



**FLEXENERGY**  
SOLUTIONS

## COMBINED HEAT AND POWER FROM FLEX TURBINES®

### **COGENERATION,**

also known as combined heat and power (CHP), is the simultaneous production of electricity and heat from natural gas. Flex Turbines recover the heat normally lost in traditional grid electricity generation and use it for heating, cooling, dehumidification and other processes.

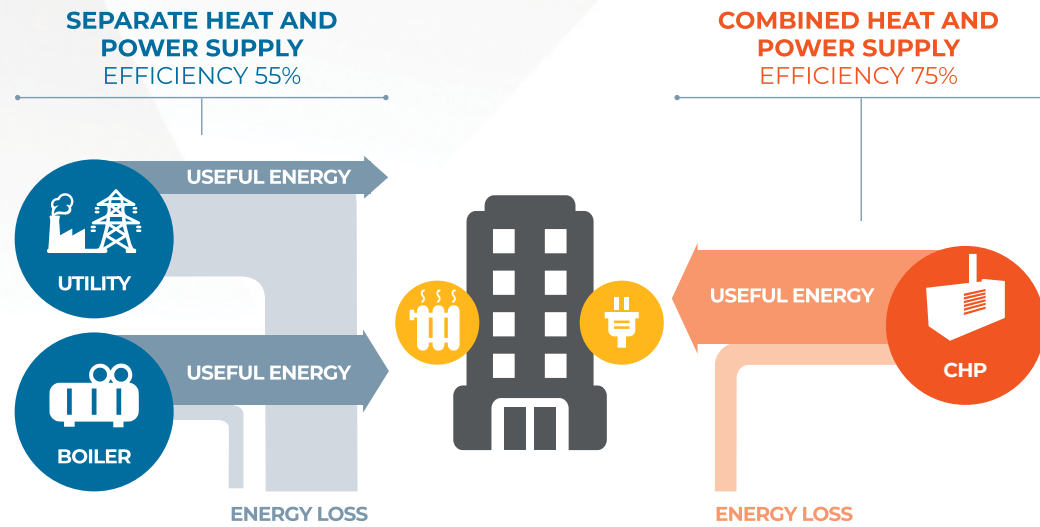


Nearly two-thirds of the energy used by typical electricity generation (i.e. utility power) is wasted in the form of heat released into the atmosphere through electricity transmission and distribution to end users. CHP dramatically increases overall efficiency compared to the use of typical power plants and on-site boilers by capturing and using heat that would otherwise be wasted.

*Power: reliable, clean, and simple.*

## OPERATIONAL EFFICIENCIES

A facility that is powered by fuels such as natural gas, biomass, or diesel only has electrical efficiency of about 33%. Thermal energy from local generation that is not harnessed for other purposes is wasted and a boiler is often used to supplement facility heating. CHP generates electricity and captures thermal energy for re-use. Heat is re-purposed as thermal energy that can be used for space heating, cooling, hot water, industrial processes, etc. This process increases a facility's energy efficiency up to as much as 75%, deriving considerable energy cost savings.



## ECONOMIC EFFICIENCIES

Although CHP systems require higher amounts of fuel compared to boilers that serve a facility's thermal demand, the overall amount of fuel needed for the equivalent electrical and thermal energy is reduced. CHP enables the facility to avoid having to purchase additional fuel for a boiler to supplement electricity from the power plant.

### ANNUAL ENERGY PRODUCTION - TRADITIONAL BOILER VS CHP

BOILER + UTILITY	VS	FLEX GT333S TURBINE
<p><b>BOILER</b> 95% EFFICIENCY</p> <p><b>UTILITY</b></p> <p><b>ELECTRICITY COST</b> \$281,000 (\$0.10/kWh)</p> <p><b>TOTAL FUEL CONSUMED</b> 13,400 MMBtu @ \$5/MMBtu</p>		<p><b>12,700 MMBTU</b> recovered for hot water</p> <p><b>O&amp;M COST</b> \$56,000 (\$0.02/kWh)</p> <p><b>TOTAL FUEL CONSUMED</b> 30,500 MMBtu @ \$5/MMBtu</p>
<b>TOTAL ANNUAL COST</b> \$348,000		<b>TOTAL ANNUAL COST</b> \$209,000

1 YEAR SAVINGS OF \$139,000

ELECTRICITY PROVIDED - 2,810 MWh | HOT WATER GENERATED - 12,700 MMBtu



## DRIVERS AND BENEFITS OF CHP FROM FLEX TURBINES

CHP offers a number of benefits compared to conventional electricity and thermal energy production, including:

**EFFICIENCY** - requires less fuel to produce a given energy output and avoids transmission and distribution losses that occur when electricity travels over power lines.

**ENVIRONMENTAL** - because less fuel is burned to produce energy output and because transmission and distribution losses are avoided, CHP reduces emissions of Greenhouse Gases (GHGs) and other air pollutants.

**ECONOMIC** - CHP can save facilities considerable money on their energy bills due to its high efficiency, and it can prevent susceptibility to electricity cost increases.

**RELIABILITY** - Unreliable electricity service represents a quantifiable business, safety, and health risk for many organizations and industries. CHP from Flex Turbines provides on-site generation and can support seamless power delivery in the event of grid disruptions.

- Lower energy operating costs
- Friendly environmental regulations
- Resiliency initiatives
- Federal and state policies and incentives
- Utility support
- Project replicability
- Flexible fuel options
- Low sound output
- Small footprint – easy installation
- Remote monitoring
- Increased uptime and lower maintenance
- Reduced strain on the grid
- Lowers GHGs and other harmful emissions by over 30% compared to traditional plant and boiler options
- Lessens the need for new transmission and distribution infrastructure
- Fueled by clean, abundant energy sources such as natural gas and biomass
- Seamless support for critical loads when utilities fail

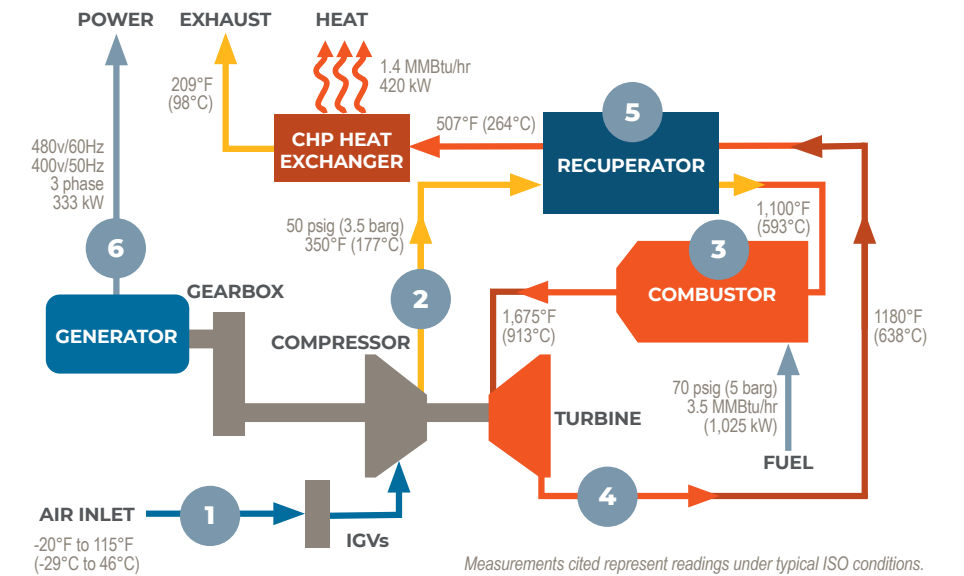
## FLEX ADVANTAGES

The Flex Turbine is a complete efficient power system packaged in a compact enclosure. It converts a wide variety of gases into electricity and useful heat such as hot water. The modularity of Flex Turbines enables scaled power delivery for applications and supply needs ranging from small (333 kW) to large (MW+).

CHP from Flex Turbines provides a cost-effective, efficient, and clean solution for reliable on-site electricity and thermal energy.

When critical power from the utility is unpredictable, our turbines provide seamless electricity during intermittent or extended interruptions.

### COMBINED HEAT PROCESS DIAGRAM



1	2	3	4	5	6
Compressor draws air through the variable Inlet Guide Vanes (IGVs) and compresses it.	Recuperator transfers heat from turbine exhaust, preheating air going to combustor, increasing system efficiency.	Fuel burns in combustor, releasing energy to drive the turbine. Fuel is fed into combustor continuously.	Turbine generates power as the hot pressurized combustion gases expand, driving the compressor, gearbox and generator.	Exhaust from recuperator contains enough energy to produce hot water (heating/chilling).	Generator converts shaft power from gear box to electricity.

## COMPREHENSIVE SERVICES

- Flex Care® service contracts cover planned and unplanned maintenance for five to 20 years
- Full remote alarm and diagnosis capabilities
- Specialty turbine configurations customized for individual field power needs
- Training to keep your Flex Energy system running, safe, and effective with maximum uptime

## IS YOUR FACILITY A GOOD CANDIDATE FOR CHP?

Answering “yes” to any of the following questions indicates that your facility may be a good candidate for CHP:

- Do you pay more than \$0.10 per kWh on average for electricity (including generation, transmission, and distribution)?
- Are you concerned about the impact of current or future energy costs on your business?
- Is your facility located in a deregulated electricity market?
- Are you concerned about the reliability of your facility’s electricity supply? Would there be substantial business, safety, or health impacts if the electricity supply were interrupted?
- Does your facility operate for more than 5,000 hours per year?
- Do you have thermal loads throughout the year (such as steam, hot water, chilled water, or hot air)?
- Do you expect to replace, upgrade, or retrofit central plant equipment (such as generators, boilers, and chillers) within the next three to five years?
- Do you anticipate a facility expansion or new construction project within the next three to five years?
- Have you already implemented energy efficiency measures and still have high energy costs?
- Are you interested in reducing your facility’s impact on the environment?



**CONTACT FLEX ENERGY SOLUTIONS  
TO LEARN ABOUT FLEXIBLE LEASE  
AND PURCHASE OPTIONS TO SUIT YOUR  
POWER DELIVERY AND BUDGET NEEDS.**



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