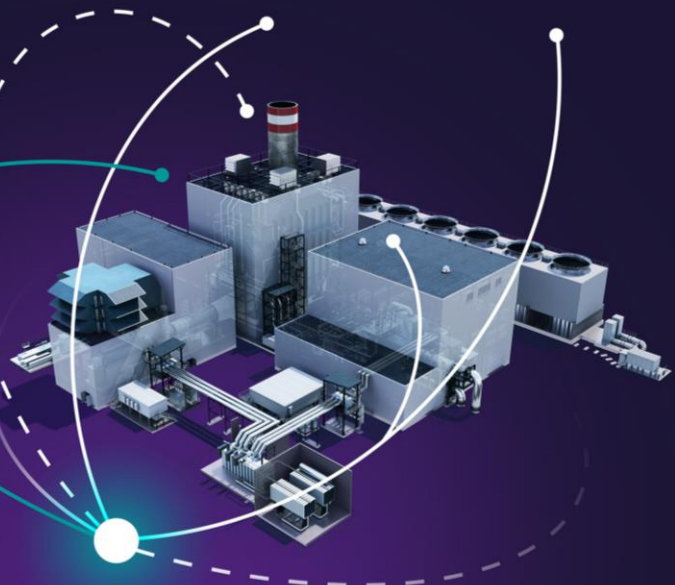


# Synchronous Condenser Conversions\*

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\* brownfield / for (non)-operating power plants

A synchronous condenser is a generator without a prime mover from a gas or steam turbine. It stabilizes the grid in changing reactive power demands. The rotating mass and the dynamic generation of reactive power stands for the high advantages of this product. Short circuit power supply and the frequency stabilization are the main benefits of the synchronous condenser.

## Initial Situation

Reduction of nuclear and fossil power and the increase of renewable power is causing stability problems in the high-voltage grid worldwide.

## Our Solution

Any existing power plant generator type could be converted into a synchronous condenser. It could supply the grid with short circuit power and could ensure permanent dynamic voltage and reactive power control. Synchronous condenser aim to stabilize the frequency and support the voltage also for long distances. They could generate electricity during dynamic peak demands and have the capability to build up the grid after black-out. The project time for converting the plant is usually less than 12 months. The solution allows to utilize existing assets and therefore offers a very short Return on Investment (ROI).

## Technical data

|                                 |  |
|---------------------------------|--|
| Reactive power                  | depending on generator size up to +1,500 / -1,000 MVar (cap. / ind.) |
| System Inertia (Kinetic Energy) | Up to 4,000 MWs with flywheel  |
| Short Circuit Power SK"         | Up to 1,800 MVA at point of connection                               |

## Technical Requirements

- Shaft train calculation
- Removal of turbine components
- Foundation verification
- Axial support of shaft train
- Turning gear system
- Cooling system optimization
- Lube and lifting oil supply adaptation
- Modification of protection system
- Modification of the plant DCS

Over 50 different projects have been developed and planned with customers for OEM and non-OEM plants worldwide. In the meantime, projects have been realized in Germany, Denmark, Sweden and USA.

Siemens Energy offers a large pool of solutions for different applications all over the world for all types of generators.

## Your Benefits

- **Minimum costs** due to re-use of the existing generator and relevant auxiliary systems. Written-off assets can be reactivated.
- Extended lifetime of a power plant generates **additional revenue**.
- **Decreased danger for blackouts** as grid is in an optimum range of operation due to improved  $\cos \psi$  and increase of short capability.

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