**Technical Analysis Study**

**<Insert Participant’s Site Name>**

**<Insert Site Address>**

Project Number: **<Insert Reference ID and PT ID from Form 104 Work Order>**

**<Insert facility photo below>**

![C:\Users\e297021\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\91VRRKBV\MC900240161[1].wmf]()

*Study sponsored by:*

**Energy Trust of Oregon - Existing Buildings Program**

*Submitted by:*

**<Insert ATAC Company name>**

*Submitted on:* **<Insert Report date>**

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**Disclaimer**

*This energy analysis is funded by Energy Trust of Oregon to help the participant (customer) identify energy savings potential at their facility. TRC is the Program Management Contractor for the Existing Buildings Program. TRC will work with the Allied Technical Assistance Contractor (ATAC) to review the accuracy of this study. If the energy efficiency upgrades (measures) recommended in this report may be eligible for Energy Trust incentives and if the participant wishes to implement the eligible measures, TRC will support and provide guidance to the participant on Energy Trust’s incentive application process and requirements throughout the life of the project.*

*The intent of this energy analysis is to estimate energy savings associated with the recommended energy efficiency upgrades. This report is not intended to serve as a detailed engineering design document. Any description of proposed improvements that may be diagrammatic in nature are for the purpose of documenting the basis of cost and savings estimates for potential energy efficiency measures only. Detailed design efforts may be required by the participant to implement measures recommended as part of this energy analysis. While the recommendations in this study have been reviewed for technical accuracy and are believed to be reasonably accurate, all findings listed are estimates only. Actual savings and incentives may vary based on final installed measures and costs, actual operating hours, energy rates and usage.*

*In no event will Energy Trust of Oregon, TRC or the ATAC be liable for (i) the inability of the participant to achieve the estimated energy savings or any other estimated benefits included herein, or (ii) for any damages to participant’s site, including but not limited to any incidental or consequential damages of any kind, in connection with this report or the installation of any identified energy efficiency measures.*

# Key Contact Information

Table 1-1: Key Contact Information

|  |
| --- |
| **Participant (Customer) Contact** |
| **Contact Name** |  |
| **Title** |  |
| **Phone** |  |
| **Email** |  |
| **Allied Technical Assistance Contractor (ATAC) Contact**  |
| **Contact Name** |  |
| **Title** |  |
| **Phone** |  |
| **Email** |  |
| **Energy Advisor Contact**  |
| **Contact Name** |  |
| **Phone** |  |
| **Email** |  |

*Please align text to the top left of the cells and numbers to the right of the cells.*

# Project and Measure Summary

This section includes a summary of the facility, its energy usage, list of recommended energy efficiency measures, and an estimate of energy savings if the recommended measures are implemented.

## Energy Use and Savings Summary

Table 2-1: Site Energy Use and Savings

|  |
| --- |
| **Facility Description** |
| **Site Name**  |   |
| **Facility Type (e.g., office, grocery etc.)** |   |
| **Year Built** |   |
| **Number of Floors** |   |
| **Total Building Area (sq.ft.)** |   |
| **Area Affected by Proposed Measure(s) (sq.ft.)** |   |
| **Energy Usage** |
| **Average Annual Electricity Usage (kWh)** |   |
| **Average Annual Gas Usage (therms)** |   |
| **Energy Use Intensity (EUI) (kBtu/sq.ft.)** |   |
| **Electric Utility Provider** |   |
| **Gas Utility Provider** |   |
| **Estimated Savings (%)** |
| **Baseline Type (Modified or Existing)** | [ ]  Modified [ ]  Existing |
| **Estimated Electricity Savings (%)** |  X% (Utility Bill or EEMs Baselines) |
| **Estimated Gas Savings (%)** |  X% (Utility Bill or EEMs Baselines) |

*Please align text to the top left of the cells and numbers to the right of the cells.*

## Energy Efficiency Measure (EEM) Summary – Custom Track

The following energy efficiency measure(s) (EEMs) are recommended for the participant’s site and are potentially eligible for custom incentives under the Existing Buildings program:

* EEM 1 - [Title]

[Provide brief measure description. ]

* EEM 2 - [Title]

[Provide brief measure description*.*]

The table below includes a list of recommended EEMs that may be eligible for Custom Incentives:

Table 2-2: EEM Summary – Custom Track

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Custom Measures** | **Measure Descriptions** | **Energy Savings** | **Cost Savings** | **Estimated Program Eligibility Cost3** **($)**  | **Estimated Project Cost - Without Incentive4 ($)** | **Simple Payback5 - Without Incentive (years)** |
| **Estimated Annual Electric Savings (kWh)** | **Estimated Annual Gas Savings (therms)** | **Estimated Annual Energy Cost Savings1 ($)** | **Estimated Annual Non-Energy Benefits2 ($)** |
| **EEM 1** |  | 0 | 0 | $0 | $0 | $0 | $0 | #DIV/0! |
| **EEM 2** |  | 0 | 0 | $0 | $0 | $0 | $0 | #DIV/0! |
| **EEM 3** |  | 0 | 0 | $0 | $0 | $0 | $0 | #DIV/0! |
| **Total** | **0** | **0** | **0** | **0** | **0** | **0** | **#DIV/0!** |

1. *Cost savings are based on Energy Trust average utility rates for electricity and gas. Actual rates and cost savings may differ.*
2. *Non-energy cost benefits are related to cost savings due to as avoided maintenance, reduced water costs etc.*
3. *Program Eligibility Cost is used to estimate cost-effectiveness under the Program. This could be the incremental cost for end-of-life replacement or full costs for early replacement measures. Program eligibility cost typically include equipment and labor costs. Costs such as permitting, shipping, crane use, painting, warranties, concrete pads, engineering, and design are ineligible to include in the program costs.*
4. *Project Cost includes all costs the participant would incur towards the EEM such as equipment, labor, permitting, shipping, and all other applicable costs.*
5. *Simple payback is estimated using current utility rates and project costs, which could vary over time.*
6. *Please align text to the top left of the cells and numbers to the right of the cells.*

## Energy Efficiency Measure (EEM) Summary – Standard (Prescriptive) Track

Please collapse this section if no prescriptive EEM is included.

The following energy efficiency measure(s) (EEMs) are recommended for the participant’s site and are potentially eligible for standard (prescriptive) incentives under the Existing Buildings program:

* EEM # - [Title]

[Provide brief measure description. ]

* EEM # - [Title]

[Provide brief measure description. ]

The table below includes a list of recommended EEMs that could be eligible for Standard (Prescriptive) incentives:

Table 2-3: EEM Summary – Prescriptive Track

|  |  |  |  |
| --- | --- | --- | --- |
| **Prescriptive Measures** | **Measure Quantity** | **Incentive per unit ($)** | **Total Incentives ($)** |
| **EEM #** |   |   |   |
| **EEM #** |   |   |   |
| **EEM #** |   |   |   |
| **Total** | **-** | **-** | **0** |

*Please align text to the top left of the cells and numbers to the right of the cells.*

The eligibility criteria for the prescriptive measures can be found here:

* Existing Buildings – Standard Measures Incentive Brochures & Forms: <https://www.energytrust.org/commercial/existing-buildings-forms/>
* Existing Multifamily - Standard Measures Incentive Brochures & Forms: <https://www.energytrust.org/commercial/multifamily-forms/>

# Historical Energy Usage

Table 3-1: Historical Building Energy Use

|  |  |  |
| --- | --- | --- |
| **Month** | **Electric Use (kWh)** | **Natural Gas Use (therms)** |
| **20xx** | **20xx** | **20xx** | **3-year Average** | **20xx** | **20xx** | **20xx** | **3-year Average** |
| **January** |   |   |   | #DIV/0! |   |   |   | #DIV/0! |
| **February** |   |   |   | #DIV/0! |   |   |   | #DIV/0! |
| **March** |   |   |   | #DIV/0! |   |   |   | #DIV/0! |
| **April** |   |   |   | #DIV/0! |   |   |   | #DIV/0! |
| **May** |   |   |   | #DIV/0! |   |   |   | #DIV/0! |
| **June** |   |   |   | #DIV/0! |   |   |   | #DIV/0! |
| **July** |   |   |   | #DIV/0! |   |   |   | #DIV/0! |
| **August** |   |   |   | #DIV/0! |   |   |   | #DIV/0! |
| **September** |   |   |   | #DIV/0! |   |   |   | #DIV/0! |
| **October** |   |   |   | #DIV/0! |   |   |   | #DIV/0! |
| **November** |   |   |   | #DIV/0! |   |   |   | #DIV/0! |
| **December** |   |   |   | #DIV/0! |   |   |   | #DIV/0! |
| **Annual Energy Usage** |
| **Annual energy usage** |  -  |  -  |  -  | #DIV/0! |  -  |  -  |  -  | #DIV/0! |
| **Rolling energy Usage** |  Month 24-36  |  Month 12-24  |  Month 0-12  |   |  Month 24-36  |  Month 12-24  |  Month 0-12  |   |
|   |   |   |   |   |   |   |   |
| **Annual energy usage (kBtu)** |  -  |  -  |  -  | #DIV/0! |  -  |  -  |  -  | #DIV/0! |
| **Energy Performance of the facility** |
| **Conditioned space area (sqft)** |   |
| **Total Energy Use (kBtu per year, based on 3-year Average)** | #DIV/0! |
| **Energy Use Intensity, EUI (kBtu/sqft/year)** | #DIV/0! |
| **Median EUI for facility type in the US 1** |   |

1. *Median EUI source: https://www.energystar.gov/buildings/benchmark/understand-metrics/what-eui*
2. *Please align text to the top left of the cells and numbers to the right of the cells.*

# Facility & Equipment Description

Please provide a high-level overview of the facility functionality and equipment in this section. Details for the equipment relevant to the savings analysis should be provided in the appropriate EEM section. Bullet points descriptions as shown below are recommended.

**Facility Operations**

* Facility description (various areas in the facility, usage etc.)
* Operating hours
* Total hours facility is occupied per year
* Total hours facility is unoccupied per year

**Building Envelope**

* Describe the building shell, wall assembly, windows, roof conditions as relevant

**HVAC System**

* **Cooling System:** Chillers, cooling tower, air handling units (AHUs), fan coil units (FCUs), rooftop units (RTUs), pumps, fans, heat exchangers
* **Heating System:** Boilers, pumps, heat exchangers, burners, steam systems
* **HVAC System type:** Single zone system, multi-zone system, terminal reheat system, dual duct system, variable air volume, induction system

**Domestic Hot Water System**

* Boiler(s), water heaters, heat exchangers, burners

**Controls (For Relevant Equipment)**

* BMS, non-programmable thermostats, programmable thermostats.

**Internal Loads**

* Occupancy
* Lighting
* Equipment (any major equipment or equipment with 24-hour load, such as server closets)

**Previous Energy Efficiency Upgrades**

* Include details of any relevant energy efficiency upgrades that occurred at the facility

# Detailed EEM Description – Custom Track

## EEM 1 – [Title]

### **Existing Baseline Description**

[Describe the existing system for this measure. The description should be clear and concise yet provide enough detail such that the system configuration and functionality can be easily understood. A bulleted list of information is recommended.

Please include equipment spec sheets in the appendix.]

### **Modified Baseline Description**

[Please collapse this section if modified baseline is not used.

In the case of fuel switching or equipment that is broken or past EUL, a modified code-baseline is required. Either collapse this section or state the reason for the modified baseline and provide the specification discrepancies from the existing baseline. Please list the detail section number of the code used such that the code requirement can be tracked easily. A bulleted list of information is recommended.

Please include equipment spec sheets in the appendix.]

### **Proposed Measure Description**

[Describe the savings opportunity and the proposed energy efficiency measure. The description should be clear and concise yet provide enough detail such that the relationship between the proposed condition and actualized savings can be easily understood.

Please include equipment spec sheets in the appendix.]

### **Savings Methodology**

[Please provide a description of the methodology you used to estimate the energy savings (spreadsheet calculations or simulation model). Also provide a description of the baseline conditions (existing, code or market baseline) used to calculate savings. Refer to the Technical Guidelines section of the ATAC Guide for guidelines on baseline conditions and model calibration. Information included in Section 6 may be excluded to avoid redundancy.]

Table 5-4: EEM Assumption

|  |  |  |
| --- | --- | --- |
| **#** | **Assumption** | **Reasoning** |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |

*Please align text to the top left of the cells and numbers to the right of the cells.*

Table 5-5: Baseline vs Proposed Conditions for the EEM

|  |  |  |  |
| --- | --- | --- | --- |
| **Performance or Operating Parameters of the Equipment** | **Input Location** | **Baseline Condition** | **Proposed Condition** |
|   |  |  |   |
|   |  |  |   |
|  |  |  |  |

*Please align text to the top left of the cells and numbers to the right of the cells.*

### **Estimated Cost**

[Provide documentation of the eligible measure cost. Cost documentation may be quotes from vendors, estimates from RSMeans, or other online sources. If cost is in reference to a previous project of similar scope, please include the project details and final cost in the appendix.

If there are issues with providing costs for this project, please include a note.

Note that for projects with a modified baseline, incremental costs should be expressed. (incremental cost = measure cost – baseline cost).]

### **Non-Energy Benefits Estimates**

[Please include a description of any non-energy savings related to this measure. Savings must be calculable items such as O&M savings, water savings, or non-incentivized energy savings. This may not include items such as employee comfort.

Note that O&M of existing equipment may not be claimed for measures with modified baselines.]

### **Measure Life**

[For EEMs with single Measure Life refer to Appendix A SB 1149 Measure Life Table.

For multi-component Measure Life, refer to the calculation method below.

First, list the components, their utility cost savings and Measure Life, as shown in Columns A, B and C. Second, multiply the Measure Life by the cost for each component, as shown in Column D. Finally, divide the Total of Column D by the Total of Column B to get the weighted Measure Life.]

 Table 5-6. ETO Multi-Component Measure Life Calculator

|  |  |  |  |
| --- | --- | --- | --- |
| **Energy Efficiency Measure Component** | **Component Utility Cost Savings1** | **Measure Life2** | **Utility Cost Savings \* Life** |
| **A** | **B** | **C** | **D** |
| Component 1 (Describe) |   |   |   |
| Component 2 |   |   |   |
| **Total** |  |   |   |
| **ETO Weighted Measure Life:**  |  |  |

1. *From the APPENDIX A SB 1149 Measure Life table*
2. *Utility cost savings should be based on electricity and natural gas only.*
3. *Please align text to the top left of the cells and numbers to the right of the cells.*

### **Measure Summary Table**

Table 5-7. Measure Summary

|  |
| --- |
| **EEM 1 - Estimated Savings, Cost & Incentive summary** |
| **Annual Energy Usage & Savings estimate** | Baseline Electric Usage (kWh) |   |
| Proposed Electric Usage (kWh) |   |
| Electric Savings (kWh) |  |
| Electric Cost Savings ($) |  |
| Baseline Natural Gas Usage (therms) |  |
| Proposed Natural Gas Usage (therms) |  |
| Natural Gas Savings (therms) |  |
| Natural Gas Cost Savings ($) |  |
| Annual Energy Cost Savings ($) |  |
| Annual Non-Energy Savings ($) |  |
| **Measure Cost & Incentives**  | Program Eligibility Cost1 |  |
| Project Cost without incentive2 |  |
| Estimated Energy Trust Incentives ($) |  |
| Project Cost with Incentive |  |

1. *Program Eligibility Cost is used to estimate cost-effectiveness under the Program. For example, this could be the incremental cost for end-of-life replacement or full costs for early replacement measures. Program eligibility cost typically include equipment and labor costs. Costs such as permitting, shipping, crane use, painting, warranties, concrete pads, engineering, and design are ineligible to include in the program costs.*
2. *Project Cost Without Incentive includes all costs the participant would incur towards the proposed measure such as equipment, labor, permitting, shipping, and all applicable costs.*
3. *Please align numbers to the right of the cells.*

*Please use the above (or equivalent) format to provide details for all the EEMs you are recommending in this report in the sections below. Feel free to create more sections as needed.*

## EEM 2 – [Title]

## EEM 3 – [Title]

# Calculation Methodology Description

## Calculation Software

[Describe the software used to calculate EEM savings – custom spreadsheet, energy model, etc. If savings are weather dependent, name the weather file used. ]

## Energy Model Calibration

[If EEMs are not applicable for Energy Calibration. Please add a description. If EEMs were calculated using a whole building energy model, include the energy model calibration table. Modeled monthly energy usage should be within 20% and the annual energy usage should be within 10% of the site’s historical utility data usage. Clarification is required to explain the discrepancy if modeled energy usage is outside the 20% /10% range of historical utility data usage.]

|  |  |  |
| --- | --- | --- |
| **Month** | **Electric Use (kWh)** | **Natural Gas Use (therms)** |
| **Baseline/ Billed**  | **Model** | **% Deviation** | **Baseline/ Billed**  | **Model** | **% Deviation** |
| **January** |   |   |  |   |   |  |
| **February** |   |   |  |   |   |  |
| **March** |   |   |  |   |   |  |
| **April** |   |   |  |   |   |  |
| **May** |   |   |  |   |   |  |
| **June** |   |   |  |   |   |  |
| **July** |   |   |  |   |   |  |
| **August** |   |   |  |   |   |  |
| **September** |   |   |  |   |   |  |
| **October** |   |   |  |   |   |  |
| **November** |   |   |  |   |   |  |
| **December** |   |   |  |   |   |  |
| **Total** | **0** | **0** | **%** | **0** | **0** | **%** |

*Please align numbers to the right of the cells.*

# Lighting and Solar Opportunities

[Please include brief details of lighting and solar opportunities you may have identified during the study. For lighting include brief details of existing lighting systems. For solar include brief details about the solar potential such as available area, orientation, shading details etc. TRC’s Energy Advisor will work with the participant and the ATAC to discuss these opportunities and/or connect the participant with Energy Trust’s lighting and solar program representatives. ]

# Next Steps for the Participant

## Apply for Energy Trust Incentives for Recommended EEMs

#### Obtain bids for EEM(s) you wish to implement and Sign the Incentive Application

* The participant will evaluate the recommended EEMs contained in the TAS and estimated incentives in the accompanying 110C and select the EEMs they wish to implement.
* The participant must obtain bids from contractors for the EEM(s) they wish to implement and send a copy of the final bid to the Energy Advisor.
* The PMC will review the contractor’s proposed scope and costs to determine compliance with Existing Building program requirements, alignment with the EEMs as described in this TAS and to ensure that the EEMs still meet the cost-effectiveness criteria.
* If the bids are found satisfactory and subject to Existing Buildings program requirements in effect at that time and incentive budget availability, PMC may issue Form 120C (or 320C) - Incentive Offer form for participant review and signature. This offer to reserve incentives will detail the approved measures and estimated incentives that the participant is applying to receive, as well as Energy Trust’s terms and conditions for Existing Buildings program incentives, including any per-site, per-year limits.
* To apply for a reservation of Energy Trust custom incentives, the customer must return the signed Incentive Offer to the PMC by the submittal deadline listed in the Incentive Offer application and **BEFORE** issuing purchase orders or beginning the project work. If the participant moves forward with purchase orders or installation before signing and returning the Incentive Offer application, the measures will no longer be eligible for Energy Trust incentives.

**Notify TRC upon Installation of EEM(s) and Submit Completion Documentation**

* The participant must notify the PMC once the installation of EEMs is completed along with final invoices before the project’s incentive reservation expiration date which will be included in the Incentive Offer.
* A post-installation verification of the installed EEMs could be required.
* All required documentation must be provided to the PMC and post installation verifications (if required) must be completed before incentive payments can be issued.

## Apply for Energy Trust Solar Incentives

Please review details of any solar opportunities, if included in this report. If you wish to find out more, please fill out Energy Trust’s solar interest form included here - <https://energytrust.org/solar-request-analysis-bid/>. Energy Trust will match you with qualified solar Trade Ally contractors in your area. The solar Trade Allies will help you assess your rooftop or property potential for solar power, provide a bid with estimates incentives, tax credits, annual solar power generation and utility cost savings information, and answer any questions you may have.

# Appendix A – EUL Reference

SB 1149 Appendix A is the default reference used for technology EULs. If a technology is more accurately captured by a different EUL source, the alternative source may be cited.


*\*SB1149 Measure Life Table References available on page 27 of* [2022 Program Guidelines (oregon.gov)](https://www.oregon.gov/energy/energy-oregon/Documents/2022-09-SB-1149-Schools-Program-Guidelines.pdf)