



Business Energy Savings Program



Retro-Commissioning

Bring New Life to Buildings





Overview

- What is Retro-Commissioning (RCx)?
- The Evergy RCx Process
- Our Program & Incentive Tracks
- Case Studies
- Get Started Saving

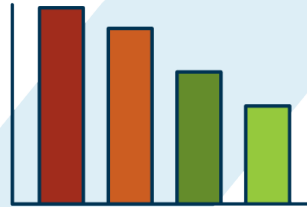


Our Program

Standard



Custom



New Construction



Retro-Commissioning





What is Retro-Commissioning?





Retro-Commissioning (RCx) is...

...a systematic process to improve the efficiency of an existing building's equipment and/or energy intensive systems.



Retro-Commissioning (RCx) can...

...often resolve problems that occurred during design or construction, or address problems that have developed throughout the building's life, as equipment has aged, or as building usage has changed.



Our RCx Process requires...

...an engineering study that will identify and describe:

- recommended EE measures for implementation, and
- a verification report describing measures that were implemented.



Our RCx Process is not...

...an energy audit!



Our RCx Program



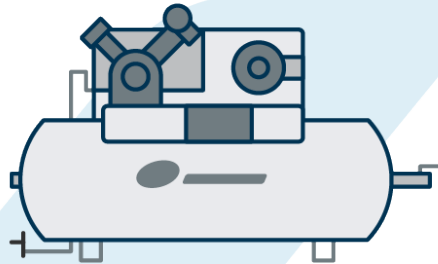


Retro-Commissioning Program Tracks

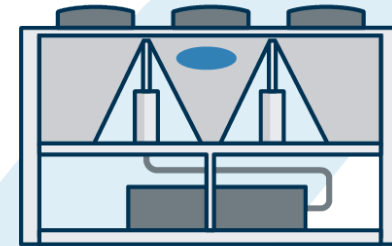
Commercial
Building



Compressed
Air



Industrial
Refrigeration





Commercial Building (RCx) Program



Facility Eligibility

- Facility must have an EMS (Energy Management System)
- At least one of the following conditions:
 - Facilities with $>100,000$ ft² of conditioned space
 - Facilities using systems with higher than average energy use intensity
- Customer must use an experienced RCx Service Provider
- Must be 2+ years since last RCx study was conducted



Commercial Building (RCx) Program

- Eligible upgrades include:
 - Temperature sensors
 - Damper Motors
 - VFDs
 - Operational Logic Updates
 - Process Improvements
- Additional upgrades available with Custom Incentives





Commercial Building (RCx) Program

RCx is great for:

- Office Buildings
- Hospitals
- Schools
- Universities
- Large Manufacturing
- Nursing Facilities



Commercial Building Retro-Commissioning

Frequency of Measures Implemented
in Retrocommissioning Projects

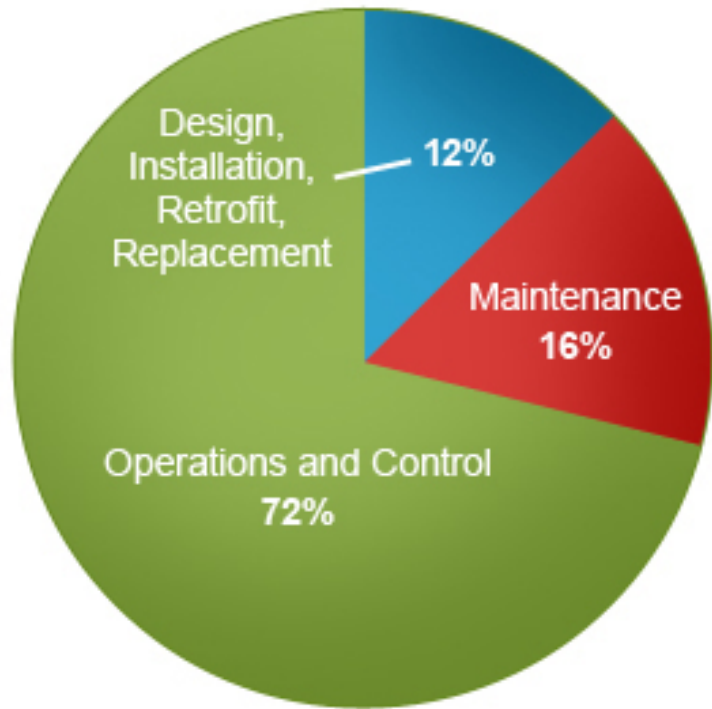


Figure Data Source: Mills, E., 2009. "Building Commissioning: A Golden Opportunity for Reducing Energy Costs and Greenhouse Gas Emissions"

Typical Problem Areas:

- Equipment or lighting that is on unnecessarily
- Systems that simultaneously heat and cool
- Malfunctioning belts and valves
- Thermostats and sensors that are out of calibration
- Air balancing systems that are less than optimal
- Economizers that are not working as designed
- Controls sequences that are functioning incorrectly
- Variable-frequency drives that operate at unnecessarily high speeds, or that operate at a constant speed even though the load being served is variable

RCx Study Excerpts

Table of Contents	
Acknowledgements	3
1.0 Executive Summary	5
1.1 Project Objectives	6
1.2 Project Scope	6
2.0 Facility Profile	7
2.1 HVAC Systems	8
2.2 Building Automation System	8
2.3 Lighting Systems	8
3.0 Energy Usage Baseline & Analysis	9
3.1 Overview	9
3.2 Usage Breakdown by Utility	10
3.2.1 Electric Usage	10
4.0 Energy Efficiency Measures (EEMs)	11
EEM 1: Schedule Units and Exhaust Fan	11
EEM 2: Discharge Air Temperature Reset	14
EEM 3: Discharge Air Static Pressure Reset	16
EEM 4: Optimize Economizer	17
EEM 5: Replace Inlet Guide Vanes with VFDs	18
EEM 6: Install EndoCube Thermostat Covers	18
EEM 7: Schedule Kitchen Hood & MAU-1	19
4.1 Other Recommendations	21
5.0 Sustaining Savings	22
5.1 Utility Analytics	22
6.0 Appendices	25
6.1 Space Occupancy Summary	25
6.2 Major Equipment Information	26

March 5, 2020



Energy	Current Facility	Target	Median Building
ENERGY STAR score (1-100)	18	75	50
Source EUI (kBtu/ft²)	338.9	133.7	192.5
Site EUI (kBtu/ft²)	121	47.8	68.7
Source Energy Use	46,218,400	18,234,900	26,252,103
Energy Cost	\$377,864	\$148,878	\$214,334
Total GHG Emissions (Metric Tons CO2e)	3,560	1,405	2,002



Commercial Office Building

RCx PROJECT TYPE: Commercial Office Building

MEASURES INCLUDED: HVAC Optimization

ANNUAL kWh SAVINGS: **1,519,800**

TOTAL INCENTIVE PAID: **\$ 136,114**

ANNUAL ENERGY
COST REDUCTION: **\$ 118,500**

PAYBACK: 1.28 years



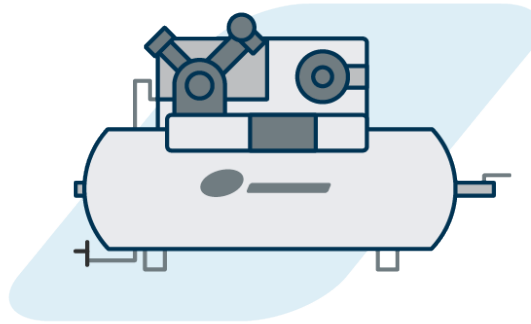


Compressed Air Retro-Commissioning

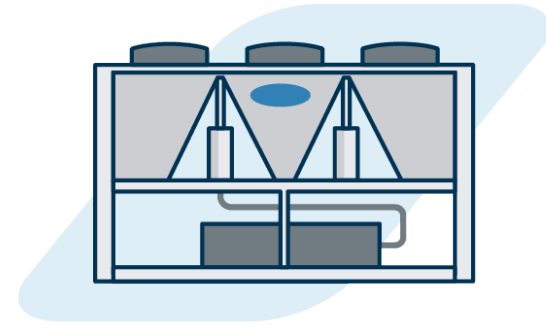
Commercial
Building



Compressed
Air



Industrial
Refrigeration





Get Started Saving



Measure Your Energy Use

Commercial Buildings:

Identify your facility or system efficiency with ENERGY STAR® Portfolio Manager. This will help you:


- Establish an Energy Use Intensity (EUI)
- Determine your building's efficiency compared with
 - Your building's past performance
 - Similar buildings in similar climates

If your results aren't the best, consult with an engineering, or mechanical, or equipment specialist to get information on a possible RCx approach.





Pre-Apply Online



Business Energy Savings Program

Retro-Commissioning Incentive Pre-Application

WELCOME

ELIGIBILITY

GENERAL INFO

PROJECT INFO

STUDY & SCHEDULE

PAYMENT & SUBMIT

Welcome!

Thank you for your interest in conducting a Retro-Commissioning (RCx) project in your facility. This form will collect basic project information and data that will be used to determine eligibility for incentives and expedite the application process.

Terms & Conditions

1. Download and read through the Program terms and conditions using the link below.
2. Electronically sign below to indicate you understand and agree to the terms and conditions.

[Evergy Business Energy Savings Program Terms & Conditions](#)

Authorization for Release of Customer Account Information

I authorize Evergy to access energy usage data for the specified accounts at the physical site address of the project and release to the Trade Ally listed on this application. I agree that Evergy may include my name, city or county of business, Program services/incentives and resulting energy savings in reports or other documentation submitted to Evergy and relevant agencies administering energy programs. Evergy will treat all other information gathered through the Program as confidential.

Agreement

I understand and agree to comply with the Terms and Conditions of the Evergy Energy Efficiency Program and that all energy efficiency measures identified in this application comply with program rules.

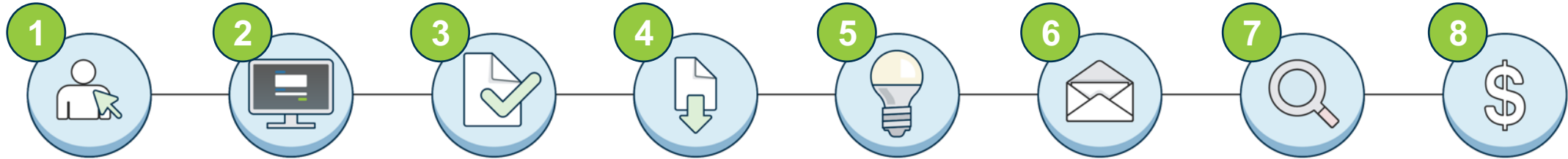
Who is completing this application? *

If you decide to pursue an RCx project, our simple online application makes it easy to establish eligibility and submit your facility's information to move forward with your project.

A Program Representative will contact you regarding next steps and how to proceed with your RCx application and project.



Retro-Commissioning Process



- | | |
|-----------------------------------|-------------------------|
| 1 Select RCx Service Provider | 5 Implement Measures |
| 2 Complete Online Pre-Application | 6 Send Completion Docs |
| 3 Complete RCx Energy Study | 7 Final Review & Report |
| 4 Complete Application | 8 Receive Incentive |



Business Development Representatives



Angie Blaize

North KC / Greater MO South
816-216-2786
ablaize@trccompanies.com



Brett Sharp

Greater Missouri
816-382-8747
bsharp@trccompanies.com



Eric Kruzan

South KC / Greater MO South
816-489-2485
ekruzan@trccompanies.com

Support Team

866-847-5228
businessrebates@evergy.com

Questions?





Energy Savings Potential

A Review of RCx Projects (2009 – 2019):

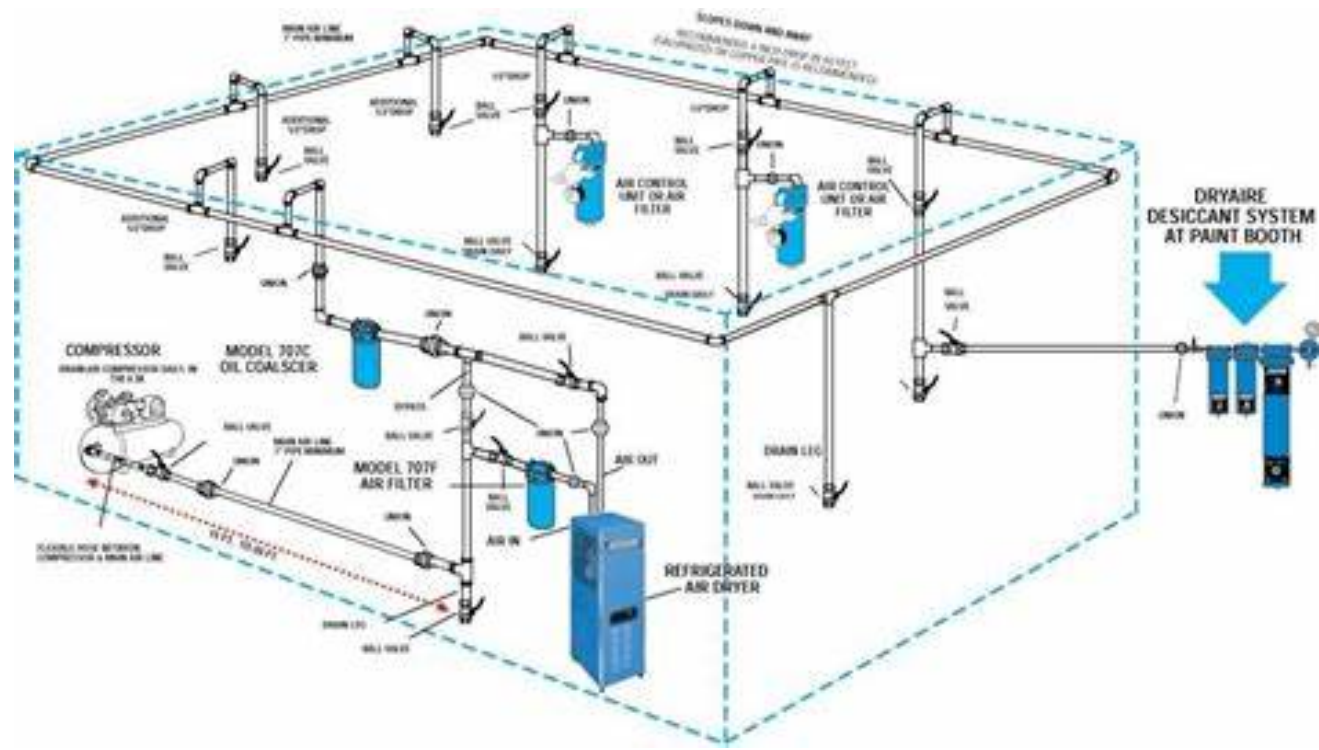
147 Projects

Customer Type	RCx Type	Number of Projects	Total kWh Savings	Average kWh Savings	Average Incentive
Healthcare	CB RCx	18	41,757,520	2,319,862	\$ 169,091
Education	CB RCx	40	20,873,167	521,829	\$ 39,726
Manufacturing	CA RCx	58	28,633,413	493,680	\$ 32,330
Office	CB RCx	24	16,192,837	674,702	\$ 69,424
Lodging	CB RCx	7	7,980,768	1,140,110	\$ 56,395

Incentive Category	Incentive (per kWh saved)
Compressed Air	8¢
HVAC Controls Optimization with Peak Demand ¹ Reduction	10¢
HVAC Controls Optimization without Peak Demand ¹ Reduction	4¢
Refrigeration	6¢



Total Incentive = RCx Study Incentive (1-3¢/kWh) + measure kWh (\leq 18 mo.) x Incentive Rate by Incentive Category



Compressed Air Retro-Commissioning (RCx)



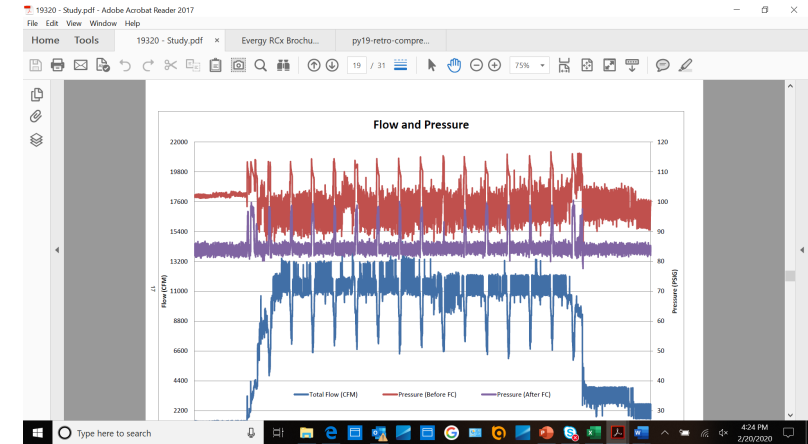
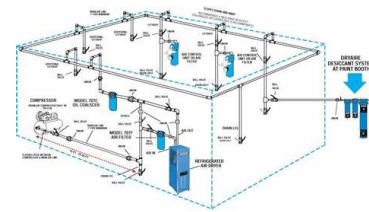
Compressed Air Retro-Commissioning Details

- Focus on Low Cost/No Cost measures (≤ 18 mos. payback.), starting with leak detection and repair
- Operations & maintenance procedure optimization
- Customers are eligible for a [CA RCx Study reimbursement incentive](#) for ≤ 18 mo. simple payback for approved energy-efficient measure (EEM) implementation

Annual kWh Savings	Compressed Air Study Incentive Rate
$\leq 500,000$ kWhs	1¢ per kWh
$> 500,000$ kWhs	2¢ per kWh

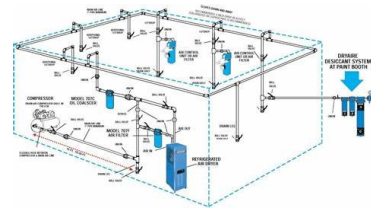
- Measures identified as < 18 mo. payback, can qualify as Custom measures @

Incentive Category	Incentive (per kWh saved)
Compressed Air	8¢
HVAC Controls Optimization with Peak Demand ¹ Reduction	10¢
HVAC Controls Optimization without Peak Demand ¹ Reduction	4¢
Refrigeration	6¢





Compressed Air Retro-Commissioning



CA RSP conducted the leak check using the SDT ultrasonic detector.

Leaks were tagged and logged with notation as to the approximate flow loss and are summarized

below.

TOTAL LEAKS TAGGED:

SMALL 7 LEAKS AT .41 CFM = 2.9 CFM

MEDIUM 28 LEAKS AT 1.6 CFM = 45 CFM

LARGE 34 LEAKS AT 6.5 CFM = 221 CFM

XL 10 LEAKS AT 26 CFM = 260 CFM

TOTALS 79 LEAKS 529 CFM

ESTIMATED TOTAL CFM LOST TO LEAKAGE: **529 CFM**

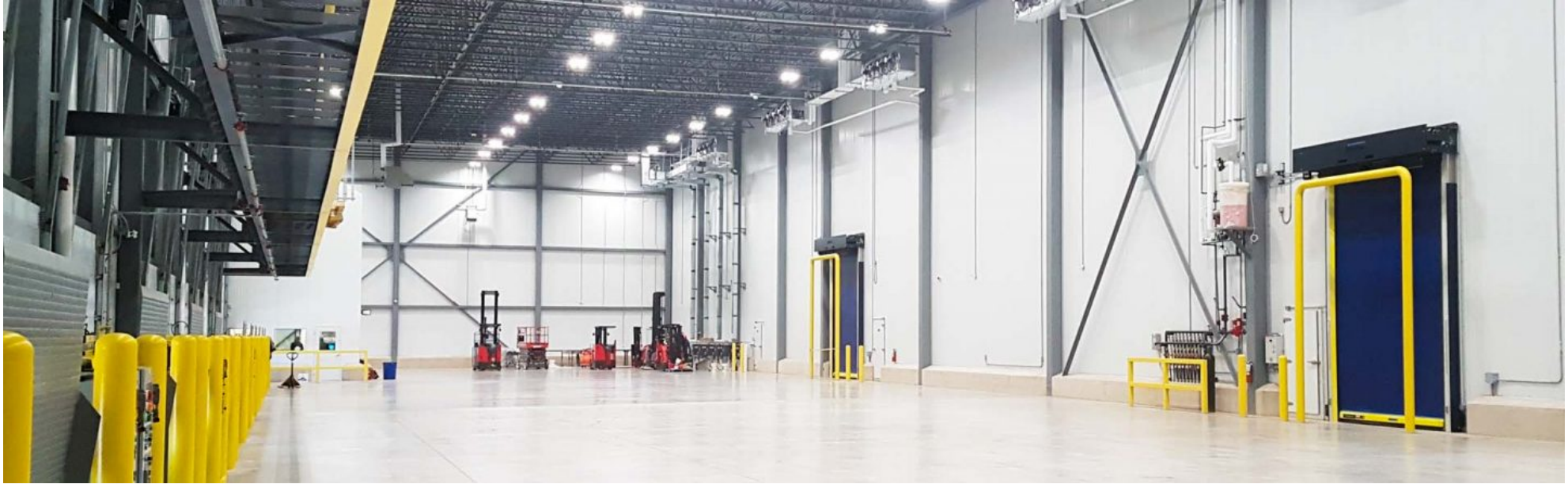
$529 \text{ CFM} / 16,160 \text{ CFM} = 3\% \text{ OF ACTIVE GENERATION CAPACITY}$

$529 \text{ CFM} / 8,394 \text{ CFM} = 6\% \text{ OF AVERAGE CFM DEMAND}$

ESTIMATED COST IN ENERGY TO SUPPORT LEAKAGE: 49.6 kW

$49.6 \text{ kW} \times 8592 \text{ hours} = \mathbf{426,163 \text{ kWhs}}$





Industrial Refrigeration Retro-Commissioning (RCx)



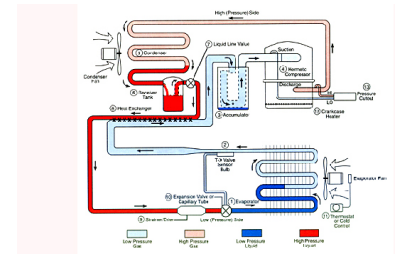
Industrial Refrigeration Retro-Commissioning Details

- Focus on Low Cost/No Cost measures (≤ 18 mos. payback.)
- Operations & maintenance procedure optimization
- Optimize Control Measure opportunities
- Customers are eligible for a IR RCx Study reimbursement incentive for ≤ 18 mo. simple payback for approved energy-efficient measure (EEM) implementation

Annual kWh Savings	Industrial Refrigeration Study Incentive Rate
$\leq 500,000$ kWhs	1¢ per kWh
$> 500,000$ kWhs	2¢ per kWh

- Measures identified as < 18 mo. payback, can qualify as Custom measures @

Incentive Category	Incentive (per kWh saved)
Compressed Air	8¢
HVAC Controls Optimization with Peak Demand ¹ Reduction	10¢
HVAC Controls Optimization without Peak Demand ¹ Reduction	4¢
Refrigeration	6¢

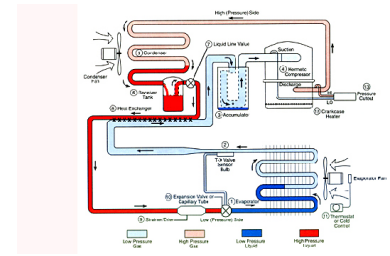




Industrial Refrigeration Retro-Commissioning

Typical Industries:

- Refrigerated warehouse
- Fruit and vegetable processing
- Brewery or winery
- Carbonated beverages
- Dairy and ice cream processing
- Meat, poultry, and fish
- Chemical, petrochemical
- Pharmaceutical





Industrial Refrigeration Retro-Commissioning

Typical Energy Efficiency Measures

Control Measures:

- Floating head pressure control
- Compressor staging controls
- Active defrost management
- Adjust suction pressure setpoints

Low Cost Measures:

- Repair refrigeration line leaks
- Adjust operating pressures

Equipment Retrofit Measures:

- VFDs on Evaporator Fans
- VFDs on Condenser Fans
- VFDs on Screw Compressors
- Condensate Subcooling
- Desuperheater

