Acela Thermal Energy Products and Services

April 2020

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Energy & Water Efficiencies Measures & Opportunities

- Variable Frequency Drives (VFD's)
- Electrically Commutated Motors (EC) Motors
- Thermal Insulation on Equipment
- Advanced Load Monitors (ALM) for Hot Water Boilers
- Retrofitting Existing Boilers to Condensing Boilers
- Condenser Water Treatment
- Condenser Evaporative Misting Systems
- Continuous Steam Trap Monitoring
- Coil Refurbishments
- Back-up / Cogeneration
- Natural Gas-Powered Chillers
- Freezer Door Anti-Fog Coating

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Adding VFD's To Fans & Pumps

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Benefits to VFD Drives To Consider

Instant Savings & Dramatically Reduce Electric Bills

Qualify for Federal, State and Local Rebate Incentives

Reduce Your Company's Carbon Footprint

Controls are Custom Tuned to Equipment Needs

Reduce Maintenance Costs

Long Controller Life Expectancy

A VFD is Basically a Cruise Control for an Electric Motor

A VFD Allows the Motor to Ramp Up And Slow Down Based On Actual Energy Needs & Machine Requirements.

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EC Motor Retrofits

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Benefits of EC Motors

Acela Energy has provided and installed EC motors in various Hotels, Schools, Casino's, Supermarkets, and Office buildings.

Most applications are Fan Motors on Fan Coils

In all instances, we have obtained utility incentives for the projects, across the country

At least a 50% Increase in Motor Efficiencies

Often replacing very old motors

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Steam & Hot Water Pipe Insulation

Strainer Bonnet

Gate Valve Bonnet

Gate Valve

Steam Traps

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Benefits of Insulation

Reducing Energy Costs - Insulation blankets have very quick payback periods

Enable Periodic Maintenance - Removable insulation allows you to easily conduct periodic inspections and maintenance of equipment

Prevent Waste and Excess Cost of Hard Insulation - With a removable insulation blanket, you can remove the insulation whenever necessary, then easily reinstall it yourself

Extend the Life of Equipment & Machinery - Insulation covers help protect expensive equipment by reducing exposure to the elements and shielding it from accidental damage

Improve Workplace Safety - Removable insulation covers can prevent direct contact with high-temperature pipes and equipment for greater workplace safety

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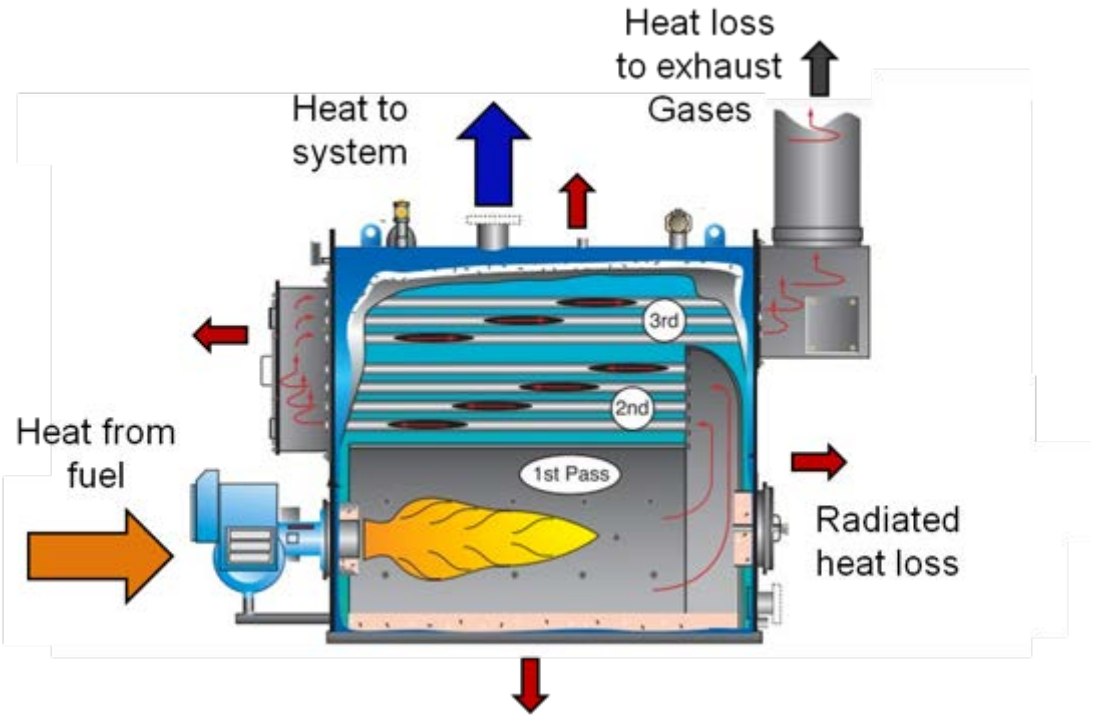
Advanced Boiler Load Monitoring Controllers

What is dry cycling?

Boiler firing due to standing losses rather than building demand



- Boilers are oversized by design
- Maintain setpoint regardless of building demand
- Heat losses cause unnecessary cycling, **“dry-cycling”**
- The boiler fires over and over, even though there is no demand

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Benefits of Advanced Boiler Load Monitoring (ALM)

The ALM is a microprocessor technology that installs in about 3 hours

Commercial boiler applications that use gas and/or oil to heat buildings

Reliable and provides a superior return on investment – 2-3 SPB

The ALM is a microprocessor based intelligent boiler load controller that dynamically monitors building demand

Building demand is monitored by analyzing the rate of change in the boiler's supply and return water temperature every 10 seconds

The ALM restricts a boiler from firing when controller determines there is no load on the boiler

By minimizing dry cycling the ALM reduces gas consumption & thermal stresses on the boiler

Significantly reduces energy consumption through elimination of wasteful burner firings

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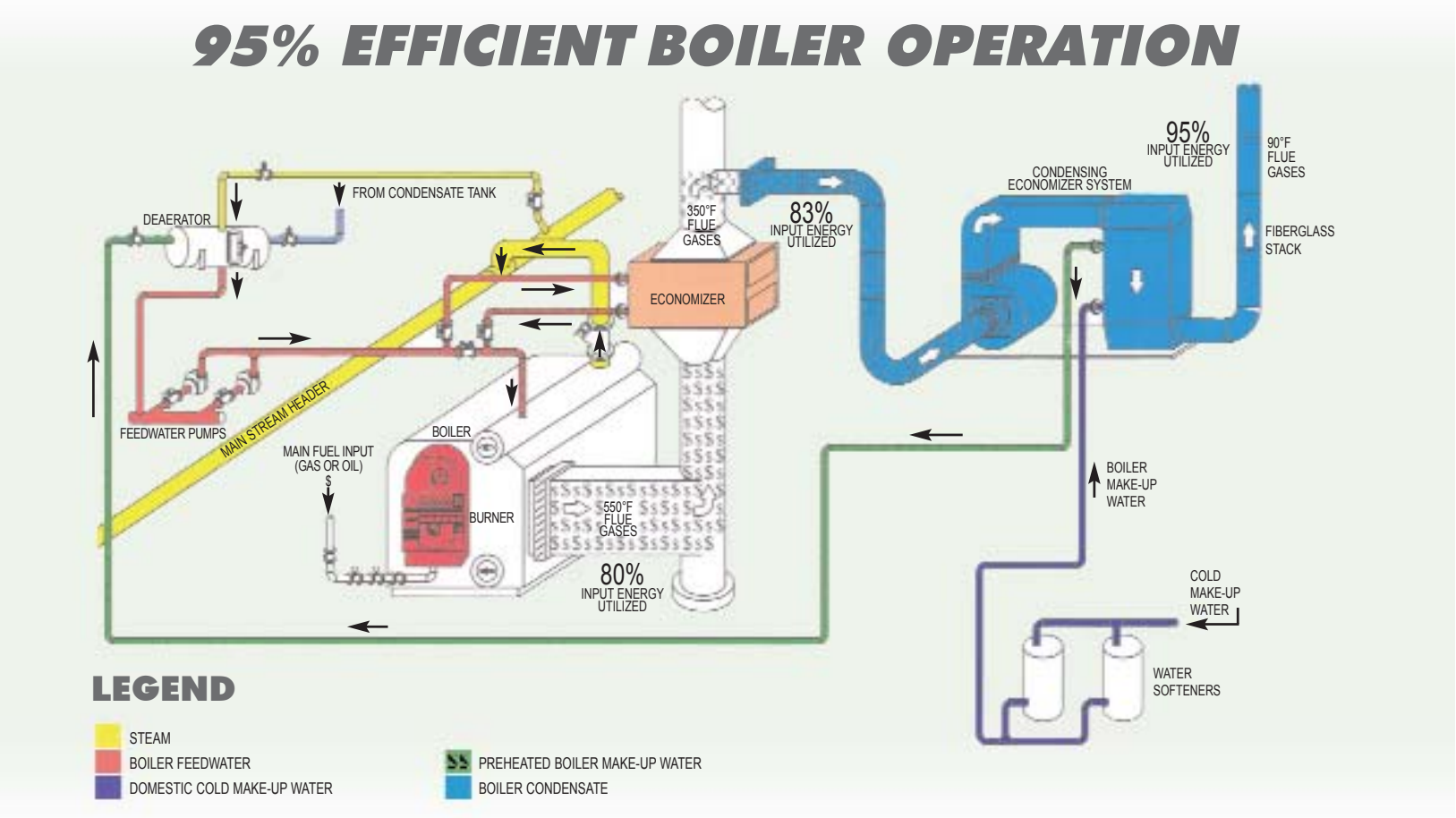
Turning Existing Boiler into a Condensing Boiler



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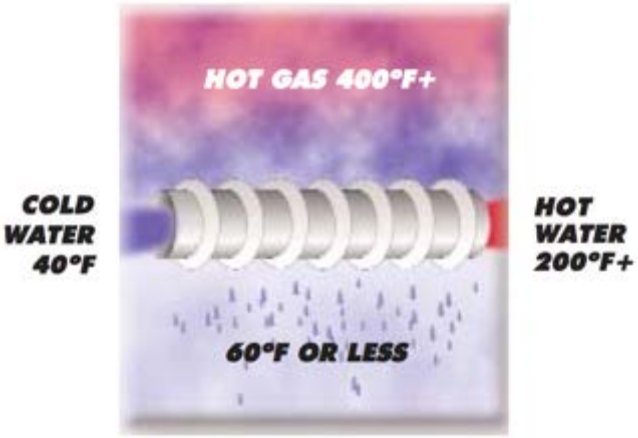

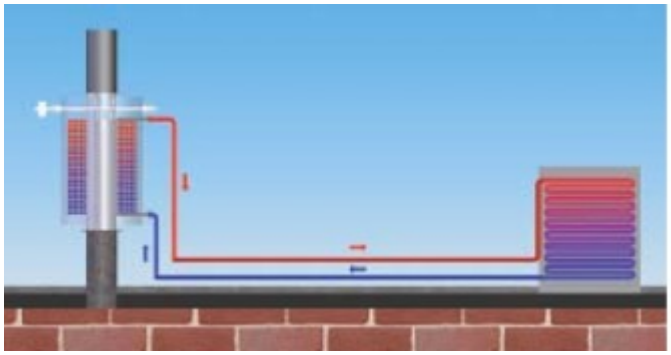

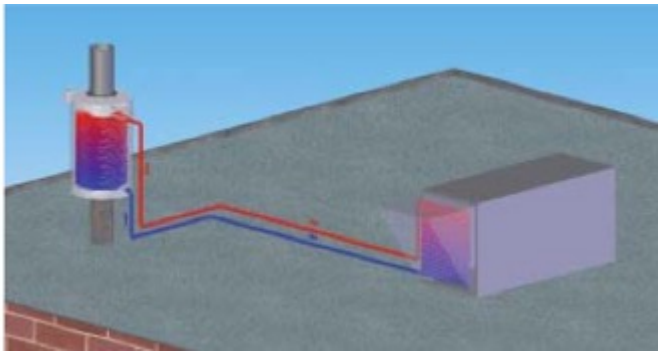

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Benefits of Boiler Retrofits

By heating cold process liquids with hot exhaust gases, the system recovers both sensible and latent heat energy.

When incoming cold fluid enters the exchanger and the hot exhaust gases pass through the proprietary exchanger unit, so much energy is exchanged that the gases are cooled beyond the point where the water vapor condenses out of the exhaust gas, releasing and recovering the heat it took to vaporize the water initially.

By recovering such significant amounts of heat from an exhaust gas that it is cooled below its dew point, a dramatic increase in fuel savings is achieved. Decrease Energy use by 15%.

The exchanger maximizes water condensation and the resulting recovery of latent heat. This key advantage is achieved in two ways: special metallurgy with high heat transfer capabilities and the addition of fins to dramatically increase the heat transfer surface area.

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Condenser Water Treatment

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Condenser Water Treatment

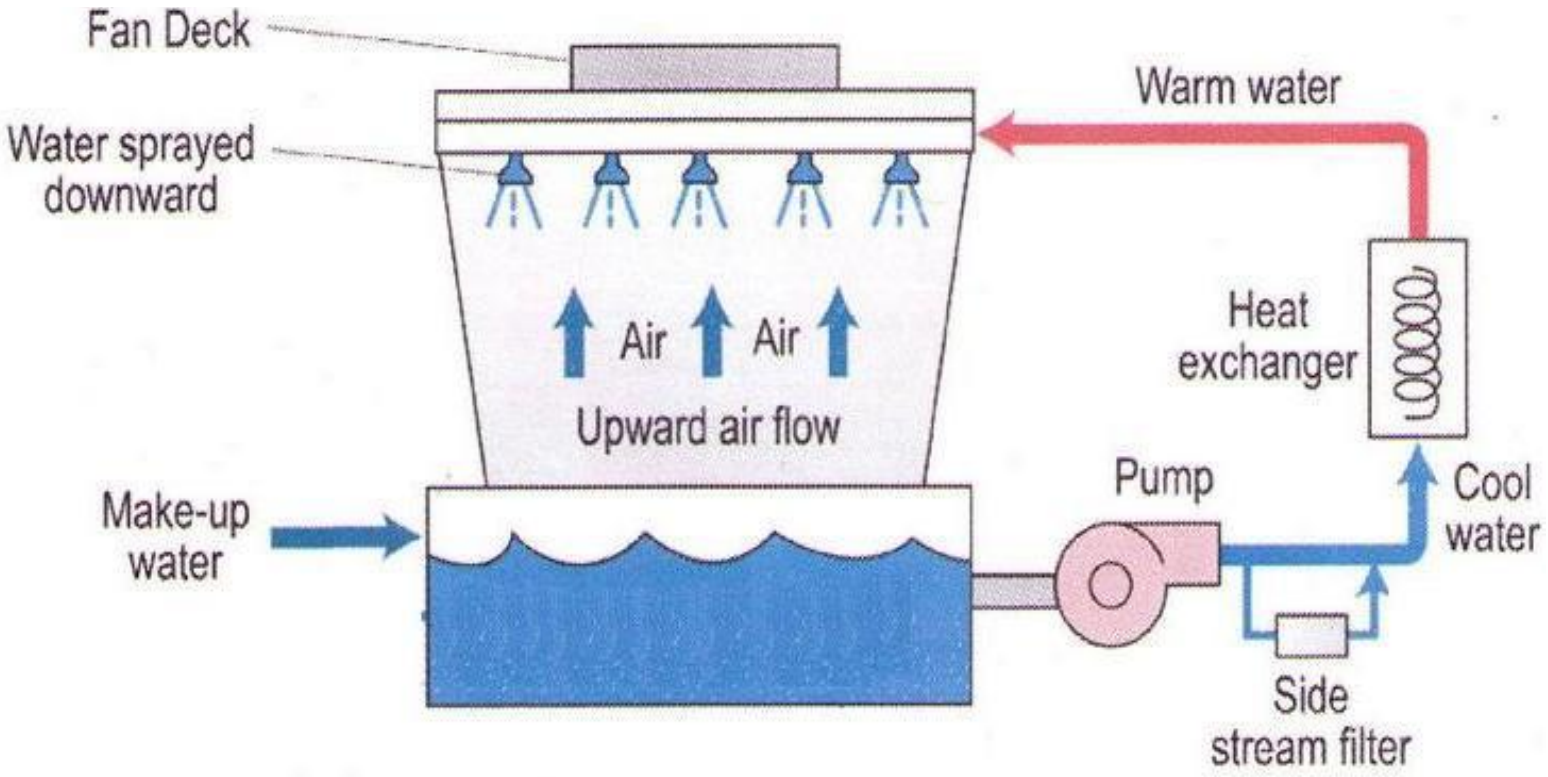

Figure 4: Cooling Tower with Side Stream Filtration Example US Dept. of Energy

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Benefits of Condenser Water Treatment

Maintenance Savings - A clean system will reduce much of the equipment maintenance and extend equipment life cycles

Energy Savings- Increasing thermo transfer and system efficiency will net an average energy savings of 12-15%

Payback - Validated ROI of 24-30 months, plus continuous year-after-year savings

Water Savings - Reduce make-up water by 20-30% by increasing equipment efficiency, focusing on evaporation rates rather than extending bleed cycles

Enhances Chemicals - Optimize chemical performance by removing 95% of suspended solids down to one micron with the use of no media and controlling total dissolved solids throughout the system - Decrease risk of bacteria, including Legionella

Carbon Footprint Reduction- Energy and water savings plus enhancing the chemical effectiveness will significantly impact environmental sustainability

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Evaporative Cooling Condenser Misting

Existing Condenser

Retrofitted Evaporative Condenser

New Evaporative Condenser

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Evaporative Cooling Condenser Misting

Air Cooled Chillers – Data Centers for Example

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Benefits of Evaporative Systems

Increased peak ambient cooling capacity

Lower demand (kW) and energy usage (kWh)

Water filtration to eliminate coil fouling

Extended compressor life

Reduced maintenance costs

Eliminates the use of garden hose solutions

Minimized water & sewerage costs

Thermostatically controlled

Fast, simple installation

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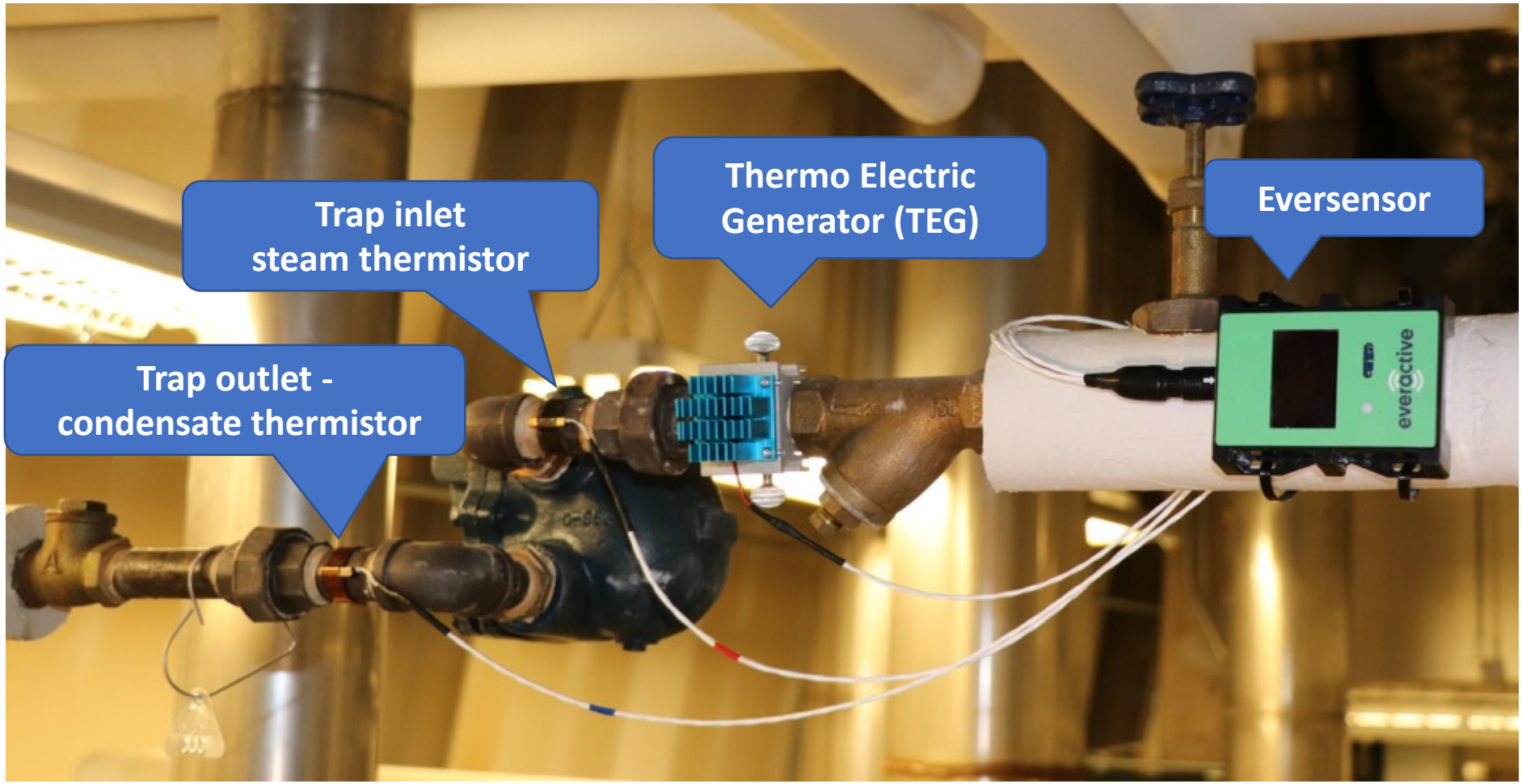
Battery Free Remote Steam Trap Monitoring



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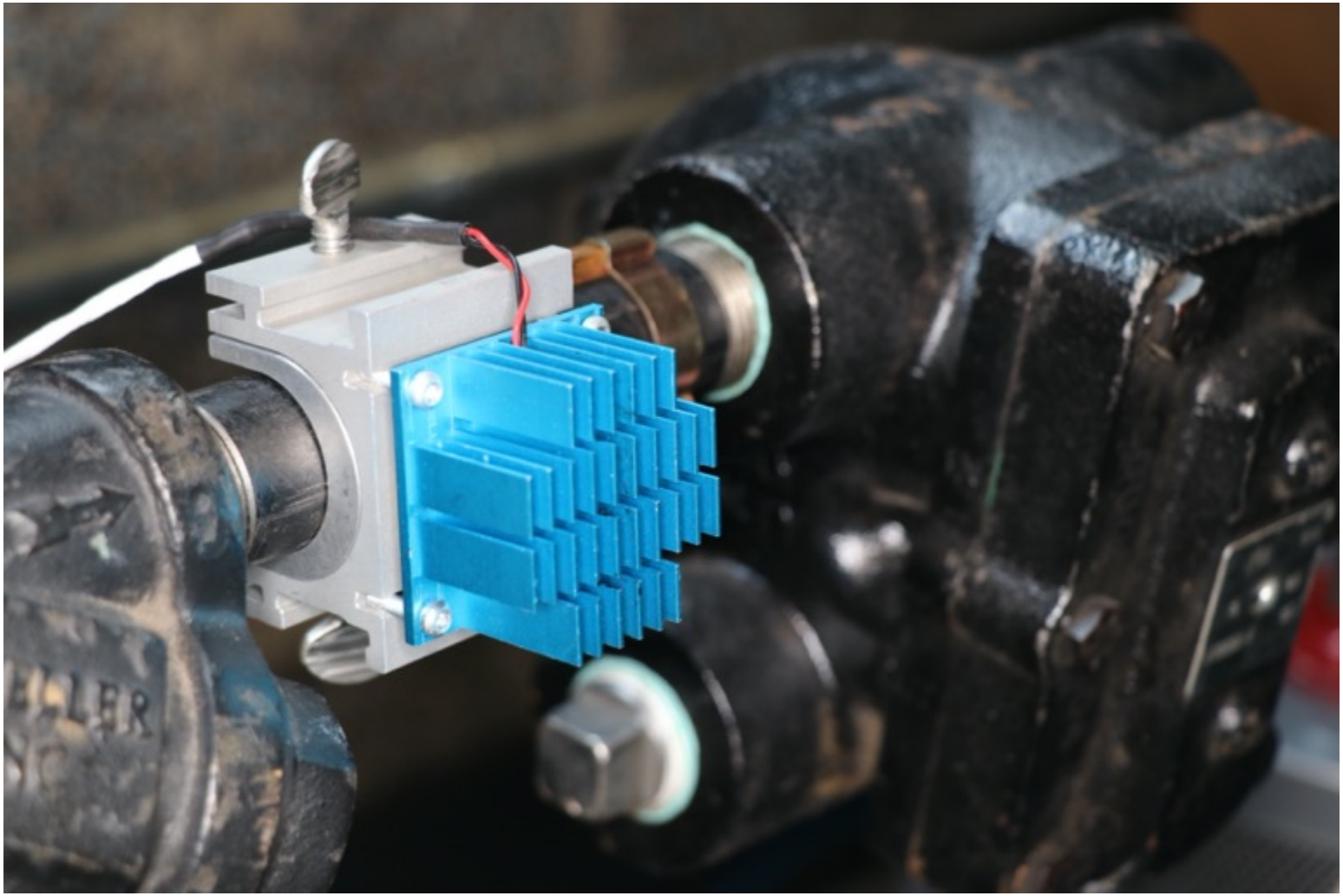
Battery Free Remote Steam Trap Monitoring



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Example of Steam Trap Failure

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Benefits of 24/7 Steam Trap Monitoring

Instantly capture steam trap failures as opposed to once a year manual audits

Low total cost of ownership – simple installation and insights-as-a-service model mean low up-front costs, while battery less technology eliminates sensor maintenance, allowing you to focus resources when and where they are needed

Real-time cost-saving insights – truly pervasive and continuous monitoring generates advanced analytics not possible with alternative solutions

Large-scale deployment – achieve site-wide steam trap coverage by eliminating steep up-front costs, lengthy installations, and tedious integrations

Drive energy savings & reduce risk of costly downtime
Improve site-wide safety & sustainability

Steam trap failures can lead to larger equipment failures, which can bring a facility's production to a complete stop for days.

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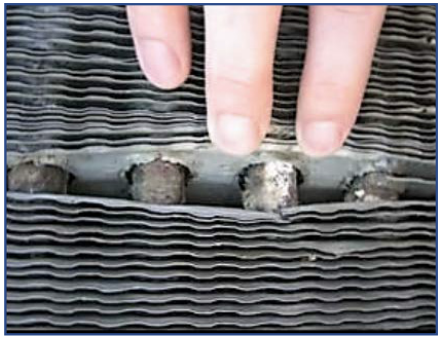
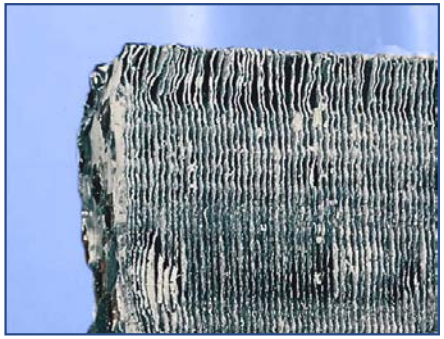
Coil Refurbishments





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Benefits of Coil Refurbishments

Higher energy efficiency

Boosts cooling systems to optimal performance

Eliminates the effects of corrosion on condenser coils

Bolsters the thermal conductivity of those coils

Prevents future damage from corrosion

Extends equipment life

Reduction of carbon footprint

Decreased energy expense

Ability to manage A/C energy and maintenance

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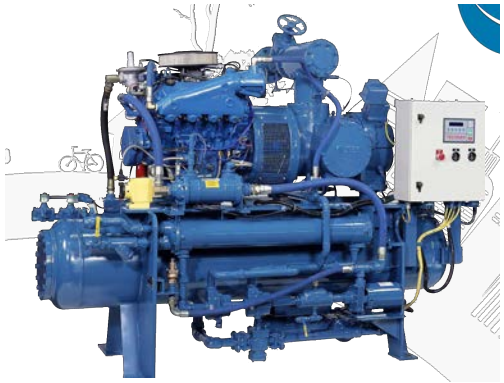
Natural Gas Powered Equipment

Air-to-Water
Gas Heat Pumps

200 & 400 Ton Natural Gas Chillers

100 kW Inverter Based
Co-Generation

Water-to-Water
Gas Heat Pumps



Natural Gas Low Temp Refrigeration

75 kW Induction Based
Co-Generation

Co-generation & Back-up Generation

Figure 1. Tecogen InVerde *Ultera* 100e+ Module

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Now a Payback for Back-up Generation

33% Electrical Efficiency (94% overall) - Best in Class!

Produce your own electricity 24/7 at half the cost of utility power

Patented variable speed operation allows for 10 kW to 125 kW output

Fully scalable from 10kW to multi-MW

Emergency power with grid-independent operation (125 kVA)

Rapid black-start for Type 10 Emergency Power Supply System (EPSS)

Ultra-low emissions levels, SCAQMD compliant

Inverter-based streamlined utility interconnection

Available with indoor or outdoor acoustic enclosure

DC input feature for seamless battery and solar PV integration

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Natural Gas Chillers – Co-Gen

300, 350, & 400 Ton Chiller

150 & 200 Ton Chiller

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Benefits of Natural Gas Cooling

Operating costs reduced by 50%

Ultra low NOx and CO emissions

Carbon footprint cut in half

Avoid on-peak electric demand charges

Nationwide factory service & support

Free engine and exhaust heat recovery

High-temperature engine jacket and exhaust waste recovery available (as much as 800,000 Btu/hr.. in the form of 230°F hot water is available per engine)

Powered by clean, economical natural gas

Utility & State incentives available in some areas

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Retro-Fit Freezer Doors with Anti Fog Glass Coatings

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Retro-Fit Freezer Doors with Anti Fog Glass Coatings

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Benefits of Anti Fog Glass Coatings

Saves energy - switch off glass heaters and maintain fog resistance

Saves more money - Rebates available from utility companies NGRID & Eversource

Boosts sales - Shoppers can clearly see food

More than 2 minutes fog free in Climate Class 3 conditions

Durable - Anti-fogging will not wash/scratch off or degrade

Reliable - Not dependent on electrics.

Sustains environment

Reduces carbon footprint

Made from renewable resources

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