



Improving building energy efficiency in commercial and multi-family construction

Recommendations from the Minnesota Department of Labor and Industry and the Minnesota Department of Commerce informed by stakeholder workgroup activities and discussions.

December 2020

Reducing energy use, new commercial and large multifamily buildings – recommendations

Purpose and summary of recommendations

In 2019 and early 2020, the Minnesota Department of Labor and Industry (DLI) and the Minnesota Department of Commerce (Commerce), collectively referred to as the “departments,” convened an informal short-term workgroup to examine the potential for allowing local units of government to voluntarily promote or prescribe greater energy efficiency measures for commercial and large multifamily buildings. This report details the process and input from experts and stakeholders that led the departments to make the following policy recommendations:

- 1) Institute an adoption framework for the statewide commercial building energy code that ensures that all new commercial and large multifamily construction is net-zero by 2036. The state would adopt the ASHRAE 90.1 standard for commercial buildings every three years, beginning with adoption of the ASHRAE 90.1-2019, coupled with necessary energy efficiency performance requirements to meet the goal of net zero by 2036.
- 2) Provide the resources that will be needed for these recommended code improvements to be successful, including conducting a cost and market analysis.

These recommendations fulfill key design criteria generated from workgroup input:

- minimize complexity,
- maintain uniformity and predictability,
- develop state and local capacity for successful implementation, and
- provide regulatory certainty with a clear and simple enforcement/compliance regime.

Finally, the departments identified additional actions that state and local governments could consider:

- engaging with stakeholders,
- learning about needs of other building types,
- exploring ways to pilot or test out new and emerging low-carbon building models,
- developing separate, but complementary, incentives and benchmarking policies, including considering expanding use of SB2030 on new (commercial and multifamily) buildings that receive state or city financial assistance, and
- examining statewide building code enforcement.

While the departments initially considered recommending allowing municipalities a one-time voluntary option to adopt ASHRAE 90.1-2019 immediately, while the state undergoes the rulemaking process to adopt the standard statewide, this seemed contrary to the key design criteria and was removed.

Background

Operating and maintaining buildings involves the consumption of large amounts of energy. In 2017, Minnesota's building sector consumed 40.6% of the total energy consumed in the state, 19.5% of which was from within the commercial buildings sector, including large multifamily buildings.ⁱ

Minnesota is currently not on track to meet statutory greenhouse gas reduction goals of 30% reduction from 2005 levels by 2025 and 80% reduction by 2050. Efficiency in the building sector is a key contributor to meeting these goals and 23 Minnesota cities have already stepped in to help by establishing energy or climate action plans.

The formation of this workgroup provided the opportunity to consider how new commercial and large multifamily buildings can be built to mitigate climate change through the use of renewable energy and energy efficiency, while taking into account affordability (short and long term) and user comfort. As with any proposed policy, ease of implementation and cost are just some of the considerations. In 2019, Rep. Jamie Long and Sen. David Senjem introduced legislation that proposed allowing local units of government the option to adopt the SB2030 performance standards as an advanced energy building standard applied to all new commercial and large multifamily buildings.

DLI and Commerce convened an informal short-term workgroup, consisting of five meetings, to examine this complex topic and consider various policy solutions. This report provides a summary of the workgroup process, what was learned and the departments' policy recommendations. We also recognize that the scope of this work was limited, therefore, we provide suggestions for further analysis and stakeholder engagement.

Climate change, energy use, carbon emissions and buildings

The negative impacts of climate change are already being felt in Minnesota. The consequences of climate change – longer and hotter heat waves, more intense rain events and vector-borne diseases – disproportionately affect vulnerable households and overburdened communities. According to the 2019 National Climate Assessment, “without substantial and sustained global mitigation and climate adaptation efforts, climate change is expected to cause growing losses to American infrastructure and property and impede the rate of economic growth over this century.”ⁱⁱ Minnesota is one of the top five states in the nation in flood-damage costs, with 50% of flood damage actually occurring outside of designated flood zones.ⁱⁱⁱ Natural disasters in America costing \$1 billion or more in damages have increased steadily for the past decade and a half.^{iv} For tenants and building owners, there is increased financial strain and there is increased financial risk for building owners and investors, with greater instability due to greater frequency of extreme weather events. A building stock that is more resilient to power outages and planned and unplanned power interruptions, more comfortable for tenants and more energy efficient can yield numerous benefits.

According to the Fourth National Climate Assessment, “Climate change creates new risks and exacerbates existing vulnerabilities in communities across the United States, presenting growing challenges to human health and safety, quality of life, and the rate of economic growth.”^v The impacts of climate change are being felt hardest by communities that lack the resources to respond to extreme weather events. Low-income households in Minnesota spend a higher percentage of their income on energy costs than affluent households.

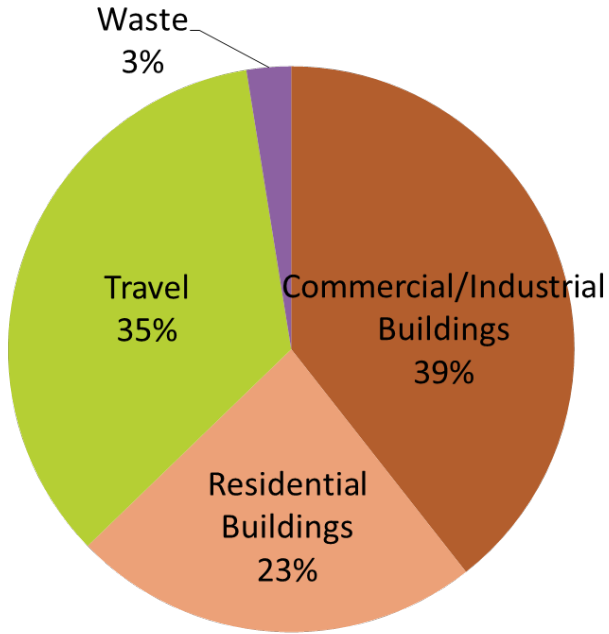
Families who face higher energy burdens often live in older multifamily buildings (or homes) that will be less able to withstand more extreme and frequent climate related disasters.^{vi} These same families often have fewer financial resources to prepare for and recover from climate-related weather disasters. Less than 40% of Americans have enough money saved to cover a \$1,000 emergency and need additional support to cover climate related costs.^{vii}

Beyond the equity and economic security benefits, addressing climate change will also have a positive health benefit by helping mitigate rising health care costs due to poor air quality, carbon emissions and other climate change-based illnesses in Minnesota. According to a Minnesota Department of Health analysis, increasing energy efficiency could benefit Minnesotans’ health through reduced emissions. Specifically, emissions reductions may reduce the risk of cardiovascular and respiratory illness as well as cancer in communities exposed to energy-related emissions.^{viii}

Minnesota is not on track to meet its statutory goals to reduce greenhouse gas emissions in the state by 30% of 2005 levels by 2025 and 80% by 2050.

Buildings make up a significant proportion of energy consumed and thus carbon emissions.

**2017 Greenhouse Gas Emissions
Breakdown for Minnesota Cities**



In cities, buildings are usually the largest aggregate source of greenhouse gas emissions. The pie chart depicts the source of greenhouse gas emissions for 20 Minnesota cities, including St. Paul, in which a third of the state’s population resides. For those 20 cities, 39% of greenhouse gas emissions in 2017 came from commercial and industrial buildings.^{ix} In St. Paul, commercial and industrial premises represented 75% of the electricity or 42% of community-wide emissions.^x

This data makes clear addressing building energy consumption will be necessary to achieve state and municipal greenhouse gas reduction goals.

Source: Regional Indicators Initiative Average

Current policy framework for new buildings limits action

Minnesota law governing a state energy code

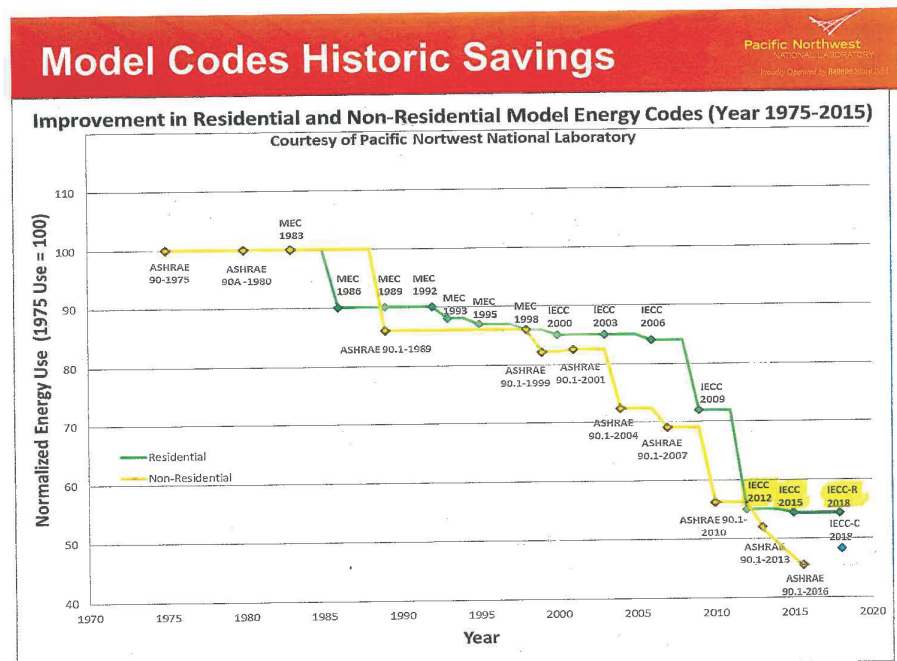
Minnesota statutes require the commissioner of DLI to establish by rule, and in consultation with the Construction Codes Advisory Council, a code of standards for the construction, reconstruction, alteration and repair of buildings, governing matters of structural materials, design and construction, fire protection, health, sanitation and safety, including design and construction standards regarding heat loss control, illumination and climate control. The code must conform, insofar as practicable, to model building codes generally accepted and in use throughout the United States. Model codes with necessary modifications and statewide specialty codes may be adopted by reference. The code must be based on the application of scientific principles, approved tests and professional judgment. To the extent possible, the code must be adopted in terms of desired results instead of the means of achieving those results, avoiding wherever possible the incorporation of specifications of particular methods or materials (Minnesota Statutes § 326B.106, subd. 1). The State Building Code is the standard that applies statewide and supersedes the building code of any municipality (Minn. Stat. § 326B.121, subd. 1).

Large multifamily buildings are apartment buildings with four or more stories and are included in the commercial energy code.

State Building Code provisions relating to heat-loss control, illumination and climate control are regulated in the Minnesota Energy Code. Minnesota is required by law to review and adopt a new commercial energy code when the U.S. Department of Energy issues a determination that the new commercial energy code is more efficient than the previous one. As a part of the State Building Code, the Minnesota Energy Code applies statewide for the construction of buildings and supersedes any similar regulation of any municipality. However, municipal enforcement only occurs in those municipalities that have adopted enforcement of the State Building Code.

Summary of Minnesota Energy Code regulation

The first commercial energy code in Minnesota was adopted in January 1976 and has a baseline rating of 100 on an energy-use scale from 1-100. By comparison, the commercial energy code in effect in Minnesota today has a rating of 48, meaning buildings constructed to this standard use 52% less energy than those constructed under the 1976 code – the *Model*



Codes Historic Savings graph illustrates the impact over time of changes in energy codes on energy use. On March 31, 2020, Minnesota adopted the 2018 International Energy Code. Buildings constructed under this new commercial energy code will be 16% more energy efficient and use 52% less energy than buildings constructed to the requirements of 1976 code. Energy savings for future model commercial energy codes are unknown at this time.

Stakeholder activities

Workgroup description and process

Workgroup composition

The commissioners of DLI and Commerce served as co-chairs of the workgroup. Individuals asked to participate in the workgroup represented a diverse range of entities, including the commercial building industry, construction subcontractors, the Minnesota Building and Construction Trades Council, commercial building owners, representatives from cities that have expressed an interest in adopting advanced building performance standards, architects, non-profit organizations with expertise in building energy efficiency, the Minnesota Housing Finance Agency, Representative Jamie Long, Senator David Senjem and non-profit organizations with expertise in affordable housing. Professor Richard Graves, director of the Center for Sustainable Building Research and an associate professor in the College of Design at the University of Minnesota, served as technical expert. Members of the workgroup were not compensated. See Appendix A for a list of workgroup members.

Workgroup meetings were open to the public and information was made available on DLI and Commerce's website at www.dli.mn.gov/about-department/boards-and-councils/building-efficiency-workgroup. Other members of the public did attend the meetings, including architects, building material companies and energy audit experts, and they provided feedback to the departments over the course of the workgroup time period.

Workgroup process

The activities of the workgroup were conducted in the fall of 2019 and winter of 2020, and included five meetings, a written survey and informal communications with workgroup members to garner feedback. See Appendix B for workgroup meeting minutes. In summary, their work can be described in several phases:

- **Information gathering and sharing:** Through presentations from or about several units of government as well as information provided by Professor Graves, Commerce and DLI, the workgroup had the opportunity to learn and share information regarding various policy options. After the first meeting, workgroup-member input was solicited through a survey, which guided the agenda and content of future meetings. In addition, at each workgroup meeting stakeholders identified opportunities, concerns and policy ideas which served to inform future meeting content.
- **Evaluation:** Based on workgroup discussions, DLI and Commerce compiled key considerations to evaluate policy options, which were used in the workgroup's discussions of policy scenarios.
- **Policy exploration and feedback loop:**

- After two meetings, DLI and Commerce generated four policy scenarios based on workgroup feedback. In the third meeting, the workgroup then gave feedback on these scenarios in both small groups and large group settings. We examined the scenarios based on compiled key considerations, as well as general advantages, disadvantages and outstanding questions. The workgroup was also asked if they had additional policy ideas to contribute that were not already represented.
- DLI and Commerce then further refined the policy scenarios based on workgroup feedback and generated two new scenarios. In the fourth meeting, workgroup members gave feedback about these scenarios, in small groups and large group settings.
- **Report drafting:** DLI and Commerce drafted this report, which summarizes the workgroup's input and offers recommendations. The workgroup had the opportunity to provide feedback on the draft report individually and at the fifth meeting.

Key considerations generated by workgroup

- Energy savings impact and carbon impact
- Benefits:
 - energy savings
 - building value, e.g. higher occupancy and resale
 - societal benefits
 - Job-creation potential
- Costs:
 - What are the additional technology costs, if any?
 - What are the related training/education costs?
 - Do costs change over time?
 - What is the impact on rebates/financing via current utility programs?
 - What are costs for typical building over lifespan?
 - What are costs of building under the new code?
 - Is public funding required?
- Adoption and implementation
 - Process for adoption
 - Does it require legislation or rule adoption?
 - Is it part of the State Code or a locally adopted ordinance?
 - Does it conflict with the statewide building code?
 - Does it impact building construction?
 - Does it impact building operations?
 - Is it a regulation?
 - Who is responsible for adoption/amendment?
 - Who is responsible for compliance and when?
 - What are the consequences and who bears liability for non-compliance?
 - Who is responsible for enforcement?
 - Does the policy work for cities of all kinds?
 - Capacity/readiness state

This report was not generated through a formal consensus-based process and therefore includes recommendations from the departments alone.

Policy options: Incentives, benchmarking, base building code, stretch codes

There are several policy options to reduce energy usage and the associated carbon emissions. Policy options fall into three categories that differ in energy savings potential and percent of buildings impacted:

- **Incentives:** Policy options that encourage building owners to incorporate energy efficiency measures, add renewable energy and/or implement other energy reduction measures. These can be in the form of loans, funding, accelerated permitting or density/height bonuses, etc.
- **Benchmarking:** Policies that require building owners to report their energy use and can be coupled with retro-commissioning and incentives to improve the performance of existing buildings.

- **Energy codes:** Base and advanced energy building standards (or stretch codes) are tools that set minimum energy conservation features or performance measures for new and substantially renovated buildings. The base code, usually adopted from national model energy codes such as ASHRAE 90.1 and the International Energy Conservation Code (IECC), is adopted by the state and affects all commercial buildings. Advanced energy building standards, or stretch codes, go beyond the base energy code and may offer a preview of the next code, potentially paving the way for future adoption.^{xi}

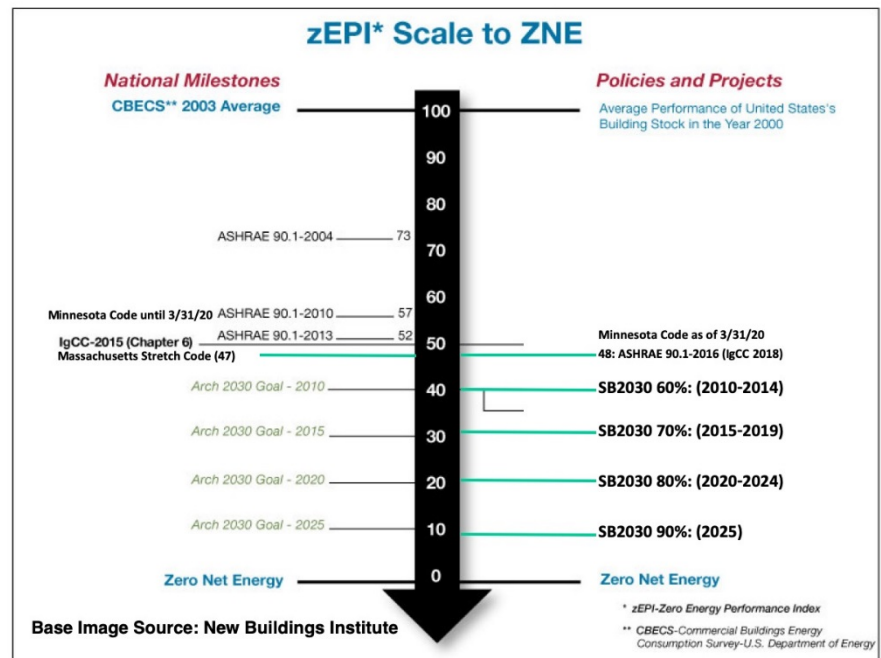
Jurisdictions that have taken action

Jurisdictions have adopted more advanced statewide codes, coupled with stretch codes^{xii}:

- **Massachusetts** adopted a performance-based code combined with prescriptive insulation, air sealing and other requirements. Cities have the option to adopt a stretch code and be designated a “Green Community” and receive state grants. It was last updated in 2017 and is due for another revision in 2020.
- **New York** adopted the NYStretch Energy, a voluntary stretch energy code for local adoption. It was developed to achieve three goals by 2030: a 40% reduction in greenhouse gas emissions, 50% of energy from renewable sources and a 23% decrease in building energy consumption.
- **British Columbia** (Canada) set a goal to have all new construction to be “net zero ready” or maximum energy efficiency by 2032. The BC Energy Step Code is an incremental step code that creates a path for the base energy code in the province to zero-energy construction. Municipalities may choose to adopt future energy code versions to meet their climate action plans.

Zero Energy Performance scale was used as a reference

The Zero Energy Performance Index (zEPI) was developed by Charles Eley to create an absolute scale benchmark for building performance and compare different energy codes. It provides a scale for measuring building energy performance based upon the energy use intensity for a building type and is adjusted for climate. The scale ranges from a “100” which represents the average performance for the US Building Stock in 2000 based upon the Commercial



Buildings Energy Consumption Survey (CBECS) 2003 and a Net Zero Energy building at “0.” Because it is an absolute scale, zEPI can be used to establish energy goals for buildings and future energy codes. The Sustainable Buildings 2030 (SB2030) program that is applied to state bonded construction has a goal of 20 on the zEPI scale as of Jan. 1, 2020. The current Minnesota Commercial Energy code is at 48 as of adoption of the 2018 IECC on March 31, 2020.

Key design requirements

Over several workgroup meetings, the departments worked with stakeholders to generate a list of criteria or areas of consideration. Policy scenarios were then discussed and questioned, and through that, recurring themes emerged:

- **The status quo policy framework does not meet energy reduction goals:** Workgroup members were presented with the scenario option of continuing with the current policy framework. Consensus was that the current building code framework will not deliver the results that many entities seek – namely, greater certainty that city and state greenhouse gas reduction timeframe and goals will be met. The energy-reduction potential of future model codes is unknown until they are created, which precludes the ability to project future energy savings. This recognition has spurred other states and jurisdictions to adopt an alternate framework which still leverages model codes but allows them to plan to meet energy-reduction goals.
- **Codes were the focus:** Out of the policy tools, workgroup members had the most interest around stretch and base codes. However, some work group members were quick to note the need for complementary policies such as incentives, training resources and the need to address existing building efficiency.
- **Minimize risk of additional costs:** The question of how a policy change would impact upfront costs was a major topic of discussion. Participants voiced concern about how to avoid creating a disincentive for development – building owners are sensitive to additional costs per square foot – and asked for information about cost impacts. The workgroup discussed the issue on many occasions. The impact on cost is a complex question to answer and is not as simple as saying costs will go up or down.

Costs and who bears them also vary depending on the entity – from the builder to the building tenant or owner.

- Upfront construction costs: The upfront cost of a building is determined by factors such as geographic location, building materials, contractor availability, local housing market forces, climate zone requirements and design specifications of the owner (the building code operates as a “base” or minimum, and does not represent the entirety of design and construction cost). In Pennsylvania, a study of affordable multi-family housing that gave bonus points in the selection of projects (that included base code to very efficient projects) to very energy-efficient designs found that land cost, owner requirements and other items are more of a driver of increased construction cost than energy efficiency.^{xiii}

- Lifecycle costs: The owner or building tenant bears the lifetime costs of the building, including energy costs. Therefore, it's important while looking at the incremental additional cost to the upfront costs of the project to also examine the costs and savings to the building owner or tenant over the lifetime of the building.

Lessons learned from the state of Massachusetts included that the costs can change – the first few projects might cost more as the development team, including the owner, architect, general contractor and subcontractors go through a learning curve. But after that, additional costs might be minimal. For all these reasons, other jurisdictions have done a cost/benefit study that considers critical local factors that impact the cost of energy efficiency like climate, design and construction industry knowledge, capacity and energy costs. In addition, costs/benefits will vary across different building types and should also be factored into any cost analysis.

- **Minimize complexity:** Complexity was a major concern for many stakeholders, as it could mean additional costs. Several workgroup members asserted that regulation was already burdensome and sorting out new or competing guidelines would create another layer of complexity. With a new requirement comes the potential need for new and continuing education for architects, engineers, construction workers, building departments and others. Other states or jurisdictions have allowed multiple voluntary options for local units of government. For example, British Columbia offered four steps as options for local governments to adopt. Many stakeholders noted the value in the current policy framework – namely, a single statewide energy code and SB2030 as a design requirement for the construction of state-bonded buildings. There was general agreement among workgroup members that a **single**, voluntary, advanced-energy building standard could keep the state building code compliance framework as a two-part framework, thus minimizing complexity to builders.
- **Provide needed capacity for building industry and other entities so that they are able to meet building code requirements:** Workgroup members saw the importance of increasing the capacity of the various entities involved in building construction to successfully meet the new policy requirements and mitigate potential risks such as higher costs. Additional capacity in the form of training, clear-language educational materials and financial incentives were common features of stretch-code programs in Massachusetts and British Columbia. Specific supports discussed included: resources to educate and train users/enforcers, access to current rebates and incentives, ensure project cost competitiveness through additional access to grants, incentives, and financing, as necessary.
- **Provide a clear and simple enforcement/compliance regime:** Stakeholders representing workers, subcontractors and enforcement entities identified concerns around a new building code framework that included post-occupancy compliance. The SB2030 requirements include benchmarking, which includes a period of verification after the building is built. This would be a significant change to the current building code framework where municipalities currently have no authority. It also raises the practical question how third-party verification would be provided at scale if post-occupancy measures were included. Some stakeholders suggested separating post-occupancy energy efficiency

requirements from the building code framework to ensure simplicity and continued clarity. However, if renewable energy measures are included, and off-site measures are allowed (such as a community solar garden or renewable energy credits), assurances that these measures continue would be necessary to ensure projected impacts.

There were also areas where divergent perspectives continued throughout the course of discussions:

- **The need for a voluntary, advanced energy building standard for local units of government:** Some stakeholders consistently argued for a voluntary option for a variety of reasons:
 - Allows cities with the capacity and interest to lead.
 - Empowers cities with energy or carbon reduction goals to be successful.
 - Enables testing of efficiency technology and approaches.
 - Acknowledges that cities know the most about their local, large, multifamily and commercial buildings market and are in the best position to determine if a stretch option is reasonable.

Concerns noted by some workgroup members included:

- With increasing complexity, costs may increase: With additional codes or frameworks comes additional complexity - the potential for a “patchwork” of codes - and the concern that costs will increase - building-technology costs, training costs, maintenance costs, enforcement costs, etc. One stakeholder noted that in their experience as a building owner they’ve seen costs increase in other jurisdictions that have implemented an advanced energy building standard.
- Inconsistency between municipalities: There was awareness that a policy change could create differences between local units of government which may lead to new confusion, complexity and additional costs. Inconsistency could result in difficulties with benchmarking and reporting. City representatives pointed out that some inconsistency already exists as municipalities have differing requirements related to buildings in some areas, as well as differing interpretations of code requirements.
- Capacity to be successful: Like with any policy change, stakeholders emphasized the need to have time for planning and implementation along with financial support for the necessary training and education. Depending on cost impacts, resources to mitigate additional costs might be necessary.

Recommended proposal: Statewide approach

In making these recommendations, the departments incorporated feedback from workgroup members which narrowed the options presented in this report. There was general agreement that the status quo, adopting model commercial energy codes (International Energy Conservation Code, commercial provisions) with or without amendments every six years, would fall well short of meaningfully contributing to achieving the state goal of an 80% reduction in greenhouse gas emissions by 2050.

Statewide approach

The charge of the Building Efficiency Workgroup was to examine policy solutions that would enable cities to voluntarily promote or otherwise ensure greater energy efficiency measures for commercial and large

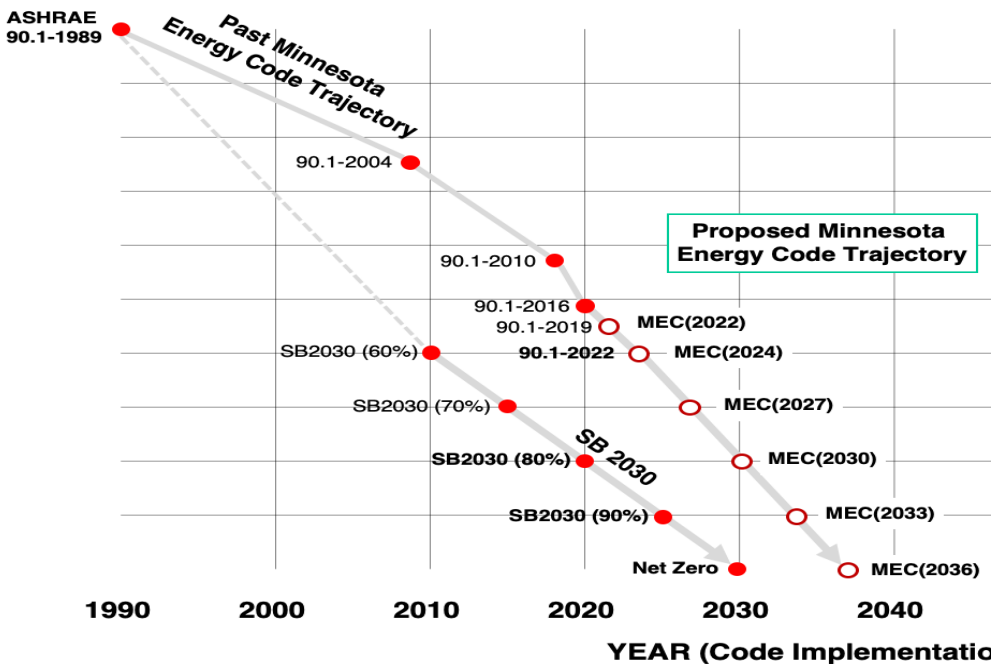
multifamily buildings. Through the workgroup process, the departments concluded that improving building energy efficiency would have a greater energy savings impact if code improvements were adopted and enforced statewide in the base energy code.

The departments recommend **the current statewide commercial energy code be advanced and accelerated such that it achieves net zero by 2036**. A net-zero building is a building with greatly reduced energy needs. In such a building, efficiency gains have been made so that the balance of energy needs can be supplied with renewable energy technologies. Renewable energy procurement should allow for a flexible compliance path.

The workgroup discussed either a three or six-year code adoption cycle, beginning with the adoption of an existing model energy code, the ASHRAE 90.1-2022, in 2024.^{xiv}

Under a three-year code adoption cycle, the commercial energy code could reach net zero by 2036 whereas under a six-year cycle net zero wouldn't be reached until 2048. Understanding the need to be more aggressive

Proposed Minnesota Energy Code T



Based upon zEPI: Zero Performance Index for Energy Codes from the New Buildings Institute

Center for Sustainable Building Research

with energy performance, the departments recommend a three-year code adoption cycle beginning with adoption of the ASHRAE 90.1-2019 standard.

ASHRAE 90.1 is the national standard for commercial building energy efficiency that is the basis for other national energy codes. DLI's current practice is to wait until the ASHRAE is incorporated into

the International Energy Conservation Code (IECC). Instead, the departments recommend moving to adoption of the ASHRAE standard, as it is used exclusively in nine states and is the basis for the IECC code used in thirty other states. The state code adoption process would take from one to two years. The department would add, for example, an "adjusted minimum percent efficiency" or an equivalent set of enhancements to that established by each ASHRAE edition in order to ensure the commercial building energy code meets the goal of net zero by 2036.

For example, if the goal for a step is a 5% reduction in energy consumption, and the adoption of the ASHRAE edition would only achieve 3%, then the code would require an additional 2% of efficiency be achieved, but not prescribe how it would be achieved. The graph shows the proposed statewide commercial energy building code trajectory and how it aligns with the already established SB2030 pathway. The current code, as of March 31, 2020, is at the 90.1-2016 point. The 2019 ASHRAE would be adopted in the rulemaking process and implemented in 2022. Going forward, the 2022 ASHRAE would be adopted in the rulemaking process and implemented in 2024 along with any required “adjusted minimum percent efficiency.” Options included in SB2030 could be used to achieve that additional percent efficiency.

The proposed framework provides a clear and uniform approach using a familiar tool:

- **Utilizes a national standard developed by industry and practitioners and preserves state rulemaking process.** The ASHRAE code is considered the model code for the International Energy Conservation Code and is developed by hundreds of building and energy practitioners. The state maintains its current ability to adopt and adapt the code to Minnesota through rulemaking.
- **Code compliance would be done through an existing tool the building industry already uses, minimizing new complexity:** Compliance with ASHRAE is facilitated by “COM Check,” a compliance tool paid for the by U.S. Department of Energy for each new edition of ASHRAE, which would facilitate enforcement.

Legislation needed

Minn. Stat. § 326B.106, subd. 1 (d) requires the DLI to act on each new model commercial energy code for which the U.S. Department of Energy has issued an affirmative determination in compliance with United States Code, title 42, section 6833. As such, DLI has authority to begin rulemaking to adopt ASHRAE 90.1-2019. Legislation would be needed to require addition of an adjusted minimum percent efficiency to the ASHRAE in order to meet the goal of net zero by 2036.

Resources needed

Significant resources may be needed for these recommended code improvements to be successful. Funds will be needed for agency staff capacity to develop the new codes and to accommodate an accelerated adoption cycle of three years. In addition, funding will be needed for education and training, plan and energy modeling review, evaluation of the availability of technology, as well as grants and incentives to support cost-effectiveness.

Specific needs include:

1. **Cost analysis** of energy code levels across different buildings in climate zone 6 and 7. A cost analysis for different building types would be needed for the two climate zones of Minnesota. Ideally this analysis would occur before the new energy code versions were launched so that their results could be used in the roll out. However, this cost analysis does not need to delay the adoption cycle. Massachusetts and British Columbia completed the cost analysis after they adopted their energy codes.

2. **Market capacity analysis:** Research about the markets' ability to design, build and operate more efficient buildings would be needed. In addition, a standing body – in British Columbia it was the BC Step Code Council – could be created to conduct ongoing capacity for communications and education.
3. **Education and training:** Informed by the market capacity analysis, a curriculum could be created and delivered to various stakeholder groups to augment the training other groups already perform in the energy-efficient building space. This could include formats such as guides, workshops, webinars, case studies, tools and videos, etc. Such information would ensure filling any knowledge gaps in building science areas to support better quality control in delivering durable energy performance. In addition, climate change impacts require that the building industry become more aware of the need to design for future climates and should be trained to integrate this emerging area.

Other areas of future research and engagement

Moving forward, there are other areas to expand stakeholder engagement and additional exploration of ideas and needs. The departments recommend:

- **Address how to continue to provide efficiency resources:** Minnesota's Conservation Improvement Programs, administered through utilities, are an important source of funding and energy design support – through rebates and advanced design assistance – for new construction, particularly affordable housing. Minnesota has a diverse mix of utilities – cooperative, municipal and investor-owned – and the administration should engage with utilities and other stakeholders about how this proposed policy framework should interact with other policy frameworks such as the Conservation Improvement Program, in order to address maintaining efficiency resources that help keep project costs down.
- **Engage with stakeholders:** The departments recommend continued and further engagement with builders, energy efficiency experts, architects, local units of government (particularly in greater Minnesota), labor, etc. Experience in other states has shown that the first and second projects built to an advanced energy standard can be more expensive to model and construct. For this reason, incentives may be needed to defray costs – a role that could be played by utilities.
- **Explore ways to pilot or test new and emerging building models:** Developers and building owners are deploying new and innovative approaches to building design, including regenerative housing, and the living-building challenge. The state could work with industry and other stakeholders on strategies that enable innovation and learning. These innovations should occur as a complement to base code improvements.
- **Learn more about needs of other building segments:** The departments note that adopting a new base code for new and significant renovations of commercial and multifamily buildings only resolves one component of building energy use, as it does not apply to residential construction or existing buildings. The energy use of those structures is beyond the scope of this report. Workgroup members suggested looking at ways to promote recommissioning and efficiency upgrades for single-family homes and older commercial buildings. The departments recommend that the Climate Change Subcabinet include buildings in their strategy considerations and public engagement.

- **Explore separate, but complementary incentives and benchmarking policies:** While adjustments to the commercial energy code will impact new and substantially renovated buildings, other policies and incentives like benchmarking, building energy use disclosure and retro-commissioning could reduce existing building energy use. At the municipal level, some Minnesota cities, including the cities of Minneapolis, St. Paul, Edina, St. Louis Park and Grand Marais have energy disclosure and/or benchmarking requirements for commercial and large multifamily buildings. This could include exploring expanding the use of SB2030 on new (commercial and multifamily) buildings that receive state or city financial assistance.
- **Examine state building code enforcement:** Enforcement was a recurring topic among workgroup members. Currently, the state building code, including the base energy code, applies statewide, but enforcement is only required in certain areas of the state. Per state law, building-code enforcement is determined by the local unit of government; it is not prescribed. The Minnesota State Building Code is enforced in 21 counties and 507 municipalities. Without enforcement mechanisms such as plan review and inspection, energy-code compliance cannot be assured in non-code enforced areas. In areas where local units of government do not enforce the building code, there is an opportunity to examine what, if anything, is needed to support code compliance.

Appendix A: Workgroup Membership

Members	Organization	Nominated By/Representing
Commissioner Steve Kelley	Dept of Commerce	Dept of Commerce
Commissioner Nancy Leppink	Dept of Labor and Industry	Dept of Labor and Industry
Deputy Commissioner Rachel Robinson	Minnesota Housing Finance Agency	Minnesota Housing Finance Agency
Kelly Hyvonen	Big-D Construction	Associated Builder and Contractors of MN/ND
Justin Knopps	JE Dunn	Associated General Contractors of MN
Jessica Looman	MN State Building and Construction Trades Council	MN State Building and Construction Trades Council
Andy Snope	IBEW Local 292	MN State Building and Construction Trades Council
Gary Thaden	MN Mechanical Contractors Assn	Subcontractors
Gerhard Guth, AIA	HGA Architects and Engineers	AIA MN
Rick Carter, FAIA	LHB Corp	AIA MN
Craig Johnson	League of MN Cities	League of MN Cities
Kurt Schultz	City of St. Paul	Cities Advanced Building Performance Working Group
Brian Hoffman	City of St. Louis Park	Cities Advanced Building Performance Working Group
Megan Hoye	Center for Energy and Environment	Center for Energy and Environment
Ben Rabe	Fresh Energy	Fresh Energy
Skip Duchesneau*	D.W. Jones	Multi-family housing
Pat Stockhaus	CommonBond Communities	Multi-family housing
Barry Greive	Target Properties	Commercial building owners
Becky Landon	Newport Midwest, LLC	Commercial building owners
Richard Graves, AIA	U of M Center for Sustainable Building Research	Expert
Senator Dave Senjem	MN Senate bill author	Legislature
Representative Jamie Long	MN House bill author	Legislature

*D.W. Jones was unable to participate after the 2nd meeting.

Appendix B: Workgroup Meeting Minutes



Meeting Notes: Building Efficiency Workgroup

Date: March 4, 2020

Attendees:

Commissioner Steve Kelley	Department of Commerce
Commissioner Nancy Leppink	Department of Labor and Industry
Rachel Robinson	Minnesota Housing Finance Agency
Jessica Looman	MN State Building and Construction Trades Council
Andy Snope	IBEW Local 292
Gary Thaden	MN Mechanical Contractors Assn
Gerhard Guth	HGA Architects and Engineers
Rick Carter	LHB Corp
Kurt Schultz	City of St. Paul
Ben Rabe	Fresh Energy
Barry Greive	Target Properties
Richard Graves	U of M Center for Sustainable Building Research
Representative Jamie Long	MN House

Commissioner Kelley convened the meeting at 10:05 am. He thanked work group participants, and shared that their input was extremely informative to the Departments and greatly influenced the draft report on ways to improve energy efficiency in commercial and large multifamily buildings.

Commissioner Kelley previewed the agenda for the meeting, which included a short presentation from the Departments recapping topline recommendations and the thinking behind it, followed by time for questions. Then the bulk of the meeting was dedicated to discussion and workgroup member feedback on the draft report.

Commissioner Leppink thanked work group participants for their contributions and noted that as policy and technology evolve, definitions have to evolve too and that there may be a need to clarify definitions. Commissioner Leppink then provided a brief overview of the topline recommendations of the draft report.

- The Departments concluded that improving building energy efficiency would have a greater energy savings impact if code improvements were adopted and enforced statewide in the base energy code.
- Therefore, the Departments recommend the current **statewide** commercial energy code be advanced and accelerated such that it achieves net zero by 2036. We would undergo a three-year code adoption cycle.

- The departments also recommend a dual path that includes improvements to the base energy code as well as a single voluntary advanced energy building standard for municipalities. A single option minimizes complexity. We provided two potential pathways for that single voluntary option.

Commissioner Leppink introduced Professor Richard Graves and Scott McLellan, DLI Building Official, who shared information on the definitions of “net zero”, and details on the two options for the single voluntary stretch code – “step ahead” and a variation of SB2030. Work group members discussed a scenario where the “step ahead” path could be implemented such that DLI would adopt two codes: an enhanced based code and the step-ahead option that municipalities would be allowed to opt into. Professor Graves shared that this process is typically established through a governance framework.

Representatives from the cities shared that they view the “step ahead” option as the preferable option and asked that the SB2030-variation option be removed from the report. Workgroup members were asked if this is acceptable and, while the workgroup didn’t formally vote, the general consensus was this was acceptable. A building industry representative noted the “step ahead” approach is useful in that it provides certainty that the building industry is spending resources towards capacity that is known to be needed. A labor representative suggested that SB2030 could be included in the report in as a separate tool that cities could use, as Saint Paul has done, for projects with city funds. Various members of the workgroup weighed in on different aspects of governance for the “step ahead” option including which code – ASHRE or the IECC – would be considered as the model code for future code adoption; the need to connect the stretch option with the statewide base code, in process and governance; and the importance of DLI reviewing the national model code (for conflicts with other codes, for example) prior to adoption. DLI staff said that review would be possible and that the commercial energy code functions fairly independently from other codes.

Several workgroup members agreed that the future rulemaking processes should be more expedited than they are now but that there is value in the process and that should not be lost. City representatives stated it is key to cities that the timeline for progress is accelerated from status quo. DLI staff shared that the first step on the proposed pathway is known and will soon be available for adoption– the ASHRE 90.1-2021 code. A labor representative suggested there be more detail on the current code process, its value and limitations, as well as on uniformity and potential impact of other codes. Commissioner Leppink noted the next step of working with her staff to lay out the pathway and refine details.

Commissioner Kelley thanked participants and shared that the Departments would take this feedback into consideration. He concluded the meeting at 11:30 a.m.

Meeting Notes: Building Efficiency Workgroup

Date: Jan. 14, 2020

Attendees:

Commissioner Nancy Leppink	Department of Labor and Industry
Assistant Commissioner Katherine Blauvelt	Department of Commerce
Deputy Commissioner Rachel Robinson	Minnesota Housing Finance Agency
Kelly Hyvonen	Big-D Construction
Justin Knopps	JE Dunn
Jessica Looman	MN State Building and Construction Trades Council
Andy Snope	IBEW Local 292
Rick Carter	LHB Corp
Daniel Lightfoot	League of MN Cities
Kurt Schultz	City of St. Paul
Brian Hoffman	City of St. Louis Park
Megan Hoyer	Center for Energy and Environment
Ben Rabe	Fresh Energy
Barry Greive	Target Properties
Richard Graves	U of M Center for Sustainable Building Research
Representative Jamie Long	MN House

Commissioner Leppink convened the meeting at 1:05 pm. She provided a recap of the last meeting which included a presentation from Kurt Schultz at the City of Saint Paul and Brian Hoffman with the City of St. Louis Park. Kurt and Brian presented the Cities' principles and policy priorities, outlining the desire for a standard that is a performance-based model that is clear, simple and flexible. The Commissioner then summarized the four possible scenarios explored by workgroup members in breakout sessions:

- Scenario #1: Current base code
- Scenario #2: Current base code + voluntary SB2030 performance standard
- Scenario #3: Base code + voluntary step code
- Scenario #4: Accelerate statewide base code

She noted members generally agreed the status quo option in scenario 1 isn't moving fast enough nor providing flexibility to cities to enable them or the state to meet greenhouse gas reduction goals. Members appreciated the possibility of significant energy use reductions in scenario 2 and that the standard SB2030 is already known to the building industry, technology is available and is in use. Concerns include the need for additional training and resources to ensure compliance, potential additional costs, inconsistency between cities, and the base code isn't addressed.

For scenario 3, members saw it could enable cities to meet their carbon reduction goals. Positives for some also included that it provides greater flexibility through step options and connects the base code with a voluntary stretch code. Concerns for some include the potential for confusion with several new options, potential for additional costs and need for resources to cities and building industry to successfully comply. Workgroup members liked the uniformity and well-vetted process of scenario 4, but there was concern that the process can be lengthy, and the energy reduction potential is unknown, as it's tied to future yet-unknown model codes. This scenario would also lack the ability to test out new options. Commissioner Leppink noted that members saw advantages to scenarios 2, 3, and 4 and suggested a combined approach which is what staff worked on developing and would be discussed today.

Commissioner Leppink invited Professor Graves to share scenarios 5 and 6 for the group to consider.

- Scenario #5: Statewide commercial building code, on a 6-year cycle, would move in four steps down to an end point of 10 on the ZEPI scale in 2042 (0 by 2048). A voluntary stretch option would allow cities to adopt the step ahead of the base code. This would require legislation.
- Scenario #6: Statewide commercial building code would, on a 3-year cycle, would move in four steps down to an end point of 10 on the ZEPI scale in 2033 (0 by 2036). A voluntary stretch option would allow cities to adopt the step ahead of the base code. This would require legislation.

A member asked what happens after we reach the limits of prescriptive codes. Professor Graves said performance codes would then kick in, which set a target but let building designers figure out how to get there. Renewables would have to be included either off site or on site to reach net zero. A member how asked how long it would take to develop the new energy standard. Professor Graves noted British Columbia took 2-3 years to develop their step code. Minnesota's advantage is we have implemented SB2030 for a number of years and we know a lot about the next two steps. Some members expressed their opinion that the stretch code could be a step ahead of the base code but alternatively it could be linked to SB2030.

Workgroup members then broke out into four small groups to evaluate each scenario. Each group then reported back to the full group. Common concerns included that a six-year cycle would not be fast enough to meet greenhouse gas reduction goals but a recognition that a longer cycle would mean fewer mistakes and allow technology to be developed. Members also noted the need for training and the possibility of job creation. Members also agreed having a single municipal option was important, though they diverged on whether that advanced standard should be a step ahead of the base code or SB2030 "Lite."

The full workgroup then discussed the scenarios. A workgroup member thought the state and municipalities would and should have influence on model national codes as they are being developed. A building industry representative was asked his perspective on a new stretch code and he indicated as long as it is defined and consistent, they can build to it. If they are guessing or filling in the blanks, that is where costs will increase. Another member noted certainty in the code will mean technology can be developed to scale.

Commissioner Leppink summarized the main points of discussion. She shared the next step will be for the departments to write the report which will include a summary of workgroup activities and input along with DLI and Commerce analysis and recommendations. She indicated a draft report would be shared with workgroup

members for feedback. She then announced the Jan. 27 meeting would be cancelled and staff would send out a new date. The meeting adjourned shortly after 4 p.m.



Meeting Notes: Building Efficiency Workgroup

Date: Dec. 4, 2019

Attendees:

Commissioner Steve Kelley	Department of Commerce
Commissioner Nancy Leppink	Department of Labor and Industry
Rachel Robinson	Minnesota Housing Finance Agency
Kelly Hyvonen	Big-D Construction
Justin Knopps	JE Dunn
Jessica Looman	MN State Building and Construction Trades Council
Andy Snope	IBEW Local 292
Gary Thaden	MN Mechanical Contractors Assn
Gerhard Guth	HGA Architects and Engineers
Rick Carter	LHB Corp
Craig Johnson	League of MN Cities
Kurt Schultz	City of St. Paul
Megan Hoye	Center for Energy and Environment
Ben Rabe	Fresh Energy
Barry Greive	Target Properties
Richard Graves	U of M Center for Sustainable Building Research
Representative Jamie Long	MN House
Senator Dave Senjem	MN Senate

Commissioner Kelley convened the meeting at 9:03 a.m. He restated the purpose of group and role is to determine potential policy solutions needed to enable cities to voluntarily promote or otherwise ensure greater energy efficiency and better energy performance measures for new and major renovations of commercial and multifamily residential buildings. The Governor's recent Executive Order asked agencies to work to put Minnesota back on track to meet or exceed our goals, established under Statute, to reduce statewide greenhouse gas emissions across all sectors.

Commissioner Leppink noted that with the input of the workgroup, the Departments of Commerce and Labor and Industry will be writing a report to the Governor's Office that includes potential policy options to improve energy efficiency in buildings.

Commissioner Kelley previewed the agenda for the meeting. The past two meetings have provided workgroup members with information on potential strategies to enable greater energy performance. Now based on workgroup feedback, the workgroup will hear presentations on several policy scenarios and then work in small groups to give feedback on the policies, working from factors that the workgroup generated, concluding with report-outs back to the larger group.

Commissioner Leppink then introduced Kurt Schultz, who helped develop and now manages the Sustainable Building Policy for the City of St. Paul and Brian Hoffman, Director of Building and Energy for the City of St. Louis Park, who have been working with a group of cities from around the state as part of the Cities Advanced Building Performance Working Group. Department staff circulated the group's principles and priorities document.

The cities presented to the workgroup (PowerPoint). Highlights include:

- Buildings represent large portion of GHG reduction potential. Status quo isn't enough to achieve goals.
- Most cost-effective way to achieve GHG reductions is in new building construction, beginning with the building envelope.
- City performance based standard's guiding principles: Faster than model code moves today; clear standard; performance based standard – simple and flexible (with option for third party compliance); leverage practices on uniformity; resources to educate/train; maintain/increase access to the conservation improvement program; zero net energy by target year; a standard that prioritizes efficiency and a standard that enables renewables flexibly.
- Noted there are other areas like sprinklers where cities have options.
- More than 20 cities engaged, representing one million Minnesotans. Engaged with diverse group of stakeholders.
- Value of resiliency – how can we withstand the pressures put upon us by climate change. Building efficiency can be considered a resiliency strategy.

Workgroup members engaged in a Q & A with the city representatives. From that discussion we learned that the cities are not specifying a particular standard like SB 2030. Under their proposal, renewables could be deployed flexibly and would not have to be on-site. Cities are not building their own infrastructure very often, so the option to put standards on their own buildings is limited, by function of that. The concern of the potential extra cost was raised.

Commissioner Kelley introduced Professor Graves to share scenarios for the group to consider. Professor Graves reviewed the suite of policy options that can impact building energy performance. He then presented on the four scenarios the workgroup will provide feedback on. The scenarios were generated based on workgroup feedback.

- Scenario #1: Current base code
- Scenario #2: Current base code + voluntary SB2030 performance standard
- Scenario #3: Base code + voluntary step code
- Scenario #4: Accelerate statewide base code to get to a specific target

The group took a break from 10:40-10:50 a.m. and reconvened in four small groups at 10:50 a.m.

Workgroup groups were provided questions to guide the discussion and a list of criteria to consider which is meant as a guide, not a definitive list.

Questions:

- (1) What are pros and what are cons to each scenario?
- (2) What are outstanding questions about the scenario that need to be answered?
- (3) How would you start to troubleshoot issues you see?

Criteria for consideration

- Energy savings impact and carbon impact:
 - Progress towards reduction in GHG emissions
 - Scope of impact
- Benefits:
 - Energy savings
 - Building value, e.g. higher occupancy and resale
 - Societal benefits
 - Job creation potential
- Costs:
 - What are the additional technology costs?
 - What are training/education costs?
 - Does it change over time?
 - Impact on rebates/financing via current utility programs.
 - What are costs for typical building over lifespan; what are costs of building under new code?
 - Does it require public funding?
 - What is the source and scope of the public funding?
- Adoption and Implementation
 - Process for adoption.
 - Does it conflict with the State-wide building code?
 - Does it impact building construction?
 - Does it impact building operations?
 - Is it a regulation?
 - Who is responsible for adoption/amendment?
 - Who is responsible for compliance and when?
 - What are the consequences and who bears liability for non-compliance?
 - Who is responsible for enforcement?
 - Does the policy work for cities of all kinds?
 - Capacity/readiness state

At 11:40 a.m., the group reconvened. Each group provided a high-level report out summarizing what they discussed.

Scenario #1: The process is known and capacity exists. Several of the small groups noted it is essentially the status quo, and thus likely would not mean cities could meet their greenhouse gas reduction goals, and therefore it was not an option they spent much time on.

Scenario #2: Several groups noted advantages such as significant energy use reductions, aggressive. It provides flexibility for cities that want to lead, and the SB 2030 standard is already known and being used for state buildings. The technology exists. Concerns include the need for additional training and resources to ensure compliance, potential additional costs, inconsistency between cities, and concern that the base code isn't addressed.

Scenario #3: Depending on targets and steps, could enable cities to meet their carbon goals – requires intention. Positives include that it provides greater flexibility with step options and connects the base code with a voluntary stretch code. Concerns include the potential for confusion with several new options, potential for additional costs and need for resources to cities and building industry to successfully comply.

Scenario #4: Advantages include it impacts all buildings, which means greater potential energy performance impact and the process is known and involves expert stakeholders. Concerns include that the process can be lengthy, and the pathway is unknown, as it's tied to future model codes that haven't been made yet, and you lose the ability to test out new options.

Commissioner Leppink provided concluding remarks, noting that it is possible to combine scenarios to be responsive to workgroup feedback. Commissioner Kelley asked members to contact the Departments if they have other policy options that should be considered.

Commissioner Kelley concluded the meeting at 12:05 p.m.



Meeting Notes: Building Efficiency Workgroup

Date: Nov. 21, 2019

Attendees:

Commissioner Steve Kelley	Department of Commerce
Commissioner Nancy Leppink	Department of Labor and Industry
Katherine Teiken	Minnesota Housing Finance Agency
Kelly Hyvonen	Big-D Construction
Justin Knopps	JE Dunn
Jessica Looman	MN State Building and Construction Trades Council
Andy Snope	IBEW Local 292
Gary Thaden	MN Mechanical Contractors Assn
Gerhard Guth	HGA Architects and Engineers
Rick Carter	LHB Corp
Craig Johnson	League of MN Cities
Kurt Schultz	City of St. Paul
Megan Hoye	Center for Energy and Environment
Ben Rabe	Fresh Energy
Skip Duchesneau	D.W. Jones
Barry Greive	Target Properties
Becky Landon	Newport Midwest, LLC
Richard Graves	U of M Center for Sustainable Building Research
Representative Jamie Long	MN House

Commissioner Nancy Leppink started the meeting at 2:06 p.m. Meeting attendees introduced themselves. Commissioner Leppink provided an overview of the agenda.

Commissioner Kelley thanked workgroup members for completing the survey. He summarized respondents' answers to the survey questions regarding advantages and concerns with enabling cities to voluntarily promote or otherwise ensure greater energy efficiency and energy performance measures for commercial and multifamily residential buildings.

Commissioner Leppink then introduced Scott McLellan, Director of the Construction Codes and Licensing Division at the Minnesota Department of Labor and Industry, to provide an overview of the State Building Code and specifically the energy code as well as how a stretch code would interact with the current statewide building code.

McLellan shared the existing statutory language and authority around the State Building Code. He noted Minnesota is obligated to review and adopt a new commercial energy code when recommended by the U.S. Department of Energy. Members wanted to know if the U.S. Department of Energy had ever issued a non-affirmative determination and the answer is no. Mr. McLellan said adoption of the commercial portion of the next Minnesota Energy Code (IECC 2018/ASHRAE 2016) will occur Nov. 25 with an effective date of March 31, 2020. The increased efficiency of this edition of the commercial energy code is approximately 16% more efficient than our current code that was adopted five years ago. The ASHRAE 2019 standard could be considered by the state – the commissioner has authority to adopt amendments to the code prior to the adoption of the new energy codes to, among other reasons, improve the efficiency of a building.

Commissioner Kelley introduced the next presenter, Richard Graves, Director of the Center for Sustainable Building Research and an associate professor in the College of Design at the University of Minnesota. Professor Graves gave a brief presentation on building energy efficiency policies in other states/counties. He noted there are five other versions of stretch codes besides Massachusetts. There are also incentives, benchmarking, improvements to the base code, reach or stretch codes. Stretch codes are often paired with incentives. ASHRAE 2016 is often the base building code for a stretch code. Professor Graves briefly discussed the British Columbia Energy Step Code and noted the province is in climate zones 4-8, which intersects with Minnesota's climate zones 6 and 7.

Commissioner Leppink introduced, via live Webinar, Ian Finlayson, Deputy Director of the Energy Efficiency Division at the Massachusetts Department of Energy Resources. Mr. Finlayson works on policy development of a number of Massachusetts' energy efficiency priorities and was the lead author of the buildings chapter of the Massachusetts clean energy plan for 2020. Mr. Finlayson said Massachusetts is a leading state for energy efficiency and the energy code. The state recently adopted strengthening amendments beyond IECC 2018 related to lighting power density, envelope minimum requirements, solar readiness, and EV-ready parking spaces. The Massachusetts stretch energy code has been an option since 2009 and 278 municipalities have adopted the stretch code. Mr. Finlayson said lessons learned include the importance of incentives (the Green Communities program increased available grant funding to \$20 million annually), code training for officials and industry, and supporting code officials. Modeling a percentage better than the ASHRAE standard is complex to administer, and they dropped prescriptive requirements in 2017. Mr. Finlayson said some cities are asking for additional options and development is underway on a net zero stretch code for 2021. While net zero has some support from the design & construction industry, trade associations are concerned. Cities that have 100% by 2050 zero carbon commitments are highly dependent on buildings for achieving greenhouse gas reductions.

Mr. Finlayson said net zero adds around 1% to the cost but there has been no clear evidence of increased cost for stretch codes. He noted some design firms see net zero capability as a competitive advantage. Mr. Finlayson said there has been no noticeable impact on development, particularly interesting during an economic downturn. Once developers know what they are building to, it hasn't been an issue. At first, technical knowledge is an issue; cost is not an issue. Mr. Finlayson concluded stretch codes were less disruptive than expected. While it took Massachusetts nine years to get to where they are, Minnesota could "catch up" quickly.

Commissioner Leppink introduced the final part of the agenda regarding workgroup goals and factors to evaluate policies.

The workgroup discussed what baseline of information is needed to evaluate policy options, including costs and benefits, job creation/reduction potential, the impact on small businesses and communities, and complexity of implementation. Workgroup members added the need for education and training, discussed the

role of utilities, the need for incentives to make options successful, and consistency. It was noted a roadmap and common endpoint, to match goals and results, would be important. Other discussion points included the distinction of building operations from building codes, and the need for flexibility. When considering cost as a factor, it was noted that buildings are a long-term asset (or liability) and the group should think beyond just the first cost of construction.

Commissioner Leppink reminded members of the December 4 meeting and said the next meeting will include a presentation and discussion by Mr. Schultz and Mr. Hoffman regarding recommendations from the Cities Advanced Building Performance Working Group. The agenda will include breakout discussions for members to discuss specific policy options with a focus on factors workgroup members have identified as important. Commissioner Leppink concluded the meeting at 4:30 p.m.

Meeting Notes: Building Efficiency Workgroup

Date: Oct. 28, 2019

Attendees:

Commissioner Steve Kelley	Department of Commerce
Scott McLellan	Department of Labor and Industry
Deputy Commissioner Rachel Robinson	Minnesota Housing Finance Agency
Kelly Hyvonen	Big-D Construction
Justin Knopps	JE Dunn
Jessica Looman	MN State Building and Construction Trades Council
Andy Snope	IBEW Local 292
Gary Thaden	MN Mechanical Contractors Assn
Gerhard Guth	HGA Architects and Engineers
Rick Carter	LHB Corp
Craig Johnson	League of MN Cities
Kurt Schultz	City of St. Paul
Megan Hoye	Center for Energy and Environment
Ben Rabe	Fresh Energy
Pat Stockhaus	CommonBond Communities
Becky Landon	Newport Midwest, LLC
Richard Graves	U of M Center for Sustainable Building Research
Representative Jamie Long	MN House

Commissioner Steve Kelley started the meeting at 2:02 p.m. He noted Commissioner Leppink had an unavoidable conflict that prevented her from attending. Scott McLellan, director of the Construction Codes and Licensing Division for DLI, represented DLI.

Meeting attendees introduced themselves. Commissioner Kelley provided an overview of the workgroup scope. A number of Minnesota cities have established energy or carbon reduction goals and have sought state assistance in achieving these energy goals. As such, many cities are working to address energy consumption in new residential and commercial building construction beyond that currently regulated by the Minnesota State Energy Code. DLI and Commerce are convening this informal process, to determine potential policy solutions needed to enable cities to voluntarily promote or otherwise ensure greater energy efficiency and better energy performance measures for new and major renovations of commercial and multifamily residential buildings. The meetings are a venue to promote a mutual understanding of the issues related to policy solutions to support cities in their building energy efficiency and performance. Ultimately, the goal will be to identify areas of potential agreement and compromise.

Commissioner Kelley reviewed the proposed schedule of meetings. Several attendees cannot attend the next scheduled meeting on November 13. Commissioner Kelley directed staff to consider alternative dates. Commissioner Kelley then provided a few meeting guidelines: (1) Active listener; (2) Be mindful of jargon and assuming knowledge; (3) Step up/Step back. Commissioner Kelley asked the group if they had any additional guidelines – none were volunteered. He noted that at any point individuals should feel free to raise an idea.

Commissioner Kelley then introduced the presenter, Richard Graves, Director of the Center for Sustainable Building Research and an associate professor in the College of Design at the University of Minnesota. From 2012 to 2014, Graves was the Executive Director of the International Living Future Institute, leading the operations and strategic efforts around all of the Institute's signature programs. Professor Graves is serving as a technical expert to this workgroup.

Professor Graves gave a PowerPoint presentation on commercial/multi-family buildings carbon use, efficiency, and energy performance. Questions and discussion included how the state energy code has evolved; past and future energy savings potential; the potential for challenges in operations and the need for trained maintenance workers to successfully implement or maintain the efficiency technology; differences in codes such as prescriptive or performance and modeling how future code improvements could lower the carbon footprint but behavior/user-driven strategies are critical components.

Attendees then held small group discussions on the following questions: What does success look like when cities are empowered to promote or otherwise ensure greater energy performance and efficiency for commercial and multifamily residential buildings? What does success look like from your sector's perspective? Attendees then shared out a brief summary of their discussions. Themes of the small group discussions included: Ensuring the comfort and autonomy of the building resident; strategy needs to be easy/accessible for the end-user; addressing and minimizing potential conflict between codes; implementation challenges; the policy should be understandable and have a long life cycle so as not to revisit every few years, the need for cross-sector strategies in order to realize success; the importance of lowering buildings' substantial carbon footprint in order to be successful in reaching local climate goals; increasing energy efficiency while keeping costs stable; for a successful experience, cities need to have tools - information, supports such as training; establish how you would track success for a city; look for the win-wins; be willing to rethink current processes as we build the next generation of buildings.

Commissioner Kelley thanked the participants for their contributions, time and concluded the meeting at 4:05 p.m.

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- ⁱ Energy Information Administration, State Energy Data System
- ⁱⁱ <https://nca2018.globalchange.gov>
- ⁱⁱⁱ Minneapolis St. Paul Magazine, "How Climate Change Will Impact Minnesota," <http://mbspmag.com/arts-and-culture/climate-change-minnesota/>
- ^{iv} Deliotte, *Climate Risk: Regulators sharpen their focus*, page 5.
- ^v "Fourth National Climate Assessment", <https://nca2018.globalchange.gov/>
- ^{vi} <https://www.energyefficiencyforall.org/resources/lifting-the-high-energy-burden-in-americas-largest-cities-how-energy/>
- ^{vii} <https://www.enterprisecommunity.org/blog/climate-change-disproportionately-affects-low-income-communities>
- ^{viii} Minnesota Department of Health, Air Quality, <http://www.health.state.mn.us/divs/climatechange/air.html>; Pope, 2002, <https://www.ncbi.nlm.nih.gov/pubmed/11879110>; Bernard, 2001, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1240667/>
- ^{ix} LHB, Inc.
- ^x City of St. Paul.
- ^{xi} New Building Institute. Moving Energy Codes Forward: A Guide for Cities and States. 2018.
- ^{xii} New Building Institute. Moving Energy Codes Forward: A Guide for Cities and States. 2018.
- ^{xiii} Pennsylvania Housing Finance Agency.
- ^{xiv} DLI has adopted the ASHRAE 90.1-2016 which will be effective in March 2020. As model energy codes are adopted every six years, the current path would involve Minnesota adopting the ASHRAE 90.1-2019 in 2026. ASHRAE 90.1-2019 could be adopted in 2021 as an even earlier accelerated option.