PON 2309 – Attachment B
Low-rise Residential New Construction Programs
Minimum Performance Standards

1. General requirements for participation:

To participate and be allowed access to Low-rise Residential New Construction Program (Program) incentives, dwelling units must meet the eligibility and technical requirements as detailed in this Attachment B and throughout PON 2309. The documentation necessary to demonstrate compliance must accurately reflect the conditions of the building when the site visits associated with the confirmed Home Energy Rating occur, regardless of the compliance path.

a. Compliance Path:
   i. Performance Path: Homes must achieve a Home Energy Rating System (HERS) Index equal to or less than the required ENERGY STAR HERS Index Target. The HERS Index shall be established through the use of RESNET-accredited software which has the capability to evaluate and auto-generate reports indicating the relevant version of the Energy Conservation Construction Code of New York State (ECCCNYS).
   ii. Prescriptive Path: Homes that qualify by utilizing the ENERGY STAR Prescriptive Path shall at the time of completion, meet all ENERGY STAR specific prescriptive requirements aligning with the ENERGY STAR Reference Design Home for the project's particular Climate Zone designation.

b. Gut-Rehabilitation (gut-rehab) Projects: A Project Application must be submitted prior to start of construction for any gut-rehab project intending to participate in this Program. Existing conditions shall be documented by the applicant and will be subject to verification by NYSERDA, either through a site visit or through review of photographs and other documentation. Written confirmation from NYSERDA is required to confirm eligibility for a gut-rehab project to participate in the Program. Gut-rehab projects are typically required to follow either the Performance or Prescriptive Path, with no special allowances or exemptions, except as provided for in Section 11 of this Attachment B.

c. Checklists: All relevant prerequisites as detailed in the EPA ENERGY STAR Certified Homes (ESCH) program must be met, except as specifically allowed per Section 11 of this Attachment B. Required checklists include:
   1. ESCH Thermal Enclosure System Rater Checklist
   2. ESCH HVAC System Quality Installation Contractor Checklist
   3. ESCH HVAC System Quality Installation Rater Checklist
   4. ESCH Water Management System Builder Checklist (or EPA's Indoor airPLUS Verification Checklist)

2. New York State Code Requirements:

Residential buildings and dwelling units constructed with Program support must meet or exceed provisions for the applicable Codes of the State of New York and local codes. Where Code requirements exceed or conflict with Program requirements, Code requirements shall take precedence.

3. **Minimum requirements for Electrical kWh Savings:**
   a. In order for dwelling units to qualify for Program incentives, electricity saving measures must be installed which, at minimum, achieve at least 750 kWh annual savings as calculated by use of the Qualification Form (except as noted below in item 3.f); display and model units must achieve 950 kWh savings.
   b. Electric savings can be achieved by installing a combination of ENERGY STAR qualified compact fluorescent lamps or LED lamps, ENERGY STAR qualified high efficiency fixtures or equivalent[1], ENERGY STAR qualified appliances, ceiling fans equipped with efficient lighting fixtures; and central air conditioning systems with a SEER of 16 /13 EER or greater.
   c. ENERGY STAR qualified lighting fixtures or lamps may be installed in Qualifying Lighting Fixture Locations per RESNET standards, or in non high-use locations in order to count toward the kWh savings requirements. Refer to the Qualification Form for more details regarding how the required kWh savings associated with lighting are determined.
   d. To claim the 400 kWh annual savings for electronically commutated motors (ECMs), the blower motor must be a fully modulating or multi-stage coupled with multi-stage or modulating burner. If central air conditioning (CAC) is installed, the outdoor condensing unit must also be equipped with a two-stage compressor.
   e. The kWh savings requirement refers to in-unit savings only. Common area prescriptive measures are listed in Section 10 of this Attachment B.
   f. Dwelling units that cannot satisfy the minimum kWh savings requirements due to limited opportunities (i.e. not enough lights or appliances in smaller dwelling units) may comply with this requirement by exclusively installing ENERGY STAR qualified appliances and lighting (LED or screw-in CFLs), including permanently installed fixtures in high-use areas, through-out the dwelling unit[1].

4. **Envelope and Fenestration:**
   a. Refer to EPA's ENERGY STAR Qualified Homes National Requirements for detailed requirements for the building's envelope and fenestration, as outlined in the EPA Thermal Enclosure Checklist.
   b. If rigid insulated sheathing or insulated siding is used on the exterior of above-grade walls of buildings in Climate Zones 5 or 6[2] to meet the reduced thermal bridging requirements listed in the Thermal Enclosure Checklist (section 4.4), the following minimum R-values for that exterior sheathing must be met:
      i. CZ 5: ≥ R-5 for 2x4 walls; ≥ R-7.5 for 2x6 walls
      ii. CZ 6: ≥ R-7.5 for 2x4 walls; ≥ R-11.25 for 2x6 walls.
   c. Single-family detached homes are required to be tested at a pressure difference of 50 Pascals with respect to the outdoors and have envelope air leakage which does not exceed the following at final inspection:
      i. CZ 4: Maximum 5 ACH_{50}
      ii. CZ 5,6: Maximum 4 ACH_{50}
   d. Low-Rise Multi-Unit Testing and Energy Modeling:
      i. Dwelling units must be modeled individually unless prior written authorization is obtained from NYSERDA or NYSERDA's Program Implementation Contractor. Modeling of the building's common areas is not required, although the various prescriptive requirements listed in Section 10 of this document must be met and the ENERGY STAR checklists must completed to address common area building elements.
      ii. Whole building testing is strongly discouraged and typically not allowed. Prior written authorization from NYSERDA or NYSERDA's Program Implementation Contractor is required if use of whole building testing is intended. This authorization will only be provided under limited circumstances, where whole building pressure diagnostics may

[1] Energy Star qualified light fixture specifications can be found at http://www.energystar.gov/index.cfm?c=fixtures.pr_crit_light_fixtures
[2] If Class II Vapor Retarders (i.e. Kraft-faced fiberglass batts or low perm paint) are installed on the interior face of above grade walls in conjunction with exterior rigid insulation on the exterior, ENERGY STAR National Program Requirement rigid insulation R-values may be used to meet the reduced thermal bridging requirement.

be the only effectively employed testing methodology, and the maximum ACH_{50} must comply with Section 4.c.

iii. For buildings classified as Residential Group R-2, R-3, or R-4, each dwelling unit shall be tested and verified as having an air leakage rate not exceeding 0.3 CFM_{50} per square foot of enclosure surface area in Climate Zones 4-6. Testing shall be conducted with a blower door at a pressure difference of 50 Pascals with respect to the outside.

5. **Mechanical Ventilation:**
   a. Refer to the EPA's ENERGY STAR Qualified Homes National Requirements documents; specifically, the HVAC System Quality Installation Contractor Checklist and the HVAC System Quality Installation Rater Checklist.
   b. The Mechanical Ventilation system for *in-unit* ventilation must be designed to meet the requirements of ASHRAE 62.2-2010. See Section 10 of this document for Common Area Ventilation Requirements.
   c. The EPA provides Checklist Guidebooks for HVAC.

6. **Heating Equipment[3]:**
   a. Refer to the EPA's program documents, specifically, the HVAC System Quality Installation Contractor Checklist and the HVAC System Quality Installation Rater Checklist.
   b. Heating Equipment shall meet the following applicable efficiency levels:
      i. ≥ 90 AFUE gas furnace, ENERGY STAR Qualified, OR;
      ii. ≥ 86 AFUE oil furnace or boilers, ENERGY STAR Qualified, OR;
      iii. ≥ 90 AFUE natural gas or propane fueled boiler, ENERGY STAR Qualified, OR;
      iv. Air source heat pumps must be ENERGY STAR Qualified and also meet the following efficiency requirements:
         1. CZ 4: ≥ 8.5 HSPF / 14.5 SEER / 12 EER w/ Electric Backup
         2. CZ 5: ≥ 9.25 HSPF / 14.5 SEER / 12 EER w/ Electric Backup
         3. CZ 6: ≥ 9.5 HSPF / 14.5 SEER / 12 EER w/ Electric backup, OR;
      v. Air source heat pump, ENERGY STAR Qualified, ≥ 8.2HSPF / 14.5 SEER / 12 EER with ENERGY STAR Qualified dual-fuel backup, OR;
      vi. Variable Refrigerant Flow (VRF) or Variable Refrigerant Volume (VRV) systems are allowed within buildings three (3) stories or less in height when the system has an AHRI rating with matched indoor and outdoor units, and the ENERGY STAR Qualified Homes 'Performance Path Guidelines' are followed, OR;
      vii. Ground-Source heat pump, any product type, ENERGY STAR Qualified. The following efficiencies shall be used based on ground source heat pump product type:
         1. Closed Loop Water-to-Air: ≥ 3.5 COP / 16.1 EER
         2. Open Loop Water-to-Air: ≥ 3.8 COP / 18.2 EER
         3. Direct Geo-Exchange (DGX): ≥ 3.6 COP / 16 EER
         4. Closed Loop Water-to-Water: ≥ 3.0 COP / 15.1 EER
         5. Open Loop Water-to-Water: ≥ 3.4 COP / 19.1 EER
   c. Combination Space Heating (boiler) and Water Heating Appliances with a Combined Appliance Annual Fuel Utilization Efficiency (CAafue) must have a CAafue rating ≥ .90.
   d. Radiant heating systems, when used, shall be installed in accordance with industry accepted best practices and all applicable codes. System components utilized must be ENERGY STAR qualified or meet all applicable requirements as defined in this Section 6.
   e. In cases where more than one heating system is installed, all heating equipment must meet the Program's Minimum Performance Standards as outlined in this Attachment B.
   f. Sealed combustion appliances must have combustion air piped from outside the building's thermal envelope directly to the appliance.
   g. Combustion safety testing and gas leak detection must be conducted on each dwelling unit using procedures which comply with both the Building Performance Institute (BPI) Standards and RESNET's "Interim Guidelines for Combustion Appliance Testing and Writing of Work Scope".

[3] Where ENERGY STAR qualified heating systems are required, all system components must be ENERGY STAR qualified.

h. For re-circulating hydronic systems, piping carrying liquid with temperatures greater that 105°F must have a minimum 1" of insulation.
i. Central Distribution (*serving ≥ 4 dwelling units or systems rated for commercial applications*):
    i. For hydronic distribution systems, all supply/return headers must be designed in a "reverse return" configuration (i.e. first riser supplied is the last returned, etc.) and/or sized based on water velocity of less than 4 ft/s. Total pressure drop of terminal unit branch piping and fittings between a supply and return riser must be significantly greater than the total pressure drop from the top to the bottom of these risers. Provide calculations and assumptions for sizing circulating pumps that meet Chapter 43 of the ASHRAE handbook, HVAC Systems and Equipment or equivalent industry accepted standard.
    ii. For hydronic distribution systems, terminal heating and cooling distribution equipment must be separated from the riser to the distribution loop by a control valve or terminal distribution pump, so that the heated or cooled fluid is not delivered to the apartment distribution equipment when there is no call from the thermostats.
    iii. Terminal heating and cooling distribution equipment serving an apartment shall be controlled by a thermostat(s) within the same apartment.

7. <u>Cooling Equipment[4]:</u>

a. Refer to the EPA's ENERGY STAR Qualified Homes National Requirements documents, specifically, the HVAC System Quality Installation Contractor Checklist and the HVAC System Quality Installation Rater Checklist.
b. Central Air Conditioners installed in buildings shall have a rating ≥ SEER listed below. (heat pumps are allowed as listed in Section 6 under Heating Equipment)
    i. Conventional Split System
        1. CZ 4: SEER ≥ 14.5 / 12 EER
        2. CZ 5, 6: SEER ≥ 13
    ii. Ductless Mini-split System
        1. CZ 4,5,6: HSPF ≥ 8.0 / SEER ≥ 14 / 11 EER
    iii. Variable Refrigerant Flow (VRF) or Variable Refrigerant Volume (VRV) systems are allowed within buildings three (3) stories or less in height when the following criteria is met:
        1. The system must have an AHRI rating with matched indoor and outdoor units
        2. ENERGY STAR Qualified Homes 'Performance Path Guidelines' are followed
    iv. Small-duct, high-velocity Split System[5]
        1. CZ 4,5,6: SEER ≥ 13
    v. Space-constrained products[5]
        1. Air Conditioners; All CZ; SEER ≥ 12
        2. Heat Pumps; All CZ; SEER ≥ 12; HSPF ≥ 7.4
    vi. Single Package Equipment
        1. CZ 4,5,6: SEER ≥ 14 / 11 EER
c. Window-mounted room and through-wall air conditioners must be ENERGY STAR qualified.

[4] Where ENERGY STAR qualified cooling systems are required, all system components must be ENERGY STAR qualified.
[5] Allowed in CZ 5 & 6, CZ 4 when justified by project constraints and cost-benefit analysis, subject to NYSERDA' review and approval.

8. **Domestic Hot Water (DHW):**
   a. Refer to the EPA's program documents.
   b. When multiple DHW tanks are used to provide additional capacity, each individual tank in the system must meet technical specification for that size, as outlined below. For example: two 40 gallon gas-fired water heaters piped in tandem (for a total capacity of 80 gallons) must each have an EF of at least .61 per the chart below.
   c. Standard DHW equipment shall, at minimum, meet the following Energy Factor (EF):

Table 2: Minimum Energy Factors (EFs) for Water Heaters			
Rated Storage Capacity	**Minimum EF for Gas**	**Minimum EF for Oil**	**Minimum EF for Electric**
30	.63	.55	.94
40	.61	.53	.93
50	.59	.51	.92
60	.57	.49	.91
70	.55	.47	.90
80	.53	.45	.89

   d. To determine the minimum EF for domestic hot water heaters that are rated with an EF but are a different size than is listed on the chart, use the following equations:
      i. Gas DHW EF ≥ 0.69 – (0.002 x Tank Gallon Capacity)
      ii. Electric DHW EF ≥ 0.97 – (0.001 x Tank Gallon Capacity)
      iii. Oil DHW EF ≥ 0.61 – (0.002 x Tank Gallon Capacity)
   e. On-demand gas-fired tankless water heaters shall be ENERGY STAR Qualified and have an EF ≥ .82.
   f. Sealed combustion appliances must have combustion air piped from outside the building's thermal envelope directly to the appliance.
   g. Water heaters that are integrated with a space-heating boiler may be used in place of a stand-alone system. These systems shall have a CAafue of ≥ .90. Note: When the primary heating source of the combined appliance is a residential boiler, the CAafue is the same as the AFUE of the boiler as determined by DOE test procedures specified in 10 CFR 430.
   h. Heat Pump water heaters shall have an EF ≥ 2.0 and must be ENERGY STAR Qualified.
   i. Solar Thermal DHW Systems must comply with the requirements of NYSERDA's Solar Thermal Incentive Program.
   j. Central DHW Systems (*serving ≥ 4 dwelling units or systems rated for commercial applications*):
      i. DHW equipment shall be ENERGY STAR qualified with an AFUE ≥ 90%, where applicable, and specified as dedicated or indirect fired, with or without storage. Atmospherically vented gas water heaters, tankless coils and side-arm water heaters shall not be specified. The maximum storage tank capacity shall be specified based on occupancy.
      ii. For re-circulating DHW systems, piping carrying liquid with temperatures greater than 105°F must have a minimum 1" of insulation. The temperature setting of in-unit storage water heaters must not exceed 140F. For both in-unit and central DHW systems, temperatures measured at faucets and showerheads must not exceed 125F.
      iii. Self-contained or electronic mixing valves shall be used to control hot water temperature for central domestic water heating systems.

9. **Duct Construction:**
   a. Refer to the EPA's ENERGY STAR Qualified Homes National Requirements documents, including the requirements of the HVAC System Quality Installation Contractor Checklist and the HVAC System Quality Installation Rater Checklist.
   b. Duct systems installed in low-rise multi-unit buildings must be modeled and tested on an individual dwelling unit basis. Distribution systems that exclusively serve common areas must be tested separately and meet program maximum allowable leakage rates on a prescriptive basis. If duct distribution systems will serve multiple dwelling units, or are in combination with services to common areas, prior written authorization from NYSERDA or NYSERDA's Implementation Contractor regarding testing and modeling protocols is required.

10. **Common Areas of Multi-Unit Buildings**
   a. Lighting
      i. *Common Area Lighting* – All fixtures in non-dwelling unit spaces, including hallways, stairwells, lobbies, elevators, and decorative fixtures, shall have combined lamp and ballast efficacies which meet or exceed ENERGY STAR Qualified Key Product Criteria, published at: http://www.energystar.gov/index.cfm?c=fixtures.pr_crit_light_fixtures. Alternatively, T-5 or T-8 lamps with electronic ballasts or ENERGY STAR Qualified screw-in lamps may be used. Lamps and fixtures in common areas cannot be counted towards the minimum kWh electrical savings requirements for individual dwelling units.
      ii. *Occupancy Controls* – All non-dwelling unit spaces, except those intended for 24-hour occupation or where automatic shutoff would endanger the safety of occupants must have occupancy sensors or automatic bi-level controls.
      iii. *Exit Signs and Emergency Lighting* – All exit signs shall be LED or photo-luminescent and emergency lighting shall conform to local building code; fixtures located above stairwell doors and other forms of egress shall contain a battery back-up as per code.
      iv. *Outdoor Security and Decorative Lighting* – All lighting shall have an efficacy ≥ 45 lumens/watt as per ECCCNYS-2010. Fixtures shall include automatic switching or photocell controls for lighting not intended for 24-hour operation, per code. Total specified exterior lighting power cannot exceed ASHRAE allowances. Trade-offs are allowed as specified in ASHRAE 90.1-2010, Tables 9.4.5 and 9.6.1
      v. *Lighting power Densities* – Allowance shall be determined by ASHRAE 90.1-2010, Tables 9.4.5 & 9.6.1. Total specified lighting power for the combined non-apartment spaces should not exceed allowances for those combined spaces by more than 20%.
   b. Air Leakage and Additional Air Sealing
      i. All wall penetrations, including mechanical, fire suppression, fire extinguisher cabinets trash chutes, etc. must be sealed to prevent air flow into and through the building's vertical chases.
      ii. Elevator shaft(s) must be insulated in relation to unconditioned space, and elevator doors properly gasketed.
      iii. All building entry and exit doors shall have weather-stripping installed.
   c. Parking Garages
      i. Must be fully compartmentalized, air sealed, and located completely outside the pressure and thermal boundaries of the building envelope.
      ii. Garage spaces must be depressurized relative to occupied dwelling units and other inhabited spaces.
      iii. Garage exhaust must be provided at a ventilation rate of 0.05-1.5CFM per SF and 100CFM per car as per NYS Mechanical Code.
      iv. Heated garages shall not be allowed for comfort purposes or to prevent pipes from freezing. Piping location shall be within the conditioned space or grouped properly and insulated to prevent freezing if outside conditioned space.
      v. Ice Prevention – Installation of Radiant Heat, either wall or ceiling mounted, or within the garage floor (or sidewalks) on the ground is only allowed as a safety feature, and written

authorization from NYSERDA is required. This measure should comply with ASHRAE 90.1-2010 Section 6.4.3.7

d. Motors
    i. All three-phase motors 1 HP or larger shall be NEMA premium efficiency or greater. VFD Motors may be utilized as an alternative compliance path if documentation is provided to NYSERDA demonstrating performance equal to or better than that of a comparable NEMA Premium motor.

e. Common Area HVAC Systems
    i. All common area ventilation systems must be designed in accordance with ASHRAE 62.1-2010.
    ii. Electric Resistance Heating
        1. Use of electric resistance heating equipment in any common area is not allowed without prior written approval from NYSERDA or NYSERDA'S Implementation Contractor. Requests will only be considered under limited circumstances, when alternative solutions are not economically feasible. If used, high-limit thermostatic control of < 50 degrees F must be specified.
    iii. All Common Area HVAC systems must comply with the EPA version 3.0 National Program Requirements including the HVAC Checklists (inclusive of all design, installation, and commissioning requirements), the appropriate sections of these Minimum Performance Standards, with only the exceptions listed in Section 10.e.i & 10.e.ii of this document.

11. <u>Gut Rehabilitation Projects (gut-rehab)</u>

a. All dwelling units and common area spaces included in gut-rehab projects must meet the relevant EPA and PON 2309 standards and requirements, unless a waiver is sought from and authorized by NYSERDA;

b. An applicant may request NYSERDA waive specific EPA or PON 2309 requirements or standards. NYSERDA approval of such a request for waiver would allow for the project to be deemed eligible to participate, receive Program incentives, and allow NYSERDA's provision of the New York Energy $mart designation. To qualify, the applicant must demonstrate to NYSERDA that compliance with specific EPA ENERGY STAR or PON 2309 requirement(s) or standard(s) would not be technically feasible or economically justified. As part of their submission to NYSERDA, the applicant must propose an alternative method which will accomplish the underlying intent of the requirement or standard. The proposed alternative method cannot negatively impact the energy savings projected to be achieved in the dwelling unit(s). Dwelling units seeking the New York Energy $mart designation will not be eligible for designation as EPA ENERGY STAR Qualified Homes or New York ENERGY STAR Homes. Such waiver requests must include the following:
    i. Specific technical requirement or minimum performance standard which cannot be achieved on the project, and a request for a waiver from the requirement;
    ii. A detailed analysis showing all options for complying with the requirement that were explored along with costs associated with implementation of these options;
    iii. A detailed plan for implementing all measures necessary to comply with the intent of the requirement being requested for waiver, which verifies that the project will follow best building practices for installation of the proposed alternative measures;
    iv. Verification through analysis which demonstrates the proposed solution will not reduce the energy savings projected to be achieved in the dwelling unit, in comparison to meeting the requirement or standard from which relief is sought.