
Packaged AHR (Advanced Heat Recovery) Systems for Engines, Gas Turbines, & Industrial Waste Heat



Tom Pierson



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Last Field Erected CHP Project- Calpine Clear Lake, TX 1999

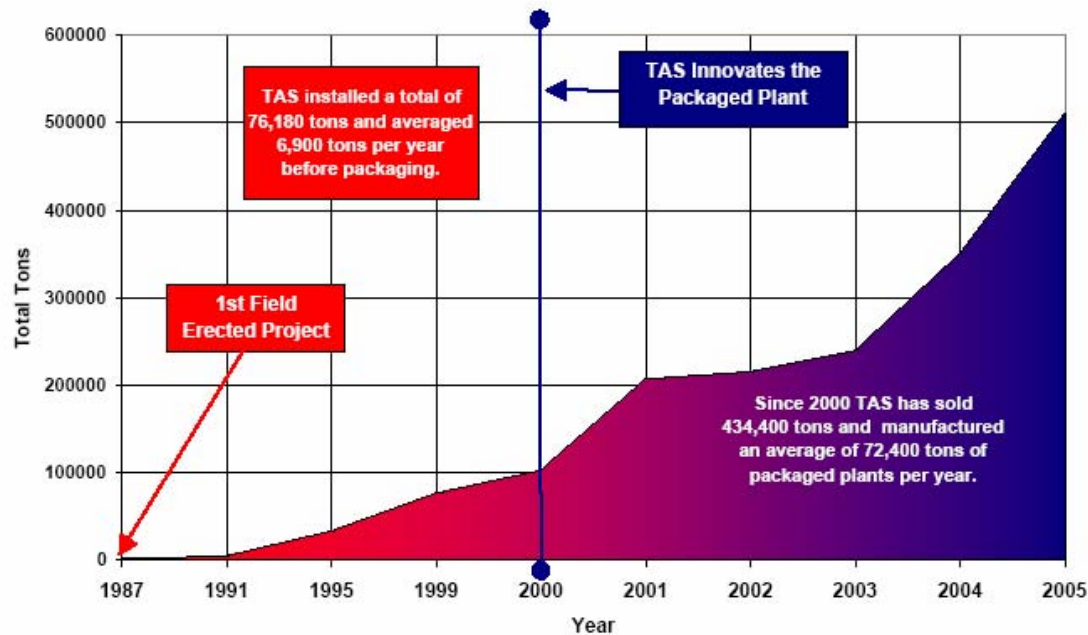




Evolution of Packaged Concept

500,000+ tons

Cumulative TAS History



Revolutionized packaged chilled water plant concept for comfort, industrial process, district cooling and the power generation industries.

updated 11/11/2005

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Factory Packaging Initially Applied to LM6000 Gas Turbines & Their TIC Systems



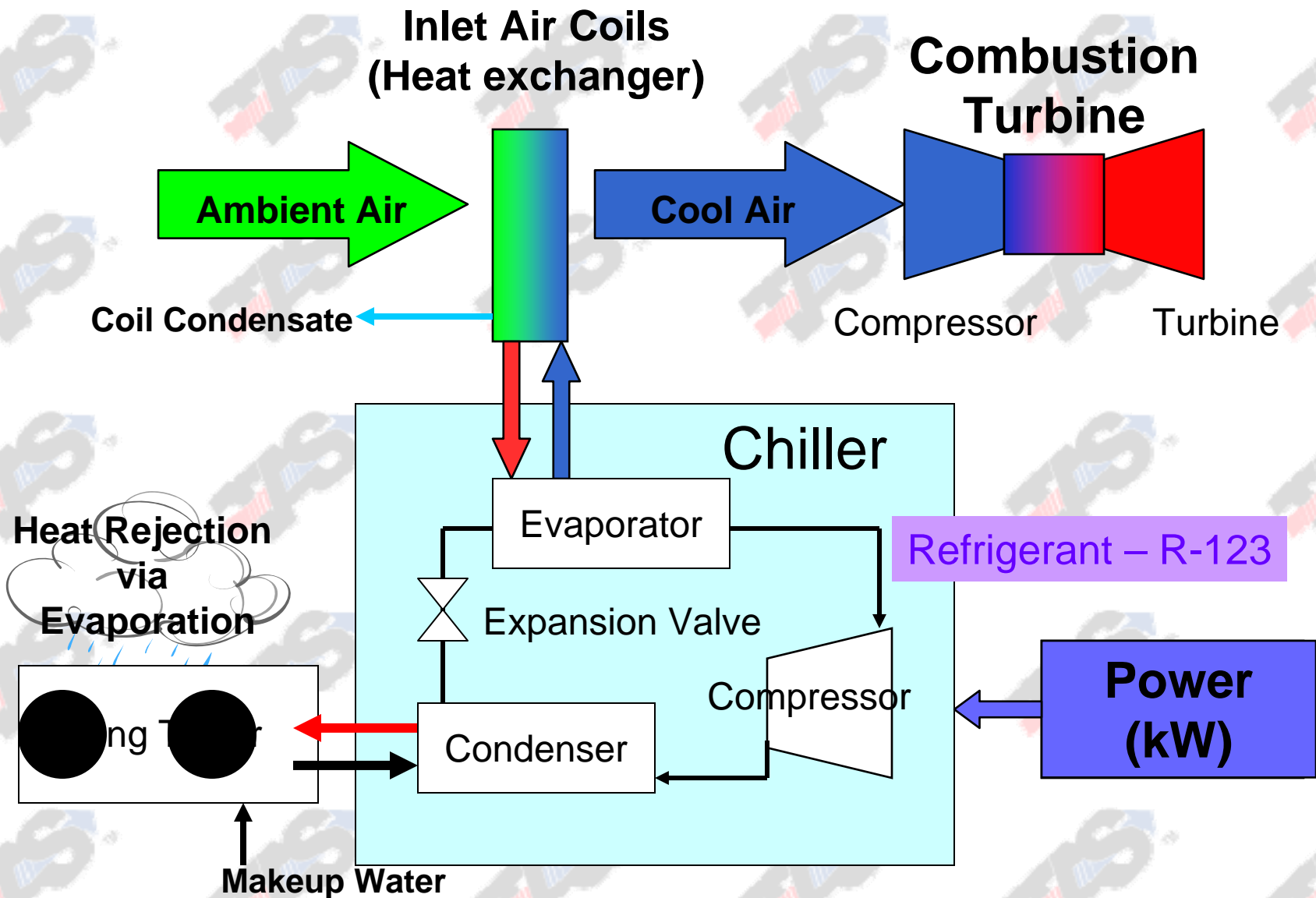
Later Applied to Combined Cycle F-Class Gas Turbines



EASY INSTALLATION



TIC Process Overview



Packaged Solutions Markets: Casino Applications

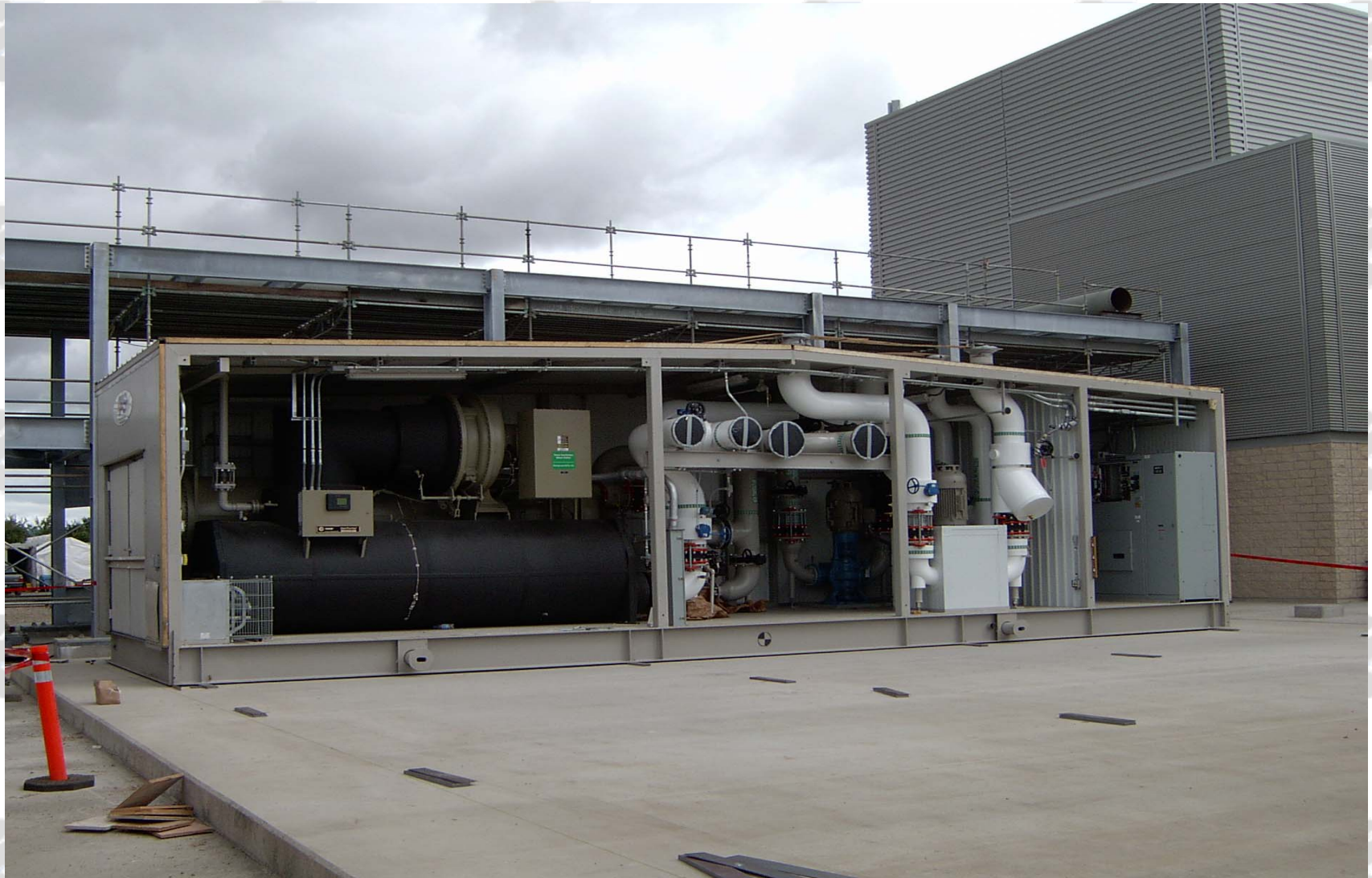


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Data Center Applications



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Global Opportunities for U.S. Manufacturers...



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60,000 Ton Packaged Central Plant Jumeriah Beach Resort, UAE



120,000 Ton Packaged Central Plant Palm Island, Dubai UAE



Packaged CHP Systems



The Next Step for the Packaged Evolution

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Inlet Filtration & Cooling Module



Austin Energy-DOE

4.5 MW & 2500 Ton

CHP Project

Burns & MacDonnell

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GT Exhaust Management Skid



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Absorber Exhaust Stack Skid



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Process Skid



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Control Room / Process Skid



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Inside Control Room



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PLC Controls Integrated with GT and Absorption Chiller Controls



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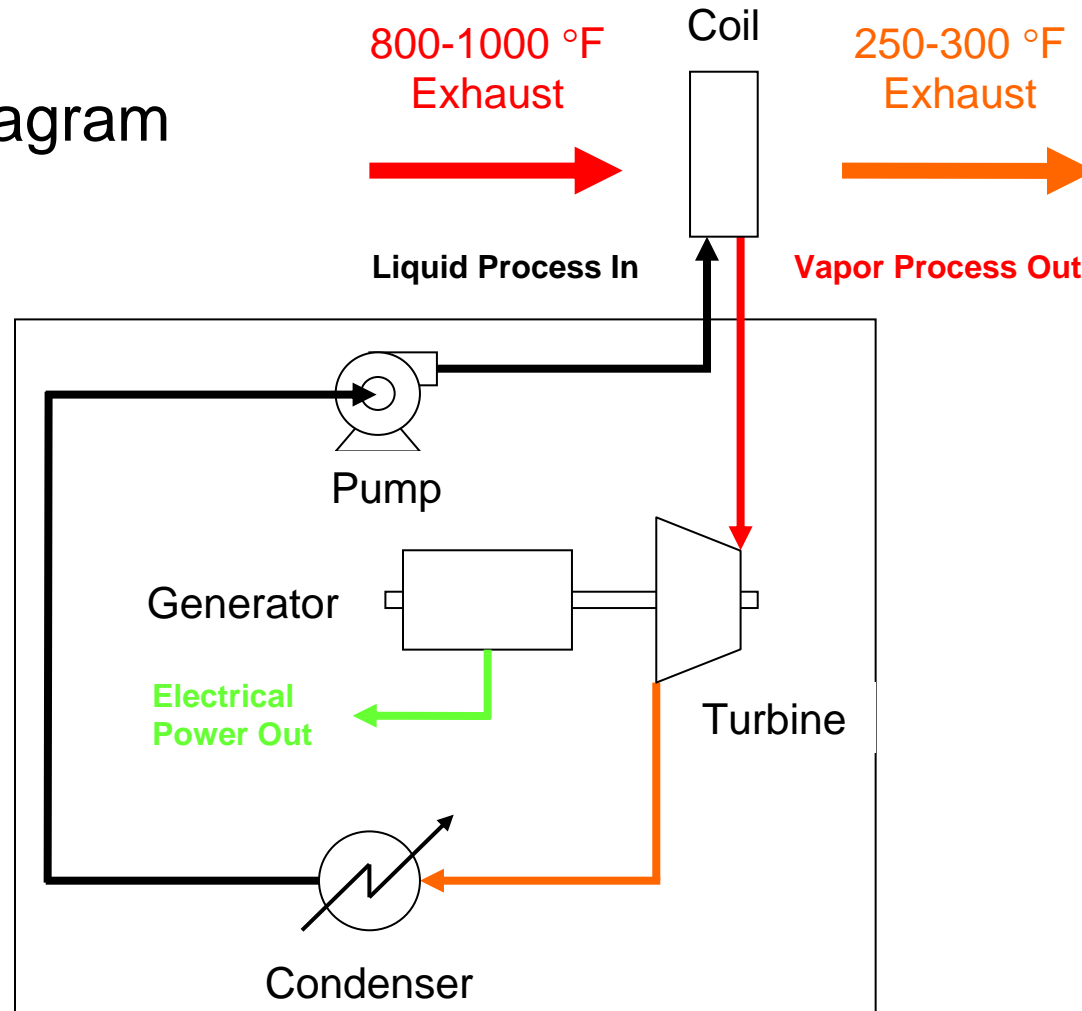
Dell Childrens Medical Center

- Solar Turbine Mercury 50 GT
- HRSG to supply hospital and absorber steam
- 900 Ton Trane 2stg Steam Absorber
- Packaged 1500 Ton Centrifugal Chiller Plant w all pumps, Cooling towers, controls
- 8000 Ton-Hr TES Tank

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The Future for the Package: Advanced Heat Recovery (AHR) Systems

Basic process diagram



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The Future for the Package: Advanced Heat Recovery (AHR) Systems

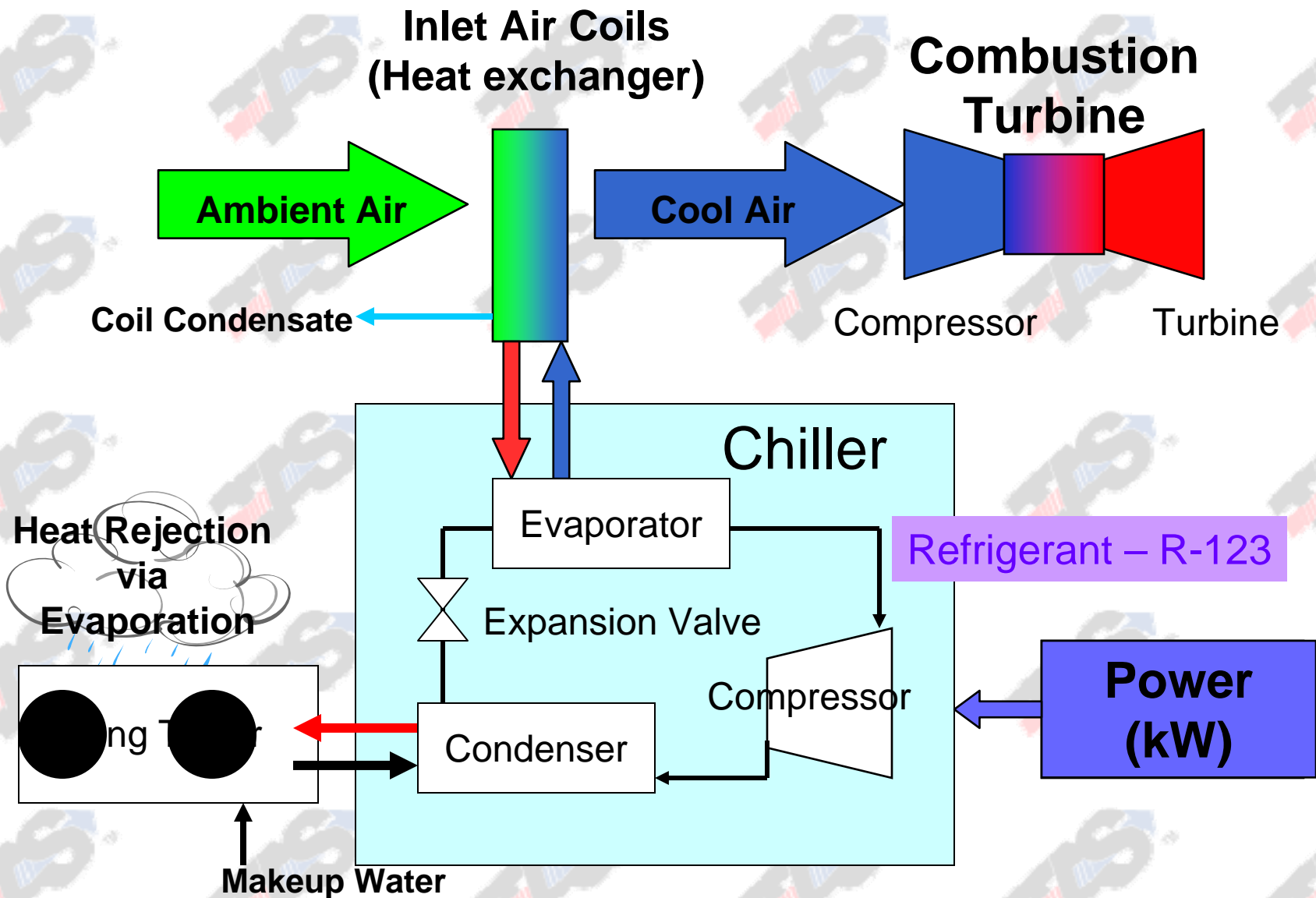


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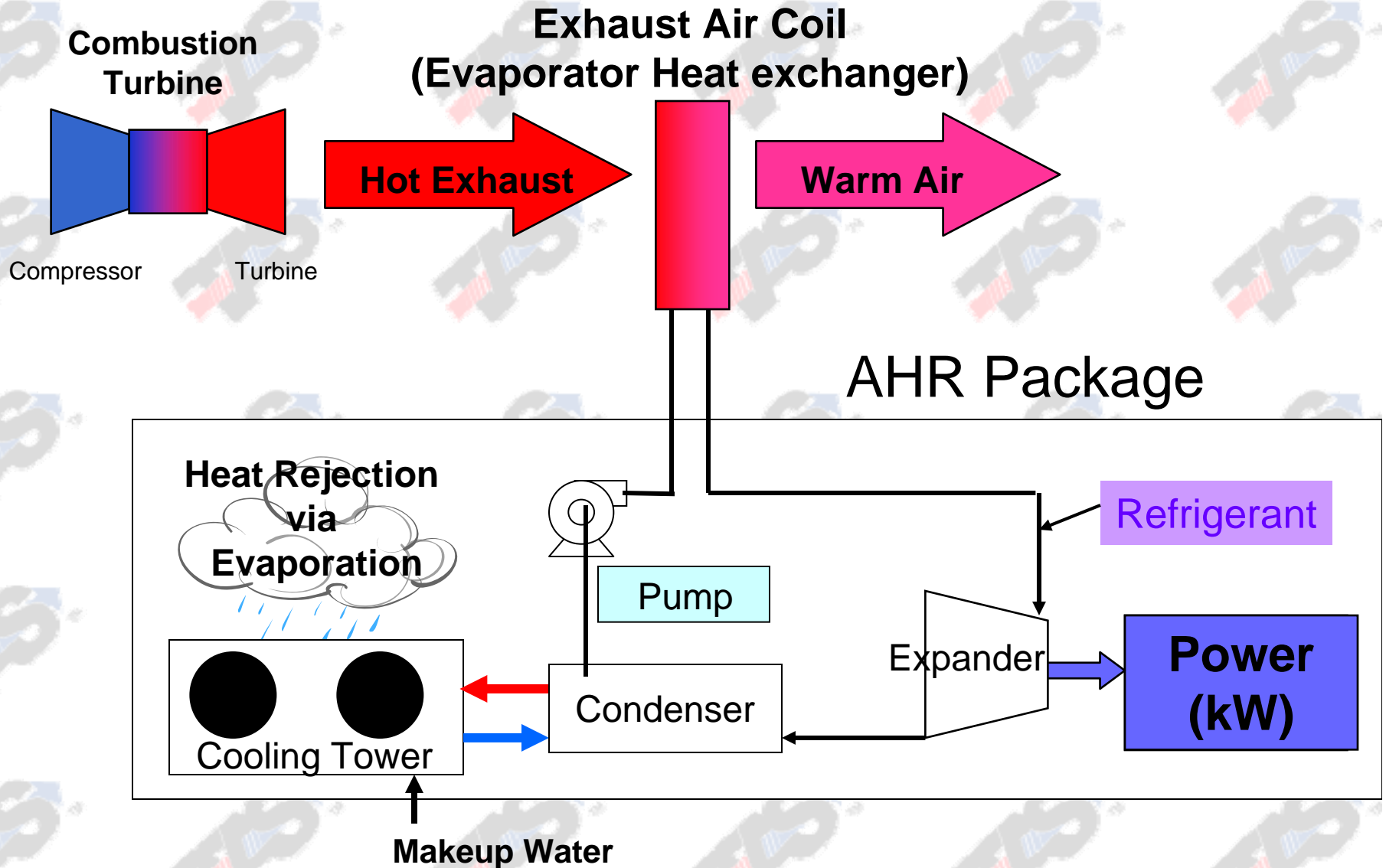
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TIC Process Overview



A.H.R. Process Overview



Easy Installation & Minimal Field Engineering



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Modular Construction



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2 X 5500 Ton Central Plant



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Integrated Switchgear & Controls



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Industrial Quality Fabrication

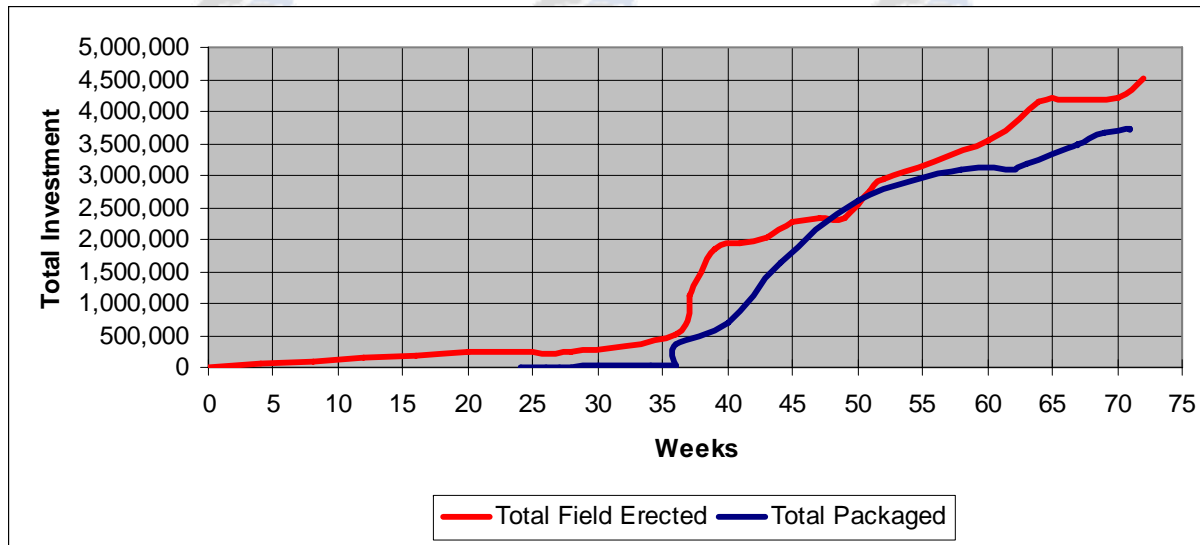


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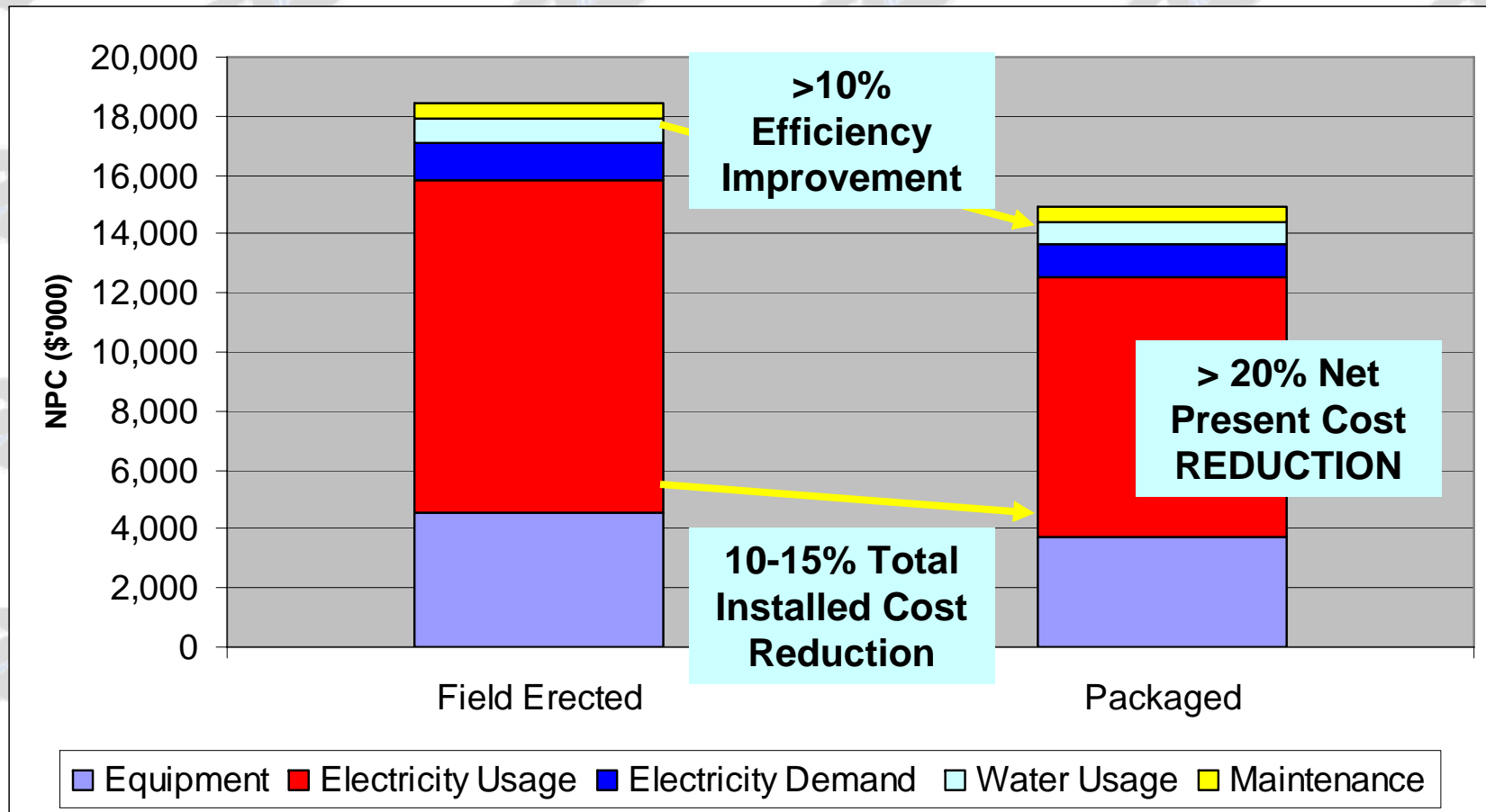
Schedule & Commitment Plan



- ✓ Project cash flows reduced & delayed
- ✓ Total delivery period is reduced dramatically
- ✓ Site installation period is reduced by 50%
- ✓ Site construction scope & risk are much reduced

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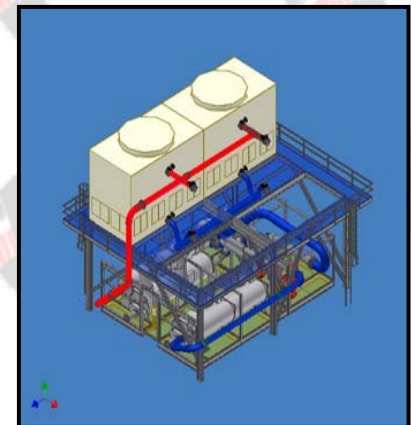
Net Present Cost Comparison



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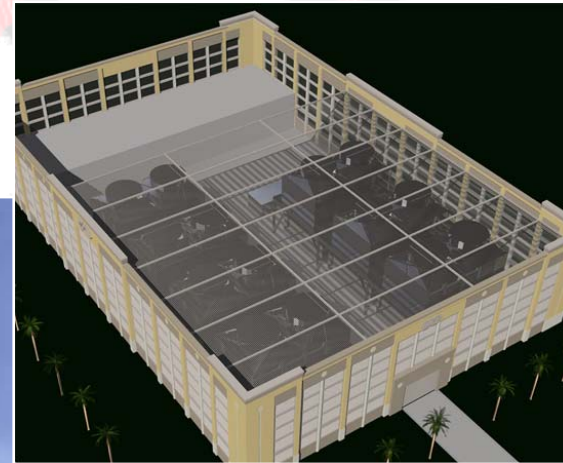
Summary

- ✓ Reduced first cost
- ✓ High efficiency plant & guaranteed performance
- ✓ Industrial quality
- ✓ Reduced footprint
- ✓ Shortened construction cycle
- ✓ Minimal site interference / maximum safety
- ✓ Enhanced value proposition
- ✓ Improved Mkt acceptance



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ARCHITECTURAL DESIGN OPTIONS



attractive screen designs; customizable for any site

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The Packaged Advantage

Compared to traditional field erected plants....

<input checked="" type="checkbox"/> Speed to Market	30 - 40% Savings in schedule
<input checked="" type="checkbox"/> Reliability	Fully tested premium and redundant equipment
<input checked="" type="checkbox"/> ISO 9001:2000	Rigorous documentation & quality process
<input checked="" type="checkbox"/> Efficiency	Up to 20% more efficient
<input checked="" type="checkbox"/> First Cost	15 - 20% Initial savings
<input checked="" type="checkbox"/> Maintainability	10 - 15% O&M cost savings
<input checked="" type="checkbox"/> Installation Safety	75% Less site construction time
<input checked="" type="checkbox"/> Guarantees	Ability to guarantee output, efficiency, cost & schedule
<input checked="" type="checkbox"/> Flexibility	Moveable—Leasing Attractiveness
<input checked="" type="checkbox"/> Aesthetics	Customizable architectural options

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