

# Power, for the Next Generation

## The Challenge

The sheer growth of microprocessor-controlled devices, deregulation of the electric utility infrastructure, and the communications revolution have elevated the issue of power quality to a critical business concern. New technology companies, telcoms, and traditional industries with 24/7 operations and process control requirements want an advanced technology solution that makes zero-downtime a reality today.

Traditionally, industry has relied on standby diesel gensets to provide backup power. However, traditional generators may not always be a viable option for emergency protection because of constraints such as fuel storage, zoning, noise or pollution restrictions.

The most convenient form of true power protection is the Uninterruptible Power Supply or UPS. A UPS provides continuous, clean, regulated power eliminating a transfer over to a generator. However, a UPS may not always be suitable for critical applications requiring extended back-up times due to its limited capability to store energy in the form of batteries with a finite amount of back-up time.

## The Next Generation Solution

MGE UPS SYSTEMS, the world leader in large power system equipment, and Capstone Turbine Corporation, the world leader in micro turbine technology, have partnered together to bring you the first micro turbine/UPS solution that will maximize run time and reduce the need for costly maintenance. By combining the clean, efficient generation system of the Capstone MicroTurbine™ on the DC bus of an MGE UPS, power protection is guaranteed - without limits.

Easily integrated into UPS systems for long ride-through applications, the Capstone MicroTurbine™ is interfaced to the DC battery voltage source and accessed through a programmable power output. Placement of the micro turbine on the DC bus of the UPS means that the energy storage system (battery) is only required to protect the load for the duration of the micro turbine start cycle. As the energy storage requirement is lowered, so is the need for a bulky, expensive UPS.

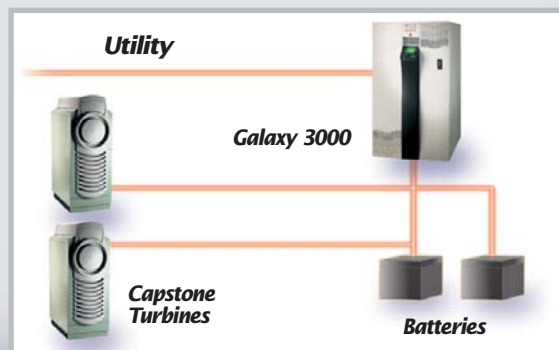


### Capstone as a Standby Power Source

- ▶ *Integrated UPS/Generator source*
- ▶ *Pollution free, quiet, low maintenance*
- ▶ *Capstone Turbines use any fuel source*

### Capstone as a DC Power Source

- ▶ *Reduces quantity of batteries*
- ▶ *Eliminates the need for backup generators*
- ▶ *Smart answer for long autonomy requirements*



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# The Benefits of an Integrated micro turbine/UPS solution

## Higher Inherent Reliability

The simplicity of a micro turbine involving a single moving part and an air cooled system makes this solution virtually maintenance free.

## Reduced Energy Storage

Placement of the micro Turbine on the DC bus of the UPS means that the energy storage system (battery) is only required to protect the load for the duration of the start cycle. Less energy storage means a smaller, lighter and less expensive system.

## Extended Battery Life

Utilizing the Capstone system for extended periods increases the life of the battery by effectively reducing battery cycling.

## System Cost Reduction

Elimination of additional energy storage, its associated maintenance, replacement and recycling requirements effectively reduces user costs.

## Fuel Flexibility

The Capstone Micro Turbine™ can operate on a wide range of fuels including natural gas, propane, diesel or kerosene. In many cases where fuel storage is a problem, turbines can be powered via a standard natural gas connection.

## Modularity, Scalability and Redundancy

The smartly engineered modular design allows the Capstone turbines to be paralleled for redundancy or capacity with no additional paralleling gear.

## Clean Emissions

The Capstone system is the cleanest source of power generation with emissions clean enough to permit continuous operation in just about all of the USA.

## Outdoor or Indoor Installation

Capstone Turbines can be installed indoors. Their lightweight, small size and low noise level allows installation even in high rise buildings.

## Ease of Connection

In this basic configuration, no additional switchgear is required to connect a generator to the system. Further, permitting requirements for the Capstone system are eased because the rectifier front-end of the UPS inherently protects against reverse power flow into the utility.

## Energy Management

A deregulated electricity market is bringing increased price volatility and price differentiation for time of use. Capstone Micro Turbines™ can mitigate such risks by peak shaving the protected load. The economics get even better when combining peak shaving and standby functions.

## Co-Generation

The exhaust heat stream can be utilized to provide either heating or cooling energy. Typical small-scale cogeneration applications include water and air heating, absorption cooling, dehumidification, food processing and even greenhouse applications

UNINTERRUPTIBLE

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**Power,  
Without  
Further  
Interruption**

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