

COMMERCIAL + INDUSTRIAL SERVICES

bulletin

Technological advances in energy generation, distribution and delivery proceed at a remarkable pace. The options available to any commercial or industrial operation are as varied as they are numerous.

At Bay State Gas we strive to provide you the latest in technology and information on the most advanced and efficient natural gas energy solutions that are right for your business.



MICROTURBINES

Microturbines

- > Reliable – runs uninterrupted for years
- > Peak shaving and base load power (grid parallel)
- > Combined heat and power
- > Stand-alone power
- > Backup/standby power
- > Microgrid

Facilities that may benefit from Microturbines include:

- Office buildings
- > Retail stores
- > Municipal facilities
- > Schools and public buildings
- > Small industrial and commercial facilities
- > Surgery Centers
- > Health clubs

Small, Lightweight, Versatile Power Source for Commercial and Industrial Power Needs

Microturbines are small combustion turbines that create high-speed rotation that turns an electrical generator. Individual units range from 30 to 400kW. Microturbines are ideally suited to combined heat and power (CHP) applications due to their installation flexibility, ability to serve larger loads, ability to provide stable and reliable power, and low emissions.

Although similar to a reciprocating engine-driven generator (in that both provide power directly to a facility), the microturbine can generate power continuously with very low emissions. The typical microturbine has relatively few moving parts, higher reliability, significantly longer maintenance intervals, and a longer operating life, offering extended operation of 8,000 hours between scheduled service and an operating life as much as ten times greater than a conventional generator set.

Microturbines were derived from turbocharger technologies found in large trucks or the turbines in aircraft auxiliary power units (APUs). Most microturbines are single-stage, radial flow devices with high rotating speeds of 90,000 to 120,000 revolutions per minute. However, a few manufacturers have developed alternative systems with multiple stages and/or lower rotation speeds. Microturbine systems are capable of producing power at around 25-33 percent efficiency by employing a recuperator that transfers exhaust heat back into the incoming air stream. Efficiencies generally

Microturbines



Outdoor installation of 6 Capstone microturbines. Photo courtesy of Capstone Turbine Corp.



Outdoor installation of Ingersoll-Rand microturbine. Photo courtesy of Ingersoll-Rand Energy Systems

decrease at elevated ambient temperatures. The systems are air cooled and some designs use air bearings, thereby eliminating both water and oil systems used by reciprocating engines.

Microturbines burn natural gas to produce clean, reliable, high-quality power that is comparable in every way to the utility electric grid. Microturbines are built for full-time operation to reduce electricity costs, but they can also be operated for peak shaving operations during times when utility-grid costs are the highest.

Microturbine generators can be divided in two general classes:

Recuperated microturbines, which recover the heat from the exhaust gas to boost the temperature of combustion and increase the efficiency, and

Unrecuperated (or simple cycle) microturbines, which have lower efficiencies.

The recuperator recovers heat from the exhaust gas in order to boost the temperature of the air stream supplied to the combustor. This feature increases the overall system efficiency and reduces the microturbine's emissions.

Exhaust heat recovery can also be used in a cogeneration configuration. The thermal energy remaining in the exhaust can help heat a facility, provide domestic hot water, drive an absorption chiller, or regenerate a desiccant dehumidifier. The clean exhaust can also be used directly in an industrial drying process. When used for cogeneration of electricity and heat, the overall efficiency of the microturbine is very high.

Microturbines can be placed either inside or outside near a facility and connect directly to the electrical distribution system. This shift from large, centralized



Multiple outdoor installation of Ingersoll-Rand microturbines.
Photo courtesy of Ingersoll-Rand Energy Systems

power plants to small, economical on-site generators is especially suited for buildings, retail establishments, and light manufacturing facilities that can benefit from reduced costs, assured availability, and quality electric power. Current customers include

financial services, data processing, telecommunications, restaurant, lodging, retail, office building, and other commercial and light industrial sectors.

Microturbines are ideally suited for distributed generation applications due to their flexibility in connection methods, ability to be stacked in parallel to serve larger loads and ability to provide stable and reliable power. Unattended operation is also an important feature of these systems as many locations may be remote from the grid, or the units may be located inside buildings close to utility interconnects and other thermal loads.

Microturbines reached commercial status in the early 2000s. Currently, thousands of units are in service around the world serving a multitude of customers.



Multiple indoor installation of Capstone microturbines.
Photo courtesy of Capstone Turbine Corp.



Partners In Energy Working Together

YOUR SOURCE FOR ENERGY SOLUTIONS

If you believe microturbine technology is an appropriate consideration for your operation, our **Partners In Energy** program can assist you. We offer financial incentives to help you minimize your upfront cost by sharing a portion of the cost to design, purchase and install the equipment. Simply follow the program guidelines to qualify for matching funds.*

These rebates, combined with the reduction in your overall energy expenses can provide an outstanding return on investment that will pay dividends for years to come.

*Program restrictions apply. Limited time offer.

FOR MORE INFORMATION call us toll-free

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