



Vermont Housing Finance Agency



Vermont Housing &
Conservation Board

PO Box 408, Burlington, VT 05402-0408
802.864.5743 | www.vhfa.org

58 East State St., Montpelier, VT 05602
802.828.3250 | www.vhcb.org

VHCB/VHFA Building Design Standards

Policy on Energy Efficiency, Health and Resiliency
in Affordable Housing Design, Construction and
Rehabilitation

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Section 1: Policy Rationale

Statement of Purpose

The purpose of this policy is to provide guidance on energy efficiency, health, and resiliency in the design and construction of affordable housing. This policy reflects the importance that VHCB and VHFA place on funding housing, which meets high standards of energy efficiency, health, and resiliency. The standards addressed by this policy guidance are critical to the long-term performance and sustainability of Vermont's affordable housing infrastructure. Developing a joint standard that reflects these shared interests provides our partners with clear and uniform guidance on the important design and development issues addressed herein.

Goals of this joint policy

Creating a joint VHCB/VHFA policy with updated content and format has four major goals which are summarized as follows:

- Support the development of affordable housing that meets high standards of energy efficiency, health, and resiliency;
- Reduce the impact of volatile fuel pricing on the financial health of affordable housing operations;
- Provide a consistent, uniform, and up to date set of requirements and expectations for development teams and funders;
- Foster consensus in the evolution of the policy by involving stakeholder input and incorporating existing state and national best in class guidance as part of this policy.

Application, certification and related requirements of this policy

- All new construction multifamily rental and single-family projects (including substantial and moderate rehabilitation multifamily projects) funded by VHCB and/or VHFA are subject to this policy.
- All projects shall comply with current versions of Vermont Residential or Commercial Building Energy Codes (RBES & CBES) and other state and municipal building codes.
- All projects shall comply with VHFA [Universal Design Policy](#)
- All projects shall provide an outline specification, schematic design, and cost estimate at the time of application to VHCB and/or VHFA.
- Rehabilitation projects shall also provide an energy audit of current usage and projected savings based on initial schematic design.
- VHFA and VHCB each require respective architectural certifications of completion.

Section 2: Design Standards

Energy Efficiency Standards

All new construction and most substantial rehabilitation projects shall comply with Efficiency Vermont's (EVT) 2020 High-Performance Track Standards as updated and integrated into this policy.

https://www.encyvermont.com/Media/Default/docs/trade-partners/technical-resources/MF_New_Construction_Checklist.pdf

Since the introduction of the High Performance Track Standards for multifamily housing in 2017, Efficiency Vermont has applied a flexible performance based approach to achieve this standard based on specific project considerations. In addition, when developers are working with other energy efficiency partners such as 3E Thermal a similar approach has been developed and expected to be maintained in the future.

Rehabilitation projects not meeting this standard shall work with energy efficiency partners to maximize energy efficiency measures based upon project budget, housing goals, historic preservation, and other building specific considerations. An explanation of where this standard cannot be met will be provided during underwriting process.

All rehabilitation projects not meeting this standard shall meet a maximum annual heating demand performance threshold of (4 BTU/SF/H DD) and achieve a post rehab. blower door tested air sealing level of (.3 CFM50/sf. of surface area). Projects that present unique challenges in achieving the minimum performance-based goals outlined above, some flexibility may be applied to the underwriting process by VHCB and VHFA. Specifically, it is anticipated this may occur in cases when energy efficiency improvements are unreasonable given inflation-adjusted paybacks of exceptionally long duration (as determined through a payback analysis). This flexible approach will require an iterative dialogue between project developers and underwriters throughout. Exceptions to these performance-based standards will be made on a case by case basis and approved by staff.

Renewable Energy

Developers are encouraged to maximize opportunities to install both on-site and community based renewable generation and non-fossil fuel mechanical systems that reflect best practices in long term sustainable building design. These standards do not contain additional requirements for renewable installation because requirements for on-site and community-based renewables are planned in the forthcoming RBES, CBES, and other state codes and guidelines.

Basis of Design and Integrated Design Process

Developers are encouraged to develop a clear mechanical Basis of Design and pursue an Integrated Design Process within the limitations of VHCB and VHFA public bidding requirements.

VHCB and VHFA underwriting staffs need to have an in-depth understanding of the projects at the time of application. The application requires outline specifications, schematic design, and cost estimates. VHCB and VHFA understand that supporting an Integrated Design Process requires understanding there may be substantive design changes post-funding commitment. Communication throughout the development of the project is critical to balance the needs of the funders and the Integrative Design Process.

[Roadmap to the Integrated Design Process](#)

Air Sealing Protocol

All projects shall have an air sealing specification included in the project specifications which lists the air sealing target (at a minimum in line with energy efficiency requirements above) and air sealing design and testing methodology for the project.

Moisture Control and Radon Protection

All projects must comply with EPA Indoor airPLUS sections 1 and 2. Design teams must document where these requirements are not feasible on particular rehab projects and what alternative measures are maintained or modified to address the particular design feature concern.

[EPA Indoor airPLUS](#)

Indoor Air Quality and Low VOC Materials

All composite wood products, flooring, cabinetry, paints, stains, adhesives, windows, doors and other building materials in all projects must comply with EPA Indoor airPLUS section 6 Low-Emission Materials.

[EPA Indoor airPLUS](#)

Sustainable and Low Global Warming Potential (GWP) Materials and Practices

Projects should strive to avoid high GWP products and practices. Design teams are encouraged to research Environmental Product Declarations (EPD's) and utilize building practices such as minimizing concrete use, utilizing (carbon sequestering) wood framing vs. steel, and minimizing the use of high GWP spray and rigid foam insulation. Provided with these standards are links to leading national information and best practices on minimizing embodied carbon.

Architecture 2030

Architecture 2030's mission is to rapidly transform the global built environment from the major contributor of greenhouse gas (GHG) emissions to a central part of the solution to the climate crisis. They go into detail on embodied carbon at their intro resource page: <https://architecture2030.org/new-buildings-embodied/>. Linked within this website is the carbon smart materials palette at <https://materialspalette.org/>

World Green Building Council

- <https://www.worldgbc.org/bringing-embodied-carbon-upfront-report-download>

The WGBC has released a comprehensive, detailed report that takes a broad view of the industry's response to reducing embodied carbon, addressing multiple stakeholders including developers and policymakers in addition to those in the AEC industry.

Carbon Leadership Forum

- <http://www.carbonleadershipforum.org/>

The leading professional community of manufacturers, designers, builders and academics focused on reducing the carbon 'embodied' in building materials. Their resource page <http://www.carbonleadershipforum.org/resources/> holds one of the most comprehensive assemblies of related resources. Their publications <http://www.carbonleadershipforum.org/resources/clf-publications/> are invaluable technical resources for professionals looking to engage in this work.

In addition, all projects are required to have a waste management plan which maximizes reuse and recycling opportunities.

[Vermont Agency of Natural Resources](#)

Site Landscape Preservation and Native Plantings

All projects must preserve existing trees and vegetation, not including within 30' of buildings, driveways, solar access, areas cleared for food production, and as required for grading and drainage requirements. Within the 30' foot building perimeter, preserve existing trees and vegetation to the extent possible and practical. When selecting new plantings for sites, the plantings must be northern hardy non-invasive varieties that do not require irrigation beyond initial establishment.

[Trees and Shrubs](#)

[Perennials](#)

[Plant Resources](#)

Light Pollution

All projects must minimize light pollution in accordance with Illuminating Engineering Society of North America (IESNA) Recommended Practice Manual.

<https://www.ies.org/product/the-lighting-handbook-10th-edition/> (This is a free download)

Project Closeout and Post Occupancy Successful Operation

All project owners will ensure that the project “as-built” drawings are permanently stored for future reference. In addition, all appropriate training and operating materials for all mechanical and building systems must be made available for property and asset managers, as well as compliance inspectors.