Multifamily Performance Program
July 2012

New Construction Component
Estimated Incremental Cost Guidelines
Version 5

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1. Scope

This document contains the methodology for calculating the Estimated Incremental Hard Costs associated with the energy reduction measures (ERMs), which are developed by the Partner for the NYSERDA Multifamily Performance Program – New Construction component. The difference in material and labor costs between the baseline equipment or system and the proposed improvement is the Estimated Incremental Hard cost for that ERM. The Simulation Guidelines, provided separately, are to be followed to determine the requirements for the baseline and proposed designs. This document, the Estimated Incremental Hard Cost Guidelines, is to be used by the Partners to provide the cost of installing each ERM, which is presented to the Developer as part of the ERM report. This Incremental Hard Cost Guidelines document may be shared with the Developers, if requested.

2. Objectives

1. Develop a comprehensive methodology to determine the incremental costs of the proposed design compared to the baseline using generally accepted costing approaches (e.g. cost-estimating manuals such as RS Means).
2. Provide a procedure to reconcile costs that are prepared by the Design Team, if these differ from the Partner's cost estimate.
3. Ensure that the process developed is fair and equitable with all types of ERMs, and replicable between projects.
4. Ensure that the procedure can be considered objective to all parties.

3. Overview

Any proposed design component with an energy consumption impact that differs from the baseline component is considered to be an ERM, and shall be provided with an Estimated Incremental Hard Cost. If an ERM cost is determined to be less than its respective baseline component's cost, then the Estimated Incremental Hard Cost will be a negative value, representing the cost decrease. This negative cost should be included in the summation of the project's Estimated Incremental Hard Costs.

Many of these ERMs will arise out of consultation between the developer/design team and the Partner, with this group finding ways to improve the energy efficiency of the proposed design. Some proposed design building components that result in reduced energy usage when compared to the baseline may have been included in the initial set of plans. All such building components are included as ERMs, even though they were part of the original designs. These ERM distinctions are pointed out to ensure that all components that are an improvement over the baseline are recognized, in order to provide a fair and equal evaluation of all projects in the Program.

To determine the cost of a baseline component, Partners should obtain the cost of an alternate but comparable option. The baseline component should have performance characteristics that closely match those determined by ASHRAE Appendix G and the Simulation Guidelines, but should have the other characteristics, such as brand, quality and appearance, that match the proposed component. For example, when calculating the incremental cost of a window, the partner will find a comparable product (frame type, dimensions, brand, etc.) that show the performance characteristics of the baseline design (U-Value, SHGC, etc.).

The Baseline Cost Estimator spreadsheet should be used to estimate baseline component costs, where applicable.

If the Developer is a not-for-profit company, no sales tax should be included for materials; otherwise the sales tax should be included.

Partners should be aware that even if the project delivery method for a project is a guaranteed maximum price bid, all incremental costs shall be determined for each ERM in the project.

4. Cost Estimating Procedures

4.1   Introduction

Once the ERMs have been determined for the project, the price of both the baseline and proposed measures must be calculated to determine the Incremental Cost and Total Resource Cost (TRC) of each measure and the comprehensive package of measures.

To do so, the Partner shall first determine all building components associated with a specific ERM that would differ from the baseline. For example, if an ERM specifies that R-20 continuous exterior wall insulation be installed in the proposed design, the only difference between the proposed and baseline would be the insulation itself. The baseline cost would include the cost of the insulation that was determined to be the appropriate baseline wall insulation, and the proposed cost would include the cost of the actual specified insulation. However, determining what components should be included in the incremental cost calculation is not always so straight forward. For example, in cases where the wall in the proposed design is a different construction type than is specified in the baseline, the total price of the wall construction including the insulation should be accounted for in the cost analysis. Therefore, Partners shall include in their Energy Reduction Plan, a description of the items that were included in the hard costs for both the baseline and proposed.

Once the components of the measure that need to be included in the cost analysis are identified, the Partner shall determine the method in which to calculate their prices. The Partner may estimate costs through the use of cost estimation manuals, the Baseline Cost Estimator spreadsheet, vendor quotes, design team calculations, or other reasonable methods – including online pricing. For each calculated hard cost, the method chosen to estimate this value shall be documented in the report.

4.2 Estimating by Cost Estimation Manuals and the Baseline Cost Estimator

One method for estimating measure costs is to use cost estimation manuals, such as RS Means. The Baseline Cost Estimator spreadsheet is another acceptable method for estimating baseline costs, and was designed to assist Partners in calculating the hard costs of baseline components. The Baseline Cost Estimator was created using prices and guidelines from RS Means, and therefore Partners are encouraged to use this document as an example of how to appropriately use a cost estimation manual.

In the Baseline Cost Estimator, the costs for materials and labor are assessed using the initial "Bare Costs" or "Raw" value derived from RS Means. These raw costs are then multiplied by correction factors to accurately estimate the total material and labor costs, which include taxes, overhead, profit, and regional fluctuations in prices. The correction factors can be found on the "Constants" tab of the Baseline Cost Estimator, and should be applied to any construction costs assessed using a cost estimation manual such as RS Means. The markup labor and markup material values are percentages that represent the national average for overhead and profit charged for the material and labor associated with construction. Whereas, the constant associated with the zip code of the project is a regional correction factor that takes into account the local area cost variations in labor and materials within New York State.

4.3 Estimating by Vendor Quotes

When using vendor supplied quotes, it is necessary that the Partner document in the report what material and labor costs are taken into account in the quote. For example, if the building was designed to be heated by a high-efficiency non-condensing boiler, and the vendor's quote did not include the material and labor cost associated with the hot water loop piping, it would be incorrect to compare that quote to the baseline cost assessment using the Baseline Cost Estimator that did include pricing for the hot water loop piping. In this case it would be appropriate to leave out the pricing for the piping system assuming a similar system type for both baseline and proposed. However, if the building was designed to be heated by individual furnaces, then it would be appropriate to compare a vendor's quote for the furnaces (that would obviously not include hot water loop piping) to the baseline cost calculated in the Baseline Cost Estimator including the piping, as this is an actual difference in the cost of the systems. Additionally, it is important to verify which type of price a vendor is providing, since this can be a source of confusion and have a large impact on the price. Vendor prices can be given as a contractor's (or trade) cost or a retail (or budget) cost. The Partner should apply an appropriate contingency/markup for these prices accordingly.

4.4 Estimating by Design Team Calculations

Similar to vendor quotes, the design team calculations should be clear on what items they are pricing for each energy reduction measure to ensure an accurate comparison between the baseline and proposed measures.

4.5 Estimating by Online Pricing

Online pricing is permitted, but the source of the quote must be justified and included in the report.

5. Guidance on Assessing Costs for Specific Building Components

5.1 Building Envelope: Opaque assemblies

Baseline design components

Calculate the costs of the ASHRAE 90.1 (mid- or high-rise projects) or IECC (low-rise projects) requirements for opaque assemblies, as summarized in the Program Requirements section of the Simulation Guidelines, using one of the estimating methods listed above. The Baseline Cost Estimator spreadsheet should be used to estimate the baseline component costs when applicable.

Proposed design components

Costs of components in the proposed design shall be estimated in accordance with their actual properties, using one of the estimating methods listed above.

Permanent shading devices (side fins, overhangs, balconies) shall not be included in the incremental cost of the proposed design.

5.2 Building Envelope: Vertical Fenestration

Baseline design components
The window area used to calculate the baseline cost shall be equal to the amount in the proposed design or 40% of the total gross above grade wall area, whichever is smaller.

Prepare cost estimates for windows that comply with ASHRAE 90.1 requirements, using one of the estimating methods listed above. If applicable, the Baseline Cost Estimator spreadsheet should be used to estimate the baseline component costs.

Proposed design components
The actual properties of fenestration planned in the proposed design shall be used for cost estimating. The proposed cost should be based on the actual amount of fenestration in the proposed design, even when there is fenestration area that is greater than 40% of the total gross above grade wall area, using one of the estimating methods listed above. For projects with excessive windows, this will likely result in a significant increase in incremental cost for the project.

5.3 Interior and Exterior Lighting: Power Density Reductions and Bi-level Fixtures

This section applies to interior lighting ERMs related to reductions in lighting power density (W/SF), exterior lighting ERMs related to reductions in lighting power density (W/SF) and installation of bi-level lighting fixtures (fixtures with manufacturer integrated occupancy controls for high-low switching). Note that, as described further in the Simulation Guidelines, "Exterior lighting performance credit can be claimed only for the areas for which lighting is specified on the drawings."

The Estimated Incremental Hard Cost for this ERM is the sum of the results for all the following steps:
1. Determine the *labor cost* portion of the Estimated Incremental Hard Cost by one of the estimating methods listed above. In most cases the incremental labor costs will be $0.
2. Determine the *material cost* portion of the Estimated Incremental Hard Cost as follows:
   a. The proposed design fixture cost shall be estimated in accordance with their actual properties.
   b. For proposed design fixtures that match the descriptions listed in the New Construction Program Pre-Qualified Incentives Worksheet (shown in Appendix A of these Guidelines):
      i. Follow the instructions on the Worksheet;
      ii. Multiply the sum of all "total incentive" values from this Worksheet by 2.5. This is the materials portion of the Estimated Incremental Hard Cost for these fixtures.
   c. For proposed design fixtures related to the ERM that do not match any description listed in the attached New Construction Program worksheet, or if preferred: Estimate the material cost using one of the methods listed in Section 4.
3. Add the material cost and labor cost to get the total incremental hard cost for this measure

The estimated costs shall assume the same quantity of fixtures in the baseline and proposed design.

If the ERM represents an energy cost increase due to the proposed design having a higher lighting power density than the baseline, then the Estimated Incremental Hard Cost for this ERM is $0.

5.4   Lighting: Automatic Control Devices

This section applies to lighting ERMs related to the installation of non-required automatic control devices. Note that, as described further in the Simulation Guidelines, "Credit for automatic controls can only be taken for spaces where such control is not required by ASHRAE 90.1."

The Estimated Incremental Hard Cost for this ERM is the sum product of all the following steps:
1. Determine the total estimated *labor cost* associated with the additional control devices. The baseline labor cost is $0, so the labor cost portion of the Estimated Incremental Hard Cost is equal to this estimated labor cost.
2. Determine the *material cost* portion of the Estimated Incremental Hard Cost as follows:
    a. For proposed design devices that match the descriptions listed in the New Construction Program Pre-Qualified Incentives Worksheet (shown in Appendix A of these Guidelines):
        i. Follow the instructions on the Worksheet;
        ii. Multiply the sum of all "total incentive" values from this Worksheet by 2.5. This is the materials portion of the Estimated Incremental Hard Cost for these devices.
    b. For proposed design devices that do not match any descriptions listed in the attached New Construction Program worksheet, or if preferred: Determine the total estimated *material cost* associated with the ERM using one of the estimating methods listed above. The baseline material cost for these devices is $0, so the total estimated material cost for these devices should be added to the *material cost* portion of the Estimated Incremental Hard Cost.

5.5   HVAC

Baseline design components

For nearly all projects in this Program, the baseline HVAC system type is a packaged terminal air conditioner (PTAC) with a constant volume fan control and either one or two hot water natural draft fossil fuel boiler(s). If fossil fuel is not available, a packaged terminal heat pump (PTHP) is to be used instead of a boiler.

When applicable, the Baseline Cost Estimator spreadsheet should be used to estimate the baseline component costs.

Proposed design components

Costs of components in the proposed design shall be estimated in accordance with their actual properties using one of the estimating methods listed above.

5.6   Service Hot Water Systems

Baseline design components

Prepare cost estimates for baseline service hot water systems that comply with ASHRAE 90.1 requirements using one of the estimating methods listed above. If applicable, the Baseline Cost Estimator spreadsheet should be used to estimate the baseline component costs.

Proposed design components

Costs of components in the proposed design shall be estimated in accordance with their actual properties using one of the estimating methods listed above..

5.7   Receptacles and Other Loads

Baseline design components

Provide estimated installed costs for the appliance or other load with the minimum efficiency required as detailed in the Simulation Guidelines. When applicable, the Baseline Cost Estimator spreadsheet should be used to estimate the baseline component costs.

Proposed design components

Provide installed costs for appliances or other loads that have the efficiency in accordance with their actual properties using one of the estimating methods listed above. For appliances, the most accurate method to obtain these prices is typically by contacting a vendor of the applicable equipment.

6. Guidance on Assessing Costs for Gut Rehab Projects

For gut rehabilitation projects, the Baseline design of the envelope shall reflect existing conditions prior to any revisions that are part of the scope of work being evaluated, as described in building envelope section of Table G3.1 of Appendix G. However, all other components of the building (HVAC, DHW, lighting, appliances, etc.) shall follow the same design guidelines of non-gut rehab projects

As such, the baseline cost for all gut rehab envelope components shall be $0. Costs of envelope components in the proposed design shall be estimated in accordance with their actual properties, using one of the estimating methods listed above.

The baseline and proposed design costs of all other components of the building shall be calculated using the guidance listed in Section 4 and 5 of this document.

APPENDIX A

The following pages from the New Construction Program Pre-Qualified Incentives Worksheet shall be used as instructed in the lighting and lighting controls sections of these Guidelines.

Pre-Qualified Lighting

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Consolidated Funding Application Number (CFA#) _____

Applicant _____   Facility _____

Completing the Lighting Measure Worksheet

• Fill in the appropriate fields for individual lighting measures on pages 2 through 4

• To calculate the **Total Incentive** for each measure, multiply the **Count** (quantity of installed equipment) by the **Unit Incentive** and enter this amount in the **Total Incentive** column

• Enter the sum of the **Total Incentive** for each lighting measure type on the summary worksheet below

• Add these **Total** amounts together for the **Grand Total** amount on the last line

General Eligibility Requirements for Lighting Systems and Controls

• Pre-Qualified projects must submit an application for incentives within 90 days of invoice for the purchase and installation of Pre-Qualified measures

• Please attach:
1) Consolidated Funding Application:
   http://www.nyserda.ny.gov/Funding-Opportunities/Consoli-dated-Funding-Application
2) Recent utility bills, with SBC notation
3) Invoices, including purchase and installation price
4) Equipment specification sheets, including product manu-facturer and model number

• All lamps, ballasts, fixtures and controls installed must be new. Used or rebuilt equipment is not eligible.

• For energy saving lighting measures not covered by the Pre-Qualified worksheet, please contact NYSERDA regarding Performance-Based programs

Individual Measure Incentive Totals

Lighting Systems (page 3). . . . . Total $ _____

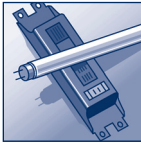Lighting Controls (page 4). . . . . Total $ _____
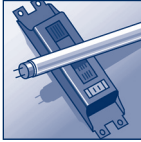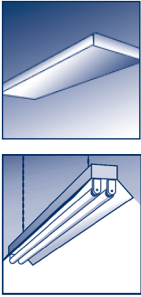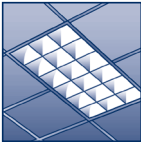
Grand Total Lighting Systems and Controls Incentive Requested $ _____

Project Cost Information (Required)

Total cost of materials and labor for installed lighting equipment. . . . . Total $ _____
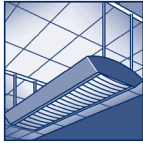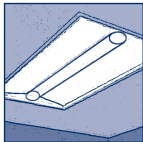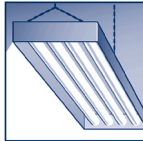
Project Type (Please check one)

☐ New Construction or Major Renovation

☐ Replacement or Retrofit (Existing Facilities)

Lighting Systems

Measure Description and Eligibility Criteria		Measure Code	Eligible Installations	Count	Unit Incentive	Total Incentive
LED Exit Signs • 5 watts or less per face • Entire sign must be new, replacing an existing sign • Exit sign retrofit kits are not eligible • New construction projects are not eligible	EXIT	ES-1	New LED Exit Sign		**Replacement** $10 per sign	
High Performance T8 Relamp and Reballast • Lamp and ballasts must be listed on the CEE High Performance T8 List or must meet the CEE High Performance T8 Specifications[1] • 1 Unit = 1 to 4 lamps and 1 ballast • Must be an upgrade of an existing T12 fixture		HPT8-RF	Upgrade an Existing T12 Fixture with New High Performance T8 Lamps and Ballasts		**Retrofit** $15 per fixture	
Reduced Wattage T8 Relamp and Reballast • Lamps and ballasts must be listed on the CEE Reduced Wattage T8 "Qualifying Products" List or must meet the CEE Reduced Wattage T8 Specifications[1] • 1 Unit = 1 to 4 lamps and 1 ballast • Must be an upgrade of an existing fluorescent fixture		RWT8-RF	Upgrade an Existing Fixture with New Reduced Wattage T8 Lamps and Ballasts		**Retrofit** $15 per fixture	
New Fluorescent Fixtures • T5 and High Performance T8 systems are eligible • T8 lamps and ballasts must be listed on the CEE High Performance T8 List or must meet the CEE High Performance T8 Specifications[1] • 1 Unit = 1 new fixture with 1 to 4 lamps and 1 ballast • In replacement projects, new fixtures must replace existing T12 fixtures • 2-foot linear T8 lamps must have minimum efficacy of 75 Mean Lumens/Watt and must be driven by High Performance T8 ballasts • 4-foot U-shaped T8 lamps must have minimum efficacy of 79 Mean Lumens/Watt and must be driven by High Performance T8 ballasts		HPT8-NF	New Lighting Fixture with T5 or High Performance T8 Lamps and Ballasts		**New Construction** $10 per fixture	
					Replacement $20 per fixture	
High Efficiency Troffer Fixture • Lamps and ballasts must be listed on the CEE High Performance T8 List or must meet the CEE High Performance T8 Specifications[1] • 1 Unit = 1 fixture with 2 lamps and 1 ballast • Overall fixture efficiency must exceed 80% for both prismatic lensed and parabolic fixtures • In replacement projects, new fixtures and retrofit kits must replace T12 fixtures		HPT8-HEF	Recessed or Surface Mounted High Efficiency Troffer Fixture with High Performance T8 Lamps and Ballasts		**New Construction** $15 per fixture	
					Replacement $35 per fixture	

[1]The Consortium for Energy Efficiency maintains specifications and a list for High Performance and Reduced Wattage T8 lamps and ballasts. The list is updated frequently and is available at http://www.cee1.org/com/com-lt/com-lt-main.php3 If a CEE qualifying product is not available for a specific application, please contact NYSERDA.

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Lighting Systems *(continued from page 2)*

Measure Description and Eligibility Criteria		Measure Code	Eligible Installations	Count	Unit Incentive	Total Incentive
Pendant/Wall Mounted Indirect Fluorescent Fixture • T5, T5HO and High Performance T8 systems are eligible • T8 lamps and ballasts must be listed on the CEE High Performance T8 List or must meet the CEE High Performance T8 Specifications[1] • 1 Unit = a 4' length (stand-alone or continuous runs) of new fixture with 1 to 3 lamps • Overall fixture efficiency must exceed 80% • Ceiling must have a reflectivity of 80% or greater • Fixture must be installed according to manufacturers guidelines for pendant length and spacing • Uplight component must be 60% or greater		HEF-P	Indirect and Direct/Indirect T5 or High Performance T8 Fixtures		**New Construction** $25 per 4 ft. section	
					Replacement $30 per 4 ft. section	
High Efficiency Low Glare Fixture • T5, T5HO and High Performance T8 systems are eligible • T8 lamp and ballasts must be listed on the CEE High Performance T8 List or must meet the CEE High Performance T8 Specifications[1] • 1 Unit = 1 fixture with 1 or 2 lamps and 1 ballast • Overall fixture efficiency must exceed 80% and a minimum of 15% of the zonal lumens between 60 and 90 degrees. • Must be a new fixture or a retrofit kit incorporating advanced lighting distribution and glare control features		HEF-LG	Recessed High Efficiency T5 or High Performance T8 Fixture with Low Glare Features		**New Construction** $25 per fixture	
					Replacement $50 per fixture	
High Intensity Fluorescent • T5, T5HO and High Performance T8 systems are eligible • T8 lamp and ballasts must be listed on the CEE High Performance T8 List or must meet the CEE High Performance T8 Specifications[1] • Each unit must have a wattage greater than 125W • Must be installed in areas with ceiling heights of 15' or greater • 1 Unit = 1 fixture with 3-12 lamps • Overall fixture efficiency must exceed 80% • In replacement projects, new fixtures must replace HID fixtures		HIF	New Fluorescent Fixture for High and Low Bay Applications		**New Construction** $35 per fixture	
					Replacement $75 per fixture	
Additional Incentive for Fixture Mounted Occupancy Sensor		OC-HIF	Fixture Mounted Occupancy Sensor		$20 per sensor	
		(enter on page 1)	**Total Lighting Systems Incentive Requested**			$

[1]The Consortium for Energy Efficiency maintains specifications and a list for High Performance and Reduced Wattage T8 lamps and ballasts. The list is updated frequently and is available at *http://www.cee1.org/com/com-lt/com-lt-main.php3* If a CEE qualifying product is not available for a specific application, please contact NYSERDA.

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Pre-Qualified Lighting

Lighting Controls

Measure Description and Eligibility Criteria	Measure Code	Eligible Installations	Count	Unit Incentive	Total Incentive
Wall Mounted Occupancy Sensors • Hardwired, passive infrared and/or ultrasonic wall-mounted occupancy detectors are eligible • Installations must comply with manufacturer's guidelines on coverage and maximum controlled watts • New construction projects are not eligible • Occupancy sensors or installations with manual "on" override capability are NOT eligible	OC-1	Wall Mounted Occupancy Sensors		$10 per sensor	
Remote Mounted Occupancy Sensors • Passive infrared and/or ultrasonic remote mounted occupancy detectors are eligible • Installations must comply with manufacturer's guidelines on coverage and maximum controlled watts • Wall switchplate mounted sensors are not eligible	OC-2	Remote Mounted Occupancy Sensor		$50 per sensor	
	(enter on page 1)	**Total Lighting Controls Incentive Requested**			$