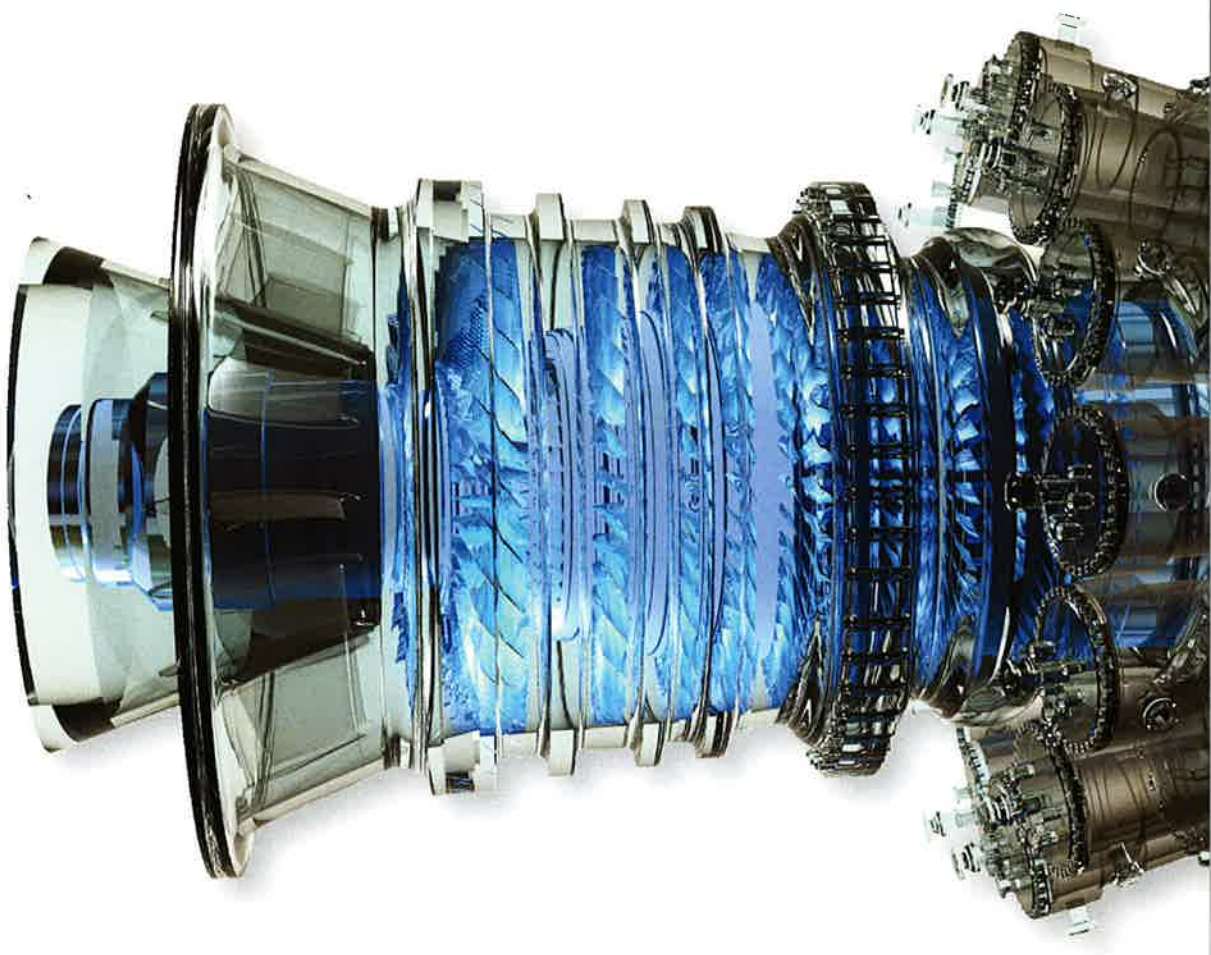
GE Energy



7FA Heavy Duty Gas Turbine Product Evolution

imagination at work

a product of ecomagination

To help meet customers' growing need to generate more power more efficiently, GE Energy introduces the next evolution of its industry-leading 7FA heavy-duty gas turbine for 60 Hz power generation regions. By merging a host of proven technologies leveraged from across our product lines, the new 7FA now offers improvements in output, thermal efficiency, operability and lower life cycle costs, all without compromising on the high degree of operational flexibility traditionally delivered by GE's F-class fleet.

GE's 7FA – Accelerating Turbine Evolution

Turning Performance into Profitability

The improved performance and efficiency of the new 7FA gas turbine translates to increased revenues for power generators. GE's 7FA delivers greater output with greater efficiency without sacrificing the reliability, availability and operational flexibility customers have come to expect from GE F-class technology. Especially well-suited for cyclic and peaking projects, the 7FA can generate more than 620 MW in a 207FA combined cycle configuration with better than 57% efficiency, and all with the backing of GE Energy's unsurpassed product support.

Part of the ecomagination* Portfolio

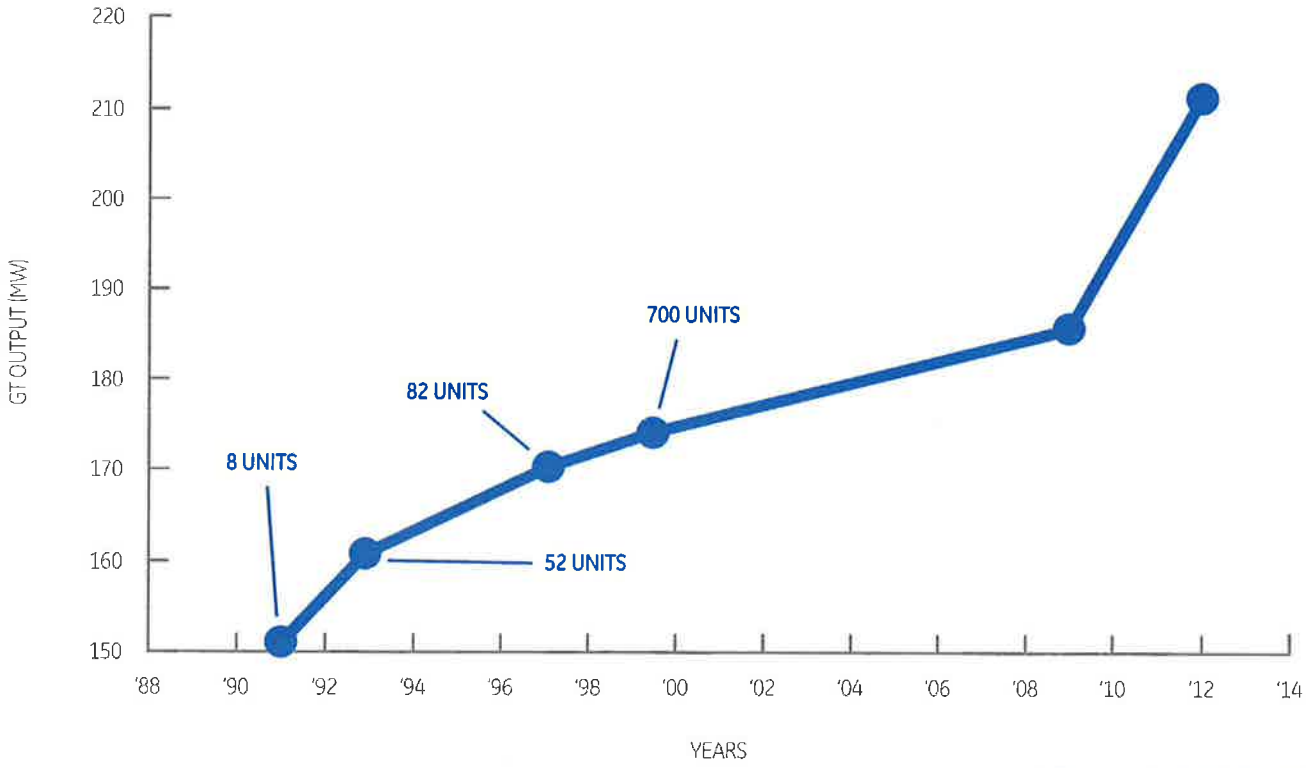
The new 7FA gas turbine is an approved ecomagination product, due to its improved efficiency and higher output, which will result in less fuel consumption and lower emissions on a MW/hr basis than currently available 7FA gas turbines. Ecomagination is GE's commitment to imagine and build innovative technologies that help customers address their environmental and financial needs, such as the need for cleaner, more efficient sources of energy. To join the ecomagination portfolio, a product must complete the company's rigorous internal and third party environmental and operational evaluation.

High Level Performance Summary

	CC[†]	SC
Output	627	211
Efficiency (%, LHV)	57.5	38.5
Heat Rate (Btu/kW-hr, LHV)	5934	8872
NO_X (ppmvd @ 15% O_2)	2	9
CO (ppmvd)	9	9

[†] Values assume gas fuel, ISO conditions, 2x1 combined cycle, with SCR

7FA Gas Turbine Evolution



Advanced Compressor Technology

Leveraging proven technology from earlier GE models, our latest 7FA is coupled with a highly advanced 14-stage axial compressor, providing enhanced performance, operability and maintainability in simple and combined cycle configurations.

Performance

The larger, more efficient compressor delivers improved output over earlier models by allowing more airflow, and enhanced efficiency due to its three-dimensional aerodynamic airfoils and a hybrid radial compressor diffuser.

Operability

The compressor's three variable stator vane stages enhance operational flexibility by allowing the control system to adjust compressor airflow to accommodate varying fuel and ambient conditions, or in response to changing operating conditions.

Maintainability

The compressor's field-replaceable blades, along with additional borescope holes that allow for enhanced coverage, improve maintainability and inspection capabilities and result in reduced outage times.

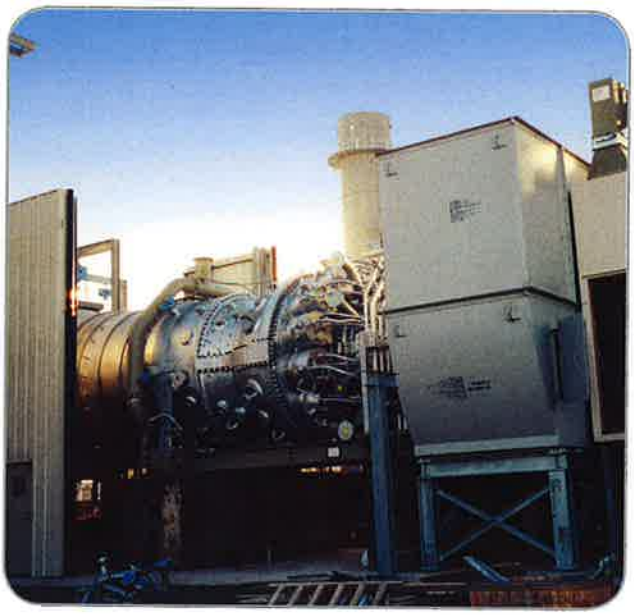
Improved monitoring and diagnostic capabilities are also included through additional sensors and instrumentation that monitor blade health, along with advanced algorithms that enhance efficiency predictions.

Superior Combustion Technology

With its industry-leading DLN 2.6 combustion system, and a model based control system that enables robust accommodation of fuel quality variations, the 7FA produces more power output by firing at higher temperatures while producing only single-digit NO_X and CO emissions—from 49% load up to 100% load.

Best-in-Class Operational Flexibility

GE's 7FA gas turbine provides the greatest operational flexibility in its class, with proven performance in applications ranging from combined cycle and cogeneration to simple cycle peaking. Our flexible performance features can help you expand your ability to operate based on your own specific business priorities and market parameters, largely free from the constraints of equipment limitations.



- Turndown capabilities ensure you can run the turbine at its lowest operating level instead of turning it off, leading to reduced fuel costs, reduced maintenance, and avoiding emissions spikes and time delays associated with full start-ups.
- Startup capabilities provide you with the ability to reduce NO_X emissions during low load operation, leading to reduced operating restrictions based on startup NO_X limits and savings based on NO_X trading credits.
- Fuel heating capabilities allow you to operate on unheated fuel over an expanded portion of the startup sequence, leading to reduced fuel consumption and reduced startup times for both cold and warm starts.

Dispatchability

For customers considering a cycling power plant, the 7FA can be outfitted with Rapid Response. Providing fast and reliable 10-minute starts[1] in both simple and combined cycle configurations, Rapid Response allows you to quickly add power-generating capacity during times of peak demand while significantly reducing NO_X and CO emissions by up to 90% during each startup.

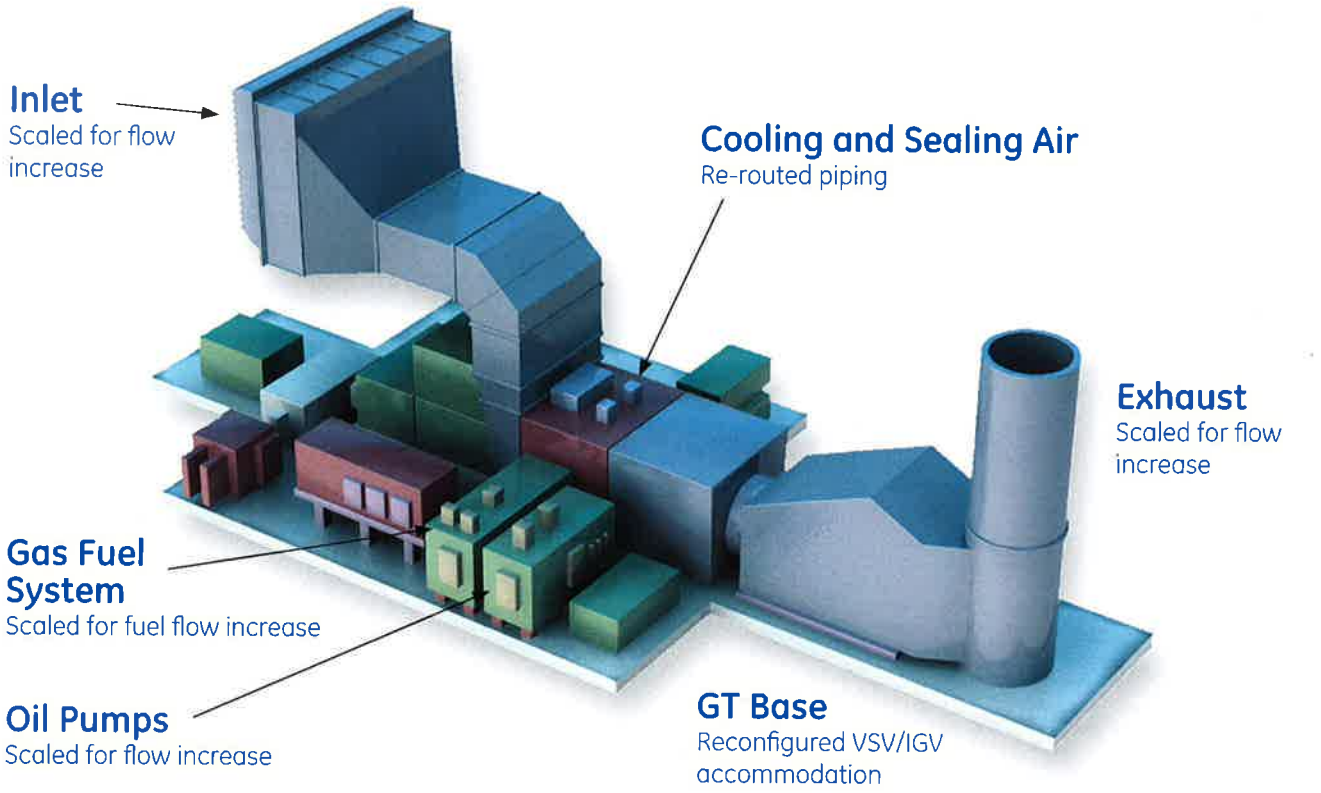
Fuel Flexibility

The 7FA is fuel flexible, and can be operated using natural gas or distillate fuel, reducing fuel costs by enabling you to operate with the lowest priced fuel available.

[1] The 7FA gas turbine with the improved startup capability will be capable of dispatching in ten minutes after a start signal, and will achieve stable combustion with steady state NO_X and CO emissions of 9 ppm within this time period. In simple cycle operation the 7FA will have the capability of dispatching more than 75% of baseload power output in this time period.

Compatible with Existing Reference Plant Designs

The latest 7FA gas turbine has low impact on customers' existing 7FA reference plant designs. Minor changes are needed to accommodate the higher airflow, including a slight increase in the size of the inlet and exhaust, but key parameters such as the required fuel gas pressure and guaranteed noise level remain unchanged.



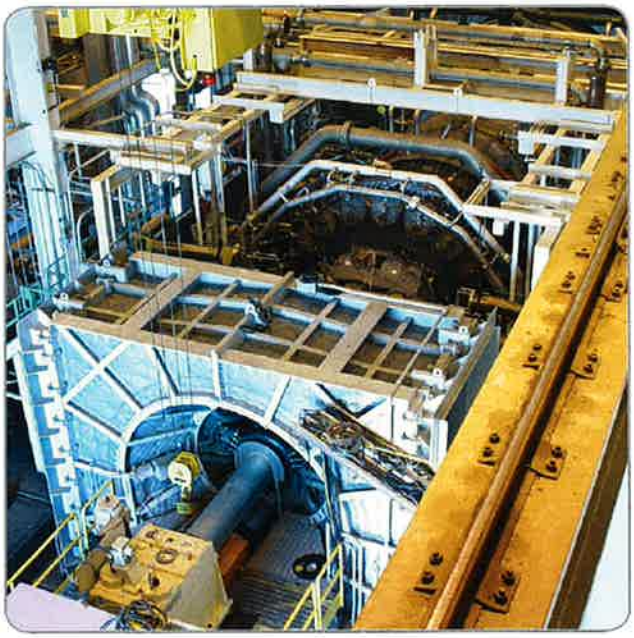
Experienced control system with enhanced capability

The new 7FA turbine uses GE Energy's Mark* VIe control system, which has extensive experience in a variety of power generation applications. This proven control system operates in cooperation with model-based and model-predictive controls that seamlessly fine-tune the performance of the gas turbine to help ensure consistent performance as operating needs and ambient conditions vary.

Advanced monitoring and diagnostics

The upgraded 7FA incorporates new monitoring and diagnostics capabilities to help operators better characterize the operation of their gas turbines and determine the condition of key components. A blade health monitoring system that detects variations in blade characteristics has been incorporated into the first stages of the compressor. The turbine also employs improved flow sensors that reduce uncertainty around key performance parameters and enable the Mark VIe control system to improve performance.

Our Industry-Leading Commitment to Service



GE's Contractual Service Agreement

With a Contractual Service Agreement (CSA) for your gas turbine, we provide maintenance, parts, services and repairs for a fixed price over a specified period of time. Compared to handling maintenance and repairs on a per-incident basis, our CSA offers additional advantages such as guaranteed plant performance and fixed maintenance costs.

A Revolution in Gas Turbine Evolution

Combining superior technology, expertise, and industry-leading product support and service, GE's 7FA is a revolution in gas turbine evolution. And with GE's continuing commitment to improve upon its long list of best-in-class achievements, the 7FA gas turbine continues to set the standard for F-class turbine technology.

GE's Gas Turbine Validation Program

To ensure operational effectiveness, the first new 7FA will undergo full validation testing at GE's manufacturing facility before the unit ships from our factory. Component level testing on the inlet, diffuser and combustor validate performance and reliability, while system level testing will be performed on the compressor and rotor, including full-speed, full-load testing. Our continuing investment in the latest test facilities and technologies is designed to assure you that your 7FA will be in top operating condition when it arrives on site.

F-Class Equals First in Class

Since its introduction, GE's F-class fleet has been successfully operated in a variety of applications around the world. And the F-class delivers—exceeding expectations with an impressive list of record-setting firsts, such as:

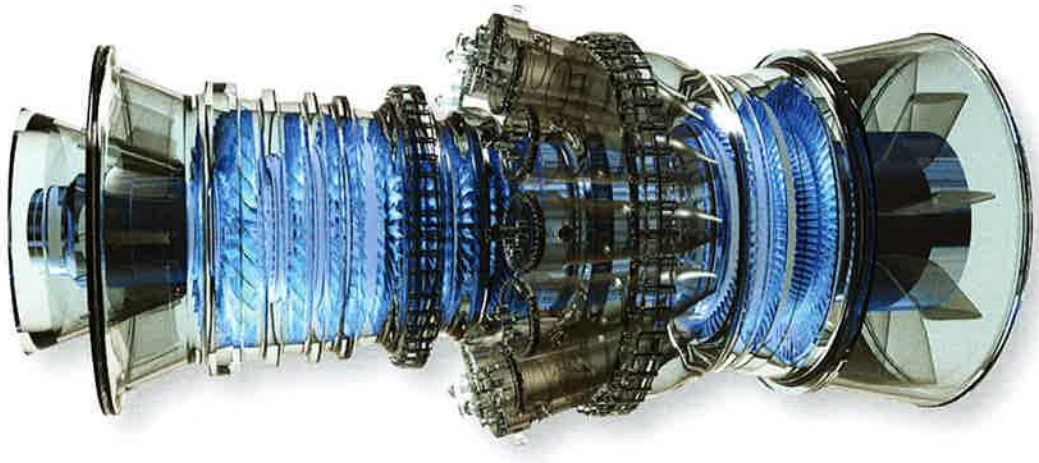
- First to reach 55% thermal efficiency in combined cycle operation
- First to achieve single digit NO_X and CO emissions
- First to achieve 99.2% operating reliability
- First to achieve 98.4% starting reliability
- First to achieve 96% availability
- First to surpass 18 million fired hours of operation

7FA Gas Turbine Technical Specifications

Performance information[1]

	CC	SC
Output (MW)	627	211
Efficiency (%, LHV)	57.5	38.5
Heat rate (Btu/kw-hr, LHV)	5934	8872
Base load fuel burn (MMBtu/hr)	3760	1880
NO_X (ppmvd @ 15% O_2)	2	9
NO_X per start (lbs) – conventional start	373 lbm/start[2]	27 lbm/start[3]
CO per start (lbs) - conventional start	2142 lbm/start[2]	126 lbm/start[3]
CO (ppmvd)	9	9
PM 10 lb/hr, total/front-half only	36/18	18/9
VOC (ppmv)	1.4	1.4
UHC (ppmv)	7	7
Liquid fuel capability	Yes	Yes
GT turndown (% baseload)	49	49
Fast Start capability (10 minutes)[4]	50% GT load	160 MW
NO_X per start (lbs) – CC Rapid Response/SC Fast Start	32 lbm/start[5]	14 lbm/start[6]
CO per start (lbs) - CC Rapid Response/SC Fast Start	162 lbm/start[5]	58 lbm/start[6]
Inlet treatment capable	Yes	Yes

[1] Provided as estimates only
[2] 207FA configuration, conventional warm start w/o Rapid Response, ignition to bottom of mode 6
[3] Single GT, conventional start, ignition to bottom of mode 6
[4] The 7FA gas turbine with the improved startup capability will be capable of dispatching in ten minutes after a start signal, and will achieve stable combustion with steady state NO_X and CO emissions of 9 ppm within this time period. In simple cycle operation the 7FA will have the capability of dispatching more than 75% of baseload power output.
[5] 207FA configuration, Rapid Response, ignition to bottom of mode 6
[6] Single GT, Fast Start, ignition to bottom of mode 6



Performance – Simple Cycle Basis

Description	Details
ISO ambient conditions	14.696 psia, 59°F, 60% relative humidity, 0 ft elevation
Fuel	100% methane
Generator	GT: 7FH2B generator
GT	New and clean

Performance – Combined-Cycle Basis

Description	Details
ISO ambient conditions	14.696 psia, 59°F, 60% relative humidity, 0 ft elevation
Fuel	100% methane
HRSG	Natural circulation HRSG with an SCR for NO_x, and no CO catalyst
Generators	GT: 7FH2B generator, ST: 324 generator
Steam turbine	207D
Cooling tower	Mechanical draft evaporative cooling tower
Duct firing	No duct firing
Plant	New and clean

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