THE MADISON ENERGY GROUP ENERGY EFFICIENCY SOLUTIONS







THE MADISON ENERGY GROUP

Proof of Concept Protocol

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

Measure Baseline Data:

- I. Identify equipment
- II. 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 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.

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. 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 the 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. GUHSD102616

Dated 10/26/2016

HMS Engineering

Client : The Madison Energy 5 Hargett St., 4 Raleigh, North C	gy Group th Floor arolina 27601	Report Print Date:	26-Oct-16	
Facility / Location: GUHSD				
Room/Equip. Tested: Walk-i	.n Cooler			
	Calculati	ion Basis		
Compressor Motor: HP:	0.3 Volts: 230) RLA: 12.0	Phase:	3
Power Consumption:	2.84 kW Elect	ricity Rate: \$0.18	per kWh	
	Operatin	ng Basis		
Projected Run Hours / Yr: Projected Cycles / Yr:	(Without EnerG ²) 6,815 10,220	With EnerG ² 5,632 6,101	Change -1,183 -4,119	<pre>% Change -17.4% -40.3%</pre>
Ene	rgy Use & Cost	Savings per Month		
Operating Hours / Month: KWh / Month: Energy Cost / Month	(Without EnerG ²) 568 1,613 \$290	With EnerG ² 469 1,333 \$240	Change -99 -280 -\$50	% Change -17.4% -17.4% -17.4%
Me	chanical Cost S	Savings per Month		
Cycles / Month: Compressor Maintenance Cost/ Month:	(Without EnerG ²) 852 \$42	With EnerG ² 508 \$25	Change -343 -\$17	<pre>% Change -40.3% -40.3%</pre>
Combine	d Energy and Me	chanical Cost Sav	ings	
Energy & Mechanical Cost / Month:	(Without EnerG ²) \$332	With EnerG ² \$265	Change -\$67	% Change -20.2%
Energy & Mechanical Cost / Year:	\$3,984	\$3,178	-\$806.27	-20.2%
EnerG ² Return on Investment				

8.92

Months

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CT14080013 Data Graph Series | Grossmont HS



HMS Engineering

Client : The Madison Energy 5 Hargett St., 4 Raleigh, North C	gy Group th Floor arolina 27601	Report Print Date:	26-Oct-16 02616	
Facility / Location: GUHSD				
Room/Equip. Tested: Walk-i	.n Freezer			
	Calculati	on Basis		
Compressor Motor: HP:	0.3 Volts: 230	RLA: 12.0	Phase:	3
Power Consumption:	2.84 kW Electr	icity Rate: \$0.18	per kWh	
	Operatin	g Basis		
Projected Run Hours / Yr: Projected Cycles / Yr:	(Without EnerG ²) 7,558 12,229	With EnerG ² 5,812 5,705	Change -1,746 -6,524	% Change -23.1% -53.3%
Ene	rgy Use & Cost	Savings per Month		
Operating Hours / Month: KWh / Month: Energy Cost / Month	(Without EnerG ²) 630 1,789 \$322	With EnerG ² 484 1,376 \$248	Change -146 -413 -\$74	% Change -23.1% -23.1% -23.1%
Ме	chanical Cost S	avings per Month		
Cycles / Month: Compressor Maintenance Cost/ Month:	(Without EnerG ²) 1,019 \$42	With EnerG ² 475 \$19	Change -544 -\$22	% Change -53.3%
Combine	d Energy and Me	chanical Cost Sav	ings	
Energy & Mechanical Cost / Month:	(Without EnerG ²) \$364	With EnerG ² \$267	Change -\$97	% Change -26.6%
Energy & Mechanical Cost / Year:	\$4,364	\$3,204	-\$1,159.30	-26.6%
EnerG ² Return on Investment				

6.20

Months

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								Longest	On-Tim	e:	1.31	hrs						
								Shortest	On-Tim	e:	<0.01	hrs						
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								Data	Off Time	т:	23.05	⁷⁰						
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CT15110070 Data Graph Series | Grossmont HS





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.

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 common-sense 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 helped Madison Energy consult with companies such as Starbucks, 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

of Ciang Andes

Tower Engineering Owner / HVAC Engineer Date: 10/25/2016

Report Date:

Kwh Rate:

10/25/2016

Craig Andes HVAC Engineering Contractor

On Behalf of:	The Madison Energy Group
For Client:	Grossmont Union

Location: Grossmont Union

					Baseline			Performance
		Start Date	Install Date	Time	kWh Consumed	End Date	Time	kWh Consumed
Area:	RTU 1	9/14/2016	9/21/2016	12:00PM	1,892.4	9/28/2016	12:00 PM	1,462.3
Meter #	15569							
			k	Wh/Month	8,110.29		kWh/Month	6,267.00
			k	Wh/Yr	98,675.14		kWh/Yr	76,248.50

RTU	Summary	
kWh Diff./Period		430.1
kWh Diff./Yr		22,426.64
% Change		23%
Savings/Yr	\$	4,036.80

0.18

Location: Grossmont Union

					Baseline			Performance
		Start Date	Install Date	Time	kWh Consumed	End Date	Time	kWh Consumed
Area:	RTU 2	9/14/2016	9/21/2016	12:00PM	1,722.3	9/28/2016	12:00 PM	1,408.5
Meter #	15543							
				kWh/Month	7,381.29		kWh/Month	6,036.43
				kWh/Year	89,805.64		kWh/Year	73,443.21

RTU Summary									
kWh Diff./Period		313.80							
kWh Diff./Yr		16,362.43							
% Change		18%							
Savings/Yr	\$	2,945.24							

Project Summary										
Total kWh/Yr Reduced		38,789.07								
Average Annual Savings	\$	3,491.02								
Normalized for Season	\$	2,945.58								
Projected ROI		4.07	Months							



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Proof of Concept Performance Summary

Program Duration - 9/14/2016 - 9/28/2016

EnerG ² Summary			
nnual Savings - Cooler	\$ 806.27		
nnual Savings - Freezer	\$ 1,159.30		
verage Annual Savings per Unit	\$ 982.79		
rojected Annual Savings for	24	units	\$ 23,586.84
rojected Savings Over 10 Years		•	\$ 235,868.40
eturn on Investment @ \$599 / unit	 	7.31	Months

IntelliHVAC Summary

Annual Savings - RTU 1	\$ 4,036.80		
Annual Savings - RTU 2	\$ 2,945.24	_	
Average Annual Savings per Unit	\$ 3,491.02		
Annual Savings Normalized for Season	\$ 2,945.58		
Projected Annual Savings for	120	units	\$ 353,469.60
Projected Savings Over 10 Years			\$ 3,534,696.00
Return on Investment @ \$999 / unit	 	4.07	Months

Overall Summary of Performance		
Combined Monthly Energy Savings	\$	31,421.37
Combined Annual Energy Savings	\$	377,056.44
Combined Energy Savings Over 10 Years	\$	3,770,564.40
Cumulative Return on Investment/Months		5.21



Limited Lifetime Replacement Warranty

Guarantor: The Madison Energy Group, located at 5 West Hargett St. 4th Floor Raleigh, NC 27601 will fulfill and administer the obligations of this performance guarantee.

This performance guarantee certifies that The Madison Energy Group's (manufacturer) EnerG² will perform satisfactorily during the guarantee period in accordance with its original energy saving standards. If the unit is defective when received or becomes defective, it will be replaced in accordance with this Limited Lifetime Warranty/Performance Guarantee. Please call The Madison Energy Group at 919-443-2404 Option 2 if this occurs.

The performance guarantee does not cover negligent, fraudulent and/or intentional damage. If the EnerG² unit is damaged, another EnerG² unit will be sent immediately as a replacement. For coverage to be valid, the client must register with The Madison Energy Group and provide proof of purchase in the form of a paid invoice from either The Madison Energy Group or one of its qualified, contracted distributors. The unit must also e installed properly along with manufacturer specifications.

This performance guarantee is effective from the date of purchase, provided that adequate proof of purchase is maintained, the product is properly registered (see below) and the product is installed properly. The Madison Energy Group must be notified immediately of any defects in the unit with all records being made available for inspection. Defects will be verified. This guarantee is exclusive and in lieu of any other performance guarantee or warranty of merchantability or fitness for a particular purpose.

In no event shall The Madison Energy Group be liable for any special, indirect, incidental or consequential damages. This guarantee, covering the replacement of the EnerG² unit is void is the product covered by the guarantee has been subject to: intentional damage, alteration, tampering, acts of God and other insurance perils, faulty installation or claims covered by insurance or service contract. The coverage applies only to EnerG² and no other product. Claims not submitted in accordance with the terms and conditions of this guarantee are void. Damage by unreasonable or unintended use, neglect, improper service or other causes not arising of defects in material or workmanship are not covered.

To Make a Claim: For service please contact The Madison Energy Group support line at 919-443-2404

To Register: In order for coverage to be valid, you must register your EnerG² within 30 days of purchase at www.themadisonenergygroup.com. Coverage is non-transferable.

Phone: 919-443-2404 Fax: 919-800-3700 INFO@THEMADISONENERGYGROUP.COM



5 West Hargett St. • 4th Floor Raleigh, NC 27601 www.themadisonenergygroup.com



Limited Lifetime Replacement Warranty

Guarantor: The Madison Energy Group, located at 5 West Hargett St. 4th Floor Raleigh, NC 27601 will fulfill and administer the obligations of this performance guarantee.

This performance guarantee certifies that The Madison Energy Group's (manufacturer) IntelliHVAC will perform satisfactorily during the guarantee period in accordance with its original energy saving standards. If the unit is defective when received or becomes defective, it will be replaced in accordance with this Limited Lifetime Warranty/Performance Guarantee. Please call The Madison Energy Group at 919-443-2404 Option 2 if this occurs.

The performance guarantee does not cover negligent, fraudulent and/or intentional damage. If the IntelliHVAC unit is damaged, another IntelliHVAC unit will be sent immediately as a replacement. For coverage to be valid, the client must register with The Madison Energy Group and provide proof of purchase in the form of a paid invoice from either The Madison Energy Group or one of its qualified, contracted distributors. The unit must also e installed properly along with manufacturer specifications.

This performance guarantee is effective from the date of purchase, provided that adequate proof of purchase is maintained, the product is properly registered (see below) and the product is installed properly. The Madison Energy Group must be notified immediately of any defects in the unit with all records being made available for inspection. Defects will be verified. This guarantee is exclusive and in lieu of any other performance guarantee or warranty of merchantability or fitness for a particular purpose.

In no event shall The Madison Energy Group be liable for any special, indirect, incidental or consequential damages. This guarantee, covering the replacement of the IntelliHVAC unit is void is the product covered by the guarantee has been subject to: intentional damage, alteration, tampering, acts of God and other insurance perils, faulty installation or claims covered by insurance or service contract. The coverage applies only to IntelliHVAC and no other product. Claims not submitted in accordance with the terms and conditions of this guarantee are void. Damage by unreasonable or unintended use, neglect, improper service or other causes not arising of defects in material or workmanship are not covered.

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