



Recommendations for Successful Stretch Code Implementation in B.C.

A REVIEW OF IMPLEMENTATION SUPPORTS IN FIVE LEADING
BEYOND-BASE ENERGY CODE JURISDICTIONS

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August 2016

This report was authored by Karolina Pol, a graduate researcher at the School of Community and Regional Planning at the University of British Columbia (UBC), as part of the UBC Sustainability Scholar program. Funding for the research was kindly provided by BC Hydro and Power Authority and the UBC Sustainability Initiative.

Acknowledgments

The author would like to acknowledge Dr. Tom Berkhout, Senior Policy Analyst, Ministry of Energy and Mines, Electricity and Alternative Energy Division, for his mentorship throughout the program. She is also grateful to all of the members of the Stretch Code Implementation Working Group for welcoming her into their working sessions. The author would also like to thank everyone who provided feedback and insights on the report, including:

Brendan McEwen, Sustainability Manager, City of Richmond

Dave Ramslie, Principle, Integral Group

Ian Finlayson, Deputy Director, Energy Efficiency Division, Department of Energy Resources

Ingrid Neumann, Energy Specialist, California Energy Commission

John Madden, Director, Sustainability and Engineering, Campus and Community Planning, UBC

Jordan Decker, Statewide Local Government Energy Efficiency Best Practices Coordinator, Local Government Commission

Lisa King, Senior Environmental Policy Planner, City of Toronto

Mark Frankel, Technical Director, New Buildings Institute

Martino Tran, Assistant Professor, School of Community and Regional Planning, UBC

Norm Connolly, Community Energy Manager, City of New Westminster

Ralph Wells, Community Energy Manager, Campus and Community Planning, UBC

Robyn Wark, Senior Key Account Manager, Sustainable Communities, BC Hydro

Zachary May, Senior Codes Administrator, Building and Safety Standards Branch

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List of Acronyms

AMO	Association of Municipalities of Ontario
ASHRAE	American Society of Heating and Air Conditioning Engineers
BBRS	Board of Building Regulations and Standards
BCBC	British Columbia Building Code
CA	California
CARIP	Climate Action Revenue Incentive Program
CEC	California Energy Commission
CPUC	California Public Utilities Commission
CoT	City of Toronto
DSM	Demand side measure
DPS	Department of Public Service
EDA	Electricity Distributors Association
EEU	Energy efficiency utility
EPIC	Electric Program Investment Charge
GHG	Greenhouse gas
HERS	Home Energy Rating System
HPNC	High performance new construction
ICE Fund	Innovative Clean Energy Fund
IECC	International Energy Conservation Code
IESO	Independent Electricity System Operator
MA	Massachusetts
MCSD	Ministry of Community, Sport and Cultural Development
MEM	Ministry of Energy and Mines
MNECB	Model National Energy Code of Canada for Buildings
ON	Ontario
OPA	Ontario Power Authority
OR	Oregon
PUC	Public Utilities Commission
SCIWG	Stretch Code Implementation Working Group
SSSB-10	Supplementary Standard (2010)
TGS	Toronto Green Standard
VT	Vermont

Executive Summary

The Building Act, passed in 2015, marks a policy shift in the regulation of energy performance of new buildings in B.C. Responsibility for establishing energy performance standards for new buildings will now rest primarily with the provincial government.ⁱ Prior to the introduction of this legislation, local governments could control energy standards in new buildings using municipal bylaws.¹ The Building Act limits this municipal authority in order to increase the consistency of building standards, increase the capacity of building officials, and drive innovation in energy efficient building design and technology across the province.ⁱⁱ

The provincial government has developed a stretch code with higher energy performance requirements than the B.C. Building Code (BCBC), to ensure that advances in energy efficient building design and technology continue within this new policy context. Once the Building Act comes into force in 2017, local governments will be able to voluntarily adopt the stretch code and use it alongside other municipal regulatory tools to encourage energy performance in new buildings that exceeds that required by the BCBC.

In anticipation of this new regulatory framework, this report assesses the supports available for the implementation of a stretch code in B.C.² In order to do this, existing supports in B.C. are compared with those in five other leading beyond-base energy code jurisdictions across North America, including California, Massachusetts, Oregon, Vermont and Ontario.

Observations from these case studies indicate that there are seven common barriers to the implementation of beyond-base energy codes across jurisdictions, including:

1. **Administration:** a lack of coordination towards common energy performance goals within the decentralized, multi-stakeholder new buildings energy sector;
2. **Communication:** low levels of stakeholder awareness, or inaccurate understanding, of the beyond-base energy code program and supports;
3. **Finance:** higher capital costs of constructing high energy performance buildings;
4. **Research and development:** limited choices for high performance building design and technology;
5. **Knowledge:** concentration of knowledge about planning and developing high energy performance buildings within an isolated group of professionals;
6. **Compliance tools:** complicated compliance processes;
7. **Training:** inconsistent capacity amongst building professionals and trades to build high energy performance buildings.

Jurisdictions have created supports in response to each of these barriers. Therefore, the barriers constitute not only a typology for understanding barriers to beyond-base energy code implementation, but also implementation supports. This typology is used in the report to assess B.C.'s stretch code

¹ Some local governments in B.C., such as the City of Vancouver, are not governed by the Local Government Act and therefore are not affected by changes to the Building Act. Some local governments that are affected by the Building Act contest the absolute authority of the province over the energy performance of new buildings and argue that the Community Charter provides municipalities with the authority to set their own targets.

² Supports refer to programs or initiatives whose purpose is to encourage the voluntary use of the stretch code for new buildings, as opposed to the base building code.

supports. The findings reveal significant gaps in existing supports. Particularly, a lack of administration, communication and knowledge supports, referred to as soft supports.

In order to address these gaps, the report makes fourteen recommendations, spanning the seven support categories, to encourage successful implementation of a stretch code in B.C., including:

Administration:

1. Develop a High Performance Building Goal and Strategy.
2. Centralize the administration of stretch code supports.

Communication:

3. Clearly communicate stretch code standards and cycles.
4. Host all stretch code information and resources on one communications platform.
5. Conduct ongoing stakeholder engagement.
6. Celebrate stretch code leadership and success.

Finance:

7. Increase the level of reliable funding available for stretch code implementation.
8. Tailor financial supports to target particular stakeholder groups.

Research and Development:

9. Integrate verification into the stretch code compliance process.
10. Offer industry and community research grants on a competitive basis.

Knowledge:

11. Create a space for knowledge sharing between stretch code stakeholder groups.

Compliance tools:

12. Develop stretch code compliance tools to guide and simplify the compliance process.

Training:

13. Integrate stretch code training into existing training programs where possible.
14. Provide open access to stretch code training to all interested parties.

These recommendations address the seven common barriers to beyond-base energy code implementation listed above using leading practices from the jurisdictions reviewed. Enacting these recommendations will encourage successful implementation of the stretch code in B.C.

The research also provides a framework for assessing beyond-base energy code supports in other jurisdictions not reviewed in this report. The seven barriers to implementation are common and should be anticipated in all beyond-base code jurisdictions as a precautionary measure. Policy makers may also look to specific support categories to identify leading practices to address implementation barriers in their jurisdiction.

Introduction

Policy Context: Regulating Energy Efficiency in B.C. Buildings

In 2007, the government of B.C. legislated one of the most aggressive greenhouse gas (GHG) reduction targets in North America in the BC Energy Plan.ⁱⁱⁱ The plan commits to decreasing GHG emissions by 33% below 2007 levels by 2020 and 80% below 2007 levels by 2050.^{iv}

Approximately 29% of B.C.'s energy-use, and 12% of its GHG emissions, come from new buildings.^v Acknowledging the significance of the building sector to its energy and climate goals, the government developed the Energy Efficient Buildings Strategy in 2008. The strategy prioritizes demand-side measures, which favour energy efficiency over increasing energy supply to meet energy demand.^{vi} This approach builds on the policy framework established in the mid-nineties with the introduction of the Energy Efficiency Act. B.C.'s energy policies and legislations are also supported by a suite of climate legislation, including the Climate Action Plan and the Clean Energy Act.

The Building Act will affect how actors can work towards the goals and objectives set out in B.C.'s energy and climate policies. The new legislation places responsibility for establishing energy performance standards for new buildings with the provincial government. Consequently, local governments are no longer able to require that new buildings meet municipal energy performance standards.³ Prior to the introduction of the Building Act, local governments were able to incentivize energy efficiency in buildings using authority granted to them by the Local Government Act and the Community Charter, some of which can no longer be used as a result of the new legislation.⁴ During this time, some local governments played a key role in encouraging innovation in energy efficient building design and technology.

Some fear that the Building Act could constrain the ability of local governments to continue supporting energy efficiency in their communities, which limits their options for contributing to provincial energy and climate targets.⁵ Given the provincial and municipal desire to increase the energy performance of new buildings, and the policy context created by the Building Act, the purpose of this report is to recommend actions the Province and other stakeholders can take to support the adoption and implementation of the proposed stretch code in B.C.

Two Approaches to Beyond-base Energy Codes: Stretch Codes and Reach Codes

Creating a beyond-base energy code at the provincial or state level provides an opportunity to establish a consistent standard of energy performance that is higher than the required standard in a particular jurisdiction. Beyond-base codes can take two forms: a stretch code or a reach code. These tools are often referenced interchangeably, however there are significant differences between the two approaches.

While a stretch code is voluntarily adopted by a local government, a reach code is mandated by a more senior level of government.^{vii} A reach code is province or state wide beyond-base code standard that is permissible within the jurisdiction regardless of local government adoption. Both of these tools allow local governments to reference higher energy efficiency requirements for new buildings without creating multiple standards within one jurisdiction. However, the use of each tool has different political implications that should be considered.

³ Some local governments contest the absolute authority of the province over energy performance of new buildings and argue that the Community Charter provides municipalities with the authority to set their own targets.

⁴ Some local governments in B.C., such as the City of Vancouver, are not governed by the Local Government Act. Therefore, changes in the Building Act do not directly impact these local governments' ability to regulate energy performance requirements for new buildings in their jurisdiction.

⁵ Some local governments in B.C. recognize the value of establishing a consistent beyond-base energy code to relieve industry of bureaucratic burdens and support market transformation.

The implementation of a beyond-base energy code requires more than the development of a technical code. Much of the existing research on beyond-base energy codes focuses on technical considerations, without understanding the factors that affect implementation once the code is developed. This report takes a policy-oriented perspective, focusing on the political and economic factors that support the development of stretch-level buildings.

Case Studies

Analyzing Beyond-base Energy Code Implementation: Roles, Supports and Policies

The implementation of beyond-base energy codes in California, Massachusetts, Oregon, Vermont and Ontario are reviewed in this report. In order to begin documenting the complicated nexus in which implementation occurs, the case studies in this report focus on three factors that affect beyond-base code implementation⁶:

1. **Roles:** Stakeholder action(s) required to implement the beyond-base energy code;
2. **Supports:** Programs or resources for overcoming barriers to beyond-base energy code implementation;
3. **Policies:** Create conditions that are either conducive to beyond-base energy code implementation.

Documenting these aspects of beyond-base energy codes in each case study provides a holistic overview of implementation.⁷ The data provides a starting point for understanding policy environments that nurture beyond-base code uptake. High-level observations of successful case studies can guide policymakers in other jurisdictions when developing their own beyond-base code implementation plans.

Each case study includes an overview of the jurisdiction's beyond-base energy code, a list of key supports and implementation insights.⁸

An more detailed list of key supports featured in the case studies can be found in Appendix A.

California Title 24

Leading Practices for Stakeholder Engagement

Support for the California stretch code is provided by the California Energy Commission (CEC) and public and investor owned utilities. Key supports are summarized in Table 1.

⁶ This report focuses on the provincial and state-level influences on stretch code implementation. However, other levels of government also affect stretch code uptake and therefore should be considered to provide a more comprehensive understanding of stretch code implementation.

⁷ This report assumes that there is no generic combination of supports and policies that can ensure stretch code uptake. Instead, uptake of beyond-base building codes depends on the nexus created within a jurisdiction between technology, policies, supports and stakeholders.

⁸ Data for the case studies was gathered through secondary research and informal telephone interviews with building experts from the case study jurisdictions, as well as the New Building Institute.

Table 1 – California Title 24, Part 6: Code and Key Supports

California Title 24	
Code	Key Supports
<p>Code typology: Prescriptive and performance based stretch code⁹</p> <p>Compliance paths: Prescriptive requirements and the Home Energy Rating System (HERS)</p> <p>Targeted buildings: Part 3 and Part 9</p> <p>Number of tiers: 2</p>	<p>California Energy Commission</p> <ul style="list-style-type: none"> • Statewide Local Government Energy Efficiency Best Practices Coordinator • Energy Code Ace for online compliance tools • Online Self-study for training purposes • Energy Efficiency Low Finance program • Code Standards Hotline <p>Public and investor owned utilities¹⁰</p> <ul style="list-style-type: none"> • Energy Efficiency Collaborative for excellence • Codes and Standards Program for compliance • Savings by Design incentive

Implementation Insights:

California demonstrates best practices in conducting stakeholder engagement to develop effective supports that foster continuous code uptake. This case illustrates the value of stakeholder engagement for long-term beyond-base energy code success.

California’s successful stretch code implementation is impressive given the decentralized and fragmented political economy of energy in which it has been implemented, which includes numerous utilities and a number of regulatory agencies. The state has mobilized these actors towards energy efficiency in new buildings by creating a long-term statewide energy plan, conducting extensive stakeholder engagement and focusing on market-driving supports, which resonate across stakeholder groups.

The development of the Long Term Energy Efficiency Strategic Plan is integral to the state’s stretch code implementation strategy. The plan provides a unified vision for energy efficiency, composed of five goal areas with accompanying objectives.^{viii} It also provides the state leadership necessary to align and coordinate stretch code supports at the utility and local government levels.

The emphasis placed on stakeholder engagement in California is especially evident from two of its supports: the Statewide Energy Efficiency Collaborative and the Statewide Local Government Energy Efficiency Best Practices Coordinator. These resources facilitate regular, ongoing stakeholder engagement. The state’s investment in these supports demonstrates the value it places on dialogue between government and stakeholder representatives to drive stretch code implementation.

Another way the jurisdiction has been able to mobilize action in its multi-stakeholder environment is by strategically developing financial supports that appeal to a broad range of stakeholder groups. These include direct funding for projects that support the broad energy efficiency goals outlined in the California Long-term Strategic Plan, subsidization of innovative design processes, and low-interest loans for energy efficient public infrastructure projects.

⁹ California refers to its beyond-base energy code as a reach code, but it is considered a stretch code given the distinction between stretch codes and reach codes made in this report.

¹⁰ Investor owned utilities (IOU’s) in California include: Pacific Gas and Electric (PG&E), Southern California Edison (SCE), Southern California Gas (SoCal Gas), and San Diego Gas and Electric (SDG&E), and Southwest Gas Corporation (SWG).

Massachusetts Stretch Code

Leading Practices for Strategic Communications

Support for the Massachusetts stretch code is provided by the Department of Energy and Resources and the Board of Building Regulations and Standards. Key supports are summarized in Table 2.

Table 2 – Massachusetts Stretch Code: Code and Key Supports

Massachusetts Stretch Code	
Code	Key Supports
<p>Code typology: Prescriptive and performance-based stretch code</p> <p>Compliance paths: Prescriptive requirements and HERS</p> <p>Targeted buildings: Part 3 and Part 9</p> <p>Number of tiers: 1</p>	<p>Massachusetts Department of Energy Resources</p> <ul style="list-style-type: none"> • Green Communities program with annual competitive grants and technical support • Mass Save for central administration • Residential New Construction program with incentives for energy efficient design and construction <p>Board of Building Regulations and Standards</p> <ul style="list-style-type: none"> • Energy Code Training

Implementation Insights:

Massachusetts demonstrates best practices in using strategic communications to maximize the impact of the supports offered within a jurisdiction.

Massachusetts has implemented its stretch code through the Green Communities Program, which embeds the code into an overarching integrated framework for municipal sustainability. The program provides local governments with access to annual competitive grants and technical support for a broad range of sustainability-related initiatives. Local governments enrol in the program by achieving designation as a Massachusetts Green Community. This requires meeting five conditions, one of which is adoption of the stretch code, or creating an equivalent standard of energy performance in new buildings in their community.^{ix}

The Green Communities Program provides a highly streamlined process for local government adoption of the stretch code with clear, guaranteed benefits. The state guarantees access to annual grant competitions and technical support for Massachusetts Green Communities by funding the program through the state’s cap and trade system.^x This provides a long-term stable funding stream. It also makes the program politically feasible for local governments, who are subject to pressure from their Councils. Since all local governments are subject to the costs of the cap and trade system, they subsidize the program regardless of their participation. This creates an incentive for local governments to become Green Communities, so that they are able to benefit from the Green Communities Program.

The Department of Energy Resources initially targeted twelve early adopters to become the state’s first Green Communities.¹¹ The Green Communities Division’s communications team regularly shared information about the benefits Green Communities were receiving with other local governments, including the amount of funding they received, the projects they were pursuing and anticipated benefits to the community. The Division continues to regularly communicate this information with local

¹¹ These communities put pressure on the state to provide support for municipal sustainability initiatives and played a key role in the development of the Green Communities Program.

governments across the state. This has leveraged competition between local governments and helped increase the number of communities participating in the program.¹²

In addition to marketing program success, the Green Communities Division also conducts regular stakeholder engagement as part of its communication strategy. This not only provided an opportunity to market the program, it also provides a mechanism for monitoring and evaluation. Data collected at engagements is integrated into the program over time to address barriers to participation faced by particular local governments, to ensure a greater range of communities are able to participate in the Green Communities program.¹³

Oregon Reach Code

Leading Practices for Market Transformation

Support for the Oregon reach code is provided by Business Oregon, the Department of Consumer and Business Services and the Oregon Public Utility Commission. Key supports are summarized in Table 3.

Table 3 – Oregon Reach Code: Code and Key Supports

Oregon Reach Code	
Code	Key Supports
<p>Code typology: Prescriptive and performance-based reach code</p> <p>Compliance paths: 2012 IECC and ASHRAE 90.1</p> <p>Targeted buildings: Part 3 and Part 9</p> <p>Number of tiers: 1</p>	<p>Business Oregon</p> <ul style="list-style-type: none"> BEST centre for excellence <p>Department of Consumer and Business Services</p> <ul style="list-style-type: none"> Bill 2801 with guidance for home energy assessment <p>Oregon Public Utility Commission</p> <ul style="list-style-type: none"> Utility Integrated Resource Planning for financial incentive to build to higher energy performance

Implementation Insights:

Oregon demonstrates best practices for developing financial supports that drive market transformation, while demonstrating the limitations of a purely market driven implementation approach.

The Oregon reach code is a “mini-max” code, which defines minimum and maximum energy performance standards for new buildings.^{xi} The establishment of maximum standards may seem counterintuitive to long-term energy performance improvements. However, this approach is justified in Oregon based on the perception that local government aversion to risks associated with innovative building design and technologies is the primary barrier to increased energy performance in new buildings. The reach code, which overrides local government authority, is meant to overcome this perceived barrier by providing an alternative path for compliance with the building code.

Within this political context, Oregon has taken a market-driven approach to reach code implementation, bypassing local governments and primarily targeting the development community. Consequently, many of the supports in Oregon address the high capital costs of building to the reach code: Utility Integrated

¹² As of June 2016, Massachusetts has 155 Green Communities, representing more than 50% of the state’s population. For more information, see [Designated Green Communities](#).

¹³ For example, engagement with small and rural communities has helped identify particular barriers for these communities to participate in the Green Communities Program.

Resource Planning Savings provide subsidies based on a building’s energy load offset; Energy Conservation Bill 2801 provides government endorsement of in-market scoring systems; and the BEST centre of excellence encourages market growth in the sustainable technologies sector.

Vermont Stretch Code

Leading Practices for Supporting Stretch Codes Using Regulatory Tools

Support for the Vermont stretch code is provided by the Agency of Natural Resources, the Department of Public Service (DPS) and Efficiency Vermont. Key supports are summarized in Table 4.

Table 4 – Vermont Stretch Code: Code and Key Supports

Vermont Stretch Code	
Code	Key Supports
<p>Code typology: Performance-based stretch code</p> <p>Compliance paths: Prescriptive requirements and HERS</p> <p>Targeted buildings: Part 3 and Part 9</p> <p>Number of tiers: 1</p>	<p>Agency of Natural Resources</p> <ul style="list-style-type: none"> • Act 250 to mandate early adopters • Act 89: Energy Code Certificates for monitoring and evaluation and compliance training • Act 89 to support stretch code awareness • REScheck to aid compliance <p>Efficiency Vermont</p> <ul style="list-style-type: none"> • Energy Code Assistance Centre • Energy Code Handbook • Training on demand • Design Checklist for Multifamily Housing • Energy Consultants on demand • Commercial New Construction program for project support • Residential New Construction program for project support • Multifamily New Construction program for project support • Residential building energy label • Targeted stakeholder engagement • Online chat for code inquiries

Implementation Insights:

Vermont’s stretch code implementation approach illustrates how legislation can be used to maximize the effectiveness of supports.

Through Act 250, the state requires development in its nine District Environmental Commission areas to meet the stretch code.^{xii} This will ensure that demonstration projects are built throughout the state, providing leadership for stretch-level building development in surrounding communities.

The state also passed Act 89, which requires local governments to collect Energy Certificates from developers prior to issuing a building occupancy permit.^{xiii} Obtaining an Energy Certificate requires developers to self-certify their projects. The state encourages the use of software available on its website for self-certification. This provision increases developers’ knowledge about the stretch code. The energy performance data collected through Act 89 also feeds into a statewide database, which will support ongoing evidence-based policy development without increasing workloads for local governments.

Vermont offers a greater range of supports than any other jurisdiction reviewed. Its supports are also uniquely tailored to stakeholder groups’ interests.¹⁴ This has been deemed a result of the establishment of Efficiency Vermont by the Vermont Public Service Board, an energy efficiency utility (EEU) with a mandate to develop, promote and administer all of the state’s energy efficiency resources and programs.^{xiv} Efficiency Vermont conducts regular engagement activities with a wide range of groups to better understand the challenges of stretch code implementation and adapt code supports accordingly. In 2012, the organization engaged over 75 stakeholder groups.^{xv} Dialogues with these groups have helped identified new implementation strategies for continued stretch code uptake. For example, including realtors in the implementation process has helped increase code stretch code uptake through an increase in the use of voluntary residential building labels.^{xvi}

Ontario Supplementary Standard

Leading Practices for Stretch Code Implementation in a Canadian Context

Support for the Ontario stretch code is provided primarily by the Ontario Power Authority. Due to the leadership of the City of Toronto (CoT) in this jurisdiction, its municipal-level supports are also included in the case study.¹⁵ Key supports are summarized in Table 5.

Table 5 – Ontario Supplementary Standard: Code and Key Supports

Ontario Supplementary Standard	
Code	Key Supports
<p>Code typology: Performance-based stretch code.</p> <p>Compliance paths: ASHRAE 90.1-2004 or MNECB (as modified in SSSB-10)</p> <p>Targeted buildings: Part 3 and Part 9</p> <p>Number of tiers: 2</p>	<p>Ontario Power Authority</p> <ul style="list-style-type: none"> • New home construction program • High performance new construction program • Conservation fund for replicable pilot projects • Community Conservation Awards for municipal leadership <p>City of Toronto</p> <ul style="list-style-type: none"> • Development charge refund • High energy performance design incentive • Centre of excellence • LEED supplement • Sustainability endowment fund for projects that support climate and air quality • Toronto Green Standard guide for developers

Implementation Insights:

Ontario’s Supplementary Standard provides a Canadian example of stretch code implementation. The case study demonstrates best practices in communicating code standards and change cycles. The CoT’s integration of the Provincial stretch code into its Toronto Green Standard (TGS) also provides best practices for integrating a provincial code into municipal bylaws and ordinances.

¹⁴ For example, unlike other jurisdictions that offer generic financial incentives to all developers, different financial supports are available to residential, multifamily and commercial property developers.

¹⁵ The City of Toronto is governed by the City of Toronto Act, while other local governments in Ontario are governed by the Municipal Act. This discrepancy provides the City of Toronto with additional authority over its financial resources and development permits. This autonomy helps the City provide stretch code supports that cannot be offered by other municipalities in Ontario.

Prior to the first provincial code cycle that included the Supplementary Standard in 2010, the Province released a suite of standards for the next two code cycles (2006 to 2011 and 2012 to 2017) for: 1) the base code; 2) stretch-level 1; and 3) stretch-level 2. This long-term planning provided stakeholders with ten years of advanced notice about base and stretch code standards and cycles.

The Province uses a rolling code cycle, in which stretch-level 1 becomes the base code in each new cycle. The code operates on a regular five-year schedule. This predictability makes it easier for stakeholders to prepare for higher energy performance standards. It also allows the construction industry to anticipate market demand for building materials and services, which helps drive market transformation.

The CoT has embedded the Supplementary Standard into its sustainable development ordinance, the TGS. The City requires TGS tier 1 for all new development (equivalent to Supplementary Standard stretch-level 1). TGS tier 2 functions as the City's stretch code (equivalent to Supplementary Standard stretch-level 2). This puts the CoT one cycle ahead of the Province.

In order to encourage development that meets TGS tier 2, the City has developed a number of municipal supports that build on the supports provided by other parties. The Better Building Partnership and LEED Supplement are good examples, as they leverage existing supports provided by non-municipal entities (the Ontario Power Authority's High Performance New Construction program and LEED gold requirements, respectively). The CoT is now working to synchronize the TGS and Provincial stretch code cycles to further streamline the compliance process and encourage greater code uptake.

Findings

A summary of best practices for beyond-base building code implementation from the case studies is provided below. The summary is divided into three sections, which correspond to the three factors that affect beyond-base energy code implementation: roles, supports and policies.

Four Key Roles

The case studies show that four key roles are needed for successful beyond-base energy code implementation:

1. **Coordinate:** Direct implementation actions and the development of supports;
2. **Fund:** Pay for implementation supports;
3. **Incentivize:** Create effective implementation supports;
4. **Implement:** Administer implementation supports.

Each role can be filled by a variety of stakeholders, which can be categorized into five major stakeholder groups: state or provincial agencies, local governments, utilities, energy efficiency utilities and third party organizations.¹⁶ Table 6 outlines roles and corresponding major stakeholder groups as observed across case study jurisdictions.

¹⁶ Third party organizations refer to all organizations that are not a state or provincial agency, local government, utility or energy efficiency utility. An example of a third party organization is a builder's association.

Table 6 – Key Roles and Corresponding Stakeholder Groups by Jurisdiction

Key Roles and Corresponding Stakeholder Groups						
Role	Jurisdiction	Major Stakeholder Group Primarily Responsible for Each Role				
		State/Provincial agency	Local government	Utility	Energy efficiency utility	Third party
Coordinate	CA	✓				
	MA	✓				
	OR	✓				
	VT	✓				
	ON	✓				
Fund	CA			✓		
	MA			✓		
	OR			✓		
	VT			✓		
	ON			✓		
Incentivize	CA	✓	✓	✓		
	MA	✓				✓
	OR			✓		
	VT				✓	✓
	ON	✓	✓			✓
Implement	CA	✓				✓
	MA	✓				✓
	OR	✓				
	VT		✓		✓	✓
	ON	✓				✓

The case studies suggest that stakeholder groups have similar roles across jurisdictions. Government agencies are generally responsible for the coordination of implementation supports. This involves developing high-level strategic plans pertaining to energy performance in the built environment.

Local governments in the case studies are responsible for incentivizing and implementing supports by aligning state or province-wide supports with municipal development processes and regulatory tools. This provides opportunities to create additional localized supports that directly target developers in their communities. Senior governments should consider how the supports they create may work in tandem with local government regulatory tools and whether more synergies between the two levels of government are possible.

Energy and energy efficiency utilities are responsible for funding beyond-base energy code implementation in each of the case studies reviewed. Funds are often collected via rate-payer funds or a levy applied to energy usage. These taxation mechanisms are justified on grounds of avoiding expensive generation, distribution and transmission costs associated with expansion of energy supply, as well as climate-related goals to reduce GHG emissions, depending on the policy context of the jurisdiction in which the beyond-base energy code is being implemented.

In the case studies, third party development organizations and building-sector associations are generally involved in developing and/or delivering training to building professionals. These organizations often partner with regional or national non-profit organizations when doing so.

The total number of stakeholder groups involved in code implementation varies across jurisdictions. Additional stakeholder groups are involved in the implementation of the beyond-base energy code in each jurisdiction.

Seven Types of Supports

The case study jurisdictions have developed supports in order to address barriers to code implementation. Therefore, analyzing the supports provides an evidence-based method for anticipating implementation barriers in other jurisdictions. Seven types of barriers, and corresponding support categories, were identified in the case studies.¹⁷ The seven barriers, and how they can be addressed using supports, are:

1. **Administration:**
Barrier – A lack of coordination to move towards common energy performance goals within the decentralized, multi-stakeholder new buildings energy sector.
Support – Provide leadership and coordination to achieve targeted energy performance outcomes for new buildings.
2. **Communication:**
Barrier – Low levels of stakeholder awareness, or inaccurate understanding, of the beyond-base energy code program and supports.
Support – Increase stakeholder awareness of the beyond-base code program and supports.
3. **Finance:**
Barrier – Higher capital costs of constructing high energy performance buildings.
Support – Decrease the financial costs of building high energy performance buildings.
4. **Research and development:**
Barrier – Limited choices for high performance building design and technology.
Support – Promote innovation in building design and technology.
5. **Knowledge:**
Barrier – Concentration of knowledge about planning and developing high energy performing buildings within an isolated group of professionals.
Support – Diffuse knowledge by encouraging networking between professionals and other stakeholders.
6. **Compliance tools:**
Barrier – Complicated compliance processes.
Support – Simplify and streamline code compliance processes.
7. **Training:**
Barrier – Inconsistent capacity amongst building professionals and trades to build high energy performance buildings.
Support – Provide builders and trades with education and skills training.

This list provides a support typology that can be used to characterize beyond-base energy code supports.¹⁸ Categorizing supports in this way can help identify gaps within a particular jurisdiction.

¹⁷ These support categories were identified inductively, by reviewing existing stretch code implementation supports.

¹⁸ Supports are multi-dimensional and may fit into multiple categories in the typology. For the purposes of this report, supports were categorized based on their intended outcome, which was determined using the researchers' discretion.

Additionally, analyzing supports developed within each support category in different jurisdictions provides a way to compare alternative solutions to the same types of barriers.

Table 7 provides a summary of the supports provided by each of the five jurisdictions and categorizes according to the seven support types listed above.

Table 7 – Beyond-base Code Supports by Jurisdiction and Support Category

Jurisdiction	Support category						
	Administration	Communication	Finance	Research & development	Knowledge	Compliance tools	Training
CA	<ul style="list-style-type: none"> - Long Term California Energy Efficiency Strategy - Energy Code Ace 	<ul style="list-style-type: none"> - Statewide Local Government Energy Efficiency Best Practices Coordinator - Code Standards Hotline 	<ul style="list-style-type: none"> - California Statewide Codes and Standards Program - Savings by Design - Energy Efficiency Finance Program 	N/A**	<ul style="list-style-type: none"> - Statewide Energy Efficiency Collaborative 	N/A**	<ul style="list-style-type: none"> - Online Self-study
MA	<ul style="list-style-type: none"> - Massachusetts 3-Year Energy Efficiency Plan - Mass Save 	N/A**	<ul style="list-style-type: none"> - Green Communities Program - Massachusetts Residential New Construction Program 	N/A**	<ul style="list-style-type: none"> - Green Communities Program 	N/A**	<ul style="list-style-type: none"> - Massachusetts Energy Code Training
OR	<ul style="list-style-type: none"> - Oregon Ten Year Energy Plan - Energy Conservation Bill 2801 	N/A**	<ul style="list-style-type: none"> - Utility Integrated Resource Planning Savings 	<ul style="list-style-type: none"> - Oregon Built Environment and Sustainable Technologies Center 	N/A**	N/A**	N/A**
VT	<ul style="list-style-type: none"> - Vermont: Vermont Triennial Plan - Energy Code Assistance Centre - Online chat 	<ul style="list-style-type: none"> - Act 250: Required demonstration projects - Targeted stakeholder outreach - Voluntary residential building energy label 	<ul style="list-style-type: none"> - Commercial New Construction incentive - Residential New Construction incentive - Multifamily New Construction incentive 	<ul style="list-style-type: none"> - Act 89: Required Energy Certificates 	<ul style="list-style-type: none"> - Energy consultants 	<ul style="list-style-type: none"> - Design Checklist for Multifamily Housing - REScheck 	<ul style="list-style-type: none"> - Energy Code Handbook - Training
ON	<ul style="list-style-type: none"> - Ontario Long Term Energy Plan - <i>LEED supplement*</i> - <i>Better Building Partnership*</i> 	<ul style="list-style-type: none"> - 10-year notice of stretch code standards - Community Conservation Awards 	<ul style="list-style-type: none"> - New Home Construction incentive - <i>Development Charge Refund*</i> 	<ul style="list-style-type: none"> - <i>Toronto Atmospheric Fund*</i> 	N/A**	N/A**	N/A**

*Supports only available in the City of Toronto.

** Supports in this category may be available in the jurisdiction but are not provided by a state-level actor

Six Key Policies

Findings from the case studies suggest that implementation approaches vary widely depending on existing conditions in the jurisdiction where a beyond-base energy code is being introduced. However, six high-level policies for successful code implementation are evident across the jurisdictions:

1. **State-wide/Province-wide energy efficiency plan;**
2. **Predictable code change standards and cycles;**
3. **Centralized administration of supports;**
4. **Ongoing stakeholder engagement;**
5. **Utility funding;**
6. **Integration with existing programs and resources.**

These policies can guide decision makers responsible for developing implementation plans for beyond-base energy codes in other jurisdictions. Each policy is discussed in greater detail below.

1. Energy efficiency plan

Each of the five jurisdictions has developed a state or province-wide plan for energy efficiency.¹⁹ These documents commit to energy performance targets, provide a roadmap for meeting the targets, and point to complimentary state resources. By embedding the beyond-base energy code as an action item in a statewide plan, the government can direct and coordinate state agencies and local governments, who play a key role in code implementation. Inclusion of the code in a high-level plan also increases confidence in the initiative, which helps mobilize non-state actors. Overall, the creation of a state or province wide vision for energy efficiency can help anchor a beyond-base code program.

2. Predictable code change standards and cycles

Beyond-base energy code programs require parties involved in planning and development to get accustomed to new practices and procedures. In order to facilitate a smooth transition, most of the jurisdictions were transparent about standards and processes as soon as possible. Ontario excelled in this regard by providing ten years of foresight about its code standards and cycles.

3. Centralized administration of supports

Beyond-base energy code supports require administration so that they can be delivered to stakeholders efficiently and effectively. Supports were administered independently by the party responsible for developing the support, or by a central agency responsible for administering all energy efficiency initiatives within a jurisdiction, including beyond-base energy code supports. Establishing a central administrative organization has a number of benefits, including better alignment and coordination between supports, better access to supports, as well as cheaper, more efficient administrative processes over the long-term.

4. Ongoing stakeholder engagement

Data about stakeholder groups is required to develop and maintain effective implementation of beyond-base codes. Insights on stakeholder groups' interests are complex and context specific. Most of the

¹⁹ Ontario: Ontario Long Term Energy Plan; California: Long Term California Energy Efficiency Strategy; Massachusetts: Massachusetts 3-Year Energy Efficiency Plan; Oregon: Oregon Ten Year Energy Plan; Vermont: Vermont Triennial Plan.

jurisdictions conduct ongoing engagement with a wide range of local groups to identify relevant stakeholders, understand their interests and find opportunities to leverage common interests.

The value of ongoing engagement is evident from the stretch code implementation experience in Vermont, where the development of stretch-level buildings has increased as uptake of voluntary residential building energy labels increased after Efficiency Vermont engaged with state realtors, an unexpected ally for stretch code implementers.^{xvii} Efficiency Vermont would not have realized the potential of partnering with realtors had the organization not had the mandate and resources to engage in extensive ongoing public engagement. In 2012, the organization engaged over 75 stakeholder groups.^{xviii} Each interaction provides an opportunity to realize common interests and leverage synergies.

5. Utility funding

Utilities play a key role as the primary funders of beyond-base energy code implementation supports in every case study jurisdiction. Energy efficiency program spending in the jurisdictions in 2014 ranged from \$50,400,000 in Vermont to \$1,579,500,000 in California.^{xix} In comparison, in 2015 approximately \$180,000,000 was spent on DSM's in B.C.^{xx} The amount of financing allocated for stretch code supports in our province should match the level of ambition of energy performance targets for new buildings.

Utilities are uniquely positioned to fund stretch code implementation supports, as well as other energy efficiency initiatives, because they incur high capital costs when they need to invest in additional energy generation, transmission and distribution infrastructure. Beyond-base codes may relieve infrastructure costs if increased energy efficiency reduces overall demand enough to mitigate expansion projects.

Additionally, the utilities' large customer base and regular income stream provides an opportunity to collect large amounts of financial capital through nominal user fees and taxes on a regular basis. This kind of stable long-term financing is needed for ongoing development and administration activities required for effective beyond-base energy code implementation. Sudden decreases in funding for implementation of a beyond-base energy code or other DSM's, such as the decrease in ICE Funds experienced in B.C. in 2010, threaten a progress towards energy performance goals.²⁰ Vermont has been able to secure stable funding for Energy Vermont to conduct stretch code related work through a levy on energy usage administered by utilities.

6. Embed incentives into existing programs and resources

Jurisdictions that embed beyond-base energy code supports into existing energy efficiency programs can increase code uptake by leveraging past investments. Additionally, this can increase code uptake by targeting groups that have already expressed an interest in other energy efficiency initiatives. For example, the CoT established a Memorandum of Understanding with the Canada Green Building Council to align the performance measures for LEED certification and the municipal stretch code. Doing this allowed builders who were already interested in developing a LEED certified building add value to their project by increasing performance to meet stretch code levels. If they did so successfully, they could acquire LEED certification while also receiving a discount on the DCC they are required to pay to the municipality.

²⁰ Amendments to B.C.'s Provincial Sales Tax in 2010 decreased annual funding for the ICE Fund by more than 70%, from approximately \$24 million annually to approximately \$7 million annually. For more information, see [Provincial Sales Tax Bulletin: Energy, Energy Conservation and the ICE Fund Tax](#).

These six key policies align with the requirements for successful stretch code implementation in B.C. developed by the Stretch Code Implementation Working Group (SCIWG). The relationship between the six key policies and the SCIWG requirements is summarized in Appendix B. The overlap between these two sets of criteria for successful beyond-base energy code implementation suggests the findings from this report are applicable to stretch code implementation in B.C.

Assessing the Potential for Successful Stretch Code Implementation in B.C.

Existing Stretch Code Stakeholders and Supports

Four provincial entities currently provide supports that could be used to aid the implementation of the proposed stretch code in B.C., including the Ministry of Energy and Mines (MEM); the Ministry of Community, Sport and Cultural Development (MCSD); BC Hydro; and Fortis BC. Supports provided by each of these parties are summarized in Table 8.

Table 8 – Existing Stretch Code Supports in B.C.

Existing Stretch Code Supports in B.C.		
Provider	Support	Description
MEM	Innovative Clean Energy (ICE) Fund	Supports economic growth in industries related to clean energy, environmental protection and making GHG reductions. Past projects have focused on research and development and professional training for advancement in these areas.
MCSD	Climate Action Revenue Incentive Program (CARIP)	Supports community projects that decrease GHG emissions in B.C. Climate Action Charter signatories' jurisdictions.
BC Hydro	Sustainable Communities Program	Supports community projects that result in energy savings through the provision of Community Energy Managers, community energy and emissions planning services, local area plan development and project implementation.
	New Construction Program*	Design support for large buildings with the potential for energy savings of at least 50,000 kWh's per year.
Fortis BC	New Home Construction Program*	Financial incentives for residential buildings that meet prescriptive or performance energy requirements. ²¹

* The New Construction Program and New Home Construction Program are now offered jointly by BC Hydro and Fortis BC under the Energy Star® for New Homes Program

Existing stretch code supports in B.C. can be organized into the seven support types, outlined above, to identify gaps in the province's implementation approach. Table 9 organizes the existing stretch code supports by support type.

A review of the distribution of existing supports in B.C. reveals significant gaps compared to leading beyond-base energy code jurisdictions in North America. The current implementation approach does not address the spectrum of barriers that should be anticipated given other jurisdictions' experiences.

²¹ Prescriptive requirements involve installation of high-efficiency natural gas appliances and incentives range between \$100 and \$1000 per installation. Performance requirements involve increasing efficiency at least 20 per cent above base code levels to achieve the ENERGY STAR for New Homes Standard or an EnerGuide rating of 82 or above for laneway homes. Incentives for energy performance range from \$250 to \$2000 per unit.

Table 9 – Existing Supports for the Proposed B.C. Building Stretch Code by Support Type

Jurisdiction	Support Type						
	Administration	Communication	Finance	Research & development	Knowledge	Compliance tools	Training
B.C.	N/A**	N/A**	<ul style="list-style-type: none"> - ICE Fund - CARIP - New Home Construction Program - New Construction Program 	<ul style="list-style-type: none"> - High Performance Window Research and Development Program* - Post-Secondary Clean Energy Partnership Program* 	N/A**	<ul style="list-style-type: none"> - B.C. EnerGuide Transition Project* - Commercial Building Energy Code Compliance Checklist Project* 	<ul style="list-style-type: none"> - Passive House Training Incentive* - High Performance Home Builders Training Incentive*

* Short-term supports proposed for 2016 to 2020.

** Supports in this category may be available but are not provided by a state-level actor.

Currently, the majority of supports available in B.C. focus on addressing financial barriers to increased energy performance in new buildings. For example, funds for the New Home Construction Program and the New Construction program provide financial incentives for builders to pursue energy efficiency in their projects. Similarly, in recent years the ICE Fund has been used to support short-term research and development, compliance tools and training projects.^{xxi}

Administration, communication and knowledge supports are not currently available to support the implementation of a stretch code in B.C. Experiences in the case study jurisdictions suggest that effective code implementation requires soft supports, particularly administration and communications supports. These two support categories are critical for coordinating the overall implementation program.²² Additionally, they maximize the effectiveness of all the supports in the other support categories. For example, training supports may become more effective if communication and administration supports are used to leverage access to the training supports. Solely focusing on financial supports will likely result in a more expensive and less effective implementation program, which does not maximize the investments made in stretch code implementation.

Specific gaps in each support category are discussed further below.

²² Soft supports provide intangible value to stretch code implementation, without a clear outcome or benefit. Soft supports generally refer to supports in the administration, communication and knowledge support categories.

Administration:

The province is missing basic administrative supports that have been critical to beyond-base code implementation in all of the case study jurisdictions. Province-wide leadership is needed to create a common vision for energy performance in buildings and provide direction for moving towards the vision.

There is also no designated administrative lead to align existing stretch code supports. This is especially important in B.C., where multiple government agencies and utilities have developed supports with different compliance requirements and processes, which may make supports difficult for stakeholder to access.

Communication:

The complexity of the proposed four-tier stretch code in B.C. makes clear communication of stretch code standards, cycles and resources especially important. Currently, stretch code information is located in multiple locations, as the content has been developed by multiple government ministries and agencies. This information should be reorganized in a central location so that it is more accessible.

Finance:

Financial supports in B.C. are currently used to fund short-term research and development, compliance tools and training programs. A reliable source of funding for ongoing supports soft supports, particularly administration, communication and knowledge supports, is needed. The case studies demonstrate that secured funding should be matched on an ongoing basis and provide examples of regulatory mechanisms that can be used to secure these funds.

Funding for energy efficiency initiatives, including beyond-base energy code implementation, in the case study jurisdictions ranged from approximately \$50 million in Vermont, to over \$1.5 billion in California, in 2014.^{xvii} This range should be used to inform the appropriate levels of funding for B.C.

Research and Development:

The province needs to establish a mechanism for collecting energy performance data for new buildings to aid evidence-based decision making in the future. Vermont provides an example of how this can be done by integrating energy reporting into the compliance process with its mandatory Energy Certificates. Energy performance data will be especially valuable to the Province in the first few years of stretch code implementation in B.C., as adjustments are being made to the code and its implementation supports.

Knowledge:

There is currently no strategy in place for diffusing stretch code knowledge and best practices throughout B.C. Other leading jurisdictions, including California, Oregon and Vermont, have established formal spaces and processes to encourage networking between stakeholder groups to ensure knowledge sharing continues to drive innovation and code uptake.

Compliance tools:

There are no stretch code compliance tools available in B.C. at this time. These tools will be required to ensure that stakeholders feel confident pursuing the stretch code on a voluntary basis.

Training:

Currently, educational stretch code materials have not been integrated into existing building professional training programs. This is a common strategy for ensuring that future professionals have

the skills and experience to build stretch-level buildings. A strategy for training present-day builders is also necessary.

Recommendations: Addressing Needs for Stretch Code Implementation in B.C.

Based on the gaps in existing B.C. stretch code supports and leading practices in the five case study jurisdictions, this report recommends that the province take the following actions in each support category²³:

Administration:

1. Develop a High Performance Building Goal and Strategy.

Province-wide direction on energy use in new buildings is needed, including energy performance targets and steps for stakeholders to take to meet these targets. Strategic plans are currently used to coordinate beyond-base code implementation in all of the case study jurisdictions. The Long Term California Energy Efficiency Strategy provides an exceptional example, featuring a 20+ year planning horizon with milestones in five action areas aligned with state supports and resources.^{xxiii}

2. Centralize the administration of stretch code supports.

The alignment, consistency and accessibility of supports in B.C. needs to be improved. Mandating a single organization to administer stretch code supports is an efficient and cost-effective way to align supports while ensuring consistency and accessibility. Mass Save and Efficiency Vermont provide leading examples for managing the administration of supports.²⁴

Communication:

3. Clearly communicate stretch code standards and cycles.

A predictable regulatory environment is needed to enable stakeholders to plan for stretch code compliance. Ontario has accomplished this through its rolling code schedule. This model should be adopted in B.C. to provide transparency and goodwill amongst stretch code stakeholders.

4. Host all stretch code information and resources on one communication platform.

Information and resources on stretch code supports in B.C. is not easily accessible. A central location for these materials is needed to increase accessibility and consistency of stretch code information and resources. An online portal, such as California's Energy Code Ace, is an effective way of providing information to stakeholder and the public at large.²⁵

5. Conduct ongoing stakeholder engagement.

Stakeholder engagement is needed to increase stretch code awareness and encourage uptake; to understand jurisdiction-specific barriers to implementation and develop corresponding supports; and to monitor, evaluate and adapt stretch code supports for long-term success. Efficiency Vermont provides leading practices for engagement with a wide range of interest groups and demonstrates the value of investing in regular engagement activities.

6. Celebrate stretch code leadership and success.

Regular acknowledgment of stretch code leadership and successes can increase code awareness and encourage uptake, maximizing the return on implementation investments. The

²³ Some of the recommendations have already been identified as action items to be implemented between 2016 and 2020.

²⁴ More information on [Mass Save](#) and [Efficiency Vermont](#).

²⁵ More information on [Energy Code Ace](#).

Massachusetts Green Communities Division demonstrates how communications can be used strategically to leverage competition between communities to increase stretch code uptake.

Finance

7. Increase the level of reliable funding available for stretch code implementation.

Steady and reliable funding is needed to support the ongoing implementation of beyond-base energy code supports. All of the case study jurisdictions use rate-payer funds or an energy consumption levy to fund part of their energy efficiency programs, which range in value from \$50 million to over \$1.5 billion.^{xxiv} Similar taxation mechanisms, such as the ICE Fund Tax, are available in B.C. and could be expanded based on leading taxation practices, such as the Electric Program Investment Charge (EPIC) in California.²⁶ Other reliable funding sources, such as carbon tax revenues, could also be used to fund stretch code implementation, as is the case with the Green Communities Program in Massachusetts.

8. Tailor financial supports to target particular stakeholder groups' implementation challenges.

Limited financial resources will require B.C. to develop cost effective financial incentives to encourage stretch code uptake. This can be done by offering smaller incentives that address particular stakeholder group barriers. For example, Efficiency Vermont distinguishes its residential and multifamily new construction incentives based on particular capital cost barriers for each typology. By investing in engagement to gain a deep understanding of development barriers, they were able to develop incentives that are both effective and fiscally responsible.

Research and Development

9. Integrate verification into the stretch code compliance process.

A province-wide database of energy performance in new buildings is needed to monitor stretch code progress and inform future code standards. The government of Vermont compiles this data by requiring local governments to issue Energy Certificates for all new buildings. In order to receive an Energy Certificate, builders must provide city staff with a building energy performance model. The B.C. government could establish similar requirements and use the data for research and planning purposes.

10. Offer industry and community grants on a competitive basis.

To drive innovation in building design and technology, more competition should be introduced within stakeholder groups involved in building stretch code buildings. This can be done by tying funding opportunities to competitive selection processes. For example, Massachusetts guarantees annual competitive grants to Green Communities. This funding opportunity has encouraged local governments to prioritize innovation in community projects.

Knowledge

11. Create a space for knowledge sharing between stretch code stakeholder groups.

Knowledge transfer between energy professionals and other stretch code stakeholder groups can be encouraged by creating spaces for networking between these groups. California, Vermont and Oregon have done this by creating a formal space for knowledge sharing.²⁷ This

²⁶ More information on the [Electricity Program Investment Charge](#) (EPIC).

²⁷ California: Statewide Energy Efficiency Collaborative; Vermont: Energy Assistance Centre; Oregon: Oregon Built Environment and Sustainable Technologies Center.

could be replicated in B.C. with the establishment of a centre of excellence for green buildings, which would also help establish the province as an international leader in green technology.

Compliance tools

12. Develop stretch code compliance tools to guide and simplify the compliance process.

In leading jurisdictions, the transition to new beyond-base energy code compliance processes is aided by instructional materials and resources. Efficiency Vermont has developed a suite of tools, including a Design Checklist for Multifamily Housing and REScheck, a self-verification program, to guide stakeholders through the compliance process.

Training

13. Integrate stretch code training into existing training programs where possible.

Providing building professionals with stretch code training is critical for successful implementation. Leading jurisdictions aim to integrate beyond-base energy code training into existing training programs for relevant building professionals. This is a cost effective method of diffusing stretch code training.

14. Provide open access to stretch code training to all interested parties.

California goes beyond providing stretch code training for building professionals by extending access to training materials to interested parties online, via Energy Code Ace. This provides additional value by increasing the reach of educational materials and potentially educating a wider range of stakeholder groups on the stretch code.

Table 11 illustrates existing and recommended supports for the proposed B.C. building stretch code by support type.

Table 10 – Existing and Recommended Supports for the Proposed B.C. Building Stretch Code by Support Type

Jurisdiction	Support Type						
	Administration	Communication	Finance	Research & development	Knowledge	Compliance tools	Training
B.C.	<ul style="list-style-type: none"> - High performance building strategy - Central organization responsible for administering supports 	<ul style="list-style-type: none"> - Central website - Community Leadership Awards - Voluntary Residential Building label - Plaque on all tier-3 and tier-4 buildings - Ongoing targeted stakeholder engagement 	<ul style="list-style-type: none"> - Energy sales tax (~\$24,000,000/year)²⁸ - <i>Innovative Clean Energy (ICE) Fund*</i> - <i>Climate Revenue Incentive Program (CARIP)*</i> - <i>Energy Star® for New Homes Program*</i> 	<ul style="list-style-type: none"> - Competitive stretch code research and development grant - Required verification 	<ul style="list-style-type: none"> - BC Green Buildings Centre of Excellence 	<ul style="list-style-type: none"> - Self-verification software 	<ul style="list-style-type: none"> - Best practices for builders - Best practices for trades - Integrate stretch code into existing program curriculum - Stretch code training webinars - Encourage local governments to require builders to self-verify new buildings

* Existing supports for the proposed B.C. building stretch code.

Enacting the recommendations put forward would increase the types of stretch code supports available in B.C. from four to seven support categories. This would result in a more holistic implementation approach that proactively anticipates code implementation barriers that have been experienced in five other beyond-base energy code jurisdictions in North America.

The majority of recommended supports fall within the training, communication and administration support categories, referred to as soft supports, as these are not currently available in B.C. These soft supports are critical for coordinating and bringing awareness to stretch code supports. Based on case study observations, they also maximize investments that are made in finance and research and development supports, without adding to the cost of implementation. Consequently, enacting the recommendations in these areas will likely provide a more effective and cost-efficient implementation strategy.

²⁸ Anticipated funding is based on annual ICE Fund Tax revenue generated prior to amendments to the Provincial Sales Tax in 2010, which decreased annual funding by more than 70%. For more information, see [Provincial Sales Tax Bulletin: Energy, Energy Conservation and the ICE Fund Tax](#).

Conclusion

A new approach to regulating energy performance in new buildings in B.C. is necessary given the introduction of the Building Act. The proposed B.C. building stretch code provides a means of ensuring local governments can continue supporting innovation in energy efficient building design and technology within this new policy framework.

Incentivizing voluntary uptake of the stretch code will require supports to be established by the provincial government, as has been done in other leading beyond-base code jurisdictions. The establishment of supports is important given that the stretch code is a voluntary measure. Provincial leadership in providing consistent supports is critical, as the code is a province-wide initiative that will require collaboration between a number of provincial ministries and other provincial-level actors.

This report's review of supports for beyond-base energy code implementation in California, Massachusetts, Oregon, Vermont and Ontario provides a number of findings that can inform the development of a successful implementation strategy for the proposed B.C. stretch code. The seven common barriers to implementation that were identified, which include administration, communication, finance, research and development, knowledge, compliance tools and training, should be addressed in the province's implementation strategy to support successful stretch code implementation.

A comparison of supports in the case study jurisdictions with those currently available in B.C. highlights a number of gaps in existing stretch code supports in our province. There is a noticeable absence of soft supports, particularly administration, communication and knowledge supports. Insights from the case studies suggest that these types of supports are critical for effective beyond-base code implementation, as they help coordinate implementation and ensure initial voluntary uptake, leverage investments made in other support categories, and increase code uptake over time, ensuring long-term success. Consequently, seven of the fourteen recommendations for successful stretch code implementation in B.C. put forward in the report relate to the administration, communication or knowledge support categories.

This report only provides an initial high-level analysis of the resources needed to support the successful implementation of a stretch code in B.C. Further research is needed to gain a deeper understanding of the strengths and weaknesses of specific supports in each support category. Different jurisdictions have addressed barriers to beyond-base code implementation in different ways. To date, there has been little comparison between these alternative solutions. Analysis of these alternatives can provide lessons to further inform the development of beyond-base building code implementation strategies.

Beyond-base building codes are an increasingly popular tool for encouraging the development of green buildings with higher energy performance and other sustainability-oriented benefits. Understanding the complex policy environments that encourage uptake of these codes is an integral part of moving towards a more sustainable built environment.

Appendix A: Detailed List of Key Province and State Supports by Jurisdiction

California Title 24:

Public and Investor Owned Utilities²⁹

California Statewide Codes and Standards Program: The program supports stretch code development and compliance enhancement measures, in addition to other building code related initiatives. It is funded by utility customers through the Electric Program Investment Charge (EPIC) collected by the California Public Utilities Commission (CPUC).

Savings by Design: Provides builders and their design teams with access to a range of services, including design assistance, design team incentives (up to \$50,000, plus an extra \$5,000 stipend for early collaboration) and owner's incentives (up to \$0.40 per annualized kWh and \$1.00 per annualized thermal savings), to develop energy efficient projects. The maximum total incentive per project is \$150,000.

Statewide Energy Efficiency Collaborative: Provides technical support for climate action planning and reducing energy use to a range of stakeholders upon request. The collaborative is a centre for excellence and serves as a platform for knowledge sharing and peer-to-peer networking. It is funded by California's investor owned utilities and administered by three statewide non-profit organizations.

California Energy Commission

Code Standards Hotline: Provides information about California's energy efficiency standards and Title 24, Part 6 to callers at any time.

Energy Code Ace: An online portal that includes stretch code fact sheets, trigger sheets, checklists and other resources to simplify compliance with the building code.

Energy Efficiency Finance Program: Provides 0% financing and 1% loans for specific projects that exemplify leadership in energy performance.³⁰ Only projects that demonstrate energy or demand cost savings are eligible.

Online Self-study: Courses on Title 24, Part 6 energy standards and requirements available online to anyone who registers for an Energy Code Ace account, which is available free of charge.

Statewide Local Government Energy Efficiency Best Practices Coordinator: A human resource devoted to supporting local governments work towards the five goals of the California Long-Term Energy Efficiency Strategic Plan. The Coordinator is responsible for developing case studies of local government energy efficiency best practices, creating platforms and resources to share best practice adoption with

²⁹ Investor owned utilities (IOU's) in California include: Pacific Gas and Electric (PG&E), Southern California Edison (SCE), Southern California Gas (SoCal Gas), and San Diego Gas and Electric (SDG&E), and Southwest Gas Corporation (SWG).

³⁰ Institutions eligible for the program include: cities, counties, special districts, public colleges or universities, public care institutions, school districts, charter schools, county offices of education, state special schools and community college districts. Eligible projects include: lighting system upgrades, pumps and motors, streetlights and LED traffic signals, energy management systems and equipment controls, building insulation, onsite energy generation (renewable and combined heat and power), heating, ventilation and air conditioning equipment, water and waste water treatment equipment, load shifting projects, such as thermal energy storage.

other local governments, and tracking statewide progress on the California Long-term Energy Efficiency Strategic Plan. They also act as a liaison between the California Energy Commission (CEC), local, investor-owned utilities and local governments.

Massachusetts Stretch Code:

Massachusetts Department of Energy Resources

Green Communities Program: Local governments that are designated as Green Communities qualify for competitive grants on an annual basis.³¹ They also have access to technical support for energy efficiency initiatives in their community from Green Communities Program Administrators.³² Program Administrators also can also help clients access Mass Save supports, if appropriate.

Mass Save: A third-party organization, established by the state government, to provide centralized administration for the state's energy efficiency supports.³³ The utility is funded through a tax on energy sales charged by local energy utilities.³⁴

Massachusetts Residential New Construction Program: Provides financial incentives for integrating energy efficiency measures into new residential buildings. Funding is provided based on prescriptive measures or energy performance. Funding for energy performance is allotted based on a three tier scale, relative to the base building code. The value of funding ranges from \$275 to \$7,000 per unit.

Board of Building Regulations and Standards (BBRS) and the Department of Energy and Resources

Massachusetts Energy Code Training: The BBRS and Department of Energy and Resources are required by law to develop energy code training content. The content is packaged and delivered to building professionals by Mass Save, the state's energy efficiency utility.³⁵ Training is available in a classroom setting or online. The courses are free for all Massachusetts code officials. Others interested in enrolling

³¹ Annual grants are funded through the state's carbon tax, which takes the form of a cap and trade system. Revenues are allocated to the Green Communities Program by state legislation, providing assurance to local governments about the sustainability of grant funding.

³² Designation as a Green Community requires meeting five criteria, as follows:

1. Provide as-of-right siting (no zoning required) in designated locations for renewable/alternative energy generation research and development, or manufacturing facilities;
2. Adopt an expedited application and permit process for as-of-right energy facilities;
3. Establish an energy use baseline and develop a plan to reduce energy use by 20% within five years;
4. Purchase only fuel-efficiency vehicles;
5. Set requirements to minimize life-cycle energy costs for new construction.

One way to meet requirement number five is to adopt the stretch code. If the community chooses not to adopt the stretch code they must provide an alternative method for ensuring life cycle energy costs for all new construction that are equivalent to that delivered by the stretch code.

³³ Most of Mass Save's supports for new buildings target developers directly, as opposed to local governments. However, local governments are able to access Mass Save funding where appropriate for two years after becoming designated as a Massachusetts Green Community.

³⁴ Massachusetts utilities that provide financial support for Mass Save include Berkshire Gas Company, Blackstone Gas Company, Cape Light Compact, Columbia Gas of Massachusetts, Eversource, Liberty Utilities, National Grid, and Unitil.

³⁵ The Green Communities Act requires the Board of Building Regulations and Standards and the Department of Energy and Resources to develop specific energy efficiency training and certification for all local code officials.

in the course may do so for \$20. All of the educational materials that are created are also distributed to all regional code staff.

Oregon Reach Code:

Oregon Public Utility Commission

Utility Integrated Resource Planning Savings: The Public Utilities Commission (PUC) recognize energy efficiency measures in new buildings as least-cost energy planning measures, which reduce the cost of meeting increasing energy demand over time. Utilities have a legal obligation to participate in least cost planning; therefore, builders who integrate energy efficient design and technologies into their projects provide value to utilities. Utilities compensate builders by providing financial returns on projects, based on calculated energy demand savings.

Department of Consumer and Business Services

Energy Conservation Bill 2801: Outlines the energy assessment process, Home Energy Assessor licensing requirements and preferred energy performance scoring systems. The Bill endorses three in-market scoring systems, including the USDOE Home Energy Score, RESNet Home Energy Rating System and Energy Trust of Oregon Energy Performance Score.³⁶

Business Oregon

Built Environment and Sustainable Technologies Center (BEST): An independent, non-profit organization established by the Oregon legislature that provides research and development support to Oregon businesses in the sustainability sector. The center helps bring innovative sustainability-oriented technologies to market by providing research facilities to industry, as well as research grants to scale-up pilot projects to commercial scales. Funds are provided by the economic development agency.

Vermont Stretch Code:

Agency of Natural Resources

Act 250: Provides the Vermont Department of Public Service (DPS) with the authority to regulate development in nine District Environmental Commissions located within the state.³⁷ The DPS has adopted the state stretch code as its base-code, which means that developments in these areas must adhere to the stretch code.

Vermont Department of Public Service

³⁶ While scoring homes remains voluntary, the Bill encourages home owners to do so when selling by suggesting a higher property value for more efficient homes. The expectation is that as values are documented, scoring will become more commonplace and the market will support a mandatory, time-of sale score.

³⁷ Act 250 gives the DPA the ability to permit or deny developments located in a District Environmental Commission's area if they meet any of the following criteria: are more than 10 acres in size; more than 1 acre in size for towns that do not have permanent zoning and subdivision bylaws; have more than 10 housing units or housing lots; construction proposed above 2,500 feet of elevation.

Act 89: Requires local governments to obtain an Energy Code Certificate prior to issuing a Building Occupancy Permit.³⁸ Additionally, local governments must provide builders with information on the stretch code upon request for a building or zoning permit.³⁹

REScheck: Software that enables builders to verify compliance with Vermont's building code. The software is publicly available on the DPS' website.

Efficiency Vermont

Commercial New Construction: An Efficiency Vermont Energy Consultant is available to facilitate the development of new commercial buildings. The Energy Consultant can provide technical assistance, design support, financial incentives for energy efficient equipment and performance-based financial incentives on a negotiated basis.

Design Checklist for Multifamily Housing: Lists prescriptive measures that builders can take to increase the energy efficiency of their projects. Rebates between \$500 and \$1000 per unit are offered for complying with prescribed measures.

Energy Code Assistance Center: Provides technical and administrative support for energy code compliance. The center is open to anyone that requires help with the state energy code.

Energy Consultants: Energy efficiency specialists employed by Efficiency Vermont that are assigned to work with builders upon request on a project by project basis. They provide technical assistance as necessary. This service is provided free of charge to the builder.

Energy Code Handbook: An energy code guide is available free of charge at the Energy Code Assistance Center and on the Efficiency Vermont website.

Multifamily New Construction: An Efficiency Vermont Energy Consultant is available to facilitate the development of new multifamily buildings. The Energy Consultant can provide administrative support and financial incentives for energy efficient equipment.

Online chat: Staff are available via an online chat service hosted on the Efficiency Vermont website to answer questions and direct clients to appropriate supports.

Residential New Construction: An Efficiency Vermont Energy Consultant is available to facilitate the development of new residential buildings. The Energy Consultant can provide administrative support, prescriptive financial incentives for energy efficient equipment, free third party verification of stretch code compliance and documentation of compliance.⁴⁰

³⁸ Energy Code Certificates document compliance with building codes and provide a reporting mechanism for the level of efficiency being met in new buildings. Builders are required to self-certify their projects in order to attain an Energy Code Certificate, decreasing the administrative burden placed on local governments while increasing knowledge of energy efficient building methods in the development community.

³⁹ All informational materials that are required to be distributed by local governments are provided by Efficiency Vermont, the state's energy efficiency utility.

⁴⁰ Verification of stretch code compliance may increase property value at the point of sale.

Targeted stakeholder engagement: Staff regularly conduct targeted stakeholder engagement with diverse groups such as builders, architects, city planners and realtors.⁴¹

Training: Training sessions based on the Energy Code Handbook are regularly delivered to building professionals, free of charge, in a classroom setting. These sessions are also available to other groups upon request.

Voluntary residential building energy label: Label for newly constructed residential buildings that communicates its level of energy performance.⁴²

Ontario Supplementary Standard:

Ontario Power Authority

Community Conservation Awards: A recognition program administered by the Ontario Power Authority (OPA), Association of Municipalities of Ontario (AMO), and the Electricity Distributors Association (EDA) that acknowledges local governments who demonstrate leadership in energy conservation at the AMO Annual General Meeting. Profiles of the award recipients and their energy efficiency achievements are published on the IESO website.

Independent Electricity System Operator (IESO) Conservation Fund: Provides grants to innovative electricity conservation pilot projects that have the potential to be scaled-up and deployed across the province. The fund rewards projects for contributing to local knowledge of energy efficient building methods, which is considered a public service. Projects supported by the fund are made publicly accessible via the IESO website. The program is funded by a levy on energy sales charged by all Ontario utilities.

saveONenergy High Performance New Construction Program: Provides funding to developers to offset the cost of energy efficient design processes and services.

saveONenergy New Home Construction Program⁴³: Provides funds to developers who demonstrate natural gas energy savings in stretch code projects. Savings may be realized using prescriptive building features or whole building design performance measures. Funding is equivalent to \$0.10 m3 of projected annual natural gas savings, to a maximum of \$30,000. The program is funded by a levy on energy sales charged by all Ontario utilities.

City of Toronto

Better Buildings Partnership (BBP): CoT staff help developers access the Ontario Power Authority's High Performance New Construction (HPNC) program by providing a liaison between developers and the Ontario Power Authority. The City also provides a fixed \$2000 incentive to offset the cost of hiring a professional design team to meet the Ontario Power Authority's program requirements.

⁴¹ Targeted stakeholder engagement provides an opportunity to educate stakeholders about the benefits of complying with the stretch code in order to increase uptake. It also provides an opportunity to identify program challenges and opportunities.

⁴² Residential building energy labels are intended to stimulate market demand for energy efficient homes.

⁴³ saveONenergy: Power What's Next is a province-wide conservation program that provides energy efficiency incentives to residential and business customers. The program is funded by Independent Electricity System Operator (Ontario Power Authority) and administered by local electric utilities.

Development Charge Refund: The CoT provides a development charge refund of approximately 20% to developers who build to Tier 2 of the Toronto Green Standard (TGS), which has a higher energy performance standard than the province.⁴⁴ The costs of providing this support are justified based on a long-term cost savings calculation, which suggests energy efficiency in buildings is more affordable than expanding energy generation, transmission and distribution infrastructure in the City.

LEED Supplement: The CoT has established a Memorandum of Understanding with the Canada Green Building Council, whereby TGS Tier 1 and Tier 2 requirements can contribute to LEED Gold certification.⁴⁵ By aligning the requirements for both supports, developers are able to acquire LEED Gold certification while also benefitting from the development charge refund offered by the City.

Toronto Atmospheric Fund: A non-profit corporation created by the CoT that manages an endowment fund financed by the sale of City-owned property in 1991. The funds are managed by a Board of Directors made up of City Councillors and citizens, who determine how to best allocate funding for initiatives that support the goals of the City's Climate and Air Quality Plan.⁴⁶

⁴⁴ The value of the development charge refund is determined using rates from the Development Charges Act. The refund has been used mostly by premium developers. The CoT has struggled to encourage other developers to take advantage of the incentive, which is valued at approximately \$500,000 per year (distributed amongst multiple projects).

⁴⁵ LEED buildings are rare in the CoT. This increases their market value. Through the LEED supplement, the City is able to leverage the value of the LEED brand to increase uptake of the stretch code.

⁴⁶ Although the Toronto Atmospheric Fund doesn't exclusively support building codes, it has played an important role in addressing GHG emissions from new buildings. For example, in 2014 the Fund published a guide for developers on how to meet the Toronto Green Standard.

Appendix B: Relationship Between Six Key Policies and the Stretch Code Implementation Working Group’s Requirements for Successful Stretch Code Implementation

The Stretch Code Implementation Working Group (SCIWG) developed a list of requirements for successful stretch code implementation in B.C. The requirements were identified by working group members, who represent a broad range of stakeholder groups. The requirements guided the development of the SCIWG report, which includes draft recommendations for stretch code implementation in B.C. to relevant provincial Ministries.

The case studies identify high-level policies for the successful implementation of beyond-base energy codes. Similarly, the SCIWG’s requirements identify outcomes necessary for successful stretch code implementation in B.C. Table 11 demonstrates the congruence between these two set of criteria.

Table 11 – The Relationship Between Six Key Policies and the EEWG Requirements for Success in B.C.

Relationship Between Six Key Policies and the EEWG Requirements for Success in B.C.	
Case Study Policy	EEWG Requirement
Vision for energy efficiency	- Clarity and consistency - Broad awareness and understanding
Predictable code change standards and cycles	- Clarity and consistency
Central administrative agency	- Clarity and consistency - Continuous learning
Stakeholder partnerships and collaboration	- Broad awareness and understanding - Continuous learning - Economic opportunity
Utility funding	- Financial sustainability
Integration into existing programs and resources	- Clarity and consistency

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