

# Pacific Intertie

## Connecting remote generation



The Pacific Intertie was the first major HVDC link in the US, and has undergone major expansions and refurbishment and ABB has been heavily involved over the years.

In 1965, ABB and General Electric were awarded a contract for a 1,440 MW,  $\pm$  400 kV transmission system - a challenge at the time since the line voltage, length and current were greater than any HVDC project built. The system was operating in 1970, until an earthquake devastated the Sylmar converter station, near Los Angeles. Operation was restored by 1973. A few years later, the owners raised the transmission rating to 2,000 A and 1,600 MW, the equipment's inherent capacity.

### Pacific Intertie upgrade

Increasing power demand as older generation around Los Angeles was retired led operators to upgrade capacity on the Pacific Intertie transmission by raising line voltage resulting in a total capacity of 2,000 MW. The Pacific Intertie upgrade (PIU) was commissioned by ABB in 1985.

### Pacific Intertie expansion

In 1985, ABB was contracted to extend the Pacific Intertie transmission to 3,100 MW - the Pacific Intertie expansion (PIE). New 1,100 MW converter stations were installed in parallel with existing stations, and current in the DC line rose to 3,100 A. The PIE was commissioned in 1989.

### Sylmar converter station

Damaged in a 1994 earthquake, the Sylmar converter station's original mercury-arc valves were also nearing the end of their design life, so the owners LADWP built a new 500 kV, 3,100 MW converter station at the existing facility. The existing converters and control building were modified, and the valve halls and as much existing equipment as possible reused. The new station went into service in 2004.

### Celilo station upgrade

In 2013, to secure the reliability of this major power supply, Bonneville Power Administration, the owners of the Celilo northern station, decided to make a refurbish and upgrade station capacity to 3,800 MW. ABB will commission the upgraded station in 2016.



<b>Main data:</b>	
Commissioning year:	2016, 2004, 1989, 1985, 1970
Power rating:	1,440 -> 1,600 -> 2,000 -> 3,100 -> 3,800 MW (Celilo)
No. of poles:	2
AC voltage:	230 kV (Sylmar), 500/230 kV (Celilo)
DC voltage:	$\pm 400$ kV -> $\pm 500$ -> $\pm 560$ kV
Length of overhead DC line:	1,360 km
Main reason for choosing HVDC:	long distance, network stability
Application:	1970 connecting remote generation; 1985 upgrade; 1989 connecting remote generation; 2004 upgrade (Sylmar); 2016 upgrade (Celilo)

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