



**SIEMENS**

*Ingenuity for life*



## Flex-Plant™ Solutions

Future-Proof Technology for  
Enhanced Plant Profitability

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# Flex-Plant™ Integrated Combined Cycles

*Siemens' integrated technology enables unsurpassed operational flexibility that helps maintain your competitive edge regardless of market changes. By offering a range of capabilities from high efficiency base load operation, fast start, low turndown and fast ramping, Siemens Flex-Plants are equipped to be future-proof, with the understanding that change is the only constant in the energy market.*





## Proven fast-start technology

***Siemens Flex-Plant is  
the energy solution  
designed to bring  
technology for tomorrow  
- to the industry today.***

With over 300,000 operating hours of commercial experience, Siemens is the market leader in flexible combined cycles. Since the first fast start combined cycle went commercial in 1999, Siemens has continued to evolve its technology, adding capabilities to the Flex-Plant™ to broaden the operational capability of the plants, reduce operating costs, and open new opportunities for dispatch.



# Flex-Plant





***“The plant’s cutting edge technology will help strengthen electrical system reliability as variable renewable resources continue to be deployed to achieve California’s important, clean energy goals.”***

*James H. Pope, General Manager, Northern California Power Agency, owner and operator of Lodi Energy Center CCPP (U.S.)*



Integrating proven, fast-start technology in a high-efficiency, three-pressure reheat combined cycle, the Flex-Plant can achieve full load in less than half the time required by traditional combined cycle plants.

#### **Co-Start™ Technology**

Integration of a Siemens Flex-Plant frees the gas turbine and steam turbine to start, stop, load and unload fast and with reliable predictability. With Co-Start, the full Flex-Plant combined cycles can be up and running in less than an hour.

#### **DASH™**

Proven to enable fast load changes in plants with duct firing, DASH can ramp as quickly as a peaking plant, moving at the maximum ramp rate of the gas turbine.

#### **Clean-Ramp™**

Siemens Clean-Ramp technology enables the Flex-Plant to stay in emissions compliance, while load following. This unique, patented

feature integrates the control of the gas turbine and the SCR to enable low emissions out of the stack while ramping up or down.

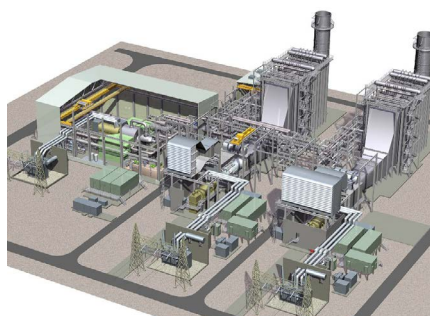
The utilization of the combined cycle for fluctuating demand is the next step in our evolution of a more eco-friendly, integrated power generation.

- Increased profits >\$25M NPV\*
- Savings of \$5M in plant capital costs with Energy-Control\*
- 500 MMBtu fuel savings per warm start with Steam-Assist\*
- Fuel savings with Co-Start approx. 425 MMBtu per start\*

Faster, more efficient, dispatchable power designed to significantly reduce start-up emissions and start-up fuel costs, can result in higher dispatch and increased generation revenue.

***The flexibility of a simple cycle, in a high efficiency Flex-Plant combined cycle.***

\*Estimated results for a 2x1 SCC6-8000H. Actual benefit is dependent on plant configuration, operational profile and local market conditions.



#### **SCC6-5000F Flex-Plant Power Island**

	Output	Efficiency
Flex-Plant 1x1	370	58.2
Flex-Plant 2x1	746	58.7

#### **SCC6-8000H Flex-Plant Power Island**

	Output	Efficiency
Flex-Plant 1x1	460	61.0
Flex-Plant 2x1	930	61.0

Ramp rates up to 200MW in 10 minutes





*Minimizing environmental impact was a top priority in developing the Flex-Plant portfolio. These highly efficient Solutions employ technology and techniques that enable fast start-up, reduce greenhouse gas production, and decrease water usage, while enhancing plant profitability.*





## Reducing Environmental Impacts and Enhancing Plant Profitability

The incorporated technology can greatly reduce start-up emissions and start-up costs, making a Siemens Flex-Plant the optimal balance between capital costs, operational requirements, and environmental conservation.

### Energy-Control™

It's not just the environmental footprint that is small. Siemens Flex-Plants can start the gas turbines at the full ramp rate, without the need for an oversized air cooled condenser (ACC). This results in ACC cell reduction savings, fuel savings, decreased water usage, and faster megawatts on the grid.

### Steam Assist™

Steam-Assist technology eliminates the additional expense and environmental impact of an auxiliary boiler for a fast start plant. Proven in combined cycle operation, this technology is available to E, F and H-classes, for plants that will handle peak and intermediate loads.

### Flexible

Whether your economic model requires plant shutdown, turndown, or high efficiency base load operation, the Siemens Flex-Plant technology offers the flexibility to do it all. A Siemens Flex-Plant solution is designed to allow you to operate your plant at peak profitability. When turndown is the preferred mode, the Flex-Plant is capable of running at as little as 13 percent of its rated load. If load following to match grid demand is a priority, the Flex-Plant, with over 80 MW per minute up and down capability, will meet this need.

### The Power of Siemens

Siemens has been developing extended scope solutions for over 100 years, and installed our first flexible combined cycle over 16 years ago. Since then, more than 25 Siemens fast start combined cycles have been supporting grids around the globe.

### Flexible Benefits

- Reduce start-up emissions up to 95%
- Lower greenhouse gas production than conventional power plants
- Fast load following within emissions compliance
- Integrates well with intermittent renewables
- Advanced design heat recovery steam generator (HRSG) suitable for fast start-up and daily cycling
- Low load operation

### Profitability

- Reduced start-up costs
- Ancillary services for grid reliability
- 10-minute megawatts dispatch
- High efficiency results in a lower cost of generation
- Increased dispatch opportunities

With a Flex-Plant solution, you can choose as little or as much as you want... from a power island to a full turnkey solution. No matter what you need, we have the solution.

- Integrated design
- Performance guarantees
- Operational guarantees
- Enhanced grid interface capabilities
- Constructability
- Commissioning
- Project management
- Supply management
- Project logistics

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