Coal-fired Steam Power Power Plants (SPP)
## Siemens Steam Turbines for coal-fired Steam Power Plants

### SST-5000 series
for subcritical coal-fired Steam Power Plants and Combined Cycle Power Plants

Various extractions for feed water preheating (up to 9 stages), process steam & district heating possible

<table>
<thead>
<tr>
<th>Power output</th>
<th>120 MW to 700 MW</th>
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</thead>
<tbody>
<tr>
<td>Max. steam parameters</td>
<td>Main steam / Hot reheat steam</td>
</tr>
<tr>
<td></td>
<td>177 bar / 600 °C / 620 °C</td>
</tr>
<tr>
<td></td>
<td>2,570 psi / 1,110 °F / 1,150 °F</td>
</tr>
</tbody>
</table>

### SST-6000 series
for subcritical and ultra-supercritical coal-fired Steam Power Plants

Various extractions for feed water preheating (up to 9 stages), process steam & district heating possible

<table>
<thead>
<tr>
<th>Power output</th>
<th>300 MW to 1,200 MW</th>
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<tbody>
<tr>
<td>Max. steam parameters</td>
<td>Main steam / Hot reheat steam</td>
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<tr>
<td></td>
<td>300 bar / 600 °C / 630 °C</td>
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<tr>
<td></td>
<td>4,350 psi / 1,110 °F / 1,166 °F</td>
</tr>
</tbody>
</table>
Our dedication is to grow your business

...by continuous improvement of our value propositions

AVAILABILITY

Highest reliability and availability

FLEXIBILITY

Fast start-up
Flexible start-up modes

PERFORMANCE

World record efficiency
Life proven performance

TRUSTED PARTNER

by continuous improvement of our value propositions
We never compromise on quality - to ensure highest reliability and availability

For us, reliability means living up to what we promise

Flexible start-up modes: fast/normal/slow
Optimized EOH consumption

Strict quality control
Highest requirement on tolerances
Reduced spare parts need
Reduced forced outage rate

Forced cooling
Reduced outage time

Long maintenance intervals
Reduced outage time and costs

Flexible start-up modes: fast/normal/slow
Optimized EOH consumption

Strict quality control
Highest requirement on tolerances
Reduced spare parts need
Reduced forced outage rate

Forced cooling
Reduced outage time

Long maintenance intervals
Reduced outage time and costs

Highest standard on maintenance intervals
Major overhaul (open casing) after 100,000 EOHs, ~12 years
Most customers have no findings at major overhauls

Benchmark setting reliability
1.8% higher reliability compared to NERC¹ statistics

¹) North American Electrical Reliability Council
We demonstrate our flexibility in our turbines and beyond

For us, flexibility means openness to your requirements

- Bypass cooling
- Minimum wall thickness
- Barrel type HP turbine
- Fast thermal loading capability
- Hot start “on the fly”
  - Reduction of hot start time
- Flexible start-up modes: fast/normal/slow
- Optimized start-up time based on demand
- HP stage bypass
- Efficient frequency control with compromising efficiency

**Hot start “on the fly”**
Reduction of hot start-up time of up to ~30 minutes without additional investment

Integrated boiler partner concept to ensure fast plant ramp-up
Founded boiler expertise as licensor of benson boiler technology
We deliver world record efficiency and life proven performance

For us, efficiency means the optimum for your RoI

- Double-flow IP turbine
  - IP-admission blade ring with vortex cooling (up to 15 K reduction of rotor temperature)
- Highest possible steam parameter
  - Internal bypass cooling
- Barrel type HP turbine
  - Minimum radial clearances
- Customized blade path design
  - High performance 3DV™ blading
- HP stage bypass
  - Efficient frequency control with compromising efficiency
- LP turbine erosion protection
  - Hollow stator blades with passive heating
- Push rod arrangement
  - Reduced axial clearances

Powered by leading efficiency and tailored solutions
Live steam pressure up to 300 bar and reheat temperature of up to 630°C
World record efficiency with Waigaoqiao III (46%)

Powered by life time performance
Proven life time performance: low degradation
We strive to be your trusted partner - by being reliable, knowledgeable, professional and respectful

We offer more than just Turbine-Generator sets:

- We consult you at early planning stage to evaluate the best concept for your application
- We go hand in hand with you to convince your end customers
- We optimize the entire water-steam cycle for you, ensured by our well-founded engineering expertise
- We reduce the interfaces for you by providing an integrated boiler partner concept
- We provide native on-site support for you to ensure smooth communication
- We support you in finding a financing solution

We offer various trainings to enable you to operate your equipment optimally, e.g.:
- Plant operator trainings
- Simulator trainings

„Customers’ voices”

“Lünen is the cleanest and most efficient hard-coal-fired power plant in Europe. Using leading-edge Siemens-technology makes it possible to save up to a million tons of CO2 every year.”

Editorial team Penn Energy
Reference example SST5-6000
Niederlausitz, Germany

Proven technology and efficiency

“Schwarze Pumpe” is a supercritical coal-fired steam power plant which is extremely fuel efficient.

The plant also produces process steam for a brown coal refinery, and provides heating for neighboring communities.

Com. operation: 1997/98
Power output: 2x 800 MW
Main steam: 252 bar / 3,655 psi
544 ºC / 1,011 ºF
Reheat steam: 562 ºC / 1,044 ºF
Reference example SST5-6000
Niederaußem K, Germany

Ultra-supercritical Steam Power Plant

For Niederaußem K Siemens delivered the largest tandem-compound steam turbine at that time.

Com. operation: 2002  
Power output: 1,027 MW  
Efficiency: 43 %  
Main steam: 265 bar / 3,830 psi  
576 °C / 1,069 °F  
Reheat steam: 600 °C / 1,112 °F
Reference example SST5-6000
Yuhuan, China

Proven technology and efficiency

The power plan Yuhuan in China is a ultra-supercritical coal-fired steam power plant. It was China’s most advanced coal-fired power plant in 2008 and got the “Asian Power Award”.

Com. operation: 2007
Power output: 4x 1,000 MW
Efficiency: 45 %
Main steam: 263 bar / 3,807 psi
600 ºC / 1,110 ºF
Reheat steam: 600 ºC / 1,110 ºF
World Class in Clean Coal

Since startup in 2008, Waigaoqiao III has, compared to an average Chinese coal-fired power plant, saved 1.1 million metric tons of coal and reduced CO₂ output by 2.8 million metric tons annually.

The plant reaches an efficiency of up to 46 %, making it one of the most efficient coal power plants in the world.

Com. operation: 2008
Power output: 2x 1,000 MW
Efficiency: 46 %
Main steam: 270 bar / 3,916 psi
600 °C / 1,110 °F
Reheat steam: 600 °C / 1,110 °F
Reference example SST5-6000
Lünen, Germany

Record-high-efficiency steam power plant

Lünen is the cleanest and most efficient hard-coal-fired power plant in Europe. It provides electricity for around 1.5 million households. It also supplies the city of Lünen with district heating.

Using leading-edge Siemens-technology makes it possible to save up to a million tons of CO₂ every year.

Com. operation: 2013
Power output: 750 MW
Efficiency: 46 %
Main steam: 270 bar / 3,916 psi
  597 ⁰C / 1,106 ⁰F
Reheat steam: 609 ⁰C / 1,128 ⁰F
Contact us directly

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siemens.com/steamturbines