Instructions:

1. Delete this page after the report is completed.
2. All text in *light blue* font is meant as instructions for filling the template. For a complete report, it should either be replaced with black text or deleted, as necessary.
3. All tables from the accompanying Existing Building Savings Calculator spreadsheet should be pasted in this document as **images**, not as embedded tables.
4. Tables should include as many rows or columns as necessary to describe the project details. Empty cells or columns should not be shown in the report, such as the Code\GSG Baseline columns when a code baseline was not modeled. Sections that are not used may also be deleted, such as the matching summary if matching was not performed.
5. This report format is meant to be a more flexible approach than the GSG reporting template. Each renovation building is unique in scope and features. Please take advantage of the format’s flexibility to accurately and fully describe the project. Modelers are able to add sections to this report to suit the unique features that may be present in each existing building.

Existing Building Electrification *– PS XYZ*

*For*

NYC School Construction Authority

*School Name*

*Project code*

*Date*

Report template version 2.3

March 2024

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# Executive Summary

**1.1 Existing Building Conditions and Scope of Work:**

*[Describe which Local Laws must be complied with. Briefly describe the existing building operations, conditions and project area. Also note whether the existing building utility bills were matched for this project.]*

**1.2 Proposed Building Upgrades:**

*[Include a line item and brief description for all of the following planned improvements**: Adjustments to space layouts, new wall, window or roof constructions, new boilers, new AHUs, new DHW systems, new lighting systems, new class/office heat pumps, and any other changes to the existing building that could change the total energy use.]*

**1.3 Savings Summary:** *[Input selected summary data from table 1b]*

1. Projected cost savings: *[$XXXXX/year]*
2. Projected energy savings
3. Electricity savings: *[XXXXX kWh/year]*
4. Natural gas savings: *[XXXXX Therms/year]*
5. *Other fuel* savings: *[#2 fuel oil, #4 fuel oil, biofuel, diesel, gasoline, steam, XXXXX MMBTU/year or gallons/year as appropriate]*
6. Building energy use intensity savings (site): *[XX kBtu/sf.yr]*
7. Building energy use intensity savings (source): *[XX kBtu/sf.yr]*
8. Building CO2 emissions savings: *[XXX Tons CO2e/year]*

# Existing Building Model

* 1. **Describe existing building baseline modeling.**
  2. **Building general description:**

*[Insert table General Building Information from the Existing Building Savings Calculator]*

* 1. **Fuel types:**

*[List the existing fuel types used in the existing building]*

* 1. **Existing HVAC systems.**

*[List all existing HVAC systems. For each system type list if it will be replaced or remain in the proposed design.]*

* 1. **Site visit details**

*[List any information gathered from site visits or interviews with building maintenance and staff. This should include status of the building envelope, HVAC equipment (including broken or malfunctioning equipment) and lighting. As appropriate, note operating temperatures and schedules for zones, descriptions of underheated/cooled conditions, and more.]*

* 1. **Details differing from SCA templates.**

*[List inputs which differ significantly from the SCA template values. This can include lighting power density, equipment, kitchen loads, temperature setpoints, schedules, envelope constructions, unconditioned or uncooled spaces, and ventilation methods. This section should provide an overview, while more comprehensive information will be included in Appendix A, Side by Side table below.]*

* 1. **Utility Bill matching**

*[If matching was performed for this project, describe the utility bill matching process and any adjustments that were made to better approximate the utility use profiles. Identify any compromises that had to be made to the matching procedures in the Existing Building Electrification Guidelines.]*

# Energy Model Calibration Results

*[If utility bill matching was not performed, remove this section.*

**3.1 Statistical Analysis:**

*[Insert results table from matching tab of SCA Appendix A spreadsheet.]*

**3.2 Electric Consumption:**

*[Insert Modeled vs Actual Electricity Consumption graph from Electricity Matching tab.]*

**3.3 Gas Consumption:**

*[Insert Modeled vs Actual Gas Consumption graph from Electricity Matching tab.]*

*[If any other fuel types were used in the existing building, include these here.]*

# Proposed Design Modeling Approach.

*[Complete the table below, describing the building upgrades as a series of independent Energy Efficiency Measures (EEMs) to be modeled in a stacked approach. Be sure to follow guidance from section 3.3 of the eQuest Modeling Guide for Existing Building Electrification when creating stacked EEMs. For each, list the aspect of the energy model that was changed, and the details before and after upgrading. If a Code/GSG baseline was modeled, include the values used in that model as well. If Code/GSG baseline is not relevant to this project, delete the corresponding column]*

|  |  |  |  |
| --- | --- | --- | --- |
| **EEM Number and Description** | **Existing Building** | **Proposed Design** | ***Code/GSG* Baseline** |
| *EX: [EEM 1: Updated Envelope]* | *[Masonry wall*  *4” face brick, 10” CMU*  *Uninsulated, Total U-0.551 btu/h\*ft2\*F]* | *[Existing wall + 2” Continuous XPS (R5/in)*  *Total U-0.084 btu/h\*ft2\*F]* | *[ASHRAE 90.1-2010*  *Non-residential Mass wall, climate 4.A*  *Total U-0.087 btu/h\*ft2\*F]* |
| *EX: [EEM 2: Boiler Replacement]* | *[Fuel oil boiler, 70% Et Produces steam for radiator system]* | *[New Natural Gas Boiler, 87% Et*  *Produces steam for existing radiator system]* | *[ASHRAE 90.1-2010, Gas-fired boiler, 80% Et]* |
| *EX: [EEM 3: Added AHU serving Gym space]* | *[No cooling serving gym area]* | *[New Heat pump AHU system 8000 CFM, 6 kW Fan power*  *200 MBH Cooling Capacity 13.3 EER]* | *[ASHRAE 90.1-2010, System 3. PSZ-AC with Furnace.*  *180 MBH Heating, 82%Et*  *232 MBH Cooling, 10.8 EER]* |

*[Insert rows as necessary to describe all EEMs necessary to bring Existing building baseline in-line with Proposed Design.]*

# Estimating Savings from EEMs

*[Insert table 1a – EEM Savings Comparison Existing Building Savings Calculator. For consistency, ensure that the same TMY3 Weather was used for all cases.]*

# Comparison of Existing and Proposed Building

*[Insert table 1b – Existing vs Proposed Results from the Existing Building Savings Calculator. For consistency, ensure that the same TMY3 Weather was used for both cases.]*

*[Insert table 1c – Energy End Use Breakdown from the Existing Building Savings Calculator.]*

# Appendix A: Side-by-side comparison

*[Complete the following side-by-side comparison table.]*

|  |  |  |
| --- | --- | --- |
| **Existing Building Baseline** | **Proposed Design** | ***Code/GSG* Baseline** |
| **Above grade walls**  *[Include details on construction and total U-value]* | **Above grade walls**  *[Include details on construction and total U-value]* | **Above grade walls**  *[Include details on construction and total U-value]* |
| **Below grade walls**  *[Include details on construction and total C-factor]* | **Below grade walls**  *[Include details on construction and total C-factor]* | **Below grade walls**  *[Include baseline construction and total C-factor]* |
| **Slab on Grade Floors**  *[Include details on construction and total F-factor]* | **Slab on Grade Floors**  *[Include details on construction and total F-factor]* | **Slab on Grade Floors**  *[Include baseline construction and total F-factor]* |
| **Roof**  *[Include details on construction and total U-value]* | **Roof**  *[Include details on construction and total U-value]* | **Roof**  *[Include baseline construction and total U-value]* |
| **Vertical fenestration**  *[Include details window-to-wall ratio, window type and frame material, U-value, and SHGC]* | **Vertical fenestration**  *[Include details window-to-wall ratio, window type and frame material, U-value, and SHGC]* | **Vertical fenestration**  *[Include window-to-wall ratio, window type and frame material, U-value, and SHGC]* |
| **Doors**  *[Include details on door type and total U-value]* | **Doors**  *[Include details on door type and total U-value]* | **Doors**  *[Include door type and total U-value]* |
| **Lighting Power Density**  *[List space types within the building and the lighting power w/ft2 for each]* | **Lighting Power Density**  *[For any spaces with updated LPD, list w/ft2 here]* | **Lighting Power Density**  *[For any spaces with updated LPD, list new baseline values for w/ft2 here]* |
| **Equipment Power Density**  *[List space types within the building and the equipment power w/ft2 for each]* | **Equipment Power Density**  *[For any spaces with updated EPD, list w/ft2 here and describe why the equipment is expected to change]* | **Equipment Power Density**  *[For any spaces with updated EPD, list w/ft2 here. For most cases, this should match the proposed case.]* |

*\*For items where proposed design is identical to the existing building baseline, the modeler may enter* **Identical to Baseline** *in the proposed design column in lieu of duplicating effort.*

*\*\*If estimated values are used, highlight these items in red.*

*\*\*\* If a Code/GSG baseline is not used, delete the Code/GSG Baseline column.*

*\*\*\*\*Baseline values should be updated only in areas within the construction scope, eg: if walls are remaining as is, leave U-values the same for all three cases.*

|  |  |  |
| --- | --- | --- |
| **HVAC equipment** | | |
| **Existing Building Baseline** | **Proposed Design** | ***Code/GSG Baseline*** |
| **Classroom Systems**  *[Describe the existing systems for conditioning the classrooms]*  **Offices and Staff Systems**  *[Describe the existing systems for conditioning offices and staff spaces. This may be combined with the classroom systems in some cases.]*  **Gymnasium System**  *[Describe the existing system for conditioning the gymnasium/gymnatorium.]*  **Auditorium System**  *[Describe the existing system for conditioning the Auditorium]*  **Kitchen/Cafeteria System(s)**  *[Describe the existing system(s) for conditioning the Kitchen/Cafeteria/Cafetorium]*  **IDF/EMR Room Systems**  *[Describe the existing systems for conditioning the IDF rooms and EMR rooms]*  **Heating/Ventilation Systems**  *[Describe the existing systems for conditioning spaces which only receive heating and/or ventilation. This can include restrooms, stairs, mechanical/electrical spaces, storage, and more]*  **Other Systems**  *[Describe any other systems which are present in the baseline, such as DOAS, energy recovery units and others]*  *\*For all systems, include the following information:*  *System type*  *Zone types served*  *Cooling/heating source*  *Baseboards/Radiators capacity and type if applicable.*  *Total CFM and outdoor air CFM*  *Total fan power (Separate supply and return if present)*  *Total heating and cooling capacity*  *Equipment heating and cooling efficiency, if applicable*  *Fan operation (CV or VAV)*  *Any economizers, demand control, or energy recovery included in the model.* | **Classroom Systems**  *[Describe the proposed systems for conditioning the classrooms]*  **Offices and Staff Systems**  *[Describe the proposed systems for conditioning offices and staff spaces. This may be combined with the classroom systems in some cases.]*  **Gymnasium System**  *[Describe the proposed system for conditioning the gymnasium/gymnatorium.]*  **Auditorium System**  *[Describe the proposed system for conditioning the Auditorium]*  **Kitchen/Cafeteria System(s)**  *[Describe the proposed system(s) for conditioning the Kitchen/Cafeteria/Cafetorium]*  **IDF/EMR Room Systems**  *[Describe the proposed systems for conditioning the IDF rooms and EMR rooms]*  **Heating/Ventilation Systems**  *[Describe the proposed systems for conditioning spaces which only receive heating and/or ventilation.]*  **Other Systems** *[Describe any other systems which are present in the proposed design, such as DOAS, energy recovery units and others]*  *\*For all systems, include the following information:*  *System type*  *Cooling/heating source*  *Baseboards/Radiators capacity and type if applicable.*  *Total CFM and outdoor air CFM*  *Total fan power (Separate supply and return if present)*  *Total heating and cooling capacity*  *Equipment heating and cooling efficiency, if applicable*  *Fan operation (CV or VAV)*  *Any economizers, demand control, or energy recovery included in the model.*  *\*\*If any zones have been moved between systems, (ex: a restroom was formerly heated-only but is now cooled by the same system as classrooms), indicate these changes.* | **Classroom Systems**  *[Describe the baseline systems for conditioning the classrooms]*  **Offices and Staff Systems**  *[Describe the baseline systems for conditioning offices and staff spaces. This may be combined with the classroom systems in some cases.]*  **Gymnasium System**  *[Describe the baseline system for conditioning the gymnasium/gymnatorium.]*  **Auditorium System**  *[Describe the baseline system for conditioning the Auditorium]*  **Kitchen/Cafeteria System(s)**  *[Describe the baseline system(s) for conditioning the Kitchen/Cafeteria/Cafetorium]*  **IDF/EMR Room Systems**  *[Describe the baseline systems for conditioning the IDF rooms and EMR rooms]*  **Heating/Ventilation Systems**  *[Describe the baseline systems for conditioning spaces which only receive heating and/or ventilation.]*  **Other Systems** *[Describe any other systems which are present in the baseline case, such as DOAS, energy recovery units and others]*  *\*For all systems, include the following information:*  *System type*  *Cooling/heating source*  *Baseboards/Radiators capacity and type if applicable.*  *Total CFM and outdoor air CFM*  *Total fan power (Separate supply and return if present)*  *Total heating and cooling capacity*  *Equipment heating and cooling efficiency, if applicable*  *Fan operation (CV or VAV)*  *Any economizers, demand control, or energy recovery included in the model.*  *\*\*If any zones have been moved between systems, (ex: a restroom was formerly heated-only but is now cooled by the same system as classrooms), indicate these changes.* |
| **Heating plant** | | |
| **Existing Building Baseline**  *[Describe the existing hot water/steam heating plant, if applicable. Include type, capacity, efficiency, fuel source, flow rates, and any pumps associated with the plant.]* | **Proposed Design**  *[Describe the proposed hot water/steam heating plant, if applicable. Include type, capacity, efficiency, fuel source, flow rates, and any pumps associated with the plant.]* | ***Code/GSG Baseline***  *[Describe the baseline hot water/steam heating plant, if applicable. Include type, capacity, efficiency, fuel source, flow rates, and any pumps associated with the plant.]* |
| **Cooling plant** | | |
| **Existing Building Baseline**  *[Describe the existing cooling plant, if applicable. Include type, capacity, efficiency, flow rates, and any pumps associated with the plant.]* | **Proposed Design**  *[Describe the proposed cooling plant, if applicable. Include type, capacity, efficiency, flow rates, and any pumps associated with the plant.]* | ***Code/GSG Baseline***  *[Describe the baseline cooling plant, if applicable. Include type, capacity, efficiency, flow rates, and any pumps associated with the plant.]* |
| **Domestic hot water heating** | | |
| **Existing Building Baseline**  *[Describe the existing DHW heater system. Include number of heaters, fuel source, efficiency, GPM, supply temperature, and storage capacity. Also include any pumps associated with the DHW supply system.]* | **Proposed Design**  *[Describe the proposed DHW heater system. Include number of heaters, fuel source, efficiency, GPM, supply temperature, and storage capacity. Also include any pumps associated with the DHW supply system.]* | ***Code/GSG Baseline***  *[Describe the baseline DHW heater system. Include number of heaters, fuel source, efficiency, GPM, supply temperature, and storage capacity. Also include any pumps associated with the DHW supply system.]* |

*\*For items where proposed design is identical to the existing building baseline, the modeler may enter* **Identical to Baseline** *in the proposed design column in lieu of duplicating effort.*

*\*\*If estimated values are used, highlight these items in red.*

*\*\*\* If a Code/GSG baseline is not used, delete the Code/GSG Baseline column*

# Appendix B: Energy Model Outputs - Existing Building TMY3 with Current Utility Rates

*[Include BEPU and ES-D reports for existing building, proposed, and EEM outputs.]*