Policy Tools for Achieving Energy Efficient and Emissions Neutral Buildings in Edmonton

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Efficiency Canada
ALBERTA ecotrust | climate innovation fund
Carleton University

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Dear reader,

Please note that the research to inform this report was undertaken and synthesized beginning in late 2022 and the first three quarters of 2023.

On December 18, 2023, the Government of Alberta announced updates to the City Charters for Edmonton and Calgary. According to the provincial government, the changes were made "to help limit potential housing cost increases while still supporting the unique needs of Alberta's largest urban centres."[1]

As described by the Government of Alberta, the changes involve:

> *Off-site levies, which enable municipalities to charge developers a portion of the costs associated with servicing a new area. These changes will still allow Calgary and Edmonton flexibility but will also make sure off-site levies don't unnecessarily drive up the costs of building new homes.*
>
> *Inclusionary housing, which allows the cities to require a developer to provide money or other resources to the municipality to be used for affordable housing, is being repealed to help limit the potential for cost increases to new housing. To date, neither Edmonton nor Calgary has used this charter provision.*
>
> *Building code bylaw authority, which allows the cities to make bylaws regarding energy consumption and heat retention, is being removed to ensure there is one uniform building code standard across Alberta.*[2]

These changes, in particular the change to building code bylaw authority, impact some of the conclusions and recommendations by the report writers. In particular, it impacts the section entitled *Municipal jurisdiction with respect to neutral emission buildings: finding pathways toward regulation* as this section relies heavily on a legal interpretation of the City Charter provisions before the amendments.

While the amendments do not necessarily limit the ability for Alberta municipalities to adopt Green Development Standards, the province of Alberta has sent a clear signal that consistent application of building code requirements across jurisdictions is an important consideration for them, making the practicality of this approach uncertain in Alberta.

The authors would like to draw attention to the section on incentive-based tools for emissions-neutral buildings as the team feels as though these recommendations could still be applicable in the Alberta context, even with the most recent amendments.

Sincerely,

Report Co-Authors

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Acknowledgements

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About Community Energy Association

Community Energy Association (CEA) was founded in 2004 and received charitable status. CEA is committed to assisting local governments in reaching ambitious climate action goals and have a long history of providing research, coaching and consulting services.

About Environmental Law Centre

Environmental Law Centre (Alberta) was founded in 1982 and has a mission to advocate for laws that will sustain ecosystems and ensure a healthy environment and to engage citizens in the law's creation and enforcement. Through education and awareness, legal research services and other programs, the Environmental Law Centre is educating Albertans to be champions for the protection of our environment and society.

About Efficiency Canada

Efficiency Canada is the national voice for an energy-efficient economy. Our mission is to create a sustainable environment and better life for all Canadians by making our country a global leader in energy efficiency policy, technology, and jobs. Efficiency Canada is housed at Carleton University's Sustainable Energy Research Centre, which is located on the traditional unceded territories of the Algonquin nation. The views expressed, as well as any errors or omissions, are the sole responsibility of the authors.

Executive summary

Municipalities across Canada, including the City of Edmonton, have established a path to transition to our net-zero future by 2050. As highlighted in Edmonton's Community Energy Transition, one of the core pillars of this transition includes finding ways to optimize building energy efficiency and emissions reductions in order to achieve Edmonton's goal of emissions neutral new buildings.

With direct influence over the greenhouse gas [GHG] emissions arising from the buildings sector, 38% of the City's total emissions, Edmonton is well-positioned to accelerate the implementation of newly constructed emissions neutral buildings. Once built to a higher energy performance standard, newly constructed buildings will use much less energy and produce far fewer GHG emissions over the lifetime of the buildings. These buildings can be expected to serve the needs of Edmonton's community for decades to come, and because they are emissions neutral from the outset they can do so without the need for costly future retrofits, one of the biggest challenges to meeting community climate targets.

To meet its net zero goals, Edmonton's buildings sector will be expected to account for nearly a fifth of the municipality's overall emissions reductions. A bold emissions neutral buildings policy today, can ensure that each new building contributes to meeting the goals of Edmonton's energy transition, and enables scarce resources to be prioritized toward decarbonizing the existing 350,000 residential buildings and over 11 million square feet of commercial space that exist in Edmonton today. Retrofitting these existing buildings to achieve emissions neutral buildings by 2050[3] will require a massive effort.

Building codes typically establish the minimum acceptable standard of construction for new buildings in a given jurisdiction. Building codes, particularly the tiered framework of the 2020 national model codes, can help municipalities develop integrated policies and planning processes that holistically consider health, environmental sustainability, and economic burden.

This report finds that although the Charter cities of Edmonton and Calgary are able to establish more stringent environmental and energy conservation requirements than what exist in current building codes, for example matters of energy consumption and

heat retention, other Alberta municipalities are not able to adopt a unique building code or adopt a higher step of the provincial building codes. Nonetheless, the City is able to set emission neutral building requirements in a limited manner, these could be implemented or supported through relevant development permit application requirements and approval processes as is the case with Green Development Standards.

These policy tools may be used to bridge the gap between today's building codes, including the upper tiers of the 2020 model codes, and Edmonton's stated goal of achieving emissions neutral new construction.

About this project

This project is a collaboration with the City of Edmonton, Community Energy Association (CEA), Efficiency Canada and the Environmental Law Centre (ELC). The project aligns with the City of Edmonton's *Energy Transition Strategy* by addressing the critical need to decarbonize new construction in order for Edmonton to reach its climate targets.

Authors

Brenda Heelan Powell & Jason Unger – Environmental Law Centre
Kevin Lockhart – Efficiency Canada
Robyn Webb – Community Energy Association

The project explores the use of regulatory tools and incentive structures that could be utilized by the City of Edmonton to reduce emissions in new construction.

These tools included:

- Regulatory tools, such as Green development standards;
- Incentive based tools, like rezoning and density bonus policies;
- Education and awareness tools, such a voluntary sustainability checklists.

The project team interviewed staff from a range of municipalities across Canada to better understand how these policies are being used by other jurisdictions and to transfer learnings to City of Edmonton staff and Council. The project team also analyzed challenges and barriers, such as legal authority, to implementation of advanced policies related to newly constructed buildings in the Alberta context. This was one of the major considerations addressed by this project with the ELC contributing a legal opinion on the validity of the various tools from rezoning policies to green development standards in the Alberta context.

While the primary audiences for this report are City of Edmonton elected officials and administration, the results will be of interest to Alberta's municipalities large and small, environmental NGOs, the green construction sector and to citizens who are concerned about climate change and want to see the City of Edmonton implement effective solutions to reducing emissions in new buildings.

The global and national imperative for action

The City of Edmonton, alongside other Canadian municipalities, is on the front lines of extreme weather events such as heat domes, forest fires, flooding, or drought. With limited resources, those same municipalities are the front line in mitigating and responding to these events, hardening existing infrastructure to enhance community resilience, all while continuing to provide basic services and social infrastructure.

Local governments across Canada are also leading the execution of several international, national and provincial commitments. Each of these commitments demonstrate an increasingly prominent role for municipalities as leaders in climate action. Municipalities such as Edmonton can heed these signals and leverage their smaller geographic jurisdiction through responsibility for land use and building code enforcement activities with advanced capacity to act as a catalyst for energy efficiency, emissions reductions, and climate change resilience innovation. In doing so, these municipalities can enhance the resilience of building occupants and the community, redirect energy savings towards more productive uses, and capture new opportunities for growth in local low carbon jobs.

Zero Carbon Step Code Introduced in BC

Similar to the leadership BC showed in creating the BC Energy Step Code, the province recently announced the Zero Carbon Step Code (ZCSC) and has yet again allowed local governments to accelerate in advance of the provincial adoption timeline. Leading municipalities in BC such as the District of Saanich and City of Victoria have adopted ZCSC and will be requiring all new construction within their boundaries to be zero emissions by 2024.

Edmonton must use the full-suite of tools to fulfill the energy transition strategy

Building codes are one of the key tools that the City of Edmonton can use to quickly reduce energy waste and building emissions in the built environment. Applied at the municipal level, stringent building codes or municipal construction standards such as

green development standards, can act as a key accelerant that prepares the building sector and the workforce to deliver high-performance buildings.

Alberta's municipalities

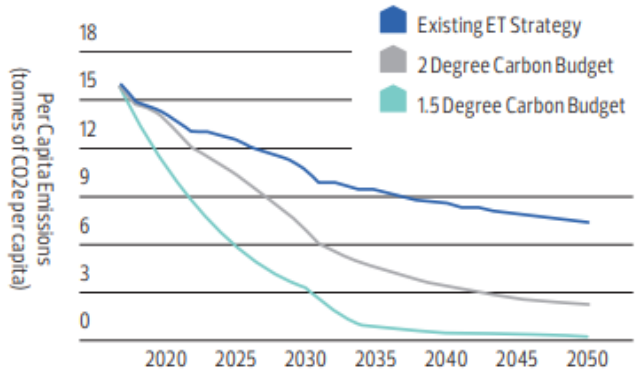
Although the Charter cities of Edmonton and Calgary are able to establish more stringent environmental and energy conservation requirements than current provincial building codes, other Alberta municipalities are not able to adopt a unique building code or adopt a higher step of the provincial building codes. As a result, these municipalities are instead limited to moral suasion/incentives such as informational campaigns, permitting incentives, and other voluntary measures to encourage energy and emissions reductions from the building sector.

Alignment with Edmonton's goals

Energy transition

In 2021, the City of Edmonton released its Community Energy Transition Strategy & Action Plan. Intended to align with the global goal of limiting global warming to 1.5 degrees, the plan calls for Edmontonians to reduce their per capita emissions from 15 tonnes of carbon dioxide per capita today, to around 3 tonnes by 2030. By 2050, resident's per capita emissions will be expected to be 0 tonnes. Emissions reductions at this scale positions the places Edmontonians live, work, gather and play in at the centre of the City's decarbonization efforts

Figure 1 Edmonton's Local Carbon Budget Trajectory



Adapted from: City of Edmonton, Edmonton's Community Energy Transition Strategy & Action Plan. April 2021.

Currently buildings account for 38% of emissions in Edmonton, with residential buildings accounting for 18% of total emissions, and commercial and institutional buildings accounting for 20% of total emissions.[4] While buildings have been identified

as a major reduction area with the potential to reduce GHG emissions by up to 19%.[5] This includes both new and existing buildings.

As such, Emission Neutral Buildings have been identified as one of four transformative pathways to reach Edmonton's Climate Resilience goal.

Emissions neutral buildings

An "emission neutral building is one that is highly energy efficient and uses only renewable energy".[6] To succeed in the Emission Neutral Buildings pathway, Edmonton will administer increasingly stringent energy codes in alignment with federal and provincial governments and undertake an extensive energy efficiency retrofit effort.

Ensuring that newly constructed buildings are emissions neutral is an important step toward sparing residents costly future retrofits needed to ensure their homes and businesses are climate ready. And in the interim, residents and business owners can benefit from greater energy security and reduce energy costs. This makes emissions neutral new construction a central component in reaching the City's climate targets.

The project is aligned with Edmonton's Energy Transition Strategy and its goals of:

- Supporting the acceleration of emissions neutral buildings.
- Catalyzing the local green building and energy efficiency industry.
- Supporting the attraction and expansion of opportunities for green building technology, products and services.

The specific goals of Emission Neutral Buildings pathway are:[7]

- Ensuring that the buildings that Edmontonians live, work and play in are emission neutral and improve personal wellness.
- Eliminating energy poverty.
- Catalyzing the local green building and energy efficiency industry.

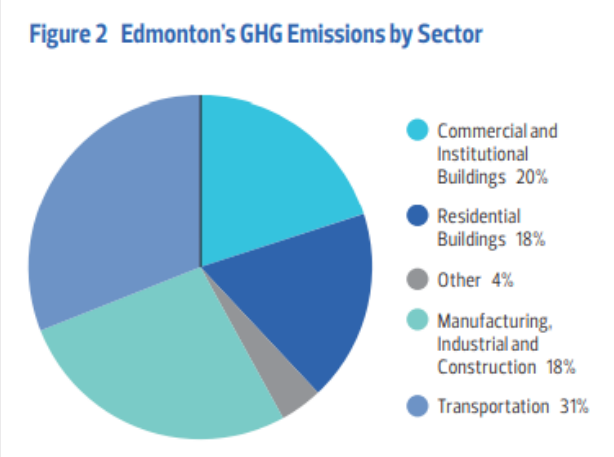
Achieving these goals includes strategies such as supporting the acceleration of emission neutral buildings, supporting low embodied carbon buildings and infrastructure, and supporting building owners to reduce overall energy use through retrofits and energy efficiency improvements. It is noted that transformative pathways require "departing from a business-as-usual approach" and treating every decision as a climate change decision.[8]

City of Edmonton definition: emission neutral building

An emission neutral building is one that is highly energy efficient and uses only renewable energy for its operations, OR produces and supplies onsite renewable energy in an amount sufficient to offset the annual greenhouse gas emissions associated with its operations.

DECISIONS MADE TODAY ABOUT HOW WE DESIGN AND BUILD OUR CITY, TRANSPORTATION SYSTEMS, INFRASTRUCTURE AND ENERGY WILL SET THE COURSE FOR OUR FUTURE GREENHOUSE GAS EMISSIONS.

Decarbonizing existing buildings represents the greater challenge to meeting these climate goals. Nonetheless, every new building built today not built to an emission neutral standard will need to be retrofitted to that standard before 2050. Thus, it is critical to address emissions from new construction and to avoid the carbon lock-in associated with these buildings. This will also help to insulate government, industry and residents against the higher cost of future retrofits.



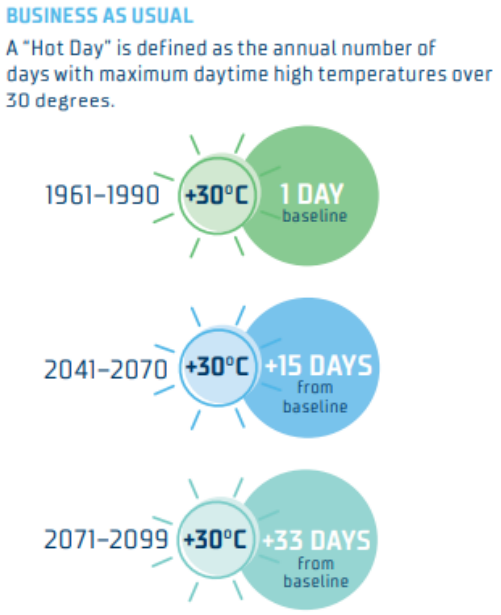
Adapted from: City of Edmonton, Edmonton's Community Energy Transition Strategy & Action Plan. April 2021.

Climate adaptation and resilience

According to Climate Resilient Edmonton, the City's Adaptation Strategy and Action Plan, Edmonton is going to experience the following significant changes.

Figure 3: Changing Temperature Climate Variables

Climate Variable	Historical Baseline	Projected Change by 2050s	Projected Change by 2080s
Warm nights *(Nighttime temperatures above 10°C)*	31 days/year	78 days/year	108 days/ year
Hot Days *(Daytime temperatures above 30°C)*	1 day/ year	16 days/year	34 days/ year
Hottest Day	30°C	35°C	38°C
Cold Nights *(Nighttime temperatures below -20°C)*	43 days/year	22 days/year	11 days/ year
Coldest Night	-38°C	-31°C	-27°C



Adapted from: City of Edmonton, Edmonton's Community Energy Transition Strategy & Action Plan. April 2021.

Emissions neutral buildings are climate resilient buildings and can help Edmontonians withstand the coming changes to their climate in the following ways:

- Resilient buildings are built with higher levels of insulation and air tightness. As a result they offer occupants stable temperatures in the event of an extended power outage or interruption in heating capacity.
- These increased levels of insulation and air tightness also help to reduce overheating by stabilizing indoor air temperatures in heat waves.
- These increased levels of insulation and airtightness also help to reduce low indoors temperatures by stabilizing indoor air temperatures in extreme cold events.
- Emissions neutral homes are increasingly electrified homes heated by efficient air source or ground source heat pumps. These heat pumps provide active air filtration to protect indoor air quality during forest fires. Additionally, they also provide mechanical cooling which reduces overheating during heat waves.

Applying a market transformation lens to Edmonton's climate plan

Market transformation is "a process whereby energy efficiency innovations are introduced into the marketplace and over time penetrate a large portion of the eligible market."[9] Achieving market transformation requires a sustained program approach "to make a deliberate and rigorous effort to intervene in [a targeted], clearly defined market."[10]

The goal of a market transformation strategy is to accelerate the uptake of energy efficiency products or technologies at market-scale (for example; energy efficient lighting, appliances, and heating, ventilation, and air conditioning equipment) through long-term strategic interventions in targeted markets. The process of market transformation helps prepare the industry for the adoption of regulation.

Market transformation is not just about raising the floor, but also about moving markets forward more quickly to the next generation of advanced technologies.[11] A technology, high-performance buildings for example, is introduced and – aided by supports such as research and development and knowledge sharing – gains market share as awareness of the technology becomes widespread and the merits of the technology become increasingly recognized for the benefits that arise from its adoption. A new technology such as low-energy, low emissions buildings is influenced by interactions between the technology, market conditions, public policy and the decisions of a wide range of stakeholders. Ideally, the technology scales up and leads to lasting change.

This market transformation approach sends a strong signal to the building sector. It indicates the long-term path of increased building energy standards and has the effect of both increasing capacity and reducing costs over the course of the transition to low-energy, low-carbon buildings.

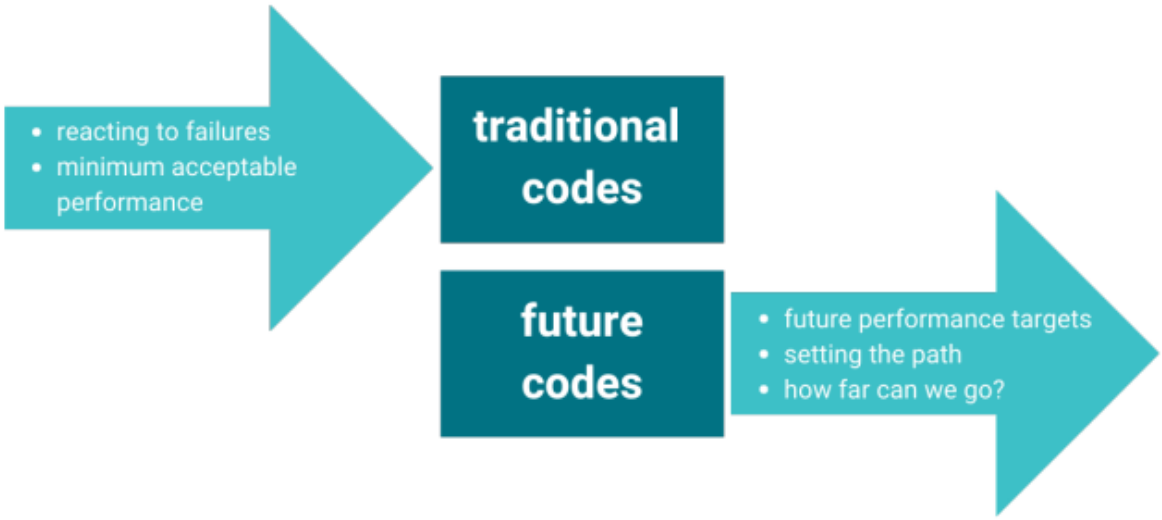


Figure 4: Adapted from NRC, Net Zero Energy Codes in Canada: Goals, status and research. June 2018 ACEEE Washington DC

Market transformation in the context of Edmonton's buildings regulatory framework

Already, municipal incentives programs and voluntary programs, such as Passive House or the CHBA's Net Zero Program, offer ample evidence the Canadian buildings sector is capable of constructing highly energy efficient buildings. Nonetheless, these voluntary certifications and/or incentive programs have been unable to shift the market transformation from the status quo and towards higher performing buildings in the way that only a robust regulatory approach can. As part of that approach, building codes and mandatory construction standards are the few select tools that can impact every new building constructed in Edmonton. Moreover, a regulatory approach shifts the financial burden of incentives from the municipality and ensures a more fair and equitable playing field for all new construction.

Commitment to high levels of building performance, complete with specific metrics and timelines for implementation, is an important first step towards the market transformation of the building sector. It also represents a marked transition from following provincially mandated building codes that set the minimum acceptable performance, to a suite of codes and standards that set a clear path for future performance and increased energy efficiency (see Figure 4).

The aim of the project is to create systemic change through the use of policy and regulatory tools to achieve greenhouse gas emissions at scale. The policy interventions will be framed in a market transformation format to help with ease of adoption and provide a clear pathway to the end goal.

Policy interventions to accelerate market transformation

Area	Measures
Education and Awareness	• Mandatory energy labelling • Mandatory energy benchmarking • Access to data
Financial incentives	• Land use incentives: Floor Area Ratio (density) bonus policy or rezoning policies • Planning and permitting policy, financial incentives for early adopters • Direct financial incentives such as grants or permit rebates
Regulations	• Mandatory minimum performance standards • Enhanced building code compliance implemented through tools such as Green Development Standards

Be bold Edmonton: key implementation considerations in support of bold action

The leadership exists in Edmonton

Herald Orr – A prairie net zero building pioneer

Herald Orr was a core member of the team that designed the Saskatchewan Conservation House in 1977. Orr has been a trail-blazer in energy efficient constructions for nearly five decades and is often credited as the catalyst behind Canada's R-2000 homebuilding program and a founder of the PassiveHaus program that first originated in Germany. Starting in the late 1970s, Orr championed high levels of insulation in foundation, wall, and roof assemblies, triple-glazed windows, and a very tight building envelope. These same energy efficiency measures continue to underpin the construction of net zero buildings and beyond, including Canada's 2020 net zero energy ready building codes.

Peter Amerongen – Building net zero in Edmonton for decades

Peter is one of the fathers of Net Zero Energy construction in Canada. A true pioneer, Peter's 40+ year career in construction has been celebrated with awards and accolades for his many accomplishments in the high performance building sector. Peter has been designing and building energy efficient houses in and around Edmonton since the 1970s. He has designed and built many net zero energy houses, Canada's first net zero energy affordable multi-family project and Canada's first net zero energy church.

Landmark Homes – Proving net zero is possible at scale

Landmark Homes is an Edmonton company that was the first large scale builder in Canada to offer an affordable Net Zero Home to buyers. The builder offers an above building code package of energy-efficient features in each home, including an ultra-efficient heating and cooling system, extra insulation, double coated triple-pane windows, and superior ventilation. Their goal is to offer super-efficient and airtight homes, an exceptional living experience, and net zero energy bills for buyers.

Other success factors

To read more about other critical success factors for implementation including the following please see Appendix B:

- Industry readiness
- Cost of ownership
- Construction cost analysis
- Current state of the industry

Municipal jurisdiction with respect to neutral emission buildings: finding pathways toward regulation

In order to better understand the potential regulatory and incentive tools available to the City of Edmonton to explore Emissions Neutral Building requirements, the following legal review was undertaken.

Municipalities are created and derive their authority from provincial statute which means a municipality can only act in the manner and deal with matters as prescribed by provincial legislation. In addition, because the authority for municipalities to act is procured through delegation from the province, the legal authority of a municipality cannot exceed that of the province. In other words, if a province is constitutionally incompetent to deal with a subject matter, then so is the municipality.

Because a municipality's jurisdiction derives from statute, statutory interpretation is essential to understanding the municipal authority to regulate and set requirements with respect to Emission Neutral Buildings. As stated by the Court in *Terrigno*, "delineating municipal jurisdiction is an exercise in statutory construction".[12]

The principles of statutory interpretation are set out by the Supreme Court of Canada in *Bell ExpressVu v Rex*: "the words of a statute are to be read in their entire context and in their grammatical and ordinary sense harmoniously" with the scheme and object of the statute and the intention of the legislators.[13] As well, it should be presumed that there is "harmony, coherence, and consistency between statutes dealing with the same subject matter".[14] These same statutory interpretation principles – i.e. a purposive and

contextual approach – were applied by the Supreme Court of Canada (SCC) in the context of the Municipal Government Act (MGA) and municipal bylaws in *United Taxi*.[15] To determine municipal jurisdiction, a purposive approach which looks at the purpose and wording in the entire context and in light of the scheme of the statute should be used.[16]

The primary piece of legislation governing the City of Edmonton is the Municipal Government Act (MGA).[17] In addition, the City of Edmonton is one of two Charter Cities in the province (the other being the City of Calgary) with enhanced authority in accordance with its *City Charter.*[18]

In terms of regulating new and existing buildings for GHG emission reduction purposes, the *Safety Codes Act*[19] is an integral piece of legislation.

Municipal government act and the Edmonton city charter regulation

As mentioned, the primary piece of legislation governing municipalities is the MGA. Part 1 of the MGA sets out the purposes, powers and capacity of municipalities. The purposes of municipalities are to:[20]

- provide good government;
- foster the well-being of the environment;
- provide services, facilities or other things that, in the opinion of Council, are necessary or desirable for all or a part of the municipality;
- develop and maintain safe and viable communities; and
- work collaboratively with neighbouring municipalities to plan, deliver and fund intermunicipal services.

A municipality has the powers, duties and functions as specifically set out in the MGA or other statutes.[21] A municipality also has natural person powers except as limited by the MGA or other statutes.[22] As well, a municipality has jurisdiction to pass bylaws on a wide array of matters including the safety, health and welfare of people and the protection of people and property.[23]

Because the City of Edmonton is a Charter City, the MGA and its regulations are modified by the *City Charter, 2018 Regulation* for the purposes of being applied to the City.[24] The result is that the City of Edmonton has expanded jurisdiction and authority as compared to other municipalities in the province (other than the City of Calgary which has a mirror City Charter).

Importantly, from a building regulation perspective, the *City Charter* modifies section 66(1) of the *Safety Codes Act*. This section of the *Safety Codes Act* states a "bylaw of a municipality that purports to regulate a matter that is regulated by this Act is inoperative" (subject to some very limited exceptions listed in section 66 such as addressing derelict buildings and minimum maintenance standards for buildings). However, the *City Charter* modifies the provision to add:

> (4) Notwithstanding subsection (1), the City may make bylaws relating to environmental matters, including, without limitation, matters relating to energy consumption and heat retention, but only to the extent those bylaws are consistent with all regulations made under this section and section 65.01 and all codes declared in force by those regulations.[25]

Section 66 of the *Safety Codes Act*, and its modification by the *City Charter*, is important for addressing the overlap and potential conflict of municipal bylaws with provincial laws. Typically, but not always, a municipal bylaw that overlaps with a provincial law will be subject to the test of **impossibility of dual compliance** to determine if there is a conflict between the two. This test essentially means that a bylaw cannot stand if compliance with one (the bylaw or provincial law) requires violation of the other. But section 66 of the *Safety Codes Act* changes the test from **impossibility of dual compliance** to a **same subject matter test**. That is, due to section 66, a municipal bylaw is inoperative if it deals with the same subject matter as the *Safety Codes Act*.

However, the modification of section 66 by the *City Charter* moves the test for assessing bylaws that overlap with the *Safety Codes Act* from that of **same subject matter** to **impossibility of dual compliance**. This means that the City can regulate the same subject matter as the building codes but cannot do so in a way that makes dual compliance impossible. In other words, compliance with the bylaw cannot necessitate a violation of the building code (or vice versa). However, such bylaws must relate to environmental matters with the *City Charter* explicitly providing energy consumption

and heat retention as two examples of environmental matters that may be addressed by such bylaws.

The *City Charter* specifies that Edmonton's bylaw powers include making bylaws for the well-being of the environment including for the creation, implementation and management of programs for the conservation and efficient use of energy, and for climate change adaptation and GHG emission reduction.[26] As well, the City of Edmonton may make bylaws relating to any of the municipal purposes as set out in the MGA (which include fostering the well-being of the environment).[27]

The municipal bylaw power may be used to make bylaws that, among other things:[28]

- regulate or prohibit;
- deal with any development, activity, industry, business or thing in different ways, divide each of them into classes and deal with each class in different ways;
- provide a system of licenses, permits or approvals.

A license/permit/approval system may establish fees; prohibit developments and activities until the requisite license/permit/approval has been obtained; impose terms and conditions on any license/permit/approval; and set out conditions for renewal, suspension or cancellation of a license/permit/approval.[29] It should be noted that if there is a conflict or inconsistency between a bylaw and a provincial law, then the bylaw is of no effect to the extent of the conflict or inconsistency.[30]

Of particular relevance to Neutral Emission Buildings is Part 17 of the MGA which governs municipal planning and development. The MGA provides the purpose of Part 17 as providing means whereby plans and related matters may be prepared and adopted:

(a) to achieve the orderly, economical and beneficial development, use of land and patterns of human settlement
(b) to maintain and improve the quality of the physical environment within which patterns of human settlement are situated in Alberta

without infringing on the rights of individuals for any public interest except to the extent that is necessary for the overall greater public interest. [31]

This provision is modified by the *City Charter* which replaces (b) above with the following:

> to maintain and improve the quality of the physical environment within which patterns of human settlement are situated within the boundaries of the City, including the promotion of environmental sustainability and stewardship.[32]

Part 17 of the MGA is extensive and sets out the parameters of municipal authority with respect to land use planning and development. Matters such as those below are addressed in Part 17 of the MGA.:

- the framework for land use decision-making, including the requirement for a land use bylaw;[33]
- the use of development levies and conditions;[34]
- the framework for subdivision of land;[35]
- planning and development bylaw requirements.[36]

Safety codes act and the building codes

In Alberta, building codes are governed by the *Safety Codes Act* and its regulations. The *Building Code Regulation*[37] adopts the National Building Code – 2019 Alberta Edition, Volume 1 (NBC (AE)) and the National Energy Code of Canada for Buildings, 2017 (NECB) as our current building codes.[38] Both the NBC (AE) and the NECB are performance-based codes and indicate that they set minimum standards to be achieved. Further, the NECB explicitly indicates that it is meant to be used in conjunction with applicable federal and provincial regulations, and municipal bylaws[39]. In the absence of such regulations or bylaws, then the NECB is to be used in conjunction with the NBC (AE).[40] Furthermore, where there is a conflict with those regulations or bylaws, or the NBC (AE) (if applicable), then the requirements providing the greatest performance level shall govern.[41]

Both codes deal with efficient energy use by buildings but do not currently address reduction of GHG emissions or use of alternative energy sources.[42] The NBC (AE) addresses energy efficiency for small residential buildings and certain small non-residential and mixed use buildings in Section 9.36.[43] The objectives and requirements

for larger residential buildings, as well as non-residential buildings larger than 300m^2 and some mixed use buildings are addressed in the NECB.

The NECB describes the relationship between the NBC (AE) and the NECB as follows:

> *The provisions in Section 9.36 of the NBC are tied to the Environment objective. These provisions, which apply to housing and small buildings, have a similar scope to that of the NECB, except that they do not address lighting and electrical power systems. The NECB is referenced in NBC Section 9.36. as an acceptable solution.*[44]

The Environment objective referred to above is "to limit the probability that as a result of the design or construction of the building, resources will be used in a manner that will have an unacceptable effect on the environment … caused by … excessive use of energy".[45] Neither code defines **unacceptable effect** or **excessive use** in general terms; rather specific requirements are set for different building components (for example, thermal characteristics of windows, doors and skylights).[46]

Table A-9.36.1.3.
Energy Efficiency Compliance Options for Part 9 Buildings
Forming Part of Note A-9.36.1.3.

Building Types and Sizes	Energy Efficiency Compliance Options		
	NBC(AE) 9.36.2. to 9.36.4. (Prescriptive)	NBC(AE) 9.36.5. (Performance)	NECB
• houses with or without a secondary suite • buildings containing only dwelling units with common spaces ≤ 20% of building's total floor area(1)	✓	✓	✓
• Group C occupancies • buildings containing Group D, E or F3 occupancies whose combined total floor area ≤ 300 m² (excluding parking garages that serve residential occupancies) • buildings with a mix of Group C and Group D, E or F3 occupancies where the non-residential portion's combined total floor area ≤ 300 m² (excluding parking garages that serve residential occupancies)	✓	X	✓
• buildings containing Group D, E or F3 occupancies whose combined total floor area > 300 m² • buildings containing F2 occupancies of any size	X	X	✓

Notes to Table A-9.36.1.3.:
(1) The walls that enclose a common space are excluded from the calculation of floor area of that common space.

Reproduced from: NBC (AE).

Summary of the NBC (AE)

The NBC (AE) sets out technical requirements for the design and construction of new buildings, and for the alteration, change of use and demolition of existing buildings. The

stated objectives of the NBC (AE) are safety, health, accessibility for persons with disabilities, fire and structural protection of buildings, and environment. Each code requirement addresses at least one of these objectives. The NBC (AE) consists of three divisions:

- Division A: defines the scope of the code, and contains the objectives, functional statements and the conditions necessary to be compliant.
- Division B: acceptable solutions/ technical requirements which are deemed to satisfy the objectives and functional statements of Division A.
- Division C: administrative provisions.

Compliance with the NBC (AE) is achieved by meeting the applicable acceptable solutions set out in Division B or by using "alternative solutions that achieve at least the minimum level of performance required by Division B in the areas defined by the objectives and functional statements attributed to the applicable acceptable solutions".[47] With respect to the environment, the stated objective is to "limit the probability that, as a result of the design or construction of the *building* or facility, the environment will be affected in an unacceptable manner" or that "resources will be used in a manner that will have an unacceptable effect on the environment".[48] The NBC (AE) environment objective goes on to state that it specifically is concerned with unacceptable effects on the environment caused by excessive use of energy.[49]

Functional statements related to energy use in the NBC (AE) include limiting the amount of:

- uncontrolled air leakage and thermal transfer through the building envelope;
- uncontrolled air leakage and thermal transfer through system components;
- unnecessary demand and/or consumption of energy for heating and cooling, and for service water heating;
- inefficiency of equipment and systems;
- unnecessary rejection of reusable waste energy.[50]

Section 9.36 of Division B addresses energy used by buildings as a result of the design and construction of the building envelope, and the design and construction or specification of systems and equipment for heating, ventilating, air-conditioning or service water heating. There are specific requirements for energy performance

compliance including calculation models for annual energy consumption of systems and equipment, building envelopes, HVAC systems, and service water heating systems. Section 9.36 of Division B addresses energy efficiency as follows:

- 9.36.1 General (sets out scope, definitions, compliance and application)
- 9.36.1 Building Envelope
- 9.36.3 HVAC requirements
- 9.36.4 Service Water Heating Systems
- 9.36.5 Energy Performance Compliance

The acceptable solutions set out in Division B are deemed to satisfy the objectives and functional statements of Division A. An alternative solution can be used in lieu of compliance with the stated acceptable solution so long as it can be shown to perform at least as well as the acceptable solution. According to the NBC (AE), alternative solutions are considered to be "variances" under the *Safety Codes Act*.[51] In other words, the NBC (AE) can be met by either (1) using the specified design, manufacture, construction, installation, use, etc. of various building components or (2) demonstrating that an alternative approach performs as well as the specified approach.

Summary of the NECB

The NECB contains requirements for design and construction of the building envelope; the design and construction or specification of systems and equipment for heating, ventilating or air-conditioning, service water heating and lighting; and the provision of electrical power systems and motors. Like the NBC (AE), the NECB is organized in three divisions:

- Division A: Compliance, Objectives and Functional Statements;
- Division B: Acceptable Solutions;
- Division C: Administrative Provisions.

The NECB has only one stated objective and that is to limit the probability that, as a result of design or construction of a building, the environment will be affected in an unacceptable manner due to excessive use of energy.[52]

There are several functional statements which describe the functions that the acceptable solutions set out in Division B are intended to perform.[53] These include things like limiting the amount of uncontrolled thermal transfer, unnecessary demand

and/or consumption of energy, inefficiency and unnecessary rejection of reusable waste energy.

Detailed technical requirements which must be complied with are set in Division B. Like with the NBC (AE), compliance with the NECB is achieved by complying with the applicable acceptable solutions set out in Division B or by using alternative solutions that will achieve at least the minimum level of performance required by Division B.

Legal analysis and recommendations: developing a City of Edmonton emissions neutral building bylaw based on city charter provisions

Given the modification made to section 66 of the *Safety Codes Act* by the operation of the *City Charter*, the City of Edmonton has authority to impose requirements over and above the provincially adopted building codes to address environmental matters.

The City of Edmonton may make bylaws regarding environmental matters but those bylaws must be consistent with the applicable building codes (as well as regulations made pursuant to the *Safety Codes Act)*. The *City Charter* explicitly provides energy consumption and heat retention, often regulated through Energy Use Intensity (EUI) requirements and Thermal Energy Demand Intensity (TEDI) requirements (see Sidebar), as two examples of environmental matters that may be addressed by such bylaws.

Thermal energy demand intensity

Thermal Energy Demand Intensity (TEDI) and Energy Use Intensity (EUI)) limit energy use and heat loss in a building by setting consistent targets on absolute energy use and/or emissions for different types of buildings. Each is based on the energy consumed in a building per unit of floor area expressed over time.

TEDI calculates the annual heat loss from a building's envelope and ventilation, after accounting for all passive heat gains and losses. TEDI is formulated as the sum of space and ventilation heating output divided by modeled floor area. TEDI is reported in kWh/m2/year.

EUI looks at total energy use, including factors such as plug loads. EUI is expressed as the energy per square area per year and reported in kWh/m²/year.

TEDI and EUI drive an outcomes-based approach that is more likely to encourage builders and designers to put a greater emphasis on whole building efficiency. This approach incentivizes passive energy measures such as window type and placement for daylighting, thermal mass, and solar gains, and more simple shapes and forms. In this way, TEDI and EUI encourage the construction of climate resilient new buildings better suited for adaptation to climate fluctuations and more likely to mitigate emissions.

To fall within this provision of the *City Charter*, a bylaw made by Edmonton must:

1. address environmental matters, for example matters of energy consumption and heat retention;
2. be consistent with applicable building codes;
3. be consistent with regulations made under the *Safety Codes Act.*

Using a purposive and contextual approach, it seems this provision of the *Safety Codes Act* is meant to allow an exception to the prohibition against municipalities regulating matters already addressed in the *Safety Codes Act*. This means the City of Edmonton may regulate matters which are covered in the building codes but must not contradict the building codes.

The modification of section 66 of the *Safety Codes Act* made by the *City Charter* moves the test for assessing bylaws that overlap with the *Safety Codes Act* from that of **same subject matter** to **impossibility of dual compliance**. This means that the City could regulate the same subject matter as the building codes but cannot do so in a way that makes dual compliance impossible. In other words, compliance with the bylaw cannot necessitate a violation of the building code (or vice versa).

Best practice considerations

In order to align Edmonton's requirements with that of neighbouring jurisdictions, the City should consider aligning new bylaw requirements with the tiers set out in the NBC and NECB. This would allow for greater consistency for industry. However, it is recommended that Edmonton also establish a greenhouse gas intensity target, which is currently outside the scope of the code and Edmonton would have to set these thresholds by itself. Guidance could be derived from the recently announced Zero Carbon Step Code in BC (see sidebar on page 8).

Because the building codes set minimum standards, it would be feasible for the City to require higher standards be used in new buildings pursuant to its *City Charter* power. This could be implemented through the issuance of building permits. Alternatively, the City could set emission neutral building requirements in a manner that is agnostic as to precise design, installation and so forth. This could be implemented through the issuance of development permits.

Section 66 *Safety Codes Act* modified by City Charter	Section 66 *Safety Codes Act* without modification by *City Charter*
This **is** the current state of law with respect to Edmonton (and Calgary).	This is **not** the current state of the law with respect to Edmonton (and Calgary). The discussion that follows (pages 13 to 17) is to address the event that the *City Charter* is revoked or amended with regard to the section 66 modification.
Test for acceptability of overlapping bylaw and building codes: impossibility of dual compliance.	Test for acceptability of overlapping bylaw and building code: same subject matter
Edmonton can pass bylaws that address environmental matters. For example, matters of energy consumption and heat retention (but the bylaws cannot necessitate a violation of the building codes).	Edmonton has authority under the MGA to make bylaws addressing environmental matters and addressing buildings. However, Edmonton cannot pass bylaws that address the same subject matters as the building codes. Avoid language that "regulates … the design, manufacture, construction, installation, use, operation, occupancy and maintenance" of buildings. Emission neutral building requirements should be agnostic as to precise design, manufacture, installation and so forth of individual building components. The NBC (AE) does not address lighting or electrical systems for Part 9 Small Residential buildings, and the NBC(AE) and the NECB do not address solar-ready, EV ready or district energy ready requirements for buildings, so these matters could be regulated without overlapping the building codes.

Other potential pathways toward regulation: green development standards

It has been articulated there is concern around using the *City Charter* as a regulatory tool. The following section considers other potential regulatory pathways outside of establishing a municipal bylaw based on the provisions in the *City Charter*. Green Development Standards, a popular tool among Ontario municipalities, is explored as an example.

In the event the City Charter is revoked or amended, how does section 66 of the Safety Codes Act impact on Edmonton's jurisdiction with respect to Emission Neutral Buildings?

On its face, it is clear that section 66 of the *Safety Codes Act* will make any municipal bylaw that attempts to address matters already covered in the *Safety Codes Act* inoperative. In other words, to the extent that a municipal bylaw addresses matters dealt with in the building codes, that municipal bylaw will have no effect. If the event that the building codes are amended or repealed to no longer address those same matters, the municipal bylaw will revive and take effect.[54]

Aside from its *City Charter* powers, the City of Edmonton has powers pursuant to the MGA to address buildings. If the City chooses to not directly engage its *City Charter* powers or those powers are revoked or amended, then it must rely on its general MGA powers. Due to the language of section 66 of the *Safety Codes Act*, the test for overlapping regulations is whether the bylaws address the **same subject matter** as the building codes. If the bylaws do not address the same subject matter, then the bylaws still must be consistent with the building codes so as not to create an **impossibility of dual compliance**.

What parameters are used to determine whether a municipal bylaw is actually addressing the same matter as regulated by the Safety Codes Act?

Unfortunately, there is little judicial consideration of section 66 of the *Safety Codes* (and none as it is modified by the *City Charter*). The Alberta Court of Appeal (ABCA) decision in *Kozak* is helpful.[55] In this case, the ABCA considered whether a municipal bylaw was inoperative by virtue of section 66 of the *Safety Codes Act*. The municipal bylaw at issue purported to regulate private sewage disposal systems and to require landowners

that are adjacent to land on which pipes from the County sewage system are located to disconnect from their private system and connect to the County system at their own expense. The *Safety Codes Act* also regulates sewage systems.

The ABCA found the bylaw does not purport to regulate the same matter as is regulated by the *Safety Codes Act* and, as such, section 66 does not apply. The ABCA found the bylaw determines whether a private sewage systems can be used at all whereas the *Safety Codes Act* "regulates the *safety* of the design, manufacture, construction, installation, use, operation, occupancy and maintenance of various facilities, buildings and services" (i.e. the safe use of private sewage systems).[56] Holding a permit under the *Safety Codes Act* does not immunize a person from compliance with bylaws (or other enactments).

Applying the reasoning in *Kozak*, the City of Edmonton could avoid regulating the same subject matter as the building codes by avoiding language that "regulates … the design, manufacture, construction, installation, use, operation, occupancy and maintenance of various facilities, buildings and services".[57] This could be achieved by setting emission-based requirements but not directly specifying the design, construction, installation or use of any particular mechanisms to achieve the emission requirements. We note that, although the relevant portions of the NBC (AE) and the NECB are focused on energy efficiency (as opposed to safety), there are no overall emission standards set in these codes rather energy efficiency standards are set on a component by component basis.

The City could set emission neutral building requirements in a manner that is agnostic as to precise design, installation and so forth. These could be implemented or supported through relevant development permit application requirements and approval processes as is the case with Green Development Standards.

See Appendix C for further exploration of this issue.

Legal analysis and recommendations: developing a City of Edmonton emissions neutral building bylaw based land use powers established by the MGA

What should an emission neutral building bylaw look like?

It will be a matter of bylaw design as to whether the same subject matter is addressed by both the bylaw and the building codes. We note that, although the relevant portions of the NBC (AE) and the NECB are focused on energy efficiency, there are no overall emission standards set in these codes, rather energy efficiency standards are set on a component by component basis. It is recommended that the bylaw focus only on setting emission neutral building requirements. Language that "regulates … the design, manufacture, construction, installation, use, operation, occupancy and maintenance of various facilities, buildings and services" should be avoided.[58] This means the emission neutral building requirements should be agnostic as to precise design, manufacture, installation and so forth of individual building components. In other words, the bylaw should state "the emissions standard for this building is X and how you achieve X is the choice of the builder".

Should emission neutral building requirements be implemented via development permits or building permits?

If the City of Edmonton pursues imposing emission neutrality building requirements at the building permit stage, there is more risk of engaging section 66 of the *Safety Codes Act* as compared to implementing the requirements at the development permit stage.

Building permits are administered by accredited municipalities in accordance with the *Safety Codes Act*. That is, building permits are issued pursuant to the requirements set under the *Safety Codes Act.* Therefore, trying to impose emission neutrality requirements via the use of building permits runs a higher litigation risk (by potentially engaging section 66 of the *Safety Codes Act)*. Under section 66, the central question is whether a municipal bylaw addresses the same subject as the *Safety Codes Act*. A bylaw which addresses energy efficiency will be addressing the same subject as section 9.36 of the NBC (AE) and the entirety of the NECB which are concerned with energy efficiency. Again, this is setting aside the fact that the *City Charter* confers jurisdiction on the City of Edmonton to make bylaws addressing the same matters covered in the *Safety Codes Act*.

There are a few arguments which could support a bylaw that imposes emissions neutrality requirements at the building permit stage despite section 66:

- Because the NBC(AE) does not address lighting or electrical systems for Part 9 Small Residential buildings, it may be possible to set requirements for these two subject matters at the building permit stage without engaging section 66. These would not be "building permits" since those are covered by the *Safety Codes Act* rather would be a municipal bylaw requirement that arises at the building permit stage of development.
- The NBC(AE) and the NECB do not address solar-ready, electric vehicle (EV) ready or district energy-ready requirements for buildings. As such, it may be possible to set these requirements at the building permit stage without engaging section 66. Again, these would not be "building permits" since those are covered by the *Safety Codes Act;* rather, these would be a municipal bylaw requirement that arises at the building permit stage of development.

It should also be noted that both codes themselves indicate they set minimum standards using performance based approaches. However, given section 66 sets a **same subject matter** test for determining whether a bylaw is inoperative, it will be hard to argue that municipal bylaw requiring higher standards be achieved for issuance of building permits are allowable. Unlike with a **dual compliance** test, it likely cannot be successfully argued that the municipal bylaw is just setting complimentary, higher standards.

A better approach may be to impose emission neutrality standards at the development permit stage. Sections 683 and 684 of the MGA address municipal development permits. Essentially these provisions require a person to obtain a development permit prior to undertaking development, and set out the general process for a municipality to consider development applications. The grounds and process for development appeals are set out in sections 684 to 687.

The details of the development permit process to be followed by a municipality are set out in the land use bylaw (LUB) which each municipality must pass. Under the MGA, a LUB must set out municipal zoning, establish a development permit process, and establish the number of dwelling units permitted on a parcel of land. A LUB may prohibit or regulate and control the use and development of land and buildings in a municipality

including imposing design standards, regulating the development of building and any other matters council considers necessary to regulate land use.[59] While the MGA sets broad requirements for the LUB, the details and contents are very much within the discretion of the municipality (so long as the broad requirements are met and not exceeded).

If a municipal bylaw imposes standards for emission neutrality within its development permit process (found within the LUB), it is not likely to engage section 66 of the *Safety Codes Act*. Such an approach is likely to be agnostic as to the method used to reach the standard. In other words, the municipal bylaw will set an emission neutrality standard without dictating how a development will achieve that standard. This avoids regulating the same subject matter as that covered by the building codes, especially if matters not covered by the building codes (such as solar-ready, EV ready or district energy ready) are presented as potential pathways to reach the emission neutrality standards.

Example: Green Development Standards

Green Development Standards (GDS) are voluntary or mandatory measures created by municipalities to encourage environmentally, socially, and economically sustainable design. First widely adopted by Ontario municipalities like Toronto, they are used to guide development at a level of land use planning and design that focuses on the community as a whole.

GDS are a full suite of standards that address the goals within a municipalities Official or City Plan by managing growth and urbanization. In doing so, the built form of buildings and public spaces reduce demands on infrastructure and reflects high environmental performance while creating healthy, complete, and sustainable communities.

Through the planning approvals process, the municipality can ask that development applications meet certain criteria in exchange for incentives or reductions in barriers to developments that deliver social and economic benefits. In the Ontario context, Site Plans, Block Plans, and Draft Plans are most often used to encourage more sustainable design criteria in new buildings and developments.

Bill 23 – The Building More Homes Faster Act

At the time this report was prepared, Ontario's approach had resulted in the implementation of more than 15 municipal green development standards. However, in November 2023, Bill 23 – The Building More Homes Faster Act, was passed. Bill 23 made fundamental changes to the land use planning system in Ontario through changes to the Development Charges Act, Planning Act, Municipal Act. Most relevant to this report, the Bill curtailed municipal oversight of sustainable design which had been used to implement GDS in the province. At the time of writing, municipalities and the province are exploring a path forward that would see a provincial framework for harmonized municipal GDS.

GDS are designed to have requirements become increasingly stringent over time and enable municipalities to quickly reduce energy waste and building emissions in the built environment. They act as a key accelerant that prepares the building sector, and the workforce, to deliver high-performance buildings at scale.

Figure 5: What do Green Development Standards cover?

Adapted from: Clean Air Partnership, What do Green Development Standards Cover?

Image credit: Clean Air Partnership, Bill 23: Why Should You Care: What are Green Development Standards, February 2022.

GDS are a community driven approach to ensure that new buildings deliver levels of building energy and emissions performance beyond the minimum standards of the provincially/territorially adopted building code.

Three common approaches to GDS have emerged among municipalities. From most effective to least effective these are: a mandatory tiered approach, incentives-based approach, and a checklist or menu approach. Each can be used individually or in combination to encourage better building energy performance through GDS.

The tiered approach seeks continuous improvement

The most effective GDS framework to reduce energy waste and emissions is the step and cap mechanism or tiered approach. Similar to the gold standard of GDS, the Toronto Green Standard, a tiered approach is based on a series of progressive green development measures. Each tier seeks a higher level of energy performance and emissions reductions. After a set period, the minimum mandatory requirement is updated, and the second tier now becomes the mandatory minimum.

The tiered approach seeks continuous improvements on energy and emissions reduction targets. It also encourages the voluntary uptake of higher tiered performance measures (Tier 3 and above) through various financial mechanisms or incentives. A tiered approach aligned with the tiers of the proposed 2020 model codes (see Figure 5) will help to better prepare local markets for net-zero building codes tier advancements into the future.

Figure 6: Aligning the Tiers of the Model Code to GDS

	Part 3 (Large Buildings)		Part 9 (Small Buildings and Houses)	
GDS Tier	Proposed tier of the NECB 2020	Voluntary Building Program/Standard	Proposed tier of the NBC 2020 (Energy)	Voluntary Building Program/Standard
Base	Reference building NECB 2017	N/A	Reference building NBC 2015	N/A
	Tier 2: 25 % better than Reference building	TEUI 20% < NECB • LEED Silver, • Built Green - Green Seal Gold, • EnergyStar	Tier 3: >/= 20% better than Reference building	EnerGuide < 80 GJ • EnergyStar, • LEED Certified/Silver, • Built Green Silver
3	Tier 3: 50% better than Reference building	TEUI 30% < NECB • LEED Gold, • Built Green-Green Seal Platinum	Tier 4: >/= 40% better than Reference building	EnerGuide < 50 GJ • LEED Gold, • Built Green-Green Seal Platinum, • R-2000
4	Tier 4: 60% better than Reference building	TEUI 50% < NECB • LEED Platinum, • Passive House	Tier 5: >/= 70% better than Reference building	EnerGuide <30 GJ • Net-Zero Ready (CHBA), • Passive House, • LEED Platinum
5	Net zero/EnerGuide = 0 GJ			

Incentives can help prime the market

While not as effective as a mandatory tiered approach, some Ontario communities use Community Improvement Incentives, to induce higher levels of building performance. This framework uses incentives, combined with a series of progressive building performance targets.

Incentives can include grants, loans, refunds, fee exemptions, tax increment rebates (a financing option that leverages expected future gains in municipal property taxes from a development project to finance improvements that will create those gains, often referred to as "land value capture" or "value-uplift"), financing or other incentives to assist project proponents, subject to available funding. Density or floor area ratio bonuses and rezoning approval are two additional tools that we will discuss in detail later in the report. Incentives are often used by communities to pull developers towards

higher levels of building energy performance. Incentives can also be aligned with the tiers of the proposed 2020 NECB/NBC (see Figure 5).

Checklists or menus must address energy and emissions directly to be effective

A GDS Evaluation Checklist, included in subdivision and site plan agreements, is another way for municipalities to encourage better building energy performance. The checklist's menu-like layout (See Appendix C) provides a flexible point system where each sustainable design feature is assigned a specific number of points. This provides developers/builders the opportunity to choose features that best meet their needs, as long as it meets the minimum GDS point requirement set out by the municipality.

By itself, this approach must carefully balance energy and emissions with other sustainability features to ensure building energy performance targets are achieved. However, menus or checklists can be combined with a tiered approach where the tiers set a series of mandatory base targets while developers can select additional measures from the checklist to top up incentives.

How have Canadian municipalities implemented GDS

Several Canadian municipalities have leveraged GDS to help their community prepare for Canada's net-zero economy while capturing community benefits such as good local jobs and healthy, comfortable, and resilient buildings for all.

Below, Table 1 looks at the different approaches taken:

Municipality	Approach	Applies to residential or commercial	Voluntary or mandatory	Aligned with building code or voluntary standard	Energy metrics	Emissions metrics
Ajax	Checklists, incentives	Draft Plan (Subdivision), Site Plan and Block Plan	T1 Mandatory, T2 core & voluntary	Yes	Yes	No
Brampton	Points-based Sustainability Metrics , Sustainability Score thresholds	Applies to Draft Plan of Subdivision, Site Plan and Block Plan	T1 Mandatory, T2 &T3 voluntary	Yes	Yes	No
Burlington	Checklist, incentives	Residential, commercial, industrial Municipal buildings greater than 500 m2 (LEED Silver)	Voluntary, single standard	Yes	Yes	No
Clarington	Checklist, incentives	Secondary plans	Voluntary	Yes	Yes	No
Mississauga	Performance-based checklist	Corporate and private buildings	T1 Mandatory (equal to TGS T2), T2 and T3 voluntary	No	Yes	No
Ottawa	Incentives	Site plan and plan of subdivision	T1 Mandatory, T2 & T3 voluntary	Yes	Yes	Yes
Whitby	Checklist	All new development	Tier 1 mandatory, Tiers 2-4 are voluntary (incentives based)	Yes	Yes	Yes
Yellowknife	Prescriptive or performance	Residential and commercial	Mandatory	Yes	Yes	No

As the table above highlights, there are numerous approaches that can be taken in the development and implementation of GDS, including mandatory or incentive based initiatives that can also be prescriptive or performance based. Common approaches include a tiered framework which can include mandatory requirements at the lowest tier, and voluntary standards at upper tiers. Many municipalities have also chosen to align with voluntary certification programs such as EnerGuide, LEED, Passive House, the CHBA's net zero program, and R-2000, or with the tiers of the 2020 national model codes.

Incentive based tools for emissions neutral buildings

There are a number of incentive based approaches to achieving emissions neutral buildings that Edmonton can implement as stand alone incentives or as part of GDS framework. A number of Canadian municipalities use their planning and land use powers to implement climate policy goals in the building sector by adopting density or floor area ratio bonuses and rezoning policies with specific metrics for energy and emissions performance in newly constructed buildings.

Edmonton's Energy Transition Strategy includes the following in the Emission Neutral Building pathway: "Provide incentives for new construction to build above Building Code. Incentives will be performance based and increase as follows: 2022 Tier 1; 2025 Tier 2; and 2028 Tier 3. The industry advisory group will provide ongoing advice on the incentives."[60]

Land use incentives

Rezoning policies

The City of Edmonton defines zoning as the type of development allowed on a property. In contrast, rezoning is the "process of changing a property's zoning to allow for new development."[61]

Many municipalities view the rezoning process as giving additional value to developers by allowing them to build additional density or a different use on the site than what is specified in current zoning. Because of this increase in value, there are often additional requests made of developers in exchange for receiving the benefits of rezoning. In

some jurisdictions this process happens on an application by application basis, in other places municipalities have adopted rezoning policies that broadly apply to all rezoning applications. The benefits of a rezoning policy creates consistency and equity for the development industry as the policy clearly indicates what conditions will need to be met in order for the rezoning to be approved.

In British Columbia a number of municipalities use rezoning policies to further their building decarbonization goals. Their policies require new developments to achieve certain sustainable design principles. A number of examples are provided below.

Example: City of Vancouver - Green Building Policy for Rezonings

Intent: This policy stipulates "Council approved the Green Buildings Policy for Rezonings setting out requirements for all applicable developments applying for rezoning to help transition industry toward more sustainable building practices."[62] The policy sets energy and emissions limits, embodied carbon limits and resilient building criteria.

Example: District of North Vancouver - Climate Ready Rezoning Policy

The Climate Ready Rezoning Policy reflects the District's goals to reduce emissions and strengthen the resilience to climate change impacts, such as heat waves and wildfire smoke. The policy encourages applicants to design low-carbon, resilient buildings when seeking additional density or land use changes.[63] Applicable projects need to measure and report lifecycle greenhouse gas emissions (embodied carbon) and the associated refrigerant emissions from each building. Additionally they will have to provide mechanical cooling for residential units and adhere to a Minimum Efficiency Reporting Value (MERV) for ventilation.

Legal analysis and recommendations

Part 17 of the MGA outlines the jurisdiction of municipalities with respect to planning and development decision-making and requires that every municipality pass a land use bylaw (LUB).[64] Among other things, a LUB must set out municipal zoning (referred to as "districts" in the MGA), and establish a development permit process, and establish the number of dwelling units permitted on a parcel of land.

With respect to zoning, the MGA requires the municipality be divided into zones with the number of zones and area of each being at the discretion of the municipality.[65] For each zone (except direct control zones) the LUB must prescribe: the uses of land/ buildings that will be permitted within the zone with or without conditions, the uses of land/ buildings that may be permitted at the discretion of the municipality, or both.[66] If a development permit is sought for a permitted use, then it must be issued with or without conditions as provided in the LUB.[67] If a development permit is sought for a discretionary use, then issuance of a development permit is at the municipality's discretion and may be subject to conditions as provided in the LUB.[68] In direct control zones, the municipal council regulates and controls the use or development of land or buildings in the zone in any manner it considers appropriate.[69]

So while the MGA sets broad requirements for the LUB and zoning, the details and contents are very much within the discretion of the municipality (so long as the broad requirements are met and not exceeded). Zoning decisions are clearly within municipal jurisdiction by virtue of Part 17 of the MGA.[70] Furthermore, the MGA indicates both permitted and discretionary uses within a zone may be subject to conditions as set out by the LUB. This means that decisions around rezoning can be made conditional. For example, land will be rezoned on the condition that specified building standards, such as LEED designations, will be met.

For further analysis on this topic see Appendix D.

Communications from City staff to the team indicated the current Land Use Bylaw Renewal Initiative will result in a system which aims to minimize the need for rezoning applications. The new LUB will have fewer zones, each of which allow more flexibility in terms of permitted land uses. Modifiers will be used to "adjust the land use intensity, density and height based on a site's proximity to certain existing or planned features".[71]

As well, "incentive-based bonusing provisions are also proposed [for the new LUB] to encourage amenity contributions".[72] Bonuses might include additional height, floor area ratio, and/or dwelling units.[73] It is also mentioned that regulations are proposed to be integrated into the new LUB to "help meet [the City's] energy transition and climate adaptation".[74] This is also discussed in Edmonton's *Climate Resilience & Energy Transition* discussion paper prepared for its Land Use Bylaw Renewal Initiative.[75] With respect to new residential buildings, it is proposed that the new LUB could develop

housing designs that increase energy efficiency through performance standards and incentives, and removal of regulatory barriers to solar energy development (to reach the City's goal of net zero by 2025).[76] Another proposal is to implement emission reduction standards and incentives for new development.[77] It is proposed in the discussion paper that climate actions could be implemented via a development permit point system, or that a standalone bylaw could be passed to address specific climate actions.[78] However, the discussion paper does not provide precise detail as to how these proposals will be incorporated into the new LUB.

While there may be less rezoning applications anticipated under the new LUB, there is an indication that bonuses and incentives are contemplated to form part of the new LUB. These could be designed to achieve higher emission standards for new buildings.

Density or floor area ratio bonus

Density or floor area ratio (FAR) bonuses offer developments a level of density that surpasses the allowable FAR in exchange for amenities. These amenities typically include parks and affordable housing, but offering increased density in exchange for greener development can also be seen as an amenity to the community. The development community normally views these voluntary incentives positively as an additional cost borne by providing additional amenities is offset by the increase in these voluntary sellable floor space in their developments. Density bonuses must be established in zoning bylaws that set out the specific conditions needed in order to receive the increased FAR.

Communities who have included emissions reductions in their density bonus programs see emissions reductions as a public amenity in the form of eliminating pollution, reducing air quality health impacts and lessening potential damage caused by climate change. Additionally, some communities have used density bonuses to encourage buildings to connect to a low carbon district energy utility. Important considerations for developing a density bonus program include providing consistency and predictability for the development community. Ensuring the incentive provided can be consistently factored into the pro forma of a proposed development is critical to the encouraging uptake. Likewise, the cost of the amenities, in this case, green building features that decrease emissions, should be commensurate with the provided benefits.

In its Energy Transition Strategy, the City proposes providing "incentives for new construction to build above Building Code. Incentives will be performance based and increase as follows: 2022 Tier 1; 2025 Tier 2; and 2028 Tier 3." Density bonuses could be one method used to provide such incentives with a lower cost burden to the City then providing direct financial incentives. The City of Edmonton has previously used density bonuses to encourage the building of affordable housing units.

However, according to City staff the uptake of previous programs has been low due to the fact that FAR limits are so high that there is no reason for a developer to use the bonus incentive. This would result in limited GHG savings at scale if implemented.

Example: District of Squamish - The Low Carbon Incentive Program

This program aims to discourage the use of high-carbon energy sources used in residential construction. To limit these emissions, the Program reduced "the permitted maximum size of residential construction by one third if a high carbon energy source is used within the building."

Only those buildings that install low carbon heating and hot water systems are permitted to build to the full allowable size. The program has resulted in lower greenhouse gas emissions for newly constructed homes and is a critical program for reaching the District's climate action goals.[79]

Example: City of Saskatoon - Density Bonus

Saskatoon's current zoning bylaw allows for density bonuses in projects that achieve certain sustainability targets. Buildings are allowed to exceed height limits if they incorporate a green building rating system such as "Leadership in Energy and Environmental Design (LEED) or Building Research Establishment Environmental Assessment Methodology (BREEAM)."[80] Both of these program stipulate reductions in energy and emissions that are higher than building code.

Legal analysis and recommendations

As discussed above, Part 17 of the MGA outlines the jurisdiction of municipalities with respect to planning and development decision-making. Part 17 of the MGA requires that every municipality pass a LUB.[81] A LUB must set out municipal zoning, establish a development permit process, and establish the number of dwelling units permitted on a parcel of land. A LUB may prohibit or regulate and control the use and development of

land and buildings in a municipality including determining population density and other matters necessary to regulate land use. While the MGA sets broad requirements for the LUB, the details and contents are very much within the discretion of the municipality (so long as the broad requirements are met and not exceeded).

It is clear that municipalities can, and in fact must, make rules around building density within the municipality. Furthermore, a municipality may make bylaws that deal with any development in different ways, divide them into classes and deal with each class in different ways.[82] Bylaws may also set up a system of permits which may include imposing conditions for grant of a permit.[83]

As such, **Edmonton does possess jurisdiction to implement a density bonus system**. This approach could be used in conjunction with a stepped building code or building emissions goals wherein higher levels of achievement result in increased density allowances. This could form part of the rezoning application process or the development permit process.

Direct financial incentives

Financial incentives can be provided to builders as an inducement to build to levels above the current building code. These direct financial incentives can include grants, low interest loans, permit fee rebates or fee exemptions, etc. The key to encouraging high levels of uptake using incentives is ensuring that those incentives are proportionate to the incremental costs of exceeding the minimum standard for building energy performance.

Figure 7: General principles for providing incentives

Principle	Reasoning
Start with incentives for both performance and prescriptive paths.	Permitting data provided by city staff for the year 2020 illustrates the need for incentives for both the performance and prescriptive paths. While this data demonstrates a preference for the performance path by Part 3 builders, only 7 of 20 Part 9 builders chose the performance path. Incentives for the Part 9 performance path should be ample enough to support this approach as it is more closely aligned with desired performance outcomes than the prescriptive approach. Incentives could include

	support for energy modeling, fee exemptions or rebates that offset the costs of performance assessments. Incentives for the prescriptive path should be based on verifiable energy conservation measures, such as higher quality doors and windows, increased insulation, zero-carbon heating/cooling and hot water systems, and achieve high-levels of airtightness and balanced ventilation.
Provide targeted incentives to enable higher levels of building performance.	Target both Part 3 and Part 9 buildings: Need to find number of commercial and residential buildings and associated emissions for CoE.
Consider performance based metrics.	While energy metrics are common throughout the municipalities listed in the Table above, leading GDS programs include performance-based targets including Thermal Energy Demand Intensity (TEDI) and Thermal Energy Use Intensity (TEUI). Greenhouse Gas Intensity (GHGI) has been included as a metric in Burlington, Ottawa and Whitby's GDS programs. These metrics have the advantage of delivering demonstrable energy savings and emissions reductions compared to a 'percent better' or reference approach.
Energy Modeling.	As outlined in the *Edmonton Emissions Neutral Buildings report,* energy modeling can be used to explore energy and cost saving measures if incorporated early in the design phase. As highlighted in planning and permitting statistics, Edmonton's builders prefer to use the performance path over the prescriptive path. As such, the need for additional resources needed to run multiple energy model iterations will be minimal. Providing financial and/or technical support for energy modelling has the potential to unlock the significant value building energy modelling can have on a project. By utilizing energy modelling early in building design, both energy and cost can be optimized for and reduced, achieving energy, emissions, and economic goals.[84]
Engage early in compliance enforcement.	This includes increased training for building and inspection officials as well as linking robust compliance reporting to any potential funding arrangements.

The *Edmonton Energy Transition Strategy* mentions a couple of incentive programs that could be used to promote building emission neutrality. This includes a Building Energy Benchmarking Program which is "a rebate for a voluntary program that invites Edmonton's large commercial, institutional, industrial, and multi-family buildings to submit their energy performance data to the City for benchmarking and disclosure purposes".[85] In addition, there is a pilot Clean Energy Improvement Program for residential and commercial energy efficiency/ renewable energy retrofit financing. However, it is clear that more is required to move along the Emission Neutral Buildings pathway and to achieve net-zero by 2050.

As noted earlier, Edmonton's Energy Transition Strategy includes plans to explore various types of incentives to encourage above building-code construction with the following dates listed below. To date, the report authors are unaware of the incentive based approach the City plans to use.

"Provide incentives for new construction to build above Building Code. Incentives will be performance based and increase as follows: 2022 Tier 1; 2025 Tier 2; and 2028 Tier 3. The industry advisory group will provide ongoing advice on the incentives."[86]

Direct financial incentives are permissible under the MGA. Municipalities have authority under the MGA to impose fees associated with its licensing, permitting and approval systems which could include the use of fee rebates or exemptions.[87] While there are limitations on municipalities providing loans, there are provisions which enable the use of PACE loans (discussed below).[88] Any grants made by a municipality must be included in its operating budget.[89]

Grants: are the most direct form of financial support
Energy advisors help to model the energy use in a proposed building by modelling space heating, ventilation, lighting, appliance and plug loads. This energy model accounts for the size and geometry of the building, the climate at the building's location, the effective insulation values of assemblies such as walls, ceilings, windows and doors, and the mechanical systems.

An energy advisor grant or incentive can encourage the use of an energy advisor by helping to offset the costs for Part 9 builders. The energy advisor can review plans,

model energy consumption, conduct air tightness testing and verify the plans and as-built home to ensure compliance with energy performance requirements.

Example: CleanBC New Construction Rebate Program

The CleanBC Better Homes New Construction Program provides rebates up to $15,000 for the construction of new, high-performance, electric homes.[90]

Loans: Municipalities can provide access to long term, low interest loans to help subsidize the cost of energy efficiency performance in new buildings. The most widely implemented version of this in the US is through a property assessed clean energy (PACE) loan. PACE programs allow property owners or builders to finance the up-front cost of building energy efficiency upgrades — such as more efficient heating systems, or building envelopes — by paying the costs back over time via a voluntary property tax assessment where the assessment is attached to the property, not an individual. In many jurisdictions, PACE financing is applicable to both retrofit existing buildings and to upgrade new construction projects. Examples of PACE programs include: Toronto's Home Energy Loan Program (HELP) allows building owners and operators to finance energy efficiency improvements with no out-of-pocket costs and repay the loan as an additional assessment on their local property-tax bill.

Alberta's version of PACE financing is referred to as the Clean Energy Improvement Program (CEIP) which is permitted by amendments made to the MGA in 2018, along with supporting regulations.[91] CEIPs are put into place via passage of a municipal bylaw, which has been done in Edmonton. Under the MGA, CEIPs can apply to private residential or non-residential properties (but not industrial properties). New construction does not qualify for CEIP loans but legislative amendments could be made to clarify that CEIPs could extend to new construction.

Example: Permit fee rebates or exemptions

Municipalities charge permit fees to cover the costs of regulating and inspecting new construction. They can offer rebates or fee exemptions on these fees as a way to incentivize energy efficient new construction.

Example: The Comox Valley Regional District (CVRD) building permit fee rebate

The CVRD offered a scaling rebate on building permits fees for projects that met step 3-5 of the Energy Step Code. The rebate ratcheted up from 25% for Step 3 to 100% for Step 5.[92]

Analysis

Direct financial incentives can be quite costly for the municipality, both financially and administratively as the municipality must find ways to balance the level of incentives with municipal budget requirements, as well as account for the increased administrative burden. Direct financial incentives can also create a patchwork approach to building performance.

Costliness to the municipality: Grants and permit rebates can be a costly way to achieve emissions reductions in new construction. Currently the City of Edmonton charges between $3887.60-$11487.30[93] for all fees associated with building a single detached home. If the City were to waive these charges it would result in a major loss of revenue. Many municipalities use the revenue from development and building permit fees to finance staff positions in their development permitting departments. If this revenue was to be lost it would be needed to be made up through general revenue from property taxes.

Administrative burden: The costs associated with applying for, receiving, and participating in financial incentives such as PACE financing, grants and rebates can generate a significant administrative burden for the municipality. This administrative burden takes staff away from operational needs and requires staff to spend their limited time responding to requests for information. Many municipalities have applied an iterative process to simplify, reduce, and condense various application and reporting requirements, as well as sought opportunities to streamline and reduce the regulatory and reporting regime related to financial incentives for new construction.

Patchwork approach: Grants, permit rebates, and other financial incentives can make a jurisdiction more cost competitive for new development than neighbouring municipalities. This can create a scenario in which builders may engage in “jurisdiction shopping,” a scenario in which they seek to leverage one municipality over another, or

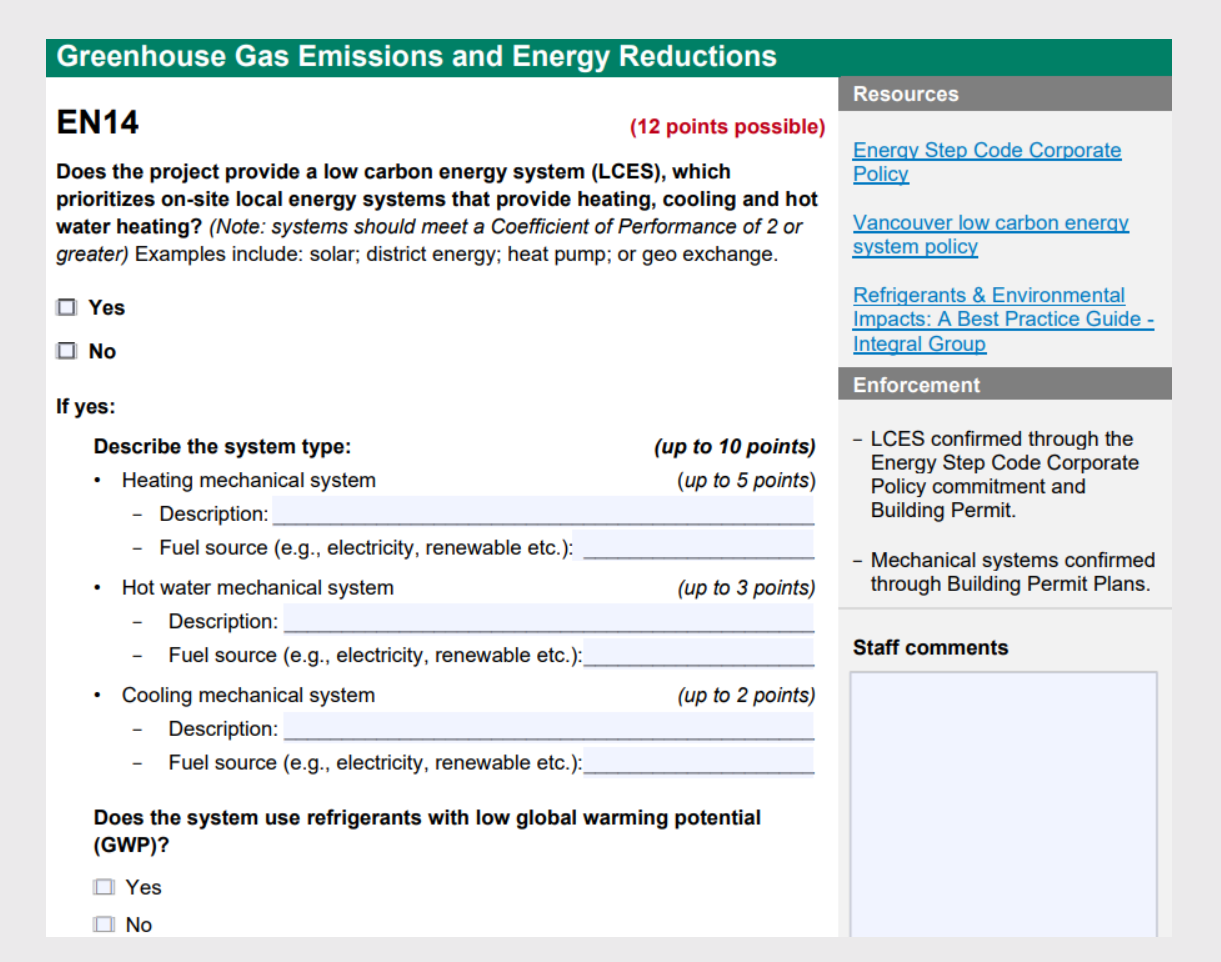
choose to operate in the municipality with fewer regulations. Municipalities can avoid this scenario by collaborating with neighbouring municipalities.

Education and awareness tool that support incentives and regulations

- Sustainability Checklists or Report Cards as part of the DP
- Building Energy Benchmarking
- Individually-Negotiated Benefits: "Municipalities may also enter into individual development benefit agreements, which may include adhoc benefits (site-specific uses or relaxations), or contributions to offset impacts such as the loss of heritage assets. This approach is sometimes used in Calgary through a direct-control district."

Examples

City of Port Moody: Requires developers to fill out a point based Sustainability Checklist for all rezoning, heritage revitalization agreement, heritage alteration permit, and some development permit applications. The report card identifies performance measures in four sustainability categories, including climate and energy. The image below outlines the Green Gas Emissions and Energy Reduction section of the report card and the performance measures used to evaluate development proposals.



Greenhouse Gas Emissions and Energy Reductions

EN14 **(12 points possible)**

Does the project provide a low carbon energy system (LCES), which prioritizes on-site local energy systems that provide heating, cooling and hot water heating? *(Note: systems should meet a Coefficient of Performance of 2 or greater)* Examples include: solar; district energy; heat pump; or geo exchange.

☐ **Yes**

☐ **No**

If yes:

Describe the system type: ***(up to 10 points)***

- Heating mechanical system *(up to 5 points)*
  - Description: _____
  - Fuel source (e.g., electricity, renewable etc.): _____
- Hot water mechanical system *(up to 3 points)*
  - Description: _____
  - Fuel source (e.g., electricity, renewable etc.): _____
- Cooling mechanical system *(up to 2 points)*
  - Description: _____
  - Fuel source (e.g., electricity, renewable etc.): _____

Does the system use refrigerants with low global warming potential (GWP)?

☐ Yes

☐ No

Resources

Energy Step Code Corporate Policy

Vancouver low carbon energy system policy

Refrigerants & Environmental Impacts: A Best Practice Guide - Integral Group

Enforcement

- LCES confirmed through the Energy Step Code Corporate Policy commitment and Building Permit.
- Mechanical systems confirmed through Building Permit Plans.

Staff comments

Emissions impact

The project team undertook an emission modelling exercise to quantify the potential emissions impact associated with the adoption of high impact policy approaches that apply to all new construction and are aligned with the highest Tiers of the NCB/NECB. (Please read the conclusion for further analysis on these policy approaches).

The following chart shows the results of the modelling and the emission reduction potential from the different Tiers of the code for residential and commercial buildings at different time frames. The total cumulative emissions savings to 20 years from all building types under Tier 5 of the national codes amounts to 13,841,855 tonnes of C02 equivalent. This is equal to 3,080,232 gasoline-powered passenger vehicles driven for one year.[94]

Figure 8: Potential emission reduction from the different Tiers of the 2020 model codes for residential and commercial buildings

	Tonnes				
NBC and NECB Summary	**Tier 1**	**Tier 2**	**Tier 3**	**Tier 4**	**Tier 5**
Annual Savings from residential buildings under NCB / NECB pathway	0	11,061	22,121	36,137	54,122
Annual Savings from commercial building under NBC / NECB pathway	0	4,913	9,826	11,791	11,791
Cumulative Savings to 7 years from residential buildings under NBC / NECB pathway	0	309,694	619,388	1,011,842	1,515,422
Cumulative savings to 7 years from commercial buildings under NBC / NECB pathway	0	137,566	275,133	330,159	330,159
Cumulative Savings to 20 years from residential buildings under NBC / NECB pathway	0	2,322,705	4,645,410	7,588,812	11,365,662
Cumulative Savings to 20 years from commercial buildings under NBC / NECB pathway	0	1,031,747	2,063,494	2,476,193	2,476,193
Total annual savings from all building types under NBC / NECB pathway	0	15,974	31,947	47,929	65,914
Total cumulative savings to 7 years from all building types under NBC / NECB pathway	0	447,260	894,521	1,342,001	1,845,581
Total cumulative savings to 20 years from all building types under NBC / NECB pathway	0	3,354,452	6,708,904	10,065,005	13,841,855

Conclusion

Summary table

The following chart provides a high level overview of the various policy approaches explored in this report that are within the City's legal jurisdiction. This quick summary includes information on the impact of each action based on cost to the City, feasibility (outside of legal jurisdiction), affordability, climate resiliency, ease of effort, emission impact and energy efficiency impact.

Figure 9: Overview of policy approaches

Impact	Building Permit – Code (Following NECB and NBC (AE))	Development Permit - Green Development Standards	Density Bonus	Rezoning Policy	Direct financial incentives
Cost (to the City)*	Low ●	Low ●	Low ●	Low ●	Higher ●
Relative challenges in implementing (outside of legal jurisdiction)	Low ●	Low ●	Moderate ●	Challenging ●	Challenging ●
Impact on affordability	Moderate ● (NBC (AE)/ NECB upper tiers) Low ● (emissions code)	Low ● (2 – 3 items from a checklist) Higher ● (implementing the full suite of actions)	Low ●	Moderate ●	Low ●
Improves climate resiliency	Yes ● (NBC (AE)/NECB tiers and the net zero emissions)	Yes ● (Full suite of actions)	Moderately ●	Moderately ●	N/A
Ease of Effort*	Moderate ●	Moderate ●	Low ●	Low ●	Higher ●

Emissions impact	Higher ●	Higher ●	Low ●	Low ●	Low ●
Energy efficiency impact	Higher ●	Higher ●	Low ●	Low ●	Low ●

*Ease of Effort refers to the number of staff positions required to administer each policy

*Cost to implement include the number of staff, which include policy development and compliance, and the budget needed to implement each initiative. The highest cost initiatives are those that require financial incentives directly to builders/developers.

Final remarks

This research has clearly indicated that Edmonton is well-positioned to start building emissions neutral buildings today. The City should demonstrate leadership by immediately exploring the establishment of emission neutral building requirements through the powers in the City Charter or a Green Development Standards approach. To have the greatest impact on emissions reductions and to ensure equity, these new requirements should be applied to all construction, both residential and commercial.

The imperative for action is acute as Edmontonians are experiencing the impacts of rising temperatures and increased storms. Acting quickly will contribute to meeting the City's climate goals, protect building owners and occupants from rising energy costs, and alleviate adding to future retrofit burden.

Appendix A: Building codes and the environment objective

In the early 2000s, Canada adopted an “objective-based” building code system. This system ties the provisions (requirements) of the model code to five objectives. These include safety, health, accessibility for persons with disabilities, fire and structural protection of buildings, and the environment. Found within Division A of the model codes, these objectives provide information for code-users to achieve code compliance with both objectives and sub-objectives, as well as “policy” level information that reflect Canadian’s expectations related to the design, construction and operation of buildings. The model code’s requirements can be considered as the minimum acceptable measures required to adequately achieve these five objectives.

A key objective of interest is the Environment objective. It sets out to “limit the probability that, as a result of the design or construction of the building, the environment will be affected in an unacceptable manner.”[i] An accompanying sub-objective, ‘Resources,’ is intended to limit the likelihood resources used in the design or construction of the building will have an unacceptable environmental impact.

Notably, this includes environmental impacts caused by excessive energy use, but not those arising from emissions related to building operations or materials used in a building’s construction.

The Province of Alberta will be adopting the lowest tier of the 2020 model codes effective in 2024[95]. However, even at the most stringent tiers of the 2020 model codes, emissions from building operations, largely from space conditioning and hot water heating, or the carbon embodied in construction materials, cannot be tackled directly through our current building codes. A gap noted by advocates and sub-national governments alike. To remedy this gap, Canada’s national net zero emissions code is now under development and expected to be available for provincial adoption in 2025 and, in a best case scenario, implemented in late 2026. At that time, the net zero emissions code will regulate operational emissions, with measures for embodied emissions on hold until 2030. In the interim, leading municipalities such as Edmonton can prepare their local markets for the introduction of the net zero emissions code, and act as a catalyst for the province as a whole, by setting a standard of excellence in

newly constructed emissions neutral buildings as part of the Community Energy Transition Strategy.

Appendix B: Critical success factors for implementation

Industry readiness

The readiness of industry to take on new regulations is a consideration Edmonton should keep in mind before implementing any sort of new incentive based or regulatory action. Fortunately, the City already has these considerations in mind and has begun the process of initiating an Emission Neutral Knowledge Exchange modeled off the Zero Emission Building Exchange incubated by the City of Vancouver. Edmonton's Energy Transition Strategy identifies the following actions underway the Emissions Neutral Pathway:

2.3 Establish an Emission Neutral Building Knowledge Exchange collaborative platform/hub that includes working with collaborators, such as post secondary institutes, on training.

2.5 Continue the Building Blocks information and discussion series to support learning and discussions on high performance buildings, and industry best practices.

Cost of ownership

Aside from being a necessity for achieving Edmonton's climate change targets, neutral emission buildings hold great appeal for Edmonton's citizens in terms of savings associated with energy efficiency. Alberta has among the highest energy costs in the country.[96] Between November 2020 and 2021, Alberta's energy prices increased by 34% as a result of a colder-than-normal winter, relatively high wholesale market prices and energy providers' variable-based pricing models.[97] As stated by Guidehouse Canada Ltd. in its report for the Alberta Energy Efficiency Alliance:

> Alberta does not integrate efficiency into its management of the electricity and natural gas utility systems. As a result, Albertans pay more than they need to for utilities, in both economic and environmental costs.[98]

In light of increasing and more volatile energy costs – in part due to the frequency of extreme weather events associated with climate change[99] – emission neutral buildings are becoming more attractive across residential, commercial, institutional, and industrial sectors.

Construction cost analysis

The incremental cost of new building regulations is another critically important consideration in light of the challenges that many Canadians are facing securing housing. The Table below highlights the Intermediate and ENBR path for a number of different archetypes, and illustrates the energy reduction, energy use intensity, thermal energy demand intensity, and emissions reduction available in each of those paths. This table also highlights the capital cost increases and 30 year net present value over the baseline value associated with each path.

Capital cost increases are those related to the design and construction of each archetype, rather than say the final purchase price to the end consumer. The ENBR path realizes significant energy use reductions and emissions reductions through additional energy conservation measures, and which are associated with cost increases that range from a low-end of 1% over the baseline for High-Rise Commercial Buildings, to a high of 11% over baseline costs for a Row House. Nonetheless, these two archetypes also demonstrate the highest 30-Year-NPV over the baseline at 6% and 9%, respectively, demonstrating the long-term value to consumers and building owners of emissions neutral buildings.

Moreover when compared to the Intermediate path, the value of the fully electrified ENBR is demonstrably clear. Investments made in ENBR may be associated with higher capital costs, but are a positive long-term financial investment, aside from the numerous climate resiliency and adaptation, comfort, and health benefits associated with ENBR.

		Detached Single Family Home	Row house	High-Rise Residential	High-Rise Commercial	Low-Rise Commercial
Energy						
Energy Reduction from Baseline (%)	Intermediate	48%	52%	51%	48%	46%
	ENBR (Electrified)	63%	67%	53%	61%	59%
Energy Use Intensity (kWh/m2)	Baseline	175	187	229	254	226
	Intermediate	92	90	112	131	123
	ENBR (Electrified)	66	61	107	98	93
Thermal Energy Demand Intensity (kWh/m2)	Baseline	100	119	91	122	89
	Intermediate	36	36	28	35	36
	ENBR (Electrified)	36	38	27	35	36
Emissions						
Emissions Reduction from Baseline (%)	Intermediate	34%	37%	42%	34%	40%
	ENBR (Electrified)	20%	26%	12%	13%	38%
Cost						
Capital Cost Premium over Baseline (%)	Intermediate	6%	6%	3%	1%	2%
	ENBR (Electrified)	10%	11%	3%	1%	3%
30-Year NPV over Baseline (%)	Intermediate	2%	4%	0%	-1%	-2%
	ENBR (Electrified)	6%	9%	3%	0%	0%

Adapted from https://www.edmonton.ca/sites/default/files/public-files/assets/PDF/2020-10-13-

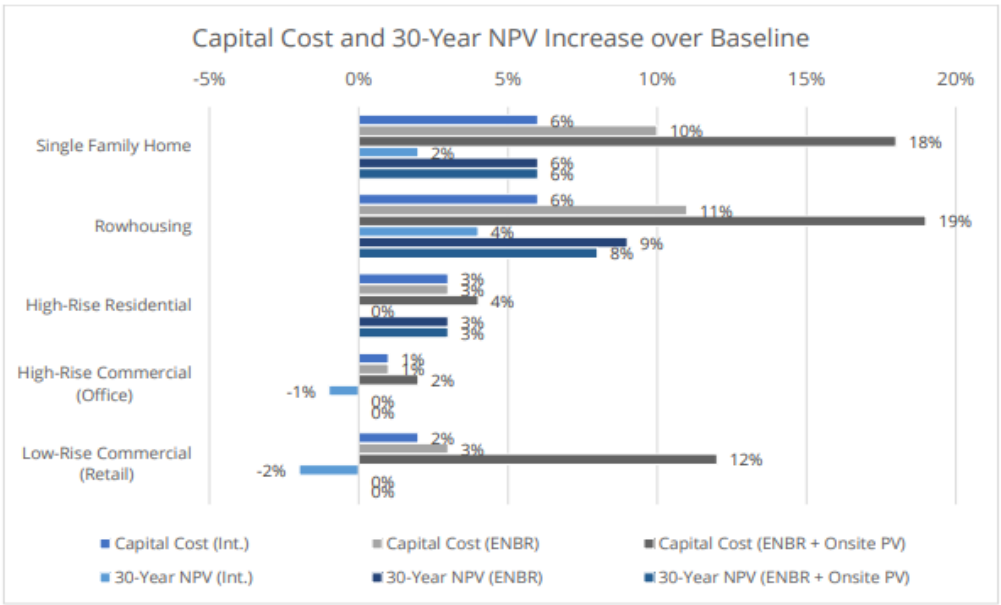


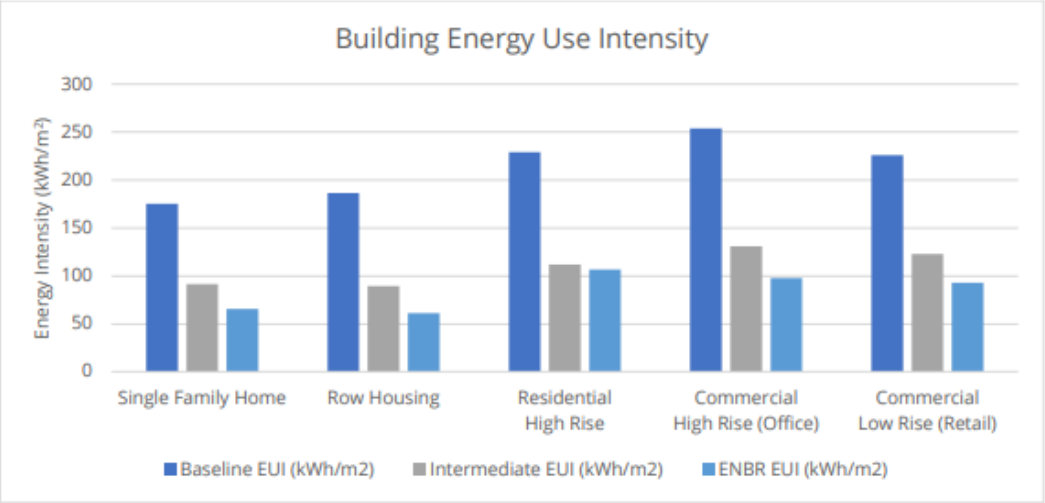
Figure 18: Capital Cost and 30-Year NPV Difference Comparison

EdmontonEmissionsNeutralBuildings.pdf?cb=1631929454

Current state of the industry[100]

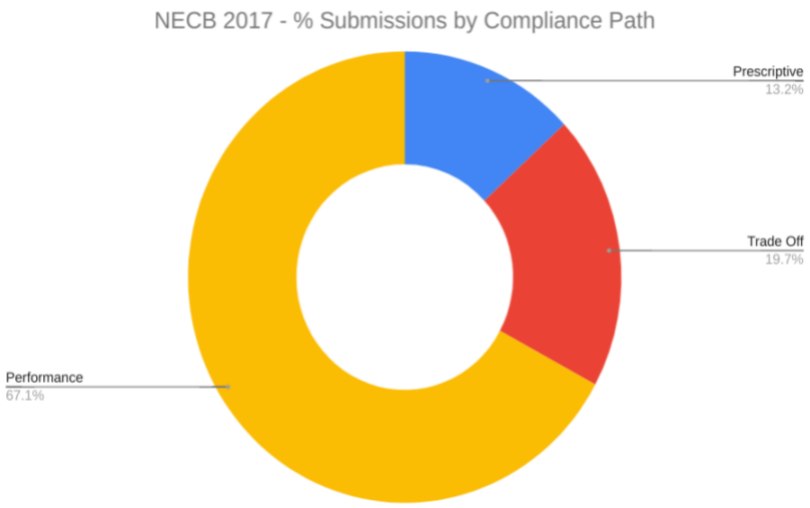
Building performance

The energy use intensity of the Baseline, Intermediate, and ENBR targets for each building archetype show a baseline EUI target above 150 kWh/m2. This target falls significantly in the Intermediate and ENBR paths.

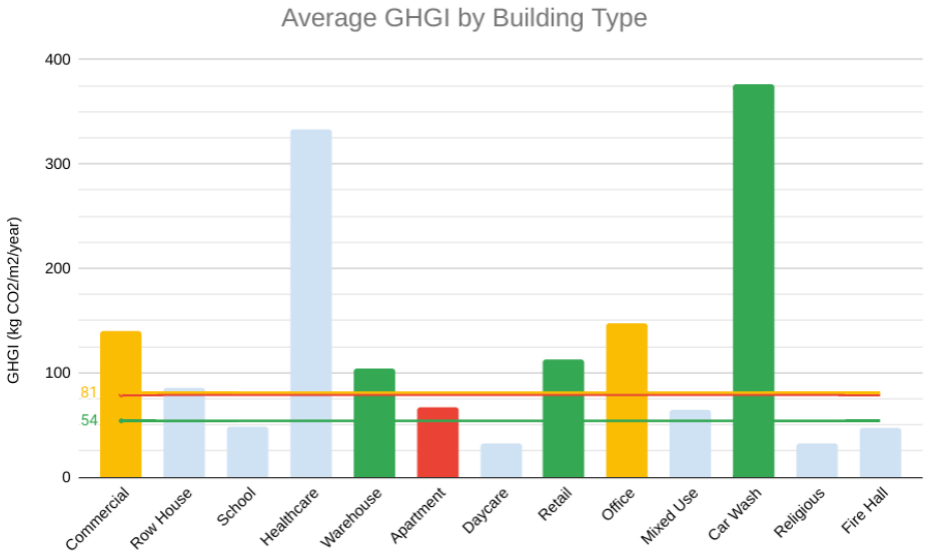


Permitting data provided by City staff highlights the gap between today's current practices and the Intermediate and ENBR paths. In 2020, no Part 3 or Part 9 buildings reached the EUI targets for either path.

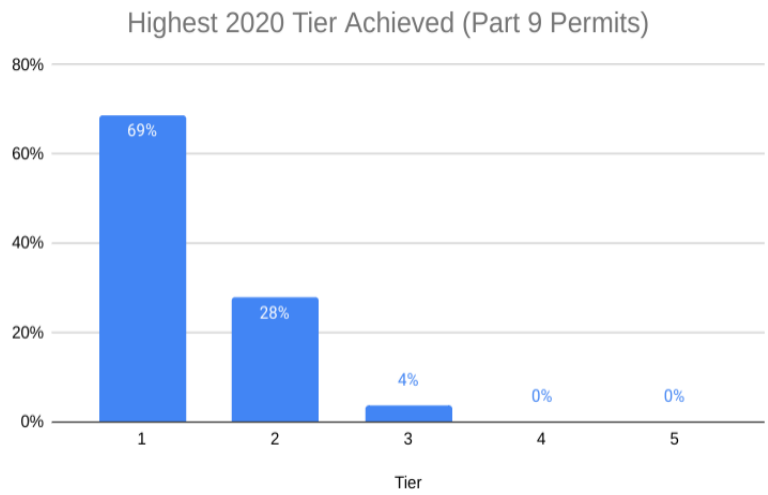
In 2020, the City of Edmonton issued 76 permits for Part 3 buildings. Of these building permits, 10 selected the prescriptive compliance path, 15 selected the trade-off path, and 51 chose the performance path. Of those within the performance path, 7% met or exceeded Tier 2 requirements for NECB 2020.



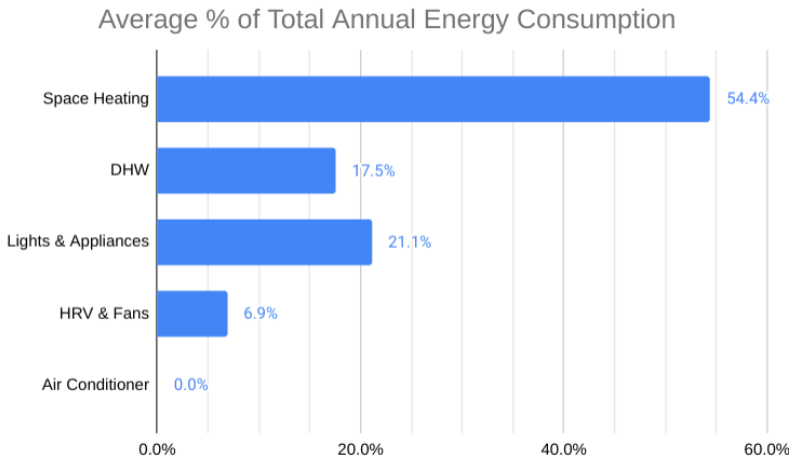
As illustrated in the graph below, GHGI emissions from different building types vary widely amongst Part 3 buildings. However, a common theme in all buildings under review indicates that the vast majority of emissions in new construction arise from heating and cooling systems, as well as hot water systems as they are predominantly fueled by natural gas.



In terms of Part 9 buildings, there were 367 permits issued in 2020. Of these building permits, 114 selected the prescriptive compliance path, 13 selected the trade-off path, and 237 chose the performance path. Of those within the performance path, nearly half (46%) of performance path permit submissions were submitted by 7 of 13 builders.



Overall, 4% met or exceeded Tier 3 requirements for NECB 2020, 28% met or exceeded Tier 3 requirements for NECB 2020, and the remainder met or exceeded Tier 3 requirements for NECB 2020.



For Part 9 permit submissions, energy use is dominated by space heating and cooling (54.4%), followed by lights and appliances (21.1%), and domestic hot water systems (21.1%). Given the predominance of energy use allocated to space heating and cooling, as well as hot water heating, it can be expected that fuel switching from fossil fuels to other low-emissions sources will result in significant emissions reductions.

Appendix C: Bylaw validity test under Section 66 of the *Safety Codes Act*

Language similar to section 66 of the *Safety Codes Act* was considered by the Ontario Court of Appeal in its *Peacock v Norfolk* decision.[101] Section 61(1) of Ontario's *Nutrient Management Act, 2002* provided that a "regulation superseded a by-law of a municipality or a provision in that by-law if the by-law or provision addresses the same subject matter as the regulation". [102] In this case, a municipal bylaw restricted the location of intensive livestock operations and associated nutrient facilities (ILOs) within "sensitivity areas". Provincial regulations under the *Nutrient Management Act, 2002* created set-backs from municipal wells and other requirements for ILOs. The applicant hog farmers complied with the regulatory requirement and obtained a provincial approval for an expansion; but the municipality's bylaw prohibited the expansion since it was within a sensitivity area.

The Ontario Court of Appeal stated that the default test for reconciling overlapping provincial statutes and municipal bylaws is **impossibility of dual compliance**. This test requires that (1) a municipal bylaw deal with the same subject matter as a provincial statute and that (2) compliance with one necessarily means non-compliance with the other.[103] In that case, a municipal by-law is inconsistent with a provincial statute and is invalid. However, as in this case, statute may change the test for reconciling overlapping municipal by-laws and provincial statutes. In this case, due to section 61(1) of the *Nutrient Management Act, 2002*, the question became whether the bylaw addressed the **same subject matter** as the regulation.

In order to answer this question, the majority of the Ontario Court of Appeal said that it must look beyond the direct legal effect and consider the object/purpose of the provisions, and compare all similarities between the two laws. The majority of the Court stated that it is inappropriate to use the "pith and substance" approach which focuses on the dominant feature of the laws. Rather, section 61(1) demands a comparison of all the similarities of the laws, and the Court must look beyond the direct legal effect of the two laws and instead consider the purpose or object of each. In this case, the majority of the Ontario Court of Appeal found that the by-law was inoperative because it dealt with the same subject matter as the provincial regulation, regulation of ILOs. By prohibiting ILOs within sensitivity areas), the bylaw deals with the same subject matter

and has the same purposes of the provincial regulation which manages ILOs and would permit the ILOs in this case.

The dissenting decision in *Peacock* used a different approach to determining whether the two laws addressed the same subject matter. The dissent stated that the subject matter of a bylaw or regulation has to do with its "pith and substance", or in other words its dominant feature. In this case, the two laws had similar purposes which were to be achieved with different means, which meant that their effect and subject matter were not necessarily the same. The dominant feature (subject matter) of the regulation was management of ILOs whereas the dominant feature (subject matter) of the bylaw was prohibition of many land uses potentially harmful to groundwater quality (and not just the provision for ILOs). Because the two laws did not address the same subject matter, the bylaw was not superseded by the regulation. The dissent then went on to consider whether the bylaw was rendered inoperative by the "impossibility of dual compliance", which it was not. As such, the dissent concluded that the bylaw was valid.

In the case of overlapping bylaws and provincial statutes, the test becomes whether the municipal bylaw addresses the **same subject matter** as the provincial regulation by operation of section 66 of the *Safety Codes Act*. The decision in *Peacock* suggests that the test of **same subject matter** is answered by looking at the object and purposes, as well as similarities, between the bylaw and provincial statute. Using this analysis, this means that an emission neutral building municipal bylaw would have to be crafted to avoid addressing the same subject matter as existing building codes or run the risk of being declared inoperative by the operation of section 66 of the *Safety Codes Act*. Of course, this is setting aside the fact that the *City Charter* confers jurisdiction on the City of Edmonton to make bylaws addressing the same matters covered in the *Safety Codes Act*.

Appendix D: Judicial Review of Municipal Bylaws

As stated in *Koebisch*, zoning decisions must be reasonable.[104] In the *Koebisch* case, three bylaws which redesignated lands from "ranch and farm district" to "natural industrial district" in order to facilitate gravel extraction developments were challenged. The Court reviewed the municipality's decisions to make the bylaws using a reasonableness standard, meaning that the decisions could not be "aberrant, overwhelming, or decisions that no reasonable municipality would have taken".[105] The Court stated it is not its role to "weigh the policy choices or social, economic, or political factors that were before council"[106] but rather whether the decisions were reasonable. As well, the Court pointed out that decisions must be consistent with any mandatory requirements (if any) that are set out in a municipal development plan.[107]

In *Howse*, the Alberta Court of Queen's Bench recently confirmed that reasonableness is the appropriate standard of review with respect to a bylaw legal challenge under section 536 of the MGA.[108] However, for questions involving procedural fairness, the standard of review is correctness. The *Howse* case involved numerous litigants, one group of which sought to maintain the *status quo* of their neighbourhood (i.e. single family homes) and another which sought to increase the density of the neighbourhood (this included the City of Calgary). The City passed bylaws adopting an Area Redevelopment Plan (ARP) which enabled densification of the neighbourhood, and sought to discharge a restrictive covenant that restricted land use to single or semi-detached homes and which applied to numerous sites. Ultimately, the Court found that the City did not exceed its jurisdiction when passing the bylaws and did not breach procedural fairness. The restrictive covenant was not discharged because the statutory test required a conflict and the Court found there was no impossibility of dual compliance even though the goals, objectives and vision of the ARP and the restrictive covenant were fundamentally incompatible.

Whitby Green Development Checklist

Citations

[1] https://www.alberta.ca/release.cfm?xID=89499F35D082F-F083-59A3-920292FFE3C5AE94
[2] Ibid.
[3] https://www.edmonton.ca/sites/default/files/public-files/documents/PDF/EnergyTransitionStrategy2021-04-20.pdf
[4] *Edmonton Transition Strategy* at 13.
[5] *Edmonton Transition Strategy* at 13.
[6] *Edmonton Transition Strategy* at 19.
[7] *Edmonton Transition Strategy* at 20.
[8] *Edmonton Transition Strategy* at 26.
[9] York, Dan, Bastian, Hannah, Relf, Grace and Amann, Jennifer. Transforming Energy Efficiency Markets: Lessons Learned and Next Steps. December, 2017
[10] Geller, Howard and Nadel, Steve, 1994. Market Transformation Strategies to Promote End-Use Efficiency. ACEEE
[11] Nevius, M., L. Hoefgen, L. Wilson-Wright, and C. Browne. 2013. A Review of Effective Practices for the Planning, Design, Implementation, and Evaluation of Market Transformation Efforts. Somerville, MA: NMR Group.
[12] *Terrigno v Calgary (City)*, 2021 ABQB 41 (CanLii) at para. 61.
[13] *Bell ExpressVu v Rex*, [2002] 2 SCR 559, paraphrasing para. 26. The SCC indicated that in the event of ambiguity, other principles will apply (such as strict construction of penal statutes and the *Charter* values presumption). Ambiguity only arises when there are two or more plausible readings (after undertaking a contextual and purposive approach) that are equally in accordance with the intentions of the statute. See also *Merk v International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers, Local 771*, [2005] 3 SCR 425.
[14] Ibid. at para. 27.
[15] *United Taxi Drivers' Fellowship of Southern Alberta v Calgary (City)*, [2004] 1 SCR 485 [United Taxi].
[16] *Terrigno v Calgary (City),* 2021 ABQB 41 (CanLii). See also *Kozak v Lacombe (County)*, 2017 ABCA 351 (CanLii) and *Condo Corporation No. 0410106 v Medicine Hat (City)*, 2019 ABCA (CanLii)
[17] *Municipal Government Act*, RSA 2000, ch. M-26 [MGA].
[18] *City of Edmonton Charter, 2018 Regulation*, A.R. 39/2018 [*City Charter*].
[19] *Safety Codes Act*, RSA 2000, ch. S-1. There are some other pieces of legislation – including the *Environmental Protection and Enhancement Act*, the *Historical Resources Act*, the *Hydro and Electric Energy Act*, and the *Alberta Land Stewardship Act* – which confer some authority on municipalities.
[20] MGA, s. 3.
[21] MGA, s. 5.
[22] MGA, s. 6.
[23] MGA, s. 7.
[24] Alta. Reg 39/2018.
[25] *City Charter*, s. 7(2).

[26] *City Charter*, s. 4(2) renumbers MGA, s.7 as s. 7(1) and adds s. 7(1)(h). The *City Charter,* ss. 9 and 10 set out public hearing and publication requirements for bylaws made pursuant to these expanded powers.
[27] *City Charter*, s. 4(4) adds MGA, s. 8.1. Note that municipal purposes are found in s.3 of the MGA. The *City Charter,* ss. 9 and 10 set out public hearing and publication requirements for bylaws made pursuant to these expanded powers.
[28] MGA, s. 8.
[29] MGA, s. 8.
[30] MGA, s.13.
[31] MGA, s. 617.
[32] *City Charter*, s. 4(32) which amends MGA, s.617(b).
[33] MGA, Part 17, Division 5. The *City Charter* changes the provision regarding the land use bylaw requirements: *City Charter*, s.4(35) which amends s. 640.
[34] MGA, Part 17, Division 6. The *City Charter* makes several changes around off-site levies: *City Charter*, ss.4(35.1) to 4(35.5) and adds provisions regarding affordable housing agreements: *City Charter*, ss. 4(36) to 4(36.1)
[35] MGA, Part 17, Division 7.
[36] MGA, Part 17, Division 12. The *City Charter* makes changes to MGA, s. 694(1)(j): *City Charter*, s. 4(38.1).
[37] *Building Code Regulation*, AR 31/2015.
[38] Ibid., ss. 1 and 2. National Research Council of Canada, *National Building Code – 2019 Alberta Edition* (Ottawa: 2019, National Research Council of Canada) and National Research Council of Canada, *National Energy Code of Canada for Buildings, 2017* (Ottawa: 2017, National Research Council of Canada). It should be noted that in 2024, these codes will be replaced with National Research Council of Canada, *National Building Code – 2022 Alberta Edition* (Ottawa: 2023, National Research Council of Canada) and National Research Council of Canada, *National Energy Code of Canada for Buildings, 2022* (Ottawa: 2023, National Research Council of Canada) as per *Notice March 2023,* online: https://open.alberta.ca/dataset/d9788033-eb09-4514-b28d-51f1089ea4c7/resource/88a37915-cc01-428a-9b9a-601581e57537/download/ma-notice-upcoming-new-alberta-codes-editions.pdf
[39] NEBC at 1.1.1.3.
[40] Ibid.
[41] Ibid.
[42] NECB at vi.
[43] NBC (AE) at 9.36.1.3.
[44] NECB at vii.
[45] NECB at 2.2.1.1. and NBC (AE) at 2.2.1.1. (OE). Note that the NECB environment objective references only buildings whereas the NBC (AE) references buildings and facilities.
[46] NBC (AE) at 9.7.3.3.
[47] NBC (AE) at 1.2.1.1.
[48] NBC (AE) at OE and OE 1.
[49] NBC (AE) at OE 1.1.
[50] NBC (AE) at 3.2.1.1 (1) F90 to F99.

[51] NBC (AE) at x. See *Safety Codes Act* at s. 38.
[52] NECB at 2.2.1.1, Objective OE.
[53] NECB at 3.1.2.1, Functional Statements F90 to F100.
[54] See Peter W. Hogg, *Constitutional Law of Canada* (Toronto: 2007, Carswell) at sections 16.6 and 35.3 for discussion of "invalid" versus "inoperative" laws.
[55] *Kozak v Lacombe County*, 2017 ABCA 351 (CanLii).
[56] Ibid. at para. 67.
[57] Ibid. at para. 67.
[58] Ibid. at para. 67.
[59] MGA st s. 640.
[60] See pg 42 Edmonton's Community Energy Transition Strategy and Action Plan
[61] Rezoning and Plan Amendments | City of Edmonton
[62] Policy: Green Buildings for Rezonings (vancouver.ca)
[63] Climate Ready Rezoning Policy | District of North Vancouver (dnv.org)
[64] MGA at s. 640.
[65] MGA at s. 640(2)(a).
[66] MGA at s. 640(2)(a).
[67] MGA at s. 642.
[68] MGA at s. 642.
[69] MGA at s. 641.
[70] MGA at ss. 640(2)(a)-(b), and 642.
[71] City of Edmonton, *Zoning Bylaw Renewal Initiative: Nodes and Corridors* (Edmonton: 2020, City of Edmonton) at 18.
[72] City of Edmonton, *Zoning Bylaw Renewal Initiative: Nodes and Corridors* (Edmonton: 2020, City of Edmonton) at 16.
[73] Ibid. at 23.
[74] Ibid. at 23.
[75] City of Edmonton, *Zoning Bylaw Renewal Initiative: Climate Resilience & Energy Transition* (Edmonton: 2020, City of Edmonton).
[76] Ibid. at 12.
[77] Ibid. at 15.
[78] Ibid. at 16 and 22.
[79] Low Carbon Incentive Program - District of Squamish - Hardwired for Adventure
[80] Bylaw 8770 (saskatoon.ca)
[81] MGA at s. 640.
[82] MGA at s. 8.
[83] Ibid.
[84] See pg 20 - Edmonton Emissions Neutral Buildings. October 2020. https://www.edmonton.ca/sites/default/files/public-files/assets/PDF/2020-10-13-EdmontonEmissionsNeutralBuildings.pdf?cb=1631929454

[85] *Edmonton Transition Strategy* at 11.
[86] Edmonton's Energy Transition Strategy, Pg. 42
[87] MGA, s. 8.
[88] MGS, ss. 264 to 268.1, and Part 10, Division 6.1.
[89] MGA, s. 243.
[90] https://www.betterhomesbc.ca/rebates/cleanbc-new-construction/#
[91] *Clean Energy Improvements Regulations*, AR 212/2018.
[92] https://www.communityenergy.ca/wp-content/uploads/2018/06/6-Comox-Valley-RD-Rural-Areas-Incentives_CVRD-Vince.pdf
[93] https://www.edmonton.ca/sites/default/files/public-files/2023-ResidentialPermits-and-Fees.pdf?cb=1690231325
[94] Calculated using the US Environmental Protection Agency Greenhouse Gas Equivalency Calculator. https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator
[95] In 2024, the existing codes will be replaced with National Research Council of Canada, *National Building Code – 2022 Alberta Edition* (Ottawa: 2023, National Research Council of Canada) and National Research Council of Canada, *National Energy Code of Canada for Buildings, 2022* (Ottawa: 2023, National Research Council of Canada) as per *Notice March 2023,* online: https://open.alberta.ca/dataset/d9788033-eb09-4514-b28d-51f1089ea4c7/resource/88a37915-cc01-428a-9b9a-601581e57537/download/ma-notice-upcoming-new-alberta-codes-editions.pdf
[96] Grant Bishop, Mariam Ragab and Blake Shaffer, *The Price of Power: Comparative Electricity Costs across Provinces* (Calgary: 2020, C.D. Howe Institute).
[97] Guidehouse Canada Ltd., *Demand Side Management Opportunities for Alberta* (Edmonton: 2022, Alberta Energy Efficiency Alliance) at 26.
[98] Ibid. at 29-30.
[99] Ibid.
[100] Permitting data provided by City of Edmonton staff for the year 2020.
[101] *Peacock v Norfolk (County)*, 2006 CanLii 21752 (ON CA).
[102] *Nutrient Management Act, 2002*, S.O. 2002, c. 4.
[103] The impossibility of dual compliance test is set out in *114957 Canada Ltée (Spraytech, Société d'arrosage) v. Hudson (Town),* [2001] 2 S.C.R. 241 , a case in which municipal pesticide bylaws were upheld despite provincial and federal regulations.
[104] *Koebisch v Rocky View (County)*, 2021 ABCA 265 (CanLii). See also *Canada (Minister of Citizenship and Immigration) v Vavilov*, 2019 SCC 65.
[105] *Koebisch* at para. 37.
[106] Ibid. at para. 42.
[107] Ibid. at para. 34.
[108] *Howse v Calgary (City)*, 2022 ABQB 551 (CanLii).