SIEMENS

SST-PAC 5000
Steam Turbine Package

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Version 2

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Siemens SST-PAC 5000

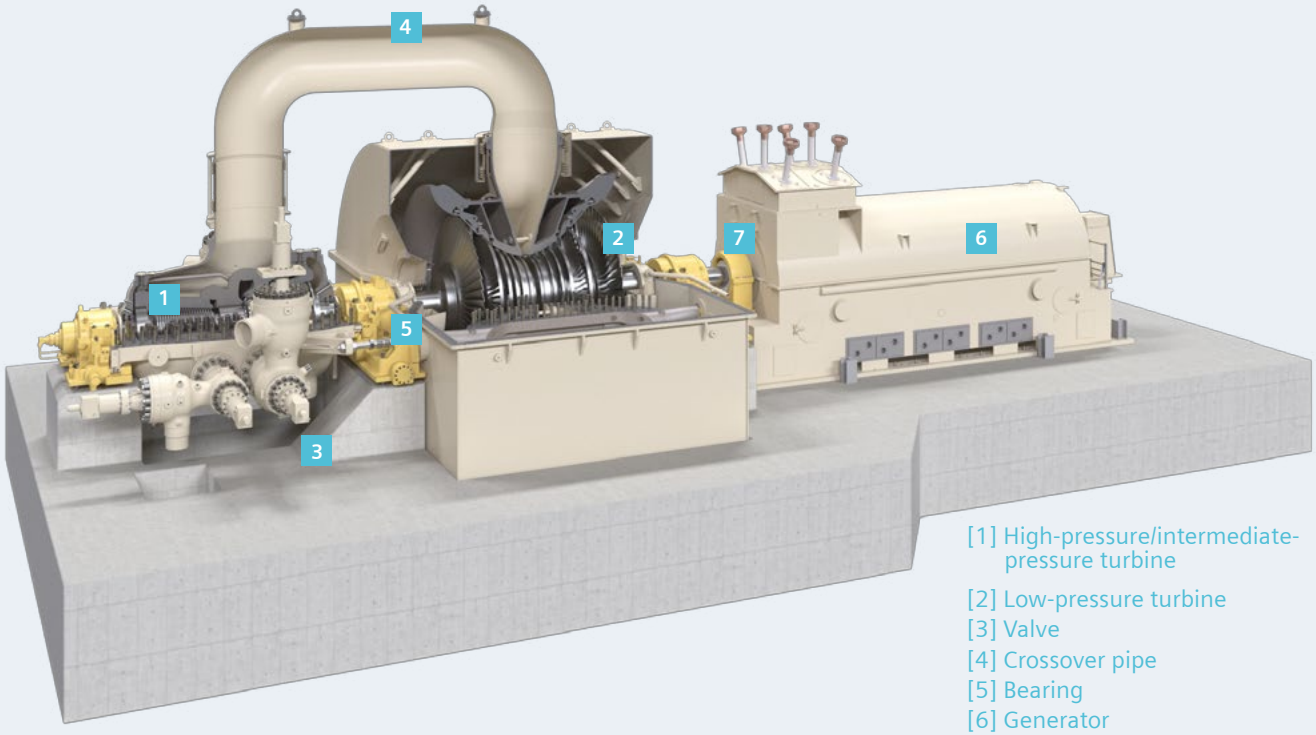
Siemens Steam Turbine packages SST-PAC 5000 are operated in combined cycle power plants (CCPP) and in coal-fired steam power plants (SPP). The SST-5000 steam turbine combined with a SGT-8000H gas turbine and a Siemens generator, achieved a **world class efficiency of 61.5 percent** in the CCPP Lausward.

The steam turbine package is installed as a low- or high-level arrangement. There are various exhaust configurations available to create an optimized plant layout: bottom, single-sided and double-sided.

Preassembled modules reduce coordination effort, on-site assembly time, and technical risk.

The SST-5000 series consists of a combined high-pressure/intermediate-pressure (HP-IP) turbine, and one or two low-pressure (LP) turbines.

Various extractions are possible for feedwater heating (up to 9 stages), process steam, and district heating.



[1] High-pressure/intermediate-pressure turbine
[2] Low-pressure turbine
[3] Valve
[4] Crossover pipe
[5] Bearing
[6] Generator
[7] Stator winding

Best efficiency High flexibility

Responsible fuel handling is becoming more and more important for reducing CO_2 emissions.
The Organisation for Economic Co-operation and Development (OECD) recently addressed the environmental requirements as a precondition for export financing for the entire range of coal-fired power plants.
Therefore the technology needs to be developed continuously to meet these environmental demands.

Going forward, the good experiences gained from existing high-end ultra-supercritical (USC) coal-fired power plants have been transferred to power plants of the 350-MW size with the SST-PAC 5000.

Siemens has extended the capability of its SST-PAC 5000 for supercritical and ultra-supercritical steam parameters. They can now be deployed in the output range of 250 to 500 MW.

Customer benefits

Performance **Flexibility** **Availability** **Trusted partnership**

- **World-class efficiency and combined heat and power**
- **Long maintenance intervals to reduce lifecycle costs**
- **Flexible steam extractions**

Technical data

Power output:
- **CCPP:** 120 to 650 MW
- **SPP:** 250 to 500 MW

Frequency: 50 or 60 Hz
Speed: 3,000 or 3,600 rpm

Efficiency:
- **CCPP:** 61.5 % net plant efficiency (2016 Lausward)
- **SPP:** 53.0 % turbine efficiency

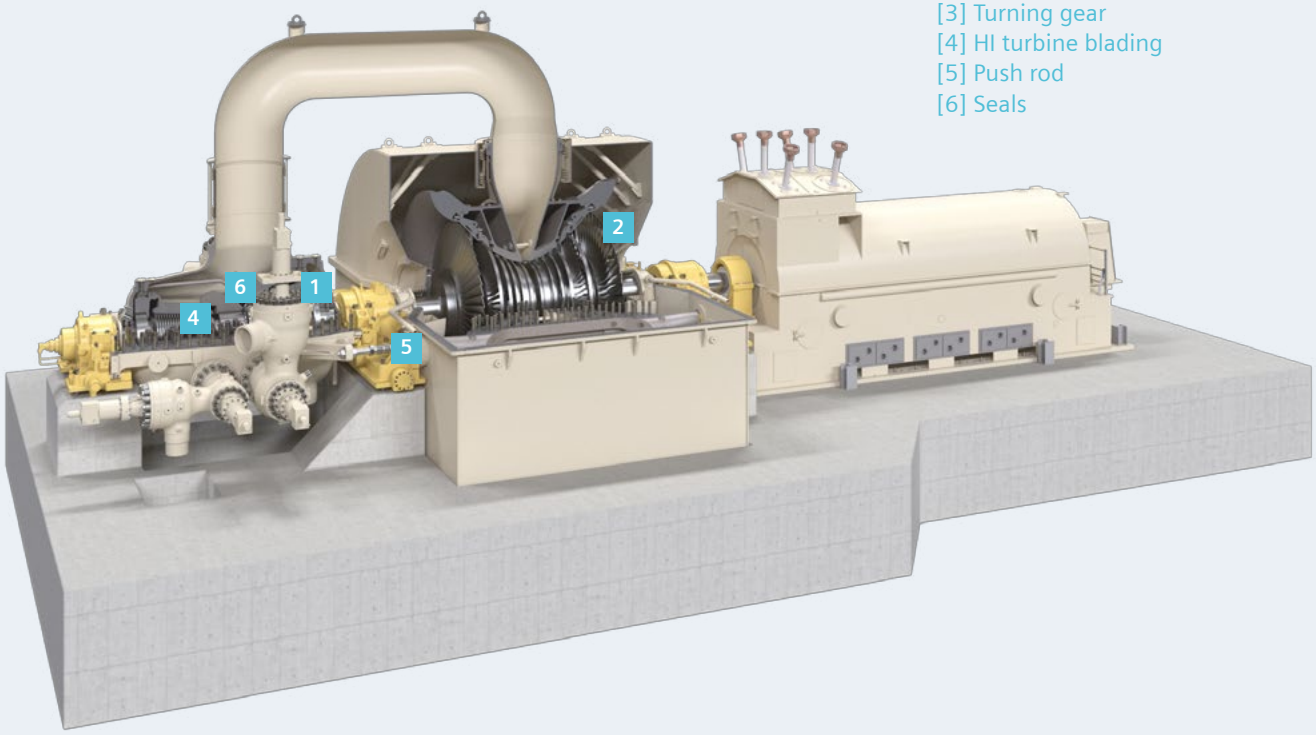
Last stage blade length:
- **50 Hz:** 66 to 142 cm / 26 to 56 inches
- **60 Hz:** 66 to 95 cm / 26 to 38 inches

Steam conditions CCPP:
- Main steam pressure up to 177 bar / 2,567 psi
- Temperature up to 600 °C / 1,112 °F
- Reheat temperature up to 610 °C / 1,130 °F

Steam conditions SPP:
- Main steam pressure up to 260 bar / 3,771 psi
- Temperature up to 600 °C / 1,112 °F
- Reheat temperature up to 600 °C / 1,112 °F

Power factor generator:
- **50 Hz:** 0.80
- **60 Hz:** 0.85 – 0.95

[1] Blade ring
[2] LP turbine blading
[3] Turning gear
[4] HI turbine blading
[5] Push rod
[6] Seals



Generator

Instrumentation and controls

Siemens SGen-2000P series

Siemens SGen-2000P series pressurized air-cooled generators with ratings up to 550 MVA are used in simple cycle, combined cycle, and steam power plants.

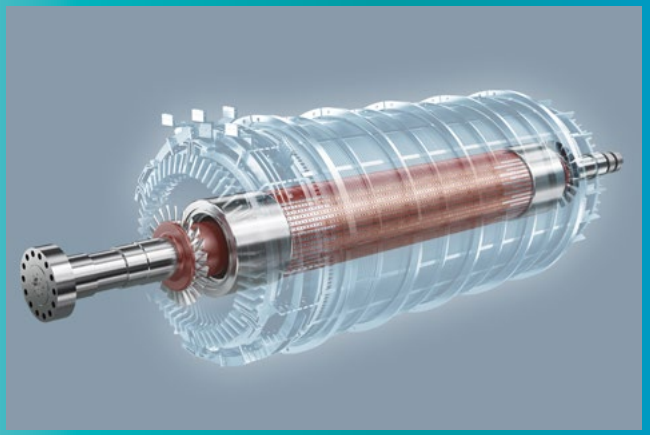
The SGen-2000P series features pressurized-air cooling with a water-cooled stator winding. Replacing hydrogen cooling with pressurized air significantly reduces plant complexity and lowers total costs of ownership (installation, service, operation).

The components of the SGen-2000P series have been proven over decades of operation.

Siemens SGen-1200A series

The SGen-1200A air-cooled two-pole generator series has ratings up to 370 MVA for steam, gas, and combined cycle applications.

Both generators serve all operational modes, from base load to peaking operation, with excellent operational flexibility.



SGen-2000P rotor

Maintenance of SST-5000

*EOH = Equivalent Operating Hours
**Estimated values (base load)
***Depending on shift mode and customer requirements

Minor Inspection | Medium Inspection | Major Inspection

Minor Inspection

- Visual inspection of accessible components, including condenser
- Functional checks on valve and control components
- Alignment checks
- Optional: Inspection of non-accessible areas with boroscope

Assembly

Combined high-pressure/intermediate-pressure turbine modules are delivered to site **completely assembled** – this allows a **fast and simple on-site installation**.

The low-pressure turbine components are designed for optimized site assembly lead time.

Auxiliaries

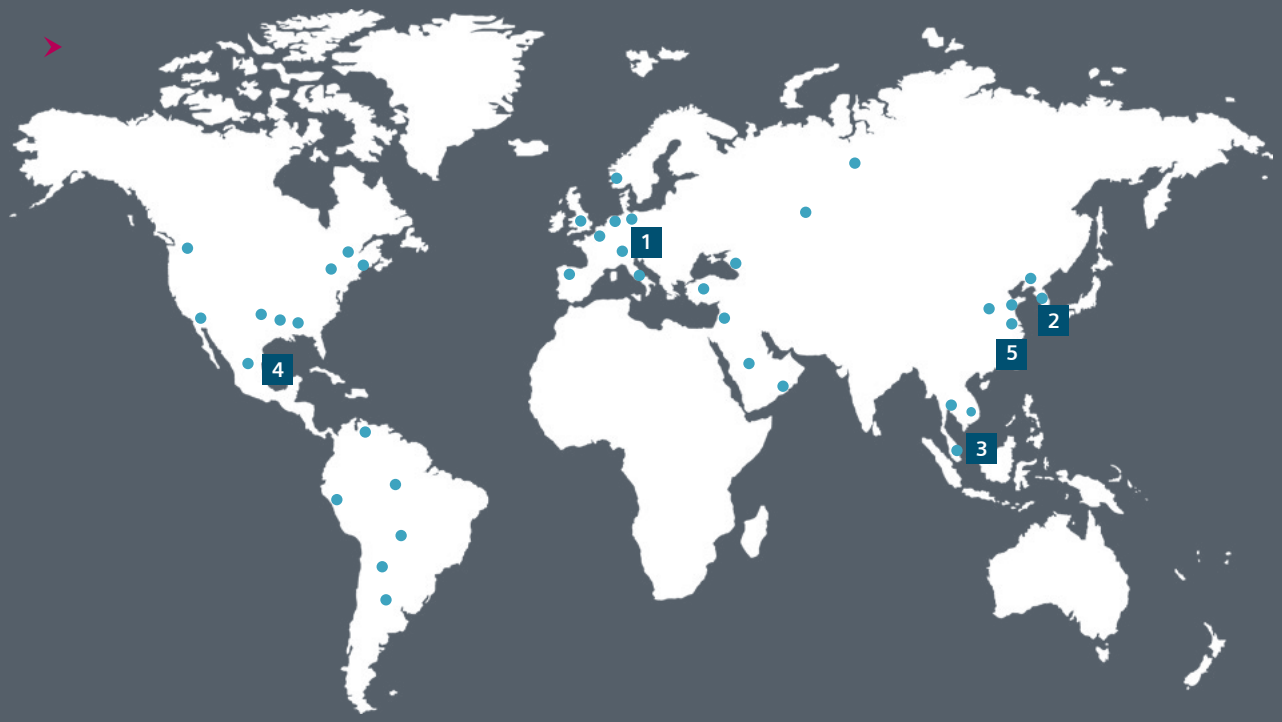
The core turbine modules as well as the auxiliary systems are designed for maximum customer value:

Lube oil system, seal oil system, seal steam system, condenser air removal system, and additional systems.

These are completely preassembled modules for easy and fast connection to the related piping and electrical systems.

Condenser air removal system

Reference examples



- [1] Lausward, Germany
- [2] Dangjin III, South Korea
- [3] Nhon Trach II, Vietnam
- [4] Panda Temple, Texas, USA
- [5] Yangcheng, China

Switch to printable overview

Combined cycle power plant.

SCC5-8000H 1S (single shaft)
Lausward “Fortuna”, Germany

The power plant has broken three world records: in the acceptance test a maximum electrical net output of 603.8 MW was achieved and the net energy conversion efficiency was around 61.5 percent.

In addition, “Fortuna” can also deliver up to around 300 MW for the district heating system of the city of Düsseldorf – a further international peak value for a power plant equipped with only one gas and steam turbine. This increases the overall efficiency of natural gas as a fuel to 85 percent.

Commercial operation: **2016**

Power output: **604 MW**

Efficiency: **> 61.5%***

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*Plant net efficiency

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