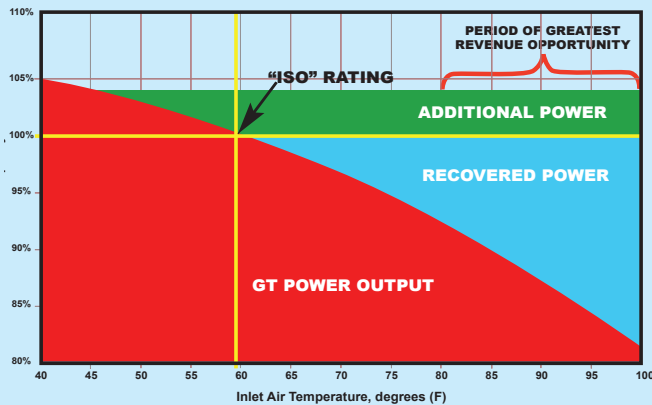


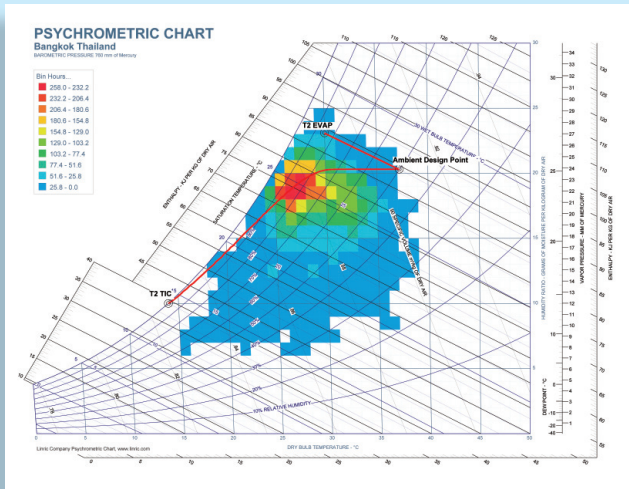
*Turbine Inlet Chilling*

# What is Turbine Inlet Chilling

Turbine Inlet Chilling (TIC) is a technology by which the inlet air to a gas turbine is chilled using a refrigeration system, causing an increase in air density. As the weather gets hotter turbine output decreases and heat rate degrades. TIC allows the operator to recover their lost power while increasing the turbine efficiency.



TIC MWs are the only dispatchable source of power augmentation generation capacity, not affected by weather. Ambient temperature and relative humidity don't impact the performance or output of inlet chilling technology.

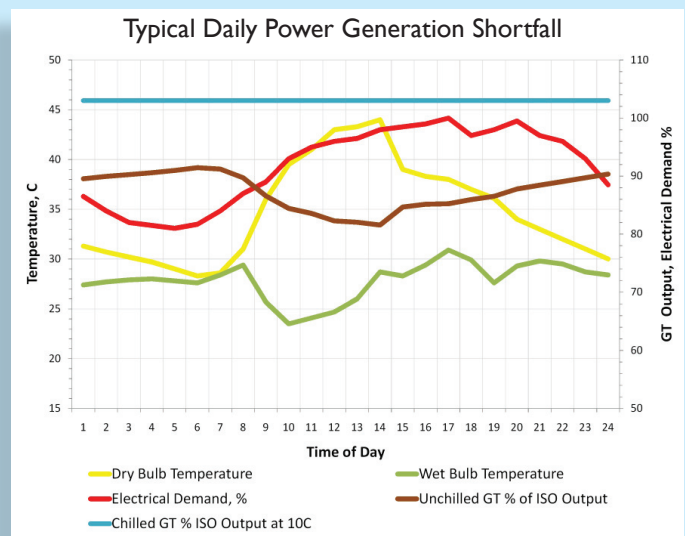


## TIC makes economic sense:

In addition to improving the efficiency of a gas turbine, the total cost to generate MWs is lower. The blended non-fuel O&M cost is lower. Increasing output by retrofitting existing plants eliminates the need for additional generation investment. With more output generated from existing facilities, the need for new, green field sites is reduced. The capital cost is less than an un-chilled base plant.

# Why use Turbine Inlet Chilling

TIC technology is utilized with both simple and combined cycle gas turbines (GTs) by the power generation industry as well as mechanical drive units. Gas turbines have a fundamental flaw. As the weather gets warmer; GT's lose power. During the summer months, and particularly during the hottest parts of the day, power plants experience dramatic increases in demand for electricity. This is a result of air conditioners keeping pace with the warmer weather. Consequently, when power demand is at peak, power producers experience a reduction in performance of the very equipment that they rely on to meet that demand. Chilling the inlet air to the turbine allows the power plant operator to control the 'weather' and restore the performance of the gas turbine to peak capability.



**TAS invented turbine inlet chilling technology. TAS is recognized for being an innovator and industry leader with multiple patents for TIC. The first TIC project was installed in the 1980's and since then TAS has chilled more turbines than all other inlet chilling providers combined.**

**The TAS Modular Solution:**

TAS manufactures modular TIC systems based on highly engineered, standard product designs that are optimized for low life cycle cost and ultra high efficiency. TAS systems are recognized for high quality construction, reliability, and industry leading guarantees. The TAS single source accountability approach is carried through the design; manufacturing; installation; commissioning; and warranty phases of a system.

**Over 465,000 tons of TIC installed on more than 15GW of gas turbines worldwide.**

**Mitigate Risk by pre-packaging:**

Site construction involves risk. Weather risk, labor availability and skill set risk, material supply risk, risk in managing remote construction projects, and site installation safety risk. TAS systems are prepackaged and designed for quick and safe installation. The base system is constructed at TAS' factory and shipped to the construction site. The cooling towers or air cooled condensers and piping are easily installed on site.



**A wide array of standard products:**

TAS has invested tens of thousands of engineering hours to revolutionize and optimize TIC plant designs by introducing standard products to the marketplace. Since inception we have installed hundreds of TIC plants. Multiple packages can be installed in parallel to meet larger needs. Each project has unique requirements and TAS offers a wide array of options using standard products to develop systems that will meet the specific needs of the project — including space limitations; reduced access to utilities; or even water limitations. TAS has the experience and expertise to create a quality solution for you.

**Minimal Footprint:**

TAS plants are designed and constructed to minimize footprint without compromising the ability to easily maintain and service all components. By leveraging modular construction techniques, TASTIC systems may be installed in tight spaces when retrofitting a power plant.

**TAS TIC, an efficient means to generate power, while facilitating the control of emissions.**

**TAS air-cooled turbine inlet chilling systems are utilized in areas where water is scarce.**

**Easy to Maintain:** TAS systems are easy to maintain. All components are easily accessible and serviceable. TAS manufactures a wide range of standard products with control rooms and other features commonly found in larger, field constructed chilled water plants.

**Generate Even More MWs with Thermal Energy Storage:**

Increase capacity payments by installing a thermal energy storage (TES) system in conjunction with the TIC plant. The TES tank can be charged at night at lower utility rates and discharged during the day when electric rates are higher and demand is at its peak. TES MWs are dispatchable within one minute and are ideal for load following applications and ancillary services (spinning reserve; ramp up and down capability) as grid operators and power markets meet constant changes in demand.



**Reduce Project Schedule:** Factory manufactured modular TIC plants can shorten project schedule by up to 40%. TAS employs an assembly line approach to building standard and custom engineered energy systems. All TAS products are modular and skid mounted for easy shipment and installation.

**Quality Management Ensures a Quality Product:** TAS is ISO 9000 compliant. We maintain a Quality Management System (QMS) in which the role of quality begins with acceptance of the purchase order. Quality management is essential when managing parts, materials, orders and projects. TAS' QMS manages our own internal manufacturing processes as well as external vendors for over 1,500 parts, which comprise the typical TIC system.

**TAS has the capability and experience to execute turnkey TIC projects.**

**TAS has Extensive Experience and Expertise**

with all types of GT's in all power markets worldwide. All types of gas turbine users have implemented TASTIC, ranging from regulated utilities, independent power producers, industrial manufacturers and municipalities. TAS has chilled all types of gas turbines — from units as small as 4MW to over 250MW, in both simple and combined cycle applications.

**TAS has chilled over 210 turbines worldwide.**

**A TAS TIC retrofit can be completed in as little as 40 weeks, with a plant outage of under four weeks.**

**Serving Markets Globally:**

TAS has completed significant projects globally, with offices in North America, the Middle East and South East Asia. Every system that TAS produces is backed by a global service and maintenance support team. We have the ability to remotely monitor system performance through our advanced system control package. TAS service engineers are experienced in system optimization, commissioning and ongoing maintenance requirements to ensure that your TAS system continues to operate as designed throughout its beneficial and economic life.



**Retrofit to Restore Output:**

A TIC system can function like a virtual peaker and can be installed on existing gas turbines that either have no augmentation or evaporative cooling installed. Retrofitting can frequently offer an attractive return on investment. This means a power plant can produce more MW's when the weather gets hotter. Existing permits can be utilized — especially advantageous in environmentally sensitive states

**The TAS Commitment:**

TAS leads the industry by guaranteeing that our products will meet the construction schedule, will meet the stated performance and that the budget for the project is held within tight controls. TAS is proud to demonstrate its commitment to high quality design, manufacturing, and service of modular TIC plants. We continually strive to ensure that our customer's expectations are met or exceeded.

**TASTIC system installed on the most advanced gas turbine in the world.**

**TAS has experience in complying with international codes and regulations.**



[WWW.TAS.COM](http://WWW.TAS.COM)

6110 Cullen Blvd.  
Houston,  
Texas 77021, USA  
Phone: 713-877-8700  
Fax: 713-440-8892  
[Marketing@tas.com](mailto:Marketing@tas.com)

TAS ME, LLC  
Shk. Zayed Road, Al Quoz  
Suite 101  
P.O. Box: 66041  
Dubai, United Arab Emirates  
Phone: (971) 04 338-9303  
Fax: (971) 04 338-9404  
[tasme-info@tas.ae](mailto:tasme-info@tas.ae)

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