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1.0 Introduction & Program Description

The Building Tune-up (BT) program is designed to promote energy efficiency, reduce electrical consumption and improve occupant comfort in existing buildings. The program offers technical and financial assistance to identify and implement low-cost measures, tune-ups and adjustments that improve the efficiency of buildings systems, with a focus on building controls and HVAC systems.

Building Tune-up is a systematic process that optimizes energy use and overall energy efficiency in an existing building over a sustained period. The goal is to bring the building systems back to original design specification and operate them in a manner that fits the current building operating schedules and needs.

Pre-approval is required to participate in the BT program. The program is open to all Pepco commercial and industrial customers in Maryland. Pepco has approved a number of BT Service Providers (Service Providers) to assist Pepco customers in fulfilling the requirements for the Building Tune-up incentives. BT Service Providers can act as the customer's authorized provider and therefore can submit applications on the customer's behalf.

The customer is the responsible party to the Pepco Commercial & Industrial (C&I) Energy Savings Program and is required to sign the application. Customers wishing to use a Service Provider who is not currently recognized by the program must ensure that the Service Provider successfully completes the Pepco BT Service Provider Application and is approved by the Pepco C&I Energy Savings Program before starting any work. Monitoring-Based Commissioning (MBCx) Service Providers are not required to be BT Service Providers.

The program offers three paths under which a customer can apply:

- Full Building Tune-up
- Small Building Tune-up
- Monitoring-Based Commissioning

The various BT initiatives and their respective incentive structures are designed to appeal to different size customers based on their unique situations. The measures can be similar under each path based on the building's needs. The three paths mentioned above will be looked at in more detail in the appropriate section.

2.0 Customer Eligibility/Target Market

The basic criteria for participation in the Building Tune-up Program are:

- High electric use intensity (per the EPA Portfolio Manager)
- Building is over 2 years old (this requirement recognizes that buildings less than 2 years old may not have the requisite full year of utility data that reflect a "fully occupied" building and consistent operating pattern)
- Mechanical equipment in relatively good condition (i.e., not near end of life)
- Demonstrated management commitment to implementing low-/no-cost measures

3.0 Eligible Measures

BT and MBCx typically involve reviewing and enhancing the performance of existing energy-related equipment. Some examples of measures are:

Control System

- Modifying a control system's programming and perhaps adding one or more sensors and/or circuit-control devices

Ventilation

- Clean/Replace Filters
- Reduce Ventilation and Exhaust Fan Operating Hours
- Tighten/Replace Belt Drives on Fans
- Interlock Exhaust Fans with Machine Operations
- Repair/Replace/Add Insulations on Ducts
- Eliminate Duct Leakage

Space Cooling

- Lower Condenser Water Supply Temperatures
- Adjust Chilled Water Supply Temperatures
- Eliminate Simultaneous Heating & Cooling
- Increase Thermostat Set-Point during Unoccupied Periods
- Repair or Addition of Chilled-Water Pipe Insulation
- HVAC Tune-Ups
- Upgrade to Enthalpy Economizer Control
- Repair Air-Side Economizer
- Service DX Units (Ensure DX Unit is fully charged with Refrigerant)
- Outdoor Air Damper Adjustment or Modification

Space Heating (to the extent that electricity use is affected)

- Reduce Thermostat Set Points for Unoccupied Periods
- Adjust Discharge Air Temperature/Minimize Reheat
- Repair/Modify Controls on Electric Space Heater
- Repair/Replace/Add Insulation on Steam or Hot-Water Piping
- Repair/Replace Steam Valves and Steam Traps
- Reduce Stem Leaks

Water Heating (to the extent that electricity use is affected)

- Reduce Thermostat Set-Point
- Repair/Replace/Add Insulation on Storage Tank and Hot-Water Piping
- Configure Supply Piping to Maximize Free Pre-Heating

Compressed Air

- Reduce Compressed Air System Leaks
- Install No-Loss Condensate Drains on Compressed Air System
- Install Solenoid Valves on Compressed Air Drops and Interlock with Machines
- Provide Compressed Air Storage and Lower System Pressure/ Replace Regulator Valves in Compressed Air System

Multiple End-Uses

- Modify Time Clock or EMS Scheduling, Assign New Points as Necessary Calibrate/ Replace Sensors

4.0 Full & Small Building Tune-up Track: Process & Incentives

The Full and Small BT track application process is similar. The key differences are the eligible building size and incentive.

The Full BT track is intended for buildings $\geq 75,000$ sq ft with pre-existing BAS/EMS.

One incentive is paid after the project is completed. 85% of project cost or \$0.25/kWh saved annually, whichever is less. The maximum incentive cap of \$200,000 for a single building and \$300,000 for a campus with multiple buildings.

The Small BT track covers building $< 75,000$ sq ft.

One incentive is paid after the project is completed. 85% of project cost or \$0.25/kWh saved annually, whichever is less. The maximum incentive cap is \$30,000.

Project pre-approval is a requirement for both tracks.

BT Process

The customer must submit the BT application and a report outlining proposed measures, energy savings calculations, and project costs. Pepco reviews the application and approves or denies customer participation at the Pepco Energy Savings for Business Program's sole discretion. Pre-inspection may be required before pre-approval is issued. The pre-approval period for the Full and Small BT tracks is six months.

After pre-approval is issued, the customer proceeds to implement measures. Upon implementation, the customer shall submit the final report along with the final savings analysis and any other supporting data requested.

Post-inspection may be required as part of the final review process. The one-time incentive is paid following the final review.

The following is required for pre-approval:

- Detailed investigation report as outlined on the following page
- Detailed savings analysis, either excel or energy model
- Pre trend data where applicable
- Signed Terms and Conditions

The following is required for project closeout:

- Final investigation report outlining the measures installed, final savings, and cost
- Detailed savings analysis, either excel or energy model
- Post install trend data where applicable
- Signed pre-approval letter
- Final Invoice

BT Investigation Report

Elements that must be included in the Building Tune-up Investigation Report are:

- ASHRAE Level II Energy Audit report template, including:
 - Title Page and Table of Contents
 - Executive Summary of the findings
 - Introduction section, including names and contact information for the Building Owner, Building Manager, and BT Service Provider
 - Detailed building and energy systems description, including more accurate estimates of the equipment usage profiles
 - Detailed operations and maintenance review
 - Documentation of O&M refresher training for facility O&M staff
 - Detailed operational scheduling of the major systems
 - Documented evidence of any energy use reductions resulting from immediate changes implemented
- A list of EEMs identified for implementation:
 - Description
 - Projected Costs
 - Projected Savings
 - Simple Payback with and without incentive
 - Total of Low-Cost/No-Cost Items
 - Total of Major Capital Items
 - Assessment of the Existing Equipment Over-Sizing and Recommendations for Right-Sizing when HVAC equipment needs replacement, including, but not limited to recommended capital items
 - Scope of work and budget for the entire project

5.0 MONITORING-BASED COMMISSIONING TRACK

Monitoring Based Commissioning (MBCx) is an ongoing process to resolve operating problems, improve comfort, and optimize energy use in existing buildings.

The program offers an incentive to monitor building systems to see how they perform and implement corrective actions. The incentive is paid in two phases. In Phase I, to help set up monitoring equipment and process the data, and at the end of Phase III, when the corrective actions have been implemented. Pre-approval is required to participate in the MBCx track.

The MBCx Track consists of three (3) phases:

- Phase I – Monitoring Equipment Installation
 - Phase I includes the installation of automated remote monitoring and diagnostic equipment. Software upgrades may be necessary to implement MBCx measures and are acceptable in this phase. Phase I incentives are 25% of the 18-month monitoring contract cost capped at a maximum of \$8,000 and \$0.04 per conditioned square foot for the ASHRAE Level II Energy Audit (if provided).
- Phase II – Monitoring Phase
 - Phase II consists of continuous monitoring, including the recommendation of additional operations and maintenance measures. An Equipment Monitoring Report is submitted to fulfill this phase. No additional incentives are available during Phase II.
- Phase III – Measure Implementation Phase
 - Phase III consists of the implementation of operation and maintenance measures recommended in the Phase II Equipment Monitoring Reports. The Implementation Summary and MBCx measure implementation report must be submitted upon project completion. The customer monitors the existing system to establish a baseline. Then, the customer implements the corrective measures and continues to monitor and adjust to determine optimum settings to maximize efficiency. This process can last up to 18 months.

MBCx Application Process

Pre-approval is required to participate in the MBCx track. The customer submits the MBCx application, an 18-month contract executed with the Service Provider, an MBCx investigation report, and EPA Portfolio Manager Statement of Energy Performance or DOE CBECs data indicating higher than average energy use intensity. An ASHRAE Level II Energy Audit can also be submitted with the application.

Pepco reviews and pre-approves or denies customer participation at the Pepco Energy Savings for Business Program's sole discretion. The pre-approval period for the MBCx track is 18 months.

Upon pre-approval by the Program, the phase 1 incentive is authorized, and the payment process begins. The customer can set up the monitoring equipment and proceed with long-term monitoring.

The customer submits the equipment monitoring report(s) to the program for review. The number of reports and frequency is dependent on the measures undertaken and will be discussed during the review period. They then proceed to implement the measures identified in the report.

At the end of phase 3, the customer submits the final implementation report, and the final incentive is paid at \$0.22 per kWh annually saved.

The following is required for pre-approval:

- 18-month contract with the Service Provider
- EPA Portfolio Manager Statement of Energy Performance or DOE CBECs data indicating higher than average energy use intensity.
- List of equipment to be monitored
- Signed Terms and Conditions
- An ASHRAE Level II Energy Audit (optional)

The following is required for project closeout:

- Final implementation report outlining the measures installed, final savings, and cost
- Detailed Savings analysis, either excel or energy model
- Final monitoring report with the trend data
- Signed Pre-approval letter
- Final Invoice

MBCx Investigation Report

The investigation report must include the items listed below:

- Executive Summary of the findings
- Introduction section, including names and contact information for the Building Owner, Building Manager, and MBCx Service Provider
- Detailed building and energy systems description, including accurate estimates of the equipment usage profiles
- Detailed operations and maintenance review
- Detailed operational scheduling of the major systems
- A listing of EEMs (including low-cost/no-cost items) identified for implementation. For each EEM, provide description, projected equipment, and installation costs, projected energy and utility cost savings for electricity, fuel, and water, and project simple payback.
- Automated Remote Monitoring and Diagnostic Equipment Report documenting the scope of work, budget, actual costs, equipment, location(s), manufacturer, model number(s), and technical specifications.

Final Implementation Report

This report should include:

- Title Page and Table of Contents
- Executive Summary of the findings
- Introduction section, including names and contact information for the Building Owner, Building Manager, and MBCx Service provider
- Monitored Equipment Listing
- O&M measures identified for implementation, including current operating conditions, proposed operating conditions, the anticipated cost of implementation, and annual project savings (kW, kWh, fuel, and water)
- Measures should include a unique identification number and description (e.g., O&M-1 – Re- initiate Enthalpy Economizer Operation for AHU-1)
- O&M measures implemented, measure number, description, date of implementation, cost of implementation, and calculated annual savings (kW and kWh)
- Cumulative listing of O&M measures recommended
- Cumulative listing of O&M measures implemented

Appendix A: Commissioning Certification Organizations

For the Building Tune-up track, the customer's commissioning Service Provider must be certified by one of the organizations listed below. When a customer wishes to use a non-certified Service Provider to perform the Building Tune-up, an exception to the rule may be granted only if (1) the proposed Service Provider provides evidence of having completed similar commissioning projects for two or more buildings of at least 75,000 square feet (conditioned space) each, and (2) the Service Provider submits at least two verifiable and satisfactory references from customers or clients who used the Service Provider to complete the similar projects. For the Monitoring-Based Commissioning track, service providers are not required to be Service Providers. However, commissioning certification is preferred.

Commissioning Certification Resources

The following organizations currently certify commissioning providers. Visit the organizations' web sites for more information on their certification incentives and to obtain lists of certified commissioning providers

- "Certified Commissioning Professional (CCP)": Building Commissioning Association (BCA), <https://www.bcxa.org/certification.html>
- "Certified Commissioning Provider": Associated Air Balancing Council Commissioning Group (ACG), <https://www.commissioning.org/membershipcertification/>
- "Accredited Commissioning Process Provider": University of Wisconsin at Madison (UWM), <http://epdweb.engr.wisc.edu/courses/index.lasso> (use link to Building Systems and Construction to find certification training)
- "Systems Commissioning Administrator": National Environmental Balancing Bureau (NEBB), <https://nebb.org/certification/>
- "Certified Building Commissioning Professional (CBCP®)": Association of Energy Engineers (AEE), www.aeecenter.org/certification