



National Resource Management, Inc.

Fun N Sun/2017/Carlsbad CA

“Reducing utility consumption is “coming up roses” in the CA floral industry -
Case Studies in Energy Reduction”

Presented by: Ted Kohlenberger

NRM, Inc./CA Division ~ tedk@nrminc.com

Thanking the following customers for their partnership & trust...



**“Fun ‘N Sun” CA Floral Convention
Park Hyatt Aviara Resort/Carlsbad**

“Reducing Utility Consumption is "Coming up Roses" in the CA Floral Industry”

On behalf of: Cal Flowers. Speaker: Ted Kohlenberger/CA Team Lead

National Resource Management, Inc. ~ tedk@nrminc.com ~ 909/287-6654

Intro, industry statistics & cost structure:

Internationally, Floriculture is a \$31.3 billion industry according to the *U.S. Bureau of Economic Analysis Personal Consumption Expenditures (2016)*.

California continues to be the leading state with floriculture crops valued at \$1.08 billion. The wholesale value of domestically produced cut flowers was \$374 million for 2015, up 3 percent from 2014.

California's is the US' leading producer of cut flowers with a wholesale value of \$294 million, accounting for 78 percent of the total cut flower value.

Floral production is a competitive business, requiring effective & efficient management of all aspects of the production & distribution channels.

Variable costs (labor, materials, utilities, etc.) make up a substantial portion of the pricing structure.

Energy and utilities consumption are manageable variable costs & can be reduced through the use of efficient practices, equipment & controls.

Main energy users around the farm, warehouse & coolers:

Pumping ground water may be the largest consumer of electricity at the grower/farm level. What you can do

- Consider higher efficiency pump machinery, frequently supported with utility incentives.
Pump water during off-peak periods, if possible.
Consider tank or reservoir storage, pump and retain water during off-peak periods.

Greenhouse fan circulation results in significant usage and adds to peak demand. What you can do -

- Replace and/or retrofit existing fan circulators with high efficiency (HE) fan motors, frequently with utility incentives.
Re-schedule operation for off-peak if possible.

Greenhouse lighting results in substantial off-peak electrical consumption. What you can do -

- Replace and/or retrofit existing fixtures with appropriate LED lamps. Many purchases supported with utility incentives.
Consider controls & other programmable devices to limit unnecessary on-time. Don't forget warehouse lighting and controls as well.

Natural gas usage for hot water and/or steam generation can be a significant. What you can do -

- Replace and/or retrofit existing hot water (HW) generators and steam boilers. Most purchases & measures are incentivized by respective utilities.
Consider solar/thermal technologies & storage for HW generation & use.

Refrigeration for walk-in coolers runs 24/7, and can account for 60% or greater site electrical use plus majority of electrical demand. What you can do -

- Consider HE fan motors, web-based controls & off-peak scheduling to save considerable energy.
Replace inefficient cooler lighting with LED fixtures.
Repair refrigeration equipment & address doors/seals.

Conclusions:

- Energy costs are increasing, particularly electricity, & utilities are ramping down many rebates & incentives. Even still, pursue energy efficiency (EE) measures as equivalent cost of sale is \$0 (Savings = profit)
- Focus on longer term financial attractiveness. Simple pay-back is not a particularly good metric.
- When considering EE, Incorporate savings from reduced maintenance & longer equipment life, and consider qualitative enhancements that come with most measures such as increased peace of mind, improved working conditions and reduced operational risk.
- Reach out to those of us in EE/engineering/contracting – all of us happy to discuss alternatives, provide budget costs, etc w/o obligation.

E. Questions/Comments:

F. Case studies, CA Floral, Grower/Shippers:

Maximum Nursery/Carpinteria
Sunshine Floral/Oxnard
Kendall Farms/Vista
Ocean Breeze Int'l./Carpinteria
Westland Orchids/Carpinteria

Some relevant and recent research that encourages our efforts...

“Our research and analysis indicate that electricity prices will continue to increase at rates that will make investments in energy efficiency and renewable energy wise decisions with strong returns for retail consumers”

UC Davis, Energy Efficiency Center, “The Future of Electricity Prices in California”, 12/2013, by Dr. Jonathan Cook, Ph.D.

<https://eec.ucdavis.edu/files/02-06-2014-The-Future-of-Electricity-Prices-in-California-Final-Draft-1.pdf>

California Generation Shares, 2012 (Percent)

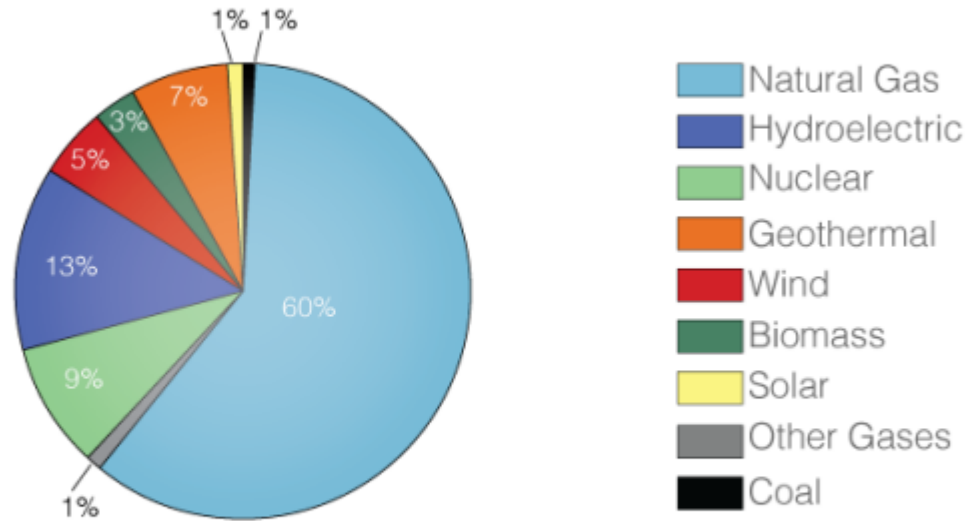


Figure 2: CA Electricity Generation Mix (2012)

Source: Energy Information Administration, Electric Power Monthly, February 2013

³ Fuel costs for nuclear are not zero, but are very small on a kWh/\$ basis.

Electricity consumption per capita in California

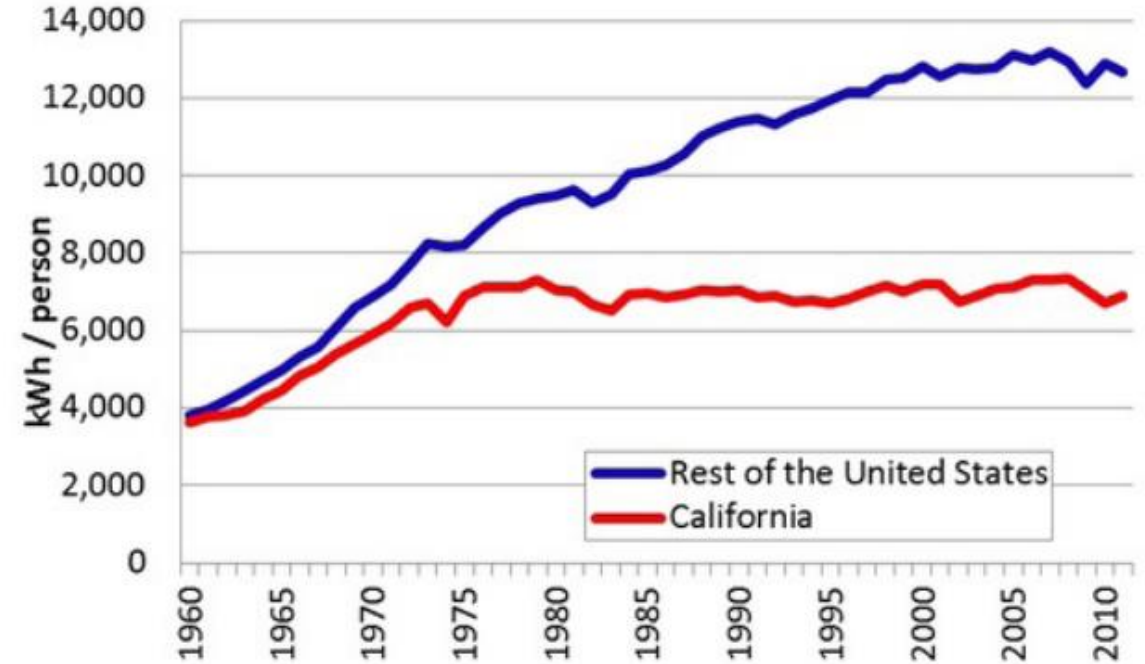


Figure 3: Electricity consumption per capita in California

Source: U.S. Energy Information Administration

For a great article with time-proven design and operational guidance on water pumping, see the link:

<https://www.wateronline.com/doc/tips-to-save-energy-on-pumping-systems-0001>

B1



Kennedy/Jenks
Consultants



Wilson Farms' old greenhouse fans drew 80 watts per motor 24/7.



NRM's new retrofit motors use only 33 watts per motor, maintain the same airflow, yet operate much more quietly.

B2

Greenhouse circulation fans are a great candidate for retrofit with HE motors. Generally, look for operation of at least 5,000 hrs/yr for good ROI.

Sunshine Floral/Oxnard warehouse and assembly area – Pre-retrofit view showing inefficient and maintenance-intensive 400w metal halide high bay fixtures.

Replaced like-for-like with state of the art 110w LED luminaires, savings apprx 75% on lighting energy while reducing heat generation in warehouse.

B3



Steam boilers and hot water generators are required to meet stringent codes for safety, efficiency and air quality impacts. Consult a reputable manufacturer for specifics.

EE measures include condensing-type operation, solar/thermal pre-heating of feed-water, exhaust stack economizers and enhanced fin/heat exchanger design.

B4

8/14/2017

National Resource Management, Inc.



INDUSTRIAL PACKAGED STEAM BOILER

Horizontal Drum Sectional Water Tube

30 to 50 HP Gas Fired

104 Steam Boilers 30 to 50 HP

Industrial Packaged
Steam Boiler

Pressures
to 250 PSI



THE PARKER DESIGN

The Parker water tube design offers an extremely efficient, reliable steam boiler built for the long term and ease of maintenance. The Parker design offers many advantages. Compare ours to the competition.

ADVANTAGES

1. Safety

The Parker ASME tube bundle is extremely flexible and offers a long life with a 25 year warranty against thermal shock. No Parker Boiler has ever been known to experience an internal explosion.

2. Large Heating Surface

A large amount of heating surface provides increased efficiency, long boiler life and minimizes chances of scaling. Compare ours to the competition.

3. Simplicity

The Atmospheric Burner System, the control system and entire boiler are furnished so that it is simple to operate by regular personnel. Simplicity is a decided advantage as there are no expensive blowers, complicated controls, or burner adjustments, as is necessary on many boilers.

4. Codes

All Parker Steam Boilers are manufactured in accordance with the ASME Power & Heating Boiler Codes and registered with the National Board of Boiler and Pressure Vessel Inspectors. The standard natural gas fired model is furnished as an Underwriters' Laboratories, Inc. Listed Gas Fired Boiler Assembly and displays their symbol on the nameplate. Outdoor, propane and Low NOx models are ETL listed. Canadian models are C-ETL Listed Industrial and Commercial Gas Fired Packaged Boilers certified to CAN/CGA 1-3.1 and UL 795.

5. Internal Accessibility

Inspection cabinet doors can easily be removed in a matter of minutes, making the internal boiler, drum, tubes, and burners readily accessible. Easy-to-remove gasketed access plugs are provided at both ends of every tube. Boiler inspections can be accomplished quickly and at low costs.

6. Ease of Inspection and Repair

Any boiler may eventually require retubing depending on care and operating conditions. Retubing does not require special tools, skills or welding as is necessary on most boilers. Tubes are reversible and replaceable through the cabinet door.



PARKER BOILER CO.
5930 Bandini Boulevard
Los Angeles, CA 90040
Tel (323) 727-9800
Fax (323) 722-2848
www.parkerboiler.com

"Never a Compromise for Quality or Safety"





Changing out shaded pole and PSC-type evaporator fan motors in your walk-in coolers should be a NO-BRAINER!

Chart 2 compares 6 Shaded Pole motors to 6 ECM's in an evaporator coil of a walk-in cooler. As each graph shows, the ECM's use 43% less energy than a PSC motor and 67% less than a Shaded Pole motor.

NRM Model Numbers

ME59-1CWSE1U
100-120 Volt CW-SE

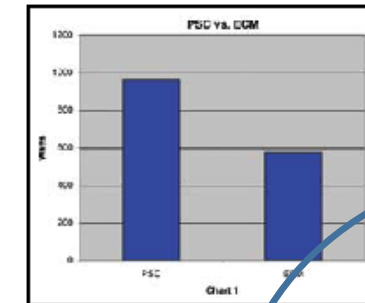
ME59-1CCSE1U
100-120 Volt CCW-SE

ME59-2CWSE1U
200-240 Volt CW-SE

ME59-2CCSE1U
200-240 Volt CCW-SE

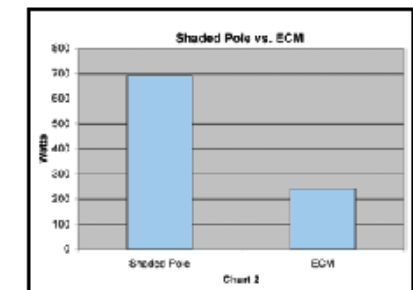
NRM ARKTIC 59 Evaporator Fan Replacement Motor

NRM's evaporator fan replacement motor, the ARKTIC 59, is a high-efficient commercial refrigeration motor manufactured by Regal-Beloit. The ARKTIC 59 offers up to 65% greater efficiency than a shaded-pole motor, and up to 40% greater efficiency than a PSC motor. Designed specifically for evaporator fan use in walk-in coolers and freezers, the 1/15 HP motor is a form-fitting, drop-in replacement for typical 3.3-inch motors. The ARKTIC 59 offers many features that ensure reliability, both within the motor and in the refrigeration system as a whole. For example, the motor's ability to contribute less heat into the refrigeration cycle means better long-term equipment reliability because there is less stress on all of the system components. The ARKTIC 59 is single phase and available in two voltages, 200-240V and 100-120V and is UL approved.



The ECM's power consumption is significantly lower than comparable PSC and shaded pole motors. Chart 1 compares the performance of 7 PSC motors and 7 ECM's in an evaporator coil of a walk-in cooler. Chart 2 compares 6 Shaded Pole motors to 6 ECM's in an evaporator coil of a walk-in cooler. As each graph shows, the ECM's use 43% less energy than a PSC motor and 67% less than a Shaded Pole motor.

The overall savings from the ECM are further amplified since there is less heat from the motor introduced into the refrigerated space. In the application from Chart 1, each ECM saved 630 kWh per year more than a PSC motor. The annual savings for each ECM in Chart 2 is 1,072 kWh compared to a Shaded Pole motor.



Maximum Nursery

4575 Foothill Rd, Carpinteria CA 93010

Tel: 805-684-4006

Santa Barbara, Santa Barbara Municipal Airport, CA














Last Updated on Aug 8 2017, 9:53 am PDT - Fair

Temperature 73°F, Humidity 74%, Dewpoint 64°F



Log Out: tedk5



NRM CoolTrol MC Series 4				Temperature °F					Status				Amps	Starts 24 Hr.			% Run 24 Hr.			% Run 7 Days		
Description	Notes	Status		Space	Evap	Dif	SP	24hr	Mode	Dfrst	Sol	Fan	Comp	Sol	Comp	Fan	Sol	Comp	Fan	Sol	Comp	Fan
 <u>Field Flowers Large</u>	—			44	43	3	<u>42</u>	43.4	<u>Run</u>	<u>Off</u>	Off	Off	0.2	14	14	90	19.7	19.9	41.8	13.7	14.1	37.1
 <u>Field Flowers Small</u>	—			45	40	3	<u>42</u>	43.9	<u>Run</u>	<u>Off</u>	On	On	20.5	27	27	63	43.3	44.7	57	39.7	40.9	53.6
 <u>Gerbera Cooler</u>	—				63	60	3	<u>44</u>	63	<u>Bypass</u>			0.1	0	189	0	0	51.2	0	0	48.4	0
 <u>Shipping Cooler</u>	—			49	45	3	<u>42</u>	44	<u>Run</u>	<u>Off</u>	On	On	17	63	64	91	33.5	36	48.2	30.3	32.9	44.9



Alarms



Comments

Fan run time was previously 100%,
now apprx 35 to 55 %.

Select Action

Execute

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Maximum Nursery's Winfred Van Wingerden has been enjoying substantial electricity savings, apprx 25% net refrigeration energy, since 2012 through a combination of high efficiency evaporator fan motors and cloud-based refrigeration controls. 24/7 monitoring increases peace of mind and helps to catch problems early before they take down a cooler.

B5

8/14/2017




National Resource Management, Inc.



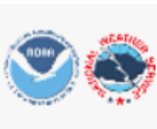
Jerry & David Van Wingerden installed efficient cooler fan motors and refrigeration controls in 2013, and have been enthusiastic supporters ever since. With increased supervision, alerts when equipment breaks down and enhanced temperature & product storage data, Westland has improved it's overall efficiency and added significant profit to their operation.

B5

8/14/2017


















Westland Orchids  
 1400 Cravens Lane, Carpinteria CA. 93014
 Tel: 805.869-1440 


Santa Barbara, Santa Barbara Municipal Airport, CA
 Last Updated on Aug 8 2017, 2:53 pm PDT - Fair
 Temperature 76°F, Humidity 58%, Dewpoint 60°F





[Log Out](#)



NRM CoolTrol MC Series 4			Temperature °F						Status				Amps	Starts 24 Hr.			% Run 24 Hr.			% Run 7 Days		
Description	Notes	Status	Space	Evap	3rd	Dif	SP	24hr	Mode	Dfrst	Sol	Fan	Comp	Sol	Comp	Fan	Sol	Comp	Fan	Sol	Comp	Fan
 Cooler 1	—		40	33		2	<u>36</u>	39.6	<u>Run</u>	<u>Off</u>	On	On	30.6	11	11	8	79.2	79.4	96.5	73	73.3	92.3
 Cooler 2	—		39	37		4	<u>36</u>	38	<u>Run</u>	<u>Off</u>	On	On	36.1	6	7	85	28.5	28.8	54.5	30.7	30.9	56
 Cooler 3	—		38	33		2	<u>36</u>	38.3	<u>Run</u>	<u>Off</u>	On	On	17.5	19	20	12	77.7	78.1	96.5	80.7	80.8	97.9
 Cooler 4	—		37	40		4	<u>36</u>	37.7	<u>Run</u>	<u>Off</u>	On	On	19.9	10	10	73	33.3	33.8	64.2	41.9	35.3	64.2
 Cooler 5	—	 	38	39	**	4	<u>36</u>	39.1	<u>Run</u>	<u>Off</u>	On	On	25.6	17	17	29	64.8	65	86.6	73.2	61.4	92.6
 Cooler 6	—		41	36		2	<u>36</u>	36.5	<u>Run</u>	<u>Off</u>	On	On	24.2	7	8	116	39.9	40	63.6	51.7	27	63.6
 Cooler 7	—		40	35		2	<u>36</u>	37.9	<u>Run</u>	<u>Off</u>	On	On	27.1	10	10	42	47.1	47.4	72	39.8	40	65.7
 Cooler 8	—		39	32	37	2	<u>36</u>	38.1	<u>Run</u>	<u>Off</u>	On	On	14.3	19	19	35	56.9	57.6	79.7	47.2	47.6	75.6

 [Schedules](#)



 [Alarms](#)

 [Comments](#)


Avg fan run-time reduced by 25%, during hotter months.
 reduction in cooler months is 40% plus...

Select Action

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Kendall Farms  

4230 White Lilac Road, Fallbrook CA 92028

Tel: 760-731-0681 












Ramona, Ramona Airport, CA

Last Updated on Aug 9 2017, 1:53 pm PDT - Fair
Temperature 92°F, Humidity 33%, Dewpoint 59°F



Log Out: tedk5



NRM CoolTrol MC Series 4			Temperature °F							Status				Amps	Starts 24 Hr.			% Run 24 Hr.			% Run 7 Days		
Description	Notes	Status	Space	Evap	3rd	Dif	SP	24hr	Mode	Dfst	Sol	Fan	Door	Comp	Sol	Comp	Fan	Sol	Comp	Fan	Sol	Comp	Fan
 1. Main Cooler A	—	 	37	34		3	35	36.6	Run	On	Off	On	Closed	-0.5	13	13	27	62.3	62.8	95	63.2	63.6	95.2
 2. Pre Cooler B	—	 	42	39	42	3	35	39.6	Run	On	Off	On	Open	11.9	6	6	1	86.6	86.6	100	85.2	84	99.7
 3. Cooler D	—	 	39	28		3	35	37.5	Run	On	Off	On	Closed	0.5	19	19	1	56.2	56.1	100	52.3	52	99.2
 4. Cooler E	—		40	36		3	35	37.2	Run	Off	On	On	Open	26.1	48	44	0	43.5	42.2	100	35.6	34.3	100



Doors



Alarms



Comments

Select Action ▼

Execute

Kendall Farms' Jason K., Jerry K. and Troy C. all depend on NRM's web-based refrigeration controls, for management of temperatures in coolers coupled with 24/7 monitoring for improper or inefficient operation. Installed since 2010, Kendall Farms has enjoyed substantial savings and increased peace of mind.

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B5

8/14/2017

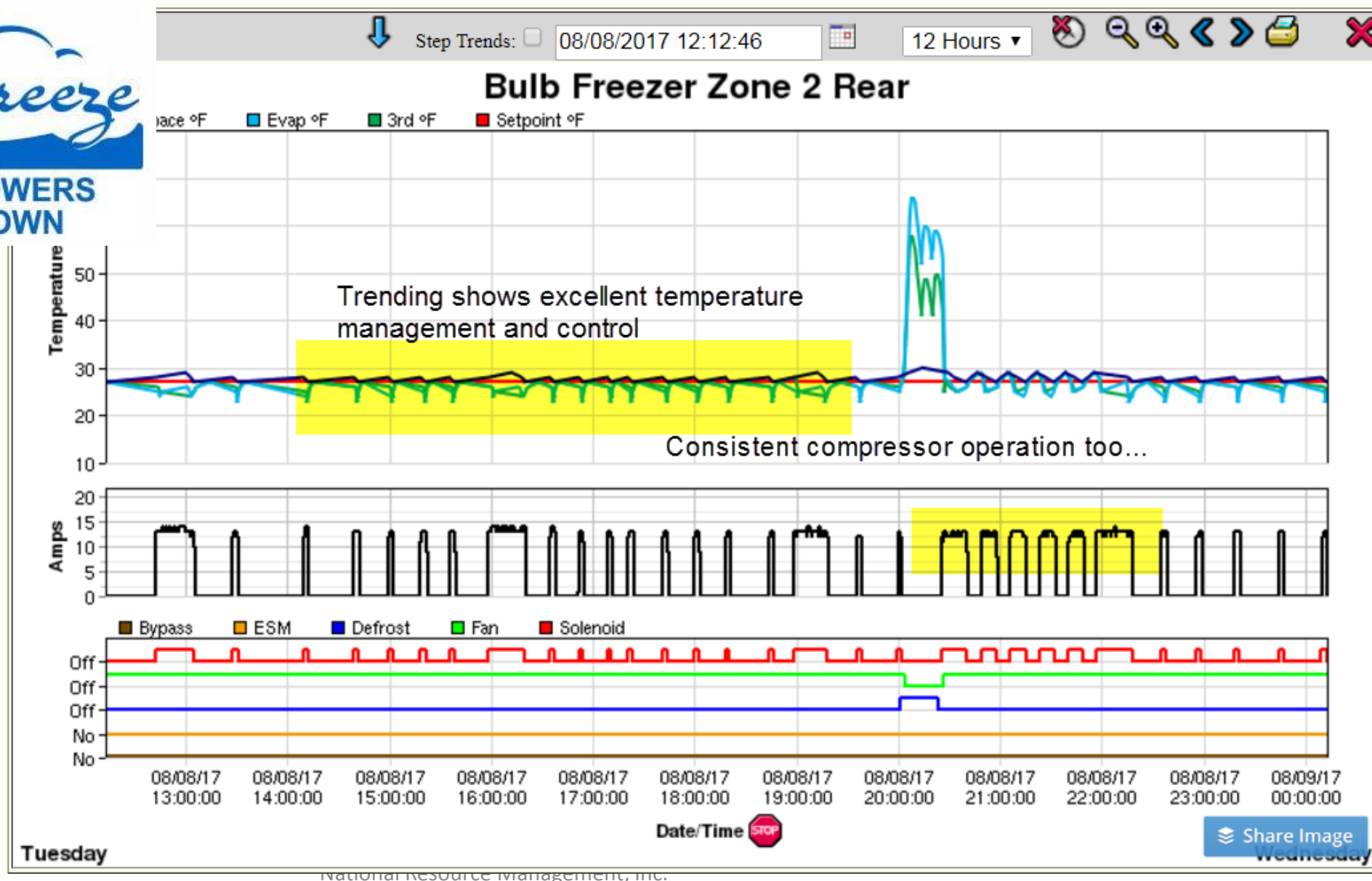
National Resource Management, Inc.



Rene and Ivor Van Wingerden have been using EC motors and refig controls since 2014. They are adding profit and protecting product. Because of their trust in us, OB has kindly referred us to other floral operations in So Cal – we're grateful!

B5

8/14/2017



Anthony Voller gave us the opportunity to show what we can do at GroLink Plant. He liked it! He then allowed us to install controls and lights at Sunshine Floral – he likes that too.

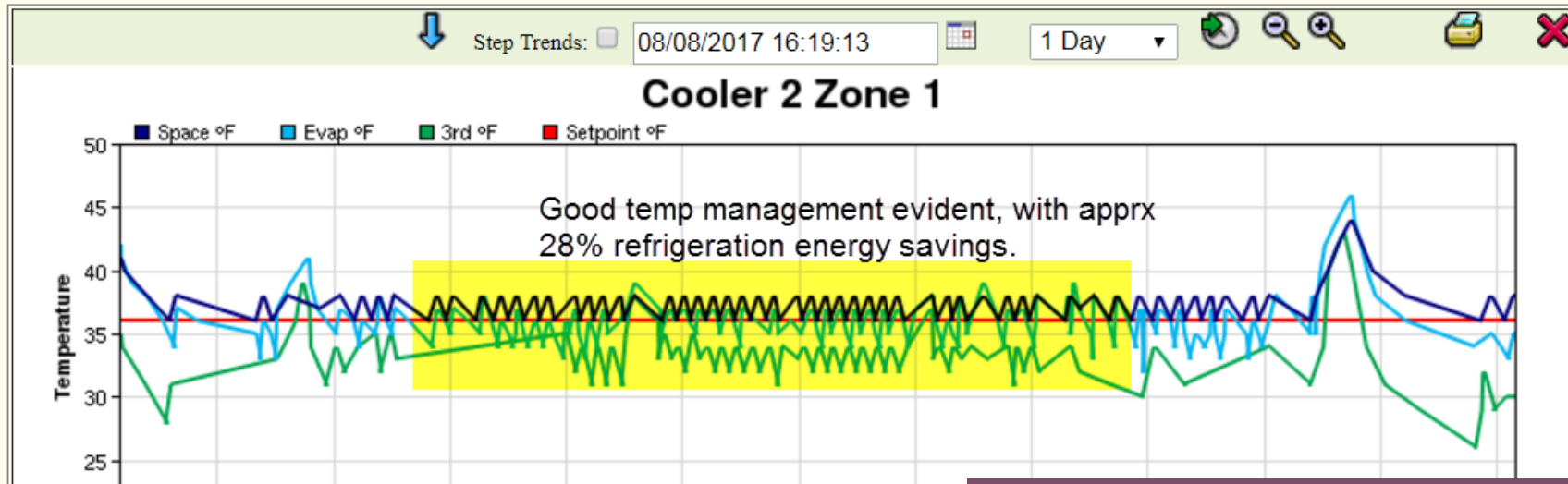
Something like 30% net refrigeration energy savings across the board, both locations.

Sunshine Floral LLC
1070 Rice Ave., Oxnard CA 93033
Tel: 805-982-8822

Oxnard, Oxnard Airport, CA
Last Updated on Aug 9 2017, 2:51 pm PDT - Fair
Temperature 70°F, Humidity 73%, Dewpoint 61°F

Log Out: tedk5

NRM CoolTrol MC Series 4			Temperature °F							Status				Amps	Starts 24 Hr.			% Run 24 Hr.			% Run 7 Days		
Description	Notes	Status	Space	Evap	3rd	Dif	SP	24hr	Mode	Dfrst	Sol	Fan	Comp	Sol	Comp	Fan	Sol	Comp	Fan	Sol	Comp	Fan	
Cooler 1 Zone 1	—		36	33		2	36	40.1	Run	Off	Off	Off	1.2	9	15	9	18.2	61.1	20.5	33.2	40.4	47.5	
Cooler 1 Zone 2	—		37	36	35	2	36	38.7	Run	Off	On	On	8.1	9	12	70	31.9	31.3	50.8	39.9	39.2	56.8	
Cooler 2 Zone 1	—		38	36	29	2	36	37.3	Run	Off	On	On	19.6	58	58	60	56.2	58.2	72.8	47.8	48.7	65.9	
Cooler 2 Zone 2	—		37	36	30	2	36	37.1	Run	Off	On	On	18	46	46	75	38.1	39.4	59.6	44.3	39.6	65	



Excellent savings indicated, both compressor and fans.

