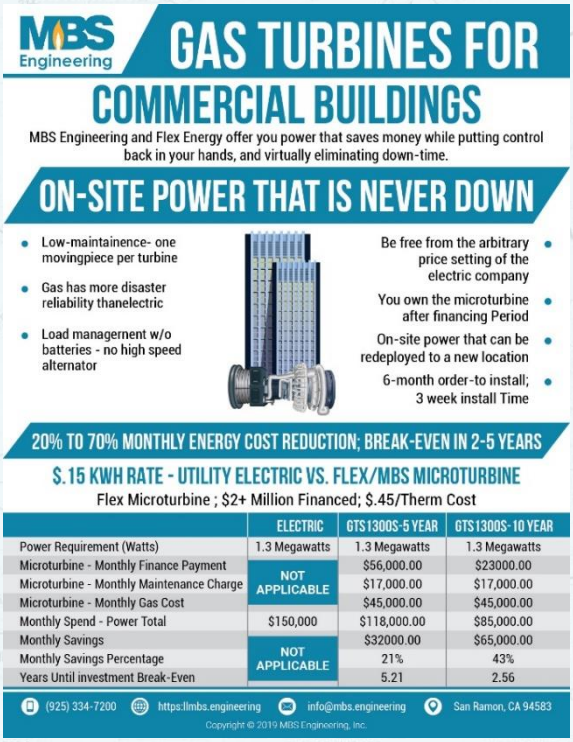
Gas Turbine Power Generation - 101

What Is A Gas Turbine Or Microturbine?

A gas turbine is a modular power station that uses the combustion of clean, natural gas to power an electric generator, generating electricity. A gas turbine 'microgrid' can generate tens of megawatts of power, a single gas turbine can generate 5oo kW up to several megawatts, and a microturbine generates up to 500 kW.



What Else Are Gas Combines It Called?

Gas Turbines are a class of 'Combined Heat And Power' (CHP), which is simply recuperating 'waste' heat (energy) from combustion of gas or fuel, making for a more efficient solution. This process is also called cogeneration.

How Old Is Gas Turbine Generator Technology?

Power from expansive gas is not a new concept, (it dates to Archimedes using steam), however, the combination of this process with electricity generation is a technology that has been constantly improving over the last 80 years or so.

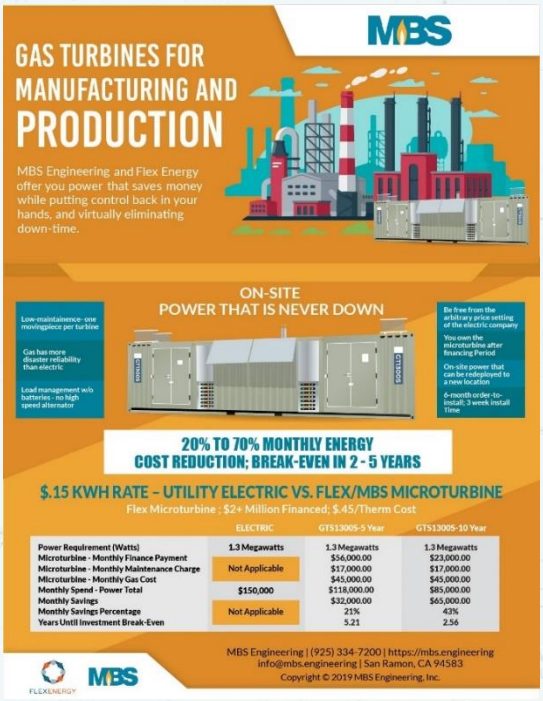
What Is Special About CHP?

While natural gas is currently used to power a lot of grid electric in California, it is less than half of the grid electric power source, making utility electric about 30% efficient. A lot of power bleeds off lines or otherwise not captured in production. 'Cogeneration' with gas turbines, which you can achieve when you have turbines deployed at your location, of about 90% efficient, reducing the overall CO2 footprint as a function of power generated.

What Are The Applications Of A Gas Turbine?

Gas turbines are indicated wherever the power draw requirement is substantial and where natural gas is available – which is pretty much everywhere, including:

1. Beer Breweries
2. IT Data Centers
3. Food Refrigeration, Cold Storage And Processing
4. For Critical Infrastructure (Hospitals, Cell Towers – where diesel backup exists)
5. Schools And Colleges (heating large spaces like gyms or swimming pools)
6. Manufacturing and Production (power costs are considerable)
7. Warehouses and Fulfillment Centers
8. Agriculture (Dairy and anything process-intensive)
9. Hemp Growers
10. Office Buildings



How Large Are Gas Turbines?

A single, 333 kW microturbine is about as big as a Smart Car. An array of 4 – comprising the 1.3 mW unit – sits on a concrete pad, and fits inside a standard shipping container.

Won't I Be Paying More For Natural Gas *And* The Gas Turbine Financing?

A 1.3 mW Flex Energy gas turbine (an array of 4 of the smaller units, for a never-down configuration), can be financed over 5 or 10 years, and the cost, along with the gas to power it (maintenance is included) *is considerably less than grid electric* (about 50% to 70%).

How Are Gas Turbines More Reliable Than Grid Electric?

Utility electric is delivered through above-ground, exposed lines. In storms or even in strong winds – or in the event of a semi-truck collision – grid electric goes down. Even in a disaster scenario, gas is seldom shut-down (extreme earthquakes – above 7.2 will require gas be shut down, but it's very, very rare). Moreover, gas typically has 'bypass' lines, so even if they are disrupted, service typically is not.

How Are Gas Turbines Cleaner Than Coal?

Most grid/utility electric is coal, which is not 'green'. Natural gas is the cleanest fossil fuel, which is why it is widely used to power public transit buses in large cities. By using

natural gas rather than electric power, you are reducing your carbon footprint in most cases.

How Complicated Is The Process Of Getting A Gas Turbine?

It's not. It typically takes about 6 months from order to install and doesn't require a lot of touch points. The steps are:

1. Call MBS Engineering and we'll help you determine whether it makes sense;
2. Have an electrical engineer draft plans including the Flex or other gas turbines; Get permitting and submit them to the Air Resources and Building Inspection boards;
3. Our lender contacts you;
4. We work with your utility to lay additional gas lines, if needed;
5. The turbine manufacturer (Flex or other) delivers the unit;
6. We arrive when the turbine(s) do/es, and perform the installation.

What Is The Breakdown Of My Savings – My Break-Even Time?

Item	Electric	GTS1300S - 5 Year	GTS1300S - 10 Year
Watts Needed	1,300 (1.3 mW)	1,300 (1.3 mW)	1,300 (1.3 mW)
Microturbine Monthly Payment	Not Applicable	$56,000	$23,000
Maintenance Charge - Figured Into Monthly Payment	Not Applicable	$17,000	$17,000
Monthly Gas Cost ($.45/therm)	Not Applicable	$45,000	$45,000
Total Monthly Payment	$150,000	**$118,000**	**$85,000**
Monthly Savings vs. Electric Utility	Not Applicable	**$32,000**	**$65,000**
Savings Percentage vs. Electric	Not Applicable	**21%**	**43%**
Years Before You Break Even	Not Applicable	**5.21**	**2.56**