

# Microturbines

## Overview

Microturbines are small turbines for generating electricity using a variety of fuels including natural gas. Their advantages over internal combustion engines are lower noise, less frequent maintenance, less vibration, more compact size, lower uncontrolled emissions, and an exemption from air quality permitting in many circumstances. Microturbines can be linked together to provide larger electric generation capacity and can be equipped with internal modems for remote monitoring, control, and diagnostics. Waste heat from 500°F exhaust can be used to produce hot water with the addition of a waste heat recovery hot water heater. In some cases, microturbines can be designed with waste heat recovery equipment to produce chilled water, or exhaust can be used directly in heating and drying applications.

## Parameters

Installed Cost	\$900-\$3500 per kW
Efficiency	25% to 32%
Size Range	30 kW -300 kW
Maintenance Costs	1 to 3 cents/kWh
NOx Emissions	2 ppm - 10 ppm

## Electricity Output

Microturbines are usually rated in gross electricity output at ISO conditions (59°F, sea level). However, when adjustments are made for parasitic loads, temperature, and altitude, net electricity output can be reduced by 3% to 25%.

## Natural Gas Pressure

Most microturbines have natural gas compressors because they require a natural gas pressure higher than what is available from The Gas Company. If the gas input pressure into the gas compressor is too low, the compressor may have to work harder to deliver the appropriate gas pressure into the microturbine's combustion chamber. Providing the maximum manufacturer rated natural gas pressure input can often increase overall efficiency and reduce wear and tear on the microturbine's gas compressor.

## Maintenance

As with any piece of machinery, microturbines must be well maintained. Maintenance includes air filter changes, compressor rebuild/replacement, core turbine rebuild/replacement, etc. To ensure proper maintenance, it is recommended that a full-service maintenance contract be purchased from an authorized manufacturer's representative.

## Air Quality

Currently, most air quality districts do not require permitting for microturbine installations that total less than 2,975,000 BTU/hr natural gas input. However, all unpermitted microturbines must meet CARB 2007 guidelines. For more information in the greater Los Angeles area covered by South Coast Air Quality Management District, please call (909) 396-3600 or visit <http://www.aqmd.gov>.