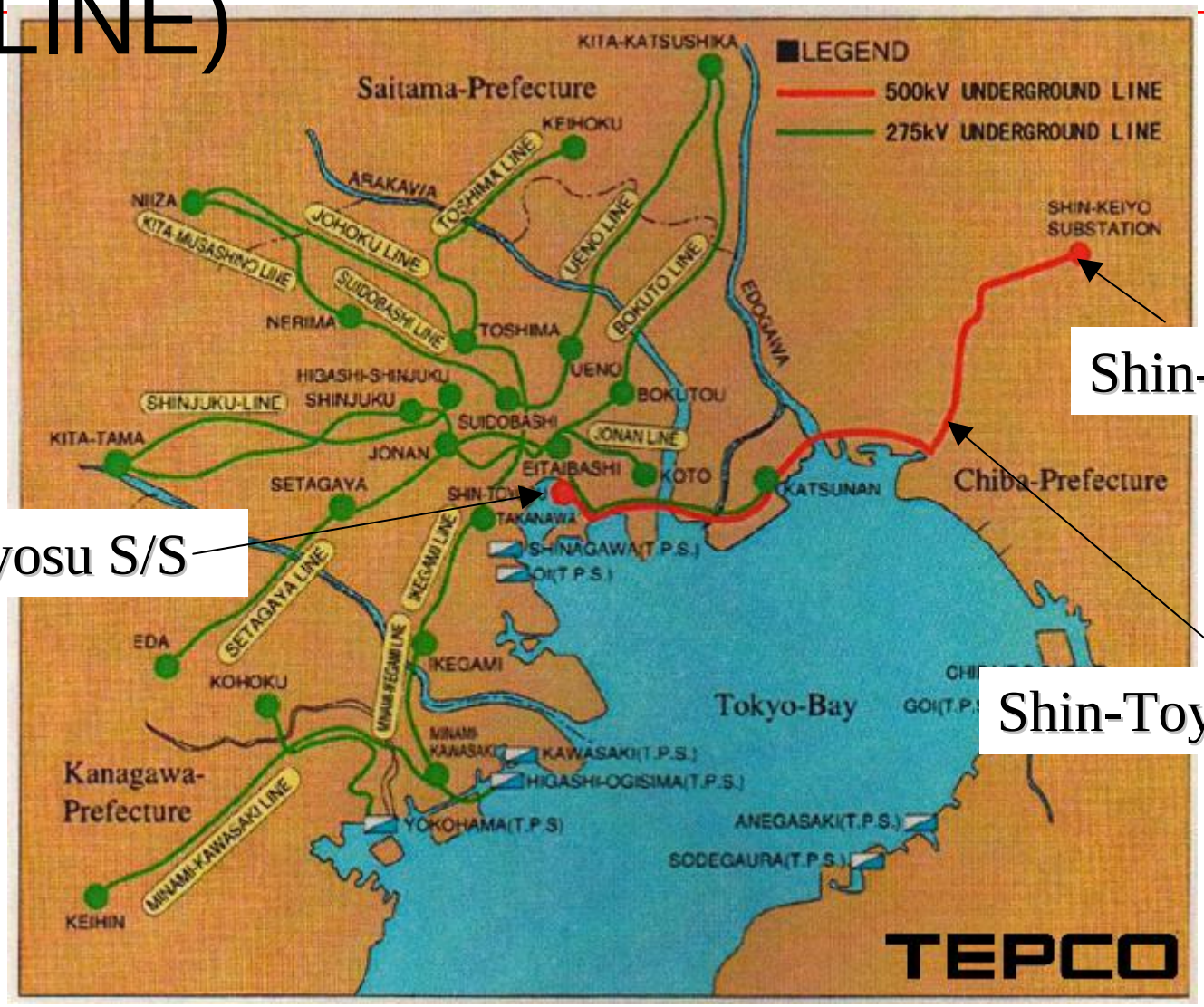
Compensation of the reactive power in japan (500kV Shin-Toyosu Line etc.)

Japan

TEPCO
TOKYO ELECTRIC POWER COMPANY

500kV SHIN-TOYOSU LINE (OUTLINE)



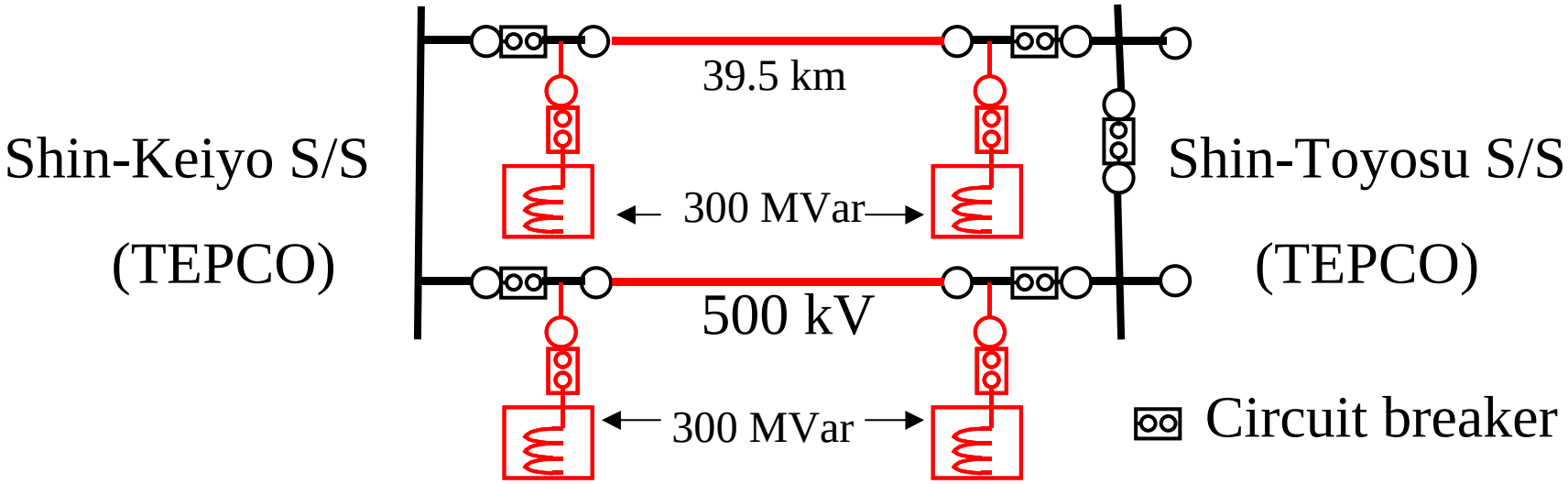
Shin-Keiyo S/S

Shin-Toyosu S/S

Shin-Toyosu Line

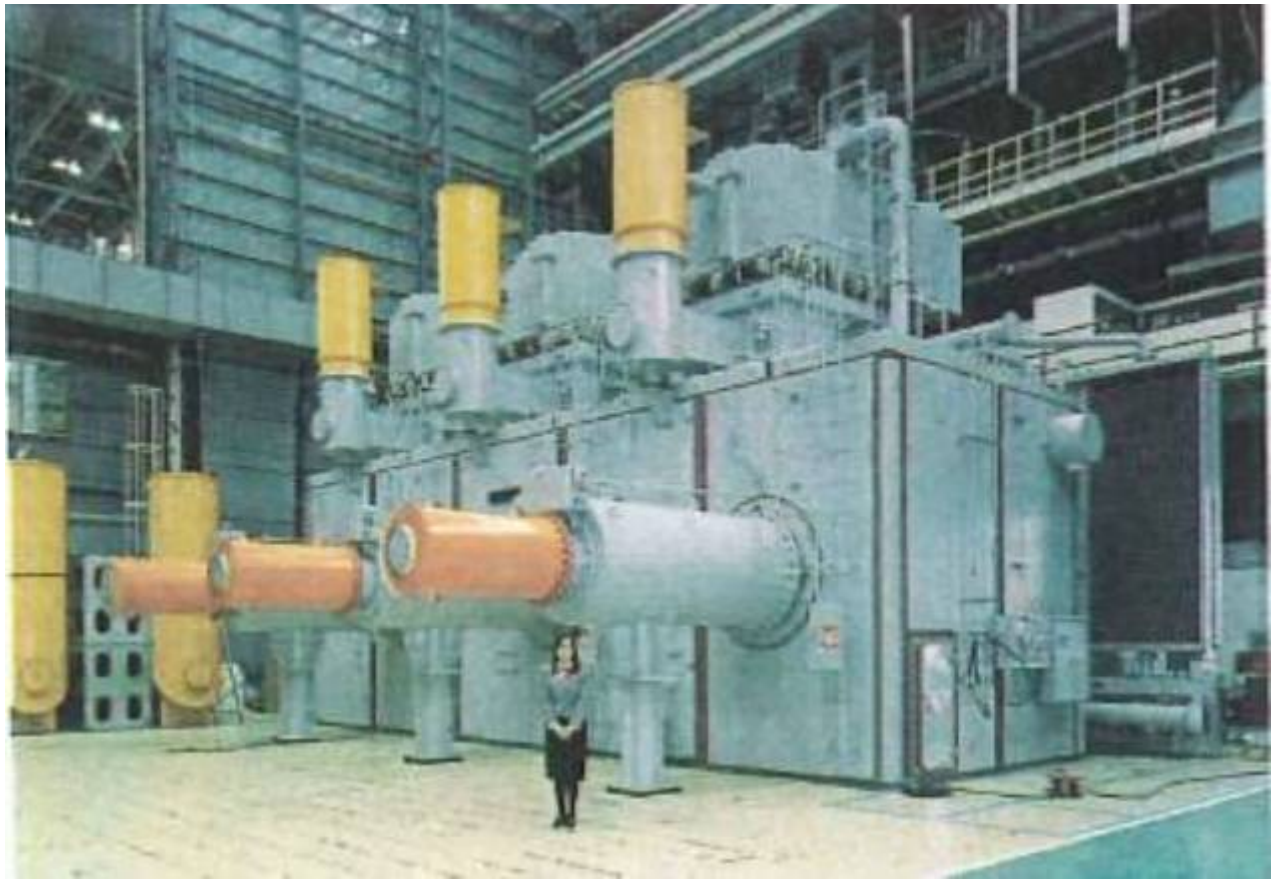
Aluminum covered XLPE (CAZVI) 2,500 mm^2, 39.5 km, 2 circuits, 900MW/cct

500kV SHIN-TOYOSU LINE (COMPENSATION)



	Shin-keiyo S/S	Shin-Toyosu S/S
Position	at both ends of the line	
	On the ground	Under the building
Nominal power	300MVar (x2)	300MVar (x2)
Space occupied	about 200 m2 (x2)	about 100m2 (x2)

An Example of shunt reactor (in factory)



How to decide the application of shunt reactor and its capacity

【Case 1 ; Enormous capacitance ;
only underground transmission】

Considering the following points;

- The capacitance of the cables is completely compensated with a reactance of the line end ShRs.
- The ShRs should be connected to bose side of the cable lines to reduce the over voltage at the cable line end when the cable lines are opened.

How to decide the application of shunt reactor and its capacity

【Case 2 ; Middle scale capacitance ; underground lines with overhead lines.】

Considering the following points;

- The voltage fluctuation should be kept within a permitted value.
- Stability of a power network should be kept while transmission line's fault occurred.
- The ShR should be located in the lower voltage circuit to reduce a construction cost.
- Considering the future expansion of system, we have to prepare the setting area.