

Assessment and Planning Report for Developing Commissioning/ Retro-Commissioning Policy and Procedures

Strategic Plan Task 3.2.4

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1. Introduction

Inyo County is developing a Cost, Energy and Service Efficiencies Plan to identify and implement activities that will lead to long-term changes that support energy efficiency, such as identifying specific measures to reduce energy use and developing a computer program to manage the County's electricity consumption, which, in turn, will provide cost savings to the county. The program also includes developing a regional template for other organizations to develop energy efficiency policies and programs. The program is proposed to be completed by October 2012.

The county will develop a voluntary policy for the county to consider the commissioning of new buildings and retro-commissioning of existing buildings. This will ensure that any new county buildings are designed with energy efficiency in mind and bring existing buildings into optimal operating conditions that will improve overall energy efficiency. Buildings will be chosen based on budget, energy use, and size.

In order to better ensure the cost-effective success of the development of a policy for the commissioning/retro-commissioning task, Salas O'Brien reviewed and assessed commissioning policies and plans and related resources of peer municipalities and organizations. The results of this assessment and planning process are presented in this report.

1.1 California Long-term Energy Efficiency Strategic Plan (CEESP) Alignment

1.1.1 Strategic Plan Goal

Strategic Plan Goal 3: *“Local governments lead by example with their own facilities and energy usage practices.”*

1.1.2 Strategic Plan Task

Strategic Plan Task 2.E: “Develop commissioning/retro-commissioning policies for county facilities”

1.2 Commissioning/Retro-Commissioning Policy Purpose, Goals and Objectives

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1.2.1 Policy Statement

Commissioning and retro-commissioning policies will be adopted to ensure that county buildings function in a manner that promotes energy efficiency and optimizes equipment operation. This, in turn, will reduce energy use, provide cost savings to the county, and will also positively affect building comfort and functionality.

1.2.2 Goals and Expected Outcomes

By adopting commissioning and retro-commissioning policy and procedures the county's facilities will be updated to operate more efficiently, which will lower overall energy use and provide cost savings to the county. An additional outcome is to improve the overall building environment (comfort).

1.2.3 Energy Efficiency (and other) Impact

Updating county facilities specifically to achieve energy efficiency will have a direct impact on energy use. Improved efficiency will lower energy use making county facilities more cost effective to operate. Commissioning and retro-commissioning can save on the order of 5% to 15% of the energy use of a building. In extreme cases, savings as high as 30% have been achieved. A comfortable, well-lit, building environment can also improve the productivity in the building by 1% to 10%. In addition, a building's indoor environmental quality affects the health, comfort, and productivity of its occupants and ranges from mildly inconvenient to very serious. Commissioning and retro commissioning can help identify and address problems that can lead to future liability. Finally, commissioning and retro commissioning can improve system performance, increase equipment life, and reduce the need for repairs, which can save money and result in fewer comfort complaints.

1.2.4 Commissioning/Retro-Commissioning Policy Criteria

Commissioning and retro-commissioning are collaborative processes that look at how and *why* a building's systems are operated and maintained as they are, or in the case of a new building, as they are installed and designed, and then identifies ways to improve overall building's performance. As a process, rather than a set of prescriptive measures, commissioning and retro commissioning adapts to meet the specific needs of each building. Since occupant comfort complaints and high energy use can often go hand-in-hand, retro commissioning can help to correct both. For this reason, the following must be considered as key criteria:

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- ✓ Improve employee, tenant or occupant comfort, safety, and health, and improve the indoor environment through a systematic evaluation of building systems, equipment, and controls.
- ✓ Optimize energy efficiency through operation of the building as originally intended (or designed) and through the identification and implementation of improvement upgrades.
- ✓ Reduce operations, maintenance, and repair costs by implementing improvements to operational requirements and effective maintenance procedures.
- ✓ Improve maintenance and operations personnel skills and awareness through training and certifications as appropriate to maintain the building in an optimal operating conditions, and to implement a process for planned continuous re-commissioning
- ✓ Gain acceptance, at all levels of management and at the Board level; of the (retro)-commissioning process as a standard (and continuous) building operating method. Use project successes and maintenance staff expertise as leverage to implement a process for planned and period, re-commissioning facilities.

2. Review of Existing Commissioning/Retro-Commissioning Policy

2.1 Description of Reviewed Commissioning/Retro-Commissioning Policy

2.1.1 Peer Municipalities

- **The County of Riverside's** Sustainable Building Policy was enacted in 2009 requiring new buildings and renovations to meet LEED Certified standards. It requires Cx in order to ensure that all building systems are performing their intended goals, to document performance, and to strengthen communication throughout projects. At a minimum County facilities that are attempting to receive LEED Certification must commission:
 - HVAC systems and controls;
 - Lighting systems and controls;
 - Renewable energy systems;
 - Day lighting systems;
 - Energy generation systems;
 - Life safety systems;
 - Emergency power systems; and,
 - Water recycling systems.

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The policy also requires a LEED accredited professional to be on the development team and to take part in the commissioning aspect of the process.

<http://rivcocob.com/policy-h/POLICY-H29.pdf>

- **The City of Santa Monica** has started to develop a Municipal Facility Retro-commissioning Study and Policy. They began by commissioning some of their municipal facilities including the City Hall, the libraries, and the Civic Auditorium. The Architectural Energy Corporation was hired to commission energy efficient upgrades to the heating, ventilation, and air conditioning (HVAC) systems, and new DDC control systems. Benefits included:
 - Equipment and hardware/software deficiencies were resolved before final acceptance of project;
 - Improved overall energy performance for energy services contract; and,
 - Short term monitoring provided baseline documentation for future measurement and verification.

- **The State of Minnesota** published their Sustainable Building Guidelines in December of 2009. This included a Design and Construction Phase Commissioning Plan. The plan is intended to verify that buildings have been constructed to meet the design represented in contract documents. This plan also requires re-commissioning at least annually or in response to certain events or triggers. The four parts of this plan are outlined below:
 - The Air Quality Management which is intended to prevent air quality problems introduced by construction. This includes:
 1. Protecting Stored Absorptive Materials
 2. Replacing Filtration Media
 3. Temporary Construction Ventilation
 4. Protecting HVAC System
 5. Offsite Product Preconditioning
 6. Removing Moisture Damaged Materials
 7. Protecting Porous Materials
 8. Building Flush-out Period.
 - The Construction Waste Management is intended to minimize use of resources and waste produced during construction. This includes:
 1. Construction Waste Management Specification
 2. Construction Waste Management Plan
 3. Debris Packaging

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4. Recycle Packaging.
 - The Correction Period Air Quality Management Plan is intended to evaluate the air quality 3, 6, and 10 months after occupancy.
 - The Corrective Period User Comfort and Satisfaction Assessment Plan are intended to assess comfort and satisfaction by conducting occupant surveys 3 and 10 months after occupancy. These surveys include:
 1. Air Quality
 2. Thermal Comfort
 3. Access to Daylight, Quality of lighting, View space and window access
 4. Vibrations, Acoustics and Noise
 5. Personal Control of IEQ conditions and impacts
 6. Opportunities and encouragement for healthful physical activity.
- **The County of Waukesha, WI** Sustainability plan for 2010 to 2014 includes “Objective 2.2 Retro-commissioning of County Facilities.” This is in order to achieve savings in gas, electric demand and energy. Retro-commissioning will realize savings through the systematic evaluation of facility systems leading to the implementation of “cost effective” projects to improve operations. The County plans to evaluate and initiate action where it is deemed necessary. Action include/intend to:
 - Evaluate the operation and control sequencing of the energy management systems (EMS) in County facilities to identify opportunities and develop recommendations to improve system performance.
 - Implement appropriate system modifications and projects identified in the EMS evaluation that can be completed with existing budget or project resources.
 - Develop projects identified in the EMS evaluation with favorable Return on Investments (ROI’s) to be incorporated in future years Capital or Building Improvement Plan budgets.
 - Rebalancing of HVAC systems. Over time, there are many reasons why air distribution systems deviate from design parameters. Test HVAC system air flows, compare to design specifications and adjust as necessary.
 - Replace existing inefficient light fixtures with high efficiency fixtures.
 - Install occupancy sensors in areas and rooms that have sporadic occupancy.
 - Upgrade the burners on boilers.
 - Install motion detection faucets and flush assemblies.
 - Install low/no flow water closets.
 - Replacement and installation of insulation and weather stripping.
 - Solar hot water at the Justice Center.

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- Geothermal at the Retzer Nature Center and proposed Health and Human Services building.
- Replacement of low efficiency doors and windows.

The goal of this plan is to the combined consumption of electric and natural gas by 20% and to reduce annual water consumption by 5 to 10%.

<http://energyindependence.wi.gov/docview.asp?docid=21192&locid=160>

- In 2009 the **City of San Diego** completed an Analysis of Local Government Policy Options and found that retro-commissioning in commercial buildings has a low cost of implementation and a medium to low potential to reduce energy use, depending on the population of buildings targeted. A policy was developed and adopted in 2009 that requires retro-commissioning in large buildings. Local Law 87 defines large buildings as 50,000 square feet or greater. Lots that have multiple buildings that exceed 100,000 gross square feet are required to receive an efficiency audit as well to identify all “reasonable” RCx needs. The building owner is required to perform all of the RCx needs that are found with certain exclusions e.g. LEED certified or highly efficient buildings.
http://www.sandiego.edu/epic/ghgpolicy/documents/ES_GHG_Policy_Buildings_FINAL_000.pdf
http://www.costar.com/uploadedFiles/JOSRE/JournalPdfs/13.269_304.pdf
- **New York City** passed the Greener Greater Buildings Plan in 2009. Local Law 87 requires building owners to file energy efficiency reports every 10 years (section 28-308.4) that must include retro-commissioning on all of the base building systems. The RCx must be performed under the supervision of an RCx agent within 4 years of submitting the report. The exceptions include LEED buildings that were certified within 2 years of the energy efficiency report.
<http://www.nyc.gov/html/planyc2030/html/about/ggbp.shtml#read>
- **The City of Pasadena** Building Code requires commission for new non-residential buildings that are 10,000 square feet and over. The Cx must be performed by trained personnel with “experience on projects of comparable size.” The code requires Cx of all building systems covered by Title 24, process equipment and control, and renewable energy systems. There are also voluntary measures for residential buildings and any buildings that are under 10,000 square feet to encourage energy efficiency.

2.1.2 Peer Organizations/Associations

- **U.S. Green Building Council’s (USGBC) LEED-EB** (existing buildings) requires documentation that a commissioning process has occurred or a 5 year plan to complete the process in order to become Certified. The commissioning process must also meet LEED’s standards which includes two levels called Fundamental Building Systems Commissioning and Additional Commissioning. The Fundamental Building Systems Commissioning requires 6 tasks which include:
 - Engage a commissioning authority
 - Review design intent and basis of design documentation
 - Include commissioning requirement in the construction documents
 - Develop and utilize a commissioning plan
 - Verify installation, functional performance, training, and documentation
 - Complete a commissioning reportAdditional Commissioning requires:
 - Complete a focused design review prior to the construction documents phase
 - Complete a focused design review of the construction phase
 - Complete a selective submittal review for commissioned equipment
 - Create a re-commissioning management manual
 - Contract for a warranty or post occupancy review

- **The US EPA Energy Star Program** with the **Portland Energy Conservation Inc. (PECI)** developed a “Retro-commissioning Guide for Building Owners” which was designed to help building owners understand the benefits of retro commissioning and the steps involved. The guide explains project basics, planning, investigation, implementation the final report/steps and how to make the benefits last (including re-commissioning). [See Appendix B for Retro-commissioning Guide for Building Owners]

- **California Department of General Services- Division of the State Architect** created a Commissioning Process Guide intended for school districts, programmers, design professionals, contractors, operations and maintenance personnel, and Commissioning Authorities.

2.1.3 NGO Resources (e.g., ICLEI, ILG, LGC)

- **The California Commissioning Collaborative** is a nonprofit agency made up of government, utility and building services organizations and professionals who have come together to create a viable market for building commissioning in California. The

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Collaborative creates and promotes tools to encourage building commissioning in new and existing buildings. They provide templates for workshops, scopes of work, Cx plans, issues logs, final reports, systems manuals etc. [See Appendix C for Commissioning Plan Outline Template]

- **Portland Energy Conservation Inc. (PECI)** has a website containing a commissioning resource center which is a library of information about commissioning that is open to the public.
- **The Building Commissioning Association** is an international non-profit organization that serves as the recognized authority and resource on commissioning. Membership is made up of professionals from all across the commercial building industry who maintain the highest standards and practices for the commissioning process. BCA organization is education-driven. Note: you must be a member to view most resources.

2.1.4 Other Commissioning/Retro-Commissioning Policy and Resources

- **California Commissioning Guide: New Buildings and Existing Buildings** was created by the California Commissioning Collaborative and explains the goals of the retro-commissioning process, LEED standards, the process of retro-commissioning, strategies, etc. The guide describes 4 phases including the plan phase, the investigative phase, the implementation phase and the “hands-off” phase (which includes the final report, training and other close-out aspects of the project).
- The Building Commissioning Association’s **Best Practices in Commissioning Existing Buildings** provides detailed, practical solutions and facilitates the implementation of Cx/RCx improvements over time while standardizing the commissioning industry. The document breaks down and outlines the commissioning process into sections including: the scope of commissioning activity, the planning phase, the investigation phase, the implementation phase, the turnover phase, and the persistence phase. [See Appendix D for Best Practices in Commissioning Existing Buildings]
- SCE has an RCx Program which offers technical and financial assistance for SCE’s customers. The program uses experienced engineers in identifying efficiencies in the buildings. These engineers will work with the County to find the best ways to save money by reducing energy usage and improve occupant comfort. SCE also has resources to identify incentives available for energy that is saved by installing new and more efficient equipment. SCE offers free screening and scoping, a custom investigation of the building operations as well as documentation and training. The RCx Program website

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also offers Cx and RCx guides, case studies, examples of common measures etc. including:

- **Statewide RCx Policy Manual 2011:** SCE in conjunction with PG&E, San Diego Gas & Electric, and Southern California Gas Company released a Retrocommissioning Policy and Procedures Manual which outlines how to receive financial incentives through the 2010-12 Statewide RCx Offering.
- EPA Retrocommissioning Guide for Building Owners
- PECI Commissioning Resource Center
- Heat Pump Schedules
- Disabled Economizer Control
- Simultaneous Heating and Cooling
- VAV Box Flow Setpoints
- Throttled Discharge Valves

<http://www.sce.com/rcx/resources.htm>

- Case Study: Marriott International Inc. The Marriott Hotel in Ranch Las Palmas hosted the 11th National Conference on Building Commissioning (NCBC) in 2003. The participants retro-commissioned the building and energy savings from their findings ranged from \$52,000-\$90,000. This lead Marriott to start a continual commissioning program. It is a monitoring-based program which ensures that problems are identified immediately and can be addressed quickly.

2.2 Assessment of Existing Commissioning/Retro-Commissioning Policy and Resources

2.2.1 Existing Commissioning/Retro-Commissioning Policy and Resource “Pros”

The many benefits of commissioning and retro-commissioning speak for themselves and are repeated, in summary:

- ✓ Energy efficiency and related reduced costs of energy.
- ✓ Improved comfort and indoor air quality (and resultant better productivity).
- ✓ Increased equipment life.
- ✓ Reduced complaints.

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- ✓ Marriott case study: The monitoring based-program is highly efficient and will be in easily implemented in the county due to the Utility Manager System.
- ✓ The State of MN and City of Pasadena clearly outline what should be commissioned, who should do the commissioning and what the report should include.
- ✓ All of the guides/resources clearly outline **how** to complete a thorough Cx/RCx project.

In addition, because commissioning is so well recognized as multi-beneficial, there are many resources available that are tailored to commissioning specifically in California. For instance, the Best Practices and Guides that many organizations provide give a step by step process for Cx/RCx.

2.2.2 Existing Commissioning/Retro-Commissioning Policy and Resource “Cons”

- Commissioning of a new building adds both time and expense to the cost/schedule of the project. A budget of at least 1% of the construction cost is realistic and can often be “value engineered” out of the project.
- Assuming the budget is available, in theory and practice there is nothing more valuable than a well commissioned new building. The reality of a non-negotiable move-in date will often trump the time needed to commission.
- Re-commissioning or retro-commissioning is also an expensive and time-consuming process. It also places significant demands on what is, often, an over extended, understaffed maintenance department.
- SCE’s RCx program is limited to buildings that have at least 25,000 square feet of conditioned space. Due to the size of the facilities, most of Inyo’s buildings will not be able to participate. Also some of the larger facilities of Inyo are non SCE clients. Therefore, those buildings will not be able to participate in SCE’s RCx program as well.
- New York City’s policy only requires RCx every 10-years which may not be as effective as a monitoring-based or more frequent program. It also doesn’t mention new buildings. It is also required of all building owners which do not apply to the County of Inyo.
- The City of Pasadena does not mention/require retro-commissioning or re-commissioning.

2.2.3 Aspects to Leverage

Commissioning and retro-commissioning require good documentation of existing equipment, systems, and design details of a building. In theory, every maintenance and operations department can work better if all of the blueprints and maintenance/equipment records are well organized and easily available. In developing the policy, this aspect of the existing M&O infrastructure should be considered and leveraged.

The many potential benefits of Cx and RCx, such as reducing utility costs, enhancing property value, protecting against future liability, reducing repair/replacement costs, and overall increasing a building's performance can be leveraged in the process of seeking support, funding and awareness. It will be important to publicize these benefits to gain Board support and to expand public awareness. For instance, the County could release a resource or guide to the public explaining what Cx/RCx is, how it benefits building owners, and describes the steps to take.

2.2.3.1 Gap Analysis

A huge hurdle will be time and money. Particularly in Inyo County with highly dispersed facilities, time will be limited. Likewise, there is a significant up front expenditure of time and money in order to implement commissioning practices. The county may consider focusing on one part of a building to commission such as HVAC (which has one of the highest return on investment). Another option is to focus on the few, least efficient buildings that are in most need of RCx. The overall extent of the Cx or RCx process will likely be limited to cost justified activities.

Consequently, it is anticipated that the policy may be informational and voluntary for the non-county stakeholders; and cost/benefit oriented (i.e. financially driven) for the county buildings.

3. Commissioning/Retro-Commissioning Policy Development and Implementation Plan

3.1 Overview

The Implementer will research and prepare a draft Policy for Cx/RCx for County facilities. This will then be submitted to stakeholders for review and eventually presented for the Board of Supervisors.

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3.1.1 Commissioning/Retro-Commissioning Policy Requirements

Because Cx and RCx can be expensive and time-consuming, the policy will focus on methodology and laying the foundation for commissioning. Buildings maybe commissioned as identified by the results of benchmarking. Table 1 illustrates the list of buildings to be benchmarked. The frequency will be determined by both need and budget, if cost justified, will likely be every third year (depending on the complexity of the systems, energy intensity and the needs of the occupants). The policy will be formed specifically based on the County’s facilities. As such, and because consultant budgets are limited, it is anticipated that the Cx and RCx will be accomplished by the existing Facilities staff.

Input from the stakeholders shall be evaluated to prioritize which buildings will provide the greatest impact to reducing energy use. Interested non-county stakeholders will be able to access resources through the County website.

Table 1: Inyo County Buildings

Id-#	Description	SF
78	Airport Hanger	26,000
57	Laws Railroad Museum	21,176
92	Health and Human Services	8,641
19	Court Building	7,281
6G	Airport Hanger 8	6,600
6F	Airport Hanger 6	6,402
6C	Airport Hanger 4	6,270
6E	Airport Hanger 6	5,890
4	County Services Building	5,536
6	Airport Hanger 1	5,229
64	Administration	5,224
1	Library and Office	5,206
5D	Airport Terminal	4,729
55	IMAAA Senior Center	4,600

3.1.2 Commissioning/Retro-Commissioning Policy Development

Two key phases of the process will involve:

- 1) Stakeholder Input:

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- Gather stakeholder input: this will initially require interviews with the maintenance and operations staff and a review of the documentation available in the form of drawings, equipment records and maintenance manuals.
- Research and report on current policies. This overlaps with the above, but also will consider available budgets.
- Meeting outreach as appropriate

2) Policy Development:

- Draft policy
- Present to stakeholders
- Document all issues, their potential fixes, and cost benefit analyses
- Revise/resubmit final policy
- Submit policy to Board of Supervisors for consideration
- Submit final report on best practices and lessons learned to SCE, City of Bishop, LTC, GBUAPCD and other interested parties.

3.1.3 Commissioning/Retro-Commissioning Policy Implementation

Five steps are anticipated as follows:

1. Gain board and public support through describing what Cx and RCx is and how it will benefit facility operations.
2. Identify operations, maintenance and energy-efficiency improvements.
3. Identify staff training needs relative to:
 - a. Optimized building system operations.
 - b. Identify wasteful energy use (and an ability to recognize energy efficiency opportunities).
 - c. Enhance the desire to collect and organize building documentation.
 - d. Develop a “library” of resources and guides that will educate/document Cx/RCx the process.
4. Estimate and track persistent savings over the remaining lifetime of the affected equipment (leveraging the Utility Manager system).
5. Encourage a well-delivered Cx/RCx process so that building owners and operators realizes the value inherent in this service.

3.1.4 Staff Training

Defining training and achieving training (and organizational needs) will be mostly focused on the M&O staff. At its core, there is no part of commissioning (or retro-commissioning) that is

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new. It is, simply, ensuring that things are operated the way they were designed to be operated, and ensuring that the needs of the occupants are met by the available systems. This is the daily task of the M&O staff. The problem is the time involved; the availability of drawings and equipment information; and, the budgets (time and money) associated with doing the right thing.

Training can and should be based on the Utility Manger benchmarking for the target buildings and should include any M&O personnel assigned to those buildings. A comprehensive training program for staff should be focused on specific equipment and systems. The program manager, facility manager and facilities staff will undergo a 1 day training using the SCE Retrocommissioning Program [available here: <http://www.sce.com/rcx/resources.htm>] which includes a Statewide RCx Policy Manual and many other resources.

3.1.5 Communications

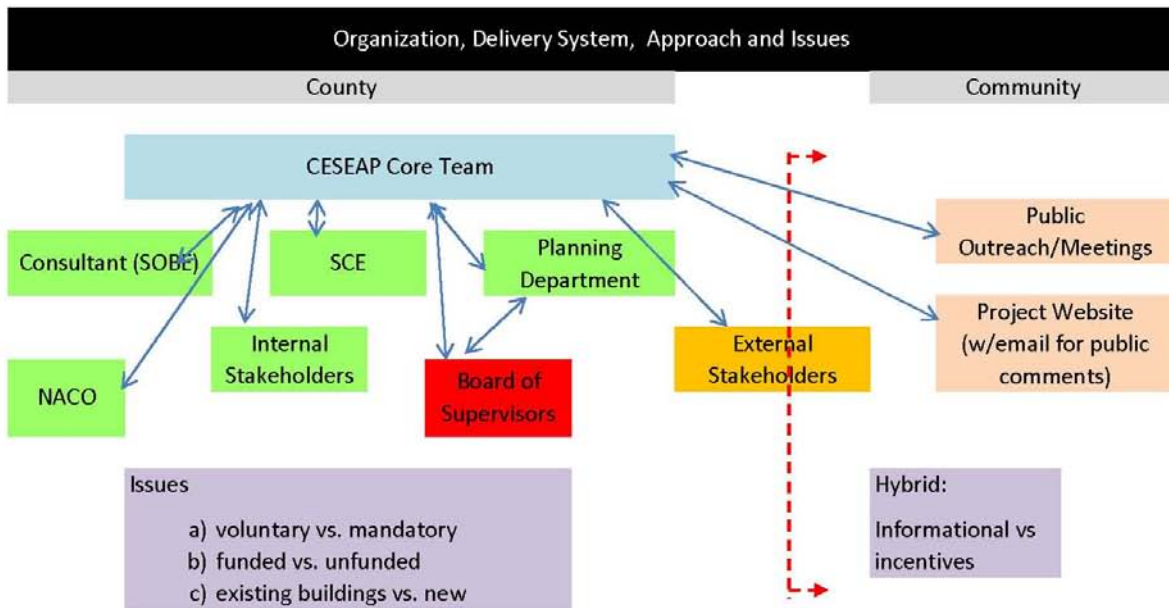
Communication between internal and external stakeholders will be a vital part to creating and adopting this policy. Through its external and internal stake holders, the county will distribute information and the proposed strategies that the Cx/RCx policy will address. It will develop a county website that will allow the public to email comments. Once the policy is finalized it will be submitted to the board for a preliminary review. It will then be finalized and then re-submitted to the board for approval and adoption.

As stated earlier there are a number of activities that will be of most benefit:

- 1) The description and benefits of Cx/RCx should be advertised county wide through brochures and/or on the web site;
- 2) A library of commissioning and re-commissioning documentation should be developed using the documents resources identified herein; and,
- 3) An assessment of available documentation for each target building should be developed. This would include an assessment of the available drawings (original building drawings), an assessment of the equipment list for each building, an assessment of the design requirements of the building, an assessment of the maintenance requirements (and frequency) of the target building; and an occupant survey (for observations/complaints).

Figure 1, below, illustrates the various communication that will take place during the creation of this policy.

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3.2 Resource Identification

3.2.1 Resource Requirements

The development of a Cx/RCx policy specific to the County of Inyo will require the data collected through the utility manager system. From this, the target buildings can be identified. Outreach to the City of Bishop, internal and external stakeholders will be required to gather information. See Appendix E for a complete list of stakeholders.

Internal resources include:

- The County of Inyo website: to explain and publicize the need for an benefit of C/Rc;
- The Utility Manager System: to provide on-going tracking of the basic “metric” of C/Rc (i.e. energy use at the target building(s));
- The Inyo County M&O department: the entire department will be encouraged to be aware of and embrace the Rc process, procedures and documentation requirements; and,
- The Inyo County Planning and Building Department: will be encouraged/required C/Rc in all County building construction and/or modernization projects.

3.2.2 External Resource Needs

It is not anticipated that there are budgets available for C or Rc subcontractors.

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Schedule

3.3 Commissioning/Retro-Commissioning Policy Development and Implementation Schedule

Commissioning & RCx Policy Development - County of Inyo: Cost Energy, and Service Efficiencies Action Plan (CESEAP)			Q-1		Q-2		Q-3		Q-4		Q-3					
Schedule of Major Deliverables (partial)			2011		2012											
			Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
1	Who	Plan														
	Imp	Issue Draft Plan			4											
	ProM	Team, Staff, Stakeholder Buy-in														
2		Development of Cx and RCx Policy														
	Imp	Draft Policy												31		
	All	Report on Stakeholder Input													17	
	All	Final Policy													17	
	ProM	Submit to Board														9
3		Maintenance & Sustainability														
	All	Monthly Meetings			2nd	2nd	2nd	2nd	2nd	2nd	2nd	2nd	2nd	2nd	2nd	2nd
	All	CESEAP Scheduled Meetings														
		Inyo Associates - Independence			17											
		Independence Civic Club			20											
		Bishop Paiute Environmental Agency			4											
		Big Pine Civic club			14											
		Bishop Chamber of Commerce				17										
		Lone Pine Chamber of Commerce				21										
		Inyo Associates				21										
		Bishop City Council Study Session				28										
		Bishop Planning Commission				29										
		Death Valley Chamber of Commerce				4										
		Inyo County Planning Commission				7										
		Public Meeting				7										
		Public Meeting				8										
		Northern Inyo Hospital District - Board					21									
		Big Pine Paiute - Tribal Council					4									

KEY
 Imp Implementer
 ProM Program Manager
 All Implementer and Program Manger Team
 tbd to be determined
 2nd Second Tuesday of every month
 SCE Due Date

3.4 Monthly Activity Tracking Schedule

The program manager and implementer will meet monthly to review above schedule and tasks. A rolling punch list and activity list will be developed as a part of the meeting in order to ensure that activities are on schedule.

4. Budget

The budget which follows is based off of the County of Inyo SOW billing schedule and is a **draft**.

**Assessment and Planning Report
for the Development of a Policy for Cx/RCx**

2.E Budget for Developing Commissioning/ Retro-Commissioning Policy and Procedures

Budget Item		Sub Cost	County Labor	County Expenses	TOTAL Budget
1	Report on Subcontractor	\$0	\$375	\$50	\$425
2	Assessment & Planning Report for Cx/RCx	\$3,295	\$1,350	\$0	\$4,645
3	Draft Policy for Cx/RCx	\$2,595	\$950	\$0	\$3,545
4	Report on Stakeholder Input	\$440	\$125	\$25	\$590
5	Final Policy for Cx/RCx	\$1,815	\$715	\$0	\$2,530
6	Submit to Board	\$435	\$125	\$25	\$585
7	Monthly Reports	\$996	\$650	\$0	\$1,646
TOTAL		\$9,576	\$4,290	\$100	\$13,966

5. Assessment of Commissioning Effectiveness

At the monthly or quarterly meetings, the implementer and program and facilities managers will discuss the overall policy effectiveness.

5.1 Staff Feedback Surveys

No staff surveys are anticipated except for quarterly meetings with representative team members. However, occupant (and staff) surveys should be solicited for some or all of the target buildings with the goal of identifying the most high-return C/Rc activities to undertake. Energy Efficiency Impact

5.2 Energy Efficiency Impact

Energy savings can be tracked and reported using the Utility Manager System as attributed by this policy.

5.3 Metric

In order to minimize confusion, the basic metrics identified in the utility manager and benchmarking reports will be used to track process on C/Rc. In addition, a building rating can be developed to provide a relative “grade” of available documentation for that building (i.e. on a scale of A, B, C, D, F: each of the buildings will be rated relative to: drawings available, quality of drawings, equipment lists available, maintenance records available, maintenance manuals available)

Appendices

Appendix A: Task Scope of Work

Task 2.E - Develop commissioning/retro-commissioning policies for Implementer's facilities

As part of the Program, Implementer will develop an energy policy requiring County buildings to undergo Commissioning (for new buildings) ("Cx") or Retro-Commissioning (for existing buildings) ("RCx"), as feasible. Cx or RCx is performed to bring the buildings into proper operating condition. Based on the age and the operating condition of a building, RCx can resolve comfort and high energy consumption issues that may have occurred during design, construction or problems that have developed during the operation and maintenance of the building. The policy will be presented to Inyo County Board of Supervisors for consideration. Implementer will develop a plan to encourage increased energy efficiency in new and altered development, including potentially identifying and prioritizing County and other government facilities and activities to be modified to minimize energy use and related emissions. The computer tracking program and final plan will provide means to audit progress, which will be implemented through the plan.

The Implementer will conduct an assessment of existing building operations and maintenance practices and policies or standards that have been developed by other entities that address Cx or RCx. As part of this planning process, Implementer will consult extensively with other local and regional partners to develop its plan for Cx and RCx for its own facilities. Implementer is currently working on retrofitting its facilities through an Energy Commission grant. Through the Program, the County will further leverage funds through these efforts.

Implementer will prepare a draft policy for Cx and RCx for County facilities. This draft policy will be reviewed with stakeholders including SCE, the City of Bishop, LTC, and GBUAPCD, among other constituents identified. A final policy for Cx or RCx will be prepared and submitted to the Board of Supervisors for consideration.

A final report on the process will be prepared and transmitted to SCE, the City of Bishop, LTC, GBUAPCD, and other interested parties documenting the best practices and lessons learned from the project, amongst other topics. The final policy for Commissioning and Retro-Commissioning will be shared with other interested agencies to assist them with their energy efficiency policy pursuits.

The Cx and RCx policy will, at a minimum, address the following:

Appendices

1. Description of what Cx and RCx is and how it will benefit the Implementer facility operations;
2. Identification of operations and maintenance and energy-efficiency improvements;
3. Provision of staff training on optimized building system operations;
4. Provision of training to building operators on how to help improvements persist;
5. Improving the ability of building operations staff to identify wasteful energy use;
6. Review and enhancement of building documentation;
7. Improving occupant comfort and workforce productivity;
8. Improving indoor air quality;
9. Creation of persistent savings over the remaining lifetime of the affected equipment;
10. Prolonging of equipment life; and
11. Demonstration of a well-delivered Cx/RCx process so that building owners and operators realizes the value inherent in this service.

The Implementer will, at a minimum, track the following estimates through the IR Tool:

1. Number of Implementer's facilities surveyed for Cx/RCx Study;
2. Number of Implementer's facilities identified as Cx/RCx candidates;
3. Number of Implementer's facilities pursuing Cx/RCx work;
4. Number of Implementer's facilities applying for Cx/RCx audits and/or rebates via SCE programs; and
5. Number of peer agencies requesting and receiving the Cx/RCx Study.

The rational and benefits of the proposed scope of work include the following:

1. Consensus-based solutions to minimize activities contributing to energy use and related emissions, and promote energy efficiency throughout the County.
2. Detailed programs, policies, and implementation measures to achieve the solutions identified.

Implementer will provide all materials developed under this task to CPM for review and comment:

1. Report on Status of Consultant or Subcontractor to Support the Task;
2. Assessment and Planning Report for the Development of a Policy for Cx and RCx on Implementer's Facilities – Implementer shall include assessment of existing Cx/RCx policies and resources and plan for developing a policy for Cx/RCx on Implementer's Facilities based on the information gained from the assessment. This may be in the format of a memo report or full report;
3. Draft Policy for Cx/RCx on Implementer's facilities;

Appendices

4. Report on Stakeholder Input – Implementer shall include a list of all stakeholder meetings, workshops, etc., list of all attendees and contact info by workshop, and discussion on how input was used in refining the policy;
5. Final Policy for Cx/RCx on Implementer’s facilities;
6. Submit Policy for Cx/RCx on Implementer’s facilities to Implementer’s Board of Supervisors for consideration - If the policy is adopted, Implementer shall submit the date the policy becomes effective. If the policy is rejected, Implementer shall submit memo report on reasons for rejection and alternate plans; and
7. Monthly reports of tracked Performance Indicators.

Task 2.E. -Deliverable(s)	Due Date(s)
1. Report on Status of Consultant or Subcontractor to Support the Task	August 9 th , 2011
2. Assessment and Planning Report for the Development of a Policy for Cx/RCx on Implementer’s facilities	November 4 th , 2011
3. Draft Policy for Cx/RCx on Implementer’s facilities	July 31 st , 2012
4. Report on Stakeholder Input: Cx/RCx on Implementer’s facilities	September 17 th , 2012
5. Final Policy for Cx and RCx on Implementer’s facilities	September 17 th , 2012
6. Submit Policy for Cx/RCx on Implementer’s facilities to Board of Supervisors for consideration	October 9 th , 2012
7. Monthly Status reports per Task 4	Monthly with Invoicing Requirements (Task 4)

Appendices

Appendix B: EPA Retro-commissioning Guide for Building Owners

Appendix C: Commissioning Plan Outline Template

Appendix D: Best Practices in Commissioning Existing Buildings

Appendix E: Complete List of Stakeholders

Cathreen Team

Josh Hart Planning Director

Cathreen Associate planner

Dan Stewart Planning Coordinator (does financial)

Internal Stakeholders

Paul Hancock Public Works

Ken Babione Airport

Nancy Masters County Library

John Jones County Maintenance

Darrell Odum Information Services

John Klusmire Eastern California Museum

External Stakeholders

Planning Commission As a group

Linda Arcularius County Supervisor

Susan Cash County Supervisor

Bill Helmer Big Pine Paiute

Brian Adkins Bishop Paiute

Keith Caldwell City of Bishop

Rich Phelps High Sierra Energy Foundation

Dr. Terence K. McAteer Inyo County Superintendent of Schools

Barry D. Simpson, Superintendent Bishop Joint Union High School

Joel Hampton, Superintendent Owens Valley Unified School District

Deanna Campbell Cerro Coso Community College, Eastern Sierra Collage Center

Appendices

John Daly Cerro Coso Community College, Eastern Sierra Collage Center
Daniel Reed Cerro Coso Community College, Eastern Sierra Collage Center
Eitan Aharoni Cerro Coso Community College, Eastern Sierra Collage Center
Scott Hooker Northern Inyo County Local Hospital district
Olin Beall Inyo National Forest
Sarah Craighead, Superintendent Death Valley National Park
Ted Schade Great Basin Unified Air Pollution Control District
Brad Henderson Fish and Game
Sharon Avey Independence Chamber of Commerce
Kathleen New Lone Pine Chamber of Commerce
Tawni Thompson Bishop Chamber of Commerce
Jim Stroh Community Member
Sally Miller Wilderness Society
Dave Tanksley Natural Resources Committee
Carl Hoelscher Natural Resources Committee