COLD-PLUS®

On October 25th, 2018 the student sustainability organization and company called EMT (Efficiency Monitoring Technologies, LLC.) was asked by university officials to conduct a short field test on an air conditioning unit that represented all the other university equipment. Supervised and coordinated by Kent Marsh - Associate Vice Chancellor for Campus Planning & Facilities Management, as well as Jerry Reed - Executive Director - Facilities Services. Making the results of this initial field test to become the "baseline energy savings" for the entire UCCS AC program. After very careful and 10-day deliberation Jerry Reed the facilities director chose a 1988 15-ton TRANE unit on the University Hall Building.

To conduct an unbiased and professional field test, we hired a professional and highly certified local HVAC company (ATMS) with an impeccable reputation to preliminarily inspect and the then install the Cold Plus into the unit. We wanted an uninfluenced third-party professional authority to conduct this field test so that the results would be unquestionable.

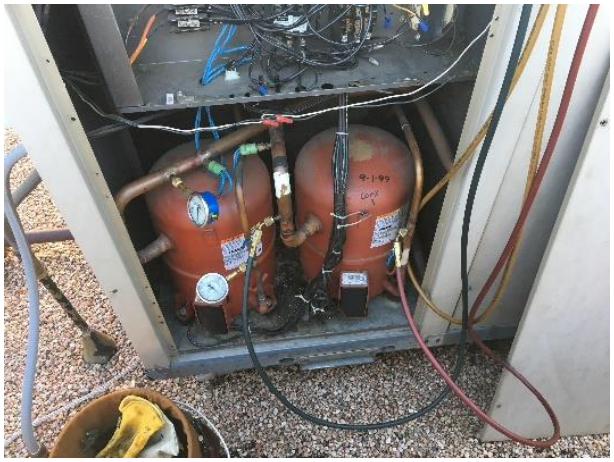
Paul O"Donnel
President

www.alltypemech.com

Upon an initial inspection of the equipment ATMS discovered this unit to be a very old unit in poor repair and low performance. Understanding that this unit was intentionally selected for testing, we concluded that most of the equipment on the campus of UCCS was of similar age and condition. Our goal is to determine what the average energy savings would be across all the campus equipment.

We were assigned an old 1988 15-ton, Trane three phase 460V air conditioner:

Model: BYC170G4L0CA
Type: 268-1234-1-A
Serial: S48143704D
R22 refrigerant
2 Circuits



Our testing procedure was as follows:

#1) Turn on the both units and measure peak amps and running amps

#2) Add ColdPlus™ to unit and measure peak amps and running amps

#3) Wait 30 minutes and measure peak amps and running amps

#4) Wait 96 hours and re-measure peak amps and running amps

#5) Calculate energy required before ColdPlus™ and after

Using the formula: **Energy (kWh) = Current (in Amps) x Voltage (in Volts) x Time (in hours)**

Before ColdPlus™

After ColdPlus™

ColdPlus Savings Calculator								
	old	new	savings				Old	New
Cost per Hour:	$ 0.33	$ 0.31	$ 0.02				Input	Input
Cost per Day:	$ 2.46	$ 2.33	$ 0.14			Running Hours per day:	7.5	7.5
Cost per Month:	$ 73.90	$ 69.76	$ 4.14			Power used in Watts (W=AxV)	3284.4	3100.4
Cost per Year:	$ 886.79	$ 837.11	$ 49.68			Price in kWh:	$ 0.10	$ 0.10
kWh per Day:	24.633	23.253	1.38					
		% savings:	5.60					

After 96 hours the compressor #1 has stabilized from 7.14 amps to 6.74 amps for a 5.6 % energy savings.

ColdPlus Savings Calculator								
	old	new	savings				Old	New
Cost per Hour:	$ 0.36	$ 0.32	$ 0.04				Input	Input
Cost per Day:	$ 2.69	$ 2.41	$ 0.28			Running Hours per day:	7.5	7.5
Cost per Month:	$ 80.73	$ 72.24	$ 8.49			Power used in Watts (W=AxV)	3588	3210.8
Cost per Year:	$ 968.76	$ 866.92	$ 101.84			Price in kWh:	$ 0.10	$ 0.10
kWh per Day:	26.91	24.081	2.829					
		% savings:	10.51					

After 96 hours the compressor #2 has stabilized from 7.8 amps to 6.98 amps for a 10.51 % energy savings.

This gives this 1988 Trane Unit an 8.1% reduction in operating energy costs in just 5 days.

Creative Energy Solutions

Cold-Plus; University of Colorado - Colorado Springs

Status Report 10.30.18

Project Manager: Paul O'Donnell

Project Phase: Installation

Project Start Date: 10.25.18

Project End Date: TBD

Project Summary:

ATMS was hired to take readings on rooftop package unit #17 on Colorado Campus building 100. The purpose of this was to take samplings of equipment performance before and after installing Cold-Plus compressor additive.

Project Status:

Milestones	Planned Dates	Actual Dates	Comments
Kickoff Meeting – installation of Cold-Plus	10.24.18.	10.25.18.	Established baseline by taking sample temperature and pressure readings on rooftop unit #17. Then installed Cold-plus in 2 separate systems, both systems are 7.5 tons. The RTU is in poor condition due to age, manufactured in 1988. It was also noted that compressor #1 had a week suction valve and compressor #2 was slightly low on charge prior to beginning testing.
Check efficiency changes on RTU#17	10.29.18	10.29.18	Recorded temperature and pressure readings on rooftop unit #17 after running 5 days with Cold-Plus

Creative Energy Solutions / Cold-Plus; University of Colorado - Colorado Springs

10.25.18 Established baseline by taking sample temperature and pressure readings on rooftop unit #17. Then installed Cold-plus in 2 separate systems, both systems are 7.5 tons. The RTU is in poor condition due to age, manufactured in 1988. It was also noted that compressor #1 had a week suction valve and compressor #2 was slightly low on charge prior to beginning testing

Date: 10.25.18 before Cold-Plus				Date: __10.29.18__ taken after _5_ days of run time with Cold-Plus added:			
Comp#1	Ambient Air Temperature: 63			Comp#1	Ambient Air Temperature: 62.7		
Amp Draw	7.14			Amp Draw	6.74		
Discharge Pressure	220			Discharge Pressure	230		
Suction Pressure	85			Suction Pressure	85		
Return Air Temp	67.6			Return Air Temp	68.3		
Supply Temp	58.7			Supply Temp	54.1		
Entering Condenser Coil Air Temp	64.4			Entering Condenser Coil Air Temp	62		
Leaving Condenser Coil Air Temp	79.2			Leaving Condenser Coil Air Temp	78		
Comp#2				Comp#2			
Amp Draw	7.8			Amp Draw	6.98		
Discharge Pressure	215			Discharge Pressure	225		
Suction Pressure	62			Suction Pressure	65		
Return Air Temp	69.6			Return Air Temp	68.4		
Supply Temp	62.1			Supply Temp	61		
Entering Condenser Coil Air Temp	64.4			Entering Condenser Coil Air Temp	62.2		
Leaving Condenser Coil Air Temp	83.7			Leaving Condenser Coil Air Temp	86.7		