**ASHRAE Level I Energy Assessment Report**

for

**Building Name**

**Address**

*Draft (template)*

**Preparation date:**

Date of report

**Prepared for:**

Company Name

Contact Name, Title

Address

**Prepared by:**

Energy Assessment Firm

Contact Name, Title

Address

*For Compliance with City of Boulder Building Performance Ordinance*

# Contents

[Contents ii](#_Toc455043010)

[1 Executive Summary 1](#_Toc455043011)

[2 Introduction 2](#_Toc455043012)

[3 Facility Description 3](#_Toc455043013)

[4 Historical Utility Data 4](#_Toc455043014)

[5 Energy Savings Opportunities 5](#_Toc455043015)

[6 Special Conditions (optional) 8](#_Toc455043016)

[Appendix A: Utility Data for Evaluation Period 9](#_Toc455043017)

[Appendix B: EEM Savings Calculations 10](#_Toc455043018)

[Appendix C: Cost Estimates 11](#_Toc455043019)

[Appendix D: Equipment Inventory Tables 12](#_Toc455043020)

# Executive Summary

This section should summarize the findings of the energy assessment including the rating and reporting results, the list of low and no-cost energy efficiency measures with estimated costs and benefits, and the potential energy and cost savings with key financial indicators. This section should also include the summaries of the City Manager Rule requirements of retrocommissioning and lighting evaluations.

A sample table of low and no-cost energy efficiency measures (EEMs) is provided below.

Table 1. Low and no-cost energy efficiency Measures and Cost Savings

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***EEM#*** | ***Measure Name*** | ***Energy Saved (energy unit/yr)*** | ***Energy Cost Savings ($/yr)*** | ***Maintenance Cost Savings ($/yr)*** | ***Measure Cost ($)*** | ***Rebates and Incentives ($)*** | ***Simple Payback (Years)*** |
| *1* | *B-1 OAT Lockout* | *504 therms* | *$585* | *$0* | *$480* | *$240* | *<2 yrs* |
|  |  |  |  |  |  |  |  |
| **Total** |  |  |  |  |  |  |  |

## Retrocommissioning Evaluation Results

This section should summarize the evaluation of the need and opportunities of implementing the retrocommissioning requirements in the Building Performance Ordinance. If retrocommissioning is not recommended, please justify. (Note: This is a high-level opinion of whether retrocommissioning would clearly benefit the building and is the high level executive summary of Section 5.6 below.)

## Lighting Evaluation Results

This section should include a statement of whether the building’s lighting systems and controls meet the lighting requirements in the Building Performance Ordinance. (Note: This will be the high level executive summary of Section 5.7 below).

# Introduction

This section introduces the scope of the project, what will happen and when, and provides contact information for the key team members.

## Assessment Scope

Provide a scope for the energy assessment process including all the major steps and clarification as to what is included in each step along with deliverables.

Please provide an estimate of what percentage of total energy use comes from process loads. If the facility includes industrial processes that account for over 25% of total energy use, then those must be included in the scope of the assessment and energy efficiency measures evaluated for these processes.

## Key Dates

Provide important dates for items such as preliminary walkthrough, staff interviews, testing, logging or trending intervals, preliminary measure selection meeting, final presentation or other important dates.

## Contact Information

Provide contacts for energy assessment contractor and client team members.

# Facility Description

This section describes the building as it exists at the time of the assessment. Provide general building information such as age, gross floor area in square feet, building orientation, space use, construction types and any major retrofits. For building envelope, domestic hot water, electrical, lighting, HVAC, plug loads, process loads, vertical transportation, and control systems include major equipment types, how they are managed, when they are used, and discuss how you differentiate between these different systems. Also, in the “other applicable information” section provide information on any special events or facility requirements which may affect energy use overall, such as historic landmark status. Include pictures of key areas and/or systems when applicable.

* General building information
	+ Year constructed
	+ Gross floor area
	+ Number of floors
	+ Annual heating/cooling days
	+ Building use(s)
	+ Hours occupied
* Building envelope
* Domestic hot water systems
* Electrical systems
* Lighting systems
* HVAC systems
* Plug loads
* Process loads
* Vertical transportation
* Control systems
* Specific problems and/or needs
* Other applicable information

# Historical Utility Data

This section is meant to provide the client with a breakdown of historical energy demand, use and cost data in order to highlight trends, identify opportunities, and show the relationship between weather, processes, occupancy, any other factors, and energy use. It can also serve to show the relative importance of different fuels. Include information on how energy is purchased, peak and off-peak pricing, load profiles of consumption and peak demand, graphs of peak usage, and a monthly summary if on a time-of-use schedule. Include cost saving utility rate analysis recommendations.

## Monthly energy data summary for 12 months minimum

ENERGY STAR Portfolio Manager requires at least twelve consecutive months of utility data for benchmarking. Two to three years is preferred to identify weather related bias in the energy data. Also provide purchasing and rate structure for each type of energy (including demand and time-of-use for electricity).

## Energy benchmarking

Include load profiles, heating and cooling degree days to heating and cooling energy comparisons, and energy use profile comparison by fuel and peak electricity demand.

## Energy target index and savings estimate

Provide energy use intensity (EUI) for the facility and estimated available savings based on EUI comparison with similar facilities in the same climate zone. Provide the ENERGY STAR score if applicable.

# Energy Savings Opportunities

This section provides the findings of the energy assessment in detail, presenting the energy efficiency measures (EEMs) organized in a manner that allows the owner to select the package best suited to their needs and budget.

## recommended low/no cost energy efficiency measures

This is the list of low and no cost measures evaluated. Low-cost/no-cost measures have a simple payback period of two years or less and don’t require large capital investments.

For each measure provide the following detailed information.

1. **Description of current situation**

Describe current situation the equipment, schedule or operation including all pertinent information leading to the recommendation.

*Sample low-cost/no-cost measure: The boiler B-1 runs 24 hours per day, 7 days per week, all year round with a heating hot water set point of 180 degrees F.*

1. **Recommended changes**

Describe the EEM and why it is being proposed, in other words how it will save energy.

*Sample low-cost/no-cost measure: Reduce boiler schedule to only run from October 1 to June 1 each year and add hot water reset schedule that lowers heating hot water supply set point (120°F to 180°F) to match outdoor air temperature. Savings will accrue from reduced runtime and reduced energy output with temperature following load.*

## Potential Rebates:

*Sample low-cost/no-cost measure: Recommend a full RCx study. 75% of study costs and up to 50% measure cost can be reimbursed by the Utility Company.*

## Savings Summary:

The following data will be provided as appropriate and available.

Table 2. EEM Savings Summary

|  |  |
| --- | --- |
| **Component** | **Value** |
| Electricity Consumption Savings (kWh/yr) |  |
| Electricity Demand Savings (kW/yr) |  |
| Gas Consumption Savings (therms/yr) |  |
| Annual Utility Savings ($/yr) | $ |
| Estimated Implementation Costs ($) | $ |
| Potential Incentives ($) | $ |
| Simple Payback without Incentives (yrs) |  |
| Simple Payback with Incentives (yrs) |  |
| Estimated Maintenance Savings ($)  | $ |

## Summary of applicable rebates, incentives and financing options

Provide a summary of the various ways to reduce and finance the capital costs of the measures.

## Retrocommissioning Evaluation Results (RCx)

This section should summarize the evaluation of the need and opportunities of implementing the retrocommissioning requirements in the Building Performance Ordinance. If retrocommissioning is not recommended, please justify. (Note: This is a high-level opinion of whether retrocommissioning would clearly benefit the building.)

## Lighting upgrade assessment

Per the Building Performance Ordinance, a lighting upgrade assessment must be included as part of the energy assessment. This section highlights the findings of whether the building’s lighting systems and controls meet each of the following lighting requirements in the ordinance:

1. Lighting power allowances for interior and exterior lighting fixtures;

2. Automatic time switch control devices, occupancy sensors, and exterior lighting controls; and

3. Internally illuminated exit signs.

*If yes:* Recommend the building owner hire a lighting contractor to calculate the lighting power allowances and submit compliance certificates and spreadsheets to the city.

*If no:* Recommend the building owner hire a lighting contractor to implement all needed lighting upgrades to meet requirements, calculate the lighting power allowances, run all reports, and submit compliance spreadsheets to the city. Include a statement of any situation or instance in the building where in your opinion the IECC 2012 or COBECC 2017 requirements are impractical for the space.

## Measures considered but not evaluated (optional)

This section is a listing of measures that were considered but not evaluated. Include assumptions and the reasons why these possible measures were not included.

# Special Conditions (optional)

Discuss any special conditions such as specific timing or pre-requisites for implementing measures, for example required repairs prior to implementing given measures.

# Appendix A: Utility Data for Evaluation Period

Provide monthly utility data for the evaluation period, and for each energy utility provider. Include all pertinent utility rate schedules for all energy utility providers.

The evaluation period is the one to three year period of utility data that will be utilized to benchmark and estimate such aspects as energy use breakdown or specific equipment energy use. Provide a period starting and ending month as well as number of days per month.

# Appendix B: EEM Savings Calculations

Provide copies of your savings calculations here. PDFs or graphics files are acceptable.

The savings calculations need to **clearly** show how current and proposed cases were calculated, the methodologies and assumptions used, and any caveats or estimated variance to the values provided. List all variables that went into the calculation.

*For example: Annual lighting electricity usage = watts per fixture X number of fixtures X annual hours of operation.*

# Appendix C: Cost Estimates

Provide details of your cost estimates here including sources and what services are included in the price such as equipment, installation, commissioning, etc. Also provide your estimated cost accuracy (i.e. +/- 25%).

# Appendix D: Equipment Inventory Tables

Include the inventory of existing equipment here. This information is typically broken up between major categories such as HVAC, lighting, plug load and process equipment. As a minimum this should include tag number, location, area served, age, capacities, efficiencies, electrical data, refrigerant type if applicable, fuel, and control type.