Security in power supply

World’s first successful retrofit of an existing HVDC PLUS system with black-start capability
In our modern world, safe and reliable power supply is of utmost importance. In case of a power outage, for example due to network interruptions or environmental reasons like an earthquake, power supply has to be restored as quickly and efficiently as possible. That’s why Siemens has retrofitted the Trans Bay Cable transmission link, running from Pittsburg to San Francisco, with black-start capability. What’s more, Siemens is the world’s first provider that has upgraded an existing plant with black-start capability – and has successfully performed a live test.
Reliable power supply for San Francisco
The Trans Bay Cable Project is a submarine High Voltage Direct Current (HVDC PLUS) transmission link, running under the San Francisco Bay. Transmitting existing energy from Pittsburg with a transmission capacity of 400 MW, it ensures highly reliable and sustainable power supply for San Francisco.

Innovative HVDC PLUS technology
The Trans Bay Cable transmission link was the first application to use the innovative HVDC PLUS technology from Siemens. Its modular multi-level voltage-sourced converters (VSC) make it the preferred solution whenever space for converter stations is limited – and it’s also a prerequisite for delivering better performance with respect to dynamic behaviors and harmonics as well as for black-start or System Recovery Ancillary Services (SRAS) capability.

Black-start capability for quick power grid restoration
Existing plants with VSC can be easily retrofitted with black-start capability. The biggest advantage: Black-start capability allows operators to restore their power to an islanded grid quickly and efficiently – without the need of additional power stations. Critical infrastructures like hospitals, fire stations, and emergency centers will benefit from expedited restoration of power to the grid.

Easy upgrade of an existing plant: Trans Bay Cable transmission link
The Trans Bay Cable upgrade project implemented black-start capability into the existing HVDC PLUS transmission system without having to exchange any HV equipment like converters or transformers, with the only upgrade the Control and Protection system. The onsite upgrade was successfully completed within the planned outage period.

First successful live test of the black-start capability
The VSC system from Siemens is the world’s first that has been successfully tested for black-start capability with load banks of 50 MW and 30 Mvar. The advantage: Load banks allow testing black-start capability without actually having to access the transmission grid.

Black-start capability from Siemens – benefits
- VSC (HVDC PLUS) from Siemens is world’s first to be successfully tested for black-start capability with active and reactive load banks connected
- Quick and efficient power restoration in the event of a blackout
- Easy upgrade of existing HVDC PLUS transmission system with black-start capability
- Sustainable protection and stabilization of power networks