

# NRM's Refrigeration Optimization Solutions

An overview of the company, the products, and the industries we serve

# Who is NRM?

National Resource Management provides optimizations for commercial and industrial refrigeration systems (**walk-in coolers, walk-in freezers, reach-in coolers, refrigerated warehouses**). These optimizations include smart controls, high-efficiency equipment upgrades, predictive fault detection, and a state-of-the-art analytics platform.

Our customers achieve a wide range of **benefits such as energy savings, extended equipment life, real-time performance metrics, automated temperature logging, and more...**

And we take a small-business approach to big-business needs. Our sales, support, and installation teams comprise in-house, NRM employees who have the appropriate licenses and certifications. All of our hardware and software is designed, tested, manufactured, and shipped from our Canton, MA-based facility.

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# Who can NRM help?

# Refrigerated Warehouses

- Cold Storage
- Wholesale/Distribution
- Produce Processing
- Floral



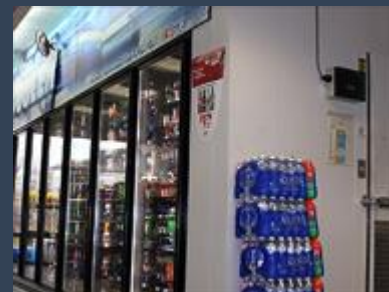
# Institutional

- Higher Education
- K-12
- Dining Services
- Life Sciences



# Food & Beverages

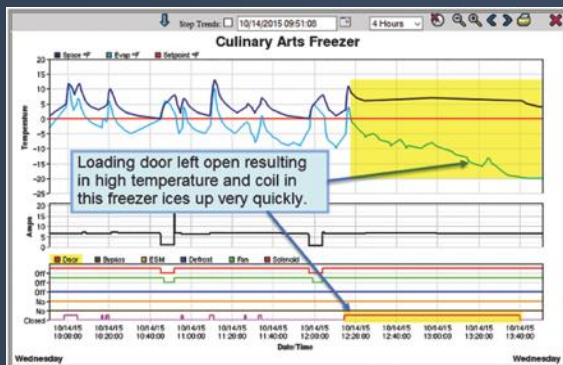
- Foodservices
- Grocery
- Restaurants
- Independent Retail
- Convenience Stores
- Liquor Stores
- Breweries/Brewpubs
- Hospitality/Entertainment



# Are any of these areas critical to your success?

- Food Safety & Quality
- Product Loss Prevention
- Equipment Diagnostics and Fault Detection
- Reducing Energy Consumption
- Sustainability
- Temperature Tracking and Logging
- Federal, State, and Industry Regulatory Compliance

# These solutions might be perfect for you



- Energy-Management Control System for Commercial & Industrial Refrigeration
- Web-Based Automated Fault Detection & Predictive Diagnostics – **IoT at Work**
- Real-time Monitoring, Alarming on Safe Temperature, Equipment Performance
- Comprehensive, Turnkey Approach to Energy Efficiency Retrofits with Utility Support
- Performance Improvement & Innovation through Monitoring Based Commissioning



# Small Cold Rooms

- Precise Temperature Control
- Adaptive Defrost Cycles
- Custom Cooling Schedules
- Evaporator Fan Cycling
- Timed System Shutdown
- Existing EMS Integration
- Stored Operational Data
- Equipment Alarms & Alerts
- Anti-Sweat Door Heater Control
- System Bypass



# Large Cold Rooms

- Precise Temperature Control
- Adaptive Defrost Cycles
- Custom Cooling Schedules
- Evaporator Fan Management
- Scheduled System Shutdown
- Cloud-Based Operational Data
- Access & Manage Refrigeration from any Device via Browser
- Equipment Alarms & Alerts
- System Bypass & Diagnostics



# Remote Site Manager (RSM)

- Real-Time Performance Metrics
- Summary Page for all Zones
- 24/7 Equipment Supervision
- Automated Temperature Logging
- Instant Email or Text Notification of Mechanical Issues
- Securely Stored Data for M&V
- Mobile Access to Data and Settings



# A unique and comprehensive solution

# Real-Time Operations Summary

NRM CoolTrol MC Series 4			Temperature °C						Status				Amps	Starts 24 Hr.			% Run 24 Hr.			% Run 7 Days		
Description	Notes	Status	Space	Evap	Dif	SP	24hr	Mode	Dfirst	Sol	Fan	Comp	Sol	Comp	Fan	Sol	Comp	Fan	Sol	Comp	Fan	
Mol-Bio Cooler RCU08	—		6.9	6.2	3	4	4.6	Run	Off	Off	Off	0.4	13	13	118	8.6	9.8	30.8	7.9	9.1	30.3	
Mol-Bio Cooler RCU09	—		8.1	8	1.5	4	4.8	Run	Off	On	On	0.2	14	27	106	19	13.1	38.3	11.1	11.6	32.2	
Mol-Bio Freezer RCU11	—		-18.5	-19.1	3.2	-20	-18.8	Run	Off	Off	Off	0.0	27	36	97	27.6	27.9	41.9	32.3	20.5	45.7	
Mol-Bio Freezer RCU12	—		-19.2	-20.5	1.2	-20	-18.6	Run	Off	On	On	15.8	38	43	94	30.5	30.3	43.9	30.3	30.3	43.9	
Protein Lab 3.151B RCU17	—		4.9	1.3	3	4	5.2	Run	Off	Off	Off	0.2	37	37	119	19	20.9	39.5	18	20.1	38.7	
Protein Lab 3.151B RCU18	—		4.2	2.4	1.5	4	4.6	Run	Off	Off	On	-1.2	34	34	125	7.9	10.2	35.7	8.2	10.4	36	
Protein Lab 3.152 RCU13	—		5.8	3.2	2	4	5.2	Run	Off	Off	Off	0.2	54	55	107	19.8	22.6	44.6	19.6	22.3	43.9	
Protein Lab 3.152 RCU14	—		6.5	6.1	3.5	4	5.5	Run	Off	Off	Off	0.3	56	56	114	11	14.5	35.2	10.9	14.5	34.1	

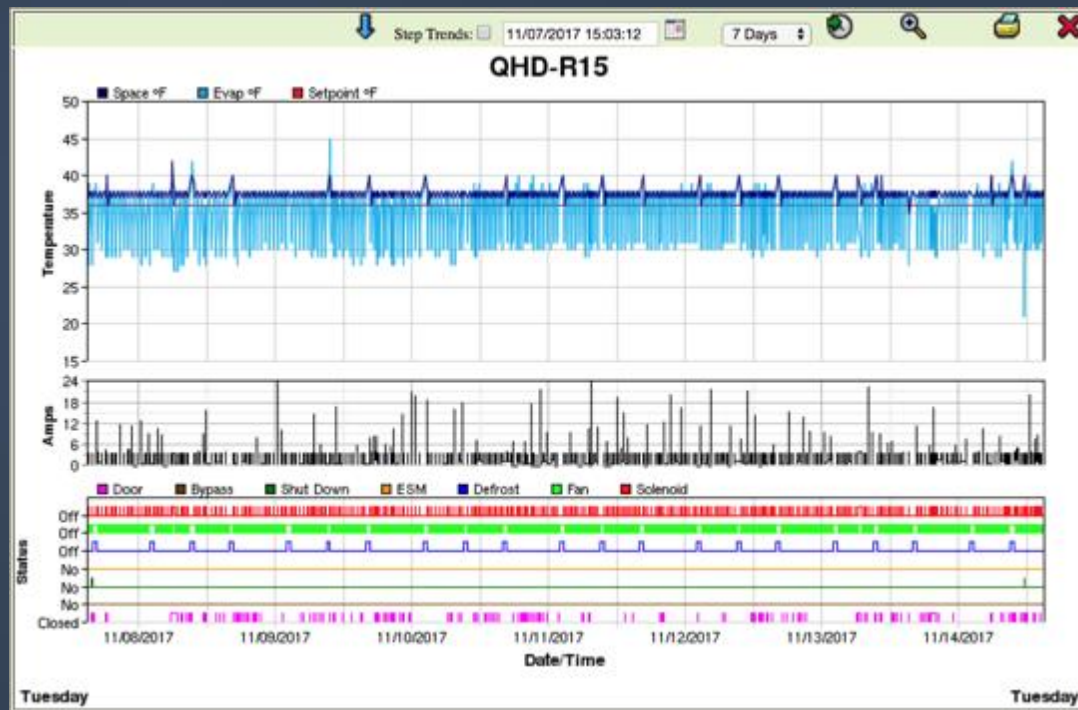
[Alarms](#) or try the new [Alarms Interface Beta Version](#)

Start Time	End Time	Ack Time	Text
2017-11-28 14:17:15			LTC0006 Mol-Bio Cooler RCU09 Compressor Failed To Respond

# Food Safety “Peace of Mind”

Automated temperature tracking to ensure your products never fall out of the designated safe zone.

Consult visual trends for the last 24 hours to the last 7 days.

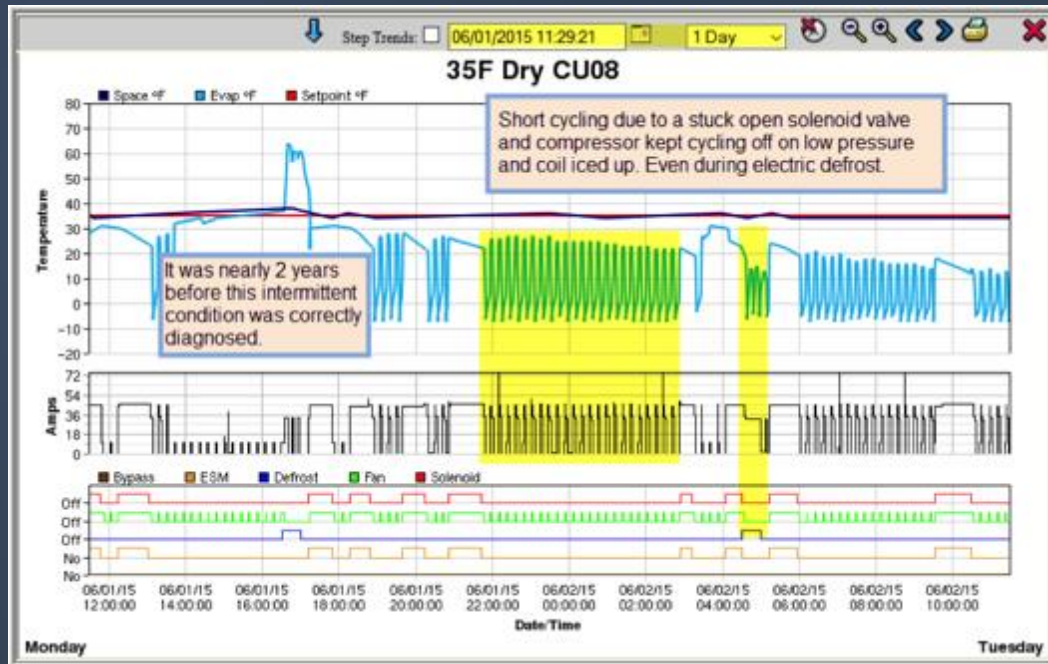




# Improved Equipment Diagnostics and Troubleshooting

















Quickly spot and remedy hard-to-find issues that waste money, put unnecessary strain on your equipment, and could possibly lead to a catastrophic failure.

Arm your technician with valuable information they didn't have before.



# An Average Reduction of 40% in the Refrigeration System's Energy Usage

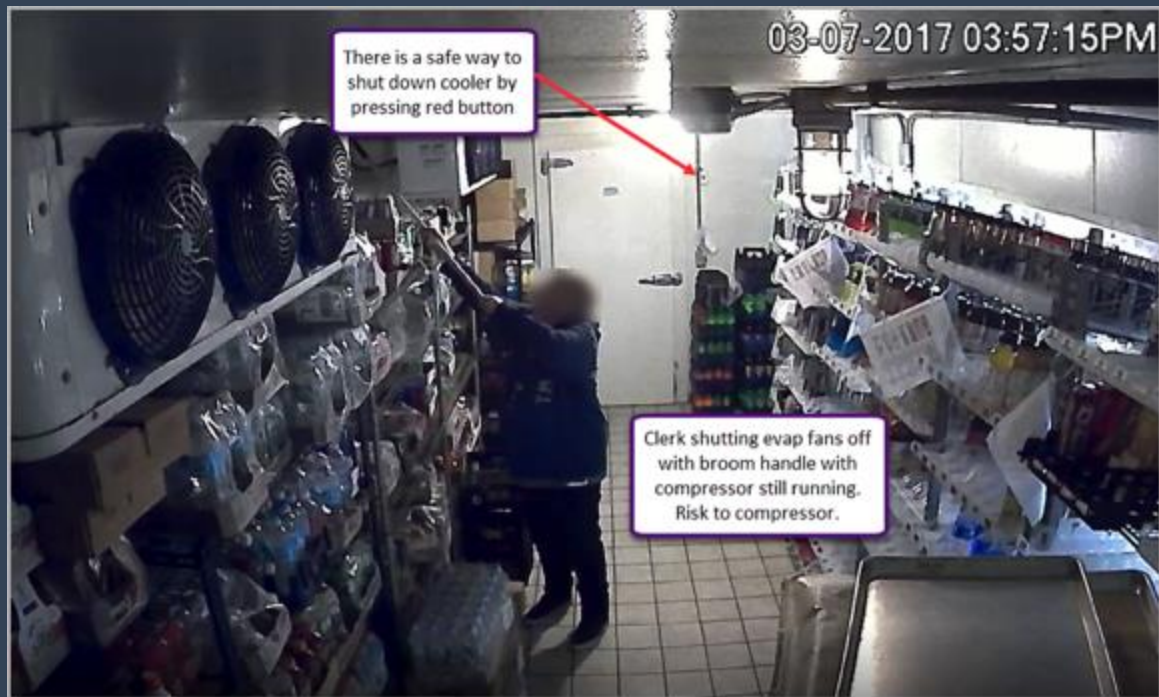
\*\* As compared to 100% runtimes prior to controls

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
 35F Dry CU07	Elec Def		35	36	4	35	36.3	Run	Off	Off	Off	1	1	5	37	72.4	0	77.5	20.7	9.6	35.2
 35F Dry CU08	Elec Def		35	32	4	35	35.6	Run	Off	Off	Off	0.5	10	15	81	28	28.2	39.1	22.5	22.7	34.9
 35F Dry CU09	Elec Def		35	32	5	35	36.6	Run	Off	Off	On	12.9	11	22	74	39.8	39.6	50.2	30	30	42.6
 35F Dry CU10	Elec Def		35	35	2	35	35.6	Run	Off	Off	Off	0.6	3	6	88	22.1	22.2	34	13.2	13.5	26.9
 35F Dry CU11	Elec Def		35	35	2	35	35.4	Run	Off	Off	Off	0.5	2	20	130	2.1	2.3	19.9	3.2	3.6	21
 35F Wet CU12	Elec Def		37	36	4	35	35.8	Run	Off	Off	Off	0.2	10	16	119	9.4	9.6	26	7.3	7.5	24.4
 35F Wet CU13	Elec Def		37	36	4	35	36.1	Run	Off	Off	Off	1.1	6	10	119	8.7	8.8	27.7	6.5	6.7	24.4
 35F Wet CU14	Elec Def		36	35	2	35	35.9	Run	Off	Off	Off	1.8	5	5	125	6.5	6.6	23.7	6.7	6.9	24

All refrigeration systems are designed to handle the hottest day of the year, so they all run at 100% of their capacity at all times. Solution ensures your system runs only when you need it to, putting money back into your pocket.



# Extended Equipment Life



*Solution provides a timed system shutdown feature for taking inventory, stocking, deliveries, temperature tracking, or any other in-cooler/freezer work that require employees to be in the cold area for an extended period of time.*

# A great system must be able to provide the greatest value to all stake holders

- Must be user-friendly and show “at a quick glance” status of recent operation
- Provide real time alerts or alarms for both temperature and equipment
- Enable users to remotely access operation and view trends and history
- Allowing users to change settings, start defrosts and
- Quick fault detection and easy diagnosing to identify cause of faults
- Issues are easy to drill down to identify when they started, what likely caused it and provide a quick way to communicate with other users
- All changes made by users are time stamped and are part of audit trail

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# Case Studies

# Life Technologies – Austin, TX

Total Number of Walk-ins:

61 Coolers & Freezers

Annual kWh Savings:

1,504,300 kWh

Implemented Measures:

CoolTrol

Evaporator fans upgraded to EC motors

Remote Site Manager

Anti-sweat door heater controls



# Aeronaut Brewing Co. – Somerville, MA

Total Number of Cold Rooms:

4 (Kegs cooler, Hops cooler, Food freezer, Packaged Products cooler)

Annual kWh Savings:

17,369 kWh

Implemented Measures:

Remote Site Manager

CoolTrol

10 evaporator fans upgraded to EC motors

Smart Defrost Kit

Glycol Monitoring

Utility Incentive:

50% of upfront cost



# TD Garden – Boston, MA - \*Phase 1

Total Number of Walk-ins:

32 Coolers & Freezers

Annual kWh Savings:

185,000 kWh

Implemented Measures:

36 zones of low to medium-temp spaces controlled via CoolTrol & Remote Site Manager

62 evaporator fans upgraded to EC motors

Anti-sweat door heater controls

*\*Additional retrofits were performed in follow-up phases as budget became available.*





# Thank You!

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