



**PUBLIC SECTOR  
ENERGY EFFICIENCY PROGRAM • 2011-2012**  
Electric and Natural Gas

*Dated 10.5.11*

# **PUBLIC SECTOR RETRO-COMMISSIONING PROGRAM PARTICIPANT MANUAL FOR PROGRAM YEAR 2011-2012**

**Program Year 4 Start Date: June 1, 2011**

**RETRO-COMMISSIONING SERVICES  
for  
LOCAL GOVERNMENT, PUBLIC SCHOOLS (K thru 12),  
COMMUNITY COLLEGES, PUBLIC UNIVERSITIES &  
STATE/FEDERAL FACILITIES**

**Conducted by the Smart Energy Design Assistance Center**



**Pat Quinn, Governor • Warren Ribley, Director**

ILLINOIS DEPARTMENT OF COMMERCE AND  
ECONOMIC OPPORTUNITY

Illinois Energy Office

500 East Monroe Street, Springfield, Illinois, 62701

# Contents

- BACKGROUND ..... 3
- ELIGIBILITY..... 3
- INCENTIVES ..... 4
- RETRO-COMMISSIONING SERVICE PROVIDER ..... 5
- FACILITY OWNER..... 5
- THE RETRO-COMMISSIONING PROCESS..... 6
- SEDAC RETRO-COMMISSIONING CUSTOMER APPLICATION ..... 9
  - Customer Acceptance of Application Terms..... 10
  - Submit Completed Applications To:..... 10
  - Contact Information ..... 11
  - Facility Information ..... 12
  - Facility General Description ..... 13
  - Facility Staff ..... 14
  - Facility Compressed Air, Processing, and Refrigeration System Information ..... 20
  - Compressed Air Systems ..... 22
  - Processing Equipment..... 24
  - Refrigeration ..... 25

## BACKGROUND

The Smart Energy Design Assistance Center (SEDAC) is sponsored by the Illinois Department of Commerce and Economic Opportunity (DCEO) in partnership with Ameren Illinois, Commonwealth Edison, Nicor, Peoples Gas, and North Shore Gas. SEDAC is implemented by the Illinois School of Architecture at Urbana-Champaign (UIUC) in partnership with the 360 Energy Group, LLC (360EG) and serves as a statewide resource working to eliminate barriers to the adoption of energy efficient building technologies by small businesses and public facilities.

SEDAC is delivering the Public Sector Retro-Commissioning (RCx) Program, providing in-depth energy analyses that will achieve significant demand and energy savings. These savings will be realized through a systematic evaluation of facility systems and the program participant's implementation of cost-effective measures targeted to improve facility operations that, in many cases, also improve occupant comfort and production efficiency.

The RCx services are delivered through a "service-incentive" program. This means the retro-commissioning analysis is the incentive to the customer and is fully funded by Illinois Department of Commerce & Economic Opportunity (DCEO). Participants are expected to cover the costs associated with implementing the measures recommended by the retro-commissioning analysis, attending meetings, and assisting Retro-commissioning Service Providers (RSPs) in acquiring facility information. Incentives for capital improvements such as lighting or HVAC may be available under DCEO's Public Sector Standard Incentive Program or Custom Incentive Program ([www.ILEEPS.org](http://www.ILEEPS.org)).

## ELIGIBILITY

Eligibility for the 2011-2012 program year is limited to public sector entities in Ameren Illinois, or ComEd electric service territory, including units of local government, K-12 school districts, community colleges, public universities and State buildings. All public sector facilities taking electrical delivery service from Ameren or ComEd are eligible for this program regardless of their choice of supplier. Entities receiving natural gas from Ameren Illinois, Nicor, North Shore or Peoples, may also be eligible for inclusion of natural gas savings measures in the RCx services provided.

The facility owner must express a willingness to commit funding for participating in the process, completing the project plan, and implementing measures. The owner must be prepared to assume costs and expenses of at least \$10,000 for agreed-upon measures that result in a combined estimated simple payback of 18 months or less based upon electrical and therm savings. If at least \$10,000 worth of recommended measures are not implemented within one calendar year from receipt of recommendations, the owner will be responsible for reimbursing the SEDAC program for the cost of the analysis.

The estimated time commitment from the customer to support the RCx program project is likely to total 60 to 100 hours of a senior facility manager over the 10- to 12-month project duration. Costs associated with internal labor to achieve energy savings through implementation will be considered as “in kind” contributions toward the \$10,000 expense total.

In reviewing program applications, SEDAC will look for evidence that cost-effective retro-commissioning opportunities exist at your facility. The following factors will be considered when reviewing your application:

- The facility should have accessible and up-to-date building documentation and records.
- The facility should have a relatively high energy usage compared to the average energy usage of buildings of the same class and/or have a low ENERGY STAR rating from Portfolio Manager.
- Preferably, the facility should be at least 5 years old and exceed 150,000 ft<sup>2</sup> in air-conditioned floor space.
- The facility should be free of major problems requiring capital repairs or replacements and have no planned major system renovations or retrofits.
- A major renovation is defined as a change in facility use or where the existing system will not meet owner / customer projected requirements within existing facility square footage.
- A retrofit is defined as changes, modifications, or additions to systems or equipment in existing facility square footage.
- The facility should have an existing and functional building automation system (BAS) or energy management system (EMS) with direct digital control (DDC).
- The facility owner and O&M staff should express a commitment to be actively involved in the retro-commissioning process. Active involvement will include:
  - Providing access to the facility.
  - Providing time for facility personnel to interface with the Retro-Commissioning Service Provider.
  - Providing and assisting with the reporting and collection of information pertaining to the retro-commissioning of the facility.

SEDAC will select program participants based on the above considerations and the level of opportunity for savings.

## **INCENTIVES**

The Retro-Commissioning (RCx) Program is a “service-incentive” program. This means the retro-commissioning analysis and implementation technical assistance is itself the incentive to the customer and is funded by the Illinois Department of Commerce and Economic Opportunity (DCEO).

In the program, Retro-Commissioning services are conducted exclusively by either SEDAC staff or pre-approved service providers. The SEDAC covers RCx service costs at 100% for a program service provider

to investigate and identify savings opportunities if implementation of measures are initiated during the same fiscal year (by May 31<sup>st</sup>) of the start of the project under the program and are completed within twelve months of receipt of the Retro-Commissioning Plan. For projects that are not completed within this timeline, the customer will be expected to reimburse SEDAC for the full cost of any completed RCx planning costs, program-funded investigation activities, and verification report costs.

Program participants are expected to cover the costs associated with contracting or arranging for the implementation of recommended measures, attending meetings, and assisting RSPs in acquiring facility information. No additional incentives will be available to participants through this Program. However, if energy efficiency measures are identified that are beyond the scope of the Retro-Commissioning Program, the customer may seek to qualify those measures through DCEO's Prescriptive or Custom programs. Matching contributions made toward efficiency measures incentivized through DCEO's programs may not be double-counted as contributions toward the \$10,000 RCx expense total.

## **RETRO-COMMISSIONING SERVICE PROVIDER**

A qualified Retro-Commissioning Service Provider (RSP) team will be provided by the program administrator to conduct the retro-commissioning services at no cost to the customer.

During the retro-commissioning process, the facility's staff will assist the RSP in acquiring access and information regarding the building systems, operation, controls system, and any other pertinent information necessary to identify and evaluate potential retro-commissioning measures. The RSP will use the information gathered from the site visit to generate the Retro-Commissioning Plan.

The RSP is not responsible for implementing the Retro-Commissioning Plan measures. However, the RSP will provide guidance and technical assistance during the Implementation Phase to aid in the successful implementation of the agreed upon measures. Implementation of the retro-commissioning measures is the responsibility of the facility owner.

Upon completion of the customer's implementation activities, the RSP will return to inspect the facility to verify the installation and proper operation of the retro-commissioning measures. The RSP will prepare and submit the Verification Report that summarizes the final findings and impacts from the project.

## **FACILITY OWNER**

The facility owner shall make available to the RSP a competent facility representative who is knowledgeable in the building systems, equipment, and operation. The individual shall provide the RSP access to the building, its Building Automation System (BAS), and any pertinent building documentation necessary to develop a thorough understanding of the operation, systems, equipment, and use of the building.

The estimated time commitment from the customer to support the retro-commissioning effort is likely to total 60 to 100 hours of a senior facility manager over the 10- to 12-month project duration.

The facility owner is responsible for implementing the agreed upon retro-commissioning measures. The owner may exercise the option to subcontract the effort to a contractor or use his own staff to complete the work.

## THE RETRO-COMMISSIONING PROCESS

The RCx provider will conduct a facility assessment to diagnose problems and make recommendations for minor low-cost adjustments that can be made immediately, as well as recommendations for more substantial improvement opportunities. This will include an assessment of cost, savings, and payback. Where applicable, the RCx study may involve an assessment of energy savings opportunities eligible for incentives through DCEO's program offerings. In such cases the incentive levels established by those programs will be used.

The standard process for SEDAC retro-commissioning will consist of four primary steps, or phases, for each individual project:

### 1. **Application Phase** (*approx. 1-2 weeks*)

The retro-commissioning project begins with the Application Phase. Project applications are completed by the facility owner or representative and submitted to SEDAC. Based on a review of submitted applications, SEDAC, with DCEO approval, will select facilities that have the highest perceived opportunity for savings to participate in the program. SEDAC may conduct an on-site or telephone interview with facility personnel to gauge building and system condition as well as potential retro-commissioning opportunities. Upon acceptance of a participant application, the SEDAC will assign the project to a qualified Retro-commissioning Service Provider (RSP).

In cases where a participant application is not accepted for enrollment, the applicant will be given the specific reasons the application was not accepted (e.g. the facility is not a good candidate for retro-commissioning because there are several major equipment renovations that should be completed prior to retro-commissioning). In addition, the customer will be directed to the appropriate DCEO programs (e.g. the Public Sector Electric Efficiency Standard and Custom Incentive Program for capital investment projects).

- **Customer Role: Complete Application and Agree to Terms & Conditions**
- **Deliverable: Program Acceptance or Rejection**
- **Duration: 1 to 2 weeks**

### 2. **Planning Phase** (*approx. 4-6 weeks*)

Following acceptance of a project into the program and selection of an RSP, work begins to establish the scope and timeline for the balance of the project. This Planning Phase typically takes about four to six weeks. This phase commences with a project kick-off meeting with the owner representative, the customer's facility staff and contractors, the RSP, and SEDAC. A site assessment and data acquisition plan is also completed by the RSP during this phase, where findings are used to generate the Retro-commissioning Plan for the project and assess potential measures and project economics.

The Retro-commissioning Plan establishes the framework and direction for the Implementation Phase. Upon its completion, another meeting is held with the owner representative and engineering staff to review the scope of the plan and the impacts and economics of the identified potential measures. The primary goal is to commit to spending at least \$10,000 for agreed-upon retro-commissioning measures that result in a bundled estimated simple payback of 1.5 years or less.

At the completion of the Planning Phase, the facility owner selects measures for implementation, which are noted on a Customer Selection Form that is submitted to DCEO with the Plan. Implementation of these measures must begin before May 31, 2012, and must be completed within twelve months from receipt of the Retro-commissioning Plan. For projects that are not completed within one calendar year, the customer will be expected to refund the cost of the retro-commissioning study.

- **Customer Role: Provide building documentation and support RSP's information collection process.**
- **Deliverable: Retro-Commissioning Plan, Completed Customer Selection Form**
- **Duration: 4 to 6 weeks**

### **3. Implementation Phase** (*approx. 8-20 weeks*)

The Implementation Phase builds upon the Planning Phase, typically including activities such as conducting detailed site assessments, diagnostic testing, and trending analyses to evaluate current facility operating procedures and equipment functionality. In this phase, the RSP works hand-in-hand with the customer's implementation team to fully investigate, implement, and verify (where possible) the recommended measures. The implementation team typically includes the facility engineers and the mechanical, electrical, and controls contractors.

Throughout the Implementation Phase, the retro-commissioning measures and associated costs, savings, and economic impacts will be updated and summarized in the Customer Selection Form. In the event that additional retro-commissioning measures are discovered or existing measures are modified, the RSP will update the Customer Selection Form and review such measures with the owner.

During the Implementation Phase, the RSP works hand-in-hand with the customer's implementation team to identify the recommended measures and provide recommendations to "fix" the problems. The implementation team includes the facility engineers, operational staff, and the mechanical, electrical, and controls contractors. The goal of this phase is to fully implement all agreed-upon retro-commissioning measures and stand ready for final verification.

The implementation costs used to calculate project economics under the program of the measures are based upon reasonable market costs as determined solely by the program team. Resources to obtain market costs include, but are not limited to industry accepted project estimation resources, vendor quotes, or professional judgment. The customer is afforded the flexibility to utilize in-house staff or an outside contractor to implement retro-commissioning measures implementation. Final implementation costs may vary from the estimated market costs; however, the market costs will be utilized to support contractual obligations.

- **Customer Role: Assist in RSP's investigation activities, contract or arrange for implementation activities, and manage completion of recommended measures.**
- **Deliverable: Implementation of Retro-commissioning Measures**
- **Duration: 8 to 20 weeks, depending on the month in which Implementation activities commence.**

#### **4. Verification Phase (*approx. 3-10 weeks*)**

During the Verification Phase, the RSP evaluates facility trending data (from the building EMS, facility sub-meters, or utility meter) and revisits the site to verify that measures have been properly completed (e.g. new control strategies are functioning properly, repairs have been made, etc). The RSP then prepares and submits the Verification Report that summarizes the final findings and impacts from the project.

- **Customer Role: Support RSP's verification process**
- **Deliverable: Verification Report**
- **Duration: 3 to 10 weeks, depending on the month in which Verification activities are completed.**

## SEDAC RETRO-COMMISSIONING CUSTOMER APPLICATION

The Public Sector Retro-Commissioning (RCx) Program is available to qualifying public sector customers within the Commonwealth Edison and Ameren Illinois Utilities service areas. The goal of this program is to help you identify and implement opportunities to improve the efficiency of major electrical systems and reduce energy costs without adversely affecting facility or system operations.

### PRE APPLICATION CHECKLIST

Please confirm you meet the following minimum eligibility requirements before submitting an application to participate in the program:

- Are you an Ameren Illinois or Commonwealth Edison electricity delivery services customer, regardless of which electric supplier you have chosen to purchase power from?
- Are you an Ameren Illinois, Nicor, Peoples, or North Shore natural gas delivery services customer?
- Do you have a peak demand of 500 kW or greater? (You may still be eligible with lower peak demand. Please contact SEDAC program manager for verification of eligibility.)
- Is your building a public facility, such as government, municipal, or public school?

### IF SELECTED FOR PARTICIPATION, CAN YOU ACCEPT THE FOLLOWING RESPONSIBILITIES?

- Are you willing to commit to spending \$10,000 on the implementation of identified retro-commissioning measures with an estimated simple payback of 18 months or less based upon electrical savings?
- Provide access to the facility and time for facility personnel to interface with the retro-commissioning service provider during all phases of the project?
- Provide and assist with the reporting and collection of information pertaining to the operation of the facility during all phases of the project?
- Initiate implementation of the mutually accepted retro-commissioning measures according to the scope and procedures outlined by SEDAC no later than the end of the current fiscal year (May 31<sup>st</sup>) and complete implementation within 1 calendar year?

### NEXT STEPS

If you answered yes to the above questions, please complete this application and submit it to SEDAC for consideration. In reviewing your application, SEDAC will look for evidence that cost-effective retro-commissioning opportunities exist at your facility. SEDAC's decision regarding selection of program applicants and the retro-commissioning program will be final and binding for all parties.

## Customer Acceptance of Application Terms

By signing below, I certify that:

- The information contained in this application is accurate and complete to the best of my knowledge, and will provide additional information if requested;
- I have read and understood the obligations of program participants, including the commitment of \$10,000 to implement identified retro-commissioning measures, and agree to a make a good faith effort to comply with all requirements if selected for participation in the program;
- Ameren Illinois, Commonwealth Edison, Nicor, Peoples, or North Shore may release historical account data to the program administrator (including SEDAC (University of Illinois/360 Energy Group, LLC), and the assigned Retro-Commissioning Service Provider) for the facility under consideration.

*(Signature of individual with authority to bind applicant to these terms required)*

**Signature:** \_\_\_\_\_

**Name (printed):** \_\_\_\_\_

**Title:** \_\_\_\_\_

**Date:** \_\_\_\_\_

## Submit Completed Applications To:

For SEDAC RCx service, please send this completed application to:  
312-264-2379 (fax) OR email to [RCx@SEDAC.org](mailto:RCx@SEDAC.org) (email)

Questions may be directed to:  
Ashley Collins, 360EG SEDAC Program Manager  
312-267-2864 (voice) or [ashley@SEDAC.org](mailto:ashley@SEDAC.org) (email)

## Contact Information

Facility name: \_\_\_\_\_

Facility owner name: \_\_\_\_\_

Facility address: \_\_\_\_\_

\_\_\_\_\_

Project contact name: \_\_\_\_\_

Project contact title: \_\_\_\_\_

Project contact phone: \_\_\_\_\_

Project contact fax: \_\_\_\_\_

Project contact email: \_\_\_\_\_

Property manager: \_\_\_\_\_

Property management firm: \_\_\_\_\_

Facility engineer: \_\_\_\_\_

Facility engineering firm: \_\_\_\_\_

Program referred to you by: \_\_\_\_\_

## Facility Information

Name of facility: \_\_\_\_\_

Facility type: \_\_\_\_\_

Year of construction: \_\_\_\_\_

Number of floors: \_\_\_\_\_

Total floor area (ft<sup>2</sup>): \_\_\_\_\_

Total conditioned area (ft<sup>2</sup>): \_\_\_\_\_

Percent currently occupied: \_\_\_\_\_

Electrical Supplier: \_\_\_\_\_

Electrical Supplier account number(s): \_\_\_\_\_

\_\_\_\_\_

Electrical Supplier meter number(s): \_\_\_\_\_

\_\_\_\_\_

Natural Gas Supplier: \_\_\_\_\_

Natural Gas Supplier account number(s): \_\_\_\_\_

\_\_\_\_\_

Natural Gas Supplier meter number(s): \_\_\_\_\_

\_\_\_\_\_

Total electricity use (kWh/yr): \_\_\_\_\_

Peak demand (kW): \_\_\_\_\_

Month of peak demand: \_\_\_\_\_

Total gas use (therms/yr): \_\_\_\_\_

## Facility General Description

Outline the major facility space types, their scheduling, and typical occupant density (e.g. 10,000 ft<sup>2</sup>, 24hour computer center that is unoccupied).

Describe the major interior loads of the facility and identify any that dictate how the HVAC system is operated. (Add additional rows as necessary.)

Space / Location	Type	# of Occupants	Scheduled Hours and Days of Occupancy

Briefly describe past energy efficiency projects or studies completed for the facility.

---

---

---

Describe any currently planned energy efficiency, renovation, or equipment replacement/upgrade projects for the facility.

---

---

Are there any scheduling issues that could affect the retro-commissioning work (e.g. major renovations or equipment replacements/upgrades)?

---

---

## Facility Staff

Please identify key individuals responsible for the operation of the facility and state how long they have held their current positions.

Contact Name	Position	Years in this Position	Facility Responsibilities

Please indicate the level of access and capability the chief facility engineer, staff, and/or controls contractor have to interact with the facility's energy management control system (select one):

- None  
 Some (e.g. able to adjust set points and schedules)  
 Full (e.g. able to modify control logic and trend facility data)

Indicate what training resources are available to the facility staff (check all that apply):

- None  
 In-house  
 Manufacturer or vendor courses  
 Utility courses  
 College/vocational schools  
 Professional associations  
 Other: \_\_\_\_\_

Describe the facility manager's and staff's receptiveness to and interest in improving the energy efficiency of the facility.

---



---

If accepted into the program, designate individuals that will act as a part of the owner’s project team and the amount of discretionary time to assist in the retro-commissioning process:

Position	Name	Amount of Time to Assist (per week)
Building Chief Engineer:		
Operations Manager:		
Safety Manager:		
Internal Controls Specialist:		
External Controls Contractor:		
Others:		

Identify the type and manufacturer of the facility’s energy management control system (EMS). If the facility does not have an automated control system, please indicate.

---



---

Is the EMS capable of trending and storing data for numerous points simultaneously?

---



---

When is the EMS likely to be replaced or receive a major upgrade?

---



---

What components of the facility are controlled with direct digital control (DDC) equipment?

---



---

What components of the facility are controlled, not just actuated, pneumatically?

---



---

Summarize any peak load shedding strategies currently being used.

---



---

Is the EMS managed internally or through an external controls contractor? \_\_\_\_\_

If managed externally, please provide the following:

Company Name: \_\_\_\_\_

Name (of the company specialist): \_\_\_\_\_

Phone Number (of the company specialist): \_\_\_\_\_

Email Address (of the company specialist): \_\_\_\_\_

Please complete the following table listing the facilities major HVAC and lighting system components. Add more rows as necessary.

Equipment	Type	Size	Age
<b>Cooling equipment</b>			
Chiller 1 (example)	Centrifugal	300 tons	15 years
<b>Heat Rejection equipment</b>			
Cooling Tower 1 (example)	Open, cross flow, induced draft	350 tons	15 years
<b>Heating Equipment</b>			
Boiler 1 (example)	Hot water condensing	1200 MBH	15 years
<b>Air handling equipment</b>			
AHU 1 (example)	VAV w/hot water reheat	25,000 CFM	5 years

<b>Domestic water heating equipment</b>			
DHW 1 (example)	Natural gas fired	20,000 BTUH	10 years
<b>Lighting systems</b>			
Main office area (example)	32W T8s w/electronic ballasts	40% of occupied ft <sup>2</sup>	4 years

Outline the current control strategies of the facility’s HVAC and lighting systems.

<b>Strategy</b>	<b>Description</b>
<b>Cooling Equipment</b>	
What is the operating schedule of major cooling equipment?	
What is the chilled water supply temperature set point?	
What is the condenser water set point? Is it reset?	
Are there VFDs on the cooling tower fans?	
Describe the cooling equipment staging strategy	
Describe the use of any air-side or water-side economizers	
<b>Heating Equipment</b>	
What is the operating schedule of major heating equipment?	
What is the maximum operating temperature?	
Describe the heating equipment staging strategy	
What is the entering and leaving water temperature? Is it reset?	
What is the flow rate?	
What is the maximum working pressure?	
<b>Air Handling Equipment</b>	
Does the HVAC system have an automatic shutdown?	
Is an optimum start/stop strategy used?	
Is the air distribution system VAV or CV?	
Are the VAV boxes Fan Powered?	
For VAV systems, what is the supply static pressure set point?	
For VAV systems, is a supply static pressure reset strategy used? If yes, please indicate the strategy(ies) used.	

Are VAV terminal units DDC controlled through a global controller?	
Do the VAV terminal units' DDC controllers have capability to be scheduled?	
Does the facility use a zone temperature setback/setup strategy?	
What is the supply air temperature set point during the summer?	
Is a supply air temperature reset strategy used? If yes, please indicate the strategy(ies) used. If there is not enough room on the application please attach information to the application.	
What type of reheat does the air distribution system have, if any?	
What is the heating energy source (e.g. gas, electric)?	
How is outdoor air intake controlled?	
What is the minimum outside air fraction setting?	
Is the system equipped with zone isolation devices for minimizing energy use in off-peak hours?	
Is there exhaust air heat recovery?	
<b>Domestic water heating equipment</b>	
What is the hot water set point temperature?	
Is there a circulating pump on the domestic hot water system? If so, is its operation scheduled?	
<b>Lighting systems</b>	
Describe the lighting system controls and current scheduling	

What type of glazing is installed at the facility (e.g. single-pane tinted)?

---



---

Describe the age and availability of any as-built drawings and sequences of operation for the facility's HVAC system?

---



---

Summarize problems or opportunities for improvement that currently exist related to the HVAC and lighting systems.

---



---

Describe any opportunities for improved operation and maintenance procedures at the facility.

---



---

What is currently the most prominent issue related to operation of the HVAC and lighting systems, and how is it being managed?

---



---

What is the primary source of occupant complaints within the facility?

---



---

**Facility Compressed Air, Processing, and Refrigeration System Information**

Complete this section only if your facility has compressed air systems, process equipment and/or refrigeration systems. Examples of these systems include, but are not limited to:

- Compressed Air Systems – Air compressor(s) and refrigerated air dryers that serve a manufacturing or process related activities.
- Process Equipment – Equipment such as conveyor lines, manufacturing equipment or equipment that; run continuously or for significant periods of time, have motors, and/or have specific heating/cooling requirements.
- Refrigeration Systems – Refrigeration equipment that is used to satisfy supply cooling requirements for food storage, manufacturing, or process equipment.

What are your primary objectives in managing your systems (check all that apply)?

Compressed Air	Process	Refrigeration	Objective
			Maintain continuous operation
			Improved or increased production
			Control and/or reduce energy use and costs
			Reduce capital costs
			Meet process quality standards
			Improve safety
			Reduce equipment maintenance
			Other:

What management approaches and tools do you currently employ (check all that apply)? What are the top two barriers to more effective operation of your facility's systems?

Compressed Air	Process	Refrigeration	Resources
			Preventative diagnostic testing
			Short term monitoring
			Long term monitoring
			Leak detection and repair
			Tracking energy use/costs
			Improving control strategies
			Using life-cycle costing to select opportunities
			Other:

What are the top two barriers to more efficient operation of your facility's systems?

Compressed Air	Process	Refrigeration	Barriers
			Not enough staff time
			Lack of budget for efficiency improvements
			Capital expenses are too high
			Paybacks are too long
			Primary focus is on production
			Lack of accountability for system energy costs
			Lack of information about opportunities
			Lack of in-house technical expertise
			Lack of training
			Management approval
			Other:

What influences you the most in terms of adopting new management tools or approaches (rank on a 1 to 10 scale, where 10 is high)?

Compressed Air	Process	Refrigeration	Barriers
			Books
			Industry articles and professional publications
			Peers / Professional organizations
			Classes / continuing education
			Demonstrated success of others in the market
			Internal pilot program success
			Outside consultants
			Equipment vendors and manufacturer reps
			Other:

## Compressed Air Systems

Complete this section only if applicable for the facility being submitted for consideration in the retro-commissioning program.

Please list all air compressors that are currently located at your facility (add more rows as necessary).

Air Compressors					
Equipment ID/Manufacturer	HP	Compressor Type (E.g. Scroll, Screw, Reciprocating, Centrifugal)	Capacity Control Mode (E.g. Load/Unload, VFD, Inlet Modulation, Blow-off)	Age (years)	Annual Operating Hours
CNP 75588-750 (example)	150	Screw	Load/Unload	15	4,000
Dryers					
Equipment ID/Manufacturer	Type	Status (Op/standby)	Age (years)		
Dryer #1 (example)	Refrigerated	Operational	15 years		
Storage					
Equipment ID/Manufacturer	Size (Gallons)	Status (Op/standby)	Age (years)		
Receiver A (example)	600	Operational	15 years		

Describe the compressed air system operating schedule at the facility.

---



---

What is the system pressure? Do you have trouble maintaining this pressure?

---



---

Describe the staging of the air compressors (e.g. manual, automatic, always on, etc.).

---

---

Is there a management system or manual procedure in place to shut compressors OFF sometimes? If so, do you think the system is properly tuned?

---

---

Are you willing to change your control strategy or usage of compressed air if recommended in the retro-commissioning study?

---

---

**Processing Equipment**

Complete this section only if applicable for the facility being submitted for consideration in the retro-commissioning program. Please list all major processing equipment currently located at your facility (add more rows as necessary).

Equipment Description/ID	HP or kW	Average loading (% full capacity)	Status (Op/standby)	Age
300 ton Servo Press – SP1 (example)	180 HP	50%	Operational	6 years

Describe the process equipment schedule at your facility.

---

---

What percentage of the facility electric/gas use is attributable to operation of processing equipment?

---

---

Are there any current operational issues with your equipment?

---

---

## Refrigeration

Complete this section only if applicable for the facility being submitted for consideration in the retro-commissioning program. Please list all major refrigeration equipment that is currently located at your facility (add more rows as necessary).

Unit description/ID	Absorption unit	Tons	Average loading (% full capacity)	Status (Op/standby)	Age
Walk in cooler – RS60A	No	60	60-80%	Operational	8 years

Describe the loads served by equipment identified above.

---

---

Describe the temperature and pressure set points for the identified refrigeration equipment.

---

---

Outline the sequencing of refrigeration equipment at the facility.

---

---

Is floating head pressure control utilized?

---

---

Describe defrost schedules/controls for refrigeration equipment at the facility.

---

---

What type of capacity control does the refrigeration equipment have (e.g. hot gas bypass, VFDs, etc.)?

---

---

What percentage of the facility electric/gas use is attributable to operation of the refrigeration equipment?

---

---

Is there an energy recovery system in place to capture waste heat?

---

---