Embodied Carbon Approaches in Codes and Standards: Proposed Methods for Reducing Impacts of Tradeoffs

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ABSTRACT

Embodied carbon has emerged as a key pillar of climate objectives and climate action plans and is increasingly a decarbonization policy priority for leading states and jurisdictions. Given the interconnectivity of operational energy and operational carbon emissions, there is a risk of incorporating embodied carbon requirements into codes and policy in a way that jeopardizes the existing floor of baseline energy efficiency in new construction energy codes and building performance standards. Tradeoffs between embodied carbon and operational energy or carbon may result in unintended consequences that impact energy affordability, public health, thermal resilience, and grid operation and reliability. This paper will review the potential for unintended consequences under existing frameworks for incorporating embodied carbon in codes that have been enacted in jurisdictions such as Massachusetts, Vermont, California, Colorado, and others. The paper will discuss the relationship between operational energy, embodied carbon, renewable energy and load management, energy costs, and the potential impacts across these categories associated with these various embodied carbon code frameworks. Finally, the paper will make recommendations for how embodied carbon requirements can be structured to avoid the unintended consequences associated with tradeoffs against operational energy, carbon, and health.

INTRODUCTION

Embodied Carbon Regulatory Landscape

Buildings' life cycle emissions are comprised of operational and embodied carbon. Operational carbon emissions result from the on-site energy use required to operate buildings, either from direct on-site combustion or from associated grid-generation combustion. Embodied carbon refers to the greenhouse gas emissions associated with the life cycle of buildings' materials, construction activities, and end of life. Globally, materials used in the construction of buildings represent approximately 7% of total greenhouse gas emissions (Lambert and Lewis 2024). Policies that have targeted the reduction of buildings' environmental and climate impacts have historically focused on building operational energy use and efficiency. As clean energy policy, energy codes, and efficiency standards continue to reduce operational carbon, embodied emissions will constitute a larger share of buildings' carbon footprints.

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In recognition of this trend, provisions focused on the reporting and reduction of embodied carbon in building projects have emerged in jurisdictional energy, building, and green codes across North America. National model codes and standards are also evolving to focus on embodied, recognizing the need for standardized methodologies for calculating and reporting. As efforts to publish these standardized approaches are still underway, jurisdictions have taken it upon themselves to develop code approaches that tackle embodied carbon. As a result, a variety of code approaches have emerged, ranging from additional credits offered through energy codes to more comprehensive reporting and reduction requirements in building and green codes. While some research exists into the methods and approaches to embodied carbon incorporation into codes and standards, there have been limited efforts to explore the impacts of these methods on other performance targets, such as energy efficiency and operational decarbonization criteria (ASHRAE 2024) (Zhang, et al. 2024). This paper looks to highlight the impact that different methods for incorporating embodied carbon criteria into codes have on these parallel performance targets and objectives, and to present strategies for minimizing potential negative impacts of tradeoffs between performance targets.

METHODS

Authors at New Buildings Institute are engaged in embodied carbon code and policy development, and internally track code and standards progress on embodied carbon at national, state, and local levels. A review of these embodied carbon approaches was conducted by the authors, and 13 codes were selected to cover all locational scales and highlight differences in approaches to incorporation.

RECENT MOVEMENT IN CODES AND STANDARDS

Recently adopted codes have instituted both product-focused (prescriptive) and building-level (performance) approaches to regulating embodied carbon in construction projects. A prescriptive approach sets a limit at the product or material level. Accounting for this information is done by submitting a qualifying environmental product declaration (EPD) that includes the product's Global Warming Potential (GWP). GWP limits set by codes and standards tend to either be static values or benchmarked against a percentage of industry-wide or average values. A performance-based approach addresses embodied carbon at the project level. This approach often sets GWP limits defined by an absolute cap per building or per square footage, or as a percentage reduction compared to a baseline – or a "business-as-usual" – building. This baseline demonstrates equivalency with the proposed design as it relates to size, scope, function, energy performance, and other characteristics, allowing project teams to explore the relative impacts of design decisions related to the materials and structure. The most common approach for this accounting is through the submission of a whole building life cycle assessment (WBLCA).

Existing code requirements present a patchwork of approaches that have resulted in several inconsistencies, including approaches and methods; the scope of required analyses; assumptions integrated into carbon accounting; referenced values; target reduction levels; and compliance and enforcement methods. A growing recognition of the need to formulate conventions around embodied carbon accounting has led to the current and ongoing development of new standards, which are anticipated to be released in the coming years. The proposed ASHRAE/ICC Standard 240P for Evaluating Greenhouse Gas (GHG) and Carbon Emissions in Building Design, Construction and Operation will provide a quantification method for evaluating and reporting GHG emissions of a building over its full life cycle (ASHRAE 2024). The standard will establish minimum modeling requirements, including consistent procedures, data, and reporting formats that can be referenced by policies, codes, and other standards that address new and existing building performance. The standard will cover both embodied and operational emissions. The forthcoming RESNET/ICC 1550 standard will also provide a methodology for calculating and reporting embodied carbon, which can be used for all building types but is intended primarily for residential dwelling units (Residential Energy Services Network (RESNET) 2024). This standard will define the scope for calculating embodied carbon and the methodology for conducting calculations across the early product life cycle stages (A1-A3). This standard is designed to be integrated into existing assessments that take place, such as HERS and ERI ratings: projects will receive two separate scores for operational and embodied impacts.

The above-mentioned standards are currently under development in recognition of the need to develop consistent methodologies for embodied carbon accounting, but procedures for accounting for the interactivity between embodied and operational carbon still vary. Because of this, frameworks for regulating this interactivity in codes are even less advanced. The emergence of ASHRAE 240P, RESNET 1550, and other carbon accounting and reduction provisions also highlights the importance of considering operational and embodied emissions in tandem, as both represent substantial opportunities to improve buildings' impacts on the environment, health and safety, and the climate. Balancing considerations of operational carbon with embodied carbon often requires an evaluation of tradeoffs related to how emissions savings made in one area may offset additional emissions in another. For example, strategies to improve buildings' operational energy efficiency, such as improving building envelope performance, may increase embodied carbon associated with insulation materials. Applying a whole-life perspective to buildings through the generation of WBLCAs can help project teams weigh these considerations and realize high-performing buildings with lower embodied carbon. As these analyses become more prevalent and standardized, code requirements have the potential to regulate buildings' life cycle emissions in a more informed manner.

RESULTS AND CODE IMPLEMENTATION MODELS

Whole building carbon accounting that looks at both operational and embodied emissions is still in its early stages. Carbon accounting offers potential for achieving a more comprehensive understanding of how operational and embodied emissions interact throughout the lifecycle of a building. In the future, advances in carbon accounting approaches may better equip industry and policymakers to make informed decisions related to tradeoffs in codes. However, in the absence of a standardized methodology to date, and the relatively young nature of industry's understanding of how to optimize tradeoffs, codes have taken a variety of approaches related to how and where embodied carbon is integrated into building and energy codes.

Energy Code

Most embodied carbon provisions incorporated into energy codes take a more limited approach to reporting and reduction, typically incorporating prescriptive measures that focus on a select number of material and product types. Boulder, Colorado, is an exception to this rule, as it includes prescriptive measures as well as WBLCA as an alternative option credit. The WBLCA pathway in Boulder's energy code requires the consideration of operational energy alongside embodied emissions. Where energy codes integrate embodied carbon criteria into the additional efficiency credit sections, the number of credits available for projects pursuing embodied carbon reporting and reduction varies widely, ranging from one point for reporting – in the case of the Vermont energy standards – to 30 cumulative points for pursuing prescriptive or performance options – in the case of the Boulder energy code.

Massachusetts

Massachusetts' 2025 Stretch Code and Specialized Opt-in Code amended the 2021 International Energy Conservation Code (IECC) and International Residential Code (IRC) to introduce optional embodied carbon energy credits. Residential projects may increase their maximum allowable HERS rating by three points per unit by incorporating net zero GWP insulation or low embodied carbon concrete (MA 2025 Commercial Stretch code and Specialized Opt-in code (IECC2021 with MA amendments) DOER Final Draft 12-17-24 2025). Commercial projects may receive up to eight efficiency credits for each credit option, including heavy timber construction, low carbon concrete, or net zero insulation (MA 2025 Residential Stretch code and Specialized Opt-in code (IECC2021 with MA amendments) DOER Final Draft 12-17-24 2024).

Boulder, CO

The City of Boulder 2024 Energy Conservation Code (CoBECC) commercial load management and carbon credits table includes embodied carbon options, for which projects can earn up to 30 points (International Code Council, Inc. 2024). The credits offer projects both prescriptive and performance pathway options. In the prescriptive approach, commercial projects must select a minimum of three materials from a list of eleven, for which they must submit product-specific EPDs that demonstrate a GWP of no more than 125% of industry-wide averages for each respective product. Residential projects can receive between one and three credits per product, depending on the amount of the material used in the project that meets the 125% of industry average cap. Commercial and residential projects may alternatively perform a WBLCA that demonstrates a minimum 10% reduction in three impact categories, including GWP, compared to a baseline model. This WBLCA must include operating energy within its life cycle scope.

Vermont

The 2024 Vermont Commercial and Residential Building Energy Standards have optional credits for GWP reporting and reduction of insulation materials. Both the commercial and residential provisions offer three tiers for credits: the first tier (Basic) requires projects to report the GWP of insulation products, using either the default values provided in the code or product-specific values as documented by product-specific EPDs (2024 Vermont Commercial Building Energy Standard (CBES) 2024; Vermont Residential Building Energy Standards (RBES) Amendments 2024). The next two tiers award additional points for reductions that demonstrate a GWP of less than 0.5 or zero, respectively. The Basic, reporting-only tier for commercial projects awards between one and eight points, depending on the building occupancy type; residential projects can earn one point for reporting. Commercial projects may receive 1.5 or two times the Basic tier's available points for the Advanced and Stretch tiers, respectively; residential projects receive a total of two or three points for the same reductions.

Building and Green Codes

Building and green code approaches for integrating embodied carbon have implemented both prescriptive and performance pathways, as well as building reuse alternative compliance options. These approaches to embodied carbon requirements largely avoid the challenge of tradeoffs between energy efficiency and embodied carbon criteria by establishing requirements that need to be met independently of operational energy performance and keeping the evaluations of embodied and operational impacts largely separate. In some cases, codes remain agnostic on the issue of tradeoffs by not requiring that operational emissions be included in WBLCA calculations. Building code and green codes offer a viable venue for weighing and optimizing embodied and operational decarbonization as the accuracy of WBLCAs continues to advance. To date, California is the only state in the United States that has introduced mandatory embodied carbon requirements statewide.

Prescriptive Concrete Codes

Several building codes have taken a more limited prescriptive approach in the form of low carbon concrete codes. Marin, California, was the first county in the United States to adopt a Low Carbon Concrete Code, under which new local building projects must choose from two pathways to comply: a total cement limit or a GWP limit met for each concrete mix in a distinct strength category. Santa Monica, California has recently followed suit by adopting its own Low Embodied Carbon Concrete Requirements. Other cities including Berkeley and Dublin, California have taken a similar approach.

Vancouver, Canada

Vancouver, Canada's 2019 and subsequent 2025 Building By-law requires the assessment and reduction of carbon at the whole building level, setting an embodied carbon cap for larger buildings at 800 $kgCO_2e/m^2$ or a 10% reduction compared to a baseline (City of Vancouver 2025). Requirements regarding what constitutes an acceptable baseline are further defined by the City of Vancouver Embodied Carbon Guidelines (City of Vancouver 2023). The scope of the LCA under this policy is restricted to embodied carbon life cycle stages and excludes operational modules.

California

The California Green Building Standards Code, or "CALGreen," is Part 11 of Title 24, California's Code of Regulations, and is the first-in-the-nation statewide mandatory green building standards code (California Building Standards Commission 2024). CALGreen has mandatory provisions affecting both residential and nonresidential construction, including new construction and qualifying alterations, as well as two voluntary tiers available for adoption by interested jurisdictions. Mandatory measures apply to all nonresidential construction with a construction valuation over $200,000, and to any residential construction which expands the conditioned area by at least 1,000 square feet.

California's embodied carbon requirements are organized into three compliance pathway options. First, building reuse projects that retain 45% of the existing building's structure and enclosure are deemed to satisfactorily meet the code's embodied carbon provisions. Second is a prescriptive approach based on meeting referenced GWP limits for covered products: concrete, steel, flat glass, and light and heavy-density mineral wool insulation. Finally, the performance pathway is based on conducting a WBLCA and demonstrating a reduction from a comparable baseline building. Unlike Boulder's WBLCA pathway, this compliance option under CALGreen expressly excludes operating energy from the assessment, keeping embodied and operational carbon considerations separate and avoiding the potential for tradeoffs between them.

While CALGreen is formally its own section of Title 24, in practice its requirements are addressed alongside building code requirements and fit within the workflow of a typical structural or full-scope plan review and field inspection. For practitioners, this is practical because the requirements apply to materials that are selected by the architect or designer and installed by contractors. For all pathways, compliance documentation is based on including supporting information in the architectural plan set, such as calculations, materials schedules, plans, general and special notes, worksheets or forms summarizing calculations and reports, and signatures.

International Green Construction Code/ASHRAE 189.1

The International Green Construction Code (IgCC)/ASHRAE 189.1 provides minimum requirements for the siting, design, construction, and operation of high-performance green buildings (ASHRAE n.d.). Chapter 9, which addresses materials and resources, houses the standard's provisions on embodied carbon. The chapter has a mandatory reporting section, requiring project teams to provide 30 EPDs from not fewer than 20 different building products, which together must equal 25% of product costs. Any product that constitutes more than 5% of the estimated material cost of the project must have EPDs provided, and teams must report the GWP and declared or functional units of all products. Project teams may then choose from two options: either conducting a building life cycle assessment (LCA) or adopting from a selection of prescriptive requirements that address material qualities such as the use of recycled and salvaged material content, regional materials, and biobased products. The building LCA pathway allows operational life cycle phases (B6 and B7) to be included but does not require it, essentially remaining agnostic on the question of how to handle tradeoffs.

Minnesota Sustainable Building Guidelines

The Minnesota Sustainable Building Guidelines (B3) are a set of building design and construction requirements for projects funded by the state (University of Minnesota 2024). The document addresses a wide range of topics aimed at reducing energy consumption and carbon emissions, as well as enhancing health and wellbeing for occupants and improving environmental quality. These topics include performance management, energy and emissions, as well as materials and waste. The materials and waste section has included a WBLCA requirement since its Version 3.0 was published in 2017. The provisions require the submission of a WBLCA for buildings of at least 20,000 square feet in size, which demonstrates a reduction of the project's GWP by at least 10% compared to a functionally equivalent reference building. Criteria around functional equivalence between the baseline and design building require that both models include identical results for operational life cycle phases (B6 and B7), and that these results indicate compliance with all other B3 guidelines that address operational efficiency. This means that reductions in the WBLCA may only be demonstrated during the embodied life cycle stages. EPDs must also be submitted to verify commitment to using the products specified in the LCA. Submitted EPDs must represent at least five different products from at least five different manufacturers.

Draft Colorado Green Code

The draft Colorado Model Green Code currently under development will be available for jurisdictional adoption and will address the topics of water efficiency, energy, and embodied carbon (Colorado Energy Office n.d.). The commercial measures present baseline and stretch options for three embodied carbon compliance pathways, like those under CALGreen: a prescriptive, materials-based option; a performance, WBLCA option; and a building materials reuse option. Residential embodied carbon provisions are limited to materials-level reporting and reductions for cement and concrete, wood framing or softwood lumber, plywood, and OSB sheathing. In their current form, all of the code's embodied carbon provisions constitute a separate section that excludes consideration of operational emissions, requiring that projects instead meet separate provisions for energy conservation, efficiency, and operational emissions.

Denver Green Code

The Denver Green Code takes a more limited approach compared to the other green code models, requiring projects using the voluntary code to meet specific GWP limits for concrete and steel products (International Code Council, Inc. 2022). For concrete, the total CO_2e value of mixes must not exceed a maximum value and must have a product-specific type III EPD. For steel, type III EPDs submitted for a minimum of 75% of steel products in the project, based on cost or weight, must be provided. Since May 2023, the Denver Green Code has shifted from a fully voluntary code to a partially mandatory document, applicable to commercial and multifamily development: new construction must follow three of the ten available provisions in the materials and resources section, while major renovations must follow one.

Potential for and Impact of Tradeoffs in Energy Codes

There is a clear risk of tradeoffs between embodied carbon and other code objectives when embodied carbon requirements are introduced into energy codes. The risk and potential impact can be observed through the introduction of renewable energy criteria into the 2012 International Energy Conservation Code (IECC) and the evolution of decarbonization requirements (i.e. renewables and load management criteria) in IECC codes and ASHRAE standards development cycles since.

Renewable energy as a component of energy code compliance was introduced to the 2012 IECC as an "additional efficiency package" through the prescriptive compliance pathway, and to the ASHRAE 90.1-1999 standard as part of the Energy Cost Budget (ECB) method. The IECC additional efficiency packages sit in the prescriptive path, on top of a whole base code of efficiency requirements. The renewable credits provide some flexibility in how building projects achieve compliance with the full performance of the code. Because of this, there is an inherent limitation on the extent of the potential tradeoff between base efficiency and renewable energy. While a similar limitation was not initially in place for the ASHRAE 90.1 ECB's allowance for renewable energy to reduce design energy cost, a 5% limit on reductions in energy efficiency in exchange for other energy or decarbonization criteria was introduced in the 2013 standard and has remained since. A similar 5% limit on renewables was approved for the 2015 IECC modeling path.

The IECC additional efficiency requirements section shifted to a credit-based structure with the 2021 code, but similar guardrails have been introduced to maintain limits on tradeoffs between efficiency and decarbonization, most recently by separating load management and renewables credits into separate requirements and limiting the amount these credits can contribute to efficiency credit requirements. ASHRAE 90.1 also incorporates renewable energy into the additional energy credits section analogous to the IECC's and has similarly introduced and maintained limits on maximum tradeoffs between efficiency measures and decarbonization measures by placing a cap on the number of credits that can be achieved with the renewable and load management criteria.

Impacts of Tradeoffs Between Efficiency and Decarbonization

While on-site renewable energy generation and building decarbonization are inextricably linked with efficient energy use, allowing for tradeoffs between these power-based objectives and the base energy efficiency requirements of energy codes introduces the potential for impacts and reductions in other benefits that only energy efficiency can yield. The potential additional benefits of base efficiency include building energy load reductions; building and utility peak demand reductions; on-site combustion emission reductions; electric generation emissions reductions; reduced energy costs and burdens; reduced equipment first costs; increased grid reliability; decreased GWP; improved regional air quality; reduced community health costs; and increased passive survivability.

The benefits of energy codes have been researched thoroughly. Some of these benefits (site energy savings, source energy savings, energy cost savings, and carbon reductions) are evaluated and described in the U.S. Department of Energy (DOE) determinations regarding energy efficiency improvements of the updated IECC residential code and ASHRAE 90.1 standard (U.S. Department of Energy, 2024). Recent research identified the intersection of advanced energy codes, regional air quality, and public health, demonstrating the public health cost savings associated with advanced energy codes (Edelson, Smits Anderson, Sheely, & Grant, 2024). The benefits of grid integration measures and recommendations for best practice code development and harmonization with energy efficiency is discussed in a 2020 ASHRAE paper (Edelson, Miller, & Carbonnier, Codes for Loads: Bringing Energy Codes into the 21st Century with Time-of-Use Efficiency, 2020). In partnership with the DOE, three national labs published a 2023 report outlining resilience benefits of energy efficiency in building energy codes, including increased passive survivability and prolonged habitability during grid outages (Franconi, et al., 2023). This and other research points to the suite of services energy codes and energy efficiency provide to building residents, utilities, and the public. Compromises in the base energy efficiency performance of energy codes in exchange for carbon reductions have the potential to disrupt a host of beneficial services to building occupants, the public, and stakeholders such as utility grid operators.

DISCUSSION

Recommended Code Approaches for Limiting Tradeoffs

The introduction of embodied carbon provisions to the energy code opens the door to the possibility of similar tradeoffs with energy efficiency as those discussed above and to the potential for unintended consequences across a range of code benefits. Where embodied carbon provisions are integrated into codes, efforts to prevent or limit tradeoffs between efficiency and embodied carbon should be introduced and maintained. Such limits on efficiency tradeoffs for renewable, load management, and operational decarbonization criteria have been valuable for adopting jurisdictions in meeting their policy objectives. These safeguards can be implemented in several ways, as described below, along with an indication of alignment of these methods with state and jurisdictional policies. The recommendations outlined below are presented in order of priority, with the first offering the most potential for avoiding unintended consequences associated with tradeoffs.

1. **Place embodied carbon requirements outside of the energy code**. This strategy greatly reduces the potential for tradeoffs with energy efficiency and makes it less likely that mechanisms or allowances for tradeoffs will be introduced in the future. Where building codes and green codes and standards have introduced embodied carbon requirements, they are typically located in a separate section or as separate compliance criteria. The International Building Code and International Residential Code, the basis of most state building codes, may be an appropriate regulatory venue for introducing and maintaining embodied carbon requirements, especially for jurisdictions that do not want to adopt a full green code.
2. **Introduce embodied carbon requirements in energy code as parallel requirements with no mechanism for tradeoffs.** This strategy allows embodied carbon criteria inside the energy code by introducing it as an additional parallel compliance requirement that does not dilute the efficiency criteria. It does, however, leave the door open for future amendments and mechanisms that would allow tradeoffs between embodied carbon and the efficiency requirements of the code. In energy codes, this may take the form of embodied carbon credit requirements in the additional efficiency credit section of the codes.
3. **Only allow tradeoffs between operational and embodied decarbonization**. This strategy allows integration of embodied carbon into the energy code, and allows tradeoffs for compliance, but limits these tradeoffs to existing decarbonization sections, such as the renewables and load management credit categories. This would permit tradeoffs that may impact building energy costs, building level emissions, local and regional air quality and health, and local grid reliability, but it would preserve base levels of efficiency in the code that contribute to

energy affordability, reduce operational carbon, and increase passive survivability and building resilience. Not all additional efficiency energy credits sections in codes differentiate between energy efficiency and other criteria such as renewable energy, load management, and operational decarbonization. Decoupling energy efficiency from these other credit criteria and prohibiting non-efficiency credits from counting towards compliance with the efficiency credit thresholds would be one strategy for achieving this.

4. **Introduce embodied carbon requirements such that they have limited tradeoff with base efficiency.** This strategy would allow but limit tradeoffs with efficiency, such that the base efficiency criteria of the energy code is largely maintained. This could involve integration of embodied carbon into energy credits where they can count towards compliance with efficiency criteria, or provide a partial compliance bonus though performance pathways, as is the case in Vermont and Massachusetts respectively, or could place a limit on the reductions in base efficiency through performance compliance options.

Code approaches to embodied carbon have so far deferred a broad conversation regarding how to handle tradeoffs with efficiency and decarbonization, either because they do not allow tradeoffs (as is largely the case with building codes or green codes approaches) or because they have not attempted the supportive analysis needed to justify and set appropriate levels of tradeoff. Where embodied carbon criteria have already been incorporated into the additional efficiency credit section of the energy code, the methodology behind determining the credit values is not clear. A clear methodology should be established to set credit values that are consistent and balanced between operational and embodied carbon credit options. The 5% limit on reductions in energy efficiency in exchange for other decarbonization criteria, as instituted in the IECC and ASHRAE, has served the industry well by maintaining the intent and primary benefits of energy codes to reduce energy and save energy costs. At this time the authors recommend that cumulative reductions in base levels of efficiency between embodied carbon, operational carbon, and other non-efficiency energy criteria like demand response and load management capability, should not exceed 5%. Until further research can comprehensively evaluate the relationship between operational and embodied emissions and other energy and power criteria to inform the regulation of tradeoffs, the 5% limit should be maintained and extended to embodied carbon requirements if and where requirements are introduced into energy codes in a way that allows for any tradeoff.

CONCLUSIONS

A long-term goal for effective code development is for embodied and operational carbon to be examined comprehensively in regulatory policies, including across building codes and standards. Standardized methods for the measurement and verification of operational and embodied carbon are both still in development. WBLCAs hold promise as effective tools to understand and optimize performance across embodied carbon and operational carbon, and for informed decision-making regarding the balance of the two. It is necessary to further advance these frameworks before allowing excessive tradeoffs between the two carbon impact categories associated with building design, construction, and operation into codes and standards. Even when these whole building lifecycle dynamics are better understood, efforts should continue to be made to limit the potential for and extent of tradeoffs between decarbonization criteria and energy efficiency criteria.

As code development professionals, policymakers, and legislators grapple with where and how to integrate embodied carbon into the design and construction regulatory environment, they will need to consider the enforceability and workflow of design and compliance professionals. While energy code professionals may review materials submittals, those reviews are often limited to insulation materials and equipment submittals that impact the operational performance of a building project. The introduction of a broader set of materials and design submittal review requirements for energy code professionals may present compliance verification challenges. The industry should be aware of and prepared to provide support for energy code professionals if and where embodied carbon is introduced to the energy code. Requirements introduced to building code or green codes better fit within the workflow of structural or full-scope plan reviews and field inspections, where practitioners already evaluate material specifications. In either case, the industry must be prepared to provide continuing education and training for plan review staff so that the workforce is prepared to include new requirements in their evaluations.

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