Advancing Energy Code Adoption: Roadmaps to Higher-Tier Performance

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ABSTRACT

The transition toward performance-based step energy codes represents an important policy mechanism for advancing building decarbonization. By establishing progressively higher performance tiers beyond baseline energy codes, step codes provide a structured pathway toward net-zero-ready construction. However, adoption challenges remain significant, particularly for large and complex projects, sectors facing cost pressures, and regions with limited institutional capacity.

This paper identifies barriers to step code adoption and outlines practical policy and industry solutions based on work with various levels of government, energy code design authorities, and construction industry stakeholders.

The analysis identifies three categories of structural barriers that broadly constrain tier escalation: economic conditions, workforce readiness, and enforcement capacity. Higher tier adoption can introduce incremental capital costs and perceived financial risk, place additional demands on a construction workforce already under pressure, and increase verification complexity for municipal permitting and inspection systems.

This paper outlines policy and implementation strategies that address these barriers, including financial instruments, workforce capacity-building initiatives, and strengthened compliance systems. Building on this analysis, the paper proposes core elements of step code adoption roadmaps that align tier escalation with the construction cycle and jurisdiction-specific market readiness.

Ultimately, step codes define a regulatory trajectory toward net-zero-ready construction, but roadmaps determine how that trajectory can be implemented in practice. The goal is not merely to accelerate adoption, but to build better – ensuring that by 2050, all new buildings achieve high performance standards approaching or meeting net-zero targets, supported by coordinated policy, capable markets, and shared accountability across jurisdictions.

Introduction

Step Codes as Decarbonization Infrastructure

Building energy codes constitute a foundational policy instrument for reducing energy demand and limiting greenhouse gas emissions associated with the built environment. Major frameworks such as the International Energy Conservation Code (IECC) in the United States and the National Building Code of Canada (NBC) and National Energy Code for Buildings (NECB) establish minimum performance requirements for new construction and major renovations.

Energy codes have historically included both prescriptive and performance-based compliance pathways. Prescriptive pathways specify predefined packages of measures and are administratively straightforward but can constrain design flexibility. Performance-based pathways require buildings to demonstrate compliance relative to a defined reference building or baseline through energy modeling, enabling greater flexibility in how efficiency targets are achieved. This structure also provides a practical mechanism for establishing tiered performance thresholds beyond minimum code, creating the basis for "step code" frameworks.

Step codes establish a series of progressively higher performance tiers beyond baseline code. When paired with adoption roadmaps, they translate long-term decarbonization objectives into a sequenced regulatory pathway. Each energy performance tier gives market actors a signal of future expectations while allowing time for phased adaptation. At advanced tiers, buildings are expected to approach net-zero-ready performance and typically deliver broader benefits, including improved durability, resilience, operations, occupant health and comfort, and reduced greenhouse gas emissions.

However, performance tiers alone do not determine how markets transition to higher standards. Effective implementation requires a roadmap that pairs tier progression with defined timelines and supporting measures. Together, step codes and adoption roadmaps function as a form of decarbonization infrastructure: they provide predictable signals that guide investment decisions, workforce development, product availability, compliance capacity, and market transformation over time. This predictability enables industry, regulators, educators, and building owners to prepare for future requirements while maintaining progress toward long-term climate objectives.

As governments increasingly rely on step code escalation to achieve climate goals, effective implementation becomes critical. Poorly sequenced or inadequately supported adoption can generate market disruption, cost volatility, workforce constraints, and compliance challenges. Conversely, well-designed roadmaps align regulatory ambition with market readiness, allowing jurisdictions to advance building performance while maintaining feasibility and industry confidence.

Purpose and Contribution

This paper examines the conditions required to enable effective adoption of higher tiers of step codes. Advancement beyond baseline code performance is frequently constrained by structural barriers that affect market readiness and institutional capacity. The analysis therefore addresses three interrelated categories: economics, workforce, and compliance. For each category, the associated barriers and corresponding policy and industry responses are assessed.

Building on this assessment, the paper proposes core elements that should guide the development of step code adoption roadmaps, aligning tier progression with economic conditions, workforce readiness, and enforcement capacity, ensuring that regulatory ambition remains achievable in practice.

Economics

Economic Barriers to Higher-Tier Adoption: Incremental Cost, Risk Exposure, and Market Distortions

Higher tiers of energy performance require improvements in envelope design, mechanical systems, airtightness, and construction practices. These measures generate incremental capital costs relative to baseline code construction. In general, the magnitude of incremental cost increases with each successive performance tier.

Evidence indicates, however, that meaningful energy efficiency gains can be achieved at relatively limited incremental costs. A study conducted by Dunsky for Prince Edward Island

(PEI) found that for all-electric single-family dwellings, achieving higher NBC step code tiers can present a positive value proposition for homeowners (Dunsky, 2025a). Figure 1 and Table 1 show indicative costs, savings, and payback periods for building new single-family homes less than $300m^3$ in PEI; Figure 2 and

Table 2 show the same for larger single-family homes. Note that the baseline case here also represents all-electric new construction.

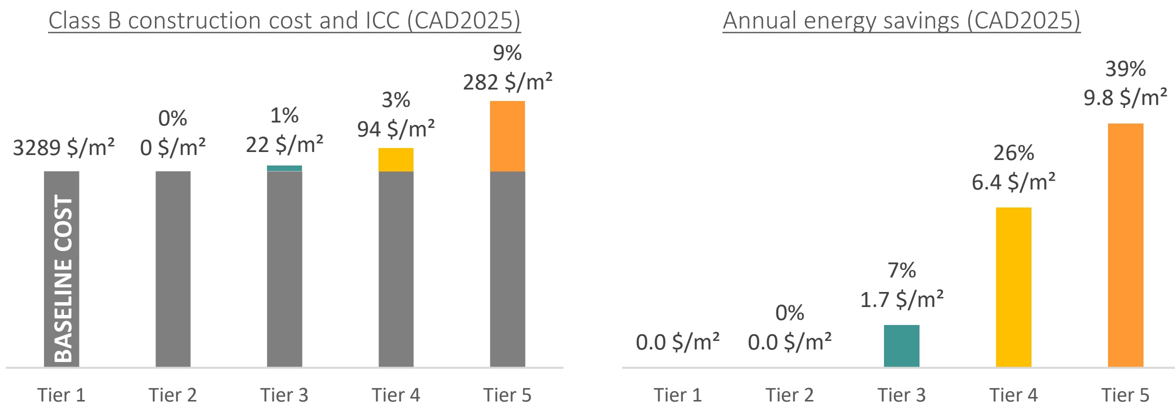

Figure 1: PEI Single-Family Dwelling < 300m^3 Incremental Costs and Savings

Table 1: PEI Single-Family Dwelling < 300m^3 Incremental Costs, Savings, Payback Periods

	Tier 2	Tier 3	Tier 4	Tier 5
Incremental Construction Cost ($/m^2)	$ 0	$ 22	$ 94	$ 282
Annual Energy Savings ($/m^2)	$ 0	$ 1.7	$ 6.4	$ 9.8
Payback Period (years)	N/A	12.9	14.6	28.7

Cost and savings are reported in 2025 Canadian dollars.

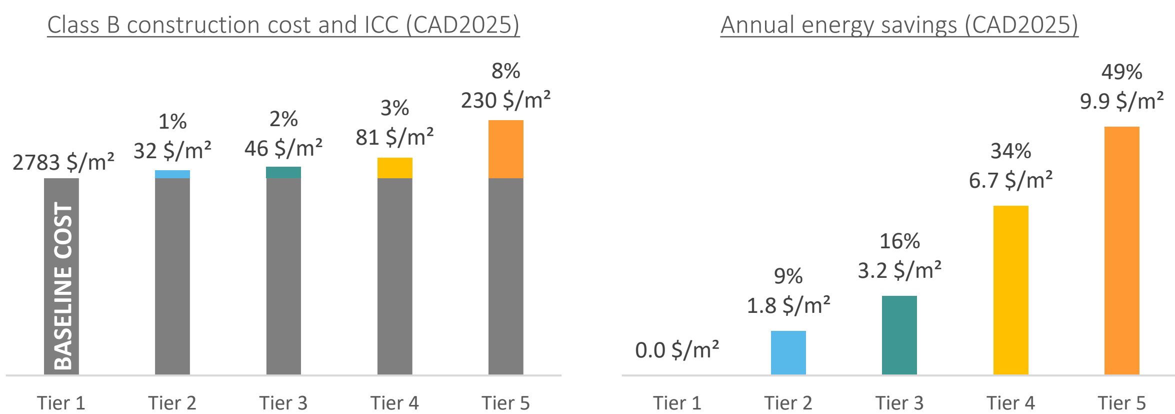

Figure 2: PEI Single-Family Dwelling ≥ 300m^3 Incremental Costs and Savings

Table 2: PEI Single-Family Dwelling ≥ 300m^3 Incremental Costs, Savings, Payback Periods

	Tier 2	**Tier 3**	**Tier 4**	**Tier 5**
Incremental Construction Cost (\$/m^2)	$ 32	$ 46	$ 81	$ 230
Annual Energy Savings (\$/m^2)	$ 1.8	$ 3.2	$ 6.7	$ 9.9
Payback Period (years)	18.2	14.5	12.1	23.2

Cost and savings are reported in 2025 Canadian dollars.

Energy performance greater than 5% above the National Building Code 2020 baseline (Tier 2) increased construction costs by approximately 0%-1%. Achieving greater than 40% above baseline (Tier 4) increased costs by roughly 3%, while reaching 70% above baseline (Tier 5, equivalent to net-zero ready construction) resulted in an incremental cost of approximately 8%-9%.

The payback period for building up to NBC Tier 4 remains below approximately 15 years, aligning with common home occupancy periods and equipment. For larger single-family homes, the payback period actually shrinks from Tier 2 to Tier 4 because energy cost savings increases outpace capital construction cost increases, delivering better value for up-front investment in energy efficient components.

At Tier 5, however, the payback period for incremental construction costs can exceed 20 years. While many high-performance building components provide benefits over the life of the building, the extended payback period may nevertheless create uncertainty for homeowners regarding whether the full value of the investment will be realized during their ownership period.

These results are based on energy modeling and cost estimation and should be interpreted as indicative rather than prescriptive or measured outcomes. The analysis relies on archetype-based, high-level measure-by-measure modeling and Class B cost estimates, using standardized assumptions and projected utility rates. Findings are therefore comparative and informational in nature. In the PEI context, the analysis assumes fully electric buildings. In cases where buildings rely on lower-cost fuels such as natural gas, payback periods may be longer due to cost differential between current pricing for electricity and natural gas.

From the purchaser's perspective, higher upfront costs introduce perceived financial risk despite calculated financial projections. Capital expenditures occur at the time of construction or purchase, while benefits (lower operating costs, improved comfort, enhanced durability, and greater resilience) occur over the building's lifetime. The temporal misalignment between costs and benefits can discourage investment, particularly when buyers prioritize short-term affordability. In addition, certain high-impact measures, such as improved airtightness or thermal bridging mitigation, are not easily visible. Limited public awareness of their value can further suppress willingness to pay.

Cost distribution dynamics reinforce this risk perception. In rental markets, landlords typically bear the incremental capital cost, while tenants capture the energy savings through reduced utility bills. This split-incentive structure weakens the economic case for higher-tier construction unless mechanisms exist to rebalance costs and benefits.

Upfront cost barriers also raise equity concerns. Without supportive policies, higher energy performance may become concentrated among higher-income households, while lower-income buyers remain exposed to higher long-term energy burdens. Over time, this dynamic can exacerbate affordability pressures and deepen inequality in operating costs and housing quality.

Mitigating Economic Risk: Financial Alignment, Market Confidence, and Policy Instruments

Addressing economic barriers to higher-tier adoption requires measures that reduce both actual incremental costs and perceived financial risk. Policy design must reduce uncertainty, strengthen recognition of lifecycle value, and align financing structures with long-term performance outcomes.

Direct financial incentives can play an important role during periods of market transition, particularly before higher performance tiers become mandatory. Capital rebates, performance-based incentives, tax credits, and low-interest financing can help offset incremental construction costs, build market familiarity with advanced practices, and support early adoption. As higher performance requirements become embedded in code, these supports may be reduced or redirected toward emerging tiers, hard-to-reach market segments, or affordability objectives. Targeted support is particularly important where cost escalation and longer payback periods may otherwise discourage uptake. In rental markets, split-incentive dynamics require specific intervention. Mechanisms such as green leases, energy-aligned financing, on-bill repayment structures, or regulatory provisions that enable appropriate cost recovery can help rebalance the distribution of costs and benefits between landlords and tenants.

Improving market recognition of long-term value is equally important. While the benefits of high-performance buildings (including lower operating costs, improved resilience, and improved occupant comfort) are well documented, these attributes are often undervalued in purchasing and financing decisions because they are not consistently visible at the point of sale or reflected in conventional valuation practices. Clear communication of lifecycle cost savings, resilience benefits, and asset value implications can shift evaluation criteria beyond upfront price. Integrating lifecycle costing into procurement and financing assessments reframes incremental capital expenditures as long-term investments. Financial institutions can play a role in this shift by incorporating projected energy savings into underwriting practices, aligning lending structures with expected operational performance. However, efforts to incorporate projected energy savings directly into underwriting have historically faced challenges related to savings estimation, verification, and market uptake, suggesting that financing innovations should be viewed as one component of a broader market transformation strategy rather than a standalone solution.

Public sector leadership further reduces perceived risk by strengthening market confidence in higher-tier construction practices and associated technologies. When governments adopt advanced performance tiers in publicly funded projects, they demonstrate the technical feasibility and operational reliability of new systems. This visible validation reduces uncertainty among developers, lenders, and buyers, particularly where unfamiliar technologies or construction approaches are involved. Demonstrated performance in public projects can normalize higher standards and increase trust in long-term value, thereby lowering perceived risk and supporting private investment decisions. Structured voluntary programs can complement this approach by allowing early adopters to gain experience before requirements become mandatory.

Impacts and Conclusion

Addressing economic barriers to higher-tier adoption has structural implications beyond individual projects. When cost perception and financial risk are reduced, higher performance standards become financeable at scale. Dedicated financing tools enable capital markets to integrate lifecycle energy savings into lending decisions. This alignment shifts energy efficiency from a discretionary upgrade to a standard investment criterion.

Economic interventions also shape the political feasibility of step code escalation. When cost premiums are moderated and risk is demonstrably manageable, resistance to higher tiers declines. Transparent cost data, predictable timelines, and visible financial support mechanisms strengthen stakeholder confidence and reduce opposition rooted in affordability concerns.

Finally, mitigating economic barriers supports equity objectives. Without corrective measures, higher energy performance can become concentrated among higher-income households, while lower-income owners and occupants face disproportionate energy burdens. Well-designed incentives, financing mechanisms, and split-incentive solutions can broaden access to affordable and energy efficient housing, reduce long-term operating costs for vulnerable populations, and prevent efficiency gains from reinforcing existing inequalities. In this context, economic policy design becomes central not only to adoption rates but to the distributional outcomes of building decarbonization.

Workforce

Labor Force Constraints

Advancing higher step code tiers depends on the availability, distribution, and technical readiness of the construction workforce. Energy performance improvements require additional labor input, enhanced skills, revised construction practices, and familiarity with performance-based compliance methods. These requirements emerge within construction sectors across North America that may already be facing capacity constraints.

A study conducted by Dunsky indicates that in Manitoba the construction workforce is expected to remain under sustained pressure over the coming decade: between 2024 and 2034, approximately 7,900 additional workers will be required beyond projected apprenticeship inflows to meet baseline residential and commercial construction demand, even without higher-tier adoption (Dunsky, 2025b). Sectoral growth and workforce retirements are the principal drivers of this shortage. The adoption of higher energy performance tiers, holding overall construction volumes constant, is likely to increase labor demand because achieving higher levels of building performance requires more specialized construction practices. This impact is expected to be uneven across trades; insulators, carpenters, and refrigeration and air-conditioning mechanics are expected to experience the greatest pressure, followed by electricians, sheet metal workers, and pipefitters. Glaziers and window installers occupy a distinct position: while higher tiers may modestly increase installation labor, a more significant constraint lies in the availability and supply of high-performance glazing products. Ensuring access to compliant materials is therefore as critical as ensuring trade capacity.

Beyond quantitative labor demand, higher-tier adoption introduces qualitative skill requirements. Achieving advanced performance levels necessitates airtightness practices and rigorous commissioning. Early tiers may be attainable with incremental adjustments to standard practice; however, higher tiers require systematic changes in training, supervision, and quality control. Without targeted skill development, performance gaps between modeled and actual outcomes may widen. Risk perception also increases with unfamiliar technologies and construction methods. Contractors may hesitate to adopt new systems without adequate training, clear technical guidance, and demonstrated performance reliability. Workforce readiness therefore directly influences market confidence in higher-tier construction.

Regional disparities further complicate adoption. Urban centers typically benefit from larger labor pools and access to specialized expertise. In contrast, rural and remote regions often face limited trade availability and reduced access to training infrastructure. Step-code escalation must therefore account for geographic differences in workforce capacity to avoid uneven compliance outcomes and market disruption.

Workforce: Development, Training, and Public Leadership

While higher-tier adoption places additional pressure on the construction workforce, it also generates measurable employment opportunities. For PEI, implementation of an energy step code could support more than 750 full-time equivalent jobs over the next decade, which corresponds to a 9% increase compared to a business-as-usual scenario (Dunsky, 2025a). For Manitoba, this implementation could support more than 3,500 full-time equivalent jobs over the next decade, which corresponds to a 6.5% increase compared to a business-as-usual scenario (Dunsky, 2025b). These new positions are expected to span multiple skill levels and to be concentrated in building envelope systems, HVAC, and lighting, which are the core components leveraged for energy efficiency and, therefore, central to higher-tier compliance. These projections indicate that workforce constraints are not solely a limiting factor; they also represent an economic development opportunity if managed strategically.

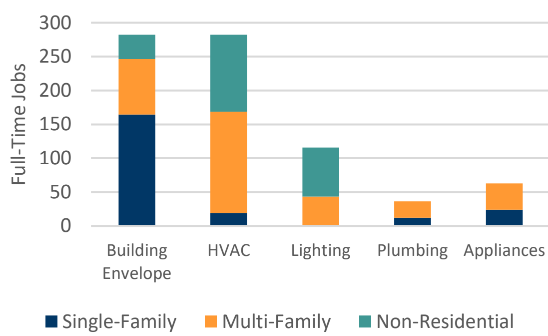

Figure 4: PEI Additional Gross Jobs Created from Higher Energy Efficiency Investments, by type, 2024 to 2034

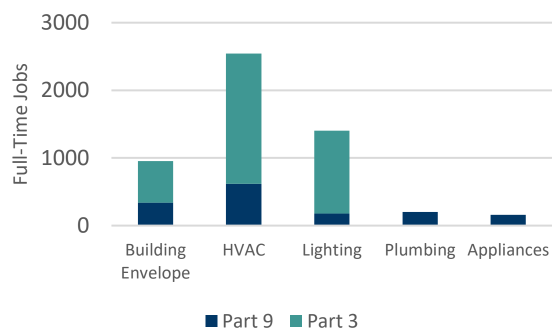

Figure 3: Manitoba Additional Gross Jobs Created from Higher Energy Efficiency Investments, by type, 2024 to 2034

Realizing these opportunities requires coordinated workforce development policies. Expanded educational capacity, targeted training programs, and structured certification pathways are necessary to align labor supply with emerging performance requirements. Stakeholder interviews conducted as part of the Dunsky study indicate that the transition to higher-performance construction will depend less on broad theoretical instruction and more on applied, skills-based training. Short, focused courses and micro-credential programs were identified as effective mechanisms to support rapid industry adaptation. Construction associations and educational institutions expressed willingness to collaborate with government to deliver such programs, provided that policy direction remains clear and stable.

Workforce readiness also depends on opportunities to apply new techniques in real-world conditions. Stakeholders emphasized that technical knowledge alone is insufficient; practical experience with high-performance assemblies, airtightness detailing, advanced mechanical systems, and commissioning practices is critical. Demonstration projects and targeted incentives were identified as essential tools to create early-stage demand for advanced practices and to build hands-on expertise before higher tiers become mandatory. Publicly funded projects can serve as training platforms, enabling trades to gain experience in a lower-risk environment while validating construction approaches.

The workforce should also be engaged during roadmap development. Early consultation with builders, trades, contractors, industry associations, and educational institutions can help identify capacity constraints, assess the feasibility of proposed tier escalation timelines, determine the training and certification needs required to support implementation, and, importantly, gain industry buy-in. This engagement can reduce the risk of establishing performance requirements that outpace workforce readiness.

Impacts and Conclusion

Higher-step code tier adoption carries broader labor market implications. While workforce constraints represent a near-term implementation challenge, structured escalation can stimulate employment growth across multiple trades and skill levels. Increased demand for high-performance construction supports new job creation, apprenticeship opportunities, and career pathways within the construction sector.

Over time, sustained investment in applied training and technical specialization strengthens the overall skill base of the construction workforce. As higher performance standards become embedded in routine practice, trades develop expertise in advanced building envelope detailing, high-efficiency mechanical systems, commissioning, and integrated design approaches. This transition elevates baseline construction quality and reduces performance gaps between design intent and operational outcomes.

Jurisdictions that successfully align workforce development with step code progression can position themselves as leaders in high performance construction expertise. Accumulated technical knowledge, trained professionals, and demonstrated project experience enhance regional competitiveness and create opportunities for knowledge transfer, consulting, and industry leadership. In this context, workforce strategy extends beyond compliance readiness; it becomes a mechanism for economic differentiation and construction sector modernization.

Enforcement and Compliance

The Adoption vs. Compliance Gap

Higher tier adoption under step code frameworks does not guarantee successful implementation; enforcement is a central determinant of whether intended energy outcomes are achieved in practice. Where enforcement systems are limited, a gap can manifest between “on paper” compliance and real-world outcomes. This adoption vs. compliance gap emerges when energy performance targets are demonstrated through design stage modeling and documentation but are not consistently translated into as-built conditions or operational performance.

Quantifying the Adoption vs. Compliance Gap: Code Compliance Studies

The literature surrounding building energy code compliance consistently documents adoption vs. compliance gaps and suggests that actual building energy consumption may exceed code (and modeled) targets by 10% to 30% on average (IPEEC, 2019).

- A 2019 Toronto Field Study observed energy performance gaps of up to 40% and concluded that overall building performance had not significantly increased since the early 2000s despite successive updates to the Ontario Building Code incorporating higher energy performance requirements (Sidewalk Labs, 2019).
- A 2014 New York State compliance study quantified the compliance gap in financial terms, finding that overall compliance fell well below target thresholds resulting in an estimated $1.3 billion in lost energy savings over five years in new construction across 44 residential and 26 commercial buildings (NYSERDA, 2014).
- A 2010 ACEEE meta-study reviewed 50 studies of US state energy code compliance and enforcement efforts and identified recurring implementation issues including deviations from approved plans, substitution of non-compliant materials, and insufficient enforcement capacity (Misuriello, Penney, Eldridge, & Foster, 2010).

Quantifying performance gaps establishes that adoption alone is insufficient; performance outcomes depend not only on code requirements, but on the strength of implementation systems and supports.

Enforcement Capacity and Implementation Constraints

Several interrelated factors spanning the construction cycle contribute to the persistence of the adoption vs. compliance gap. At each stage, increasing performance ambition introduces compliance verification complexity and capacity pressures.

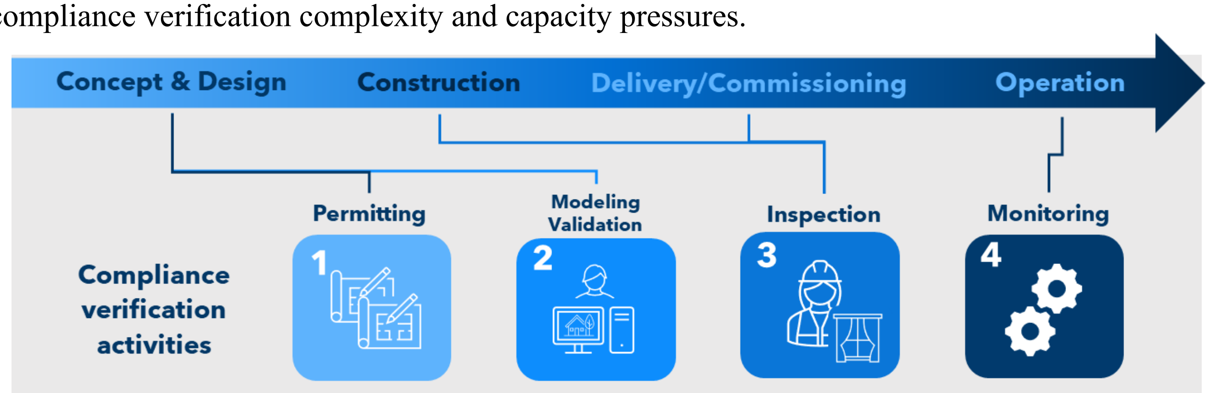

Figure 5: Construction Cycle-Aligned Code Compliance Activities

At the design stage, compliance is typically demonstrated through energy modeling, performance documentation, and submission of detailed drawings and specifications. As performance tiers escalate, reliance on modeling-based compliance increases, placing greater emphasis on accurate inputs, defensible assumptions, and correct interpretation of reference baselines and modeling rules. Reviewing these submissions requires technical expertise that is not consistently available across jurisdictions, particularly in smaller municipalities where access to specialized training is limited.

Resource constraints and limited staffing levels paired with high permit volumes can further constrain permitting reviews. Where documentation requirements are not standardized, inconsistencies in submissions and their interpretations may arise.

During construction, the translation of modeled assumptions to as-built conditions depends on installation quality and on-site decision making within dynamic project environments. In practice, as-built conditions very often differ from approved plans due to material substitutions, incomplete installations, and adjustments made in response to evolving site conditions.

Verification during the construction stage is further complicated by the sequencing and timing of work. As construction progresses, energy-critical elements (e.g., insulation, air barriers, duct sealing) become concealed beneath assemblies and finishes. If inspections are not aligned with construction progress, opportunities to confirm compliance may be lost. Inspection capacity and resource constraints also manifest during the construction stage as limitations in the number and timing of inspections to verify components. Differences in inspection practices across jurisdictions may also contribute to inconsistent enforcement outcomes.

Post-construction performance assessment remains an uncommon practice in most mandatory step code compliance frameworks, which typically assess projected (design-stage) rather than measured (operational stage) outcomes. Without mechanisms to compare projected and realized energy use, performance gaps and drift remain undetected.

Across the construction cycle, differences in training, experience, and administrative processes result in variability in code interpretation and inconsistent enforcement.

Building Enforcement Systems for Higher Tier Implementation

Addressing enforcement and compliance barriers requires shifting from viewing compliance as a final checkpoint to treating it as a system that aligns with the construction cycle.

Strengthening compliance at the design stage begins with clear documentation standards and consistent review processes. Standardized checklists and tools can improve permit submission quality and reduce reviewer burden. Where performance-based compliance pathways prevail, jurisdictions may also need to rely more heavily on qualified third-party energy professionals to prepare, review, and validate energy models. These professionals can supplement municipal capacity, particularly where specialized modeling expertise is limited, while improving consistency and quality in permit submissions.

During construction, inspection resources should focus on performance-sensitive elements. Risk-based approaches allow limited staff to prioritize the inspection of building components with the greatest impact on energy outcomes, such as envelope continuity, airtightness, insulation installation, system configuration, and controls.

Clearly defined inspection milestones before assemblies are concealed can improve verification effectiveness. Where inspection capacity is constrained, photo or video documentation can supplement in-person verification and improve traceability.

Voluntary or incentive-based post-occupancy reviews and compliance studies can assess alignment between modeled and operational performance. Leveraging intelligent metering and benchmarking tools can help identify significant deviations and inform corrective action.
Across all stages, effective compliance enforcement systems rely on standardization, improved education and training, and strategic use of qualified third-party verification.

Impacts and Conclusion

Advancing to higher energy step code tiers without parallel enhancements to inspection and enforcement systems risks compliance shortfalls, performance gaps, enforcement capacity strain, and inconsistent implementation across and within jurisdictions. Effective compliance systems reduce uncertainty, focus limited municipal resources on energy efficiency measures with the greatest impacts, expand institutional capacity through training, and scale verification through standardized processes and qualified third parties.

When compliance processes are aligned with the construction cycle and supported by adequate enforcement capacity, modeled performance targets are far more likely to translate into real-world code compliance.

Step Code Adoption Roadmap Development

Step code advancement is not solely a technical exercise in setting performance thresholds; it is a systems design challenge requiring alignment between regulatory ambition and market capacity. The preceding sections discuss how economic conditions, workforce readiness, and enforcement capacity each shape the feasibility of step code tier escalation.

A step code adoption roadmap is a planning tool that translates performance targets into a sequenced implementation strategy, coordinating tier advancement with targeted supports, enabling conditions, and risk mitigation measures.

Step Code Adoption Roadmap Development: Core Elements

Begin with capacity assessment. Roadmap development begins with a feasibility assessment of jurisdiction-specific market conditions, trends, and forecasts across three domains: (1) economic; (2) workforce; (3) enforcement. This assessment identifies constraints and barriers that must be addressed to enable step code tier escalation.

Identify supports and enabling measures. In response to the constraints and risks identified during capacity assessment, mitigation strategies are identified to support adoption. Studies conducted by Dunsky indicate that increased cost (or perceived cost) and lack of training and education across industry sectors and the public are the primary barriers to step code tier escalation in Manitoba and Prince Edward Island, Canada. Impactful supports address these issues directly (Dunsky Energy + Climate Advisors, 2025a) (Dunsky Energy + Climate Advisors, 2025b).

Prioritize supports and enabling measures. Not all interventions carry equal complexity or impact. A useful structuring tool is an impact-vs-effort map (Figure 6), which categorizes supports into four quadrants. Sequencing should prioritize quick wins early, while initiating longer-term structural reforms (complex but impactful) in parallel so that enabling conditions mature before mandatory tier escalation. Examples of potential quick wins (high impact, low effort) include targeted training and education initiatives, while more complex but impactful interventions may include the development of new financing mechanisms or compliance infrastructure. Lower-impact, low-effort measures may include awareness campaigns or guidance materials, whereas lower-impact, high-effort measures should generally be deprioritized unless they address a jurisdiction-specific barrier.

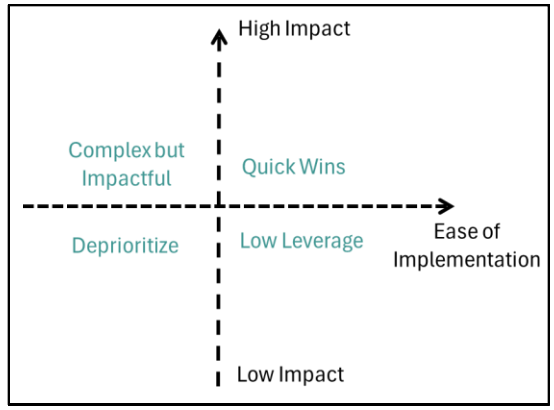

Figure 6: Impact vs Effort Map

Manage cost and perceived risk. Roadmaps should integrate financial tools and policy instruments that address capital cost sensitivity and perceived risk. Aligning incentives, financing mechanisms, and public sector leadership with tier escalation reduces resistance and smooths adoption.

Sequence step code tier escalation to balance ambition with capacity. Escalation that outpaces market capacity risks cost volatility, workforce constraints, compliance variability, and performance gaps. Conversely, overly cautious timelines can delay energy consumption reductions and result in failure to meet climate goals.

Provide advance notice and lead time to the construction industry and the public. Predictable sequencing reduces uncertainty and supports market adaptation. Roadmaps should ideally provide multi-year signaling that allows industry, educators, enforcement bodies, and the public at large to prepare in advance of and adapt to regulatory change. Sequencing strategies may include (but are not limited to):

- flexible transition periods for complex building types;
- voluntary or pilot projects or sectors prior to mandatory escalation;
- phased differentiation by building type or project scale;
- staggered implementation across regions where capacity varies.

Context-Aligned Step Code Advancement

No single step code adoption roadmap model applies universally. Market conditions, workforce capacity, enforcement readiness, and economic context vary across jurisdictions and building sectors.

Two recent Canadian examples show how sequencing strategies can be adapted to suit different jurisdictional contexts. Nova Scotia adopted the 2020 National Model Codes at Tier 1 effective April 1, 2025, and established a staged escalation pathway to Tier 3 over four years (Government of Nova Scotia, 2024). The timeline differentiates by building type, with Part 9/NBC (smaller residential buildings) advancing one year ahead of Part 3/NECB (larger and more complex buildings). This staged and differentiated progression provides industry and regulators with clear transition intervals and recognizes the varying complexity and readiness of different building sectors.

New Brunswick adopted the 2020 National Model Codes effective April 1, 2025, applying the NBC and NECB directly at Tier 2 energy performance rather than first adopting to Tier 1 (Government of New Brunswick, 2025). This approach establishes a higher minimum energy performance standard immediately upon adoption of the 2020 codes. The province further plans to adopt the 2025 National Model Codes effective January 1, 2027, directly at Tier 3 for Part 9 and Tier 2 for Part 3 buildings.

These examples demonstrate that jurisdictions may pursue different escalation pathways while working toward similar long-term objectives. What distinguishes effective roadmap development is not uniformity of structure, but clarity of sequencing, alignment with capacity, and deliberate integration of enabling supports.

Despite variation in step code roadmap design, one consistent conclusion emerges: industry consultation is essential to ground roadmaps in practical realities. Engaging builders, designers, trades, lenders, educators, and municipal officials improves feasibility assessment accuracy, clarifies supports ahead of escalation, and, most importantly, strengthens buy-in.

Where step codes define regulatory progression toward net-zero ready construction, roadmaps function as implementation tools that ground tier escalation in the practical realities of jurisdiction-specific economic conditions, workforce readiness, and enforcement capacity.

References

Dunsky Energy + Climate Advisors. (2025a). *Confidential report.*

Dunsky Energy + Climate Advisors. (2025b). *Confidential report.*

Government of New Brunswick. (2025). *Code Update Roadmap.* Retrieved from Government of New Brunswick: https://www.gnb.ca/content/dam/GNB3/t/ls/li-ri/technical-inspections/docs/code-update-roadmap.pdf

Government of Nova Scotia. (2024, September 20). *News Release: Province to Adopt 2020 National Building Codes.* Retrieved from Government of Nova Scotia Municipal Affairs and Housing: https://news.novascotia.ca/en/2024/09/20/province-adopt-2020-national-building-codes

IPEEC. (2019, November). *Building Energy Performance Gap Issues: An International Review.* Retrieved from International Partnership for Energy Efficiency Cooperation (IPEEC): https://www.dcceew.gov.au/sites/default/files/documents/building-energy-performance-gap-issues-international-review.pdf

Misuriello, H., Penney, S., Eldridge, M., & Foster, B. (2010). *Lessons Learned from Building Energy Code Compliance and Enforcement Evaluation Studies.* Retrieved from American Council for an Energy-Efficient Economy: https://www.aceee.org/files/proceedings/2010/data/papers/2185.pdf

NYSERDA. (2014, January). *New York Energy Code Compliance Study.* Retrieved from New York State Energy Research and Development Authority: https://gelfny.org/wp-content/uploads/2015/05/New-York-Energy-Code-Compliance-Study.pdf

Sidewalk Labs. (2019, July). *Diagnosing the Performance Gap Between Design and Operational Energy Use.* Retrieved from Sidewalk Labs Toronto Multi-Unit Residential Building Study: https://be-exchange.org/wp-content/uploads/2019/07/SWL-MURB-Presentation-Final.pdf

AI-assisted tools used: ChatGPT.
Used for: drafting sections, light editing.
Human review: The authors reviewed and verified all content, calculations, and citations.