Our top priority at Siemens is to provide outstanding, responsive service solutions to help you improve your operating plant competitiveness and profitability. As part of our ongoing commitment to meet the changing requirements of your operating assets, we offer the latest technology to help to enhance your operating plant capability and flexibility as part of Siemens Flex-Power Services™. One of our modernization products is the Turn Down upgrade.

Siemens offers the Turn Down upgrade as an innovative solution designed to further reduce the compressor mass flow at part load and therefore to reduce the minimum part load where carbon monoxide emission requirements can be met.

**Our product**

The implementation of the Turn Down upgrade is designed to help increase efficiency for combined cycle plants in part load operation with a reduced minimum part load, lower carbon monoxide emissions and almost constant gas turbine exhaust temperature at a high level. The resulting expanded operating range is achieved by decreasing the compressor mass flow with increasing the adjustable range of the inlet guide. The actual minimum part load depends on your site specific conditions and the desired carbon monoxide emission level. The high turbine exhaust temperature level allows the steam turbine to be in operation with optimum efficiency.

The Turn Down upgrade can provide significant performance advantages and offer attractive financial payback options.

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Your benefits
The Turn Down upgrade can offer you a technical and monetary quantifiable benefit and can be a cost-effective means to help you improve the overall performance of your gas turbine plant.

The Turn Down upgrade can include the following benefits:
- Reduced minimum part load with lower carbon monoxide emissions at part load (depending on site specific configuration and desired carbon monoxide emission level)
- Increased combined cycle efficiency in part load operation
- Lower fuel consumption (cost) during negative spark spread operation

Scope of supply
The Turn Down upgrade from Siemens is just one of the many innovative packages available.

The scope of this upgrade includes:
- New linearization unit for Inlet Guide Vane
- New Inlet Guide Vane position sensor with extended operating range
- Modification of Inlet Guide Vane ring (including new scale and new bolts for bearing blocks)
- Detailed engineering and implementation of instrumentation and controls modifications related to the gas turbine.

The Turn Down upgrade may be combined with other modernizations such as the Hydraulic Clearance Optimization. The Turn Down upgrade is applicable for the SGT5-4000F (V94.3A) and SGT6-4000F (V84.3A) and is state-of-the-art for new Siemens gas turbines of the SGT5-4000F (V94.3A) since July 2005. We recommend a major outage for implementing the Turn Down upgrade. We offer a full range of field service capabilities to help you manage your maintenance and outage schedules.

References
Since 2003 (first time application) more than 120 units are in operation worldwide with the Turn Down upgrade and have logged more than 2,500,000 equivalent operating hours (EOH). Several units of frame type SGT5-4000F (V94.3A) and SGT6-4000F (V84.3A) have been retrofitted worldwide:
- Two units in South Korea
- One unit in Belgium
- One unit in Germany
- One unit in New Zealand
- One unit in Spain
- One unit in United Kingdom

We provide products and services to support your goal of maximizing your return on investment.