



# A COMPARISON OF MULTIFAMILY GREEN BUILDING CERTIFICATIONS

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# List of Acronyms

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<b>ACCA</b>	Air Conditioning Contractors of America
<b>ASHRAE</b>	American Society of Heating, Refrigerating and Air-Conditioning Engineers
<b>CARB</b>	The California Air Resources Board
<b>CHFA</b>	Colorado Housing and Finance Authority
<b>CO</b>	Carbon Monoxide
<b>CWMP</b>	Construction Waste Management Plan
<b>DOC PS</b>	Department of Commerce Performance Standard for Wood-Based Structural-Use Panels
<b>EGC</b>	Enterprise Green Communities
<b>EOC</b>	Energy Outreach Colorado
<b>EPA</b>	Environmental Protection Agency
<b>Energy Star MFNC</b>	Energy Star Multifamily New Construction
<b>EPB</b>	Equity Priority Building
<b>EV</b>	Electric Vehicle
<b>DIC</b>	Disproportionately Impacted Community
<b>GBCI</b>	Green Building Certification Inc.
<b>HERS</b>	Home Energy Rating System
<b>HPWH</b>	Heat Pump Water Heater
<b>HTC</b>	Housing Tax Credits
<b>HVAC</b>	Heating, Venting, Air Conditioning
<b>I-Codes</b>	International building codes
<b>IECC</b>	International Energy Conservation Code
<b>IPM</b>	Integrated Pest Management
<b>IRA</b>	Inflation Reduction Act of 2022
<b>LBC</b>	Living Building Challenge
<b>LEED</b>	Leadership in Energy and Environmental Design
<b>MEP</b>	Mechanical, Electrical, Plumbing
<b>NGBS</b>	National Green Building Standard
<b>NFRC</b>	National Fenestration Rating Council
<b>PHI</b>	Passive House Institute
<b>PHIUS</b>	Passive House Institute US, Inc.
<b>PV</b>	Photovoltaics
<b>QAP</b>	Qualified Allocation Plan
<b>RESNET</b>	Residential Energy Services Network
<b>SCAQMD</b>	South Coast Air Quality Management District
<b>USGBC</b>	U.S. Green Building Council
<b>ZERH</b>	Zero Energy Ready Homes

# A COMPARISON OF MULTIFAMILY GREEN BUILDING CERTIFICATIONS

## Introduction

This review provides a comparison of multifamily green building certifications to help stakeholders understand the relevant requirements and value proposition of each rating system. Analysis focuses on the application of these certifications to multifamily affordable developments in Colorado, including Housing Tax Credit developments. The report was commissioned by the Colorado Housing and Finance Authority to provide more information on multifamily building green certifications, requirements, benefits, and challenges.

Included are matrices and accompanying narratives outlining certification system characteristics and alignment with key outcomes for residents. Certification complexity, minimum requirements, cost considerations and program benefits are reviewed. Where appropriate, comparisons are broken out by “sustainability” and “energy-focused” certification system types. In general, the “energy-focused” certifications have required performance targets and focus largely on operating energy. The “sustainability” certifications are holistically focused with different levels of certification based on performance. Group14 has also provided an overview of how an “average” Colorado-based affordable housing design aligns with the analyzed certification systems.

The green certification programs addressed include:

### Sustainability

- Leadership in Environmental and Energy Design (LEED) for Homes and Multifamily Mid-rise
- Enterprise Green Communities (EGC)
- National Green Building Standard (NGBS)

### Energy

- ENERGY STAR Multifamily New Construction (MFNC)
- Zero Energy Ready Homes (ZERH)
- Passive House Institute US (PHIUS)
- Living Building Challenge (LBC) Zero Carbon Certification



## Value of Green Building Certification

Green building certifications provide benefits for a wide range of building stakeholders, with a focus on occupants. The systems establish a road map that development teams can use to design and construct healthy, highly efficient buildings. Evidence based research has documented several benefits of green building certification:

**Accountability** – The certification process provides objective and transparent documentation of the building’s environmental impact, using third party evaluation and testing to verify project performance. Green building certifications also provide a consistent set of design and construction requirements across different climates, jurisdictions, and resident populations.



**Addressing Climate Change** – According to a UC Berkley study, green certified buildings (on average) contribute 50% fewer GHG emissions than conventionally constructed buildings due to reduced water consumption, energy efficiency, sustainably-sourced materials, and access to alternative transportation. These benefits also reduce operating costs, improve air quality, and reduce resource consumption.

**Equity in Design** – Some green building certification systems prioritize the lived experience of lower income populations and ensure that the developers and designers are responsive to the resident community. These programs do this by ensuring staff and residents are engaged in the design process and by having dedicated spaces in the building that address critical needs around safety, financial security, health, and wellness. These design elements are especially critical for children growing up in poverty, whose long-term health outcomes are improved by safe, dignified housing.

**Resilient Design** – Some green building certification systems encourage development teams to address the project’s potential climate risks by doing a hazard assessment and incorporating resilient design strategies. A recent Group14 analysis commissioned by the Colorado Energy Office found that 23% of “Equity Priority Buildings” over 50,000 SF exist in high hazard zones. Addressing climate risk increases affordable housing’s resiliency over the life of the building asset. The World Bank found that the average net benefit of investing in more resilient infrastructure is \$4 for each \$1 invested. This is especially impactful for the income-qualified populations most vulnerable to high heat, poor air quality, and energy burden.

**Supporting Disproportionally Impacted Communities** – The population served by affordable housing faces multiple burdens, including environmental and socioeconomic stressors, poverty, high unemployment rates, high housing costs, pollution and poor air quality, and lack of access to basic resources. Some green building certifications require project teams to understand the social determinants of health facing their community and how these burdens can be mitigated through project design.

## Overview - Green Building Certification Programs

While all the green certification systems can be used for multifamily residential construction, EGC is the only one specifically designed for affordable housing. Only LEED, EGC, NGBS, and ENERGY STAR can accommodate moderate and/or substantial rehabilitation projects. With the evolution of green building standards and a more rigorous focus on energy, there are no green building certification systems that can be easily achieved without third party expertise. Most systems require an individual on the team that is an accredited professional.

The variability in green certification system design allows multifamily affordable housing developers to pick the program that is right for their project. The table on the following page outlines the high-level program benefits development teams should consider when making this choice.

## Certification Overview

Sustainability Certifications	
<b>LEED</b>	Recognizable, well-established program focused on environmental and social sustainability. LEED utilizes standard best practices in energy efficiency and housing design. The program is ideal for marketability and showcasing the projects' sustainability achievements. In addition, the program focuses on sustainable sites, water efficiency, and indoor environmental quality.
<b>EGC</b>	The only certification system designed specifically for affordable housing, EGC focuses creating sustainable housing that benefits the environment, the owners/operators, and the end users. In addition to requiring best practices in energy use, there is a strong focus on health and wellness, engaging residents in the design process, climate hazard resiliency, and creating dignified, human-centered housing. This program is well suited to supportive housing and projects with a focus on healing design. EGC requires ENERGY STAR certification as a prerequisite.
<b>NGBS</b>	Highly flexible and cost-effective program that allows users to choose the credits that best serve the developer's objectives. While design and development teams can achieve certification with standard best practices, the certification system provides the opportunity to go above and beyond regarding water efficiency, universal design, and climate resiliency
Energy-Focused Certifications	
<b>ENERGY STAR MFNC</b>	Provides best practices around energy efficiency to ensures above code performance, promotes improved ventilation and air quality, and balances up front and long-term costs to the owners/developers. The widespread use of the program means that developers, architects, and general contractors have familiarity with the requirements.
<b>ZERH</b>	Builds upon ENERGY STAR standards with increased requirements around energy performance. Sets projects up to achieve net zero operations with the addition of renewables. Requirements for solar PV ready, EV ready, and heat pump ready sets up buildings for future electrification.
<b>Passive House Institute US</b>	A great framework for maximizing the benefits of passive design and building orientation. Strict air sealing and insulation requirements help projects minimize heating and cooling loads, significantly lowering operating costs.
<b>LBC Zero Carbon</b>	The most demanding energy-focused certification system on the market; LBC requires an all-electric design, on-site renewables, offsetting of carbon associated with material use, and proof of net zero with 12 months of utility data. The program is for projects that want to fully decarbonize and minimize their impact on the environment as much as possible.

*\*Note that the Passive House Institute (PHI) and Passive House Institute US (PHIUS) are separate organizations; for the purposes of the analysis we have referenced PHIUS standards.*

The matrix below provides an overview of each of the analyzed green rating systems, including the certification levels or tiers and the designated expertise required of design teams. To facilitate a deeper analysis, certifications have been grouped into two broad types: sustainability certifications and energy-focused certifications. The broader green building certifications (LEED, EGC, and NGBS) focus on a range of sustainability topics and have tiers based on a project’s level of performance. The energy-focused programs typically lack tiers - projects must meet all criteria to earn the certification (including ENERGY STAR, ZERH, PHIUS, and LBC).

### Certification Comparison

Sustainability Certifications			
	Enterprise Green Communities (EGC)	LEED for Residential (LEED)	National Green Building Standard (NGBS)
<b>Certification Entity</b>	Enterprise Community Partners	USGBC / GBCI	Home Innovation Research Labs
<b>Certification Tiers</b>	2 tiers with minimum prerequisites	4 tiers with minimum prerequisites	4 tiers with minimum prerequisites
<b>Required Designations in Project Team</b>	N/A (Except what’s required for ENERGY STAR MFNC)	LEED Green Rater and a Qualified Energy Rater	NGBS Green Verifier

Energy-Focused Certifications				
	Zero Energy Ready Homes (ZERH)	Passive House Institute US (PHIUS)	Energy Star MFNC (Energy Star)	Living Building Challenge (LBC*) Zero Carbon
<b>Certification Entity</b>	Department of Energy/EPA	Passive House Institute US	Department of Energy/EPA	International Living Future Institute
<b>Certification Tiers</b>	No tiers. Must meet all certification requirements	2 tiers. Must meet all certification requirements	No tiers. Must meet all certification requirements	No tiers. Must meet all certification requirements
<b>Required Designations in Project Team</b>	Certified Energy Rater, HVAC Functional Testing Agent	HERS Rater, PHIUS Accredited Designer Certifier and Building Certifier	Certified Energy Rater, HVAC Functional Testing Agent	Living Future Accreditation

*\*Note that the Living Building Challenge has several types of certifications that range from a focus on zero carbon / zero energy to full certification of all the “petals” and imperatives. For affordable housing design, the LBC Zero Carbon certification is the most relevant and achievable for projects. See details in Appendix B regarding the various LBC certification types and what they address.*

### Requirements - Green Building Certification Programs

The matrix on the following page outlines the covered scope areas for each of the green building certification programs. As mentioned above, ENERGY STAR, ZERH, PHIUS, and LBC Zero Carbon certifications are focused primarily on energy efficiency. NGBS broadens the certification scope to environmental-based sustainability topics that include site design, water efficiency, sustainable materials, and climate resiliency. LEED and EGC take a more holistic approach to sustainability by also incorporating physical/mental health and equity credits.

A key strategy employed by LEED and EGC are “Integrative Design” requirements. LEED defines this as a design methodology that brings “everyone involved in a project, from the design phase to construction to the actual day-to-day operations, together right from the start to collaborate.” EGC (and to a lesser extent LEED) mandatory credits will require a set of integrated design meetings focused on energy, sustainability, resilience, health, and equity considerations.

All the rating systems require some level of onsite verification/testing by a certified professional to ensure the project is meeting performance targets. In addition, LEED, EGC, and NGBS projects must compile documentation, calculations, and narratives to submit for review by a certification body. The LBC Zero Carbon program is the only program which requires post-occupancy proof of energy performance.

Topic Areas	Sustainability Certifications			Energy-Focused Certifications			
	EGC	LEED for Residential	NGBS	ENERGY STAR MFNC	ZERH	PHIUS	LBC Zero Carbon
Integrative Design	•	•					
Access to Amenities	•	•	•				
Site Design	•	•	•				
Water	•	•	•				
Energy	•	•	•	•	•	•	•
Materials	•	•	•				•
Healthy Living	•	•	•				•
Air Quality	•	•	•		•	•	
Education / Engagement	•	•	•				

## Electrification and Decarbonization

Regulated electric utilities in Colorado are required to reduce their carbon emissions by 90% by 2050. Many municipal and cooperative utilities are following suit. This means that the carbon footprint of all-electric buildings will decrease over time as the grid decarbonizes. Electrification readiness sets up a building optimally for future conversion to all-electric end uses. Within the certifications covered, the approaches to electrification range from awarding points for energy efficient design to optional criteria around passive design, EV charging, Solar PV (photovoltaic) generation, electrification, and reducing the embodied carbon within building materials. LBC Zero Carbon is the only system that requires full decarbonization, achieved through all-electric construction and net zero energy consumption.

Topic Areas	Sustainability Certifications			Energy-Focused Certifications			
	EGC	LEED for Residential	NGBS	ENERGY STAR MFNC	ZERH	PHIUS	*LBC Zero Carbon
Energy Efficiency	•	•	•	•	•	•	•
Solar PV generation	○	○	○	○	○	○	•
EV-Chargers installed		○	○		•		

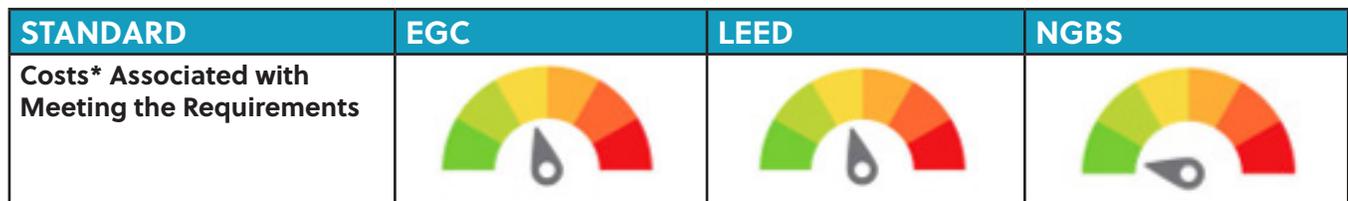
All-Electric	○	○	○	○	○	○	●
Electric-Ready		○	○		●		
Embodied Carbon			○				
Performance Reporting	●			●			●

- = Required / Strongly Recommended
- = Optional Credit
- \*Certification is dependent on post-occupancy performance

## Comparison of Certifications

### Sustainability Certification Difficulty & Costs

The graphic below shows the relative performance requirements and estimated hard costs associated with the three sustainability certifications. This comparison largely focuses on the minimum requirements of the certification that exceed standard, code-compliant multifamily design and drive cost increases. To ensure an accurate comparison, the base level of each certification has been used for this analysis.



\*refers to hard costs only; excludes consulting and certification fees

For many multifamily affordable housing developments, the NGBS Bronze standard provides a flexible and cost-effective pathway to a green building certification. The most significant cost increase for most building designs is the addition of a passive radon mitigation system and radon testing. LEED focus areas are similar to NGBS, but have more stringent requirements around sustainable material selection, energy and water metering, and ventilation.

EGC certification requires additional measures that result in a more sustainable building. However, these measures may also increase upfront costs if they are not already required by the jurisdiction. Examples include on-site stormwater management and construction waste management, which are above and beyond standard I-code requirements. Two integrative design meetings are required, one at the start of the project and the other at pre-construction.

There is enough variability in the project specific application of each green certification's energy requirement to make direct cost comparisons difficult. In general, EGC and LEED for Homes both require ENERGY STAR certification as a means of confirming energy performance. The energy pathways within LEED Multifamily Midrise and NGBS provide a higher level of flexibility around compliance options.

The table below identifies some of the key mandatory prerequisites of each certification system to provide a comparison of baseline certification cost drivers.

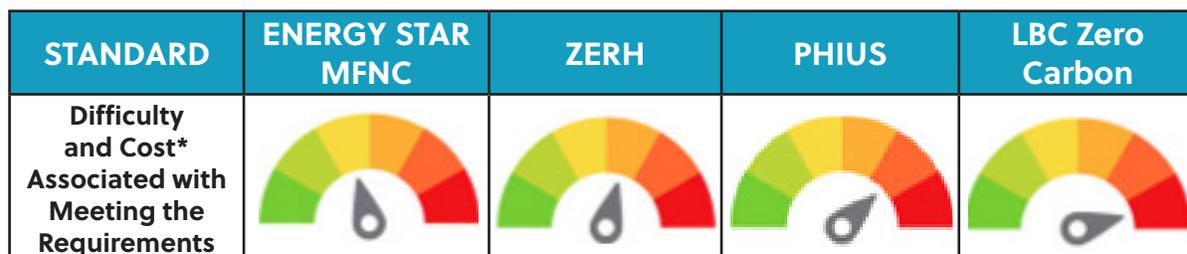
Mandatory Prerequisites for Baseline Certification				
Topic Area	Mandatory Prerequisite	EGC	LEED for Residential	NGBS
Indoor air quality	Passive Radon Mitigation	•	•	•
Indoor air quality	Radon Testing			•
Indoor air quality	Smoke-Free Policy	•	•	
Waste	Construction Waste Management Plan	•		
Energy	Envelope leakage testing	•	•	
Energy	Duct leakage testing	•	•	
Energy	Grade 1 Insulation	•	•	•
Energy	Mandatory air sealing details	•	•	•
Energy	Foundation Insulation	•	•	
Site	Stormwater Management	•		
Site	Native and/or Adaptive Landscaping	•	•	•
Site	Floodplain Avoidance	•	•	
Education	Resident and Owner Education	•	•	•
Education	Resident Engagement	•		

When projects aim for a higher level of certification beyond the baseline tier, costs will generally increase. The requirements associated with each green certification tier are detailed in Appendix B. Most systems allow projects to select a bundle of optional credits to meet higher tier certification levels. The bundle selected will drive cost add amounts.

## Energy Focused Certifications

### *Certification Difficulty & Cost Impact*

The graphic below shows the relative performance requirement stringency and hard costs needed to secure energy-focused certifications. Many design teams evaluate “cost adds” for energy focused certifications in terms of the variance from jurisdictional adoption of the International Energy Conservation Code (IECC). Projects already subject to 2021 IECC will see less cost add to achieve an energy focused certification than projects located in jurisdictions with older versions of the IECC. Given the variability in compliance pathways and local codes, the comparisons below should be understood as a generalized assessment rather than an absolute ranking.



*\*refers to hard costs only; excludes consulting and certification fees*

In general, ENERGY STAR is the most attainable of the four analyzed certifications. ZERH represents a significant step up from ENERGY STAR in terms of increased performance requirements. PHIUS/LBC are the most stringent certifications analyzed, with requirements well beyond the scope of the majority of multifamily affordable housing projects. LBC certification also requires the use of renewables, adding an additional cost category not required by the other programs.

The comparison above does not include consulting costs, which are variable and typically a small fraction of the overall certification cost.

#### Additional considerations for comparison

Embedded in the ZERH is the Indoor airPLUS standard. This requires projects to improve air quality and ventilation to above standard design. Passive House Institute US also has separate requirements around balanced ventilation systems. Beyond air quality, the greatest difference in these four certification programs concerns energy efficiency:

- ENERGY STAR MFNC requires enhanced performance for mechanical and building envelope (roof, walls, windows, etc.) systems, as well as more rigorous construction phase testing and site observations.
- ZERH requires ENERGY STAR MFNC certification, Solar Photovoltaic-ready design, electrification-ready design, and additional efficiency requirements. The goal of this certification is to build projects that could achieve net zero energy performance with the addition of renewables. ZERH does not require the addition of renewables.
- ENERGY STAR or ZERH certification make projects eligible for the 45L tax credit. The tax credit includes a fixed base amount and then a five times multiplier is available for projects that meet prevailing wage requirements. Tax credit amounts available through 45L are shown below:

Certification	Per unit Tax Credit	
	Without Prevailing Wage	With Prevailing Wage
ENERGY STAR Multifamily New Construction	\$500	\$2,500
Zero Energy Ready Homes	\$1,000	\$5,000

*\*Formal certification is required to earn the 45L tax credit*

- PHIUS and LBC Zero Carbon are seen as stretch goals by the industry given associated costs. These certifications push very high-performance building systems, tight air leakage requirements, optimal site orientation, and passive solar design. In the case of LBC zero carbon, full electrification and on-site renewables are required. These certifications will generally be a financial challenge for most multifamily affordable projects without additional funding sources.

## Certification Fee Comparison:

All certification programs have national entities that charge a fee to review and approve project documentation. These fees are separate from certification program consulting and hard costs. Outlined below are national certification entity fee scenarios for two hypothetical multifamily affordable housing projects in Colorado. The two projects compared are:

- A single building with 45 units and 50,000 SF
- A single site with eight similarly designed/scaled buildings and a total of 200 units (175,000 SF)

### Sustainability Certifications

Using the two multifamily affordable housing project scenarios, the below graphic compares the certification entity fees for each sustainability rating system.

STANDARD	EGC	LEED for Residential	NGBS
<b>Single building with 45 units and total of 50K SF</b>	\$1,550	\$3,200	\$2,050
<b>Eight (8) buildings with 200 units and a total of 175K SF</b>	\$1,550	\$10,475	\$8,400

*\*See Appendix for details of the certification costs.*

Note that EGC is certified on a per project basis, allowing all buildings on a site (grouped under the same construction phase) to be registered under a single certification. LEED and NGBS are certified on a per building basis regardless of whether the buildings are part of the same project/site.

### Energy Certifications

Below is a summary of the certification costs of the different energy focused certifications. There is a pathway within ENERGY STAR and ZERH that allows for prescriptive compliance and does not involve certification costs, but this is less commonly used.

STANDARD	ENERGY STAR MFNC	ZERH	PHIUS	LBC Zero Carbon
<b>Single building with 45 units and total of 50K SF</b>	\$900	\$900	\$17,775	\$10,000
<b>Eight (8) buildings with 200 units and a total of 175K SF</b>	\$4,000	\$4,000	\$42,000	\$80,000

*\*See Appendix for details of the certification costs.*

## Multifamily Affordable Housing Green Certification Trends in Colorado

The two green building certification systems used most frequently by multifamily affordable housing developers in Colorado are NGBS and EGC. In Group14's experience, EGC was the prevalent certification system from 2009 - 2019. In 2020, many developers began to explore alternatives to EGC, with NGBS emerging as a common choice. LEED is, by a wide margin, the least used certification for multifamily affordable housing.

Most multifamily new construction projects will meet baseline NGBS certification (Bronze) with few added costs. Dayna Ashley-Oehm, Development Director at Aurora Housing Authority, states, "NGBS offers a comprehensive approach to sustainability while also being cost effective and flexible for design teams." Higher NGBS rating levels such as Silver or Gold may only result in incremental costs adds, especially for urban projects that naturally qualify for site-based credits.

Group14's experience is that EGC is also achievable for most affordable housing development budgets. However, EGC's new construction ENERGY STAR certification requirement can introduce cost adds when compared to jurisdictional code minimum building systems.

Doug Snyder, Vice President of Regional Real Estate Development at Volunteers of America, notes "As a legacy developer-owner-operator, Volunteers of America (VOA) must design and build with the highest quality energy/sustainability buildings possible for our residents and the long-term operational sustainability of our buildings. One of our key principals or values is to provide high quality and healthy spaces for our residents. Housing sustainability is a big piece of achieving this through things like ventilation, air quality, efficient equipment and many other building features. Enterprise Green Communities (EGC) is the preferred option to achieve these sustainability goals. EGC standards offers multiple benefits to our organization; it was the early pioneer in sustainability, is institutionalized in the development community, and many states Housing Finance Agencies throughout the country utilize it. Enterprise Green Communities helps VOA provide consistent design standards across the various states that we work in. It aligns well with things that Volunteers of America prioritizes, our values, and works well with the populations we serve in affordable rental housing."

Currently, many multifamily rehabilitation projects are utilizing EGC because of a Colorado specific alternative compliance energy pathway. This Colorado specific option allows for prescriptive efficiency upgrades instead of meeting whole building performance targets and air leakage testing. It is managed by Energy Outreach Colorado and is supported by their Multifamily Rebate program. This program supports design teams' ability to do cost-effective efficiency upgrades with the potential to access rebates. For these rehab projects, ENERGY STAR certification is not required.

## Summary

All green building certifications analyzed in this report help ensure quality homes for Colorado income-qualified residents. Certified green buildings cost less to operate, have lower carbon emissions, and are more resilient to climate change. The sustainability certifications provide more holistic approaches to green building, widening the focus well beyond energy. The energy certifications analyzed provide a range of options from ENERGY STAR above-code performance to full net zero operations with the Living Building Challenge..

When considering green building certification selection, desired outcomes for a project's resident population should be considered. The different base level requirements of the sustainability certifications means that an appropriate option can be found by all projects. No matter the pathway chosen, a certified green building performs better than a code minimum building, and will meaningfully improve the lives of residents.

# APPENDICES

## Appendix A: Detailed Certification Breakout

	Sustainability Certifications			Energy-Focused Certifications			
STANDARD	LEED for Residential	Enterprise Green Communities (EGC)	NGBS	ENERGY STAR MFNC	ZERH	Passive House	LBC Zero Carbon
<b>Certification Entity</b>	USGBC / GBCI	Enterprise Community Partners	Home Innovation Research Labs	ENERGY STAR/ EPA	Department of Energy/EPA	PHIUS	International Living Future Institute
<b>Income Qualified Requirements</b>	N/A	Affordable Housing (project serving residents at 60% AMI or below)	N/A	N/A	N/A	N/A	N/A
<b>Eligible Building Types</b>	Single and Multi-Family Housing	Single and Multi-Family Housing with an affordable component	Single and Multi-Family Housing and Hotels	Single and Multi-Family Housing	Single and Multi-Family Housing	All Buildings	All Buildings
<b>Project Types</b>	New Construction & Substantial Rehabilitation	New Construction, Moderate and Substantial Rehabilitation	New Construction & Substantial Rehabilitation	New Construction & Substantial Rehabilitation	New Construction	New Construction & Substantial Rehabilitation	New Construction
<b>Documentation &amp; Review Process</b>	On-site verification process with an Energy Rater and LEED Green Rater + Teams must submit narratives, calcs, and documentation to GBCI for review	Teams must submit narratives, calcs, and documentation to EGC for review.	On-site inspections at both Rough and Finals + Teams must submit narratives, calcs, and documentation to HIRB for review	On-site verification with Field Rater + energy models and RESNET documentation to EPA for review.	On-site verification with Field Rater + energy models and RESNET documentation to EPA for review.	Onsite project testing and inspections by PHIUS certified raters.	Teams must submit narrative, calcs, and documentation to ILFI for review + 12-months post construction utility data.

<b>Required Designations in Project Team</b>	LEED Green Rater and a Qualified Energy Rater	N/A (accepts what's required for ENERGY STAR MFNC)	NGBS Green Verifier	Energy Rating Company Certified Rater, HVAC Functional Testing Agent	Energy Rating Company Certified Rater, HVAC Functional Testing Agent	HERS Rater, Passive House Institute Accredited Building Certifier, Certified Passive House Designer, Certified Passive House Tradespeople	Living Future Accreditation
<b>Certification Costs</b>	\$1,200 + \$0.04 - \$0.045/SF (for multifamily)	\$1,550	3 stories: \$300 + \$30/unit ; 4-8 stories \$700 + \$30/unit; 9+ stories: \$1,000 + \$30/unit	~\$20/unit	~\$20/unit	\$2,750 - \$52,225 based on square footage (25K SF bldg. = \$11,275) for residential	Price per square foot ranges from \$0.11 - \$0.19 with a minimum fee of \$10,000
<b>Embedded Non-Energy Standards</b>	Walk Score, ASHRAE 62.2-2019, ASHRAE 52.2, ASHRAE 62.1-2019, EPA WaterSense, SCAQMD 1168, CARB Ph. 2	ASHRAE 62.2-2019, ASHRAE 52.2, ASHRAE 62.1-2019, EPA WaterSense, SCAQMD 1168, CARB Ph. 2	N/A	ASHRAE 62.2-2010	EPA Indoor airPlus	EPA Indoor airPlus	Red List for Materials, JUST label
<b>Energy Performance Requirements</b>	ENERGY STAR v3 and HERS targets derived from IECC 2006, but HERS target is 70 maximum, which equates to 30% reduction from 2006 IECC	Defer to ENERGY STAR	2018 IECC Baseline	IECC provides envelope baseline depending on version of the program is being pursued: 2012 (1.1), 2021 (1.2)	2021 IECC	Required levels of envelope performance will generally meet or exceed the 2021 IECC	Baseline established by CBECS (opposed to IECC) via Zero Tool + 105% of consumption met with renewables

<p><b>Decarbonization Approach</b></p>	<p>Optional Criteria: PV &amp; Solar Hot Water Ready, Renewable Energy, Passive Design</p>	<p>Optional Criteria: Near Zero Certification (ZERH, PHI/PHIUS), PV &amp; Solar Hot Water Ready, Passive Design, Renewable Energy, Net Zero Certification, All-Electric Ready, All Electric</p>	<p>Optional Criteria: EV ready, EV charging, Renewables, Embodied carbon analysis</p>	<p>N/A</p>	<p>EV equipped (10%) and ready (30%) required, PV ready required, HPWH ready required and heat pump for space heating ready required</p>	<p>Minimizing building HVAC energy usage to very reduced levels (far beyond any code)</p>	<p>All buildings required to be all electric, demonstrate net positive energy with 12 consecutive months of utility data, and reduce embodied carbon</p>
<p><b>Performance Reporting</b></p>	<p>N/A</p>	<p>Post Occupancy Reporting of Energy and Water Required</p>	<p>N/A</p>	<p>For projects &gt;50,000 SF, a whole-building data collection strategy must be in place</p>	<p>N/A</p>	<p>N/A</p>	<p>Post Occupancy Reporting of Energy and Water Required - must prove net positive energy and water in performance</p>

## Appendix B: Certification Tier Comparison

### LEED Certification

Certification Tier	Requirement
<b>Baseline - Certified</b>	<p><b>General Requirements</b></p> <ul style="list-style-type: none"> <li>• ENERGY STAR for Homes, Walkscore, EPA WaterSense</li> </ul> <p><b>Location and Transportation</b></p> <ul style="list-style-type: none"> <li>• Floodplain Avoidance</li> </ul> <p><b>Sustainable Sites</b></p> <ul style="list-style-type: none"> <li>• Construction Activity Pollution Prevention</li> <li>• No Invasive Plants</li> </ul> <p><b>Water Efficiency</b></p> <ul style="list-style-type: none"> <li>• Water Metering</li> </ul> <p><b>Energy and Atmosphere</b></p> <ul style="list-style-type: none"> <li>• Minimum Energy Performance</li> <li>• Energy Metering</li> <li>• Education of the Homeowner, Tenant, or Building Manger</li> </ul> <p><b>Materials and Resources</b></p> <ul style="list-style-type: none"> <li>• Certified Tropical Wood</li> <li>• Durability Management</li> </ul> <p><b>Indoor Environmental Quality</b></p> <ul style="list-style-type: none"> <li>• Ventilation</li> <li>• Combustion Venting</li> <li>• Garage Pollutant Protection</li> <li>• Radon Mitigation</li> <li>• Air Filtering</li> <li>• Smoke-Free Policy</li> <li>• Compartmentalization</li> </ul> <p><b>Innovation</b></p> <ul style="list-style-type: none"> <li>• Preliminary Rating</li> </ul>
<b>Silver</b>	50 - 59 points
<b>Gold</b>	60 - 79 points
<b>Platinum</b>	80+ points

## EGC Certification

Certification Tier	Requirement
<b>Mandatory Credits</b>	<p><b>General Requirements</b></p> <ul style="list-style-type: none"> <li>• ENERGY STAR for Homes, EPA WaterSense</li> </ul> <p><b>Integrative Design</b></p> <ul style="list-style-type: none"> <li>• Project Priority Survey</li> <li>• Charrette</li> <li>• Coordination Meetings</li> <li>• Construction Management</li> </ul> <p><b>Location and Neighborhood Fabric</b></p> <ul style="list-style-type: none"> <li>• Sensitive Site Protection</li> <li>• Connections to Existing Development and Infrastructure</li> <li>• Compact Development</li> <li>• Proximity to Services and Community Resources</li> <li>• Preservation of and Access to Open Space</li> <li>• Access to Broadband Ready (mandatory for rural areas)</li> </ul> <p>Site Improvement</p> <ul style="list-style-type: none"> <li>• Environmental Remediation</li> <li>• Minimization of Disturbance during Staging and Construction</li> <li>• Ecosystem Services/Landscape</li> <li>• Surface Stormwater Management</li> <li>• Efficient Irrigation and Water Reuse</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>• Water Conserving Fixtures (EPA WaterSense)</li> </ul> <p>Operating Energy</p> <ul style="list-style-type: none"> <li>• Building Performance Standard</li> <li>• Sizing of Heating and Cooling Equipment</li> <li>• Energy Star Appliances</li> <li>• Lighting</li> </ul> <p><b>Materials</b></p> <ul style="list-style-type: none"> <li>• Healthier Materials Selection</li> <li>• Moisture-Resistant Bath, Kitchen, and Laundry Surfaces</li> <li>• Managing Moisture: Foundations</li> <li>• Managing Moisture: Roofing and Wall Systems</li> <li>• CWMP</li> </ul> <p><b>Healthy Living Environment</b></p> <ul style="list-style-type: none"> <li>• Radon Mitigation</li> <li>• Reduce Lead Hazards Pre-1978 Buildings</li> <li>• Combustion Equipment</li> <li>• Garage Isolation</li> <li>• IPM</li> <li>• Smoke-Free Policy</li> </ul>

## EGC Certification (continued)

Certification Tier	Requirement
<b>Mandatory Credits</b>	<ul style="list-style-type: none"> <li>• Ventilation</li> <li>• Dehumidification</li> </ul> <p><b>Operations, Maintenance, and Resident Engagement</b></p> <ul style="list-style-type: none"> <li>• Building Operations &amp; Maintenance Plan</li> <li>• Emergency Management Manual</li> <li>• Residential Manual</li> <li>• Walk-through and Orientations to Property Operation</li> <li>• Energy and Water Data Collection and Monitoring</li> </ul>
<b>New Construction</b>	40+ optional points
<b>Rehab</b>	35+ optional points
<b>EGC Plus Certification</b>	Projects that also comply with Criterion 5.2b Moving to Zero Energy: Near Zero Certification or Criterion 5.4 Achieving Zero Energy will be recognized with Enterprise Green Communities Certification Plus.

## NGBS Certification

Certification Tier	Requirement
<b>Mandatory Credits</b>	<p><b>Chapter 6 – Resource Efficiency</b></p> <ul style="list-style-type: none"> <li>• Capillary break and vapor retarder are installed at all concrete slabs</li> <li>• Cavity insulation is dry before encapsulated</li> <li>• Weather resistant barrier installed</li> <li>• Roof and exterior wall flashing details provided</li> <li>• Non-paper faced tile backing materials at behind tiled and wet locations</li> <li>• Horizontal ledgers are sloped away to provide gravity drainage</li> <li>• Final grade sloped away from building edge at minimum of 2%</li> <li>• Hazardous waste materials plan</li> </ul> <p><b>Chapter 7 – Energy Efficiency</b></p> <ul style="list-style-type: none"> <li>• HVAC system sizing (ACCA or ASHRAE)</li> <li>• Ducts are air sealed</li> <li>• Building frame cavities are not used as ducts or plenums for supply</li> <li>• Duct system is sized and designed in accordance with ACCA Manual D or equivalent</li> <li>• Targeted building thermal envelope</li> <li>• Visual inspection of Grade I insulation</li> <li>• Visual inspection of air and thermal barriers</li> </ul>

## NGBS Certification (continued)

Certification Tier	Requirement
<b>Mandatory Credits</b>	<ul style="list-style-type: none"> <li>• Windows and sliding glass doors have an air infiltration rate of no more than 0.3 cfm/SF</li> <li>• ICAT rated can lights</li> <li>• 75% high efficacy lighting</li> <li>• Boiler supply piping in unconditioned space is insulated</li> <li>• NFRC-certified glazing that meets 2018 IECC</li> </ul> <p><b>Chapter 8 – Water Efficiency</b></p> <ul style="list-style-type: none"> <li>• Irrigation plan executed by a professional</li> </ul> <p><b>Chapter 9 – Indoor Environmental Quality</b></p> <ul style="list-style-type: none"> <li>• Gas-fired fireplaces and direct heating equipment directly vents to outdoors</li> <li>• Structural plywood is compliant with DOC PS</li> <li>• No wall-to-wall carpet in bathrooms</li> <li>• CO alarms are provided</li> <li>• Bathrooms are ventilated to the outdoors</li> <li>• Clothes dryers vented to the outdoors</li> <li>• Radon mitigation</li> <li>• Living space is sealed to prevent unwanted contaminants</li> <li>• Visual inspection for microbial growth and moisture inspection</li> </ul> <p><b>Chapter 10 – Operation, Maintenance, and Building Owner Education</b></p> <ul style="list-style-type: none"> <li>• Manuals for tenants and staff with NGBS certificate, list of green building features, and product manufacturer’s manuals</li> <li>• Training of building management staff</li> <li>• Building construction manual with a narrative detailing importance of green buildings, attributes, copy of the NGBS, and maintenance instructions</li> <li>• Operations manual detailing practices to conserve water and energy</li> <li>• Maintenance manual with a list of local service providers that offer regularly scheduled service and maintenance for equipment</li> <li>• Training of building owners</li> <li>• Multifamily occupant manual with list of green building features, operations manuals, and NGBS certificate</li> </ul>
<b>Bronze</b>	43 - 58 points
<b>Silver</b>	59 - 88 points
<b>Gold</b>	89 - 118 points
<b>Emerald</b>	119+ points

## Living Building Challenge

STANDARD		LBC Full Certification	LBC Petal*	LBC Zero Carbon	LBC Net Zero
Topic Areas	Integrative Design	•	•		
	Access to Amenities	•	•		
	Site Design	•	•		
	Water	•	•		
	Energy	•	•	•	•
	Materials	•	•	•	
	Indoor Environment	•	•		
	Education / Engagement	•	•		

\*Must address Energy, Water, or Materials but do not need to meet the criteria for all three.

## Appendix C: Certification Websites

- **LEED for Residential:** <https://www.usgbc.org/leed/rating-systems/residential>
- **EGC:** <https://www.greencommunitiesonline.org/>
- **NGBS:** <https://www.ngbs.com/the-ngbs-green-promise>
- **ENERGY STAR MFNC:** [https://www.energystar.gov/partner\\_resources/residential\\_new/program\\_reqs/mfnc\\_cert\\_process](https://www.energystar.gov/partner_resources/residential_new/program_reqs/mfnc_cert_process)
- **ZERH:** <https://www.energy.gov/eere/buildings/zero-energy-ready-home-program>
- **Passive House:** <https://www.phius.org/>
- **LBC Zero Carbon:** <https://living-future.org/zero-carbon/zero-carbon-certification/>