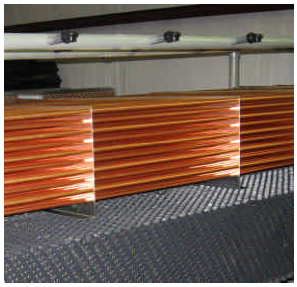
Thermal~Flow

The Total Concept Energy Conservation Company

ThermalFlow - Commercial Products " Demand Buster" series
Fluid-Coolers and Evaporative Condensers

It's no accident *that large commercial buildings utilize water-cooled air conditioning systems. Typically water-cooled systems have a 40% to 60% efficiency advantage over air-cooled air conditioning equipment. Water-cooled equipment utilizing Cooling towers, and Evaporative condensers have been utilized mainly in large commercial chilled water applications. This long proven technology does not exist in the light commercial applications that dominate the commercial market. Most light commercial buildings utilize roof top air-cooled "package unit", they are inexpensive and easy to install. The downside is that the units experience excessive heat due to the roof top installation. The "heat island" effect with all of the radiant heat energy on the roof makes the unit suffer additional efficiency and capacity losses. In most sun-belt desert applications the air-cooled roof top units run at a net* ***6 EER*** *using* ***2 kilowatts per ton/hour.*** *A water-cooled roof top unit under the same desert conditions can run at a net* ***14+ EER using .85 kilowatts per ton/hour. Up to 60% savings over air-cooled systems.***

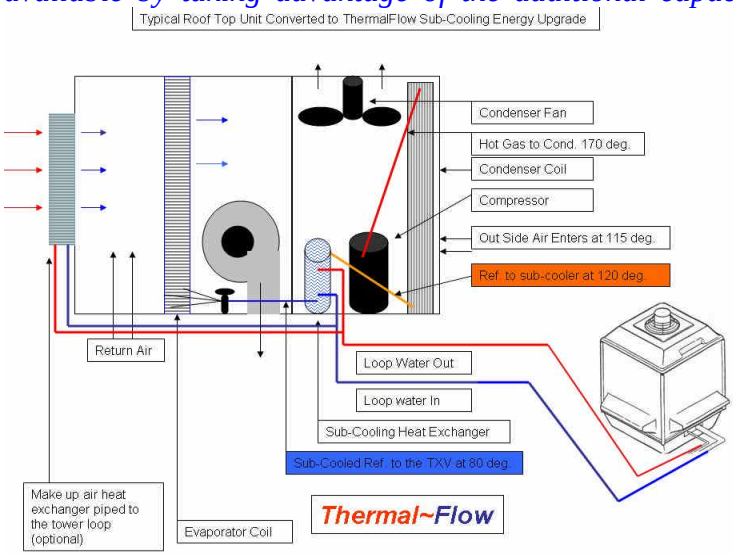
ThermalFlow has developed a retrofit application (Evaporative Sub-Cooling) that converts air-cooled roof top units into a Hybrid Air/Water cooled system. The reliable failsafe design will operate in the air-cooled mode only and in the more efficient air/water cooled mode. The ThermalFlow "Demand Buster" line of cooling towers (closed circuit and evaporative condensers) are the only units on the market that are light enough to be installed on a typical roof with out structural upgrades.



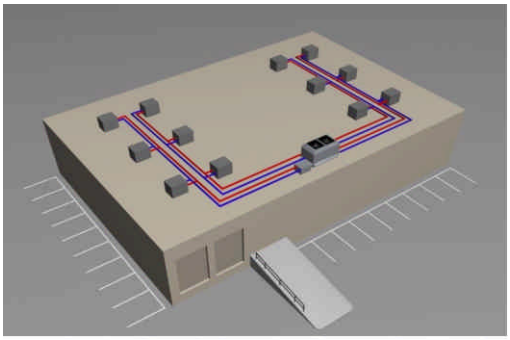
The most energy efficient feature of both the evaporative condenser and the fluid cooler versions is the all copper tube bundle mated with a full evaporative media deck. No other manufacturer in the industry utilizes both a copper bare tube bundle and media in one machine. The media provides full phase change capacity added to the evaporative surface area of the generous tube bundle. The combination results in significant fan and pump energy savings. The cooler water temperature made possible by the media dramatically reduces the scaling potential and allows the tower to handle the minerals with ***no chemicals,*** *utilizing a simple pre-programmed auto purge/clean function. The fans provided by ThermalFlow use electronically-modulated motors (ECMs) that vary the fan speed to maintain the leaving water temperature or refrigerant temperature at the desired level regardless of the heat load. The modulating fan control optimizes operating efficiency and evaporates only the minimum amount of water to handle the load.*

The Evaporative Sub-Cooling Application:

At ThermalFlow, we have adopted the sub-cooling strategy to enhance the operating efficiency of any air-cooled air conditioning or refrigeration system. We utilize our very efficient lightweight evaporative fluid cooler (closed circuit cooling tower) in a closed water-loop to the rooftop units fitted with our sub-cooling heat exchanger. The most dramatic savings are in the hot dry regions of the United States. Our primary commercial application is the conversion of rooftop packaged air conditioners that dominate the light commercial market. In the extreme heat of the desert regions, savings over conventional air-cooled units, utilizing the existing compressors, will reach 35%. With the installation of downsized compressors an additional 15 % efficiency gain is available by taking advantage of the additional capacity made possible by the lower condensing temperature. Many older rooftop units operating in the desert regions are operating at about 1.7 to 2 kw/ton/hr. With sub-cooling and downsizing, power can be reduced to 0.85 to 1 kw/ton/hr.



The fluid cooler is installed on the roof and a simple insulated PVC piping loop will move the glycol/water to the rooftop units. The refrigerant is removed and the heat exchanger installed in the refrigerant circuit and re-charged. The water connections are completed and the system is placed back in operation. The ThermalFlow fluid cooler is fitted with an auto purge system to keep the tower basin free of dirt and minerals. The air intake windows provide a light-blocking feature that keeps direct sunlight from the wet section, thus eliminating the need for chemical algaecides. The sloped water basin is designed to freeze without damage to the tower, thus eliminating energy wasting electric basin heaters and the task of draining the basin before the winter season.



Evaporative Sub-Cooling Application w/ ThermalFlow Evaporative Fluid Cooler

Other Fluid Cooler applications:

- *Process Heat Rejection*
- *Hybrid Geothermal*
- *Refrigeration Racks*
- *Slab Cooling*
- *Closed Loop Condensing*
- *Water Source Heat Pumps*

For more information
Contact: Eco-$mart, Inc. (888)329-2705

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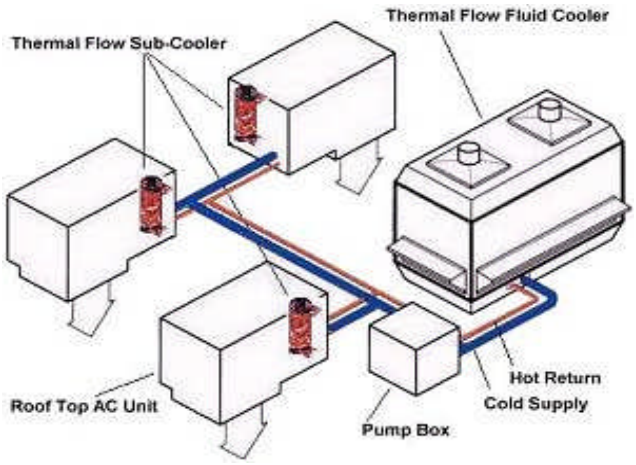
Thermal Flow Demand Buster Wholesale Pricing

Item Number	Description	Wholesale Price
TF-DB-FluidCooler-10	Fluid Cooler - 10 Ton = 50 Ton Capacity	$5,400.00
TF-DB-FluidCooler-15	Fluid Cooler - 15 Ton = 75 Ton Capacity	$8,000.00
TF-DB-FluidCooler-20	Fluid Cooler - 20 Ton = 100 Ton Capacity	$11,000.00
TF-DB-PumpModule	Tower Spray Pump, Closed Loop Pump, Controls	$1,466.67
TF-DB-HeatExchanger	Heat Exchanger for Existing A/C Unit (one per line set)	$433.33

Application Notes: Fluid Coolers are sized at 20% of the total existing HVAC system capacity. One Pump Module per Fluid Cooler is required, and one Heat Exchanger per existing compressor is required (installed between the condenser and evaporator). Insulated PVC loop from Pump Module to Heat Exchangers to be provided by installer.

Labor Time Estimate: Heat Exchanger - One man, two hours.
Tower - Two men, one day for tower and piping

Savings Potential: Typical commercial A/C units adapted with the Demand Buster system experience kW and kWH reductions of 30 to 40 percent.



Terms: Prepaid by credit card or check
Freight: Quoted by job
Lead Time Typically 4 weeks

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Building Energy Efficiency Cost / Benefit Analysis

Job Name: Tervis Tumbler
Melded kWH Rate: $ 0.1003
$$$ Saved = Electric savings

Proposed: Retrofit the 91Tons of air-cooled A/C condensers with Demand Buster Water-Cooled System

Retrofit Costs and Savings:

Total A/C Tons.	kW/ Ton-Hr	Ann. Hrs. Used	Current kWH	Current Ann. Cost	New kW/ Ton-Hr	Ann. Hrs. Used	New kWH	New Ann. Cost	kWH Saved	Ann. $$ Saved	Est. Retro Cost	Payback (yrs.)
91.000	1.70	2,500	386,750	$38,791.03	1.00	2,500	227,500	$22,818.25	159,250	$15,972.78	$33,449.00	2.09

Notes The above analysis represents the costs and savings associated with retroffitting the thirteen existing air-cooled a/c condensers with the Demand Buster water-cooled system. Current condensers are estimated to be operating at 7 EER (1.7 kW per Ton-Hr). By installing the Demand Buster system, the estimated performance will be 12 EER (1.0 kW per Ton-Hr).

The retrofit is estimated to pay for itself in energy savings just over two years, equal to an annual return on investment (ROI) of over 47 percent.

The Demand Buster system works on the principal of lowering the refrigerant temperature prior to the compressor, reducing the work required by the compressor. This would be expected to have the effect of extending the life of the compressor, in addition to saving energy.

Please let us know how we can be of service.
Call 888-329-2705 for more information, or visit us on the web at www.eco-smart.com

----- Original Message -----
From: Rick Bofinger
To: 'Matt Ross'
Cc: 'MacWord'
Sent: Wednesday, September 10, 2008 11:08 AM
Subject: Demand Buster

Dear Matt:

We are a mechanical contractor in Northern California that uses a number of techniques to reduce energy use. We recently completed a test of the Thermal Flow "Demand Buster" cooling tower on a Home Depot. I am attaching a report that is getting a lot of notice. We achieved a 28.9% reduction in peak demand, and a 55% reduction in kWh, while actually INCREASING the capacity of the a/c unit.

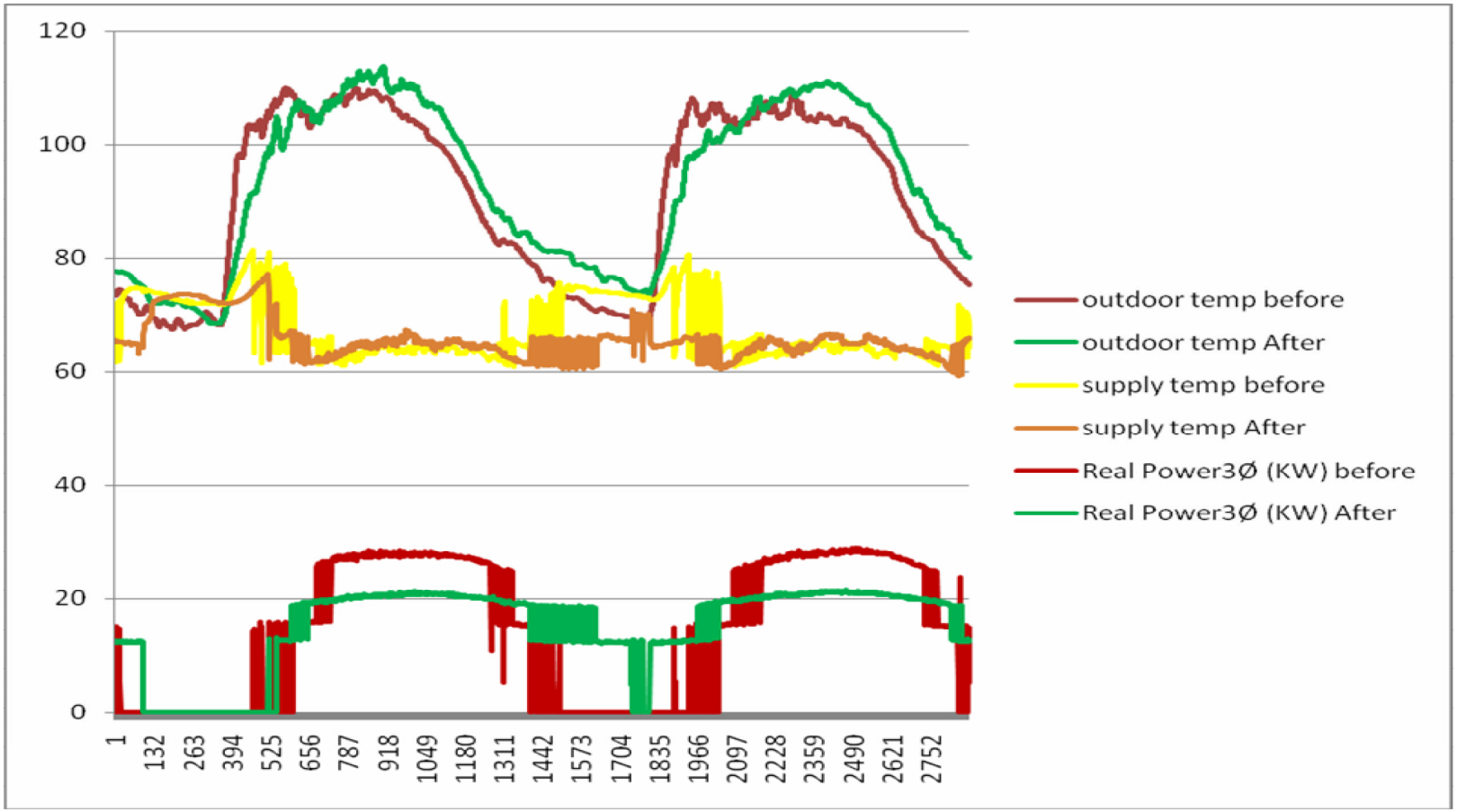
We were able to retrofit and downsize the compressors due to the increased cooling capacity created by the Thermal Flow Demand Buster addition, but we estimate that 75% of the energy savings would have been achieved with the Demand Buster alone.

We have also used this product on low temp refrigeration systems with excellent results. I am attaching the Home Depot report for your consideration, as well as a couple of pictures of the installation.

Rick Bofinger
Jerico Mechanical
Office 916-925-0151 x 112 Cell 825-8880

Big Box Retailer

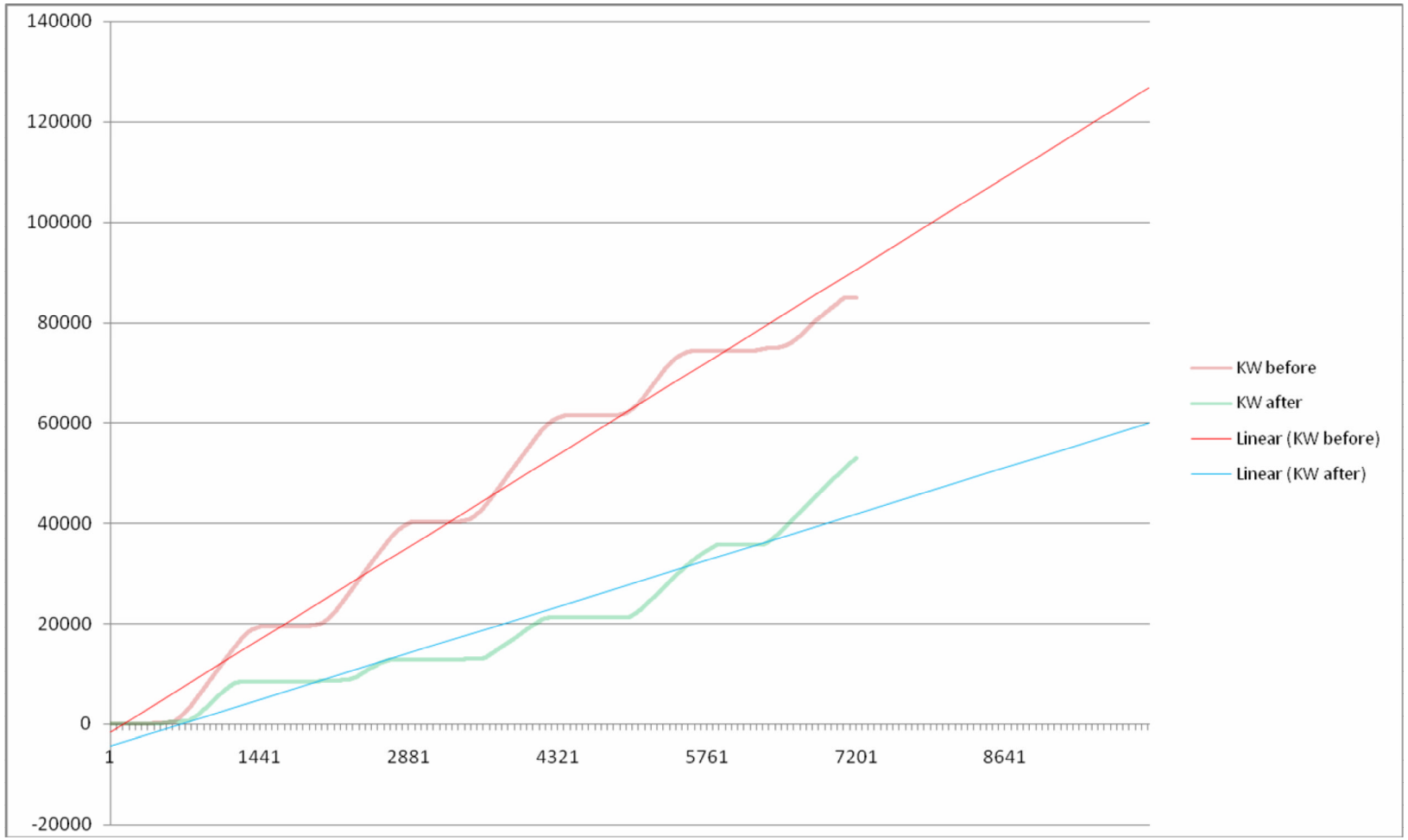
Two Day Before Retrofit & Two Day After Retrofit Comparison



Numbers across bottom are minutes (1440=1 day)

Big Box Retailer

5 Days kW Accumulation



Numbers across bottom are minutes (1440=1 day)

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I am forwarding to you charts that show the energy savings we achieved at a Big Box retailer on their almost new Trane 20 ton air condition.

Peak reduction was 28.9%
kWh reduction was in excess of 50%

The data we collected was reviewed by Optimized Energy, a Roseville Electric sub contractor. I want to cover some facts that are represented in the data and on the charts that needs to be understood.

Linear Chart

The linear chart (straight and wavy lines inclining to the right) simply shows the actual accumulation of kW as the system ran for 5 days during average to hot weather. Our summer has been very mild this year.

1. The red line (pre-retrofit data) was actually cooler weather, it was measured in May. The post retrofit data (blue lines) was measured in July. The hottest pre-retrofit day was 100.7 degrees on the roof, the hottest post retrofit day was 107.0 on the roof.

2. If you follow the trend out to 7 days, the energy saved was in excess of 50%. Based on Roseville electric's numbers, this store spent $172,804 on power in 2007, and $200,590 the previous year which was a hotter summer. Since we demonstrated a reduction in demand of 28.9% and kWh by over 50%, we anticipate that we can impact the total electrical cost for the store very measurably. Knowing the amount of power used for other demands (lighting, equipment, etc.) would be necessary to determine the total bill reduction.

3. The horizontal runs on the wavy lines indicate the unit running in economy mode with no compressors, just pulling in outdoor air at cool periods, and confirms proper operation of economizers.

Temp/Power Comparison Chart

This chart shows two hot days temperature (about 100 degrees). Reds and yellow are before retrofit, green and blue are after. The legend to the left accurately defines temperature at the top of the chart and power at the bottom of the chart.

The bottom chart shows run time and power consumed in kW.

The top blue line on top indicates that we maintained a lower supply/discharge air temperature. The bottom green line indicates that we used substantially less energy to accomplish that work. The bottom chart shows peak energy used, and the staging of the two compressors. Two compressors operation is indicated by the thick lines in the bottom chart running from about 15 to 28 on red and 13 to 19 on green. You can notice the dropping out of the second stage compressor by the thick vertical lines. The elevated thin green line in day two indicates stage two was required more constantly. The taller lines indicate a compressor coming on or dropping off. All these charts were pulled from raw data, there are NO interpretive calculations used.

Bear in mind that this was almost brand new equipment. We can achieve these same savings on 30 year old equipment. On stores with older equipment, you will recognize a much greater energy reduction since the old units that are so prolific have piston compressors that we would change out to more efficient scrolls. As long as the air handler section is in good condition, which is usually the case, there is no need to change the entire unit to get energy savings.

I invite you to view our new website, that summarizes the new services and products we are pioneering. www.jericoenergy.com

Rick Bofinger rick@jermec.com
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July 18th, 2008

This is photos of a Big Box retailer's 20 ton Trane a/c that we did a number of energy retrofits to. We achieved 28.9% reduction in peak energy demand and 55% reduction in kWh use under almost identical conditions.

Following is the photographs of what we have done to the Trane 20 ton, and what we propose to do to the remaining 4ea. Lennox 20 ton units, the computer room a/c, and the break room a/c. This tower is adequate to handle the additional existing a/c's.

The complete project with tower to the left.

Original Compressors.

Downsized scroll compressors.

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Each evaporator will gains capacity of about 24%, so two 10 evaporators will produce far more cooling in extreme weather than they are rated for.

This conversion can be done with almost no interference to store operations.

I welcome your questions,

Rick Bofinger