



---

# PacifiCorp Recommissioning 2007-2008 Utah Program Evaluation

---

Prepared for  
PacifiCorp

Prepared by  
The Cadmus Group, Inc. / Energy Services  
720 SW Washington Street, Suite 400  
Portland, OR 97205  
503-228-2992

November 12, 2010

Prepared by:

Brian Hedman

Bill Falkenhayn

Randy Spitzer

Aquila Velonis

M. Sami Khawaja, Ph.D.  
Vice President  
The Cadmus Group, Inc.

## Table of Contents

<b>1. Executive Summary .....</b>	<b>1</b>
Conclusions.....	4
Recommendations.....	5
<b>2. Introduction .....</b>	<b>7</b>
Program Description and Overview.....	7
<b>3. Impact Evaluation.....</b>	<b>11</b>
Energy Analysis Methodology .....	11
Energy Savings Calculation Methods Used in the Program Evaluation.....	11
Realization Rate Analysis Method.....	12
Engineering Findings and Results .....	13
Net-to-Gross (NTG).....	14
Free-ridership .....	15
Spillover .....	16
<b>4. Process Evaluation .....</b>	<b>17</b>
Process Evaluation Overview .....	17
Process Evaluation .....	17
Organizational Data/Firmographics.....	17
Participation .....	18
Enrollment.....	19
Operational Changes.....	20
Installation Results.....	20
Energy-Efficiency Decision Making .....	21
Interaction with Rocky Mountain or Third-Party Staff .....	21
Satisfaction.....	21
Key Findings.....	22
Recommendations.....	23
<b>5. Cost-Effectiveness Analysis .....</b>	<b>25</b>
<b>Appendix A. Individual Site Reports .....</b>	<b>28</b>
<b>Appendix B. Survey Tools.....</b>	<b>29</b>

**Appendix C. Comparative Programs..... 51**

## 1. Executive Summary

The Recommissioning Program (RCx), implemented by Nexant, is designed to achieve electric demand and electric energy savings in commercial and industrial facilities in Rocky Mountain Power's Utah service territory. Savings are realized through systematic evaluation of facility systems, and identification of low-cost and no-cost operation and maintenance measures. In addition to financial incentives, this program's Recommissioning Service Providers (RSPs) supply consulting services to facility managers to identify and recommend system modifications that, lower energy costs through improved system operations, extend equipment life through reduced maintenance and improve productivity through enhanced occupant comfort.

Program participants are commercial and industrial facility owners who can demonstrate a commitment to spend \$10,000 to implement recommissioning measures that have an estimated simple payback of one year or less. Eligible sites include existing facilities on a qualifying Rocky Mountain Power retail rate schedule with a summer peak electric demand of at least 300 kW.

The 2007-2008 program had a total of 17 Utah projects installed, with expected savings of 9,005,935 kWh. The program was found to be cost-effective by total resource test and utility cost test perspectives.

Expected savings and other program-related data were downloaded from PacifiCorp's tracking database. Expected savings were those calculated for each installed project and documented, based on post-installation conditions, and entered in PacifiCorp's database at the conclusion of each project.

Table 1 summarizes expected savings, evaluated savings, and the realization rate for Utah 2007 and 2008 completed projects. Evaluated savings are verified or calculated for each installed project, as documented in this evaluation effort.

**Table 1. Energy Savings and Realization Rates**

Sector	No. Measures	Expected Saving Estimates (kWh)	Evaluated Savings (kWh)	Realization Rates
Commercial	89	6,394,372	6,244,203	98%
Industrial	5	2,661,563	2,661,563	100%
<b>Total (2007+2008)</b>	<b>94</b>	<b>9,055,935</b>	<b>8,905,766</b>	<b>98%</b>

Table 2 summarizes expected demand savings, evaluated demand savings, and realization rates.

**Table 2. Demand Savings and Realization Rates**

Sector	Expected Saving Estimates (kW)	Evaluated Savings (kW)	Realization Rates
Commercial	844	756	90%
Industrial	61	61	100%
<b>Total (2007+2008)</b>	<b>905</b>	<b>817</b>	<b>90%</b>

Table 3 summarizes expected savings by facility type. At 35%, office installations accounted for the largest share of savings.

**Table 3. Expected Program Savings by Facility Type**

		Facility		Expected Savings	
		Frequency	%	kWh	%
2007	Industrial	1	6%	1,807,500	20%
2008	Hospital	2	12%	1,034,752	11%
	Industrial	1	6%	854,063	9%
	Office	5	29%	3,127,257	35%
	Other Health	2	12%	358,547	4%
	School	5	29%	1,209,788	13%
	Service	1	6%	664,028	7%
<b>Total All Years</b>		<b>17</b>	<b>100%</b>	<b>9,055,935</b>	<b>100%</b>

Achieved energy savings were evaluated for 17 projects. Site visits were conducted for 14 projects; the remaining three were addressed through phone interviews. All projects were evaluated incorporating data provided from the project files, research, and interviews with key facilities personnel. Observations obtained from site visits were used to verify proper measure installation and function.

Overall, the program achieved a 98% energy savings realization rate (see Table 4).

**Table 4. Evaluated Savings by Facility Type**

Facility Type		Facility Count	Expected Savings Estimates (kWh)	Evaluated Savings Estimates (kWh)	Realization Rates
2007	Industrial	1	1,807,500	1,807,500	100%
	<b>Sub Total</b>	<b>1</b>	<b>1,807,500</b>	<b>1,807,500</b>	<b>100%</b>
2008	Hospital	2	1,034,752	1,034,752	100%
	Industrial	1	854,063	854,063	100%
	Office	5	3,127,257	3,127,257	100%
	Other Health	2	358,547	214,357	60%
	School	5	1,209,788	1,183,880	98%
	Service	1	664,028	683,957	103%
	<b>Sub Total</b>	<b>16</b>	<b>7,248,435</b>	<b>7,098,266</b>	<b>98%</b>
<b>Total All Years</b>		<b>17</b>	<b>9,055,935</b>	<b>8,905,766</b>	<b>98%</b>

Table 5 shows energy savings realization rates by measure type. Realization rates were uniformly high.

**Table 5. Evaluated Savings by Measure Type**

	Measure Type	Measure Count	Expected Savings Estimates (kWh)	Evaluated Savings Estimates (kWh)	Realization Rates
2007	HVAC	4	1,807,500	1,807,500	100%
	<b>Sub Total</b>	<b>4</b>	<b>1,807,500</b>	<b>1,807,500</b>	<b>100%</b>
2008	Additional Measures	8	270,079	270,079	100%
	Controls	8	1,225,147	1,225,147	100%
	Hot Water	1	14,721	14,721	100%
	HVAC	72	5,729,888	5,579,719	97%
	Lighting	1	8,600	8,600	100%
	<b>Sub Total</b>	<b>90</b>	<b>7,248,435</b>	<b>7,098,266</b>	<b>98%</b>
<b>Total All Years</b>		<b>94</b>	<b>9,055,935</b>	<b>8,905,766</b>	<b>98%</b>

After applying free-ridership to the evaluated savings, the program achieved an 84% net-to-gross (NTG) ratio. Consequently, net program savings for program years 2007 and 2008 were 7,480,843kWh.

A cost-effectiveness analysis was performed to compare the program's benefits and costs. Table 6 summarizes the program costs for 2005-2008. The program was found to be cost-effective in both 2007 and 2008, and the results of this analysis are summarized below in Table 7 and Table 8.

**Table 6: Cost Table**

Cost	2005 - 2006 <sup>1</sup>	2007	2008
<b>Program Costs</b>			
Implementation Cost (project management)	\$ 295,461	\$ 185,931	\$ 1,032,590
Incentive Costs	\$ 0	\$ 0	\$ 13,090
Utility Administrative Costs	\$ 20,117	\$ 1,353	\$ 7,701
<b>Total Program Costs</b>	<b>\$315,579</b>	<b>\$ 187,284</b>	<b>\$ 1,053,381</b>

Because all 2007 completed projects involved industrial customers, the 2007 analyses are based on the Rocky Mountain Power 2008 IRP 65% Eastside Decrement. All 2008 completed projects were commercial customers and, therefore, the 2008 analyses are based on the Rocky Mountain Power 2008 IRP 16% Eastside Decrement.

<sup>1</sup> For years 2005 and 2006 there were program costs, but no completed projects, therefore no cost effective analysis was calculated for these first two program years.

**Table 7: Cost-Effectiveness Summary 2007 – IRP 65% LF Decrement**

Cost Effectiveness Test	Levelized \$ / kWh	Costs	Benefits	Net Benefits	Benefit / Cost Ratio
Total Resource + Conservation Adder (PTRC)	\$0.025	\$229,804	\$418,358	\$188,554	1.82
Total Resource No Adder (TRC)	\$0.025	\$229,804	\$380,325	\$150,522	1.66
Utility (UCT)	\$0.02	\$187,285	\$380,325	\$193,041	2.03
Ratepayer Impact (RIM)	\$0.064	\$593,052	\$380,325	-\$212,727	0.64
Participant (PCT)	\$0.005	\$42,519	\$405,768	\$363,249	9.54
Lifecycle Revenue Impact				\$0.00000154	
Discounted Participant Payback (years)				0.65	

**Table 8: Cost-Effectiveness Summary 2008 – IRP 16% LF Decrement**

Cost Effectiveness Test	Levelized \$ / kWh	Costs	Benefits	Net Benefits	Benefit / Cost Ratio
Total Resource + Conservation Adder (PTRC)	\$0.033	\$1,213,707	\$2,710,106	\$1,496,399	2.23
Total Resource No Adder (TRC)	\$0.033	\$1,213,707	\$2,463,733	\$1,250,026	2.03
Utility (UCT)	\$0.028	\$1,053,381	\$2,463,733	\$1,410,352	2.34
Ratepayer Impact (RIM)	\$0.094	\$3,491,855	\$2,463,733	-\$1,028,122	0.71
Participant (PCT)	\$0.005	\$173,416	\$2,451,564	\$2,278,148	14.14
Lifecycle Revenue Impact				\$0.00000725	
Discounted Participant Payback (years)				0.43	

**Table 9: Cost Effectiveness Summary 2007-2008 - IRP 65% Decrement**

Cost Effectiveness Test	Benefits	Costs	Net Benefits	Benefit / Cost Ratio	Cost \$ / kWh
Total Resource + Conservation Adder (PTRC)	\$ 2,941,734	\$1,359,885	\$1,314,419	2.16	\$0.031
Total Resource No Adder (TRC)	\$2,674,304	\$1,359,885	\$1,314,419	1.97	\$0.031
Utility (UCT)	\$2,674,304	\$1,168,086	\$1,506,218	2.29	\$0.027
Ratepayer Impact (RIM)	\$2,674,304	\$3,844,314	-\$1,170,011	0.70	\$0.088
Participant (PCT)	\$2,688,416	\$203,987	\$2,484,429	13.18	\$0.005
Lifecycle Revenue Impact				\$0.000008475	

## Conclusions

- The program is cost-effective, and Rocky Mountain Power customers have expressed a high degree of satisfaction with the program. Although surveyed participants had initial concerns about the program, all these concerns have been successfully addressed through capable program staff, a knowledgeable implementer, and professional, responsive RSPs.
- Cadmus found program methodology is on the right track, as evidenced by the high level of project completions. From program marketing, application processing, project screening, planning, investigating, bundling RCx options, implementation, and final project verification, a 98% realization rate shows this program is a success.

- PacifiCorp and its program administrator have a comprehensive QA/QC process which results in thorough and well prepared engineering reports.
- The free RCx services provided through RMP were uniformly seen as the strongest motivating factor for participation, outweighing the importance of financial incentives. From a customer's perspective, the RCx study reduces the risk associated with an RCx project, leading them to proceed with the project.
- The program appeared to effectively complement the Energy FinAnswer program. In most cases, both RSPs and customers had participated in prior Energy FinAnswer programs. Besides its primary energy-savings potential, this program provided value as a component of a "portfolio" of measures that could be used to guide participants along a continuous series of energy-efficiency investments.
- A certain amount of overlap in program roles is occurring as the program matures. Both RMP and Nexant agree that Nexant is the "face to the customer", however there is some duplication of efforts in administering, marketing, tracking and managing the program.
- Some RSPs see a market for smaller projects. From their perspective simplifying the administrative requirements and project size constraints would allow them to address the apparent demand for smaller projects, and expand the program.
- A key market weakness uncovered was under-qualified controls contractors. Given the dearth of qualified controls contractors, several RSPs suggested they prefer doing this work themselves as to better control costs and quality of work performed.
- A number of RCx programs from other utilities were compared to RMPs RCx program. RMP's program was found to be consistent with best and current RCx practices. A table of comparative programs can be found in Appendix C.

## Recommendations

- Follow-up should continue with earlier non-participants. Interviews revealed possible future participation as financial conditions improve.
- Using concrete examples such as past RCx project deliverables, to serve as case studies to illustrate how the process and final payback works would be valuable to demonstrate the benefits of RCx.
- Some RCx opportunities may currently be limited to a participant's less vital operations, when primary building systems are considered too important to experiment with for possible energy savings. In those cases, a deeper analysis of the interface between the building's business operations and building systems could be pursued.
- Explore the possibility of allowing participation by smaller customers.



## 2. Introduction

### Program Description and Overview

Rocky Mountain Power's Recommissioning Program is designed to achieve electric demand and electric energy savings in commercial and industrial facilities within Rocky Mountain Power's Utah service territory. Savings are realized through operation and maintenance measures. Although facility managers may be knowledgeable about energy-efficiency measures, they often are time and staff constrained, focusing primarily on reactive system repairs rather than proactive comprehensive system performance enhancements. In addition to financial incentives, this program provides free consulting services to overcome the facility managers' resource constraints. This allows facility managers to identify and recommend more comprehensive solutions, which, when deployed simultaneously, can considerably increase their building's efficiency.

To increase program cost effectiveness, participants are limited to commercial and industrial facility owners who demonstrate a commitment to spend \$10,000 to implement recommissioning measures that have an estimated simple payback of one year or less. Eligible sites include existing facilities on a qualifying Rocky Mountain Power retail rate schedule with a peak electric demand of at least 300 kW.

Eligible participants receive free recommissioning services when recommended measures are implemented within a mutually negotiated timeframe. Incentives are available for low-cost measures to buy down the implementation cost to achieve a simple payback of one-year..

To ensure program success, participants are required to complete the following five phases:

1. **Application Phase:** Applications are submitted, reviewed, screened, and projects assigned to a preapproved recommissioning service provider (RSP).
2. **Planning Phase:** From kickoff to site visits and document gathering, a high-level review of low-cost and no-cost measures are assessed for savings opportunities. A Recommissioning Plan is developed.
3. **Investigation Phase:** an Investigation Report documents facility operating procedures and equipment functionality. Low-cost measures are recommended, and incentives and timelines are agreed upon. The Investigation Report typically groups measures into three bundling options:
  - **Bundle 1—Good.** High likelihood of owner acceptance, and estimated implementation cost of \$10,000 or less. Meets the project's target savings value. Typically will have a simple payback of less than one year.
  - **Bundle 2—Better.** Builds upon Bundle-1. More aggressive and comprehensive. Inclusion of recommissioning measures (RCMs) with larger savings, but perhaps longer paybacks.
  - **Bundle 3—Best.** Builds upon Bundle-2. The most aggressive approach, targeting comprehensive implementation of cost-effective RCMs. Simple payback must not exceed three years.

A Program Agreement is signed, listing the agreed-upon bundle option and the mutually agreed-upon timeframe.

4. Implementation Phase: Measures are implemented within the agreed-upon timeframe.
5. Verification Phase: The RSP verifies proper installation measures, new control strategies, and repairs. The project's final Verification Report is submitted.

Nexant addresses QA/QC through each of the five phases. Specifically, Nexant engineers and administrators:

- Screen applications to assure they fit the minimum program requirements,
- Review RSP reports to check if all estimates on savings, costs, and project timelines are reasonable,
- Emphasize a quick turnaround to RSPs averaging about one to two weeks, and
- Verify performance by checking measure related before and after operational outputs from building automation systems.

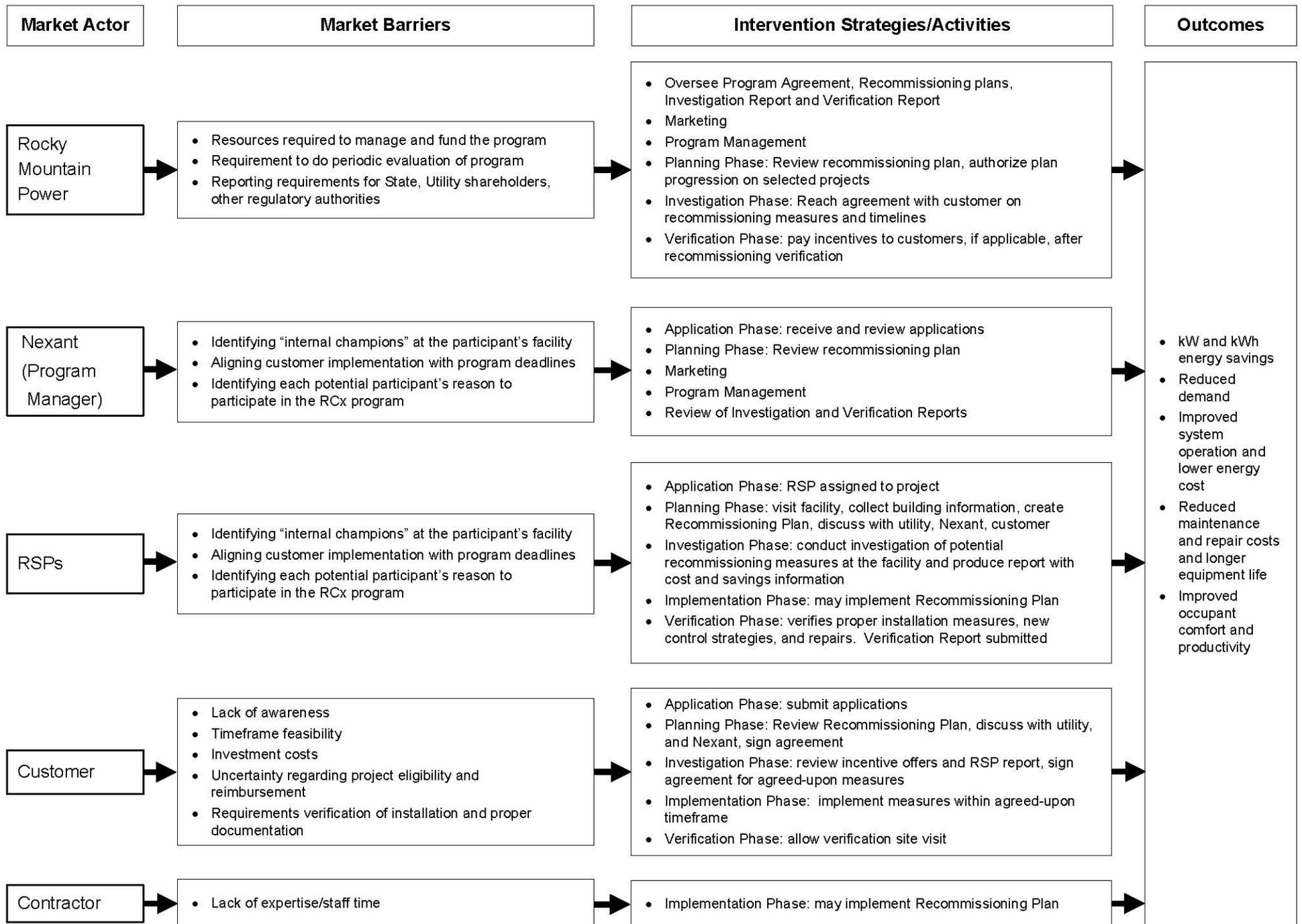
Nexant encourages continuous feedback from RSPs on ideas for improvement to the program. One suggestion made by an RSP to substitute industry standard assumptions for certain engineering calculations was agreed to by Nexant engineers. This resulted in saving RSP's time and expense on projects.

Projects completed under this program have included numerous measures supporting optimal functioning of building facility systems. Examples of measures evaluated in this program include:

- ***Change condenser water temperature setpoint.*** A measure resetting the condenser water temperature setpoint to 70°F for cooling, reducing peak demand by 35 kW/month, and providing energy savings of 41,999 kWh/year.
- ***Correct VAV box control.*** Measure involving reprogramming, after a field inspection revealed a programming error, reducing the peak demand by 59 kW/month, and providing energy savings of 112,366 kWh/year.
- ***Tune AHU economizer control.*** Tuning an AHU economizer control sequence after a programming error was identified during a site inspection and review of trend data, reducing peak demand by 9 kW/month, and providing energy savings of 27,344 kWh/year.

The logic model diagram on the following page shows the relationships between market actor, market barriers, activities, and outcomes for the RCx program.

# Rocky Mountain Power's Recommissioning Program (RCx) Logic Model



Recommissioning program participants completed projects in a variety of facility types during 2007 and 2008, as shown in Table 10. Expected energy savings were largest for office buildings.

**Table 10 Expected Program Savings by Facility Type**

		Facility		Expected Savings	
		Frequency	%	kWh	%
2007	Industrial	1	6%	1,807,500	20%
2008	Hospital	2	12%	1,034,752	11%
	Industrial	1	6%	854,063	9%
	Office	5	29%	3,127,257	35%
	Other Health	2	12%	358,547	4%
	School	5	29%	1,209,788	13%
	Service	1	6%	664,028	7%
<b>Total All Years</b>		<b>17</b>	<b>100%</b>	<b>9,055,935</b>	<b>100%</b>

Table 11 shows distribution of expected savings by end use. HVAC measures represent the greatest percentage of combined program year savings at 83% of expected savings, followed by controls related measures at 14%.

**Table 11. Expected Savings by End Use**

		Expected Savings Estimates	
		kWh	%
2007	HVAC	1,807,500	20%
2008	Additional Measures	270,079	3%
	Controls	1,225,147	14%
	Hot Water	14,721	<1%
	HVAC	5,729,888	63%
	Lighting	8,600	<1%
<b>Total All Years</b>		<b>9,055,935</b>	<b>100%</b>

### 3. Impact Evaluation

#### Energy Analysis Methodology

Engineering calculations served as the basis for estimating evaluated energy savings for 2007–2008 projects.

The evaluation conducted energy analyses to verify the reasonableness of original analyses underlying the utility's savings estimates. Original savings estimates developed for a recommissioning plan were based on a thorough review of prior studies and site inspections. Recommissioning projects had very detailed reports, which included investigation, implementation, and post-verification stages. All the reports were performed by qualified recommissioning providers. The reports used various engineering analyses methods, including Bin Temperature Models, DOE2 analysis, and/or data logging equipment before and after EEM implementation. Post-verification savings were based on data collected from trend logging equipment, temperatures, and other related information to verify recommended operations were in place.

The evaluation sought to confirm that basic assumptions used in the analysis were correct, the analysis method was appropriate, measures had been installed and operated as planned, and the customer's facility was still in use. Our energy analysis primarily focused on verifying the validity and findings of the original analysis based on site visit observations and phone verifications. In cases where fundamental differences were identified, our analysis provided revised energy and demand savings estimates.

Steps conducted for the energy analysis verification process are described below.

#### Energy Savings Calculation Methods Used in the Program Evaluation

Analysis of projects began with a complete review of project files, which included one or more reports at various stages of the project, and presenting energy savings, costs, and incentive calculations and estimates.

We applied engineering analysis methods to determine if savings were reasonable for the measure type (as discussed below). Site inspections were conducted to verify equipment and control strategies were in place. This was done by verifying building operations (operating hours) with building personnel and examining building automation systems (BAS). BAS systems were reviewed to insure set points (static pressure, chilled water temperatures, and stop/start schedules) remained in place during the post site inspection.

The energy analysis approach applied to all 17 projects. To prioritize site visits, projects were ranked by highest savings. The top quarter of projects, representing 61% of estimated savings, were all selected and remaining projects were randomized. These included visits to 14 sites and phone interviews for the remaining three sites to gather and verify data on equipment and operations. A detailed review of how systems operated was conducted for each project, including interviews with facility managers and supporting staff.

As noted, site visits provided an opportunity to verify recommended measures were implemented correctly. For example, on a controls measure, we verified an economizer with a dry bulb controller had been changed to enthalpy control for better savings. These data were then used to estimate evaluated EEM energy and demand savings by performing engineering calculations.

In most cases, evaluated energy (or demand) savings were calculated as follows: evaluated energy savings equaled evaluated post-consumption less estimated pre-consumption. In some cases, however, baseline energy consumption in our analysis varied from the original estimate. If our review of project files, site visits, phone surveys, or discussions with project participants identified a different base case assumption than that used in the original analysis, we corrected the assumption in our analysis to estimate the pre- and post-implementation values. For example, operating hours might have changed since the project's inspection; therefore, our base case energy use estimate would reflect revised operating hours, as would our post-implementation energy use estimate.

### **Engineering Calculations**

We used various engineering algorithms to estimate energy savings for particular measures, as applicable. Through discussions with building operators, our engineers learned of any operational changes that may have affected energy savings estimates. In some cases, we also used energy data from the Commercial Buildings Energy Consumption Survey (CBECS), Bonneville Power Administration (BPA), and/or End-use Load and Consumer Assessment Program (ELCAP) to confirm building end-use indexes (EUIs) and end-use energy consumption, and to verify claimed savings estimates.

We also applied engineering calculations to some projects, determining whether original analyses were appropriate and produced reasonable savings estimates. In some cases, we did this when the original analysis was very complex and required extensive data collection for modeling purposes (e.g., where an original facility had been modeled using a complex building simulation, based on complete building characteristics data). Applying simplified engineering calculation methods, we determined whether initial estimates from the more complex analyses were reasonable. In other cases, such as lighting schedule optimization, calculations were straightforward multiplications of operating hours and changes in end-use power consumption.

Various engineering algorithms were used to estimate savings based on specific measures. Observations of operational characteristics became a critical element in estimating actual savings. We used observations of key assumptions, validation of the engineering methods, and recalculations based on differences observed to provide evaluated savings estimates.

### **Realization Rate Analysis Method**

For each EEM in the projects, we calculated energy and demand savings realization rates as the ratio of evaluated savings to expected savings. The energy realization rate was calculated as a percentage, using evaluated energy savings and the utility's expected energy savings. The demand realization rate was calculated similarly. If the evaluation confirmed the original savings estimate, the realization rate is 100%.

As discussed, evaluated energy and demand savings from a project reflected changes observed in assumptions used in the original analyses. The realization rate accounted for these changes in estimating evaluated savings, but the rate was calculated relative to the utility's expected savings estimate without adjustments.

## Engineering Findings and Results

### Step 1: Methodology Selection

All projects were analyzed by using the engineering calculation methods described above.

### Step 2: Site Visits, Verification, and Data Collection

Analysis for all projects required site visits to verify equipment installation and operations, obtain data needed to perform calculations or simulations, and meet with building maintenance staff. The 14 site visits were completed in two waves, during late January and early March 2010. The three remaining projects were verified through phone and e-mail correspondence with building maintenance staff. Appendix A provides site visit and phone verification information, and summaries of our analyses of all 17 projects.

### Step 3: Analysis

Energy savings for the projects were evaluated using engineering calculations incorporating measurements and observations obtained from site visits and verification correspondence, and from data provided in the project files.

Table 12 shows evaluated energy savings by facility type. The program achieved an overall 98% energy savings realization rate. The 60% realization rate for Other Health was due to one project where a new HVAC system was installed after the RCx project had been completed. Evaluated savings for this project were limited to the 1 ½ year period between RCx project completion and HVAC system replacement.

**Table 12. Evaluated Energy Savings by Facility Type**

	Facility Type	Facility Count	Expected Savings Estimates (kWh)	Evaluated Savings Estimates (kWh)	Realization Rates
2007	Industrial	1	1,807,500	1,807,500	100%
	Sub Total	1	1,807,500	1,807,500	100%
2008	Hospital	2	1,034,752	1,034,752	100%
	Industrial	1	854,063	854,063	100%
	Office	5	3,127,257	3,127,257	100%
	Other Health	2	358,547	214,357	60%
	School	5	1,209,788	1,183,880	98%
	Service	1	664,028	683,957	103%
	Sub Total	16	7,248,435	7,098,266	97%
Total All Years		17	9,055,935	8,905,766	98%

As seen in Table 13, realization rates were nearly always 100% when measures were found installed and functioning as specified in the program verification report. The HVAC measure realization rate (97%) was impacted by the same HVAC project mentioned in Table 12.

**Table 13. Evaluated Energy Savings by Measure Type**

	Measure Type	Measure Count	Expected Savings Estimates (kWh)	Evaluated Savings Estimates (kWh)	Realization Rates
2007	HVAC	4	1,807,500	1,807,500	100%
	Sub Total	4	1,807,500	1,807,500	100%
2008	Additional Measures	8	270,079	270,079	100%
	Controls	8	1,225,147	1,225,147	100%
	Hot Water	1	14,721	14,721	100%
	HVAC	72	5,729,888	5,579,719	97%
	Lighting	1	8,600	8,600	100%
	Sub Total	90	7,248,435	7,098,266	98%
Total All Years		94	9,055,935	8,905,766	98%

Table 14 shows demand savings realization rates by measure type. The HVAC demand savings realization rate was lower for same reason as described above for energy savings.

**Table 14. Demand Savings Realization Rates by Measure Type**

	Measure Type	Measure Count	Expected Savings Estimates (kW)	Evaluated Savings Estimates (kW)	Realization Rates
2007	HVAC	4	25	25	100%
	Sub Total	4	25	25	100%
2008	Additional Measures	8	55	55	99%
	Controls	8	180	180	100%
	Hot Water	1	2	2	100%
	HVAC	72	643	555	86%
	Lighting	1	-	-	
	Sub Total	90	880	792	90%
Total All Years		94	905	817	90%

## Net-to-Gross (NTG)

Net savings are the savings “net” of what would have occurred in the absence of the program<sup>9</sup>. Net-to-gross (NTG) consists of freeridership and spillover. For this evaluation, we only quantified freeridership. Though reporting was done on spillover, an NTG spillover adjustment was not incorporated, given that participants were not able to identify additional energy-efficient measures purchased as a direct result of their program participation.

<sup>9</sup> Model Energy Efficiency Program Impact Evaluation Guide authored by the EPA as part of the National Action Plan for Energy Efficiency

## Freeridership

Freeridership is defined as the percentage of savings that would have occurred in a program's absence. This was quantified through telephone surveys with program participants. While asking participants to self-report freeridership is a standard industry approach, it should be noted this methodology has some limitations in that it does not account for longer-term market trends among contractors and supply houses, which typically occur with multiyear programs. For example, a multiyear program may alter retailers' stocking practices or even market shares of higher-efficiency products available in a region. Consequently, a customer, choosing between various makes and models of a given product, may not be aware selected choices have been altered by a program. Therefore, while the customer may correctly state a choice was offered between two efficient products, the choice may have resulted from a program. While such a customer would count as a freerider, had the program not been running, a less-efficient option may have been available to the customer—an option they might have otherwise chosen.

Accuracy of self-report surveys partly depends on respondents' memories of their decisions. For the recommissioning program, some participants were asked to recall actions taken over a year before. Participant candor may also be a factor, as participants may tend to seek a "halo" effect, where the customer indicates they would have made the energy-efficient choice because they perceive it as the response preferred by the interviewer.

In calculating free-ridership, five program participants were surveyed over the 2007 and 2008 program years. Table 15 presents freeridership analysis results, along with evaluated savings numbers from Table 13 and Table 14. The freeridership value was applied across all measures to arrive at net free-ridership for all years.

**Table 15. Free-ridership Analysis**

KWh	Net-Gross-Ratio (1-Free-ridership)	84% (+/- 9%) <sup>10</sup>
	Evaluated Savings	8,905,766
	<i>Net Savings</i>	7,480,843
KW	Net-Gross-Ratio (1-Free-ridership)	84%
	Evaluated Savings	817
	<i>Net Savings</i>	686

In most cases, RSPs reported participants initially did not feel they needed recommissioning until they were shown the benefits. This program enabled Rocky Mountain Power to get their RSPs "in the door" to show how this "low cost/no cost" program could provide significant value to participants. These anecdotal reports seem to suggest most participants initially were not inclined to invest in a comprehensive recommissioning effort, though subsequent participation may have been influenced by the efficacy of prior measure installations.

Participants found information provided for measure savings, payback, and personal familiarity with measures had a positive impact on their decisions to install measures. Effects of prior

<sup>10</sup> Reported at 90% confidence

measure purchases were mixed: it affected some, but others not at all. Similarly, for some, the project incentive was a major reason for purchases, but less so for others, partially because some participants felt they did not receive enough information on cost. Only one participant was required to perform the project by their organization.

## **Spillover**

Spillover is defined as the amount of additional savings generated by program participants, but not captured by program records. Customers purchase energy-efficient measures or adopt energy-efficient practices because of a program, yet, as they choose not to participate in that program (or are otherwise unable to participate), program records do not include savings their actions generate. Cadmus used the participant survey instrument to qualify spillover.

In this evaluation, spillover was assessed by asking participants who made energy efficiency improvements through this program if, because of the program, they decided to install an efficient measure or undertook some other efficiency-improving activity.

Most RSPs reported that the participants considered additional energy-efficiency measures, but most also expressed skepticism as to whether they had the capabilities to implement additional measures. As one RSP put it, “Yes, all have considered (additional measures), but I haven't experienced follow through.”

RCx program's impact was mixed regarding respondents' decisions to perform new energy-efficiency work. One did not think it had much influence; three saw it as a positive influence on future decisions.

## 4. Process Evaluation

### Process Evaluation Overview

The process evaluation sought to assess coordination and communication between Rocky Mountain Power, its contractor staff (Nexant), and their RSPs. It examined how effective the program was in influencing customer decision making regarding investments in comprehensively improving (recommissioning) their operations' energy systems.

**Table 16. Rocky Mountain Power Process Evaluation Samples**

Group	Goal	Achieved
Participants	10	5
Non-participants	14	14
Implementers	1	1
RSPs	1	3 <sup>2</sup>
Program Staff	2	2

### Process Evaluation

The process evaluation's approach was divided into the following key tasks:

1. All available program literature and documentation were reviewed, including program logic models, program design and theory, assumptions, filings, marketing materials, program surveys, participant databases, work plans, schedules, and data collection methods.
2. A list of researchable questions was developed as was a survey instrument for debriefing key program staff, program managers, corporate account managers (CAMs), trade allies, RSPs, participants and non-participants.
3. In-depth interviews were conducted with identified key personnel, trade allies, RSPs, participants, and non-participants.

### Organizational Data/Firmographics

From 2007 to 2008, 17 projects were conducted under this program. Nexant was the program implementer, and services were provided by a small number of RSPs with previous experience with similar programs deployed in other service territories (e.g., Colorado). Evaluators attempted to survey most participants, and were able to complete 5 interviews.

The participant survey represented companies as small as 100 employees to as large as 28,000 employees. In most cases, energy represented a very small portion of companies' operating costs. Except for one case, electricity was no more than 2% of costs.

---

<sup>2</sup> Additional RSPs were interviewed to gain a fuller understanding of their role.

Non-participants included firms involved in manufacturing, accommodations, professional services (e.g., office building management), agriculture, refrigerated warehousing, finance, and food processing. These firms reported an average of 45 employees. Of interviewees responding to questions about energy costs (with several indicated this was proprietary information), the average firm spent 36% of their annual operating costs on electricity. Non-participants varied in their ability to oversee energy management in-house, with approximately half stating they would need to use external technical expertise.

## Participation

### Program Support (RSPs, Nexant, RMP Staff) Perspective

Nexant sought to limit RSPs number to facilitate intensive training and ensure quality of work, reducing follow up and rework the program required. Most RSPs contributing to this program heard about the program directly from Nexant or learned about it from Rocky Mountain Power's outreach efforts. Many RSPs were also involved with other Rocky Mountain Power programs, such as Energy FinAnswer and FinAnswer Express. Consequently, significant cross-selling occurred as RSPs marketed this program to prior customers involved in other Rocky Mountain Power programs. Initial RSPs included: ETC, EMC Engineering, Compression Engineering Corp, and Cascade Engineering (Cascade eventually dropped out of the program to focus on other programs).

RMP staff reported the program has a high level of customer follow-through, with only one instance in which a project was delayed beyond the agreed-upon completion period. RMP staff cites various reasons for the high level of follow-through, including agreement on specific customer commitments to an Energy Management System; commitment of staff time, and commitment of \$10,000 to spend on performing recommissioning activities. These agreements are made to ensure that the customer is committed to the project.

RSPs reported that the recommissioning program's service component was far more important than the incentives. In many cases, the program's incentives were not applied (when the investment's payback period was a year or less), with the program's real value derived from dedicated consulting services provided by RSPs. The value of this "short-term extension of staff," as one RMP staff member characterized the program, can be attested by participants often "hiring" RSPs to conduct additional tasks associated with successful implementation of recommissioning work. It can be reasonably assumed that if the participants lacked resources to implement recommissioning, they also lacked resources to adequately scope recommissioning in the first place. Thus, the program addressed a critical resource constraint, the removal of which increased energy-efficient investments by these participants. A quote by one of the RSPs characterized most of their experiences: "There is some confusion about the process (three phases) and the administrative requirements, but feedback about the end results are 100% positive."

One frequent observation about the program was it was "cumbersome" from an administrative perspective, and another was reporting requirements for the three main phases were both confusing and burdensome.

In addition, more complex documentation required during the planning phase culled smaller projects due to their higher “overhead.” Several RSPs suggested the program needed to address more small projects to capture additional savings and to expand the program’s participant base.

### **Participant Perspective**

These participants were respondents who had completed RCx projects. Some participants may be actively involved in the RCx program, but because they have not completed their projects, they were not included in this survey.

Customers most commonly learned of the program through Rocky Mountain Power Account Representatives and past participation. Other avenues mentioned were contractors’ recommendations, Internet searches, and participation in other Rocky Mountain Power programs.

When asked why they chose to participate, responses covered a wide range. Some related to reducing electricity costs and funding; others addressed long-term goals regarding energy, maintenance, or the environment.

Some initial concerns were expressed about the RCx process and cost. All concerns were resolved through the program’s initial audit process. Participants reported engineers worked transparently and provided straightforward analysis, with reasonable and doable recommendations.

### **Nonparticipant Perspective**

Of previous non-participants either beginning to participate in the program or expressing an interest, nearly all stated the primary reason for involvement was to save money on electricity bills. Half of participants said they were motivated by the financial savings, while several others (6 of the 14, or 43%) said saving energy would provide impetus to become involved. Some non-participants said they would be influenced by RMPs’ or contractors’ recommendations. Finally, two of interviewees said they would be motivated to replace old equipment with newer technology.

Non-participants stated a variety of reasons for not becoming involved with the program, with the most common (5 of 14 non-participants, or 36%) being they simply did not know of the program. The next most common nonparticipant response was that their firms were not financially secure enough to invest in energy-efficiency measures. Others stated they already had considered the same recommended recommissioning efforts; so program participation did not seem sufficiently worthwhile. No non-participants attributed their non-involvement to Rocky Mountain Power or contractor staff.

## **Enrollment**

Most RSPs felt the enrollment process was not unduly burdensome, although most assisted their participants with enrollment paperwork, at least initially. They uniformly agreed the eligibility requirements were appropriate and not inappropriately difficult to achieve. This was confirmed by many enrollees following through on the projects, although they were, as one RSP stated,

“hard-pressed to do so on a timely basis.” The RSPs also noted: “Those that do not participate usually are lacking the local commitment.”

The only enrollment difficulties encountered involved time required for processing. One participant found the process took longer than desirable, but understood why this was so. Another found the legal documentation overly complicated and suggested, if the language was simplified, they would not have to use attorneys.

Interviewed participants’ companies were involved in recommissioning outside of 2007–2008. Most were also involved in other energy-efficiency programs, especially ones run by Rocky Mountain Power. Programs run by BPA and Questar also were mentioned. Overall, participants found the RCx’s application process about the same as other programs. One found the process easier because of the cost structure having fewer upfront costs.

## Operational Changes

Two participants added measures beyond those recommended. One made minor adjustments to account for building drift.

Changes made by two participants were partly because of restrictions on controls access for tenants. One provided controls allowing tenants to turn on the system for up to two hours at a time during off-hours. Another briefly eliminated night setbacks to accommodate temporary increases in occupancy hours. Night setbacks were replaced once occupancy hours returned to normal.

## Installation Results

Some RSPs reported the program’s implementation phase revealed a “gap” in the program. Most participants did not have project management skills or internal resources to manage implementation effectively. This was compounded by under-qualified controls contractors not understanding the comprehensive nature of recommissioning. In some cases, where the RSP had left implementation entirely up to the client, it was necessary to perform rework to achieve desired efficiencies. More often, RSPs maintained some role during implementation to assure the project did not derail due to lack of focus or resources, or inadequate contractor skills. Many participants ended up hiring RSPs to manage implementation.

All interviewed participants applied recommissioning measures to existing equipment. They were highly satisfied with the bundles of measures installed, rating an average 9 out of 10 for all measures. One participant was not satisfied with work on dampers, but, besides this one measure, was very satisfied.

Participants expected electricity energy savings, and some expected natural gas savings. In all cases, electricity savings met expectations. Participants were highly satisfied with overall installation costs, rating an average of 9 out of 10. Participants also mentioned expecting benefits in lower maintenance costs, increased tenant comfort, and acquired recommissioning experience.

Several earlier non-participants recently became involved in energy measure installation. In particular, 10 of 14 interviewees (71 %), since 2008, retrofitted their lighting (e.g., switching

from T12 lights to T8 or T5 lights). Interviewees also commonly modified HVAC systems, replacing large and small AC units, installing temperature controls and new thermostats, or cleaning AC coils. A few non-participants (3 out of 14, or 21%) considered replacing lighting, but had not yet made the necessary investment. One interviewee said they were waiting for RMP to review their latest lighting retrofit plans to determine next steps. The businesses indicated energy-efficiency measure installation costs ranged from \$30,000 to \$800,000, but expected to recoup those expenditures through energy savings over the next several years.

## Energy-Efficiency Decision Making

The RSPs reported participants were often “converted” to the effectiveness of recommissioning only after seeing savings estimates resulting from the RSPs’ planning studies. Though initially they may not have understood the program, participants routinely reported satisfaction with the outcome.

Four of five respondents believed energy efficiency was extremely important to company operation and management, rating it a 9 or 10. Three considered it vital to their organization’s success, and the fourth believed both direct and indirect social and monetary benefits were substantial. The only participant, who rated energy efficiency’s importance lower, at a 6, believed their company’s business model allowed little room for experimenting with different techniques. Change was seen as very risky; so interest in energy efficiency was limited to the company’s less vital portions.

Nearly all non-participants considered energy efficiency essential to their firms’ operation, with an average score of nearly 9 out of 10. Interviewees indicated business energy efficiency had become critical due to high use of energy, corporate management and board directives on energy efficiency, and a bottom-line incentive to reduce energy costs. On the other hand, two manufacturer participants said, while energy efficiency was important, it was not as essential as making and delivering products.

## Interaction with Rocky Mountain or Third-Party Staff

The RSPs reported contact with Rocky Mountain Power was limited for this program, and most contacts were with Nexant. Most RSPs mentioned they previously worked with Rocky Mountain Power on the Energy FinAnswer program.

On their recommissioning projects, participants worked with 4 to 20 people including Rocky Mountain Power account representatives, Nexant project managers, recommissioning service providers, and a variety of contractors. Overall, participants found these interactions positive.

## Satisfaction

Participants found the overall experience to be quite satisfactory, rating it 8.6 out of 10, and unanimously would be willing to participate again.

Two would have desired improvements in process timing or flow. One would have appreciated increased incentives. A final suggestion was to provide examples of past recommissioning

projects as case studies to illustrate how the process and final payback worked through concrete examples.

Almost all non-participants stated they had not heard about or responded to information from the program, or faced financial barriers. One nonparticipant said the initial RMP evaluation failed to recommend possible use of a co-generator on site, which, in hindsight, they thought might have been beneficial for energy management.

## Key Findings

Based on RSP, implementer, program staff, participant, and nonparticipant responses, no significant program defects were noted.

The program is cost-effective, and Rocky Mountain Power customers have expressed a high degree of satisfaction with the program. Although surveyed participants had initial concerns about the program, all these concerns have been successfully addressed through capable program staff, a knowledgeable implementer, and professional, responsive RSPs.

We found program methodology is on the right track, as evidenced by the high level of project completions. From program marketing, application processing, project screening, planning, investigating, bundling RCx options, implementation, and final project verification, a 98% realization rate shows this program is a success.

The free RCx services provided through RMP were uniformly seen as the strongest motivating factor for participation, outweighing the importance of financial incentives. From a customer's perspective, the RCx study reduces the risk associated with a RCx project, leading them to proceed with the project.

The program appeared to be an effective way to complement the Energy FinAnswer program. In most cases, both RSPs and customers had participated in prior Energy FinAnswer programs. It appeared, in several cases, the recommissioning program served as a complementary function, which could be implemented when Energy FinAnswer measures were exhausted, or when participant funds for additional investment in Energy FinAnswer or other programs were temporarily unavailable. Besides its primary energy savings potential, this program also provided value as a component of a "portfolio" of measures that could be used to guide participants along a continuous series of energy-efficiency investments.

Some RSPs see a market for smaller projects. From their perspective, simplifying the administrative requirements and project size constraints would allow them to address the apparent demand for smaller projects, and expand the program.

A key market weakness uncovered was under-qualified controls contractors. Given the dearth of qualified controls contractors, several RSPs suggested they prefer doing this work themselves as to better control costs and quality of work performed.

Participants had different reasons for recommissioning. Some participants required energy savings determined before the start of the project, while others had less immediate goals, looking to savings sometime in the project life. Others had an immediate need to adjust an existing

building rather than implement a long-term plan. While participants initially had concerns about the program, these were resolved through performance of the initial audit.

Overall, interviewed participants had positive program experiences. The majority installed all recommended measures, and, aside from small or temporary adjustments, initial measures remained in place. Participants expressed satisfaction with overall costs and program staff, and would participate again.

A certain amount of overlap in program roles is occurring as the program matures. Both RMP and Nexant agree that Nexant is the “face to the customer”, however there is some duplication of efforts in administering, marketing, tracking and managing the program.

Discussions with non-participants resulted in several key findings:

- Non-participants did not get involved with recommissioning efforts either because they had not heard of the program, or were not in a financial position to invest in energy efficiency.
- Many earlier non-participants since became involved with recommissioning efforts.
- Nearly all non-participants considered energy management critical to effective business operations, and several said they received corporate management directives to improve energy efficiency.

## Recommendations

Follow-up should continue with earlier non-participants. When the primary participation impediment has been financial, interviews revealed optimism regarding possible future participation as financial conditions improve.

For a company new to providing RCx, examples of past RCx projects, serving as case studies to illustrate how the process and final payback worked and using concrete examples, would provide a strong energy-saving argument for RCx.

Some RCx opportunities may be limited to a company’s less vital portions, when those building systems areas are considered too important to experiment with for possible energy savings. In those cases, a deeper analysis of the interface between production systems and building systems could be pursued.



## 5. Cost-Effectiveness Analysis

To assess cost-effectiveness, evaluators conducted an analysis of program costs and benefits from five perspectives, using Cadmus' DSM Portfolio Pro model. These perspectives include:

1. **PacifiCorp Total Resource Cost Test (PTRC):** This test examined program benefits and costs from Rocky Mountain Power's and Rocky Mountain Power customers' perspectives, combined. On the benefit side, it includes avoided energy costs, capacity costs, and line losses plus a 10% adder to reflect non-quantified benefits. On the cost side, it includes costs incurred by both the utility and participants.
2. **Total Resource Cost Test (TRC):** This test examined program benefits and costs from Rocky Mountain Power's and Rocky Mountain Power customers' perspectives, combined. On the benefit side, it included avoided energy costs, capacity costs, and line losses. On the cost side, it included costs incurred by both the utility and participants.
3. **Utility Cost Test (UCT):** From Rocky Mountain Power's perspective, benefits were through avoided energy and capacity costs and line losses. Costs included any program administration, implementation or incentive costs associated with funding the program.
4. **Ratepayer Impact (RIM):** All ratepayers (participants and non-participants) may experience increases in rates to recover lost revenues. This test included all Rocky Mountain Power program costs as well as lost revenues. As benefits, this test included all avoided energy costs, capacity costs, and line losses.
5. **Participant Cost Test (PCT):** From this perspective, program benefits included bill reductions. Costs included any customer contribution to the measure cost.

Table 17 summarizes various components of the five tests.

**Table 17. Benefits and Costs Included in Various Tests**

Test	Benefits	Costs
PTRC	Present Value of Avoided Energy and Capacity Costs with 10% Adder for Non-quantified Benefits	Program Administrative and Marketing Cost + Participant Cost
TRC	Present Value of Avoided Energy and Capacity Costs	Program Administrative and Marketing Cost + Participant Cost
UCT	Present Value of Avoided Energy and Capacity Costs	Program Administrative, Marketing and Incentive Cost
RIM	Present Value of Avoided Energy and Capacity Costs	Program Administrative and Marketing Cost + Present Value of Lost Revenues
PCT	Present Value of Bill Savings	Participant Share of Measure Cost

Table 18 provides selected inputs to the cost analysis. These include the evaluated energy savings for each year, discount rate, line loss, and program costs. Other than the energy savings, these values are provided by Rocky Mountain Power. The discount rate is from Rocky Mountain Power's 2008 Integrated Resource Plan. Rocky Mountain Power also provided the values for line loss and the program costs.

**Table 18: Selected Cost-Effectiveness Analysis Inputs**

Input Description	2005 - 2006 <sup>3</sup>	2007	2008
Net Program Savings (kWh/year)		1,518,300	5,962,543
Discount Rate		7.40%	7.40%
Line Loss <sup>4</sup>		6.33%	9.35%
Average Retail Rate (\$/kWh) <sup>5</sup>		\$0.0434	\$0.0654
Net Participant Costs		\$42,519	\$173,416
<b>Program Costs</b>			
Implementation Cost (project management)	\$ 295,461	\$ 185,931	\$ 1,032,590
Incentive Costs	\$ 0	\$ 0	\$ 13,090
Utility Administrative Costs	\$ 20,117	\$ 1,353	\$ 7,701
<b>Total Program Costs</b>	<b>\$315,579</b>	<b>\$ 187,284</b>	<b>\$ 1,053,381</b>

Program benefits comprise energy savings and their associated avoided costs. The energy savings used in the cost-effectiveness analysis are the evaluated kWh savings from this study. Benefits are accrued over the expected useful life of the installed measure. The Measure life for all RCx measures is seven years. This value is supported through a combined analysis of various industrial sources including the Database for Energy Efficient Resources (DEER) 2008, American Council for An Energy –Efficient Economy (ACEEE), and the California Measurement Advisory Council (Calmac).

Table 19 and Table 20 present the results of the cost-effectiveness analysis for the Program in 2007 and 2008 respectively. Because all 2007 participants were industrial customers, 2007 analyses are based on the Rocky Mountain Power 2008 IRP 65% Eastside Decrement. All 2008 participants were commercial customers, and therefore the 2008 analyses are based on the Rocky Mountain Power 2008 IRP 16% Eastside Decrement.<sup>6</sup>

**Table 19: Cost-Effectiveness Summary 2007 – IRP 65% LF Decrement**

Cost Effectiveness Test	Levelized \$ / kWh	Costs	Benefits	Net Benefits	Benefit / Cost Ratio
Total Resource + Conservation Adder (PTRC)	\$0.025	\$229,804	\$418,358	\$188,554	1.82
Total Resource No Adder (TRC)	\$0.025	\$229,804	\$380,325	\$150,522	1.66
Utility (UCT)	\$0.02	\$187,285	\$380,325	\$193,041	2.03
Ratepayer Impact (RIM)	\$0.064	\$593,052	\$380,325	-\$212,727	0.64
Participant (PCT)	\$0.005	\$42,519	\$405,768	\$363,249	9.54
Lifecycle Revenue Impact				\$0.00000154	
Discounted Participant Payback (years)				0.65	

<sup>3</sup> For years 2005 and 2006 there were program costs, but no completed projects; therefore, no cost-effective analysis was calculated for these first two program years.

<sup>4</sup> For 2007, all participants were industrial customers, while for 2008, all participants were commercial customers. The industrial line loss was used for the 2007 analysis, and commercial line loss was used for 2008.

<sup>5</sup> For 2007 the industrial retail rate was used. For 2008 the commercial retail rate was used.

<sup>6</sup> IRP decrements are detailed in Appendix G of PacifiCorp's 2008 Integrated Resource Plan Vol. II Appendices: [http://www.pacificorp.com/content/dam/pacificorp/doc/Environment/Environmental\\_Concerns/Integrated\\_Resource\\_Planning\\_6.pdf](http://www.pacificorp.com/content/dam/pacificorp/doc/Environment/Environmental_Concerns/Integrated_Resource_Planning_6.pdf)

**Table 20: Cost-Effectiveness Summary 2008 – IRP 16% LF Decrement**

Cost Effectiveness Test	Levelized \$ / kWh	Costs	Benefits	Net Benefits	Benefit / Cost Ratio
Total Resource + Conservation Adder (PTRC)	\$0.033	\$1,213,707	\$2,710,106	\$1,496,399	2.23
Total Resource No Adder (TRC)	\$0.033	\$1,213,707	\$2,463,733	\$1,250,026	2.03
Utility (UCT)	\$0.028	\$1,053,381	\$2,463,733	\$1,410,352	2.34
Ratepayer Impact (RIM)	\$0.094	\$3,491,855	\$2,463,733	-\$1,028,122	0.71
Participant (PCT)	\$0.005	\$173,416	\$2,451,564	\$2,278,148	14.14
Lifecycle Revenue Impact				\$0.00000725	
Discounted Participant Payback (years)				0.43	

## **Appendix A. Individual Site Reports**

Provided under separate cover.

1. 90000
2. 90001
3. 90002
4. 90003
5. 90004
6. 90005
7. 90006
8. 90007
9. 90008
10. 90009
11. 90010
12. 90011
13. 90012
14. 90013
15. 90014
16. 90015
17. 90016

## Appendix B. Survey Tools

### Recommissioning Participant Interview Guide

Company: \_\_\_\_\_ Telephone: \_\_\_\_\_  
Name: \_\_\_\_\_ Cell phone: \_\_\_\_\_  
Title: \_\_\_\_\_ Fax: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Interview date: \_\_\_\_\_ Time: \_\_\_\_\_  
SIC Code (4-digit) NAIC: \_\_\_\_\_

Hello, my name is \_\_\_\_\_ from The Cadmus Group, calling on behalf of Rocky Mountain Power.

Rocky Mountain Power is evaluating its Recommissioning program and would appreciate your input. “It is important for Rocky Mountain Power to include your opinions in this study so they can serve your needs better.”

[NOTE: If the customer has received a Recommissioning site visit, state: ‘This is a brief follow up survey to the site visit you recently received.’]

This survey is for research purposes only and this is not a marketing call. Your responses will remain confidential. This survey will take approximately 20 minutes. *As a Thank You for your assistance, at the end of the survey you we would like to offer you a \$50 gift card, which will be mailed to you.* Do you have a moment to answer questions about your experience with the program?

[If a customer asks if this is the Total Quality Service survey, or states that he has recently participated in the Total Quality Service survey, say ‘this is a separate survey about your participation and satisfaction with the Recommissioning program.’]

[If “No – Not a convenient time,” ask if Respondent would like to 1. Start now and do part of the survey, or 2. Arrange a more convenient time we can call them at home.]

[If customer wants to verify the validity of the survey, tell them that they are welcome to contact Chris Kanoff, PacifiCorp Program Manager, at (503) 813-5122.

[If “No” – Arrange callback]

- 
- In this survey, I will be asking about your participation in the Rocky Mountain Power Recommissioning Program during the 2007-2008 time period.
- 
- **Confirmation**

1. The Rocky Mountain Power records show that you participated in the Recommissioning program during [Month] of [Year], and the recommissioning measures implemented at [LOCATION OF INSTALLATION] included [MEASURES]

Is that correct?

1. Yes [*IF YES → GO TO QUESTION 4.*]

2. No, measure is/are incorrect

3. No, date is incorrect (*SKIP TO 3*)

98 DK (*TERMINATE*)

2. [*IF Q1= NO, MEASURES ARE INCORRECT, ASK*] What measures were implemented?  
\_\_\_\_\_ [*RECORD RESPONSE*]

3. [*IF Q1= NO, DATE IS INCORRECT, ASK*] About when were the measures implemented?

1. \_\_\_\_\_ MONTH \_\_\_\_\_ YEAR

98. DK (*DO NOT TERMINATE*)

99. REF (*TERMINATE*)

## Participation

4. How did you learn about the Recommissioning Program?

[*DO NOT READ RESPONSES; MARK ALL THAT APPLY*]

1. Contacted by my Rocky Mountain Power account representative
2. Contacted by other Rocky Mountain Power staff
3. Firm approached/contacted by equipment vendor

4. Firm approached/contacted by Recommissioning Service Provider or contractor
5. Contacted by Nexant (program administrator)
6. Program sponsored conference or workshop
7. Program sponsored technology demonstration
8. Trade Publication
9. Word of mouth; from another business colleague
10. Through a trade organization or professional organization/association
11. Through printed material or outreach materials sent by the Program
12. At a trade show
13. Through family, friend, or neighbor
14. Participation in other Rocky Mountain Power Rocky Mountain Power Programs
15. Past Program participants
16. Internet research/found Program on the Rocky Mountain Power website
17. Other [SPECIFY] \_\_\_\_\_
98. Don't know
99. Refused

5. Why did you decide to participate in the Program?

*[DO NOT READ RESPONSES; MARK ALL THAT APPLY]*

1. To save money on electric bills
2. To receive a no-cost building analysis to help optimize energy use
3. To receive incentives for recommissioning measures
4. To reduce maintenance costs
5. To extend equipment life
6. Because the Program was sponsored by Rocky Mountain Power
7. Previous experience with other Rocky Mountain Power Programs
8. To help protect the environment
9. To save energy
10. Recommended by Program contact
11. Recommended by contractors/a Retrocommissioning Service Provider
12. Recommended by another Rocky Mountain Power customer; word of mouth
13. Recommended by family, friend, or neighbor
14. Part of a broader maintenance plan
15. Other [SPECIFY] \_\_\_\_\_
98. Don't know
99. Refused

6. Did you hear about the Program before or after you decided to do recommissioning at this facility?
7. Thinking back to when you were first involved with the Program, were there any aspects of the Program that initially caused you concern?
1. Yes
  2. No [*SKIP TO 8*]
  - 98 Don't know [*SKIP TO 8*]
  - 99 Refused [*SKIP TO 8*]

7a. What caused your concern?  
\_\_\_\_\_ [*RECORD RESPONSE*]

- 7b. Was this issue resolved?
1. Yes [*Ask 7C*]
  2. No [*SKIP TO 8*]
  98. Don't know [*SKIP TO 8*]
  99. Refused [*SKIP TO 8*]

7c. How was it resolved?  
\_\_\_\_\_ [*RECORD RESPONSE*]

### **Enrollment**

8. Did you encounter any problems, delays or difficulties during the application, review or approval processes for the Program?
1. Yes
  2. No [*SKIP TO 12*]
  98. Don't know [*SKIP TO 12*]
  99. Refused [*SKIP TO 12*]
9. [*IF 8 = YES*] What problems, delays or difficulties did you encounter?

*[DO NOT READ RESPONSES; MARK ALL THAT APPLY]*

1. The process took too long
2. Too many delays between steps in the process
3. The process was too complex
4. The process required more information and data than we anticipated.
5. The program required more hands-on management than we expected.
6. The reporting requirements of the program were too cumbersome.
7. The applications materials were difficult to understand
8. The Program staff was not responsive; could not get questions answered
9. The Program staff was not knowledgeable
10. The information and support I received were less than I expected
11. Unable to get information on the status of the application
12. Multiple requests for more information from recommissioning Service Provider throughout the process
13. Disagreement over initial energy savings calculations
14. Disagreement over final energy savings calculations
15. Other *[SPECIFY]* \_\_\_\_\_
98. Don't know
99. Refused

10a. *[IF 10 = MORE THAN ONE ANSWER]:* What was the **most** difficult issue for you? \_\_\_\_\_ *[RECORD RESPONSE]*

10. If you could change anything about the application process, what would you change?  
\_\_\_\_\_ *[RECORD RESPONSE]*

11. Besides this project did your company participate in the Recommissioning program before 2006 or after 2008?

1. Yes
2. No
98. Don't know
99. Refused

11a. Have you participated in other energy efficiency programs?

1. Yes
2. No [skip to 13]
98. Don't know [skip to 13]
99. Refused [skip to 13]

11b. *[IF 11a = YES]* What other energy efficiency programs have you participated in?

\_\_\_\_\_ *[RECORD RESPONSE]*

11c. *[IF 11a = YES]* Who were the sponsors for these programs?

\_\_\_\_\_ *[RECORD RESPONSE]*

11d. *[IF 11a = YES]* How did this Program's application process compare to your prior experience? Was it easier, harder, or about the same?

1. Easier
2. Harder
3. About the same

11e. *[IF 11d = EASIER OR HARDER]* Why do you say that?

\_\_\_\_\_ *[RECORD RESPONSE]*

### **Recommended Efficiency Measures**

***[IF THE MEASURES/ACTIONS TAKEN WERE LESS THAN ALL OF THOSE RECOMMENDED IN THE INVESTIGATION REPORT, STATE]***

12. The Recommissioning Investigation Report recommended the following measures or actions:  
*[NAME MEASURES/ACTIONS]*

12b. Why did you choose not to put these in place?

\_\_\_\_\_ *[RECORD RESPONSE]*

1. Was not in current budget
2. Other spending priorities
3. Logistically difficult
4. Not timely [Ask 'How soon do you plan to do this?']
5. Other [RECORD] \_\_\_\_\_
98. Don't know
99. Refused

### **Installed Efficiency Measures**

13. Were the *[RECOMMISSIONING MEASURES]* installed/implemented through the Program for existing equipment/processes, for new equipment/processes?

1. For an existing equipment/process
2. For a new equipment/process
3. Both
98. Don't know
99. Refused

14. On a scale of 0 to 10, where 0 is not at all satisfied and 10 is very satisfied, how satisfied would you say you are with the performance of the *[RECOMMISSIONING MEASURES]*?

\_\_\_\_\_ *[RECORD RESPONSE]*

98. Don't know
99. Refused

14a. [If 14 <=5] Why do you say that?

\_\_\_\_\_ *[RECORD RESPONSE]*

98. Don't know
99. Refused

### Operational Changes

15. At the time that you participated in the program, did you have an overall plan to recommission this facility?

1. Yes
2. No
98. Don't know
99. Refused

15a. After the recommissioning project was completed did you make any additional changes in to the equipment or processes put in place as part of the recommissioning?

1. Yes
2. No *[SKIP TO18]*
98. Don't know
99. Refused

15b. **What** was changed?

\_\_\_\_\_ *[RECORD RESPONSE]*

15c. **Why** was it changed?

\_\_\_\_\_ [RECORD RESPONSE]

15d. **When** was it changed?

\_\_\_\_\_ [RECORD RESPONSE]

15e. Were these changes part of the overall plan to increase the energy efficiency of your operations?

1. Yes
2. No [SKIP TO 18]
98. Don't know
99. Refused

16. [ASK IF 15A MENTIONS HOURS OF OPERATION] Have you changed the number of operating hours or change the operation schedules of equipment that was part of the recommissioning project?

1. Yes
2. No [SKIP TO 18]
98. Don't know
99. Refused

16a. Please explain what changes were made

\_\_\_\_\_ [RECORD RESPONSE]

17. How did the recommissioning activity fit with planned maintenance? Was any recommissioning scheduled before the program?

1. Yes
2. No [SKIP TO 18]
98. Don't know
99. Refused

17a. What recommissioning was scheduled before the program?

\_\_\_\_\_ [RECORD RESPONSE]

18. [FR] Was the recommissioning *INCLUDED YOUR MOST RECENT CAPITAL OR OPERATING BUDGET BEFORE YOU PARTICIPATED IN THE PROGRAM?*

1. Capital budget
2. Operating budget

- 98. Don't know
- 99. Refused

19. When you the recommissioning was completed, did you expect savings on:

19a. Electricity ?

19b. Water?

19c. Natural Gas?

19d. *[ASK IF 19a = YES]* Do the electric energy savings meet your expectations?

- 1. Yes *[SKIP TO 22]*
- 2. No
- 98. Don't know
- 99. Refused

19e. *[ASK IF 19a = No]* When do you expect these energy savings?

- 1. Immediately
- 2. Within the next 6 Months
- 3. Within the next year
- 4. Within the next two years
- 5. Never *[IF NEVER, ASK 'Why do you not expect savings from the recommissioning in the future?']*
- 98. Don't know
- 99. Refused

20. Are there any other benefits that you anticipate?

**[PROBE IF NEEDED: HAVE YOU OBSERVED ANY CHANGES IN LEVEL OF PRODUCTION OR SALES? PRODUCT QUALITY?]**

\_\_\_\_\_ *[RECORD RESPONSE]*

21. How satisfied are you with the final cost to you of the recommissioning?

Please use a scale from 0 to 10, with 0 being extremely dissatisfied and 10 being extremely satisfied.

\_\_\_\_\_ [RECORD RESPONSE]

- 98. Don't know
- 99. Refused

21a. [IF Q21<=5] Why do you say that?

22. How satisfied are you with the performance of the recommissioning?

Please use a scale from 0 to 10, with 0 being extremely dissatisfied and 10 being extremely satisfied.

\_\_\_\_\_ [RECORD RESPONSE]

- 98. Don't know
- 99. Refused

22a. [If 22 <=5] Why do you say that?

\_\_\_\_\_ [RECORD RESPONSE]

### Free Ridership and Market Effects

[NOTE: ONLY ASK FOR SAME MEASURE AS PRIOR QUESTIONS]

23. On a scale from 1 to 10, how important were the following factors in deciding whether to do this recommissioning project:

Factor	Score
A. Information provided by program staff on measure savings	
B. Information on payback for the measure	
C. The project incentive	
D. Familiarity with these measures	
E. Had done recommissioning in the past	

24. [FR] Do you consider these recommissioning activities as standard industry practice?

25. [FR] Was this project required under corporate/organizational policy or guidelines?

26. [FR] Regarding these recommissioning actions, without the recommissioning program would you have done all, some or none of these actions?
1. All
  2. Some
  3. None
  98. Don't know
  99. Refused
27. [FR] Which of these actions would you have done?
28. [FR] Without the recommissioning, would you have taken these actions...
1. In the same year?
  2. In one to two years?
  3. In three to five years?
  4. More than five years out?
  98. Don't know
  99. Refused

### Energy Efficiency Decision Making

Next, I would like to ask you some questions about the decision making process in regards to energy efficiency purchases and upgrades.

29. Using a 0 to 10 rating scale, where 0 means not at all important and 10 means extremely important, please rate how important energy efficiency is to the operations and management of your company?
1. \_\_\_\_\_ *[RECORD RESPONSE]*
  98. Don't know
  99. Refused
- 29a. Why do you say that?
30. Do you have sufficient technical resources in house to address the management of energy and water costs?
1. Yes [SKIP TO 31]
  2. No
  98. Don't know
  99. Refused

30a. *[IFQ30=NO]* For this project, was Rocky Mountain Power or the Recommissioning Service Provider able to provide you with the needed technical assistance?

\_\_\_\_\_ *[RECORD RESPONSE]*

### Spillover

31. Besides the energy efficiency improvements made through this program, since this project have you made any other energy efficiency improvements or purchases on your own without any assistance from a utility or other organization?

1. Yes

2. No *[SKIP TO 32]*

98 .....Don't know *[SKIP TO 32]*

99 Refused *[SKIP TO 32]*

31a. What improvements did you make?

\_\_\_\_\_ *[RECORD RESPONSE, PROBE ON SPECIFIC PURCHASES OR INSTALLATIONS]*

31b. I'm going to read a statement about the equipment/processes that you implemented on your own. On a scale from 0 to 10, with 0 indicating that you strongly disagree, and 10 indicating that you strongly agree, please rate the following statement.

“My experience with the Recommissioning Program influenced my decision to make additional energy efficiency improvements on my own.”

\_\_\_\_\_ *[RECORD RATING]*

98. Don't know

99. Refused

### Interaction with Rocky Mountain Power or 3rd Party Staff

We are also interested in learning more about your interactions with the Program staff

32. How many people did you work with throughout your participation in the Program? This would include people from Nexant, Rocky Mountain Power, Recommissioning Service Providers, contractors, etc.

\_\_\_\_\_ Number of people

*[SKIP TO 35 IF =0]*

33. In what capacity did they work with you?

*[PROBE IF NEEDED. WAS IT PROJECT MANAGERS, ACCOUNT REPS, THIRD PARTY STAFF, CONTRACTORS; MULTIPLE RESPONSE]*

1. \_\_\_\_\_ Rocky Mountain Power Account Representatives
2. \_\_\_\_\_ Rocky Mountain Power Energy Efficiency Project Managers
3. \_\_\_\_\_ Nexant Energy Efficiency Project Managers
4. \_\_\_\_\_ Recommissioning Service Providers
5. \_\_\_\_\_ Installation Contractors
6. \_\_\_\_\_ Controls contractors
7. \_\_\_\_\_ Equipment vendors
8. \_\_\_\_\_ External Consultant
9. \_\_\_\_\_ Other [*SPECIFY*] \_\_\_\_\_

*[RECORD COMMENTS]*

34. Please describe your overall experience working with these people in relation to this project. \_\_\_\_\_ *[RECORD RESPONSE]*

### **Satisfaction**

35. Would you participate in the Program again?

1. Yes
2. No

- 35a. *[IF 35 IS NO]* Why not?

\_\_\_\_\_ *[RECORD RESPONSE]*

36. If you could change anything about the Program, what would you change?

\_\_\_\_\_ *[RECORD RESPONSE]*

98. Don't know

99. Refused

37. Using a scale from 0 to 10, with 0 being extremely dissatisfied and 10 being extremely satisfied, how satisfied are you with your overall experience with the Program?

\_\_\_\_\_ *[RECORD RESPONSE]*

98. Don't know

99. Refused

- 37a. *[IF Q37 <=5]* Why do you say that?

### **Organizational Data/Firmographics**

I have a few last questions about your business or organization

38. Approximately, what percent of your total annual operating costs does your electricity bill represent?

\_\_\_\_\_ [RECORD RESPONSE]

98. Don't know

99. Refused

39. Approximately, what percent of your total annual operating costs does your water bill represent?

\_\_\_\_\_ [RECORD RESPONSE]

98. Don't know

99. Refused

40. How many people does your firm employ?

\_\_\_\_\_ [RECORD RESPONSE]

98. Don't know

99. Refused

55. For my final question, I would like your mailing address so I can send you the \$50 gift card as a thank you for your participation today.

Name \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_

Zip \_\_\_\_\_

Phone \_\_\_\_\_

Thank you for your time. Your opinions are very valuable to this research for Rocky Mountain Power.

## Recommissioning Non - Participant Interview Guide

Company: \_\_\_\_\_ Telephone: \_\_\_\_\_  
Name: \_\_\_\_\_ Cell phone: \_\_\_\_\_  
Title: \_\_\_\_\_ Fax: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Interview date: \_\_\_\_\_ Time: \_\_\_\_\_  
SIC Code (4-digit) NAIC: \_\_\_\_\_

Hello, my name is \_\_\_\_\_ from \_\_\_\_\_, calling on behalf of Rocky Mountain Power. We are conducting a study on behalf of Rocky Mountain Power regarding energy efficiency programs. May I speak with *[designated respondent]* or with the person who is responsible for overseeing energy management for your organization?

*[IF DIRECTED TO A DIFFERENT RESPONDENT, REPEAT INTRODUCTION]*

My questions are for research purposes only. We are interested in your opinions to help improve our programs, and understand how to assist customers in saving money on their utility bills. Your individual answers will be used by Rocky Mountain Power to evaluate energy efficiency programs. *[IF RESPONDENT ASKS HOW LONG, SAY: "APPROXIMATELY 15 MINUTES."]*

[If a customer asks if this is the Total Quality Service survey, or states that he has recently participated in the Total Quality Service survey, say 'this is a separate survey about our energy efficiency programs.']

Screening:

S2. First, I need to validate my records.

S3. Which electric company provides electric power to your business?

- 1 Rocky Mountain Power ..... CONTINUE
- 2 OTHER..... TERMINATE AND TALLY
- 98 DON'T KNOW ..... RETURN TO Q.B AND RESCREEN

### Introduction

1. Which of the following best describes your company's primary activities?

- 1. Manufacturing
- 2. Retail
- 3. Dairy / Agricultural
- 4. Finance and Insurance
- 5. Food Processing
- 6. Refrigerated Warehouse
- 7. Professional, Scientific, and Technical Services
- 8. Educational Services
- 9. Health Care
- 10. Public Administration
- 11. Arts, Entertainment, and Recreation
- 12. Accommodation
- 13. Food Services
- 14. Real Estate
- 15. Other [*SPECIFY*] \_\_\_\_\_

### Participation

2. Have you heard of the Rocky Mountain Power Recommissioning Program?

- 1. Yes [*CONTINUE*]

- 2. No *[SKIP TO 17]*
- 98. Don't know
- 99. Refused

3. How did you learn about the Recommissioning Program?

*[DO NOT READ RESPONSES; MARK ALL THAT APPLY]*

- 1. Contacted by my Rocky Mountain Power account representative or other Rocky Mountain Power staff
- 2. Marketing by Recommissioning Service Provider, vendor or contactor
- 3. Contacted by program representative [IF YES ASK 'Do you remember what company they were from?']
- 4. Firm contacted the Program
- 5. Program sponsored conference or workshop
- 6. Program sponsored technology demonstration
- 7. Program sponsored integrated audit
- 8. Trade Publication
- 9. Word of mouth; from another business colleague
- 10. Through a trade organization or professional organization/association
- 11. Through printed material or outreach materials sent by the Program
- 12. At a trade show
- 13. Through family, friend, or neighbor
- 14. Participation in other Rocky Mountain Power Programs
- 15. Past Program participants
- 16. Internet research/found Program on Rocky Mountain Power website
- 17. Other [SPECIFY] \_\_\_\_\_
- 98. Don't know
- 99. Refused

4. Regarding the Recommissioning program, have you either begun participation in the program and dropped out, or had a project application rejected?

- 1. Dropped out
- 2. Application rejected
- 3. No *[SKIP TO 10]*
- 98. Don't know *[SKIP TO 10]*
- 99. Refused *[SKIP TO 10]*

5. What are the reasons why you [DROPPED OUT OF/HAD AN APPLICATION REJECTED BY] the Program?

*[DO NOT READ RESPONSES; MARK ALL THAT APPLY]*

\_\_\_\_\_ *[RECORD RESPONSE]*

- 98. Don't know
- 99. Refused

### **Program Drop-Outs and Rejected Applications**

*ASK THIS SECTION ONLY IF RESPONDENT IS: (1) PROGRAM DROP-OUT (2) REJECTED APPLICATION*

- 6. Thinking back to when you were first considered the Program, were there any aspects of the Program that initially caused you concern?
  - 1. Yes
  - 2. No *[SKIP TO 6C]*
  - 98. Don't know *[SKIP TO 6C]*
  - 99. Refused *[SKIP TO 6C]*

- 6a. What were the aspects that caused concern?

\_\_\_\_\_ *[RECORD RESPONSE]*

- 6b. How was it resolved?

\_\_\_\_\_ *[RECORD RESPONSE]*

*ASK ONLY IF RESPONDENT IS A PROGRAM DROP-OUT*

- 6c. Why did your business drop out of the Program?

\_\_\_\_\_ *[RECORD RESPONSE]*

*ASK ONLY IF RESPONDENT'S APPLICATION WAS REJECTED*

- 6d. Do you know why your application to participate in the program was denied?

\_\_\_\_\_ *[RECORD RESPONSE]*

*ASK FOR BOTH GROUPS*

- 6e. Was the underlying problem resolved to your satisfaction? If not, why not?

We are also interested in learning more about your interactions and experience with the Program staff.

7. How many people did you work with during your time with the Program? This would include people from Nexant, Rocky Mountain Power, Recommissioning Service Providers, contractors, etc.

\_\_\_\_\_ number of people

8. Who worked with you with you on this project?

*[PROBE IF NEEDED. WAS IT PROJECT MANAGERS, ACCOUNT REPS, THIRD PARTY STAFF, CONTRACTORS; MULTIPLE RESPONSE]*

10. \_\_\_\_\_ Rocky Mountain Power Account Representatives  
 11. \_\_\_\_\_ Rocky Mountain Power Energy Efficiency Project Managers  
 12. \_\_\_\_\_ Nexant Energy Efficiency Project Managers  
 13. \_\_\_\_\_ Recommissioning Service Providers,  
 14. \_\_\_\_\_ Installation Contractors  
 15. \_\_\_\_\_ External Consultant  
 16. \_\_\_\_\_ Other *[SPECIFY]* \_\_\_\_\_

9. If you could change anything about the Program, what would you change?

\_\_\_\_\_ *[RECORD RESPONSE]*

98. Don't know  
 99. Refused

10. Did your company participate in the Recommissioning program before 2006? After 2008?

### **Recommissioning Activity Outside of the Program**

11. In the past year at your facilities, have there been any recommissioning efforts? By that I mean has there been a systematic evaluation of your facility to identify and implement operational improvements?

4. Yes *[CONTINUE]*  
 5. No *[IF NO, SKIP TO ENERGY EFFICIENCY DECISION MAKING]*  
 98. Don't know  
 99. Refused

- 11a. What opportunities for improvement were identified? *[DO NOT READ. RECORD ALL OPPORTUNITIES IDENTIFIED]*

1. Facility controls

2. Facility HVAC and lighting systems
3. Facility compressed air, processing, and refrigeration system
4. Compressed air systems
5. Processing equipment
6. Refrigeration
7. Other [*SPECIFY*] \_\_\_\_\_
98. Don't know
99. Refused

12. What action(s) have you taken as a result?

\_\_\_\_\_ [*RECORD RESPONSE*]

98. Don't know
99. Refused

13. Did you receive a financial incentive or tax credit for taking this action?

1. Yes [Specify the incentive and/ or tax credit amount, and the agency/program offering the incentive/tax credit.]
2. No [*IF NO, SKIP TO ENERGY EFFICIENCY DECISION MAKING*]
98. Don't know
99. Refused

14. Why did you decide to do recommissioning?

[*DO NOT READ RESPONSES; MARK ALL THAT APPLY*]

1. To save money on electric bills
2. To obtain an incentive; Program incentive
3. It was scheduled for replacement/upgrade
4. To replace old equipment
5. To replace broken equipment
6. To acquire the latest technology
7. To reduce maintenance costs
8. Because [PACIFIC POWER/ROCKY MOUNTAIN POWER] account manager suggested it
9. Because Nexant engineer suggested it
10. Because we had funds available in this fiscal year
11. Because we lose funds if we don't replace it now.
12. Because the Program was sponsored by [PACIFIC POWER/ROCKY MOUNTAIN POWER]
13. Previous experience with other [PACIFIC POWER/ROCKY MOUNTAIN POWER] Programs
14. To help protect the environment
15. To save energy
16. Recommended by Program contact
17. Recommended by contractors/trade allies

18. Recommended by another word of mouth
19. Recommended by family, friend, or neighbor
20. Part of a broader remodeling or renovation
21. Other *[SPECIFY]* \_\_\_\_\_
98. Don't know
99. Refused

### Energy Efficiency Decision Making

Next, I will ask some questions about the decision making process in regards to energy efficiency purchases and upgrades.

15. Using a 0 to 10 rating scale, where 0 means not at all important and 10 means extremely important, please rate how important energy efficiency is to the operations and management of your company?

\_\_\_\_\_ *[RECORD RESPONSE]*

98. Don't know
99. Refused

16. Why do you say that?

\_\_\_\_\_ *[RECORD RESPONSE]*

17. Do you have sufficient technical resources in house to address the management of energy and water costs?

1. Yes *[SKIP NEXT QUESTION]*
2. No
98. Don't know
99. Refused

### Organizational Data/Firmographics

I have a few last questions about your business or organization

18. Approximately, what percent of your total annual operating costs do your electricity bills represent? \_\_\_\_\_ *[RECORD RESPONSE]*

98. Don't know
99. Refused

19. Approximately, what percent of your total annual operating costs do your natural gas bills represent?

\_\_\_\_\_ [RECORD RESPONSE]

98. Don't know

99. Refused

20. Approximately, what percent of your total annual operating costs do your water bills represent?

\_\_\_\_\_ [RECORD RESPONSE]

98. Don't know

99. Refused

21. How many people does your firm employ?

\_\_\_\_\_ [RECORD RESPONSE]

98. Don't know

99. Refused

Thank you for your time. Your opinions are very valuable to this research for Rocky Mountain Power.

## Appendix C. Comparative Programs

RCx programs exist through multiple utility programs Table 21 provides a summary of comparative programs.

**Table 21: Previous and Current RCx Programs**

Utility/Organization	Timeframe	Program Name	Program Sector Targets	Brief Project Description
PG&E	2002-2003	Oakland Energy Partners Building Tune-Up Program	Publically owned, commercial buildings in the Oakland area.	No-cost engineering evaluation, identification and recommendations of building operations improvements with a focus on those with low or no-costs and quick paybacks. Flexible incentives.
Pacific Gas and Electric and Southern California Edison	2004-2005	Building Tune-Up Program (BTU)	Medium to large existing construction in the public and private sectors.	Comprehensive engineering investigation, including key energy consuming systems, cost-effective and low-cost improvements to building operations as well as capital improvements.
University of California, California State University, and California IOUs	2004-Current	UC/CSU/IOU Energy Efficiency Partnership	Limited to all 33 UC/CSU campuses within the California IOU service territories.	Participating campus' received permanently installed energy monitoring equipment, campus staff received training on how to use the systems.
CenterPoint Energy	Current	Commercial Retrocommissioning	Medium to large (>300,000sqft) existing construction in the public and private sectors, excluding transmission class industrials.	Systematic evaluation of electrical systems and recommendations for low-cost measures. Recommendations for capital improvements that may be covered through other CenterPoint programs may also be made. A bonus of up to \$10,000 or 80% of the ECMs is available for projects completed on time and with minimum peak reduction of 150k. RCx agents are also eligible for a bonus, up to \$4,000.
Portland General Electric	1999-2003	Retrofit Commissioning Program	Large commercial and industrial customers	Funding provided for O&M projects with paybacks of 2 years or less.
Xcel Energy	2001-Current	Building Recommissioning	Buildings greater than 100,000sqft and more than 5 years old.	Participants received incentives of 50% of project cost, up to \$15,000.
Commonwealth Edison	1998-1999	MORES	Facilities with electric chillers and minimum load profiles of 1,000 kW.	Participants received RCx study and recommendations as well as matching incentives, paid to participants in amounts to \$8,000 for the study and \$10,000 for implementation.