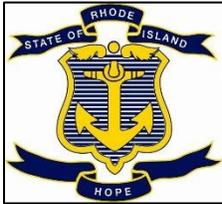


**RHODE ISLAND**  
**RESIDENTIAL STRETCH CODE: A VOLUNTARY**  
**GREEN BUILDINGS PROGRAM**



February 16, 2018

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

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1<sup>st</sup> EDITION

Special thanks to the many working group members that lent their expertise and time to support the development of this stretch code. Although the following list is not exhaustive, we would like to acknowledge the following individuals and organizations (listed alphabetically) for their significant contributions:

Division of Capital Asset Management & Maintenance, Rhode Island Department of Administration: Arthur J. Jochmann II

Dryvit: Dean Balcirak

Energy & Resource Solutions (ERS): Brian McCowan, Stretch Code Development Consultant

Green Building Advisory Committee: All members, with specific thanks to Christopher Armstrong, Joseph DaSilva, Kenneth Filarski, Steven Hughes, Susan LaPanne, and Stephen Turner

National Grid: Francis Boucher, Thomas J. Coughlin Jr., Laura Rodormer, and Kevin Rose

Newport Renewables: Michael Cabral

Northeast Energy Efficiency Partnerships (NEEP): Darren Port and Carolyn Sarno

Rhode Island Building Code Commission: John Leyden, Commissioner

Rhode Island Energy Efficiency and Resource Management Council (EERMC): All council members and members of EERMC's consultant team, including Richard Faesy and Mike Guerard

Rhode Island Office of Energy Resources: George Sfinarolakis and Becca Trietch

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# 1. Introduction

The Rhode Island Residential Stretch Code is an important part of a comprehensive effort to reduce long-term energy consumption, support Rhode Island’s growing green economy, increase the affordability of home utility costs, and meet the state’s greenhouse gas (GHG) reduction targets which aim to reduce statewide GHG emissions to 80% below 1990 levels by 2050 (§ 42-6.2-2). As referenced in National Grid’s Zero Energy Buildings white paper, establishing zero-energy building energy codes in Rhode Island by 2035 will be an important component to achieving these goals. This Residential Stretch Code is meant to serve as a stepping stone towards these ambitious targets.

As directed in the Governor’s Lead by Example Executive Order ([EO 15-17](#)), the Office of Energy Resources led in the development of this document. Its overarching purpose is to provide a uniform set of provisions that will help bridge current construction practices to widespread development of high performance and zero energy buildings.

The Rhode Island Residential Stretch Code (hereafter “Residential Stretch Code”) is a **voluntary code** that provides guidance and best-practice requirements intended to reduce the negative impacts and increase the overall positive impacts of the built environment. It is consistent with the Rhode Island Office of Energy Resources’ mission to lead Rhode Island to a secure, cost-effective, and sustainable energy future and supports the Governor’s energy efficiency and renewable energy goals for State-owned facilities ([EO 15-17](#)).

This code establishes provisions that adequately protect public health, safety, and welfare; do not unnecessarily increase construction costs; do not restrict the use of new materials, products, or methods of construction; and do not give preferential treatment to particular types or classes of materials, products, or methods of construction.

This document is designed to be used by all individuals and organizations interested in the construction of higher-performance homes. Builders, developers, architects, and homeowners are encouraged to comply with all provisions of this code and receive recognition for obtaining higher performance levels. The code can also be used as a guide for higher-performance construction and renovations without achieving compliance with the entire code. Code officials, at their own discretion, may accept compliance with the energy efficiency provisions of this code, as a compliance path for similar provisions in the base Residential Building Code, SBC-2, and Residential Energy Code, SBC-8. This authority is given to code officials in section

## STRETCH CODES

Stretch codes can be employed in addition to base codes to guide the construction of buildings that use less energy, have less negative impact on the environment, and achieve higher levels of occupant health and comfort. Stretch codes encourage the use of best practice design and construction approaches that take advantage of advances in building science and technology.

R102.1.1 of Rhode Island's current (2017) Residential Building Code (SBC-2) and Energy Conservation Code (SBC-8).

The Residential Stretch Code is based heavily on the elements of the US Department of Energy (DOE) Zero Energy Ready Homes (ZERH) program and the US Environmental Protection Agency's (EPA) WaterSense program.<sup>1</sup> In addition to energy and water efficiency, this code also addresses indoor environmental quality and comfort as well as operations and maintenance for building systems, appliances, and components. Homes built to this code are also ready for the installation of renewable energy systems and electric vehicle charging stations. This code contains clear and specific provisions that align with all regulations promulgated by the State Building Code Standards Committee and maximize the incentives available from Rhode Island's nation-leading energy efficiency programs. Consistent with State residential base codes, it will be updated to allow for new construction methods and technologies to be incorporated at least once every three years. Buildings that comply with the Residential Stretch Code are expected to use less energy and water, have less negative impact on the environment, and achieve higher levels of occupant health and comfort.

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<sup>1</sup> Links to referenced programs are included in Appendix A.

## 2. Applicability, Compliance, and Relationship to Other Codes

The Residential Stretch Code is a voluntary code that is meant to support developers, architects, engineers, and builders interested in improving the sustainability, health, and comfort of the built environment. Compliance with this document allows users to maximize incentives from available energy efficiency programs and to gain recognition for their efforts from the state. The provisions of this code apply to the new construction or renovation of residential buildings as defined by the Rhode Island Building Code SBC-2:

*Detached one- and two-family dwellings and multiple single-family dwellings (townhouses) not more than three stories in height with a separate means of egress, and their accessory structures.*

All other buildings fall under the jurisdiction of the Rhode Island Commercial Building Code SBC-1 and its related Energy Conservation Code (SBC-8) and Commercial Stretch Code. The following Rhode Island Building Code Commission website includes details regarding Rhode Island Codes: <http://www.ribcc.ri.gov/>.

This code is designed to be used in conjunction with Rhode Island base building codes: SBC-2 (Residential Building Code); SBC-3 (Plumbing Code); SBC-4 (Mechanical Code); SBC-5 (Electrical Code); and the residential provisions of SBC-8 (Energy Conservation Code). The Residential Stretch Code does not replace any existing codes or regulations in effect, and there is no previous version of this 2017 Residential Stretch Code.

The developers of this code have researched several model codes and high-performance building programs and have incorporated the best features into the compliance paths. The US Department of Energy (DOE) Zero Energy Ready Homes program is referenced as the principal energy performance compliance path, and the US Environmental Protection Agency's (EPA) WaterSense program is referenced as a compliance path for water use efficiency. In all cases, alternative compliance options are available.

Each of the referenced programs maintains a list of definitions. It is the responsibility of the user of this code to review the definitions used by specific programs referenced within this code, unless a definition is explicitly provided within this document.

**Compliance verification.** Compliance with the provisions of the stretch code is demonstrated through a verification process. Each of the certification programs recognized as compliance paths for energy efficiency (DOE ZERH, LEED, Passive House, and Living Building Challenge) has its own verification process, and documentation of compliance with the selected program shall be submitted to the Rhode Island Office of Energy Resources.

To verify compliance with the stretch code without completing a certification program, it is the responsibility of the applicant to provide documentation of third-party verification. A signed statement of compliance from a Residential Energy Specialist must be submitted with the applicable checklists included in the Residential Stretch Code Compliance Packet. Residential

Energy Specialists shall have at least three (3) years of building design or construction experience, and shall possess at least one of the following professional certifications:<sup>2</sup>

- Residential Energy Services Network (RESNET) – Home Energy Rating System (HERS) Certified Rater
- Building Performance Institute (BPI) – Certified Building Analyst, or Certified Energy Auditor
- Association of Energy Engineers (AEE) – Certified Energy Manager or Certified Energy Auditor

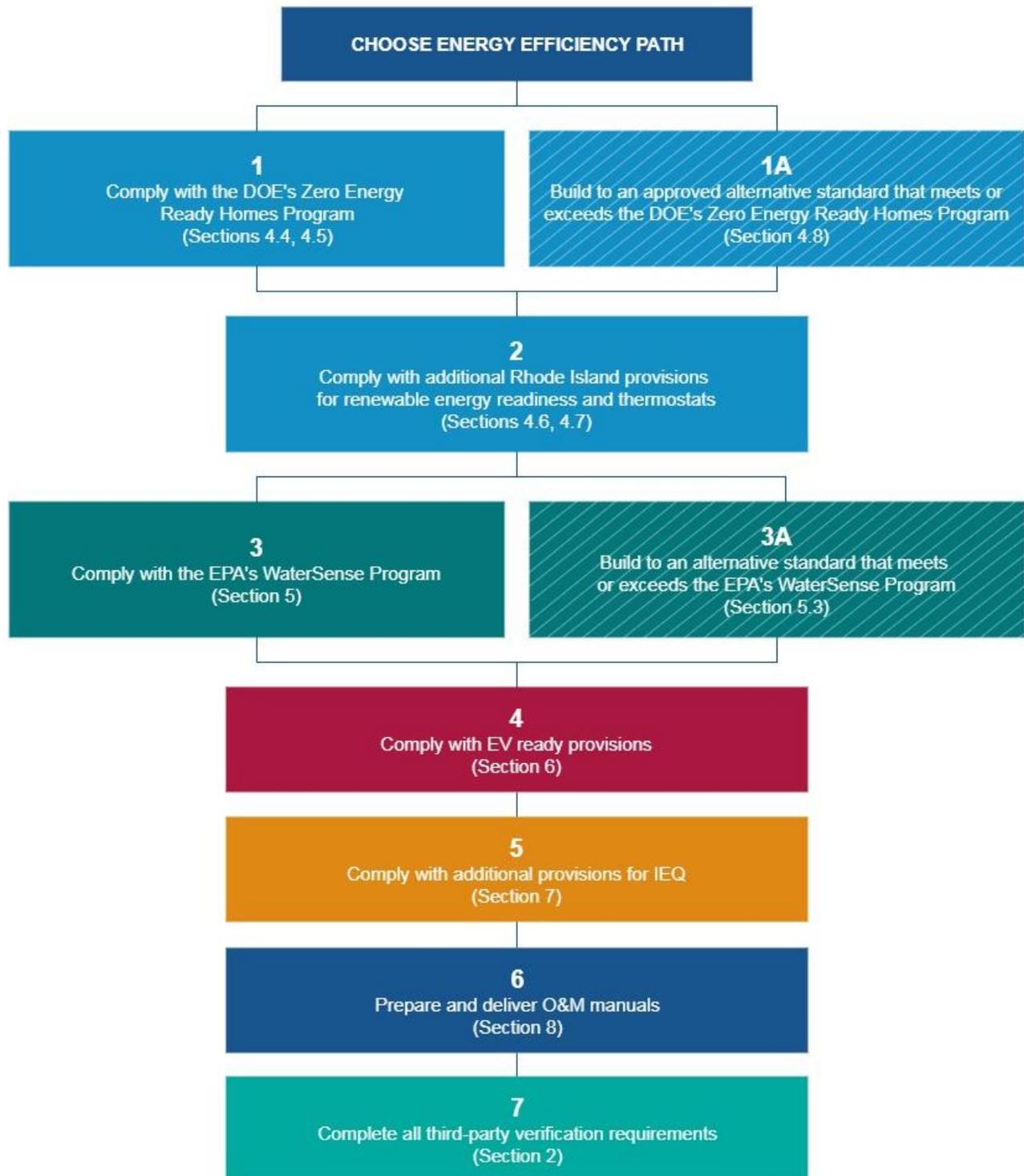
Compliance with non-energy provisions of the Stretch Code is verified by completing and submitting a signed copy of the checklist(s) included in the Residential Stretch Code Compliance Packet.

**Figure 1** summarizes the process and options for compliance with this code.

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<sup>2</sup> Links to the referenced certification programs are included in Appendix A.

**Figure 1. Summary of Compliance Path Options<sup>3</sup>**



<sup>3</sup> Note: Sections 1A & 3A represent alternative compliance paths.

**Additional Information:**

- All projects must also comply with all current applicable Rhode Island base codes.
- When using alternative compliance paths, it is the responsibility of the applicant to arrange for the verification of performance levels equivalent to the main compliance paths.
- Please be sure to comply with all requirements listed in this document as well as the requirements published for selected compliance paths.

### 3. Effective Use of This Code

It is recommended that building practitioners and/or project owners do the following:

- Inform the building department/code official of the intent to follow the Residential Stretch Code prior to or at the time of permit application. As allowed in sections R102.1.1 of the Rhode Island Residential Building Code (SBC-2) and Energy Conservation Code (SBC-8), the code official may, at their discretion, use verification of the energy efficiency portion of this code as a compliance path for the energy efficiency provisions of the base codes.
- Review the compliance path options and develop a compliance plan, including downloading all relevant program documentation and verifying that the project will meet the criteria.
- Utilize the compliance checklist included in Appendix B and in the compliance packet to track compliance progress and include it with final documentation for the code official and the homeowner.
- Contact National Grid and communicate the intent to follow the Stretch Code (and interest in participating in National Grid’s efficiency programs) prior to finalizing design documents and starting construction. Appendix A includes links to information for National Grid’s technical assistance and incentive programs.
- Investigate tax credits and other incentives available for renewable energy systems and electric vehicles. Appendix A includes links to renewable energy programs available in Rhode Island.

#### **R102.1.1 ABOVE-CODE PROGRAMS**

The following excerpt is from Rhode Island’s current (2017) base code, and gives code officials the authority to accept compliance with this stretch code document as a compliance path for the energy efficiency provisions of the base codes: “The code official or other authority having jurisdiction shall be permitted to deem a national, state, or local energy efficiency program to exceed the energy efficiency required by this code. Buildings approved in writing by such an energy efficiency program shall be considered in compliance with this code. The requirements identified as ‘mandatory’ in Chapter 11 [SBC-2] or Chapter 4 [SBC-8] shall be met.”

## National Grid Stretch Code Support

National Grid offers no-cost services and incentives to help build energy efficient homes with lower operating costs and increased durability, comfort, and safety. They are available as follows but are subject to change.

- Technical assistance – Working in partnership with the owner and/or builder, the Residential New Construction (RNC) Program offers energy modeling, design assistance, and in-field inspections to help customers achieve energy efficient homes.
- Financial incentives – The RNC Program offers whole-house performance incentives in addition to rebates for qualifying high efficiency heating, cooling, and hot water equipment.

### WHY IS NATIONAL GRID INVOLVED?

An important premise of National Grid's new construction program offerings is to prepare building design and construction practitioners for future advancement in the energy efficiency requirements of the state building code. The Rhode Island Stretch Code shares this premise, and National Grid's new construction programs have been designed to complement the energy aspects of this code where possible.

To learn more about National Grid's new construction services, call 888-887-8841.

## Innovation

Innovative approaches and alternative materials, designs, and methods not specifically addressed in this code can be approved by the code official where the proposed innovative approaches or materials, designs, or methods comply with the intent of the provisions of the code. However, the building practitioners and/or project owners shall be responsible for demonstrating equivalency if alternative approaches are employed.

## 4. Energy Efficiency

**4.0 General.** This chapter addresses the energy performance of the home and presents alternative paths for compliance.

**4.1 Scope.** The provisions of this chapter regulate the design, construction, commissioning, and operation of buildings and their associated building sites for the effective use of energy.

**4.2 Intent.** This chapter is intended to provide flexibility to permit the use of innovative approaches and techniques to achieve the effective use of energy and to facilitate the construction of zero net energy homes when renewable energy systems are incorporated into the design or are planned for future installation.

### USE OF THIS CHAPTER FOR COMPLIANCE WITH SBC-8; ENERGY CONSERVATION CODE

Compliance with this chapter is intended to result in improved energy performance compared with the residential provisions of SBC-8. At the discretion of the code official having jurisdictional authority, compliance with the energy efficiency provisions of this code can be used to demonstrate compliance with the residential provisions of SBC-8.

**4.2.1. Design and construction incentives.** National Grid offers technical assistance and financial incentives through its electric and natural gas efficiency programs for many of the requirements included in this chapter. Please refer to Appendix A for links to National Grid's incentive programs.

**4.3 Application and compliance.** Buildings and their associated building sites shall comply with all provisions of the Rhode Island Residential Building Code (SBC-2) and all provisions within Sections 4, 5, 6, 7, and 8 of this code or alternative compliance paths as described throughout this document.

**4.4 Energy performance.** Compliance with the DOE Zero Energy Ready Homes National Program Requirements (Rev. 06,) <sup>4</sup> with Rhode Island amendments is required for compliance with this code. Alternative compliance paths, as specified in Section 4.8 of this code, may also be used to demonstrate compliance. ZERH program homes are verified by a qualified third party, as defined in the ZERH program documentation. According to the DOE, ZERH program homes are a minimum of 40%–50% more energy efficient than a typical new home on a national average basis. Compliance may be verified through either a prescriptive or performance path.

**4.4.1 ZERH prescriptive path.** The prescriptive compliance path specifies provisions that must be met for insulation levels, air sealing, fenestration performance, lighting, HVAC systems, appliances, and miscellaneous energy-using systems. The prescriptive path provides a single, comprehensive set of required measures. Modeling is not required, but no measure tradeoffs are allowed.

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<sup>4</sup> Rev. 06 is the current version of the ZERH program at the time of adoption of this code. Any revisions to this or other Stretch Code requirements will be issued as amendments to this code and detailed on the Rhode Island Office of Energy Resources Website: <http://www.energy.ri.gov/>.

**4.4.2 ZERH performance path.** The performance compliance path option requires that “mandatory” prescriptive provisions be met, but it allows for the modeling of overall building performance to demonstrate that the proposed building will use no more energy than a similar building constructed in compliance with the prescriptive path.

**4.5 DOE ZERH program design intent.**<sup>5</sup> ZERH certified homes are intended to be designed and constructed to a standard that allows them to achieve zero net energy status, on an annual basis, following the installation of an on-site renewable energy system – typically, a photovoltaic (PV) solar electric system. This code does not require the installation of such a system at the time of construction but encourages the use of renewable energy and requires that the home be PV installation ready as stipulated in Section 4.6.

**4.6 RI Amendment – Renewable Ready.** For compliance with this code, the provisions in this section replace the Requirement 7 (Renewable Ready and PV Ready Checklist) provisions in the DOE ZERH program.

The Rhode Island Residential Stretch Code does not require but does encourage the installation of renewable energy systems at the time of home construction. Recognizing that the vast majority of renewable systems installed on ZERH certified homes will be solar PV systems, it is required that the homes include PV ready features.

**4.6.1 Solar site evaluation.** Prior to construction, the applicant must obtain a minimum of one solar site evaluation from a solar installation firm that holds the following credentials: a Rhode Island Contractors’ Registration and Licensing Boards registration, proof of registration with the Rhode Island Secretary of State’s Office, and a Rhode Island Renewable Energy Professional Certificate and/or a Valid “A” Electrical license. The site evaluation must detail the location of the roof- or ground-mounted PV panels and evaluate shading factors affecting system performance.

**4.6.2 PV installation preparation.** To facilitate PV installation, homes not initially constructed with renewable energy systems shall be prepared for future installation. Preparation shall include at least the following steps. An installation checklist is included with the stretch code compliance packet:

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<sup>5</sup> Appendix A includes links and contact information for this and other referenced programs.

### PV Installation Preparation Requirements

Install two 1” minimum diameter EMT conduits from the main electrical panel location to the attic or other area easily accessible to the PV panel’s proposed location. Conduits for future PV installations are to be capped and labeled at both ends. <b>Alternative:</b> Install conduits as specified on a proposed PV installation plan from a credentialed installation firm.
Install a 70-amp dual pole circuit breaker in the electrical service panel dedicated for use by a PV system. <b>Alternative:</b> Provide a labeled slot for a double-pole breaker in the electrical service panel.
For roof-mounted systems – Provide code-compliant documentation of the maximum allowable dead load and live load ratings of the proposed roof. The roof structure dead load rating shall support an additional 6 lb/sq ft for future solar system and shall meet all Rhode Island Building Code requirements as required by the local code official.
For ground-mounted systems – Possible locations of the panels must be identified in the submitted construction plans and be supported by a solar site evaluation. At least one potential location must be identified in the construction plans for the future installation of the panels.

**4.7 RI Amendment – HVAC Thermostats.** The following provisions are required in Rhode Island when using the ZERH program for compliance with this code:

**4.7.1. Wireless “smart” thermostat** – For the control of HVAC systems, wireless “smart” thermostats as defined by the ENERGY STAR program and meeting the requirements of National Grid’s Residential New Construction Program must be installed.

**4.7.1.1 Exception.** For homes utilizing ductless heat pump systems for heating and/or cooling, a thermostat meeting the requirements of 4.7.1 may be installed. For ductless heat pump installations, a wall-mounted thermostat compatible with the heat pump may be installed rather than a wireless “smart” thermostat. Handheld remote controls do not meet the thermostat requirements of this code.

**4.8 Alternative energy efficiency paths.** In addition to ZERH certification, alternative paths may be used to comply with the energy efficiency requirements of this code: US Green Building Council’s Leadership in Energy and Environmental (LEED) for Homes, Passive House, and the Living Future’s Living Building Challenge. However, each of these three certifications differ in their scope and methodology. **To use them for compliance with this code, it is the responsibility of the applicant to demonstrate, and supply a form of third-party verification allowed by this code, that the performance features of the home will result in energy usage equal to or lower than that required to obtain ZERH certification.** If compliance with this code is being used to demonstrate compliance with the energy efficiency provisions of the base building code (SBC-2) or the energy code (SBC-8), applicants should discuss with the code official the intent to comply with this code and any alternative compliance paths to be followed.

**4.8.1 LEED for Homes.** LEED for Homes is a voluntary program that promotes the design and construction of efficient homes. The program includes both mandatory and

optional requirements. Achieving LEED certification and meeting the prescriptive or performance energy efficiency requirements of the DOE ZERH program is an option for complying with this stretch code.<sup>6</sup>

LEED for Homes can be used for both single-family homes and multifamily projects. The mandatory energy and atmosphere requirements for this program include a maximum HERS index and a completed Energy Star Qualified Homes Thermal Bypass Checklist. Higher levels of performance and a lower HERS rating are obtained by complying with selected optional requirements. Applicants should discuss with the code official the particular set of LEED requirements proposed for the project prior to construction.

**4.8.1.1 LEED certification pathways.** To acquire LEED certification, all homes must first meet three prerequisites related to energy and the atmosphere. These include meeting minimum energy performance, acquiring appropriate energy metering tools, and educating the homeowner, tenant, or building manager.

The program includes separate but similar checklists of aspects for single-family homes and multifamily projects. Credits are awarded for each aspect that is met. Once projects are completed, verifiers aggregate points that have been attained to provide a LEED certification score. This score enables the USGBC to grant the home one of four increasing levels of certification (certified, silver, gold, and platinum).

**4.8.2 Passive House.** Passive House is a certification standard that includes rigorous standards for the design and construction of ultra-low energy homes. ZERH certification is currently a requirement for Passive House certification, and in many ways, Passive House goes above and beyond the requirements of this code. All other provisions of the stretch code must be met as described within this document. The intent to use Passive House for code compliance should be discussed with the code official or third-party verifier prior to construction.

Passive House largely focuses on creating buildings that require minimal energy used for heating or cooling. Insulation levels, air tightness, ventilation, windows and doors, space heating, lighting and electrical appliances are all addressed in the program requirements.

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<sup>6</sup> The current ZERH prescriptive and performance path requirements can be found at <https://energy.gov/eere/buildings/downloads/doe-zero-energy-ready-home-national-program-requirements-rev-06>.

**4.8.3 Living Building Challenge.** The International Living Future Institute’s Living Building Challenge provides a set of highly rigorous guidelines for energy efficiency. The program objectives include reducing ecological harm and repairing environmental damage through aggressive standards. A Living Building Challenge certification can be used as an alternative path for compliance with the energy and water efficiency provisions of this code; all other provisions of the stretch code must be met as described within this document.

Homes can achieve the Living Building Challenge at an affordable cost through the Living Building Challenge Framework for Affordable Housing. “Petals” are awarded for implementing rigorous standards of sustainability. The energy petal, in particular, requires projects to capture 105% of their total energy needs through on-site renewable energy without the use of on-site combustion. Projects must also provide viable on-site energy storage for resilience purposes.

## 5. Water Efficiency

Water is an integral component of any home’s energy use. Conservation of water resources is especially vital towards its continued sustainability in Rhode Island. This stretch code incorporates various methods by which homeowners can ensure efficient distribution and availability of water. To comply with this stretch code, verification of compliance<sup>7</sup> with the provisions of the 2017 version of the US Environmental Protection Agency’s (EPA’s) WaterSense program, or an equivalent alternative compliance path, is required.

The EPA’s WaterSense program helps consumers save water and maximize efficiency. The program was designed to encourage water efficiency through voluntary action and to promote products that use less water. Major or minor lifestyle changes by the consumers are therefore not necessary to become more efficient. Instead, products and irrigation professionals are awarded certifications based on their ability to fulfill certain efficiency and training criteria. These specifications are applied to water used for both interior and exterior/landscaping purposes.

**5.1 Interior.** The following components of a home are covered by the WaterSense indoor criteria:

- Service pressure
- Toilets
- Bathroom faucets
- Showerheads
- Hot water delivery systems

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<sup>7</sup> Applicants may provide a copy of WaterSense certification, or if they not obtaining certification may complete the WaterSense checklist and have it signed by the licensed plumber responsible for the installation of the plumbing fixtures.

- Dishwashers
- Clothes washers
- Evaporative air conditioners
- Water softeners
- Drinking water treatment systems
- Whole house humidifiers

**5.2 Exterior/landscaping.** On average, 30% of a home's water is used outside, although this percentage can increase greatly during summer in arid climates. Monitoring and controlling water systems outdoors is a particularly important aspect of managing residential water use outside.

The following components of a home are covered by the WaterSense outdoor criteria:

- Landscape designs
- Mulching
- Pools/spas
- Ornamental water features
- Irrigation system designs
- Irrigation controllers
- Sprinkler heads
- Micro-irrigation systems
- Schedules

**5.3 Optional paths to WaterSense for water compliance.** Aside from EPA's WaterSense program, there are additional programs related to residential water usage that may be used to comply with the water efficiency requirements of this code. Three programs – LEED for Homes, Living Building Challenge, and Enterprise Green Communities– offer concrete guidelines for designing and managing water efficient systems in homes. However, these three certifications differ in their scope and methodology. To use these alternative paths for compliance with this code, the applicant may use the documentation checklist or specifications for the referenced program and submit a copy signed by the licensed plumber responsible for the installation of the plumbing fixtures.

**5.3.1 LEED for Homes.** LEED for Homes utilizes a credit system whereby points are awarded for water efficiency. Credits are earned depending on the compliance path chosen. The EPA WaterSense program is referenced as a compliance path; stretch code applicants may document equivalent water efficiency performance.

**5.3.2 Living Building Challenge.** Homes can achieve the Living Building Challenge's water petal at an affordable cost through the Living Building Challenge Framework for

Affordable Housing. The water petal requires projects to work in harmony with the natural water flows of the building site and its environment.

Projects must obtain 100% of their water needs from captured precipitation or other natural closed-loop water systems or by recycling used water. Additionally, water must be purified without the use of any chemicals. Any stormwater and water discharge must be treated on-site and managed through re-use, a closed system, or infiltration.

### **5.3.3 Enterprise Green Communities**

Enterprise Green Communities aims to increase residential water efficiency, with an emphasis on affordable housing. Enterprise's water conservation standards utilize many of the EPA's WaterSense guidelines and recommend WaterSense certified products. If using the water guidelines for this program for stretch code compliance, the applicant must provide third-party verified documentation that the performance features of the home will result in water usage equal to or lower than that required to obtain the EPA's WaterSense certification.

## **6. Electric Vehicle Readiness**

Electric vehicles (EVs) are predicted to be a critical part of a sustainable energy future, and the ownership rate of EVs is increasing dramatically with new models being introduced every year. Some simple provisions installed at the time of new construction will make it easier and less intrusive to add electric charging stations at residences in the future. EV residential charging stations fall into two categories: Level 1 charging, which operates on a 120-volt circuit, and Level 2, which operates on a 240-volt circuit. Level 2 charging stations charge the batteries much faster and are now considered the standard for EVs. A specification also exists for Level 3 charging, but Level 3 charging stations use high voltage (480V) dc circuits and are applicable to commercial/industrial facilities and specialty charging stations.

**6.1 Charging station readiness.** Each single-family home, or at least one home in a two-family dwelling, must be constructed with the capability to easily add a Level 2 charging station immediately upon occupancy or at some future time. For multifamily residences falling under the jurisdiction of the Rhode Island Residential Building Code (SBC-2), at least 25%, but never less than one, of the parking spaces must be made EV ready.

For compliance with this code, the charging station preparation must include, at a minimum:

- A Raceway (conduit) to accommodate a 240V 40-amp circuit (level 2) which terminates at an electrical circuit panel at one end and in a garage or at an exterior parking location at the other end.
- The installation of an approved electrical enclosure at the future charging station.
- The labeling of a dedicated double pole 40-amp circuit breaker location in the main electrical distribution panel or subpanel.

All installations must be completed by a licensed electrician and meet all Rhode Island electrical base code requirements.

## 7. Indoor Environmental Quality (IEQ)

To promote healthy indoor environments, this code includes simple requirements related to indoor air quality:

- Ventilation rates – Each of the available energy efficiency paths within this code includes guidelines for ventilation rates and control.
- Operations and maintenance – This code requires that operations manuals (see Section 8 of this code) be supplied to the homeowner for all systems and appliances. Properly following the recommended maintenance procedures – especially for the cleaning and/or replacement of air filters – is critical for dust control.
- Limiting the volatile organic compound (VOC) content in interior building products, components, and finishes – Conventional paints, varnishes, oils, carpets and carpet padding, plywood, plastics, and other surface finishes typically contain VOCs. Because they are “volatile,” VOCs escape to the air over time. Nearly all categories mentioned above are now offered in no-/low-VOC formulations, and suppliers now routinely publish VOC levels as part of their marketing literature.

**Compliance options.** For compliance with this code, certification with the EPA Indoor AirPLUS is a requirement of the ZERH Program certification. If following an alternative compliance path for energy, applicants may obtain Indoor AirPLUS certification separately, or may meet the VOC content criteria of one of the following programs or an equivalent. The checklist in the compliance packet must be completed and signed by the applicant.

**Greenguard.** Certifies both residential and commercial products for VOC levels and provides a free tool (SPOT) for identifying qualifying products.

**Cradle to Cradle.** Also operates a certification program with product search capabilities.

**Health Product Declaration (HPD).** HDP publishes a User Guide to meeting the indoor product requirements of green building programs.

**Declare.** This is a component of the Living Building Challenge and provides guidance and a product database.

## 8. Operations and Maintenance

Many homes and other buildings built to a high energy efficiency level do not achieve their energy savings potential due to operational issues. The intent of this set of requirements is to help ensure that homes built to the Rhode Island Stretch Code standard perform as intended and deliver significant savings over their lifetime.

**8.1 Owner’s manual.** Prior to or at the time of first occupancy, the contracting team shall provide an owner’s manual to the residents. The manual must include, at a minimum:

- A description of all energy-using systems and appliances in the home.
- The manufacturer’s operating manual for each system and appliance.
- Manufacturer’s instructions for all thermostats.
- The required solar site evaluation and a description of the PV ready conduit installed.
- A description of the EV charging station preparation that was installed.
- Brochures for the finishes (paints, stains, varnishes, carpet, etc.) that are present in the home.
- Manufacturer’s instructions/operating manual for all safety equipment such as smoke, fire, carbon monoxide, radon detectors, and fire extinguishers.
- Manufacturer’s instruction for any “smart” home energy management systems such as smart hubs, networked lighting controls, etc.

**8.2 Energy efficiency and renewable energy incentives.** Prior to or at the time of first occupancy, the builder shall provide the residents with an information packet describing the current opportunities available through utility and government sources supporting energy efficiency improvements and the installation of renewable energy systems.

## Appendix A

### References and Program Links

The following references and weblinks are organized by code section.

#### Section 1. Introduction

US Department of Energy (DOE) Zero Energy Ready Homes program:

<https://energy.gov/eere/buildings/zero-energy-ready-home>

US Environmental Protection Agency's (EPA) WaterSense program:

<https://www.epa.gov/watersense>

#### Section 2. Applicability, Compliance, and Relationship to other Codes

**Rhode Island Building Code Commission** – Includes details regarding all Rhode Island Codes: <http://www.ribcc.ri.gov/>

**RESNET HERS Rater Certification** – Directory of certified HERS Raters located in Rhode Island: [http://www.resnet.us/professional/programs/search\\_directory](http://www.resnet.us/professional/programs/search_directory)

**BPI Building Professional Certification Programs** – Information on BPI's certification programs and a "Locator" for finding certified Building Analysts, and Energy Auditors: <http://www.bpi.org/certified-professionals>

**AEE Professional Certification Programs** – Information on AEE's certification programs and a search tool for finding certified professionals: <https://www.aeecenter.org/certifications>

Energy Auditor, or AEE Certified Energy Manager

#### Section 3. Effective Use of This Code

**Licensed contractors** – Licensed electricians and individuals and companies holding a Rhode Island Renewable Energy Professionals (REP) certificate are legally qualified to install solar PV systems in Rhode Island. A list of individuals and companies holding an REP certificate, as well as guidelines for qualifying for the certification, can be found at <http://www.energy.ri.gov/policies-programs/for-vendors/renewable-energy-professional.php>.

**Renewable Energy Fund (REF)** – The Rhode Island Commerce Corporation offers first-come-first-serve grants for renewable energy systems. Often these grants can cover 25%–30% of renewable energy installation costs. These projects include both photovoltaic (PV) and solar domestic hot water (SDHW) technologies. For more information visit: <http://commerceri.com/finance-business/renewable-energy-fund/small-scale-projects/>.

**Renewable Energy Growth (REG) Program** – Available to eligible renewable distributed generation (DG) projects, the REG Program enables National Grid customers

to sell their generation output under long-term tariffs at fixed prices. For more information visit: [https://www9.nationalgridus.com/narragansett/business/energyeff/4\\_dist\\_gen.asp](https://www9.nationalgridus.com/narragansett/business/energyeff/4_dist_gen.asp).

**Tax Incentives** – Information regarding sales tax exemptions and income tax credits is available at the following link: <http://www.energy.ri.gov/policies-programs/programs-incentives/solarize-ri.php>.

## **Section 4. Energy Efficiency**

ENERGY STAR Smart Thermostats:

[https://www.energystar.gov/products/heating\\_cooling/smart\\_thermostats](https://www.energystar.gov/products/heating_cooling/smart_thermostats)

National Grid thermostat incentives: <https://www.nationalgridus.com/media/pdfs/resi-ways-to-save/thermostat-rebate.pdf>

### **ZERH program resources:**

The ZERH program is a fully supported program that provides guidance and third-party project verification.

Program home page that provides general program information and a navigation menu:

<https://energy.gov/eere/buildings/zero-energy-ready-home>

Program participation guidelines as well as an introduction to the prescriptive and performance paths are presented on this page.

<https://energy.gov/eere/buildings/guidelines-participating-doe-zero-energy-ready-home>

Specific design and construction requirements of the program can be downloaded in Adobe pdf format from this page. <https://energy.gov/eere/buildings/downloads/doe-zero-energy-ready-home-national-program-requirements-rev-06>

Design and construction guides, training opportunities, fact sheets and brochures, partner and builder links, etc. <https://energy.gov/eere/buildings/doe-zero-energy-ready-home-resources>

Additional ZERH resources are available upon registering as a program partner.

### **USGBC LEED Resources**

Guide to LEED Certification for Homes:

<https://www.usgbc.org/cert-guide/homes>

LEED for Homes Reference Guide:

<https://www.usgbc.org/resources/leed-reference-guide-homes-design-and-construction>

Multifamily Verification and Submittal Guidelines:

<https://s3.amazonaws.com/usgbc-assets/usgbc.org/library/V4-Verification-and-Submittal-Guidelines-Final.pdf>

### **Passive House Resources**

Passive House Program Requirements:

[http://passivehouse.com/02\\_informations/02\\_passive-house-requirements/02\\_passive-house-requirements.htm](http://passivehouse.com/02_informations/02_passive-house-requirements/02_passive-house-requirements.htm)

Certification Overview:

<http://www.phius.org/phius-certification-for-buildings-products/phius-2015-project-certification/phius-certification-overview>

### **Living Building Challenge Resources**

The Living Building Challenge Framework for Affordable Housing:

<https://living-future.org/wp-content/uploads/2016/11/Living-Building-Challenge-Framework-for-Affordable-Housing.pdf>

Living Building Challenge 3.1 Standard:

<https://living-future.org/product/lbc-3-1-standard/>

Living Building Challenge Overview:

<https://living-future.org/lbc/basics/>

## **5. Water Efficiency**

### **EPA Water Sense Program Resources**

EPA WaterSense Program Guidelines (version 5.3):

<https://www.epa.gov/sites/production/files/2017-02/documents/ws-program-guidelines.pdf>

EPA WaterSense Single-Family New Home Specifications:

<https://www.epa.gov/sites/production/files/2017-02/documents/ws-specification-home-suppstatement-v1.0.pdf>

EPA WaterSense Labeled Homes Reference Guide:

<https://www.epa.gov/sites/production/files/2017-01/documents/ws-homes-labeled-reference-guide.pdf>

Resource Manual for Building WaterSense Labeled New Homes:

<https://www.epa.gov/sites/production/files/2017-01/documents/ws-homes-builder-resource-manual.pdf>

### **USGBC LEED Water Efficiency Resources**

Homes Credit Library v4:

<https://www.usgbc.org/credits/homes/v4/water-efficiency>

LEED WaterSense for New Homes:

<https://www.usgbc.org/credits/homes/v4/wepc32>

### **Living Building Challenge Water Efficiency Resources**

Living Building Challenge Framework for Affordable Housing:

<https://living-future.org/wp-content/uploads/2016/11/Living-Building-Challenge-Framework-for-Affordable-Housing.pdf>

### **Enterprise Green Communities Water Efficiency Resources**

Enterprise Green Communities Criteria Manual:

<http://www.enterprisecommunity.org/sites/default/files/media-library/solutions-and-innovation/green/ecp-2015-criteria-manual-11-15.pdf>

Enterprise Green Communities Criteria Checklist:

<http://www.enterprisecommunity.org/sites/default/files/media-library/solutions-and-innovation/green/ecp-2015-criteria-checklist-11-15.pdf>

## **Section 6. Electric Vehicles**

**Rhode Island Office of Energy Resources; Electric Vehicles** – Information on electric vehicles, charging stations, and incentive programs.

<http://www.energy.ri.gov/transportation/ev>

**US Department of Energy; Electric Vehicles** – Information on electric vehicles, including a comparative cost calculator. <https://energy.gov/eere/electricvehicles/electric-vehicles>

## **Section 7. Indoor Environmental Quality**

**EPA Indoor AirPLUS** – An otherwise voluntary certification program that is a mandatory component of the ZERH program. <https://www.epa.gov/indoorairplus>

**Greenguard** – Certifies both residential and commercial products for VOC levels and provide a free tool (SPOT) for identifying qualifying products.

<http://greenguard.org/en/index.aspx>

**Cradle to Cradle** – Certification program with product search capabilities.

<http://www.c2ccertified.org/drive-change/built-environment>

**Health Product Declaration (HPD)** – HDP publishes a User Guide to meeting the indoor product requirements of green building programs. <https://www.hpd-collaborative.org/resources/>

**Declare** – Declare is a component of the Living Building Challenge and provides guidance and a product database. <https://living-future.org/declare/>