformer (50Hz) - Shunt capacitor (50Hz) - 275kV GIS (60Hz, outdoor) - AC switchgear 	2bays for line, 1bay for bus section, 1bay for converter transformer, 1 bay for stepdown transformer (5bays in total) 1bay for stepdown transformer, 2bays for shunt capacitor (3bays in total) 1Unit for shunt capacitors 2Units 2bays for line, 1bay for converter transformer (3bays in total) Installed when necessary, based on the bidder's proposal except for the above GIS

◇ Circuit Configuration



3-1. Outline of Frequency Converter (Higashi-Shimizu S/S)

Tentative Layout (Higashi-Shimizu S/S, CEPCO)



- ① #3FC frequency converter*2 (converter transformer, voltage-sourced converter, buffer reactor (valve reactor)*1, switchgear*1, AC filter*1, shunt capacitor*1, shunt reactor*1)
- ② #1FC frequency converter*2 (converter transformer, voltage-sourced converter, buffer reactor (valve reactor)*1, switchgear*1, AC filter*1, shunt capacitor*1, shunt reactor*1)
- ③ 275kV GIS (50Hz), bushings and gantry towers
- ④ Station power supply system and a part of DC equipment of #1FC

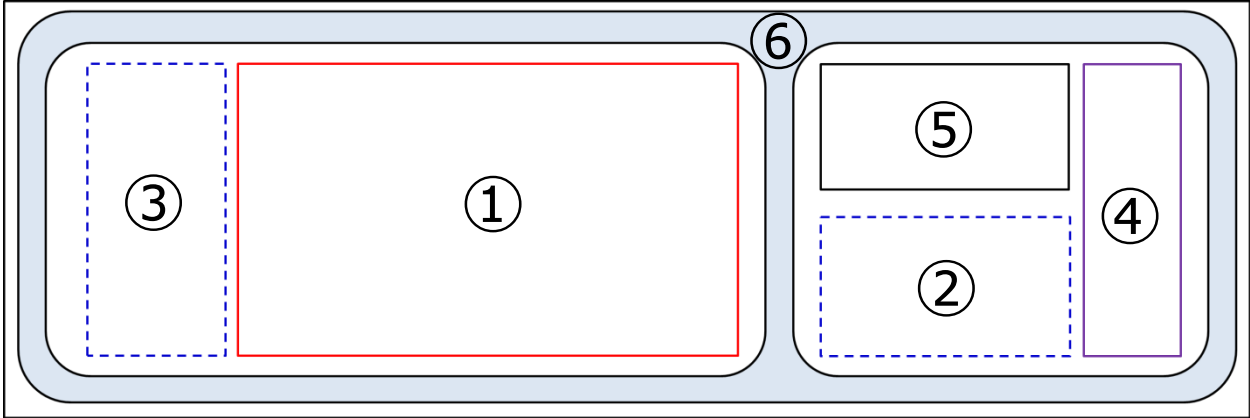
It might be possible that additional area can be available for the FC after our scheduled study.

*1 The equipment can be installed when necessary, based on the bidder's proposal.

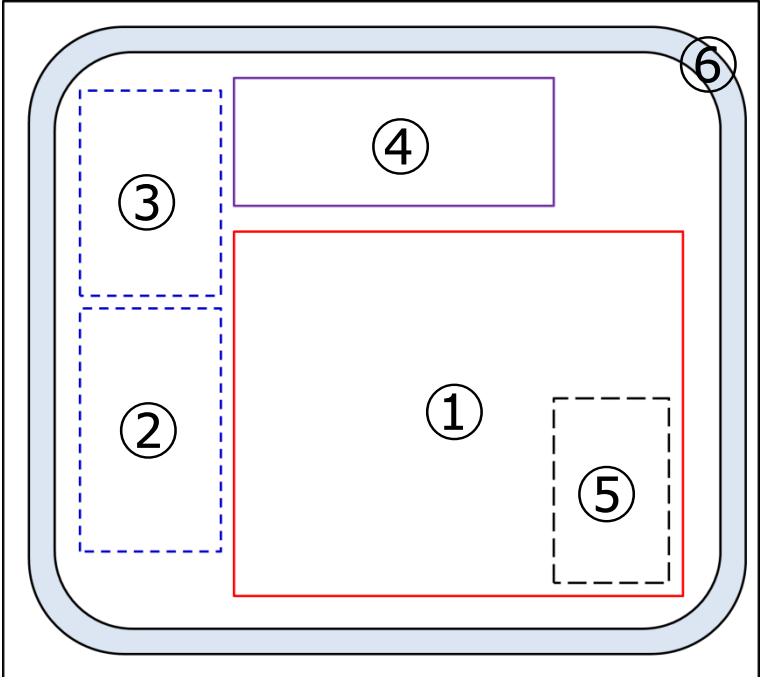
*2 The grading area of ① will be changed depending on the size of the adopted system for #3FC.

3-2. Outline of Frequency Converter (Shin-Sakuma FC)

Layout Plan 1*1



Layout Plan 2*1



- ① Frequency converter system (converter transformer, voltage-sourced converter, buffer reactor (valve reactor)*2, AC filter*2)
- ② 275kV GIS (50Hz), bushings and gantry towers
- ③ 275kV GIS (60Hz), bushings and gantry towers
- ④ Step-down transformer, 66kV GIS and shunt capacitors (50Hz)
- ⑤ Main building
- ⑥ Internal road

*1 The plans are tentative and may be changed depending on our scheduled study and/or land acquisition.
 *2 The equipment can be installed when necessary, based on the bidder's proposal.

4-1. Scope of Work (Higashi-Shimizu S/S, CEPCO)

Item			Specifications	
Frequency converters with voltage-sourced converters	#1FC	Voltage-sourced converter	Rated power	300MW±100Mvar (50Hz, 60Hz)
			Frequency	50Hz (Tokyo side) / 60Hz (Chubu side)
			Type	Indoor, air insulated, water-cooled system The circuit configuration can be proposed by the bidder.
		converter transformer	Rated capacity	Should be determined based on the rated power of VSC
			Rated primary voltage	275kV (50Hz, 60Hz)
	Buffer reactor (valve reactor), AC filter, shunt capacitor, shunt reactor and so on can be installed when necessary, based on the bidder's proposal.			
	#3FC	Voltage-sourced converter	Rated power	300MW±100Mvar (50Hz, 60Hz)
			Frequency	50Hz (Tokyo side) / 60Hz (Chubu side)
			Type	Indoor, air insulated, water-cooled system The circuit configuration can be proposed by the bidder.
		converter transformer	Rated capacity	Should be determined based on the rated power of VSC
Rated primary voltage			275kV (50Hz, 60Hz)	
Buffer reactor (valve reactor), AC filter, shunt capacitor, shunt reactor and so on can be installed when necessary, based on the bidder's proposal.				
AC system	275kV GIS (50Hz)		Insulation type	SF ₆ gas insulated, outdoor installation
	Station power supply system, Generator system for emergency		—	For frequency converters

4-2. Scope of Work (Shin-Sakuma FC, J-POWER)

Item		Specifications	
frequency converter system with voltage-sourced converter	Voltage-sourced converter	Rated power	300MW±100Mvar (50Hz) 300MW±0Mvar (60Hz)
		Frequency	50Hz (Tokyo side) / 60Hz (Chubu side)
		Type	Indoor, air insulated, water-cooled system The circuit configuration can be proposed by the bidder.
	Converter transformer	Rated capacity	Should be determined based on the rated power of VSC
		Rated primary voltage	275kV (50Hz, 60Hz)
	Buffer reactor (valve reactor), AC filter and so on can be installed when necessary, based on the bidder's proposal.		
AC system	275kV GIS (50Hz)	Insulation type	SF ₆ gas insulated, outdoor installation
	66kV GIS (50Hz)	Insulation type	SF ₆ gas insulated, outdoor installation
	Step down transformer (50Hz)	Rated capacity	180MVA
		Rated primary voltage	275kV
	Shunt capacitor (50Hz)	Rated capacity	80Mvar x 2 Units
		Rated voltage	66kV
		Others	Low order harmonics damping circuit may be necessary.
	275kV GIS (60Hz)	Insulation type	SF ₆ gas insulated, outdoor installation