



BUILDING ELECTRIFICATION SCOPING GUIDELINES

1.0 GENERAL GUIDELINES

2.0 BUILDING ELECTRIFICATION

2.1. Introduction

The following 'Scoping Guideline' is provided to clarify the intended scope of assigned Capital Improvement Program (CIP) projects related to the Building Electrification Work and provide directions on how to approach the investigation and scoping of the work for the 'DOE Referred Items' as well as 'SCA Additional Recommended Items' in Scope Reports. These guidelines are intended to supplement the General Scoping Guidelines and the requirements of the Scoping Process outlined in the CIP Project Manual.

The intent of a Building Electrification Project is to convert the school building from on-site fossil fuel use to the exclusive use of all-electric energy sources to meet the NYC Local law 97/19, with the commitment to achieve certain reduction in greenhouse gas emissions by 2050 and improve energy efficiency to meet the NYC local law 51/23, and the 2020 NYC Energy Code.

A Building Electrification Project performs the upgrade or replacement of the system components in the building's HVAC system, Domestic Hot Water (DHW), Education program space equipment including food service/culinary art cooking, and other types of educational program space (Science Labs, Vocational Shops, and others) to function together to eliminate the use of fossil fuels.

The design of upgrades or replacements must be comprehensive and engineered, addressing all building HVAC systems, Domestic hot water (DHW), education program space equipment, and prioritizing upgrades to achieve the carbon reduction goals and reduce energy use.

When reviewing building electrification scope items, it is important to realize that all components function together as a system and that all components must be evaluated/reviewed to fully identify any issues. Other issues with building electrification can include Excess Distribution Facilities (EDF), Boiler/Mechanical/Electrical room water penetration, roof replacement, window/door replacement, lighting upgrades, slab openings, and structural load capability & reinforcement.

2.2. Strategic Coordination with Building Envelope Improvements & Development of an Electric Power Budget (EPB)

Strategic building electrification shall be achieved by prioritizing the strategic coordination with building envelope performance improvements and where feasible, to meet LL51/23 and facilitate the reduction of electric service requirements and HVAC equipment building heating, cooling, domestic water heating, and electrical service loads.

It is important to ensure that all HVAC systems and Education program space equipment are inspected to develop an Electric Power Budget (EPB) and the assessment/coordination of Architectural/Structural work impacted by the selection of electric space heating, air conditioning, domestic hot water heating, food service cooking, and the replacement of educational program use of fossil fuels to all-electric energy. A thorough review of existing conditions and discussion of the history of building issues with school personnel are critical to understanding and achieving a successful outcome.



2.3. Energy Code Compliance

The 2020 NYC Energy Code requires that alterations to any building or structure are to comply with the requirements of the code for new construction, with the exception of these requirements specifically listed in Section C503.1 (Section 5.1.3 equivalent of Appendix CA ASHRAE 90.1-2016). Thus, in general, for CIP Building Electrification projects:

- For any Building Envelope Capital Categories work, refer to Chapter 4, Section C402 Building Envelope Requirements (Chapter 5 equivalent of Appendix CA ASHRAE 90.1-2016) and C503.3 Building Envelope (Section 5.1.3 equivalent of Appendix CA ASHRAE 90.1-2016).
- For all MEP system upgrade or replacement work refer to Chapter 4, Sections C403 to C406 (Chapters 6, 7, 8 and 9 equivalent of Appendix CA ASHRAE 90.1-2016).
- Provide an Energy Model analysis to meet the requirements of Section C407 Total Building Performance (Energy Cost Budget Chapter 11 or Performance Rating Method Appendix G of Appendix CA ASHRAE 90.1-2016).

AEOR shall follow the applicable referenced energy code sections (2020 NYCECC based on the International Energy Conservation Code (IECC) or Appendix CA ASHRAE 90.1-2016) depending on how the project is to be filed.

2.4. New York City Local Law 51/23 Green Building Standards Compliance – Implications for Renovation & Electrification Projects

Per LL 51/23, a Substantial Reconstruction is a capital project in which the scope of work includes rehabilitation work in at least two of the following three major systems of the building: electrical, HVAC (heating, ventilating and air conditioning) and plumbing, and at least 50 percent of the building's gross floor area is subject to GC construction work.

Per LL 51/23, Substantial Work on the Building Envelope means the replacement or alteration of 50 percent or more of the building envelope's total glazing area, or 50 percent or more of the building envelope's total area of opaque components, including, but not limited to, recladding, work on the interior side of exterior walls, such as removal of interior wallboard or plaster, and roof replacements.

- Projects with Substantial Reconstruction with Substantial Work on the Building Envelope: Demonstrate Building Energy Performance Requirements to meet 50% reduction in site EUI compared to ASHRAE 90.1, year as per Mayor's rules, or Source EUI 70 kBtu/SF/yr.
- Projects with Substantial Reconstruction without Substantial Work on the Building Envelope: Building Energy Performance Requirements are not applicable, as the building is subject to meet the Green Schools Guide and thus must meet the energy savings requirements to meet the Energy Credits.
- Projects without Substantial Reconstruction (typical of most building electrification projects): Alterations to any building or structure that include HVAC installation or replacement, having construction cost equal to or more than 2 million* dollars, are to comply with the requirements of the code to meet a 10% reduction in site EUI compared to NYC Energy Conservation Code. In the event that a building is unable to demonstrate the required savings, apply for an exemption. Refer to the MOEC guidance document (see Exhibit C Flow Chart) outlining the steps needed.



* Cost thresholds listed above are denominated in January 2022 dollars and are indexed to inflation annually.

2.5. New York City Local Law 6/16 Geothermal System – Implication for Renovation & Electrification Projects

- New Construction or the retrofitting of an existing city-owned building's heating and cooling system require the use a screening tool in the planning process to indicate if installation of a geothermal system may be cost-effective, and engineering analysis shall be conducted to evaluate comparison with other heating/cooling alternatives.
- The goals of the comparison of the geothermal system versus other alternatives are the reduction of the greenhouse gas, reduction of air pollutants, reduction of annual electricity consumption, peak demand reduction, and fuel & power cost reductions. The net present value of all alternatives considers a 20-year life expectancy, capital costs, operations and maintenance, fuel costs, available federal, state, and other non-city governmental funding assistance, and the social cost of carbon value.
- If the geothermal system has the lowest net present value of all alternatives considered, it shall be selected for implementation.

2.6. Project Definition

Building Electrification Capital Categories, typically included as “DOE Referred” Items include the following:

- Electrification/Boiler Removal
- Electrification/Heat Pump Systems
- Electrification/Climate Control
- HVAC Upgrade for Classrooms and PA
- Electrical Service Upgrade

The following Capital Categories may also be related to Building Electrification projects where required as “SCA Additional Recommended” Items:

- Lighting Upgrade
- Fire Alarm System Replacement
- Low Voltage Electrical System
- Ansul System/Fire Suppression
- Hot Water Heaters
- Program Accessibility



- Water Penetration in Boiler Room (may be included under “Flood Elimination” (Below Grade) for below grade water infiltration.
- Building Envelope Capital Categories: Roofs, Windows, Exterior Masonry, Parapets, See Building Envelope Scoping Guidelines
- Flood Elimination (Below Grade)

Also, refer to the “CIP Building Electrification Field Report” & “Building Envelope Testing Scoping Guidelines” (if any building envelope scope items are included) for descriptions of recommended testing strategies and procedures.

2.7. Referred Items and Additional Items

“Building Electrification Projects” deviate slightly from “General Scoping Guidelines” for referred and additional items. For the proposed building envelope performance improvements, investigate roofs, windows, exterior doors, parapets and exterior wall construction and advise the Design Project Manager (DPM) if the other components should be added to the scope of work as “SCA Additional Recommended Items” to provide an energy efficient building upon completion of the project. Before proceeding with scoping additional items, the AEOR must obtain approval from the DPM.

As with all designated or undesignated components, the designer needs to determine the appropriate extent of work to be performed, not just to replace all the components. The goal is, in a cost-effective manner, to upgrade or replace building MEP systems and building envelope items to provide better performing energy efficient systems and enclosure to serve the school premises for 7 to 10 years as a minimum before maintenance (e.g., minor replacement of system accessories, etc.) is required and 15 to 20 years before any major replacement is necessary.

2.8. Investigation & Documentation of Findings

Visit the site to perform visual inspections as appropriate to the scope of work. Arrange for the use of lifts and booms as appropriate. Document findings using photography and annotated drawings. Prepare “Existing Condition” or “Damage Mapping” drawings that record the locations and extent of deficiencies on copies of plans and/or elevations and include them in the “Scope Drawings” section of the Scope Report (Appendix 2).

In addition to the “Existing Condition” drawings, prepare separate “Proposed Work” drawings, which correspond to the “Existing Conditions” drawings, but indicate the proposed work based upon analysis of the existing conditions. Both “Existing Condition” and Proposed Work” drawings are to be included in the “Scope Drawings” section of the Scope Report (Appendix 2).

Also, refer to the [CIP Project Manual](#) for a further description of the Scoping Process.

2.9. Warranty/Guarantee

When a component being scoped is under an existing warranty/guarantee and is found to be deficient, leaking or not functioning properly, these items must be referred to the DOE/Custodian. DOE representative(s) for follow up with the company who issued the warranty/guarantee. Typical manufacturers’ warranties include MEP system components, roofing, windows/insulating glass units, and some types of cladding. Roof warranties may be in effect for 20 years or more; windows and insulating glass are typically 5 to 10 years; cladding can vary widely from simple



1-year guarantees to longer term (10-50 year) warranties for a wide range of issues. There may also be separate agreements with specific contractors for workmanship on items such as brick masonry or sealant or injection waterproofing installations for which material/system warranties alone are not sufficient. These types of warranties are typically in the range of 1 to 3 years. In all cases, the warrantor will generally require that any repair or investigation work to their system(s) only be performed by approved contractors and only with their specific approval. They will typically reserve the right to void the warranty, either for specific components that are modified or for the entire warranted system, if these steps are not taken. Warranties are valuable – DO NOT risk voiding any warranty by performing work without contacting the appropriate manufacturer or contractor.

2.10. Meetings and Site Investigations with School Personnel

The designer must meet with the school's Custodian, Principal, and other designated school staff during the investigation to identify existing Building HVAC equipment & system problems or hazards and review the status of outstanding building violations related to the Building HVAC equipment & system and other renovations or additions being planned which may impact the funded project.

Prior to the Kick-off Meeting, it is recommended that the AEOR forward a copy of the Heating, Ventilation, & Air-Conditioning Equipment Record Form to the Custodian to request a list of equipment with locations and current conditions.

Forward a copy of the [Interior Active Leak Record Form](#) to the Custodian for confirmation. See the Building Envelope Scoping Guidelines for additional comments regarding the investigation of building envelope components. For Consultant designed projects, the form and Preliminary Damage Mapping Drawings shall also be included in the [Building Electrification Field Report](#). Refer to the Building Envelope Scoping Guidelines for a sample of the completed leak form.

The "Damage Mapping Drawings" need not be more than a copy of annotated existing plans and elevations from the Authority's EDOCS application with hand markings of field notes. (For samples, refer to the Building Envelope Scoping Guidelines). Damage shall be described to distinguish between the areas of simple staining, reports of prior leakage (without current leakage) and areas with clearly failed finishes or other evidence of water leakage. "Damage Mapping Drawings" are critical in diagnosing the nature and extent of leakage issues, as well as ascertain whether leaks are discrete/isolated conditions or are more widespread/systemic. This is necessary to determine the most appropriate testing strategies to confirm the cause(s) of deficiencies or leakage and/or confirm existing conditions.

It is important when meeting with the school staff to be clear that the project intends to address the repair or replacement of items listed in the Capital Plan as deficient and to bring the Building Electrification work into good upgrade or replacement and provide water-tight mechanical rooms or entire building (if building envelope categories included).

Minutes of meetings with school personnel shall be included in the Scope Report.

2.11. Building Electrification Field Report & Pre-Scope/Design Checklist

The [Building Electrification Field Report](#) and [CIP Building Electrification Pre-Scope/Design Checklist](#) are required components of CIP Electrification Scoping and part of a necessary process for Local Law 51/23 compliance - Green Building Standards (Update of Local Laws 31/32). It is a tool to be completed as a collaborative effort between the MEP and Building Envelope categories



at the beginning of the development of the CIP Building Electrification Field Report. It is critical to create an Early-Scope Energy Model that should be performed for the Field Report phase to provide a comprehensive Final Scope Report for the electrification of the existing building. The purpose of the CIP Electrification Field Report is to evaluate as many of the relevant and significant conditions of building envelopes and MEP systems found at the existing school building and explore the feasibility of converting from on-site fossil fuel use to the exclusive use of all-electric energy sources. The design team is to create an early-scope energy model with load estimation to determine potential energy use and carbon reduction impacts of proposed envelope improvement measures. The model is to be used to determine if the project will meet LL51/23 requirements, and if the work required for electrification does not meet the requirements, what additional measures may be added to achieve the requirement. Energy Modeling is also required at the 50% and 100% phase to verify compliance.

As soon as possible following the Initial Kick-Off Meeting and site visit(s), the AEOR shall utilize and submit a Building Electrification Field Report to document preliminary findings and proposed specialty testing, which can be found on the SCA Website and the internal SCA T: drive.

In addition to basic background information about the Existing Building and Site Information, the Building Electrification Field Report shall include the following:

- Summary of Key Building/Site Observations
- Existing Building MEP Systems Description
- Architectural Existing Building Envelope
- Testing Requirements
- Preliminary Assessment of Geo-Thermal System Options
- Preliminary Assessment of Systems Options
- Early-Scope Energy Model
- Appendix
 - Photo Location Plans
 - Photos
 - Interior Active Leak Record
 - Preliminary Damage Mapping Drawings
 - Reference Drawings
 - Site Visit Meeting Minutes
 - Field/Pre-Scope Design Checklist
 - Probe Request Sketches
 - NDT Request Sketches

2.12. Scope Report - Building Electrification Findings and Recommendations.

The Building Electrification Scope Report shall be a complete and comprehensive scoping of all Building Electrification Capital Categories and components using the latest Scope Template found on the SCA Website or Internal T: drive.

The Building Electrification Findings and Recommendations Template is comprised of an Executive Summary, followed by a listing of all the Building Electrification Capital Categories, starting with “DOE-Referred” Categories and followed by any “SCA Additional Recommended Items”.



2.12.1 Parts of Section G – Finding and Recommendations

- Executive Summary

Provide an “Executive Level” summary to provide background information on conditions or needs that generated the project, followed by brief findings and recommended work under each DOE-Referred and SCA Additional Recommended Category. See the template for the format and text to be edited to suit the specific project.

Summarize all testing performed which may include but not limited to spray testing, probes, roof cuts, and other specialty testing and what was found. (If any testing is not yet complete, explain what testing has been requested and what it is expected to reveal.) Clearly identify the recommended work under each Capital Category (for the DOE-Referred and Additional Work). Update the summary of findings and recommendations when testing is complete.

The following shall be included in the findings and recommendations for each Building Electrification Capital Category:

- Introduction

Provide background information and a general description of the primary components under each Capital Category. Include a description of the history of previous renovation projects and repairs. Identify the status of warranties for roofing and other components. Expand upon background information for Red Dot and other emergency projects and the hazardous conditions that must be addressed in the project. Identify if there is or is not water infiltration occurring due to defective components in the referenced category.

- Findings and Recommendations

In accordance with SCA Standards, all findings should be numbered in outline format and have a one-to-one correlation with the recommendations. This is intended to clearly identify the deficiencies in the ‘Findings’ section and the resulting ‘Recommendations’. Items referred to in the ‘Recommendations’ should include statements in the ‘Findings’ that correspond with the appropriate description of the existing conditions or deficiencies that ‘justify’ the Recommendations. Include alternative approaches explored (if any) and indicate the recommended option.

2.12.2 Typical Items to be considered in determining the recommendations.

- Confirmation of Existing Conditions: The AEOR, as part of their independent investigation, must confirm actual existing conditions. The AEOR should not rely upon the condition descriptions in the BCAS report or items identified by school personnel, without further investigation and assessment. Include findings based upon the AEOR’s independent investigation and assessment based upon site inspection and confirmed reports from the Custodian, Principal, or other school representatives.

BCAS deficiencies must be field verified to confirm conditions and determine if work is required in the project. This is required since the Department of Education might have done repair work after the initial BCAS field conditions were documented. Deficiencies must be described in the findings and illustrated by referenced photos in



Appendix 1 of the Scope Report. References to photos or findings in the BCAS report alone are not acceptable.

Retain the list of all components in the Building Electrification Findings and Recommendations Template. Provide a brief description of each component and describe specific deficiencies (if any). Identify all deficiencies noted in the BCAS report and if, in the AEOR's opinion, work is or is not required. If the component is in good condition and no work is required, indicate in the corresponding findings and recommendations.

Where components are in good condition and no work is required, provide a brief description of the component(s) and condition under "findings". If appropriate, indicate "No work required" or "No work required at this time" in the "Recommendations" in lieu of "No recommendations".

When commenting on general conditions, use terms as used in BCAS (Good, Fair and Poor), rather than "fine" or "adequate". For any components that are noted as "fair" or "poor", describe conditions that contribute to that assessment. Estimate the remaining service life (number of years) of the equipment.

- Break-down of Larger Categories of Work: Some LLW Categories cover a very large amount of work. It is recommended that the 'Findings and Recommendations be broken into smaller subsections as appropriate. Break down findings between the Original Building and subsequent additions. For Interior ceiling work, for example, consider breaking down conditions by ceiling "type" with similar properties, such as specific floor classroom ceilings, where the extent of replacement can be described on the Proposed work Drawings. The reader should not be required to read many pages of repetitive findings for each proposed work before getting to the recommendations.
- Cause of Deficiencies: The Findings should include the description of the deficiencies and what, in the AEOR's professional opinion, is judged to be the cause(s). Summarize the findings of any probes and/or tests performed to confirm conditions and cause(s) of defects. In the Scope Report, note whether probes or testing are planned but not yet completed. If applicable, describe the probes and/or testing that have been requested and the estimated completion date(s).
- Interior Replacement Work: Replacement of collateral impacted areas related to the referred items shall also be included in the scope of work as part of the Work.
- Other Collateral Impacts: Indicate existing conditions and impacts to MEP and other components required by the proposed work under each category. If no impact is anticipated, indicate "no impact anticipated".
- Photo Documentation of Findings: In the numbered pictures referred to in the 'Findings', add photo 'close-ups as necessary to allow a view of the cited deficiencies. Include reference to photos in bold text in the findings, such as (Photo #1) or (Photo #2).
- Record the locations and extent of deficiencies and proposed work on the "Damage Mapping" and "Recommended Work" Scope Drawings in Appendix 2 of the Scope Report.



- Quantification of Recommendations: Recommendations should include quantification of the repair/replacement for the proposed scope. Refer to Scope Drawings to clarify location and quantities as appropriate. The quantities should match those in the Scope Estimate. Quantities in recommendations shall be in bold text with units, such as “Area of Work: **350 SF**” or “Area of Work: **110 LF**”.

End of Building Electrification Scoping Guidelines