



DC Net-Zero Energy Program

Technical Guide



SUBMITTAL CHECKLIST

- Project and Team Information Sheet
- Signed Participation Agreement
- Full Set of Construction Plans
- Energy Use Intensity (EUI) Calculator
- HVAC Load Sizing Calculation
- Energy Model
- Renewable Energy Plan

 DEPARTMENT OF THE DISTRICT OF COLUMBIA
DC MURIEL BOWSER, MAYOR

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Overview

With the 2018 District of Columbia Construction Code adoption, the Department of Consumer and Regulatory Affairs (DCRA) will have in place Appendix Z, a voluntary appendix to the DC Energy Conservation Code (DC ECC) that sets the standard for net-zero construction for commercial buildings within the District.

The goal of the DC Net-Zero Energy: Residential Program is to create a programmatic and incentivized structure for projects not under Appendix Z, and encourage net zero energy practices beyond those required for residential construction under current codes. The mission of the program is to identify individual contributors through a selective process designed to diversify construction projects and practices. The program's goal is to spread knowledge and notoriety over as many projects as possible. The following document will outline requirements around eligibility, compliance paths, and project certification.

Project Eligibility

Residential Program Eligibility

To be eligible to participate in the DC Net-Zero Energy: Residential Program the project must include homes or dwellings that meet the following eligibility requirements:

1. Detached dwelling units (e.g. single family homes).
2. Dwelling units in any multifamily building four stories or fewer.
3. Dwelling units in multifamily buildings four stories or fewer above-grade where dwelling units occupy 80% or more of the occupiable square footage of the building.

Dwellings in eligible multifamily buildings as listed above may be served by central heating, cooling, or hot water systems. In these projects use of the RESNET Guidelines for Multifamily Ratings for modeling the specified central system(s) is recommended.

If your project does not fall under the following eligibility requirements, you may use the DC Net-Zero Energy: Commercial Program. If you have questions about eligibility, please email green.building@dc.gov.

Commercial Program Eligibility

All projects subject to the DC Energy Conservation Code (DCMR 12-I) are eligible to use “Appendix Z”, the District’s first Net-Zero Energy Code. Building types might include office buildings, multifamily buildings, mixed-use buildings, schools, or hospitals.

The most current language for Appendix Z of the forthcoming DC Energy Conservation Code is out for the 2nd round of proposed rulemaking - <https://www.dcregs.dc.gov/Common/DCR/Issues/IssueCategoryList.aspx?CategoryID=14&IssueID=800>

Certification Process

The certification process for the DC Net-Zero Energy Program begins at project design to be eligible for the Design Incentives associated with the program. Programs that wish to pursue an approved alternative net-zero energy pathway, please reference DCMR 12-A sections 101.10.6 and 101.10.7 (see below).

Design & Pre-Permitting

1. Review the NZE Program Requirements for the Residential Program or Commercial Program based on your eligibility.
2. Register the project with DCRA by emailing green.building@dc.gov and a Green Ambassador will set up a preliminary interest meeting. At the meeting you’ll give an overview of the project timeline, look at current incentives, and talk through steps you need in preparation for permitting.
 - a. Submit signed Participation Agreement to DCRA with supplemental documentation
 - b. Complete step 1 of NZE Calculator

Permitting

When the project is ready to submit a permit application, they will work with the Green Ambassador to ensure permitting occurs in a more streamlined, expedient manner. Projects conducting phased permitting (e.g. BCIV, FD, B) should develop a plan addressing the following sequence:

1. Permit intake and pre-screening: Complete building permit application through DCRA’s online permit system
2. Building Permit plan review by DCRA and sister agencies, as applicable (ex: DOEE, DDOT, DC Water, DOH)
 1. Residential NZE Program review additional requirements

- a. Complete Step 2 of NZE EUI calculator and submit
 - b. Submit documentation of completed energy model
 - c. Submit documentation for heating and cooling load sizing calculations
2. Commercial NZE Program
 - a. Complete zEPIU calculation and submit
 - b. Submit documentation of completed energy model
 - c. Submit documentation for heating and cooling load sizing calculations
3. Approved Net-Zero Energy Alternative Compliance Pathways should reference guidance below
3. Solar Permit Review (where applicable)
 1. Where on-site solar is required, submit for a solar permit application (more instructions on solar permitting process can be found [here](#))
 2. Where on-site solar is not possible, initiate preliminary community solar agreement

Inspections

During construction, projects will undergo on-site verification and performance testing at two main points, mid-construction and final. On-site verification will be completed by the DCRA Green Building Division Inspectors. DCRA Green Building Division will carry out independent inspections of the project to document and verify progress required by the DC-Energy Conservation Code and any additional items identified in the Participation Agreement. Projects may continue to utilize 3rd party inspectors for all other inspection disciplines.

DCRA mid-construction verification visit

This visit is sometimes called a pre-drywall, insulation inspection, or rough inspection. During this visit inspectors will verify certain building systems that are only visible while the building walls remain open, such as efficient framing measures and installed ventilation ducting. DCRA inspectors will be looking at the following:

- Thermal Envelope
- HVAC Equipment
- Ductwork
- Water Heater
- Appliances
- Water Fixtures
- Lighting
- Pre-testing Results

DCRA Post-Construction Verifications

Once construction is complete, the DCRA inspector will return for the second mandatory site visit. During this visit, the inspector will verify all remaining items and review the required performance testing.

1. Pre-Occupancy Verification: At the end of construction and prior to occupancy, projects must complete verification/check-in with DCRA. Projects will be required to submit the following documentation after the Final Inspection:
 - a. Certificate of Occupancy Application (1)
 - b. Documentation from third party rating program (when applicable)
 - c. DCRA will review the documentation to confirm performance testing requirements have been met and achieved
2. Post-Occupancy Verification: Based on the Pre-Occupancy approval, an estimated date will be set by DCRA and the project team to confirm third party rating and certification has been completed. To be listed as certified in the DCRA Net-Zero Energy Program, projects must submit the following documentation:
 - a. Completion of approved *renewable energy strategy*.
3. Once all pre and post occupancy steps have been verified, the project team will be invited to the following
 - a. Case Study submittal which must be reviewed by DCRA staff for approval
 - b. Professional Directory intake form

[1] Single family homes in the District of Columbia are not required to obtain a certificate of occupancy and will not be required to submit this piece of documentation.

Green Ambassador Incentive Program

Overview

The Green Ambassador Incentive Program works directly with each project team to help successfully complete the projects per the program requirements. The Green Ambassador provides technical advice, and ultimately is responsible to sheppard the project through the permitting process. They act as the final decision maker on issues and interpretations of the project as it pertains to the program requirements.

Incentives

DCRA offers a rolling set of incentives to projects pursuing an approved net-zero energy (NZE) standard under the DC Net-Zero Energy Program. Below is a summary of current incentives. To confirm the most current incentives being offered, please check with the DCRA Green Building Division at green.building@dc.gov.

Incentive Overview:

Permitting Incentives	Post-Occupancy Incentives
<ol style="list-style-type: none">1. DCRA Green Ambassador (Account Manager, Point of Contact)2. Accelerated Permitting3. NZE financial incentive up to \$10,000	<ol style="list-style-type: none">1. Case Study (<i>in development</i>)2. Professional Directory (<i>in development</i>)

The program reserves the right to limit incentives of multiple unit projects in order to diversify the portfolio of participants.

Incentives Available at Permitting

1. **DCRA Green Ambassador:** The project will be assigned a DCRA “Green Ambassador”. The Ambassador will be a point of contact in the Agency to ensure a smoother process through permitting and construction.
2. **Accelerated Permitting:** DCRA Green Ambassador will work with the project team to determine an accelerated permitting timeline for the project. Accelerated timeline will take into account application submittal, permitting pre-screening, plan review for not only DCRA but applicable sister agencies, and permit issuance. It is an expedient and pragmatic approach to permitting that ensures a more predictable timeline.

3. **NZE Financial Incentive:** DCRA in partnership with the DC Sustainable Energy Utility (DCSEU) is awarding up to \$10,000 at permit issuance to qualifying NZE projects. This incentive is based on offsetting above-code construction items deemed crucial to achieving net-zero energy goals. Evidence must be provided to the DCSEU to document that costs/expenses have been incurred toward the development of the project. Any funding provided by the DC Sustainable Energy Utility (DCSEU) will be implemented and tracked through a separate agreement and is subject to available funds to be provided by DCSEU.

Incentives Available at Post-Occupancy

1. **Case Study:** We are proud of the pioneering NZE projects in the District, and are working internally and with regional partners to develop a case study template to promote projects that achieve NZE. Check back soon for more information.
2. **Professional Directory:** Each NZE project breaks new ground, and the project team's experience is invaluable to the next NZE project in the District. All project team members associated with an approved NZE project will be recognized. Check back soon for more information.

Residential NZE Technical Requirements

A project follows either the DC Residential Energy Performance Pathway, or an alternative compliance pathway. Meeting these guidelines will meet, by default, the requirements/intent of the DC Energy Conservation Code.

Residential Energy Performance Pathway

The energy performance path provides a flexible approach to designing and building a net-zero project, allowing for trade-offs after the mandatory Target Energy Use Intensity (EUI) has been met. Follow these steps to use the performance path:

1. Use the **NZE Calculator** to calculate the **Maximum EUI** allowed for your project.
2. Using an energy model, select a combination of energy efficiency measures to meet or beat your project's **Maximum EUI**.
3. Submit a full energy model to DCRA for review. Submittal must include the following:
 - Thermal envelope inputs
 - Equipment specifications
 - Internal loads
 - Miscellaneous loads
- a. The energy model may not include renewable energy generation to achieve the **Maximum EUI**.
- b. The energy model report must provide detailed information including the EUI.
4. Select a **renewable energy plan** as described in Table 1 below to meet project energy needs.
 - a. The project must meet as much of its energy needs on site before opting for off-site renewable options. A detailed explanation of onsite limitations must be submitted before final approval.

Table 1. Renewable Energy Requirements

On-site combustion as an energy source	Prohibited
On-site renewables	<ol style="list-style-type: none">1. Photovoltaic panels2. Solar thermal systems3. Wind turbines

Off-site renewables	<ol style="list-style-type: none"> 1. Utility-approved CREF 2. 5-year PPA 3. Connection to renewable microgrid 4. Connection to a low-carbon neighborhood thermal energy system
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Alternative Compliance Pathways

The DCRA Net Zero Energy Program recognizes the efforts of other third party verification programs towards NZE. Please discuss options with the Green Building Division for alternative compliance paths. These include but are not limited to:

- Zero Energy Ready Home, Department Of Energy.
- Passive House Institute US.
- Zero Energy Certification, International Living Future Institute.

Project Requirements

Regardless of which compliance path is chosen, all projects are required to meet the following measures in order to comply with the DC Energy Conservation Code for Residential Provisions.

1. Performance Testing.
 - a. Air infiltration Testing.
 - i. Pre-test: Thermal envelope fully installed.
 - ii. Post-test: conducted at final inspection.
 - b. Duct testing.
 - i. Pre-test: conducted immediately after duct installation before the air handler has been installed.
 - ii. Post testing: conducted at final and must be complete system testing.
2. Manual J and Manual S calculations: Must include room by room airflow rates.
3. Equipment Efficiency:
 - a. Project must be 100% electric, this includes but not limited to:
 - i. HVAC; *multi stage recommended.*
 - ii. Domestic hot water; *heat pump water heater recommended. Solar thermal with electric backup allowed.*
 - iii. Cooktop and stove; *induction cooktop recommended.*

Project Completion

1. Inspections must be completed and approved.
2. Documentation must be completed and approved.
 - a. Performance testing
 - i. performance testing must be conducted by an approved agency unaffiliated to the project or project team. Results shall meet or exceed current code minimums.
 - b. Renewable energy agreement
 - i. Solar installation documentation.
 - ii. CREF or other approved off site generation plan.
 - c. Final approval
 - i. Marketing material packet. *(in development)*

DC Commercial NZE Technical Requirements

(Currently published as 2nd round of proposed rulemaking for the new DC Construction Codes)

APPENDIX Z NET-ZERO ENERGY COMPLIANCE PATH

Z1	GENERAL
Z2	MINIMUM PERFORMANCE REQUIREMENTS
Z3	RENEWABLE ENERGY
Z4	ENERGY METERING, MONITORING AND REPORTING
Z5	ENERGY REPORTING
Z6	NORMATIVE REFERENCES

Z1 GENERAL. Appendix Z is intended to be an optional alternative compliance path for projects to comply with the *Energy Conservation Code-Commercial Provisions*.

The design of a *net-zero energy building* shall be achieved through the use of three complementary approaches, to be employed to the maximum extent feasible, in the following order:

1. Reducing building energy demand for heating, cooling, lighting and ventilation through the use of passive design and improved envelope performance techniques.
2. Reducing total building energy demand through the installation of high-efficiency mechanical systems, hot water systems, power systems, lighting, and process equipment.
3. Supplying remaining building energy needs from renewable sources of energy.

Appendix Z draws on existing requirements outlined in the *Energy Conservation Code-Commercial Provisions*. Additional minimum performance requirements for building thermal energy performance and airtightness testing have been set to ensure new construction achieves a high degree of energy conservation.

Z1.1. Definitions. In addition to definitions contained in Chapter 2 of the *Building Code* and in Section 3.2 of the *Energy Conservation Code-Commercial Provisions*, the following definitions shall apply to projects opting to use Appendix Z:

Airtightness. The rate of air leakage through the building envelope, measured in cubic feet per minute per square foot of building envelope ($\text{cfm}/\text{ft}^2_{\text{env}}$), at 0.0109 psig (75 Pa) of pressure differential.

Annual cooling demand. The total amount of thermal energy required to cool a building over the course of a year, measured in thousands of British thermal units per square foot of interior conditioned floor area, per year ($\text{kBtu}/\text{ft}^2_{\text{ICFA}}/\text{yr}$).

Annual heating demand. The total amount of thermal energy required to heat a building over the course of a year, measured in thousands of British thermal units per square foot of interior conditioned floor area, per year ($\text{kBtu}/\text{sf}_{\text{ICFA}}/\text{yr}$).

Energy Use Intensity (EUI). The annual energy use of the building expressed in kBtu divided by square feet (kbtu/ft^2).

Low-carbon neighborhood thermal energy system. A district-scale energy system that uses acceptable sources of renewable energy per section Z3.2 to produce steam, hot water, or chilled water for the purposes of providing for building heating, cooling, and/or domestic hot water needs.

Net-zero energy building. A highly energy-efficient building that produces on-site, or procures through the construction of new renewable energy generation, enough energy to meet or exceed the annual energy consumption of its operations.

Renewable energy microgrid. (As defined by the U.S. Department of Energy) A group of interconnected loads and distributed renewable energy resources within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid.

Zero Energy Performance Index (zEPI). A scale representing the ratio of the energy performance of a proposed design or an existing building compared to the mean energy performance of the building stock from the benchmark year of 2000 (Commercial Buildings Energy Consumption Survey, US Department of Energy, 2003 Average).

Z1.2. Scope and intent. The provisions of Appendix Z regulate the design, construction, commissioning and operation of buildings and their associated building sites for

compliance with the *Energy Conservation Code-Commercial Provisions*. The intent of this Appendix is the reduction of energy use to achieve net-zero performance.

Z1.3. Administration and enforcement. Administration and enforcement of Appendix Z shall be governed by Chapter 1 of the *Building Code*, 12-A DCMR.

Z1.4. Application. The provisions of Appendix Z shall apply to each project that is new construction, or classified as a Level 3 alteration under the *Existing Building Code*, and for which this compliance path option has been chosen.

Z1.5 Compliance. Compliance with Appendix Z requires that the building and its site comply with the provisions of Sections Z2, Z3, Z4, and Z5.

Z2 MINIMUM PERFORMANCE REQUIREMENTS. Minimum performance requirements for building energy use intensity have been set to ensure maximum energy efficiency prior to adding renewable energy generation. The building and its site shall be designed and constructed to meet the mandatory prescriptive requirements in sections Z2.1, Z.2, Z.3, Z.4, and Z.5.

Z2.1. Building energy use intensity. Applicant shall submit, with the building permit application, *permit documents* with data and calculations sufficient to ascertain compliance with the net-zero energy performance target for buildings and their sites, using predictive modeling. Predictive modeling shall use a source energy unit of measurement, expressed in kBtu/ft²/yr, based on the use of the *Zero Energy Performance Index (zEPI)* as outlined in section Z2.1.1. In a mixed-use building, all uses shall be included in demonstrating compliance, and an area-weighted calculation method shall be used to account for each use.

Z2.1.1. Zero Energy Performance Index, zEPI. Building design shall demonstrate a zEPI of 30 or lower as determined in accordance with Equation 1.

$$zEPI = 50.4 (EUI_p/EUI) \quad (\text{Equation 1})$$

Where:

EUI_p = The annual energy use of the building in source kBtu/ft², for the proposed design of the building and its site, calculated in accordance with Section Z2.1.2, not taking into account any on-site or off-site renewable energy.

EUI = The annual energy use of the building in source kBtu/ft² for a baseline building and its site, calculated in accordance with Section Z2.1.2, not taking into account any on-site or off-site renewable energy.

Z2.1.2. Annual energy use indices. The EUIp of the building and building site, and the EUI, shall be calculated in accordance with Appendix G to ASHRAE 90.1-2016, as modified by Sections Z2.1.2.1 and Z2.1.2.2, and *approved* modeling guidelines published by the *Department* in *administrative bulletins*. The annual energy use shall include all energy used for the building systems and its anticipated occupancies.

Z2.1.2.1. Additional Modeling Rules and Procedures. Modeling inputs shall be in accordance with the *COMNet Rules and Procedures Manual*.

Z2.1.2.2. Electricity. In calculating the annual energy use indices, consistent units shall be used for electric energy use, converting the electric energy use measured at the utility meter or metered point of delivery from kWh to kBtu. kWh shall be converted to kBtu by multiplying the annual electric energy use, in kWh, by 3.412 kBtu/kWh; and multiplying the result by the dimensionless conversion factor found in Table 1.

TABLE Z2.1.2.2
ELECTRICITY GENERATION ENERGY CONVERSION FACTOR
BASED ON EPA eGRID SUB-REGION

eGRID 2010 SUB-REGION ACRONYM	eGRID 2010 SUB-REGION NAME	CONVERSION FACTOR
RFCE	RFC East	3.28

Z2.2. Building Thermal Energy Performance. Building thermal energy performance shall comply with Sections Z2.2.1 through Z2.2.2.

Z2.2.1. Annual heating demand. Building design shall demonstrate a maximum *annual heating demand* of 4.2 kBtu/ft²_{iCFA}/yr (4.8x10⁴ kJ/m²_{iCFA}/yr).

Z2.2.2. Annual cooling demand. Building design shall demonstrate a maximum *annual cooling demand* of 6.4 kBtu/ft²_{iCFA}/yr (7.3x10⁴ kJ/m²_{iCFA}/yr).

Z2.3. Multiple buildings on a site. Where there is more than one building on a site, each building shall comply with Sections Z2.2.1 and Z2.2.2 or the combined demands of all the buildings on the site shall comply with Sections Z2.2.1 and Z2.2.2.

Z2.3.1. Assignment of energy to multiple buildings on a site. For building sites employing district energy systems and with multiple buildings, the energy use associated with the building site shall be assigned to each building proportionally to the gross floor area of each building as a fraction of the total gross floor area of all buildings on the building site. Where energy is derived from either renewable or waste energy, or both sources, either located on the building site, within individual buildings, or on individual buildings and delivered to multiple buildings, the energy so derived shall be assigned on a proportional basis to the buildings served, based on each served building gross floor area. Energy delivered from renewable or waste energy sources located on or within a building shall be assigned to that building.

Exception: Where it can be shown that energy to be used at the building site is associated with a specific building, that energy use shall be assigned to that specific building.

Z2.4. Registered design professional in responsible charge of building energy simulation. Where the *applicant* chooses to utilize Appendix Z as the path of compliance with the *Energy Conservation Code-Commercial Provisions*, the owner shall engage the services of, and designate on the building permit application, a registered design professional who shall act as the registered design professional in responsible charge of building energy simulation. Building energy simulation services engaged by the registered design professional shall be certified by an *approved* accrediting entity as determined by the *code official*. As authorized by the *code official*, the owner is allowed to designate a substitute registered design professional who shall perform the duties required of the original registered design professional in responsible charge of building energy simulation. The owner shall notify the *code official*, in writing, whenever the registered design professional in responsible charge of building energy simulation is changed or is unable to continue to perform his or her duties.

Z2.5. Building Commissioning. All systems shall be commissioned in accordance with this section and the *Energy Conservation Code-Commercial Provisions*. Energy systems commissioning and completion shall be performed for the following systems and their associated controls:

- Building envelope;
- HVAC (both mechanical and passive systems as well as HVAC controls);

- Lighting, daylighting, and lighting control systems;
- Domestic hot water systems; and
- Renewable energy systems.

Z2.6. Airtightness Testing. A whole building pressurization testing shall be conducted in accordance with Section 11.3.1.2.4(a) of the *Energy Conservation Code – Commercial Provisions* to measure the airtightness of the building envelope. The owner shall verify that the airtightness specified in the final approved predictive energy model is achieved in the field by providing the *code official* with a copy of the test results before the final *Certificate of Occupancy* is issued.

Z3 RENEWABLE ENERGY. The building and building site shall be provided with renewable energy equal to the EUI_p on an annual basis and calculated in accordance with Section Z2.1.1. Sources of renewable energy shall comply with Sections Z3.1 through Z3.3.

Z3.1. On-site combustion. On-site combustion of fossil fuels shall not be permitted for the provision of thermal energy to the building except as specified by the *code official*.

Z3.2. Acceptable sources of renewable energy. Acceptable sources of on-site renewable energy to be used on the building site include:

- Photovoltaic panels;
- Solar thermal systems;
- Wind turbines; and
- Biogas

No other source of on-site renewable energy is acceptable for building design, unless the rationale for its selection is approved by the *code official*.

Z3.3 On-site renewable energy. Renewable energy shall be generated on-site wherever feasible. Before procuring off-site renewable energy, a project must demonstrate one of the following:

1. A minimum of 5% of the total building energy consumption shall first be met by an acceptable source of renewable energy installed on the building roof or site.
2. For projects generating onsite renewable energy through solar photovoltaic systems, a minimum of 25% of total site area, including building footprint, shall be allocated for photovoltaic array and energy production.

Exception: Where there is not adequate solar access as determined by Chapter 13 of the *Energy Conservation Code-Commercial Provisions*.

Z3.4. Procurement of off-site renewable energy. The procurement of off-site renewable energy is acceptable only where the energy is procured from a qualified electricity supplier providing energy from Tier 1 renewable sources meeting the minimum percentages of the District of Columbia Renewable Portfolio Standard. Acceptable methods for the procurement of off-site renewable energy include any of the following or as approved by the *code official*:

- Owner shall provide the *code official* with documentation of a signed, legally-binding contract to procure off-site renewable energy through a power purchase agreement for a minimum period of 5 years for electricity generation from solar or wind-generation facilities that are located within the District of Columbia, Maryland, or Virginia. The owner remains subject to, and must comply with, the District of Columbia's Renewable Portfolio Standard;
- Connection to a *renewable energy microgrid*; or
- Connection to a *low-carbon neighborhood thermal energy system*.

Z4 ENERGY METERING, MONITORING AND REPORTING.

Z4.1 Scope. The provisions of this Section Z4 shall apply to all projects that opted for Appendix Z as a path of code compliance.

Z4.2. Purpose. The purpose of this Section Z4 is to provide requirements that will ensure that buildings are constructed or altered in a way that will provide the capability for their energy use, production and reclamation to be measured, monitored and reported. This includes the design of energy distribution systems so as to isolate load types, the installation of meters, devices and a data acquisition system, and the installation of energy displays and other appropriate reporting mechanisms.

Z4.3 Energy metering. All forms of energy delivered to the building and building site; or produced on the building site or in the building, shall be metered and all energy load types measured.

Z4.4. Ventilation flow rate. In addition to requirements outlined in the *Energy Conservation Code-Commercial Provisions*, all centrally ventilated building systems

shall be designed to enable the collection of real-time and historical ventilation flow rate data.

Z4.5. Grid integration. In places where equipment constraints in the distribution network render net metering impossible, onsite storage options shall be considered.

Z5 ENERGY REPORTING. Owners of buildings that used Appendix Z as a path for code compliance shall comply with this Section.

Z5.1. Post Occupancy Measurement and Reporting.

Z5.1.1. Owners of buildings that use Appendix Z as a path for code compliance shall annually benchmark and report their energy and water performance using the Energy Star® Portfolio Manager tool, including renewable energy generation and green power usage, pursuant to rules in *20 DCMR 3513*, regardless of square footage.

Z5.1.2. Energy Star Portfolio Manager account. The *owner* of a *building* that used Appendix Z as a path for compliance with the *Energy Conservation Code-Commercial Provisions* shall create an Energy Star® Portfolio Manager account and property record on the U.S. Environmental Protection Agency's benchmarking website, and share the property with the District of Columbia's Department of Energy and Environment. The *code official* is authorized to require proof of compliance with this Section Z5.3.1 and proof that all utilities have been linked to the account.

Z5.2. Performance Verification. Within 24 months of occupancy, the owner or owner's representative shall submit documentation to the *code official* demonstrating 12 continuous months of operation with no less than 90% occupancy where the energy consumed by the building and building site as measured in accordance with Section Z4 are equal to or less than the renewable energy associated with the building and building site in accordance with Section Z3. Documentation shall be in a form acceptable to the *code official*.

Z5.2.1. Normalization for abnormal conditions. At the discretion of the *code official*, the owner or owner's representative may submit documentation demonstrating that abnormal weather or occupancy conditions during the compliance period are responsible for the variance between the energy consumed by the energy and energy site and the renewable energy associated with the building and building site and that the building would comply with Z5.2 under normal conditions.

Z6 NORMATIVE REFERENCES

Section numbers indicate where the reference occurs in Appendix Z.

U.S. Army Corps of
Engineers

Standard Reference number	Title	Referenced in code section number
Version 3: 2012-05-11	Air Leakage Test Protocol for Building Envelopes	Appendix Z, Z2.6

Passive House Institute US
(PHIUS) 116 W Illinois St #5e
Chicago, IL 60654

Standard reference number	Title	Referenced in code section number
Version 1.03 July 27 2016	Passive Building Standard for North America	Appendix Z, Z.1

RESNET P.O Box 4561 Oceanside,
CA 92052 www.resnet.us

Standard reference number	Title	Referenced in code section number
August 16, 2010	<i>COMNET Rules and Procedures Manual</i>	Appendix Z, Z2.1.2.1

DC Renewable Portfolio Standard

<u>Standard reference number</u>	Title	<u>Referenced in code section number</u>
Section 15-2901 RPS Compliance Requirements	<i>DC Renewable Portfolio Standard</i>	Appendix Z, Z3.3
Section 15-2902 Generator Certification		
Section 15-2999 Definitions		

DCRA Net Zero Energy Participation Agreement

General Agreement

This DCRA Net Zero Energy Participation Agreement (Participation Agreement) is between the Department of Consumer and Regulatory Affairs (DCRA) and the participating party of: _____ (Participating Party, or, Participant). This Participation Agreement and the DCRA Net Zero Energy Technical Guide (Technical Guide) sets out the terms and conditions with which the participating party must comply in order to participate in the Net Zero Energy Program (NZE Program). This program is designed to incentivize net zero energy development in the District through items identified in the Technical guide.

Term

The term of this Participation Agreement is effective: July 28th and will end September 30, 2019. Any funding provided by the DC Sustainable Energy Utility (DCSEU) will be implemented and tracked through a separate agreement and is subject to available funds to be provided by DCSEU.

Project Team Enrollment

Project teams that wish to participate in the program must submit the following:

1. Signed and dated DCRA Participation Agreement.
2. [Project and Team information sheet.](#)
3. [Submittal checklist and all identified documentation.](#)

Enrollment into the program does not guarantee additional project approval or any DCSEU incentive. Each eligible project must submit a new application and be reviewed for approval.

DCRA NZE Program Commitments

This Participation Agreement provides the Participating Party with the following benefits:

1. Up to date materials, documentation, resources, and support that provide a clear path to program success.
2. Pre and post construction marketing material packets.
3. Program development and support that bring long-term value to participating parties.

[Incentives from DCSEU are implemented and tracked through a separate agreement.]

Participating Party Responsibilities

In order to participate in the program, the Participating Party must meet the following requirements, as well as all requirements in the Technical Guide and must comply with all other terms and conditions of this Participation Agreement:

1. The project will follow design elements identified in the energy model or the Participating Party must re-submit an energy model incorporating changes and justification for changes.
2. Participating Party must schedule a rough and final inspection directly with DCRA Green Building Division. The final inspection may require documentation submittals. If issues are identified on final inspection, a commitment to remediate promptly, within the discretion of the Green Ambassador or DCRA Green Building Program must be provided.
3. Provide clear and accurate information about how the project meets requirements listed in the Renewable Generation Target documentation.
4. Participants agree to adhere to all program rules and will immediately contact the Green Ambassador if the project team believes completion in the program is jeopardized.
5. Participating Party shall facilitate interaction between the Green Building Division and the project owners. The Participating Party shall also provide descriptive information and supporting documentation related to energy efficiency and sustainability measures as it pertains to the project.
6. Participating Party agrees to provide evidence of costs for items crucial to achieving net-zero. Such evidence must be provided to the DCSEU to document that costs/expenses have been incurred toward the development of the project.

General Terms of the Participation Agreement

1. **Good Standing:** To the extent the Participant is an entity, the participant warrants that it is (i) duly organized, validly existing and in good standing under the laws of its state of jurisdiction and is qualified to do business and is in good standing under the laws of the District of Columbia, (ii) is authorized to perform under the Participation Agreement and (iii) has all necessary power to execute and deliver the Participation Agreement.
2. **Counterpart Execution:** This Participation Agreement may be executed in one or more counterparts, which counterparts, when taken together, shall constitute a single, binding instrument.
3. **Governing Law:** This Participation Agreement shall be governed by, construed and enforced in accordance with the laws of the District of Columbia.
4. **Valid Execution and Delivery:** This Participation Agreement has been duly executed and delivered by the participant, and constitutes the legal, valid, and binding obligations of the participant, enforceable against the participant and its successors and assigns, in accordance with its terms.
5. **Severability:** If any of the covenants, conditions or terms of this Participation Agreement shall be found void or unenforceable for whatever reason by any

court of law or of equity, then every other covenant, condition or term herein set forth shall remain valid and binding.

6. **Anti-deficiency:** The parties acknowledge and agree that their respective obligations to fulfill financial obligations of any kind pursuant to any and all provision of this Participation Agreement, or any subsequent Participation Agreement entered into by the parties pursuant to this Participation Agreement, are and shall remain subject to the provision of (i) the Federal Anti-deficiency Act, 31 U.S.C. §§ 1341, 1342, 1349, 1351, (ii) the District of Columbia Anti-Deficiency Act, D.C. Official Code §§ 47-355.01-355.08 (2001), (iii) D.C. Official Code § 47-105 (2001), and (iv) D.C. Official Code § 1-204.46 (2006 Supp.), as the foregoing statutes may be amended from time to time, regardless of whether a particular obligation has been expressly so conditioned.
7. **Confidential Information:** The parties to the Participation Agreement will use, restrict, safeguard and dispose of all information related to services provided by the Participation Agreement, in accordance with all applicable federal and local statutes, regulations and policies.
8. **Applicable Law:** The parties shall comply with all applicable federal and/or District laws, regulations and rules, whether now in force or hereafter enacted or promulgated.
9. **Notice:** The following individuals are the contact points for each party under this Participation Agreement:

For DCRA

David Epley, Green Building and Sustainability Program Manager
Green Building Program
Department of Consumer and Regulatory Affairs
1100 4th Street, SW, 3rd Floor
Washington, DC 20024
Telephone: (202) 442-4587
Email: david.epley@dc.gov

For DCSEU

Shawn Fenstermacher, General Manager, Mid-Atlantic Region
District of Columbia Sustainable Energy Utility
80 M Street, S.E., Suite 310
Washington, DC 20003
Telephone: 202-479-2222 Ext. 4801
Email: sfenstermacher@dcseu.com

10. **Indemnification:** The Participant agrees to defend, indemnify and hold harmless the District, its officers, agencies, departments, agents, and employees (collectively the "District") from and against any and all claims, losses, liabilities, penalties, fines, forfeitures, demands, causes or action, suits, costs and expenses incidental thereto (including cost of dense and attorneys' fees), resulting from, arising out of, or in any way connected to activities or work performed by the Participating Party, Participating Party's officers, employees,

agents, servants, subcontractors, or any other person acting for or by permission of the Participating Party in performance of this Participation Agreement. The Participating Party shall also repair or replace and District property that is damaged by the Participating Party, Participating Party's officers, employees, agents, servants, subcontractors, or any other person acting for or by permission of the participating party while performing work hereunder. The indemnification obligation under this section shall not be limited by the existence of any insurance policy or by any limitation on the amount of type of damages, compensations or benefits payable by or for the participating party or any subcontractor, and shall survive the termination of the Participation Agreement. The District agrees to give the Participating Party written notice of any claim of indemnity under this section. Additionally, the participating party shall have the right and sole authority to control the defense or settlement of such claim, provided that no contribution or action by the District is required in connection with the settlement. Monies due or to become due the Participating Party under the Participation Agreement may be retained by the District as necessary to satisfy any outstanding claim which the District may have against the Participating Party.

11. **Non-endorsement:** DCRA is executing this Participation Agreement in furtherance of its NZE Participation Agreement and in cooperation of work being undertaken by DCSEU under its contract with DOEE. The execution of this Participation Agreement by DCRA or any actions by DCRA in furtherance of the purposes hereof shall not be deemed an endorsement of the Participating Party.
12. **Good Faith Conflict Resolution:** The parties hereto shall in good faith seek to resolve any conflicts hereunder. DCRA may by written notice to Participant, terminate this Participation Agreement without liability in the event of any breach or violation of the Participation Agreement. Notwithstanding the forgoing and in addition thereto, the District shall also have the right at its sole discretion without cause, upon thirty days' notice to the Participating Party, to terminate this Participation Agreement.
13. **Information Disclosure:** The Participating Party shall at all times obtain the prior written approval of DCRA before any of its officers, agents, employees or subcontractors, either during or after the expiration or termination of this Participation Agreement, makes any materials relating to the work performed or data collected in connection with this Participation Agreement available to the public.
14. **Conflict between the Participation Agreement and the Memorandum of Understanding (MOU):** This Participation Agreement is entered into pursuant to the MOU dated July 22, 2019 by and between DCRA and DCSEU. In the event of any conflict between this Participation Agreement and the MOU, the MOU shall supersede. In no event shall the obligations of DCRA hereunder exceed those agreed to in the MOU.

For Participating Party:

Signature: _____

Name: _____

Title: _____

Date: _____

For DCRA:

Signature: _____

Name: _____

Title: _____

Date: _____

Approved Alternative Net-Zero Energy Compliance Pathways

<Taken from 2nd round of proposed rulemaking for the DC Construction Codes, DCMR 12-A>

101.10.6 Alternative Compliance Paths for Commercial Building Projects. In lieu of the requirements of the *Energy Conservation Code-Commercial Provisions*, commercial building projects that comply with one of the alternative compliance paths set forth in Sections 101.10.6.1 through 101.10.6.7 ~~101.4.7.3.4.1, 101.4.7.3.4.2, 101.4.7.3.4.3, or 101.4.7.3.4.4~~ shall be deemed to comply with the *Energy Conservation Code-Commercial Provisions*.

101.10.6.1 Appendix Z. Demonstrate compliance with all sections of Appendix Z with the exception of Z5.2 of the *Energy Conservation Code-Commercial Provisions*.

101.10.6.2 Compliance Utilizing ILFI Living Building Challenge. Design, construct and certify to the International Living Future Institute's Living Building Challenge program for either full Living Building Challenge or Energy Petal certification. The *owner* shall provide documentation to the *code official* confirming registration with the Living Building Challenge program prior to permit issuance. The *owner* shall have an 18-month period from the date of issuance of the first certificate of occupancy, or from approval of the final inspection, to submit official evidence of certification to the *code official*. The *code official*, for good cause and upon written request, is authorized to extend the period to submit evidence of certification.

101.10.6.3 Compliance Utilizing ILFI Zero Energy Building. ~~Certification:~~ Design, construct and certify to the International Living Future Institute's Net Zero Energy Building Certification. The *owner* shall provide documentation to the *code official* confirming registration with the Net Zero Energy program prior to permit issuance. The *owner* shall have an 18-month period from the date of issuance for the project of the certificate of occupancy, or from approval of the final inspection, to submit official evidence of certification to the *code official*. The *code official*, for good cause and upon written request, is authorized to extend the period to submit evidence of certification.

101.10.6.4 Compliance Utilizing PHIUS+ and On-Site Solar. Design, construct and certify to the Passive House Institute United States' PHIUS+ program. The *owner* shall have an an 12-18-month period from the date of issuance ~~for the project~~ of the certificate of occupancy for the project, or from approval of the final inspection, to submit official evidence of certification by the

PHIUS+ program to the *code official*. The *code official*, for good cause and upon written request, is authorized to extend the period to submit evidence of certification. Additionally, the *owner* must install a solar PV system on the building's roof that offsets the annual net energy use.

101.10.6.5 Compliance Utilizing PHI and On-Site Solar. Design, construct and certify to the Passive House Institute program. The *owner* shall have an 18-month period from the date of issuance for the project of the certificate of occupancy, or from approval of the final inspection, to submit official evidence of certification by the PHI program to the *code official*. The *code official*, for good cause and upon written request, is authorized to extend the period to submit evidence of certification. Additionally, the *owner* must install a solar PV system on the building's roof that offsets the annual net energy use.

101.10.6.6 Compliance Utilizing LEED and LEED Zero Carbon. Design, construct, and certify to the LEED Rating System and LEED Zero Carbon Rating System. The *owner* shall provide *approved* documentation to the code official prior to permit issuance (1) confirming registration with the LEED Rating System programs, and (2) an approved pre-construction energy model that is consistent with achieving LEED Zero Carbon certification. Additionally, *owner* must complete "Enhanced Commissioning" requirements during construction. The *owner* shall have an 18-month period from the date of issuance of the certificate of occupancy, or from approval of the final inspection, whichever is later, to submit official evidence of certification to both LEED and LEED Zero Carbon to the *code official*.

101.10.6.7 Compliance Utilizing LEED and LEED Zero Energy. Design, construct and certify to the LEED Rating System and LEED Zero Energy Rating System. The *owner* shall provide *approved* documentation to the code official prior to permit issuance (1) confirming registration with the LEED Rating System programs, and (2) an approved pre-construction energy model that is consistent with achieving LEED Zero Energy certification. Additionally, *owner* must complete "Enhanced Commissioning" requirements during construction. The *owner* shall have an 18-month period from the date of issuance for the project of the certificate of occupancy, or from approval of the final inspection, whichever is later, to submit official evidence of certification to both LEED and LEED Zero Energy to the *code official*.

101.10.7 Alternative Compliance Paths for Residential Buildings In lieu of the requirements of the *Energy Conservation Code-Residential Provisions*, residential building projects that comply with one of the alternative compliance paths set forth in Sections 101.10.7.1 through 101.10.7.9 ~~101.10.7.1, 101.10.7.2, 101.10.7.3, or 101.10.7.4~~ shall be deemed to comply with the *Energy Conservation Code-Residential Provisions*.

101.10.7.1 Compliance Utilizing ERI. Achieve Design and construct to an Energy Rating Index (ERI) of “0” in accordance with Section R406 of the *Energy Conservation Code-Residential Provisions*. Verify compliance at the completion of construction per guidance given by the *code official*.

101.10.7.2 Compliance Utilizing DCRA Residential Net-Zero Energy Program. Achieve compliance with the requirements of DCRA’s Residential Net-Zero Energy Program as set forth in an *administrative bulletin*.

101.10.7.3~~2~~ Compliance Utilizing ILFI Living Building Challenge. Design, construct and certify to the International Living Future Institute’s Zero Energy Building Certification (NZEB) standard as listed in Chapter 5 of the *Residential Code*. The *owner* shall have an ~~1218~~ month period from the date of issuance of the first certificate of occupancy, or approval of the final inspection, to submit official evidence of certification to the *code official*. The *code official*, for good cause and upon written request, is authorized to extend the period to submit evidence of certification. Design, construct and certify to the International Living Future Institute’s Living Building Challenge program for either full Living Building Challenge or Energy Petal certification. The *owner* shall provide documentation to the *code official* confirming registration with the Living Building Challenge program prior to permit issuance. The *owner* shall have an 18-month period from the date of issuance of the first certificate of occupancy, or from approval of the final inspection, to submit official evidence of certification to the *code official*. The *code official*, for good cause and upon written request, is authorized to extend the period to submit evidence of certification.

101.10.7.4 Compliance Utilizing ILFI Zero Energy Building Certification. Design, construct and certify to the International Living Future Institute’s Zero Energy Building Certification. The *owner* shall provide documentation to the *code official* confirming registration with the Zero Energy Building program prior to permit issuance. The *owner* shall have an 18-month period from the date of issuance for the project of the certificate of occupancy, or from approval of the final inspection, to submit official evidence of certification to the *code official*. The *code official*, for good cause and upon written request, is authorized to extend the period to submit evidence of certification.

101.10.7.3~~5~~ Compliance Utilizing the DOE Zero Energy Ready Home and On-site Solar. Design, construct and certify to the standards of the Zero Energy Ready Home program of the United States Department of Energy (DOE) listed in Chapter 5 of the *Energy Conservation Code-Residential Provisions*. The *owner* shall have an ~~1218~~ month period from the date of issuance of the certificate of occupancy, or from approval of the final inspection, to submit official evidence of certification to the *code official*. The *code official*, for good cause and upon written request, is authorized to extend the period to submit evidence of certification. Additionally, the *owner* must install a solar PV system on the roof that offsets the annual net energy use of the home.

101.10.7.46 Compliance Utilizing PHIUS+ and On-site Solar. Design, construct and certify to the Passive House Institute United States' PHIUS+ program ~~listed in Chapter 5 of the Energy Conservation Code-Residential Provisions~~. The *owner* shall have an ~~12~~18-month period from the date of issuance of the certificate of occupancy, or approval of the final inspection, to submit official evidence of certification to the *code official*. The *code official*, for good cause and upon written request, is authorized to extend the period to submit evidence of certification. Additionally, the *owner* must install a solar PV system on the roof that offsets the annual net energy use of the home.

101.10.7.57 Compliance Utilizing PHI and On-Site Solar. Design, construct and certify to the Passive House Institute program. The *owner* shall have an 18-month period from the date of issuance of a certificate of occupancy or from approval of the final inspection, whichever is later, to submit official evidence of certification by the PHI program to the *code official*. The *code official*, for good cause and upon written request, is authorized to extend the period to submit evidence of certification. Additionally, the *owner* must install a solar PV system on the roof that offsets the annual net energy use of the house.

101.10.7.8 Compliance Utilizing LEED and LEED Zero Carbon. Design, construct and certify to the LEED for Homes or LEED for Homes Midrise Rating Systems, and LEED Zero Carbon Rating System. The *owner* shall provide *approved* documentation to the *code official* prior to permit issuance (1) confirming registration with the LEED rating system programs, and (2) an *approved* pre-construction energy model that is consistent with achieving LEED Zero Carbon certification. The *owner* shall have an 18-month period from the date of issuance of a certificate of occupancy for the project or from the date of final inspection approval, whichever is later, to submit official evidence of certification by both LEED and LEED Zero Carbon to the *code official*.

101.10.7.9 Compliance Utilizing LEED and LEED Zero Energy. Design, construct and certify to the LEED for Homes or LEED for Homes Midrise Rating Systems, and LEED Zero Energy Rating System. The *owner* shall provide *approved* documentation to the *code official* prior to permit issuance (1) confirming registration with the LEED rating system programs, and (2) an *approved* pre-construction energy model that is consistent with achieving LEED Zero Energy certification. The *owner* shall have an 18-month period from the date of issuance of a certificate of occupancy for the project or from approval of the final inspection, whichever is later, to submit official evidence of certification by both LEED and LEED Zero Energy to the *code official*.