

Purpose of EN97A Form

This form is used to report the inputs and results of a utility bill and energy analysis performed with or without energy modeling for the purposes of aiding building emissions applications for adjustments. If energy modeling is used to support any part of the application, then the energy modeling input and output files must be made available to the Department upon request.

- The form is based in excel and contains quality control features to mitigate common mistakes. The pages from this workbook must be included with other documents that are submitted to the department, *AND* the excel version of this workbook must also be submitted to the department.
- As indicated in the sections of the workbook, each entry must also reference where the source of the information entered can be found in other supporting documents submitted.
- If using energy modeling software that isn't DOE2-based, then the applicant must provide evidence of the approval of the software from both the Secretary of State of New York State and the Buildings Commissioner.
- For additional information and resources refer to <https://www1.nyc.gov/site/sustainablebuildings/requirements/adjustments.page>

The **EN97A Analysis Workbook** is a required document for all **28-320.8** and **320.8.9** applications. The EN97A must be submitted in both PDF and Excel formats.

When you access the Workbook, you may get a message about macros. Macros must be enabled for the Workbook to operate correctly.

1,2,3 Information

1 Location Information

Provide the house number, street name, borough, block, lot, BIN and CB No.

2 Applicant Information

Provide the last name, first name, middle initial, business name, telephone number, address, fax number, mobile number, and address of applicant. Provide the license number.

3 Adjustment Option

28-320.8 applications, select one of three compliance options and the required sheets of the form will be indicated:

- 2024 GHG Limit – for applications that do not use energy modeling to support any portion of the application
- Section 11 ECB – for applications using energy modeling to support any portion of the application, including applications demonstrating equivalency with the 2014 NYCECC based Section 11 ECB energy modeling protocol.
- Appendix G PRM – ONLY for applications demonstrating equivalency with the 2014 NYCECC based on Appendix G PRM energy modeling protocol.

28-320.9 applications, one of two compliance options and the required sheets of the form will be indicated:

- 320.9 NFP Healthcare – for applications that do not use energy modeling to support any portion of the application.

- Section 11 ECB – for applications using energy model modeling for any portion of the application, BUT 320.9 APPLICANTS DO NOT NEED TO COMPLETE SECTIONS “5a-b. Special Circ End Use” & “5c-d. Special Circ Usage”.

Design Applicant’s Statement Signature

Print Applicant of Record name and enter date. Applicant of Record must sign and seal.

4a.1 Utility Bills – Electric; 4a.2 Utility Bills – Elec add’l; 4b. Utility Bills – Nat. Gas; 4c. Utility Bills – Steam, Other; 4d. Utility Bills – Other

Monthly entries of the 2018 annual energy used by fuel are required in these sections. This includes all metered fuels and all bulk deliveries. Any 2018 utility bills to support inputs of Actual Building Emissions data may be requested. Verification of 2018 Benchmarking data may be required. Meter numbers and monthly energy use should be provided for each meter of every fuel source in the building. All utility meters for every energy source or fuel type serving the building should be provided, even if the meter is physically located in another building and even if not related to the energy use of the building. For energy sources delivered in bulk, each account should be considered one meter.

- **4a.1 Utility Bills – Electric**

Provide the meter number of every electrical meter. For each meter enter the monthly meter read date (last day of period), billing period length (number of days), billed electric (kW) and the billed electric peak (kW).

- **4a.2 Utility Bills – Elec add’l**

Provide the meter number of every electrical meter. For each meter enter the monthly meter read date (last day of period), billing period length (number of days), billed electric (kW) and the billed electric peak (kW).

- **4b. Utility Bills – Nat. Gas**

Provide the meter number of every natural gas meter. For each meter enter the monthly meter read date (last day of period), billing period length (number of days) and the billed natural gas (therm).

- **4c. Utility Bills – Steam,Other**

In the first section le provide the meter number of every district steam meter. For each meter enter the monthly meter read date (last day of period), billing period length (number of days) and the billed steam (Mlb).

The names for the energy sources in the second and third section tables (rows 40 and 37) come from the section **4e-f. Usage to GHG** in table **4f** where the applicant must select the name of the energy source from the choices in the drop-down menu. Once selected, the applicant returns to section **4d. Utility Bills – Steam, Other** and enters the meter number of each energy meter. If the energy is delivered in bulk rather than metered, then the applicant enters **Bulk Fuel Delivery** as the *Meter #*. For each meter enter the monthly meter read date (last day of period), billing period length (number of days) and the billed energy for the units shown (e.g., gallons for #2 Fuel Oil). *Refer to the Filing Guide for Building Emissions Adjustments for guidance on allocating energy use for bulk fuel deliveries.*

- **4d. Utility Bills – Other**

The names for the energy sources in the first section table (row 3) come from the section **4e-f. Usage to GHG** in section table 4f where the applicant must select the name of the energy source from the choices in the drop-down menu. Once selected, the applicant returns to section **4d. Utility Bills – Other** and enters the meter number of each energy meter. If the energy is delivered in bulk rather than metered, then the applicant enters **Bulk Fuel Delivery** as the *Meter #*. For each meter enter the monthly meter read date (last day of period), billing period length (number of days) and the billed energy for the units shown (e.g., gallons for #2 Fuel Oil). *Refer to the Filing Guide for Building Emissions Adjustments for guidance on allocating energy use for bulk fuel deliveries.*

If the building uses other than those already considered, then the applicant can include up to two additional energy sources. These are entered in the second and third section table (rows 20 and 37). The applicant must indicate the name of the energy source and in parentheses include the energy use for the billing units (e.g., Biomass (kBtu)). The applicant must also enter the Meter # for each applicable meter. If the energy is delivered in bulk rather than metered, then the applicant enters **Bulk Fuel Delivery** in the *Meter #*. For each meter the applicant must enter the monthly meter read date (last day of period), billing period length (number of days) and the billed fuel (kBtu). **The entries in this section table must be in kBtu.** *Refer to the Filing Guide for Building Emissions Adjustments for guidance on allocating energy use for bulk fuel deliveries, AND for converting billing units for energy sources not already billed in units of kBtu.*

4e-f. Usage to GHG

The monthly totals for each of the energy sources entered in section 4a. through 4d. will be totaled in the section table **4e. Utility Bill Summary – including Special Circumstance/2018 Bills**.

In section table 4e.

- Supporting Documentation column: Indicate in the description field where in the energy documentation (e.g., page number, section table number, etc.) the data supporting the entered information can be found.

The table **4f** to the right displays the GHG coefficient for each energy source. If the applicant entered a custom energy source in rows 20 or 37 in section 4d. Utility Bills – Other, then the applicant must enter the GHG coefficient in units of tCO₂e/kBtu. Refer to the *Filing Guide for Building Emissions Adjustments for more information about how to determine and document the GHG coefficient for these other energy sources.*

The section table titled **Utility Bills – Converted to GHG (tCO₂e)** will calculate and display the total monthly and annual GHG emissions for each energy source and the aggregate total for the building.

5a-b. Special Circ End Use

In section table **5a. 2018 Actual Building with Special Circumstance** and **5b. 2018 Actual Building Model without Special Circumstance**

- Enter the energy use data per fuel type for each end use in the section table (Interior Lighting, Misc. Equip., Space Heat, Space Cool, Heat Rejection, Pumps & Misc., Vent Fans, Dom. Hot Water,

Exterior Lighting, Vertical Transportation) With the Special Circumstance and Without the special circumstance.

- In the Basis for Breakdown field, select from the pulldown menu (Metered, Manual Calculations, Energy Model) for each end use
- Indicate in the description field where in the associated report the supporting documentation location (e.g., page number, section le number, etc.)
- The TOTAL fields will display the calculated annual proposed energy for each fuel type.

5c-d. Special Circ Usage

In the **2018 Special Circumstance Energy Usage** section table:

- Energy use for the Special Circumstance will be calculated using the inputs from the Building with and without Special Circumstance section table from the prior section.

In the **Special Circumstance – converted to GHG** section table:

- The TOTAL GHG emission in metric tons of CO2 equivalent (tCO2e) will be calculated and totaled per fuel and for the aggregated total 2018 emissions from the special circumstance. The aggregate total tCO2e of all the fuel types should be consistent with the inputs of DOB NOW application.

Description of Special Circumstance

A Special Circumstance narrative is required for all applications and should explain how the special circumstance is responsible for the excess emissions and include supporting calculations and documentation, which should be coordinated with the DOB NOW application. The narrative should provide details of the various factors, building conditions and occupancy patterns

that encompass the special circumstance. If more than one special circumstance is present in the building, describe each separately. This description may include information about occupant density, usage patterns, base building systems

operating, and occupant/equipment schedules (e.g., occupied, unoccupied periods, seasonal periods) as necessary. The narrative should include quantitative evidence from measured data, calculations, metering, or sub-metering data. The detailed information used to demonstrate the special circumstance may come from measurement and verification or other robust empirical methodologies to support the narrative and emissions calculations.

- Include a narrative for the “Description of the Special Circumstance” in the space provided. If space in the text box is insufficient or it is preferred, the applicant can put the name of a separate document(s) uploaded with the application where the narrative for the Special Circumstance is provided.

ENVELOPE

6a-b. Envelope, 6c. Fenestration

For each section, information is required for the baseline case and the actual building model. For projects selecting 2024 GHG Limit or Section 11 ECB as the compliance option, the baseline case values will reflect the mandatory and prescriptive values in ASHRAE 90.1-2010. For projects selecting Appendix G

PRM as the compliance option, the baseline case values will reflect those in ASHRAE 90.1-2016 Appendix G with Building Performance Factors (BPFs) aligning to ASHRAE 90.1-2010.

- **6a. Above-Grade Walls & Fenestration Areas.**
 - 2024 GHG Limit: For both the baseline case and the actual building, enter the total above-grade wall area (window + wall area) for each orientation as well as the vertical glazing area for each orientation as it exists in the actual building. Enter the total roof area (roof + skylight area) and the total skylight area.
 - Section 11 ECB & Appendix G PRM: For both the baseline case and the actual building model, separately enter the total above-grade wall area (window + wall area) for each orientation as well as the vertical glazing area for each orientation. Enter the total roof area (roof + skylight area) and the total skylight area. For Appendix G only, select the building area type from the drop-down menu. If the building area type does not appear, select 'Other'.
- **6b. Opaque Elements.**
 - All Compliance Categories: For each building assembly category, select the space-conditioning category (i.e., residential, non-residential, semi-heated) and assembly description from the drop-down list. This information will auto-populate the U-factor for the baseline case. For the actual building model, type in a general description of the building assembly with the corresponding average U-factor.
- **6c. Vertical Fenestration**
 - All Compliance Categories: For each type of Vertical Fenestration and Skylight, select the space-conditioning category (i.e., residential, non-residential, semi-heated) and fenestration description from the drop-down list. This information will auto-populate the U-factor and Solar Heat Gain Coefficient (SHGC) for the baseline case. For the actual building model, type in a general description of the fenestration assembly with the corresponding average U-factor, SHGC and Visible Transmittance (VT). The VT from the actual building will populate the baseline case. Identify from the drop-down list if any shading devices are present in the actual building. If any shading devices are present, list the description in the corresponding text box.

LIGHTING

6d. Interior LPD-Space Method, 6d. Interior LPD-Space Method

- **6d. Interior LPD-Space Method**
 - All Compliance Categories: Select from the drop-down, each distinct Space Type in the building along with the corresponding aggregate area, which auto populates the baseline lighting power density (LPD). The total area of the space types shall amount to the total area of the conditioned space within the building, if not, an error will occur. Additionally, indicate whether each space is required to have automatic controls (i.e. occupancy sensors, daylight responsive controls). For the actual building, input the LPD for each corresponding space type, and select from each drop down, whether that space type has automatic controls or daylight responsive controls.

- **6e. Ext LPD**

- All Compliance Categories: Select from the drop-down, the Zoning District where the building is located. For each exterior lighting area type, input the length of the area parameter in feet or the area of the parameter in square feet, which will automatically calculate the baseline watts. Input the actual building designed lighting wattage for each area type. The compliance summary will automatically calculate the baseline power allowance and the actual wattage for all of the exterior lighting.

MISCELLANEOUS LOADS

6f. Misc. Equip.

Miscellaneous equipment consists of the unregulated loads that contribute to the overall energy consumption in the building. Some examples include elevator usage, appliances, computer equipment, data center equipment.

- All Compliance Categories: Input a simple description of the space type (i.e., office spaces, dwelling units) or the equipment type (i.e., elevator, washing machines) with the corresponding area of the space or number of equipment in the space. The annual kwh or kw shall be calculated and provided along with the annual operating schedule.
- Compliance with ECB or PRM: Indicate from the drop-down menu whether the baseline and actual building are modeled identically. If they are not modeled identically, provide a description as to what is different in the supporting documentation.

SERVICE HOT WATER

6g-h. Service HW

- Section 6g, All Compliance Categories: In the pink cell C5, select the building area type that is served by the service water heating system. Enter the service water heating system type and fuel that exists in the actual building. The baseline service water heating system will automatically populate.
- Section 6h, All Compliance Categories: Provide a narrative of the building's heating, cooling, ventilation, and service hot water systems. Include details of the type of systems for each occupancy category, a summary of the control system and any energy saving strategies.

HVAC

6i. Actual Building Zone HVAC, 6j-n. Building Plant Eqp, 6o. Baseline Zone HVAC, 6p-t. Baseline Plant Eqp

- **6i. Actual Building Zone HVAC**

Building HVAC systems that serve the zones within the building shall be itemized on this section. Only like systems of the same type may be combined on the same row. Details of the specific information to enter in each column are described below. The information in this section shall correspond to the data in the supporting documentation and the energy modeling reports.

- **System Tag(s)** – Enter the unique tag of the system that correlates to the supporting documentation (i.e., audit or M-dwg)
- **Mfg. & Model No.** – Enter the manufacturer name and the model number of the equipment (if known), if not known, enter NA
- **Existing Equipment Type** – Select the equipment type in column C from a drop-down menu. The selection will populate the purple cells in columns E, F, and I.
- **Description of Spaces Served** – Enter a brief description of the zone that is served by the HVAC system (i.e., perimeter office space, lobby, apartments, corridors on FL 1-10).
- **Zone Classification** – this information is pre-populated and dependent on the selection of the equipment type in column C. Further modifications can be made via drop-down to align with the actual zone that is served by this equipment.
- **Heating Source** – this information is pre-populated and dependent on the selection of the equipment type in column C. Further modifications can be made via drop-down to align with the actual heating source.
- **Rated Capacity (heating)** – Enter the rated heating capacity in thousand BTU for the individual system serving the HVAC zone. If several systems are included in a single row, enter the individual system capacity and number of units (i.e., 37 units @ 72 kBTU)
- **Rated Efficiency (heating)** – Enter the rated efficiency and indicate the units of the zone heating system. If the unit is rated in both full load and part load, include both efficiency ratings and associated units.
- **Cooling Source** - this information is pre-populated and dependent on the selection of the equipment type in column C. Further modifications can be made via drop-down to align with the actual cooling source.
- **Rated Capacity (cooling)** – Enter the rated cooling capacity in thousand BTU for the individual system serving the HVAC zone. If several systems are included in a single row, enter the individual system capacity and number of units (i.e., 37 units @ 72 kBTU)
- **Rated Efficiency (cooling)** – Enter the rated cooling efficiency and indicate the units of the zone cooling system. If the unit is rated in both full load and part load, include both efficiency ratings and associated units.
- **Supply Airflow (CFM)** – Enter the supply airflow of the zone system
- **Outdoor Airflow (CFM)** – Enter the outdoor airflow of the zone system
- **Fan Control** – Select either Constant Volume or Variable Volume from the drop-down list to indicate the fan control of the zone system
- **System Fan Power** – Enter the total system fan power, including any supply, exhaust, return fans, in kilowatts
- **Economizer** – Select Yes/No from the dropdown list, indicating whether an economizer is present on the zone system
- **ERV** - Select Yes/No from the dropdown list, indicating whether an energy or heat recovery device is present on the zone system
- **DCV** - Select Yes/No from the dropdown list, indicating whether demand-controlled ventilation is present to control the outdoor air flow to the zone

- **6j-n. Building Plant Eqp**

The data input shall correspond to the information provided in the supporting documentation and the energy modeling reports.

- Heating Plant Equipment – Enter the information for each unique heating plant equipment in a separate row. Heating equipment of the same type may be combined into a single row.
- Cooling Plant Equipment– Enter the information for each unique cooling plant equipment in a separate row. Cooling equipment of the same type may be combined into a single row.
- Cooling Tower Equipment– Enter the information for each cooling tower equipment in a separate row. Cooling Tower equipment of the same type may be combined into a single row.
- Pumps– Enter the information for each pumping system in a separate row. Indicate which plant system the pump is serving.
- Other Equipment – Enter the information for other plant equipment that cannot be classified into one of the above categories (i.e., cogeneration systems)

- **6o. Baseline Zone HVAC**

This section automatically populates the baseline Building HVAC systems selection depending on the information entered in Section 6i. Actual Building Zone HVAC. Follow the instructions above for 6i. Actual Building Zone HVAC on populating Columns H through R. The values input into this section shall align with the values in the modeling reports.

- For Appendix G Compliance: Select the Building Area Type of the portion of the building that is served by the system. This information will pre-populate the information in columns D, E, F and G.

- **6p-t. Building Plant Eqp**

The data input shall correspond to the information provided in the supporting documentation and the energy modeling reports. Follow the instructions above for 6j-n. Building Plant Eqp. The information provided shall align with the energy modeling reports.

7 Modeling Information

- **7a. Modeling Firm**

Enter the information of the firm that is responsible for performing the energy model, including the information of the individual performing at the firm who should be the point of contact for any questions.

- **7b. Energy Modeling Information**

- **Modeling Protocol** – This information is auto-populated based on the adjustment option selected on section (e.g., eQuest v3.65)
- **Weather File** – Enter the weather file used in the energy model, including the TMY information
- **Proposed Unmet Load Hours** – Enter the unmet load hours for the actual building model (excluding the special circumstance)
- **Baseline Unmet Load Hours** – Only applicable to Adjustment Options following ECB or PRM Enter the unmet load hours for the baseline building model (excluding the special circumstance)
- **Gross Square Feet** – Enter the gross square footage of the building

- **Modeled Square Feet** – Enter the modeled square footage of the building
- **7c. Energy Modeling Information per Modeled Square Feet**

The information in this section is auto-populated based on the energy usage of the actual modeled building (excluding special circumstance energy usage) and the baseline modeled building energy usage. The information provides details on the energy cost per square foot, site energy per square foot, and greenhouse gas emissions per square foot.

8a. Usage – Actual v Modeled, 8b. Graphs – Actual v Modeled, 8c. Graphs – Actual v Modeled

The Building including the special circumstance energy usage shall be modeled and the energy usage shall closely align with the utility bills. The following information provides information as to whether the building energy model can be considered equivalent to the actual energy consumption.

- **8a. Usage – Actual v Modeled**
 - **Utility Bill Comparison – including Special Circumstance** - Enter the monthly utility information for each fuel type. Indicate the modeling reports where this information was obtained.
 - **Utility Bills – Actual v. Modeled (% difference)** – The information in this section table is auto-populated based on the utility bill information and the modeled fuel use information. Row 38 indicates whether the differences between the modeled building and the actual energy consumption are acceptable. If the criteria is not acceptable, then adjustments must be made to the energy model until the criteria indicates acceptable.

- **8b. Graphs – Actual v Modeled**

The graphs are automatically generated based on the utility bill information and the modeling usage. This section contains graphs for electricity kwh, electricity kw, natural gas, district steam, and the 'other fuels' as indicated in cells N9 and N10 of section **4e. Usage to GHG**.

- **8c. Graphs – Actual v Modeled**

The graphs are automatically generated based on the utility bill information and the modeling usage. This section contains graphs for the 'other fuels' as indicated in cells N11, N12, and N13 of section **4e. Usage to GHG**.

9. 2014 ECC – End Use Comp.

Enter values in this section only for applications choosing either Section 11 ECB or Appendix G PRM as the Adjustment Option on 1,2,3 Information.

- **Baseline model (no special circumstance)** Enter the annual energy usage for each building system type and fuel type of the baseline energy model.
 - **Section 11 ECB:** The baseline energy model shall follow the modeling methodology of the 2014 NYCECC Appendix A (modifications to ASHRAE 90.1-2010).
 - **Appendix G PRM:** The baseline energy model shall follow the modeling methodology of the 2016 NYCECC Appendix CA (modifications to ASHRAE 90.1-2016).

- **Actual w/o Special Circumstance v. Baseline**

The information in this section table is auto-populated using the annual utility end use information in the section *table Baseline model (no special circumstance) on this section and the annual utility end use information in the section le 2018 Actual Building without Special Circumstance on 5a-b. Special Circ End Use*. The information in Columns C and D display the percentage of annual energy consumption for each end use. Positive values in Column E indicate which end uses have less energy consumption in the actual building than the baseline and the negative values indicate which end uses have more energy consumption in the actual building compared to the baseline.

10. Modeling Equivalence

This section only needs to be completed if energy modeling has been used to establish equivalency with the 2014 NYC Energy Conservation Code (2014 NYCECC).

- **10a. Purchased Energy Rates & Compliance Documentation**

- Enter the annual energy cost per fuel type for both the actual building (without special circumstance) model and the baseline building model. The utility rate information should be the same for the baseline model and the actual building, which should also align with the utility bills.
- Applications that demonstrate equivalency with the 2014 NYCECC will show ‘Equivalent’ in cell I15, applications that are not equivalent will show ‘NOT Equivalent’ in cell I15
- The algorithm for equivalency is determined by the modeling methodology selected for the baseline, as indicated in section 1,2,3, Information. Appendix G PRM equivalency is based on either the Performance Site Energy Index or the Performance Carbon Index, if either method shows equivalency, then the building is deemed equivalent to the 2014 NYCECC.

- **10b. Performance Site Energy Index – Appendix G ONLY**

- Select the building area type for the building from the drop-down list in cell D20. If more than one building area type exists, select ‘Weighted Average’ and complete section 10d. Weighted BPF. The Building Performance Factors (site energy) are auto-populated based on the selection of the building area type in cell D20. These Building Performance Factors are listed in the Rule and are deemed equivalent to the 2014 NYCECC.
- The green cells in this section will auto-populate from other information in the workbook. If the actual building Performance Site Index (cell D24) is less than or equal to the baseline building Performance Site Index (cell C24), then the building is deemed equivalent.

- **10c. Performance Carbon Index – Appendix G ONLY**

- Select the building area type for the building from the drop-down list in cell D28. If more than one building area type exists, select ‘Weighted Average’ and complete section 10d. Weighted BPF. The Building Performance Factors (carbon) are auto-populated based on the selection of the building area type in cell D28. These Building Performance Factors are listed in the Rule and are deemed equivalent to the 2014 NYCECC.
- The green cells in this section will auto-populate from other information in the workbook. If the actual building Performance Carbon Index (cell D32) is less than or equal to the baseline building Performance Carbon Index (cell C32), then the building is deemed equivalent.

- **10d. Weighted BPF – Appendix G ONLY**

- Information in this section shall be entered when the building contains more than one building area type and 'Weighted Average' is selected in either cell D20 or D28.
- Enter the modeled area for each space classification. The total sum of the modeled area should equal the Modeled Square Feet input in section 7b of section 7 Modeling Information, otherwise the text 'Not Equal to Modeled Area" will appear.