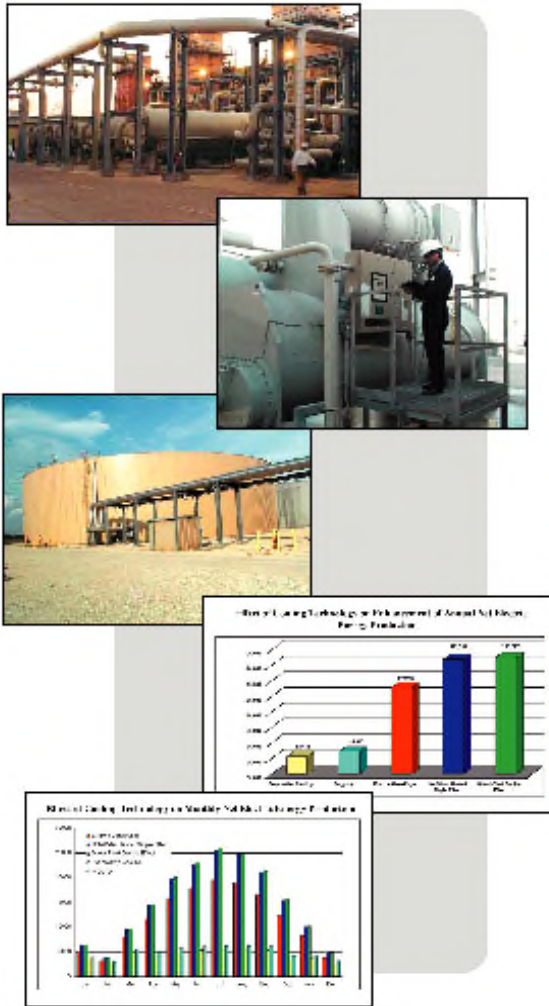




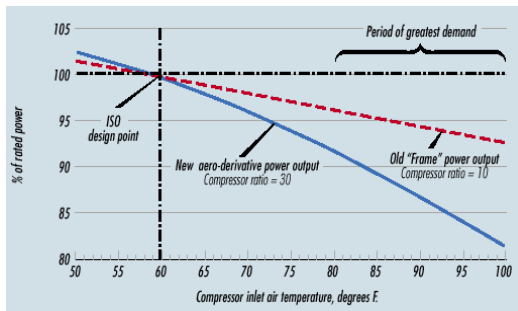
## Turbine Inlet Cooling Consulting Services



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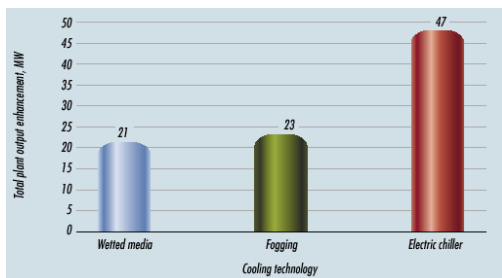
## Hot Weather & Combustion Turbines

When the weather is hot, the demand for electric power and the market value of electric energy are high. Unfortunately, just when you need it the most, generation capacity of all combustion turbines (CTs) decreases during the hot weather and power producers lose the opportunity to maximize their profit potential.



## Turbine Inlet Cooling

Turbine inlet cooling (TIC) can help you maximize the potential of your generation assets. TIC is commercially proven and hundreds of CT systems are already deploying it. TIC provides incremental capacity at economically attractive low costs.



There are several TIC technologies commercially available: wetted media, fogging, chillers (mechanical or absorption) with or without thermal energy storage (TES), and hybrid systems. Which of these technologies is optimum for your application? It depends on several factors including: typical weather conditions at your plant location, real-time market value of electric energy,

market demand for capacity, gas cost, and CT characteristics and operating configuration.

## Our Services

Avalon Consulting, Inc. (Avalon) provides consulting services for power plant owners, energy service companies, and design and engineering contractors. The scope of our services includes technical and economic analyses of alternative technologies, system optimization, developing bid specifications, evaluating bids, technical support through detailed design, construction and commissioning, performance test evaluation.

## Our Experience

Avalon has been providing energy technology services since 1996 and has successfully performed projects in the U.S. as well as many other countries, including Australia, Canada, India, Korea, Saudi Arabia and U.A.E. The founder and principal consultant, Dharam (Don) Punwani has over 40 years of experience in energy technologies. A list of some of the TIC technical publications and presentations he has authored/coauthored is shown on the next two pages.

## Our Contact Information

For more information on TIC, our services or your specific needs, please contact:

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Figures Source: "Unearthing Hidden Treasure," published in Power Engineering, November 2005



## **List of TIC Publications & Presentations**

1. "Benefits of Turbine Inlet Cooling and Thermal Energy Storage for CHP and Cogeneration Systems," Midwest Cogeneration Conference, "Implementing Winning Cogeneration/CHP Projects," Elgin (Chicago Area), IL, October 11, 2011
2. "Turbine Inlet Cooling Technologies and Applications for Optimizing Cogeneration / CHP Systems," a Webinar Presentation Cosponsored by the Midwest Cogeneration Association and the U.S. DOE Midwest Clean Energy Application Center, August 25, 2011
3. "Combustion Turbine Inlet Cooling for Power Augmentation: An Overview," ASME Turbo Expo 2011, Vancouver, BC, Canada, June 6-10, 2011
4. "Optimizing Clean Energy Systems with Thermal Energy Storage and/or Turbine Inlet Cooling," U.S. Clean Heat & Power Association (USCHPA) Spring CHP Forum, Washington, DC, May 5-6, 2011
5. "Hybrid Systems for Cooling Turbine Inlet Air for Preventing Capacity Loss and Energy Efficiency Reduction of Combustion Turbine Systems," ASME 2010 Power Conference, Chicago, IL, July 14, 2010
6. "Turbine Inlet Cooling: Increased Energy Efficiency & Reduced Carbon Footprint Aspects for District Energy Systems," International District Energy Association (IDEA) Conference, Indianapolis, IN, June 14, 2010
7. "Hybrid and LNG Systems for Turbine Inlet Cooling," Competitive Power College Curriculum (CPC 504), POWER-GEN International, Las Vegas, NV, December 7, 2009
8. "Impact of Turbine Inlet Cooling Technologies on Capacity Augmentation and Decrease in Carbon Footprint for Power Production," Electric Power 2008, Baltimore, MD, May 7, 2008
9. "Technologies and Economics of Turbine Inlet Cooling Application in Cogeneration," Midwest Cogeneration Association Conference, Countryside, IL, May 6, 2008
10. "To Cool Or Not To Cool," published in Power Engineering, February 2006
11. "Turbine Inlet Cooling for Power Augmentation in Combined Heat & Power (CHP) Systems," presented at POWER-GEN International 2005, Las Vegas, NV, December 6-9, 2005
12. "Unearthing Hidden Treasure," published in Power Engineering, November 2005

13. "Turbine Inlet Cooling Benefits Plant Owners and the Environment," published in POWER, September 2005.
14. "Database of U.S. Combined Heat & Power Installations Incorporating Thermal Energy Storage and/or Turbine Inlet Cooling," a report prepared for the U.S. Department of Energy, September 2004.
15. "Hybrid Systems & LNG for Turbine Inlet Cooling," published in the Energy-Tech, October 2004.
16. "Chiller Technologies for Turbine Inlet Cooling- Part 2," published in the Energy-Tech, June 2004.
17. "Chiller Technologies for Turbine Inlet Cooling," published in the Energy-Tech, April 2004.
18. "An Introduction to Turbine Inlet Cooling," published in the Energy-Tech, December 2003.
19. "GT Inlet Air Cooling Boosts Output on Warm Days to Increase Revenues," published in the Combined-Cycle Journal, October 2003.
20. "Turbine Inlet Cooling Technologies & Economics," a Web-based tutorial developed for the Web site of the Turbine Inlet Cooling Association, June 2003.
21. "Turbine Inlet Cooling: A Great Strategy for Maximizing the Potential of Combustion Turbines and Addressing the Needs of Restructuring Energy Market," presented at the ASHRAE seminar on Technical, Energy and Government Issues Update, Chicago, IL, January 2003.
22. "Impact of Turbine Inlet Cooling on Power Availability in California," presented at the ASHRAE Seminar on Combustion Turbine Inlet Cooling, Atlantic City, NJ, January 2002.
23. "A Hybrid System for Combustion Turbine Inlet Cooling for a Cogeneration Plant in Pasadena, TX," ASHRAE Transactions Vol.107, Part 1, 2001.
24. "Absorption Chiller Application for Power Generation: A Case Study for a 316-MW Cogeneration Plant in Pasadena, Texas (USA)," presented at the International Gas Research Conference, Amsterdam, The Netherlands, November 2001.
25. "A Hybrid System for Combustion Turbine Inlet Cooling at a Cogeneration Plant in Pasadena, Texas," presented at the ASHRAE Symposium on Combustion Turbine Inlet Cooling, Atlanta, GA, January 2001
26. "Emerging Growth Opportunity for Sorption Heat Pumps: Power Capacity Enhancement of Gas Turbine Systems," International Sorption Heat Pump Newsletter, Vol.5, No.4, Fall 1999.

27. "Application of Absorption Chiller for Combustion Turbine Inlet Cooling: Some Technical and Economic Analysis and Case Summaries," presented at the ASHRAE Seminar on Combustion Turbine Inlet Cooling, Seattle, WA, June 1999.

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