THE MADISON ENERGY GROUP ENERGY EFFICIENCY SOLUTIONS

Case Study:







Proof of Concept Protocol

<u>Purpose</u>: Demonstrate product performance on specified equipment at multiple pre-determined locations.

Measure Baseline Data:

- I. Identify equipment
- I. Ensure unit is operating properly (normal duty cycle, no visible ice, reaches set point)
- III. Ensure thermostat is accessible and compatible
- IV. Ensure compressor motor is accessible for data logger connection
- V. Record unit information: Type, Mfg, Model #

Compressor Power Source:

- I. At the compressor
 - i. Single phase (hot lead)
 - ii. 3 Phase (1 of 3 hot leads)
- II. Locate power rating (amperage/voltage) on compressor nameplate
- III. Record on datasheet; Phase, Volts and Amps
- IV. Record pilot start date/time on datasheet

Record Baseline Data:

- I. Install Dent TOU CT Logger or EKM Omni-meter V.3
- II. Record Baseline Data 7 days
- III. Validate baseline data

Measure Performance Data:

- I. Install Madison technology
- II. Record install start date/time
- III. Record Performance Data 7 days
- IV. Validate Performance Data
- V. Record pilot ending date/time
- VI. Analyze results



EnerG² reduces energy consumption and compressor cycles in walk-in coolers and freezers by providing a more accurate means of temperature measurement through a specialized gel compound that simulates the food product temperature instead of the air temperature which fluctuates with more volatility. It retrofits to the existing thermostat air probe and requires no additional maintenance.



Guaranteed to Reduce Energy Costs 15 – 30% Reduces Compressor Cycles by 40 – 60% Prevents Wear and Tear Extends Life of Equipment 12 Month ROI Green Restaurant Associated Endorsed Reduced CO2 Emissions – Go Green! Lifetime Warranty



EnerG² is a device that was developed by The Madison Energy Group and contains a non-toxic, food safe gel compound that has similar thermal properties to that of food and beverage. It is therefore, not subject to the same wider and more volatile standard of deviation in temperature that air is. The technology of EnerG² is based on the fact that food and beverage products contain significantly differently thermal properties than air. This means that their temperatures rise and fall at different rates and at different intervals. This causes inefficiency in operation because typical measurement is of the environment (air) and not the actual food and beverage product. Air, having very little density, fluctuates with more volatility thereby causing the coolers to engage in cooling cycles unnecessarily, while EnerG² simulates the stable temperature curve of food product and allows the cooler to operate only when it needs to.

When applied, EnerG² easily retrofits over the external air probe in commercial coolers and freezers and converts the temperature measurement from the ambient air temperature to that of food and beverage temperature. We are now measuring the *intended target of measurement* of food and beverage temperature instead of the immediate environment surrounding the thermostat. This creates an inherently more efficient scenario and results in an average energy reduction of 15-30%. EnerG² is also effective at reducing carbon emissions by several thousand pounds annually. It also increases food safety by maintaining more stable temperature ranges and reduces maintenance costs on equipment by minimizing unnecessary compressor cycles.

HMS Engineering Ltd.

Phillip Stewart

Engineering Consultant

Background and Qualifications for Energy Analysis

Mr. Stewart joined the US Military in 1982 and became a marine engineer involved with mechanical, electrical and structural engineering. After completing his military tour in 1990, he was recruited by Walt Disney World as a Control Specialist and Engineer. During that period Mr. Stewart became extremely interested in energy management systems. After opening Pleasure Island, MGM Studios, Disney Vacation Club, he realized that it was time for new growth in my life and joined Florida's largest Service Company BGSI. Mr. Stewart became certified as a Master Engineer for Refrigeration and Food Equipment.

After years of international endeavours Mr. Stewart entered semi-retirement where he established his consulting company, HMS Engineering Ltd. (HMS), based in Montego Bay, Jamaica in 2007.

As a Chief Engineer, Renewable Energy Consultant and Food Equipment expert, he continues to educate and assist many large companies on ways to reduce their energy consumption and increase their bottom line profits. Companies he has supported over years include Sandals, Couples Resorts, Montego Bay Convention Centre, KFC, Wendy's, Burger King, Moes, Margaritaville, and many others.

The attached Baseline/Performance Test Report was prepared by Mr. Stewart and all findings are based on analysis of the raw data logger information collected onsite and provided to him. I certify that neither I nor my company (HMS Ltd.) ever receive any compensation which correlates in any manner whatsoever to test report results and that the referenced report findings are accurate and unbiased.

Phillip Stewart

Chief Engineer
HMS Engineering Ltd.
Referenced Report No.

WAB111918

Dated 11/19/2018

HMS Engineering

Months

Client : The Madison Energy Group 16-Nov-18 Report Print Date: 5 Hargett St., 4th Floor Raleigh, North Carolina 27601 Report No.: Dom111618 Facility / Location: Dominos Pizza - Midland, TX (503) Room/Equip. Tested: Walk-in Cooler Calculation Basis 0.3 Volts: 230 RLA: 8.0 Compressor Motor: HP: Phase: 2.84 Electricity Rate: \$0.08 Power Consumption: per kWh Operating Basis (Without EnerG2) With EnerG² Change % Change -23.9% Projected Run Hours / Yr: 6,852 5,214 **-1,**638 -55.6% Projected Cycles / Yr: 9,855 4,380 -5,475 Energy Use & Cost Savings per Month With EnerG² (Without EnerG2) Change % Change -23.9% Operating Hours / Month: 571 435 -137 -388 KWh / Month: 1,622 1,234 -23.9% \$99 Energy Cost / Month \$130 -\$31 -23.9% Mechanical Cost Savings per Month With EnerG² (Without EnerG2) Change % Change Cycles / Month: 821 365 -456 -55.6% Compressor Maintenance Cost/ Month: \$42 \$19 -\$23 -55.6% Combined Energy and Mechanical Cost Savings (Without EnerG2) With EnerG² Change % Change Energy & Mechanical Cost / Month: \$171 \$117 -\$54 -31.6% Energy & Mechanical Cost / Year: \$2,057 \$1,407 -\$650 -31.6% Energ² Return on Investment

11.06

Longest Off-Time:

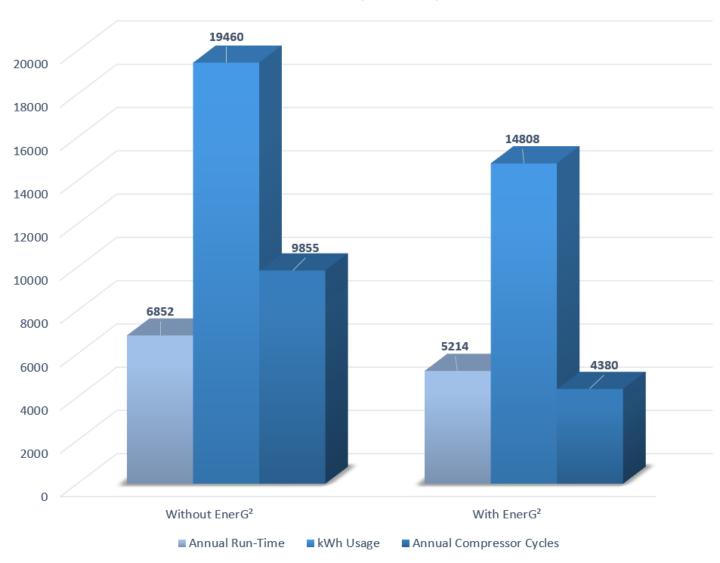
Shortest Off-Time:

1.13 hrs

<0.01 hrs



CT18040039 Data Graph Series | Dominos TX





Serial Number: CT18040039

Description: DENT SMART LOGGER On-Time Since Reset: 231.40 hrs Off-Time Since Reset: 104.60 hrs

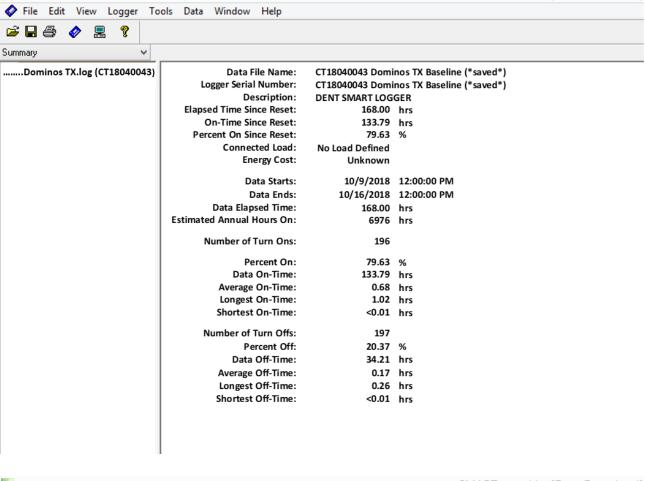
Date	TOU/Day (hrs)
Tuesday, October 9, 2018	9.37
Wednesday, October 10, 2018	18.82
Thursday, October 11, 2018	18.87
Friday, October 12, 2018	18.75
Saturday, October 13, 2018	18.74
Sunday, October 14, 2018	18.87
Monday, October 15, 2018	18.75
Tuesday, October 16, 2018	16.74
Wednesday, October 17, 2018	14.35
Thursday, October 18, 2018	14.22
Friday, October 19, 2018	14.37
Saturday, October 20, 2018	14.26
Sunday, October 21, 2018	14.08
Monday, October 22, 2018	14.16
Tuesday, October 23, 2018	7.04

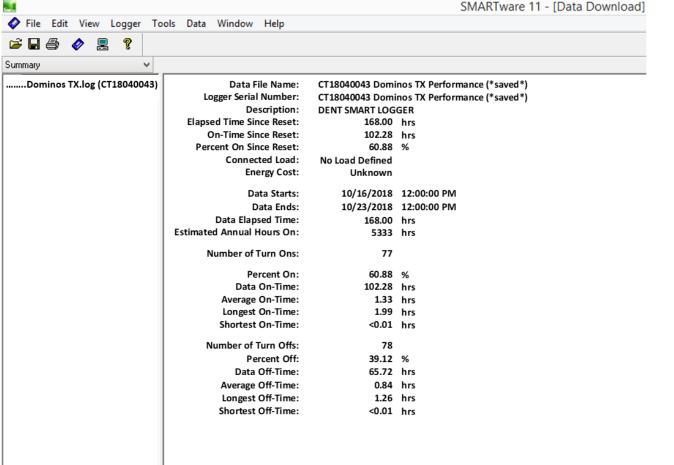
HMS Engineering

Months

Client : The Madison Energy Group 16-Nov-18 Report Print Date: 5 Hargett St., 4th Floor Raleigh, North Carolina 27601 Report No.: Dom111618 Facility / Location: Dominos Pizza - Midland TX (1307) Room/Equip. Tested: Walk-in Cooler Calculation Basis 0.3 Volts: 230 RLA: 12.0 Compressor Motor: HP: Phase: 2.84 Electricity Rate: \$0.08 Power Consumption: per kWh Operating Basis (Without EnerG2) With EnerG² Change % Change Projected Run Hours / Yr: 6,976 5,333 -1,643 -23.6% -60.7% Projected Cycles / Yr: 10,220 4,015 -6,205 Energy Use & Cost Savings per Month With EnerG² (Without EnerG2) Change % Change -23.6% Operating Hours / Month: 581 444 -137 -389 KWh / Month: 1,651 1,262 -23.6% Energy Cost / Month \$132 \$101 -\$31 -23.6% Mechanical Cost Savings per Month With EnerG² (Without EnerG2) Change % Change Cycles / Month: 852 335 -517 -60.7% Compressor Maintenance Cost/ Month: \$42 \$16 -\$25 -60.7% Combined Energy and Mechanical Cost Savings (Without EnerG2) With EnerG² Change % Change Energy & Mechanical Cost / -\$56 Month: \$174 \$117 -32.5% Energy & Mechanical Cost / Year: \$2,085 \$1,408 -\$677 -32.5% Energ² Return on Investment

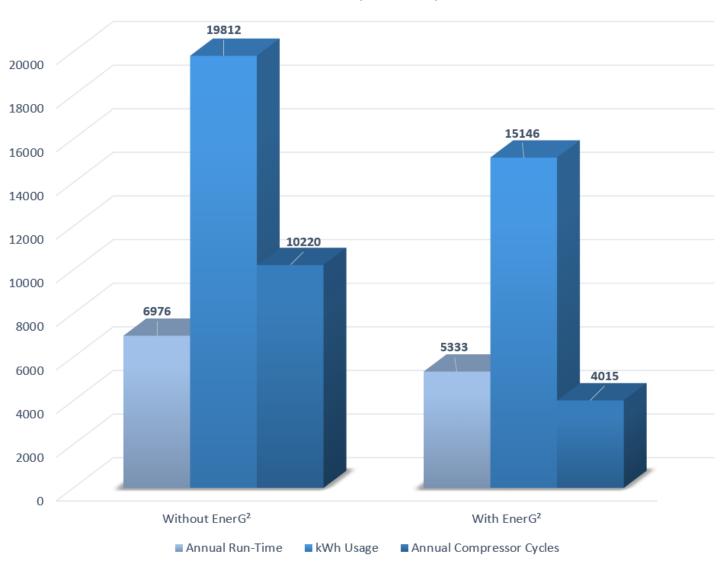
10.62







CT18040043 Data Graph Series | Dominos TX





Serial Number: CT18040043

Description: DENT SMART LOGGER On-Time Since Reset: 236.07 hrs Off-Time Since Reset: 99.93 hrs

Date	TOU/Day (hrs)
Tuesday, October 9, 2018	10.56
Wednesday, October 10, 2018	18.88
Thursday, October 11, 2018	19.14
Friday, October 12, 2018	19.69
Saturday, October 13, 2018	19.94
Sunday, October 14, 2018	18.38
Monday, October 15, 2018	18.37
Tuesday, October 16, 2018	17.66
Wednesday, October 17, 2018	13.04
Thursday, October 18, 2018	14.12
Friday, October 19, 2018	14.33
Saturday, October 20, 2018	14.86
Sunday, October 21, 2018	14.17
Monday, October 22, 2018	14.58
Tuesday, October 23, 2018	8.35



IntelliHVAC reduces energy consumption in HVAC units through efficient fan control and compressor cycling. The combination of these two technologies optimizes performance by allowing the fans, which use 8 to 15 times less energy than the compressors to capture latent energy that would otherwise be lost. It is retrofitted at the 24-volt terminal and requires no additional maintenance.



Guaranteed to Reduce Energy Costs 10 – 30%
Reduces Compressor Cycles by 20%
Prevents Wear and Tear
Extends Life of Equipment
12 - 18 Month ROI
Reduced CO2 Emissions – Go Green!
Lifetime Warranty



IntelliHVAC is a dual microprocessor technology that easily retrofits to any existing central air HVAC system. It contains both a *post-purge* and *compressor cycle functions* that work together to create a significantly more efficient environment within the system. The inefficiency and therefore *opportunity* is that there is still latent cold energy on the coil or heat energy in the exchanger and this energy is wasted as it dissipates within the system. IntelliHVAC captures this excess energy through its *post-purge function*. This process is known as latent recovery and has been verified by numerous utility companies.

When the HVAC system reaches set point, IntelliHVAC will extend and optimize the fan run-time based on the previous compressor cycle to ensure that the latent hot or cold energy has been captured and that all of that air is circulated all the way through the duct system so that it is not wasted. IntelliHVAC continues to monitor the system and adjust the post purge cycle based on its proven algorithm.

IntelliHVAC also has a *compressor cycle function* that increases the overall energy savings cycling the compressor off for 5 minutes for every 25 minutes of continuous run-time. This allows the fan, which uses 8 to 15 less energy than the compressor to capture the latent energy from the coil or heat exchanger. IntelliHVAC will run the fan for the equivalent amount of time that the compressor is off to ensure that air continues to circulate and there are no negative effects to the indoor air temperature quality.

Tower Engineering Craig Andes Owner / HVAC Engineer

J. Craig Andes, MBA

With close to 40 years of experience, Mr. Andes has been an industry veteran since 1977 and has a keen eye toward efficiency for his customers. Mr. Andes has owned and operated numerous businesses including several mechanical companies, an insulating company, has built numerous structures, and has directed large service oriented companies. Mr. Andes has also been hired as a consultant by several companies to assist them in their growth and process management.

Currently Mr. Andes owns and operates Tower Engineering in the Raleigh, NC metro market.

After earning his MBA at Union University in Jackson, TN, Mr. Andes is able to merge the real-world practical side of HVAC with financial feasibility and ROI making for good commonsense guidance.

With regard to Madison Energy Group, Mr. Andes serves as an independent, 3rd party consultant and assists the company specifically with the IntelliHVAC technology. Mr. Andes has help Madison Energy consult with companies such as Restaurant Brands International, Darden Restaurants, CBL Properties, and others in helping them to understand the mechanics of their systems as well as the benefits of the IntelliHVAC technology. Mr. Andes also manages the pilot program process, analysis and reporting on behalf of Madison.

The attached reporting is hereby approved and certified by Mr. Andes as accurate in its entirety. Mr. Andes is not compensated in any manner that is based on test results.

J. Craig Andes

Tower Engineering

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Owner / HVAC Engineer

Date: 11/19/2018



Craig Andes HVAC Engineering Contractor

On Behalf of: The Madison Energy Group
For Client: Dominos Pizza

Location: Midland TX (503)

Report Date: 11/19/2018

Kwh Rate: 0.08

					Baseline			Performance
		Start Date	Install Date	Time	kWh Consumed	End Date	Time	kWh Consumed
Area:	RTU 1	10/9/2018	10/16/2018	12:00PM	986.8	10/23/2018	12:00 PM	807.4
Meter #	15563							
				kWh/Month	4,229.14		kWh/Month	3,460.29
				kWh/Yr	51,454.57		kWh/Yr	42,100.14

 RTU Summary

 kWh Diff./Period
 179.4

 kWh Diff./Yr
 9,354.43

 % Change
 18%

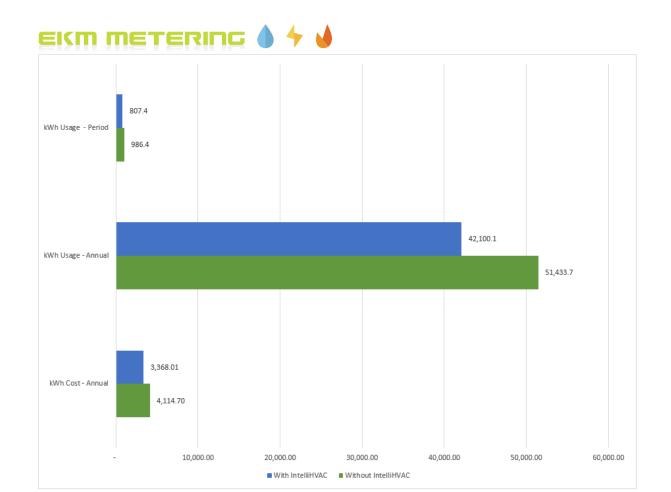
 Savings/Yr
 \$ 748.35

Location: Midland TX (1307)

					Baseline			Performance
		Start Date	Install Date	Time	kWh Consumed	End Date	Time	kWh Consumed
Area:	RTU 2	10/9/2018	10/16/2018	12:00PM	947.0	10/23/2018	12:00PM	768.2
Meter #	15536							
				kWh/Month	4,058.57		kWh/Month	3,292.29
				kWh/Year	49,379.29		kWh/Year	40,056.14

RTU Summary				
kWh Diff./Period		178.80		
kWh Diff./Yr		9,323.14		
% Change		19%		
Savings/Yr	\$	745.85		

Project Summary					
Total kWh/Yr Reduced		18,677.57			
Average Annual Savings	\$	747.10			
Normalized for Season	\$	1,270.07			
Projected ROI 9.44 Months					

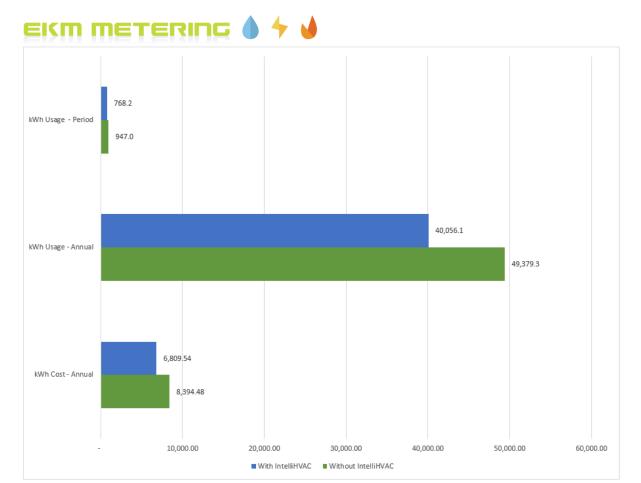




EKM-OmniMeter v.3
Dominos RTU 503 LogFile

Total kWh Usage for Period: 1794.2

Date	Kilowatt Hour	Avg. Voltage	Avg. Amps	Avg. Watts	Avg. Cosî, (Power Factor)
10/9/201	8 52.5	120.4	24.8	2248	LO.86	
10/10/201	8 124.0	120.6	25.2	2252	LO.87	
10/11/201	8 139.4	120.8	24.6	2362	LO.88	
10/12/201	8 175.5	122.8	24.6	2230	LO.89	
10/13/201	8 172.8	121.2	25.0	2256	LO.87	
10/14/201	8 136.1	121.4	25.4	2252	LO.87	
10/15/201	8 126.2	120.6	25.2	2332	LO.87	
10/16/201	8 120.5	120.8	25.2	2340	LO.86	
10/17/201	8 104.9	121.2	24.8	2260	LO.87	
10/18/201	8 111.7	121.2	24.6	2260	LO.86	
10/19/201	8 142.6	121.2	24.8	2350	LO.87	
10/20/201	8 140.0	122.4	25.6	2360	LO.86	
10/21/201	8 107.3	120.8	26.2	2258	LO.86	
10/22/201	8 98.5	122.0	25.4	2412	LO.86	
10/23/201	8 42.1	122.2	24.8	2422	LO.86	_





EKM-OmniMeter v.3
Dominos RTU 1307 LogFile

Total kWh Usage for Period: 1715.2

Date	Kilowatt Hour	Avg. Voltage	Avg. Amps	Avg. Watts	Avg. Cosî,	(Power Factor)
10/9/2018	43.6	118.6	26.2	2652	LO.87	
10/10/2018	120.9	120.4	25.4	2640	LO.87	
10/11/2018	133.5	120.6	25.6	2568	LO.87	
10/12/2018	168.4	120.8	24.8	2552	LO.87	
10/13/2018	169.2	120.4	24.6	2522	LO.87	
10/14/2018	130.2	121.6	25.2	2534	LO.86	
10/15/2018	121.7	120.6	25.0	2608	LO.86	
10/16/2018	119.0	121.4	24.2	2430	LO.86	
10/17/2018	96.4	121.4	23.4	2380	LO.86	
10/18/2018	109.8	119.4	23.6	2370	LO.86	
10/19/2018	131.1	118.8	22.4	2310	LO.86	
10/20/2018	133.2	119.8	22.8	2280	LO.86	
10/21/2018	99.6	120.4	22.4	2270	LO.86	
10/22/2018	96.5	120.2	21.6	2280	LO.87	
10/23/2018	42.1	118.6	21.4	2342	LO.86	

Proof of Concept Performance Summary

Program Duration - 10/9/2018 - 10/23/2018

EnerG ²	Summary
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\$ 650.00 Annual Savings - Cooler 1 Annual Savings - Cooler 2 677.00

Average Annual Savings per Unit 663.50

Projected Annual Savings for units \$

Projected Savings Over 10 Years

Return on Investment -----

Months

12,606.50

126,065.00

IntelliHVAC Summary

Annual Savings - RTU 1 \$ 748.35 Annual Savings - RTU 2 \$ 743.85

\$ 746.10 Average Annual Savings per Unit Annual Savings Normalized for Season 1,270.07

Projected Annual Savings for 38

Projected Savings Over 10 Years

48,262.66 units - \$ 482,626.60

Return on Investment -----

Months

Overall Summary of Performance

3,203.64 Annual Per Store Energy Savings

Combined Monthly Energy Savings 5,072.43

Combined Annual Energy Savings 60,869.16

Combined Energy Savings Over 10 Years

608,691.60

Cumulative Return on Investment/Months

10.66

(with DFA Preferred Pricing)







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