

Department of Labor and Industry

STATEMENT OF NEED AND REASONABLENESS

In the Matter of Proposed Revisions of Minnesota
Rules Chapter 1323; R-04696

Construction Codes and Licensing Division

September, 2022

General information:

- 1) Availability: The State Register notice, this Statement of Need and Reasonableness (SONAR), and the proposed rule will be available during the public comment period on the Agency's Public Notices website: <http://www.dli.mn.gov/about-department/rulemaking/rulemaking-docket-minnesota-rules-chapter-1323-0>
- 2) View older rule records at: [Minnesota Rule Statutes https://www.revisor.mn.gov/rules/status/](https://www.revisor.mn.gov/rules/status/)
- 3) Agency contact for information, documents, or alternative formats: Upon request, this Statement of Need and Reasonableness can be made available in an alternative format, such as large print, braille, or audio. To make a request, contact Amanda Spuckler, Rules Specialist, Department of Labor and Industry, 443 Lafayette Road N., St. Paul, MN 55155; telephone 651-284-5006; email amanda.spuckler@state.mn.us; or use your preferred telecommunications relay service.

Contents

STATEMENT OF NEED AND REASONABLENESS.....	1
Contents.....	3
Acronyms.....	4
Introduction and overview.....	5
<i>Introduction</i>	5
Background.....	5
Public participation and stakeholder involvement.....	6
Statutory authority.....	6
Reasonableness of the amendments.....	8
<i>General Reasonableness</i>	8
<i>Rule-by-Rule Analysis</i>	9
Regulatory analysis.....	34
Notice Plan.....	38
<i>Notice</i>	38
<i>Additional notice plan</i>	38
Performance-based rules.....	39
Consult with MMB on local government impact.....	39
Impact on local government ordinances and rules.....	40
Costs of complying for small business or city.....	40
Witnesses and SONAR exhibits.....	42
<i>Witnesses and other staff</i>	42
<i>SONAR exhibits</i>	42
Conclusion.....	42

Acronyms

APA	Administrative Procedures Act
ALJ	Administrative Law Judge
ANSI	American National Standard Institute
ASHRAE	American Society of Heating Refrigerating and Air-Conditioning Engineers
ASHRAE 90.1-2016	2016 edition of ANSI/ASHRAE/IES Standard 90.1 Energy Standard for Buildings Except Low-Rise Residential Buildings
ASHRAE 90.1-2019	2019 edition of ANSI/ASHRAE/IES Standard 90.1 Energy Standard for Buildings Except Low-Rise Residential Buildings
ASHRAE 62.2-2019	2019 edition of ANSI/ASHRAE Standard 62.2 Ventilation and Acceptable Indoor Quality in Residential Buildings
Btu/h	British thermal unit per hour
Btu/hr/ft ²	British thermal unit per hour per square foot
CCAC	Construction Codes Advisory Council
CFM	Cubic feet per minute
CFR	Code of Federal Regulations
Department	Department of Labor and Industry
DOE	United States Department of Energy
ERV	Energy Recovery Ventilation
HVAC	Heating, Ventilation, and Air Conditioning
ICC	International Code Council
IECC	International Energy Conservation Code
IES	Illuminating Engineering Society
IRC	International Residential Code
LED	Light-Emitting Diode
MAT	MN Association of Townships
MMB	Minnesota Management and Budget
MN	Minnesota
MORS	MN Office of the Revisor of Statutes
OAH	Office of Administrative Hearings
SONAR	Statement of Need and Reasonableness
TAG	Technical Advisory Group
W	Watt

Introduction and overview

Introduction

The Commissioner proposes to adopt amendments to the Minnesota Commercial Energy Code, Minnesota Rules, chapter 1323. The proposed rules will incorporate by reference ASHRAE 90.1-2019, with amendments.

Background

The Commissioner (“Commissioner”) of the Department of Labor and Industry (“Department”) and certain local authorities enforce the Minnesota State Building Code, which consists of 22 chapters of the Minnesota Rules. One of those 22 chapters is chapter 1323, the Minnesota Commercial Energy Code. See Minnesota Rules, part 1300.0050. The Commissioner proposes to amend the current Minnesota Commercial Energy Code in Minnesota Rules, chapter 1323, to incorporate by reference ASHRAE 90.1-2019.

ASHRAE 90.1-2019 is an American National Standards Institute (“ANSI”) standard published by ASHRAE (“American Society of Heating Refrigerating and Air-Conditioning Engineers”) and jointly sponsored by Illuminating Engineering Society (“IES”). ASHRAE 90.1-2019 (“the standard”) is a continuous maintenance standard, meaning revisions to it are continuously reviewed due to the rapid changes in technology related to energy efficiency. ASHRAE publishes full editions of the updated standard every three years to provide the construction industry with the most current standard provisions for use throughout the nation.

ASHRAE 90.1-2019 establishes the minimum standards for the efficient use and conservation of energy in new and remodeled commercial buildings. For purposes of this standard, commercial buildings include all buildings except for residential buildings that are three stories or fewer above grade, one- and two-family dwellings, and townhouses. ASHRAE 90.1-2019 addresses energy conservation requirements for all aspects of energy use including heating, ventilation, lighting, water heating, and power usage for appliances and building systems. ASHRAE 90.1-2019 provides design requirements for all facets of energy conservation.

The current chapter 1323 adopts and amends the 2018 edition of the International Energy Conservation Code (“IECC”). See Minnesota Rules, part 1323.0010, subpart 1. Accordingly, the Department currently administers and enforces the 2018 edition of the IECC with amendments as contained in Minnesota Rules, chapter 1323. The 2018 IECC is based on ASHRAE 90.1-2016 and the current Minnesota Commercial Energy Code permits its use as an alternative compliance path.¹ The Department proposes to adopt rules so that ASHRAE 90.1-2019, with amendments, is the sole compliance path for energy efficiency in commercial buildings.

The decision to propose for adoption ASHRAE 90.1-2019 was the result of the Department and the Minnesota Department of Commerce convening an informal short-term workgroup to enable cities to voluntarily promote or otherwise ensure greater energy performance measures for

¹ See Section C401.2 of the 2020 Minnesota Commercial Energy Code, https://codes.iccsafe.org/content/MNEC2020P1/chapter-4-ce-commercial-energy-efficiency#MNEC2020P1_CE_Ch04_SecC401.2.

commercial and multifamily residential dwellings.² The workgroup recommended the Department maintain uniformity and minimize complexity with the adoption of a single compliance path, ASHRAE 90.1, with amendments. Furthermore, the workgroup recommended the adoption of ASHRAE 90.1 on a three-year cycle. The adoption of the latest edition of ASHRAE 90.1 will allow the Department to more quickly adopt the latest energy conservation requirements.

Minnesota Statutes, section 326B.106, subdivision 1, requires the Department to consult with the CCAC in connection with the adoption of rules, codes, and standards relating to building construction. Minnesota Statutes, section 326B.07, subdivision 1, sets forth the requirements for membership of the CCAC. Minnesota Statutes, section 326B.07, subdivision 2, directs the CCAC to review code changes and provide recommendations to the Commissioner on proposed changes to the rule chapters that comprise the Minnesota State Building Code.

In consultation with the CCAC, the Department has appointed a Commercial Energy Code Technical Advisory Group (“TAG”) to review the current Chapter 1323 and ASHRAE 90.1-2019 to propose reasonable and necessary amendments to the existing rule and the model code. The Commercial Energy Code TAG members were appointed by the CCAC, and represented buildings officials; commercial building owners and operators; commercial construction; engineering and architectural design; energy conservation associations; and department personnel. Upon completion of the review of the rules and ASHRAE 90.1-2019 by the Commercial Energy Code TAG, a report was submitted to the CCAC detailing the TAG’s evaluation of the ASHRAE 90.1-2019 and recommended changes to that standard and the current Minnesota Rules, chapter 1323. After review, the CCAC forwarded this report, with comments, to the Commissioner for consideration in proposing amendments to chapter 1323.³ The proposed amendments in this rulemaking incorporate changes to ASHRAE 90.1-2019 proposed by the Commercial Energy Code TAG members and approved by the CCAC.

Public participation and stakeholder involvement

The Commercial Energy Code TAG held public meetings. Members of the public were invited to submit Code Change Proposal forms that contained their proposed amendments for TAG members’ consideration. The TAG allowed members of the public to comment during these meetings. Both people in favor of and opposed to a proposed amendment were invited to comment during meetings. The public was also invited to comment on the report submitted to the CCAC.

Statutory authority

Under Minnesota Statutes, section 326B, the Commissioner has authority to adopt, amend and repeal the State Building Code except for those portions of the code to which the Legislature has granted rulemaking authority to the Plumbing Board, Board of Electricity, or Board of High Pressure Piping Systems:

326B.02, Subdivision 5. General rulemaking authority. The commissioner may, under the rulemaking provisions of chapter 14 and as otherwise provided by this chapter, adopt, amend,

² The report detailing the workgroup’s findings is available at <https://www.dli.mn.gov/sites/default/files/pdf/BuildingsEnergyEfficiency2020.pdf>.

³ A report detailing the Commercial Energy Code TAG review of ASHRAE 90.1-20199 can be found at http://www.dli.mn.gov/sites/default/files/pdf/TAG_commercial_energy_code_report_071521.pdf.

suspend, and repeal rules relating to the commissioner's responsibilities under this chapter, except for rules for which the rulemaking authority is expressly transferred to the Plumbing Board, the Board of Electricity, or the Board of High Pressure Piping Systems.

Because the Legislature has not granted rulemaking authority to any of these boards in connection with the Minnesota Commercial Energy Code, the Commissioner is responsible for all amendments to the Minnesota Commercial Energy Code. See Minnesota Statutes, sections 326B.32, subd. 2, 326B.435, subd. 2, and 326B.925, subd. 2.

In Minnesota Statutes, sections 326B.101 and 326B.106, the Legislature has enacted additional requirements regarding the adoption or amendment of the State Building Code:

326B.101, Policy and purpose. The State Building Code governs the construction, reconstruction, alteration, repair, and use of buildings and other structures to which the code is applicable. The commissioner shall administer and amend a state code of building construction which will provide basic and uniform performance standards, establish reasonable safeguards for health, safety, welfare, comfort, and security of the residents of this state and provide for the use of modern methods, devices, materials, and techniques which will in part tend to lower construction costs. The construction of buildings should be permitted at the least possible cost consistent with recognized standards of health and safety.

326B.106, Subdivision 1. Adoption of code. Subject to paragraphs (c) and (d) and sections 326B.101 to 326B.194, the commissioner shall by rule and in consultation with the Construction Codes Advisory Council establish 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 also include duties and responsibilities for code administration, including procedures for administrative action, penalties, and suspension and revocation of certification. The code must conform insofar as practicable to model building codes generally accepted and in use throughout the United States, including a code for building conservation. In the preparation of the code, consideration must be given to the existing statewide specialty codes presently in use in the state.

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. To that end the code must encourage the use of new methods and new materials. Except as otherwise provided in sections 326B.101 to 326B.194, the commissioner shall administer and enforce the provisions of those sections.

Under these statutes, the Department has the necessary statutory authority to adopt the proposed rules.

In addition to providing the required statutory authority, Minnesota Statutes Chapter 326B includes special requirements regarding the commercial energy code. Specifically, Minnesota Statutes section 326B.106, subdivision 1(d), requires the Department to comply with federal law on energy codes administered by the United States Department of Energy (DOE):

(d) Notwithstanding paragraph (c), the commissioner shall act on each new model residential energy code and the new model commercial energy code in accordance with federal law for which the United States Department of Energy has issued an affirmative determination in compliance with United States Code, title 42, section 6833. The commissioner may adopt amendments prior to adoption of the new energy codes, as amended for use in Minnesota, to advance construction methods, technology, or materials, or, where necessary to protect the health, safety, and welfare of the public, or to improve the efficiency or use of a building.

The federal statute cited in this law requires DOE to evaluate each update of a specified energy efficiency standard (ASHRAE 90.1) and issue a determination about whether the update will improve energy efficiency in commercial buildings. If the DOE determines that the update will improve energy efficiency in commercial buildings, then:

... each State shall, not later than 2 years after the date of the publication of such determination, certify that it has reviewed and updated the provisions of its commercial building code regarding energy efficiency in accordance with the revised standard for which such determination was made. Such certification shall include a demonstration that the provisions of such State's commercial building code regarding energy efficiency meet or exceed such revised standard.⁴

In accordance with this statute, the DOE on July 28, 2021, issued a determination that the 2019 edition of ASHRAE 90.1 improves overall energy efficiency in buildings subject to the code.⁵ “States are required to certify that they have reviewed the provisions of their commercial building code regarding energy efficiency, and, as necessary, updated their codes to meet or exceed the updated edition [2019] of Standard 90.1.” After adoption of ASHRAE 90.1-2019 (as amended), Minnesota will be able to certify to the DOE that Minnesota has updated its commercial energy code to meet or exceed the 2019 edition of ASHRAE 90.1.⁶

Reasonableness of the amendments

General Reasonableness

The Department has thoughtfully considered every proposed amendment and weighed multiple factors and parties’ interests while keeping improving energy efficiency and improving occupant comfort in new commercial buildings and those undergoing alteration or repair at the forefront. The proposed

⁴ 42 U.S.C. § 6833(b)(2) (2019).

⁵ See 2021-07-28 Final Determination Regarding Energy Efficiency Improvements in ANSI/ASHRAE/IES Standard <https://www.regulations.gov/document/EERE-2020-BT-DET-0017-0010>.

⁶ <https://www.energycodes.gov/determinations>. States must either make this certification by July 28, 2023 or request an extension by that deadline.

amendments reflect this thoughtfulness, statutory requirements, and provide minimum standards that offer performance-based rules to the extent feasible while maintaining clarity enforceability.

Rule-by-Rule Analysis

Some of the proposed amendments are not substantively new but rather relocated as a result of adopting ASHRAE 90.1-2019 instead of the IECC. While ASHRAE 90.1 and the IECC contain similar requirements, the documents are organized and formatted differently. For example, the list of required information on construction documents has been relocated from 1323.0201, subpart 10, to proposed part 1323.0420 because ASHRAE 90.1-2019 addresses administrative requirements in section 4.

Other amendments are substantive and explained below or serve to clarify the requirement and are also explained below. Lastly, several rule parts are repealed because the amendments correspond with the commercial provisions of the IECC, which renders them irrelevant now that Minnesota is adopting ASHRAE 90.1.

1323.0010 INCORPORATION BY REFERENCE OF ASHRAE STANDARD 90.1.

Subpart 1. General. This subpart is amended to provide the necessary information to incorporate by reference ASHRAE 90.1-2019, as amended, to replace the 2018 IECC in chapter 1323.⁷ The proposed amendment incorporates specified sections, appendices and addenda of ASHRAE 90.1-2019 because, after consulting with stakeholders, the Department has decided to simplify compliance options for energy efficiency in commercial buildings by permitting compliance only with ASHRAE 90.1. ASHRAE 90.1 is the basis for the IECC so the shift is not significant for code users and the adoption of the latest edition of ASHRAE 90.1 will allow the Department to quickly adopt the latest standards and technology for energy efficiency in commercial buildings.

Additionally, three appendices are incorporated by reference: Normative Appendix A, Normative Appendix C, and Normative Appendix G. Addendums a, c, d, g, h, k, j, q, r, w, af, cd, cr, da, and db, are also incorporated as described in subpart 2.

Subp. 2. Mandatory sections. This subpart is amended to address which sections of ASHRAE 90.1-2019 must be applied and enforced as a part of the Minnesota State Building Code, which includes three appendices: Normative Appendix A, Normative Appendix C, and Normative Appendix G and Addendums a, c, d, g, h, k, j, q, r, w, af, cd, cr, da, and db, as described below.

Normative Appendix A. Normative Appendix A is incorporated by reference and contains thermal resistance requirements for construction assemblies, such as roofs, walls, and windows. Section 5 of the standard requires construction assemblies to have thermal resistance capabilities and refers code users to Normative Appendix A for thermal resistance specifications for materials and assemblies.

Normative Appendix C. Normative Appendix C is incorporated by reference because it is referenced in and provides the methodology for the building envelope trade-off option permitted by Section 5.6. The building trade-off option allows designers greater flexibility by permitting trade-offs in the energy efficiency of different building envelope components. For example, a designer may decide to install more insulation in the roof as a trade-off for additional window area that is not permitted by

⁷ ASHRAE 90.1-2019 is available at: <https://www.ashrae.org/technical-resources/standards-and-guidelines/read-only-versions-of-ashrae-standards>.

the prescriptive standard requirements.

Normative Appendix G. Normative Appendix G is incorporated by reference to permit an alternative path, the performance rating method. Normative Appendix G is one of the two performance paths permitted by ASHRAE 90.1-2019 in subsection 4.2.1.3. The other performance path is Section 11 Energy Cost Budget Method that compares the proposed design to one built to the prescriptive requirements of the code to determine the overall energy efficiency of the building. This performance path permitted by Section 11 allows for more flexibility and trade-offs than what is permitted by Normative Appendix C discussed above. Rather than examining individual trade-offs, the performance rating method evaluates the performance of all elements of the proposed design thereby encouraging designs that exceed the minimum prescriptive requirements. Normative Appendix G is more flexible than Section 11 because it allows for performance-based designs which are compared to an independent baseline where the design receives credit for exceeding the prescriptive requirements and practices of the standard, such as selection of more efficient HVAC equipment. The independent baseline is equivalent to the requirements of the 2004 edition of the standard and does not change from each edition but instead the baseline must be exceeded by a certain percentage with each subsequent edition of the standard. Normative Appendix G contains extensive requirements for the computer simulation modeling of a comparison between the proposed building design and a building designed to the independent baseline. This computer modeling simulation determines if the building meet the requirements of Normative Appendix G.

The proposed rule also incorporates by reference several addenda to ASHRAE 90.1-2019 without amendment. Although ASHRAE 90.1-2019 is a continuous maintenance standard and changes to the standard are constantly being reviewed and approved by the standards committee, the approved changes are not immediately or automatically effective and enforceable in Minnesota. The addenda to ASHRAE 90.1-2019 are changes that have been approved for inclusion in the standard and will be published in the next full revised edition. The Department proposes adopting the addenda discussed below in order to improve the energy efficiency of buildings as well as clarify requirements in the standard.⁸

Addendum a. Addendum a adds section 6.5.3.7 and table 6.5.3.7 to address minimum fan efficacy requirements for low-power ventilation fans. The standard includes an efficiency requirement for higher power fans in section 6.5.3.6 but does not include requirements for low power fans such as bathroom exhaust fans or those used in ERVs. Addendum a defines “low power fans” to establish a clear scope. Both higher power fans and low power fans should be clearly regulated for consistency and to avoid confusion. Fan efficacy is necessary and reasonable to include in the commercial energy code because it will result in less energy use by low power fans, which is a main purpose of this code. Any additional costs for fans that meet the efficacy requirements is anticipated to be minimal and are offset by the energy savings they provide.

Addendum a also adds ASHRAE 62.2-2019 to section 6.5.3.8 as a referenced standard and permits its use as an alternative to other codes in determining minimum ventilation rates for dwelling units, specifically the amount of outdoor air that enters a building. The Minnesota State Building Code includes ventilation requirements for residential buildings that are more than three stories in height in Minnesota Rules, chapter 1346, the Minnesota Mechanical and Fuel Gas Code. ASHRAE

⁸ ASHRAE 90.1-2019 addenda are available at: <https://www.ashrae.org/technical-resources/standards-and-guidelines/standards-addenda/addenda-to-standard-90-1-2019>.

62.2-2019 is an alternative for determining minimum ventilation rate. ASHRAE 62.2-2019 is an industry standard and its requirements are similar to those in chapter 1346. It is necessary and reasonable to include ASHRAE 62.2-2019 here for consistency with chapter 1346 and because it is familiar to code users.

Lastly, Addendum a renumbers section 6.5.3.7 Ventilation Design to section 6.5.3.8 because of the new section 6.5.3.7 Low Power Fans that is added. The section reference numbers in sections 6.3.2 and 11.5.2 are also renumbered to reflect this change.

Addendum c. Addendum c revises sections 6.3.2 and 6.4.3.3 requirements for HVAC controls for residential spaces and small non-residential occupancies. Addendum c requires HVAC systems serving residential spaces to be equipped with an automatic shutdown that can start and stop the system under at least two different schedules (e.g., weekend and weekday) and setback controls. That is, the addendum requires the installation of a programmable thermostat. Programmable thermostats are currently required for residential spaces that must comply with Minnesota Rules, chapter 1322, the Minnesota Residential Energy Code, including dwelling units in buildings that are three stories or less in height. It is reasonable for all dwelling units to have similar requirements for programmable thermostats since the height of the building is unrelated to the thermostat's effectiveness. Furthermore, Addendum c will ensure that occupants of residential spaces in buildings that are more than three stories in height are provided with the same energy saving benefits as those living in low-rise buildings. Any additional cost for the programmable thermostat is anticipated to be nominal and offset by the energy savings provided by limiting or shutting off the heating or cooling of a space when it is unoccupied.

Addendum c clarifies off-hour control requirements for HVAC systems serving small non-residential spaces. Specifically, off-hour controls are not required for systems with a design heating capacity and cooling capacity less than 7000 Btu/h and have accessible manual on/off controls. A system with a design heating and cooling capacity less than 7000 Btu/h serves a space approximately 1000 square feet in size. It is reasonable to exclude small HVAC systems for off-hour control requirements because the occupants can turn the system on as needed. Non-residential spaces served by a system with a design heating and cooling capacity between 7000 Btu/h and 15,000 Btu/h must be equipped with an automatic shutdown and setback controls like those provided for residential occupancies. This is reasonable because these spaces are large enough that a programmable thermostat will provide energy savings but not so large as to make more complex automatic shutdown controls economical.

The changes in addendum c are reasonable because the unrevised language does not sufficiently differentiate requirements for residential spaces and non-residential occupancies. Furthermore, the current language creates conflict between code requirements because section 6.4.3.3 exempts small systems, including those serving residential spaces, from the off-hour controls requirements while exception 1 to section 6.4.3.3.1 requires residential occupancies to be equipped with automatic shutdown controls. Addendum c is necessary because it clarifies requirements for both residential spaces and small non-residential occupancies.

Addendum d. Addendum d revises two sections to improve parking garage ventilation and the energy efficiency of ventilation systems. A definition of "parking garage section" is added to section 3.2 because the addendum revises section 6.4.3.4.5 requirements for parking garage ventilation systems based on parking garage sections. Item a of section 6.4.3.4.5 is revised by

Addendum d to require separate ventilation systems and controls for each parking garage section. This is necessary to prevent vehicle exhaust from one section moving to another section of the garage and improves energy efficiency by ensuring that only an area with harmful fumes is exhausted.

Addendum d revises item b and item c requirements in section 6.4.3.4.5 to improve the energy efficiency of ventilation equipment. Item b is revised to clarify that the control systems are for each parking garage section and reduces fan airflow rates to 20 percent or less of design capacity from 50 percent. This is reasonable because 50 percent is a much higher airflow rate than is necessary to ventilate the parking garage section. The reduction of airflow rates to 20 percent or less design capacity will use less energy while still ensuring sufficient ventilation for parking garage sections. Item c is added to require that the parking garage section have controls and devices, such as variable-speed drives, that reduce the energy used as airflow is reduced. Any additional cost for the controls and variable-speed drives is offset by the reduced energy costs.

Addendum d also revises exception 1 to improve the energy efficiency of parking garage ventilation systems and deletes exceptions 2 and 3. Exception 1 is revised so that garages that are not heated or cooled are exempt from the ventilation requirements of section 6.4.3.4.5 and exempts other garage systems based on the size of the motor used in the ventilation systems rather than the size of the garage. This is reasonable because the size of the motor more directly dictates how much energy is used. Ventilation fan motors that are less than 5 hp are exempt from the requirements of section 6.4.3.4.5 because compliance by systems with motors of that size is not cost-effective.

Exception 2 provides an exemption based on ventilation system motor size. Because of the changes to exception 1, exception 2 is no longer necessary and therefore deleted.

Exception 3 is deleted because it is redundant. Section 2.4 of ASHRAE 90.1-2019 does not permit the standard to be used to circumvent any other safety codes. The building official has the authority to reject the design of parking garage ventilation systems as necessary for life safety.

Addendum g. Addendum g revises section 6.5.1.1.5 to clarify code requirements for relieving excess outdoor air during the air economizer operation because in practice, it was often ignored and violated due to vagueness. Air economizers are a duct and damper arrangement in which the automatic control system allows a cooling system to supply outdoor air to reduce or eliminate the need for mechanical cooling during mild or cold weather. If the economizer brings in more air than is exhausted, the building can become over-pressurized and more cool outdoor air cannot be added to the building to induce cooling. When a building is over-pressurized, more energy is needed to condition the air. Addendum g specifies that excess outdoor air can be relieved by one of two methods: (1) return or relief fans or (2) a barometric or motorized damper relief path. It is reasonable to incorporate Addendum g because it clarifies requirements known to be confusing.

Addendum h. Addendum h revises section 4.2.1.1 to clarify that gross floor area is to be used when calculating the building performance factor for mixed-use buildings. There are several types of areas defined in the standard (e.g., gross floor area, gross conditioned floor area, gross lighted floor area). It is necessary and reasonable to specify gross floor area (as defined in the standard) in section 4.2.1.1 so the designer includes all and only spaces necessary to correctly calculate the building performance factor.

Addendum k. Addendum k adds an exception to section 11.5.2(h). Section 11.5.2(h) provides fan system efficiency requirements. However, when an alternative compliance path is taken using a performance-based design instead of the prescriptive requirements of the standard, a requirement for fan power for energy recovery systems is necessary. The fan power of the proposed energy recovery system should either be equal to the power permitted by the prescriptive requirements or comply with the fan power limit in section 6.5.3.1 but without the design receiving the fan power credit for energy recovery. It is reasonable that a system added as a part of performance-based design to improve energy efficiency conform to standard requirements for the system so that the system does not negatively impact the overall energy efficiency of the building. Furthermore, it is reasonable that the performance-based design does not receive the additional fan power credit because the design is already receiving credit for use of energy recovery when it is not required. If the design were to receive credit for fan power and the use of energy recovery, it would receive credit for the same element twice and negatively affect the overall energy efficiency of the performance-based design.

Addendum l. Addendum l revises Table G3.1 requirements for vertical fenestration distribution on each face of the baseline building.⁹ The revisions clarify how designers are to calculate the vertical fenestration of the baseline building performance based on the above-grade exterior wall area of the building. A new paragraph is added requiring a proportional increase of the fenestration on the other building faces when the proposed vertical fenestration on a given face exceeds the 40 percent of the above grade wall area. The headings of Table G3.1.1-1 are revised for consistency with the revisions to Table G3.1. The incorporation of Addendum l is necessary to clarify requirements for the calculation and distribution of vertical fenestration for performance-based designs.

Addendum q. Addendum q revises Table G3.7 to correct an error which duplicates lighting requirements for laboratory classrooms. Table G3.7 has requirements for laboratory classrooms under both the “Classroom/Lecture Hall/Training Room” category and “Laboratory” category. Table G3.7 is located in Normative Appendix G which is the performance compliance path that uses an independent baseline that is equivalent to the 2004 edition of the standard and requires designers to exceed this baseline by a certain percentage. The 2004 edition of the standard did not have requirements for laboratory classroom under the “Laboratory” category. In the updating process, the requirement was inadvertently duplicated. It is necessary to delete the requirements laboratory classrooms under the “Laboratory” to maintain the baseline 2004 standard requirements and prevent confusion as to Normative Appendix G baseline design requirements.

Addendum r. Addendum r adds an exception to section 6.4.3.3.3 so that heating and cooling systems in residential spaces are not required to have optimum start controls. Optimum start controls automatically adjust the start of heating and cooling systems prior to occupancy in order to bring the space to desired temperature levels at the beginning of scheduled occupancy. Because residential spaces do not have scheduled occupancy times like offices or retail spaces, optimal start controls are an unnecessary expense that does little to improve energy efficiency. As provided in the foreword to the addendum, this addendum is considered a clarification of the existing requirement and not a substantive change.

Addendum w. Addendum w modifies section G3.1.3.7 and Table G3.1.3.7. Section G3.1.3.7

⁹ In common language, “vertical fenestration distribution” is the distribution and location of windows and doors on the exterior walls of a building.

requires electric chillers in the building design. Table G3.1.3.7 determines the number of chillers required for the building design. Addendum w clarifies that the modeling of chillers for the baseline building design should be based on total peak coincident cooling load of HVAC systems using chilled water. It is necessary to specify HVAC systems using chilled water because other cooling systems, such as DX cooling systems, do not use chilled water to cool the air and instead use refrigerant-based cooling. The modeling is to be based on peak coincident cooling load, meaning that other building systems are at maximum usage, to ensure the correct calculation of energy usage. The unrevised standard language as written could result in confusion and chillers that do not meet energy efficiency requirements.

Addendum af. Addendum af revises item 6 (Lighting) of Table G3.1, Modeling Requirements for Calculating Proposed and Baseline Building Performance, to clarify the requirements for computer simulation modeling of lighting power for proposed and baseline building designs when the space does not yet have a lighting system designed.¹⁰ The methodology the designer must use depends upon whether the space types are known. If a use for each space within a building is known, then lighting power should be determined using the Space-by-Space Method. If the space types have not been determined, then the Building Area Method, which addresses the entire building, should be used.

For designs that are modeled using the Space-by-Space method and include retail space types, the addendum clarifies that modeling for both the proposed and baseline design is permitted to include an increase in the interior lighting power allowance for retail display lighting consistent with Section 9.6.2(b). Section 9.6.1 provides the prescriptive requirements for calculation of the interior power allowance using the Space-by-Space method and Section 9.6.2 details circumstances in which additional lighting power use is permitted, including for retail display lighting. The addendum is necessary to clarify that modeling of both the proposed design and baseline design is permitted to include additional lighting power use for retail display lighting when the Space-by-Space method is used for consistency with prescriptive requirements of the standard.

Addendum af also revises Table G3.6 Performance Rating Method Lighting Power Densities for Building Exterior by deleting the items that are nontradable surfaces to clarify the requirements for computer simulation modeling of the power usage of these items. Table G3.1 directs standard users to model exterior lighting identified as “Tradable Surfaces” using the baseline lighting power allowance in Table G3.6 and the modeling for all other exterior lighting is to be the same for the baseline design and proposed design. However, Table G3.6 provides lighting power allowances for both tradable and nontradable surfaces, which conflicts with the instructions provided in Table G3.1. Furthermore, the allowances for nontradable surfaces in Table G3.6 exceed what is permitted by the prescriptive requirements located in Table 9.4.2-2. It is necessary to delete the nontradable surfaces from Table G3.6 to prevent confusion as to the permitted power allowances for nontradable surfaces and to ensure the correct modeling of building energy use.

Addendum cd. Addendum cd modifies section 6.5.6.1.2 and adds sections 6.5.6.1.2.1 and 6.5.6.1.2.2 to clarify the requirements for the use of energy recovery systems and air economizer or bypass operation. Energy recovery systems recover energy used by the ventilation system to cool, heat, humidity, or de-humidify outdoor air. The second paragraph of section 6.5.6.1.2 is deleted

¹⁰ Addendum af modifies Table G3.1 for both I-P and SI units. Chapter 1323 incorporates only the I-P standard so any references to SI units are irrelevant for our purposes.

because the requirement is clarified and moved to the new section 6.5.6.1.2.1 without material change to the requirements. Section 6.5.6.1.2.2 is added to limit the amount of exhaust air passing through the energy recovery unit to 10 percent or less of full design airflow when the air economizer or bypass operation is in use. In winter, energy recovery systems use a heat exchanger to transfer heat from the exhaust air stream back into the incoming outdoor air stream to temper it. In summer, energy recovery systems transfer heat from the incoming outdoor air to the building exhaust air before entering the interior air handling system. Air economizers are used in summer to bring unconditioned cool outdoor air into the building to cool the interior without using mechanical cooling. Use of the energy recovery system while using an air economizer only transfers the building heat back into the incoming air stream. A bypass of the energy recovery system is needed when using an air economizer in order to exhaust as much heat as possible from the building when the outdoor air can satisfy the building cooling load. For example, when the indoor building temperature is 80 degrees Fahrenheit and the outdoor temperature is 55 degrees Fahrenheit, the outdoor air may be used to cool the building without mechanical air conditioning by using the air economizer. The energy recovery bypass will prevent the heat in the exhaust air stream from the toilet room from being redirected back into the building through an energy recovery system, and instead the hot air is exhausted directly to the outside using the energy recovery bypass operation. The exception to section 6.5.6.1.2.2 allows the use of the energy recovery system at the same time as the air economizer or bypass operation when 80 percent or more outdoor air is introduced into the energy recovery system because the outdoor air can effectively dilute the recovered heat from the exhaust and provide a comfortable indoor temperature without mechanical cooling.

Addendum cr. Addendum cr modifies section 11.2 Compliance and Normative Appendix G. The unrevised standard and Appendix G allow unlimited trade-offs between the building envelope and other building systems. The building envelope is the building elements that separate conditioned space from unconditioned space, including the wall assembly and roof. These elements are unlikely to be upgraded over time and can limit a building's energy performance. Addendum cr revises section G1.2.1 to add item c to require new buildings to either comply with all the building envelope requirements (section 5.5) or permits limited trade-offs between the building envelope performance and other building elements dependent upon the building's use. This is particularly effective in Minnesota's climate. Addendum cr limits the trade-offs allowed between the building envelope and other building systems. The incorporation of Addendum cr is necessary to improve a building's long-term energy performance.

Addendum da. Addendum da aligns various items in Appendix G with Section 11 of the standard. Specifically, addendum da revises the list of required documentation in Section G1.3.2, simulation program requirements in Section G2.2, climatic data in Section G2.3 and exceptional calculation methods in Section G2.5. The addendum also updates Section G2.4.2 to include a reference to the baseline service water heating and space heating energy source tables in Appendix G. It is reasonable to align requirements in Normative Appendix G and the performance-based compliance paths in the standard.

Addendum db. Addendum db revises item 5 Building Envelope of Table G3.1 of Normative Appendix G to clarify space conditioning categories so the computer simulation modeling compares the proposed design to the appropriate baseline design. As written, unrevised item 5 may cause confusion because it does not include specific direction for the modeling of conditioned space and semiheated spaces. As a result, a conditioned space could be incorrectly modeled based on the less stringent semiheated building envelope requirements. Item 5, subitem b directs standard users to

the Tables G3.4-1 through G3.4-8 for the correct building envelope requirements for different space conditioning categories. Addendum db adds Table G3.4-9 Heated Space Criteria that includes criteria for when a semiheated space is required to be modeled using the building envelope design criteria for conditioned spaces. The incorporation of Addendum db is necessary so that the building envelopes are modeled on the correct criteria to ensure the proposed performance-based design exceeds baseline requirements.

1323.0020 REFERENCES TO OTHER CODES.

Subpart 1. General. This subpart is amended to repeal subparts 2 through 11 to delete references to other codes and standards promulgated by the ICC and referenced in the IECC. ASHRAE 90.1-2019 is not published by the ICC so it does not refer to any codes and standards published by that entity. However, ASHRAE 90.1-2019 does refer to the “building code” or “applicable code” so it is necessary to clarify to code users that references to the “building code” or “applicable code” mean the Minnesota State Building Code as described in Minnesota Rules, part 1300.0050.

1323.0210 SECTION 2 SCOPE.

Subpart 1. ASHRAE 90.1 Section 2.1. This subpart modifies section 2.1 to add items 5, 6, and 7. Items 1 through 4 are a part of the standard and are consistent with the scoping for the Minnesota Commercial Energy Code located in existing part 1323.0100, subpart 2. The scope of the existing Minnesota Commercial Energy Code also includes existing buildings undergoing alteration or change of occupancy or use, so proposed items vi and vii are consistent with existing requirements.

Proposed item 5 expands the scope of the Minnesota Commercial Energy Code to include historical buildings. Currently Minnesota Rules, chapter 1323, which adopts and amends the 2018 IECC, does not directly address historical buildings, so these buildings must fully comply with 2018 IECC requirements for existing buildings. However, chapter 1323 allows an alternative compliance path of ASHRAE 90.1-2016, which exempts historical buildings from compliance with the standard requirements for energy efficiency.¹¹ Currently, historical buildings not subject to the residential energy code that undergo alteration or addition do not comply with current energy code standards if the alternative compliance path is chosen. It is reasonable to amend the scope of the Minnesota Commercial Energy Code to include historical buildings as a specific category to require compliance for renovations and improve energy efficiency. Requiring compliance will make historical buildings more durable and provide better occupant comfort, while retaining identified historic elements and features as exempt. See proposed part 1323.0420, subparts 1 and 2 and proposed part 1323.0513, subpart 2 for discussion of exceptions for historical elements. The reasons for amending the scope to include historical buildings that are residential multi-family structures three stories or fewer in height is discussed in proposed subpart 2, below, and for other historical buildings in proposed part 1323.0420, subpart 1, below.

Historic elements and features will vary from one building to the next based upon the nature of the building’s historicity. For example, buildings only listed as contributing to a historic district have historic exterior features where visible to the public, but the building interiors and facades not visible to the public are not deemed historically contributing and therefore would not be exempt. The historic

¹¹See Section 4.2.1.3 of ASHRAE 90.1-2016, <https://codes.iccsafe.org/content/MNEC2020P1/4-administration-and-enforcement>.

exterior may also include views into the building through windows on public facades, and so may include limited interior construction as well. A building such as this could typically have the interior side of exterior walls insulated to comply with the energy codes, but the historic windows would need to remain. Other buildings may be historic because of their use, like barracks buildings at Fort Snelling, where both the exteriors and the interiors of the buildings are historic. Buildings such as these have historic exterior walls and roofs as well as historic interior plaster walls, wood moldings and trim. The exterior walls of these buildings would be exempt from energy code because insulating them on the exterior or the interior would destroy historic building elements. However, sealing cracks and joints and insulating hidden attic spaces would not be exempt. The National Park Service and the Minnesota State Historic Preservation Office specifically list the historic nature and contributing historic elements of a building when the building is deemed historic.

Subp. 2. ASHRAE 90.1 section 2.2. This subpart modifies section 2.2 to specify the types of structures that are not required to comply with the Minnesota Commercial Energy Code. Item a specifies that the listed residential buildings are not required to comply with chapter 1323 because they are required to comply with the provisions of the Minnesota Rules, chapter 1322, the Minnesota Residential Energy Code. These structures are currently exempt from chapter 1323 so there is no substantive change. It is necessary and reasonable to maintain this exemption.

Section 2.2, item b, is identical to item b in ASHRAE 90.1-2019 and exempts buildings that do not use electricity or fossil fuel from compliance with the standard. The proposed rule does not modify ASHRAE 90.1-2019 language for this item.

An exception is added to permit historical buildings that are residential structures and three stories or fewer above grade to comply with this chapter or chapter 1322. Currently, all residential structures that are three stories or fewer above grade must comply with chapter 1322, the Minnesota Residential Energy Code. However, the residential energy code provisions are largely prescriptive and do not include exceptions for the preservation of historical buildings. As a result, historical buildings that are also residential structures of three stories or fewer and undergoing alteration, renovation, repair, or change of occupancy must comply with all chapter 1322 requirements for existing buildings for that building feature or element undergoing alteration without regard for its historical significance. For example, chapter 1322 requires the insulation of walls that are opened up during the renovation process.¹² However, compliance with wall insulation requirements can be difficult for residential historic buildings with historic exteriors and an interior with historic plastered solid brick walls and details such as crown moldings, wainscoting, and trim around windows, doors, and floor base. The only option for compliance while preserving historical elements with minimal damage is to cover the existing interior wall with insulation and new drywall. The proposed exception would exempt the historical exterior and interior walls from compliance with the requirements for wall insulation in order to preserve historical features. It is not anticipated that permitting historical buildings that are residential structures and three stories or fewer above grade to comply with this chapter will increase the cost of construction because the building envelope requirements of chapter 1322 are similar to those of chapter 1323.

Compliance with the requirements of chapter 1322 is particularly challenging for historical buildings that are undergoing a change of occupancy to become residential multi-family structures of three stories or fewer above grade. Historical buildings that are renovated to multi-family

¹² See Section 402.1 of the 2015 Minnesota Residential Energy Code, https://codes.iccsafe.org/content/MNEC2020P1/chapter-4-re-residential-energy-efficiency#MNEC2020P1_RE_Ch04_SecR402.1.

structures must also comply with the historical preservation requirements of Minnesota Rules, chapter 1311, the Minnesota Conservation Code for Existing Buildings.¹³ As a result, the building is subject to conflicting code requirements because chapter 1322 requires historical features and elements to fully comply with energy efficiency requirements while chapter 1311 permits alternatives that allow for historic preservation. The proposed exception is reasonable because it provides designers with an option to comply with both chapter 1311 and chapter 1323 to preserve the historical features and elements while improving the energy efficiency in residential buildings, which improves occupant comfort and lowers energy costs.

Subp. 3. ASHRAE 90.1 section 2. This subpart modifies section 2 scope by adding two new sections, sections 2.5 and 2.6. Section 2.5 is added to direct code users to Minnesota Rules, chapter 1322, for energy conservation requirements for buildings constructed in accordance with the IRC and for the portions of buildings containing other residential occupancies where the entire building is three or fewer stories above grade. This amendment is reasonable because it clarifies to code users and designers that the residential provisions are amended in a different rules chapter. This is helpful for designers from other states who may not be familiar with the organization of the Minnesota State Building Code.

Section 2.6 is added to clarify requirements for buildings that contain more than one occupancy group, such as buildings that contain dwelling units as well as retail or office space. The portions of the building containing occupancies described in proposed section 2.5 must comply with Minnesota Rules, chapter 1322. The other occupancies are required to comply with this chapter. This is an existing provision that is revised and relocated from existing rule part 1323.0100, subpart 7 and is necessary for consistency with the scoping of the residential provisions of the IECC as adopted by chapter 1322. The requirements for dwelling units in buildings three stories or less in height are located in chapter 1322 because the patterns of energy use in these dwellings based in part on anticipated occupancy load are more closely aligned with one- and two-family homes and townhouses than dwelling units located in building four stories or more in height. Therefore, the requirements of chapter 1322 are more effective in improving energy efficiency in these dwellings. Furthermore, any building, intended for residential or commercial purposes, that is more than four stories must comply with all Minnesota Building State Building Code requirements for commercial construction.

1323.0310 SECTION 3.1 GENERAL.

Section 3 of the standard addresses definitions, abbreviations and acronyms. Existing rule part 1323.0201 addresses general requirements for defining terms because that is consistent with the IECC formatting. Therefore, the proposed rule repeals part 1323.0201 (see repealer) and relocates these requirements to section 1323.0310 to align with ASHRAE 90.1-2019 formatting and organization.

Subpart 1. ASHRAE 90.1 Section 3.1 General. The proposed rule modifies ASHRAE 90.1-2019, section 3.1 to state that when a term is not defined in the standard to refer to the Merriam-Webster Collegiate Dictionary. The Merriam-Webster Collegiate Dictionary is recognized as providing ordinarily accepted meanings. The proposed rule combines the existing standard language and the current chapter 1323 language to describe how definitions should be used while maintaining the same method for addressing terms not specifically defined in the standard.

¹³ See [Minnesota Rules, part 1300.0040, subpart 2.](#)

Subp. 2. ASHRAE 90.1 Section 3.1.1 Terms defined in other codes. Proposed subpart 2 adds Section 3.1.1 to refer code users to other chapters of the Minnesota State Building Code for definitions of terms not defined in this chapter. ASHRAE 90.1-2019 may use terms that are not defined within the standard but are defined in other chapters of the Minnesota State Building Code, so it is necessary to inform code users that those definitions apply. This is one of the “methods authorized by this chapter” referenced in subpart 1 that would be used before relying on the Merriam-Webster Collegiate Dictionary.

1323.0320 SECTION 3.2 DEFINITIONS.

The proposed rule repeals existing part 1323.0202 addressing definitions and relocates definitions to section 1323.0320 because ASHRAE 90.1-2019 is formatted and organized differently than the IECC and ASHRAE 90.1-2019, section 3.2 addresses definitions. Subpart item A is for definitions that are modified while subpart item B has definitions that are added.

A. Modified Definitions. Definitions contained in this subsection modify the definitions in section 3.2 of ASHRAE 90.1-2019.

Computer Room. This definition modifies the ASHRAE 90.1-2019 definition to add the phrase “connected design data equipment load of greater than 10 kW.” This is consistent with the definition for “computer room” located in current part 1323.0202 and provides additional clarification of data equipment and its power usage.

B. Added Definitions. Definitions contained in this subsection are added to section 3.2 of ASHRAE 90.1-2019 because they are terms that are used in this rule.

Approved. The definition is added to this proposed rule and to other chapters in the Minnesota State Building Code, including chapter 1300, to give the building official discretion to approve new materials or technology while maintaining quality and the purpose of the rules because objective, reasonable criteria on which approval is based is listed in the definition. It is necessary and reasonable to have a consistent definition of “approved” that fits with Minnesota’s enforcement structure.

Commercial parking facility. This definition is added to clarify existing requirements for commercial parking facilities. Existing part 1323.0401, subpart 2, prohibits the heating of commercial parking facilities. This has caused confusion as to the meaning of “commercial parking facility” and the parking facilities that the prohibition applies to. The proposed definition clarifies that a commercial parking facility is any structure where parking of the vehicle is associated with commerce and that commerce could include the rental or purchase of motor vehicle spaces. The existing provision is revised and relocated to rule part 1323.0611, subpart 2, to align with the standard formatting and to provide additional clarity.

Standard. This definition is added because ASHRAE 90.1-2019 refers to itself as “this standard.” Because ASHRAE 90.1-2019 is proposed for incorporation by reference as the Minnesota Commercial Energy Code it is necessary to clarify to code users that references to “the standard” or “this standard” in ASHRAE 90.1-2019 means Minnesota Rules, chapter 1323.

1323.0411 SECTION 4.1.1 SCOPE.

This proposed amendment adds a new subsection to address requirements for a mixed occupancy building that is three stories or less in height and includes various residential occupancies. A mixed occupancy building is a building that contains more than one use, such as dwelling units and office or retail space. This subpart is necessary because the requirements vary based on the number of stories in the building and occupancy. For buildings that are more than three stories above grade, all occupancies in the building must comply with the applicable requirements of chapter 1323. For buildings that are three stories or less in height, the spaces within the building that are residential occupancies are to comply with Minnesota Rules, chapter 1322, and the other occupancies are to comply with chapter 1323. This rule part is necessary to clarify which portions of mixed occupancies buildings are required to comply with chapter 1323 and will provide for uniform application and enforcement of the code.

1343.0420 SECTION 4.2 COMPLIANCE

Subpart 1. ASHRAE 90.1 section 4.2.1.3 Alterations of Existing Buildings. This section is modified to add the first two sentences to carry forward existing requirements for alterations located in part 1323.0100, subpart 3, that is being repealed. Existing part 1323.0100, subpart 3, addresses administrative requirements, which are addressed in section 4 of ASHRAE 90.1-2019; therefore, it is necessary to repeal existing part 1323.0100, subpart 3, and relocate the requirements for alterations of existing buildings to this subpart for consistency with the formatting and organization of ASHRAE 90.1-2019. The first two sentences are existing requirements that are relocated to align with ASHRAE 90.1-2019 formatting. The proposed amendment also clarifies that the portions of a building undergoing alteration must comply with the standard to the extent possible without creating an unsafe condition and the portions of the building not undergoing alteration are not required to conform to the standard.

The third sentence and items a, b, and c, include the same requirements as section 4.2.1.3 of ASHRAE 90.1-2019 for alterations. Alterations must comply with requirements for compliance documentation and with the prescriptive compliance path (item a) or one of the two performance paths permitted by the standard (item b or item c). The proposed rule does not modify the ASHRAE 90.1-2019 language for these requirements.

The exception to section 4.2.1.3 is modified to require historical buildings undergoing alteration to comply with the requirements of the standard to the greatest extent possible without the alteration of the components, elements, or systems deemed historic by the historic authority having jurisdiction. The proposed modification only impacts the portion of the building or building element that is undergoing alteration.

The proposed modification to the exception is reasonable because it preserves historical building elements while requiring elements that can be altered to comply with the same energy efficiency requirements that other existing buildings undergoing alteration must comply with. Each historical building is able to comply to a different extent and to different requirements. Some historical buildings have windows or other elements of the building envelope that are historical and cannot be altered. Any element that is not historical will be required to comply to the same extent as any other existing building, meaning any alteration to the building envelope, lighting, water heating and HVAC systems will have to comply with the proposed rules unless it is a historical feature or element. The designer is to indicate which features are historical so that the building official is aware of which

features cannot comply with energy efficiency requirements. The proposed modification to the exception is reasonable because it improves the energy efficiency of historical buildings while still maintaining historic components, elements, and systems.

The costs for alterations to lighting, water heating, and HVAC systems will not significantly increase as a result of the proposed rule because energy efficient replacements are the most commonly available and cost-effective options. Any lighting fixtures undergoing renovation in a historical building that are not historical features are most likely to be replaced with LED fixtures that comply with this chapter because they are the most readily available option. Similarly, there is less efficient HVAC and water heating equipment available, but that equipment is more difficult to obtain and is at a similar cost as more energy efficiency options making it less likely to be selected to replace inefficient, older equipment.

The Department anticipates a cost increase for alterations to the building envelope as a result of the proposed rules. The building envelope is the building elements that separate conditioned space from unconditioned space. Alterations to the building envelope include replacement roofs, windows, and doors and non-cosmetic alterations to exterior walls. The Department examined costs of these alterations for climate zone 7, which includes the northern counties of Minnesota, and determined the most significant cost increase is to replace a roof that has not been previously insulated. The costs were determined by averaging the cost of materials that were obtained from three nationally recognized building materials retailers in three different locations in Minnesota. The Department found the cost to insulate a pitched roof with blown fiberglass R-60 insulation is \$2.12 a square foot.¹⁴ Based on the occupancy load density in the Minnesota Building Code, a one-story building that is occupied by a small business with 50 employees would have a roof of approximately 7,500 square feet and the cost to insulate this roof is approximately \$15,900.

There are cost increases for window and door replacement as well as for non-cosmetic alterations to exterior walls. The Department determined the cost to replace a window in compliance with ASHRAE 90.2-2019 is \$22 per linear foot for framing and \$15 per square foot for insulated glass. The cost to replace a typical 236 square foot store front window is \$2,948 for the framing and \$3,540 for replacement glazing. The cost of to replace a typical 42 square foot door in compliance with the proposed rules is \$1,400. Lastly, the Department determined that the cost to insulate an exterior wall in compliance with the proposed rule is \$3.45 per square foot for 3-inch extruded polystyrene with an R-value of R-15.2 so the cost to insulate 254 square foot wall is approximately \$900. However, an exterior wall is only required to be insulated if it is not a historical element and the wall is opened to add the supplementary wood necessary to expand the thickness of the wall to allow insulation to be installed. Insulation will not be required for repairs or cosmetic alterations to exterior walls such as painting.

The Department recognizes that the proposed rules can significantly add to the cost of renovation of a historical building. However, the proposed rules do not require a historical building to undergo renovation and only requires that the portion of the building undergoing renovation to conform to the energy efficiency requirements for existing buildings. Currently, a nonhistorical existing building undergoing renovation must comply with the requirements of chapter 1323 while a historical building of similar age and condition that undergoes renovation is exempt. The occupants of the

¹⁴ This number was determined by averaging out the prices from three major suppliers in three different metropolitan areas in Minnesota in early 2022. This technique was used to determine the costs of materials throughout this document.

nonhistorical existing building benefit from the improvements to energy efficiency that reduce energy costs and improve comfort while the owners of historical buildings are exempt from improvements that benefit occupants. The proposed rule is reasonable because it promotes consistency as it requires alterations to all existing buildings to comply with the same requirements while allowing for the preservation of historical building features and elements.

Subp. 2. ASHRAE 90.1 section 4.2.1.4 Change of occupancy or use. The proposed rule adds a section to the standard to replace current part 1323.0100, subpart 4, which addresses requirements for spaces undergoing a change of occupancy or use. Current part 1323.0100, subpart 4, is being repealed for consistency with the organization and formatting of ASHRAE 90.1-2019, which addresses administrative provisions in section 4. The current rule requires spaces undergoing a change of occupancy to comply with the interior lighting power allowance that is permitted for a new construction building of that occupancy. Proposed subpart 2 requires a space undergoing a change of occupancy to comply with all lighting requirements for new construction, which includes requirements for lighting controls and exterior lighting power allowances in addition to the requirements for interior lighting power allowance. Lighting controls ensure that users of a space have the ability to turn lights off if not needed, and in some instances, occupancy detectors or timers are used to ensure that lights are not left on when spaces are not being used. When a change of occupancy affects an entire building, the requirements extend to exterior lighting requiring the same power limitations as for new construction and the same types of lighting controls as new construction to ensure that exterior lighting is not using energy when it is not needed. There is an initial cost for improvements to exterior lighting, but this cost is offset by the savings provided by more efficient lighting. For example, a LED 50 W exterior wall fixture costs \$50 while a 250 W high pressure sodium vapor wall fixture costs \$30. However, the lifespan of the LED lamp is two to four times longer than that of a high-pressure sodium vapor lamp, resulting in a cost savings in replacement costs in addition to the energy cost savings provided by the more efficient LED lamps.

The proposed subpart also requires spaces undergoing a change of occupancy that results in an increase in the demand for fossil fuel or electricity to comply with the standard. This requirement is identical to the existing requirement in current part 1323.0100, subpart 4, that is being repealed. It is necessary to relocate this requirement to ensure the energy use of a space is compliant with requirements for that occupancy.

Lastly, there are two exceptions to the proposed requirements for change of occupancy. The first exception requires historical buildings to comply with the requirements for change of occupancy to the greatest extent possible without altering elements or features that are deemed historic by the historic authority having jurisdiction. This exception is necessary because the proposed rules expand the scope of the Minnesota Commercial Energy Code to apply to historical buildings. A historical building undergoing a change of occupancy will often undergo extensive renovations for its new use, including renovations to the lighting. The proposed exception permits lighting in a historical building to remain unaltered if it is a historical element. Similarly, the change of occupancy may result in a greater demand for fossil fuel or electrical energy than the previous use, but the historic elements or features may prevent the historical building from undergoing the full alterations needed to comply with the energy use requirements for the new use. The proposed exception will improve the energy efficiency of historical buildings while still maintaining and preserving historic elements and features.

Exception 2 is added to clarify change of occupancy requirements for a tenant space within a multi-tenant building. The exception ensures that the tenant is only responsible for energy

efficiency improvements to their space and is not responsible for improvements to other tenant spaces or those impacting more than one tenant. For example, a downtown commercial building with multiple tenants may have a space previously used as a retail store (Mercantile Group M occupancy) that is converted into a dentist office (Business Group B occupancy). The cost to the tenant to renovate the retail space into a dental clinic does not include upgrading of a common boiler used to provide heat to the entire building. This exception is necessary to clarify that tenants are not responsible for energy efficiency improvements other than to the space being leased.

Subp. 3. ASHRAE 90.1 section 4.2.5.1.1 Information on construction documents. This subpart modifies section 4.2.5.1.1 to include the list of information required on construction documents that is currently located in part 1323.0100, subpart 10, that is being repealed. Part 1323.0100, subpart 10, is being repealed for consistency with the organization and formatting of ASHRAE 90.1-2019, which addresses administrative provisions in section 4. The title of the section is revised from “Information on building permit application” to “Information on construction documents” for consistency with the current title in 1323.0100, subpart 10, and to more accurately describe the documents that are to include the information required by this section.

Proposed items e through r are identical to items A through M from part 1323.0100, subpart 10. Proposed items a through c are the same as items a through c in section 4.2.5.1.1 of ASHRAE 90.1-2019 but in place of the abbreviations for “verification and testing” (“V&T”) and “functional performance testing” (“FPT”), the full phrases are used. Item d is new and requires the designer to specify which energy code compliance path permitted by ASHRAE 90.1-2019 is being followed. These items are necessary for the uniform application and enforcement of the code by clarifying required information the builder or designer must provide to the building official for a complete review of construction plans as they pertain to applicable energy code requirements. This information is necessary so that field inspections can be conducted based on the plans and specifications that have been reviewed by the jurisdiction. The information on the construction documents will help provide clarity and consistency in both the enforcement process and during the plan review and inspections.

1323.0512 SECTION 5.1.2 SPACE CONDITIONING CATEGORIES.

Section 5.1.2.3 states that spaces are assumed to be conditioned spaces at the time of construction. There is an exception that states a space may be designated as either semiheated or unconditioned if approved by the building official. This rule part modifies the exception to clarify when semiheated and unconditioned spaces are equipped with an automatic fire sprinkler system they must be approved by the building official as such and signage requirements for semiheated spaces must be posted so that any replacement equipment does not heat the space beyond what is permitted by the standard.

The first sentence of the exception is taken from the exception to 5.1.2.3 in ASHRAE 90.1-2019. The second sentence is added and requires unconditioned and semiheated spaces that happen to be protected by an automatic fire sprinkler system to be approved by the building official because under Minnesota’s cold design conditions and with the prescriptive insulation requirements for semiheated and unconditioned spaces, the interior spaces will drop below freezing temperatures. Unconditioned spaces may only be heated to the equivalent of 3.4 Btu/hr/ft². Semiheated spaces are enclosed spaces within a building that are heated by a very small system whose output capacity relative to floor area is limited to 14 Btu/hr/ft² in the southern climate zone of Minnesota and 16

Btu/hr/ft² in the northern climate zone of the state.¹⁵ The maximum heating allowance for semiheated and unconditioned spaces are insufficient to prevent water in automatic fire sprinkler system pipes from freezing in Minnesota's climate.

Only certain types of sprinkler systems are designed to be installed in locations that can freeze and this approval ensures that the building official has opportunity to verify that the appropriate type of sprinkler system is being installed. The frozen water can cause the pipes to burst, resulting in damage to the automatic fire sprinkler system and the semi-heated or unconditioned space. To prevent the damage caused by frozen pipes, many semiheated and unconditioned spaces are heated in excess of what is permitted by the standard for semiheated and unconditioned spaces. This additional heating is inefficient because semiheated and unconditioned spaces are allowed to comply with reduced building envelope requirements, so additional energy is needed to heat the spaces to the extent necessary to prevent water from freezing. The proposed modification is necessary to ensure that semiheated and unconditioned spaces are not heated in excess of what is permitted by the code when being protected by automatic fire sprinkler systems as required by other chapters of the Minnesota State Building Code.

The last two sentences require signs with the maximum heating input allowed by the energy code to be posted near the entrance of the semiheated space. These signs are reasonable because they alert building occupants to the extent the space is allowed to be heated to prevent unnecessary heat and energy loss and alert facility managers of limitations on heating equipment when replacement equipment is needed.

1323.0513 SECTION 5.1.3 ENVELOPE ALTERATIONS.

Subpart 1. ASHRAE 90.1 section 5.1.3. The proposed amendment modifies exception 3 by requiring alterations of the roof, wall, or floor cavities that include the installation of insulation to have either an integral vapor retarder or a membrane vapor retarder. The vapor retarder is necessary to prevent moisture in the form of water vapor from entering the roof, wall, or floor cavity, which can damage the effectiveness of the insulation. The vapor barrier must separate the insulation from the conditioned space due to Minnesota's cold climate. As the conditioned warm, moist indoor air migrates through the insulation toward the exterior, condensation occurs when the temperature in the insulation reaches the dewpoint. This causes moisture accumulation in the form of water or ice, which degrades the insulation's effectiveness. The installation location requirements for membrane vapor retarders are necessary to protect the insulation and structure from water damage.

Subp. 2. ASHRAE 90.1 section 5.1.3. The proposed amendment modifies exception 8 by deleting the existing ASHRAE 90.1-2019 language addressing replacement of existing fenestration with requirements for historical buildings. The ASHRAE 90.1-2019 exception 8 language conflicts with the requirements of Minnesota Rules, chapter 1311, the Minnesota Conservation Code for Existing Buildings. Exception 8 requires replacement fenestration to comply with section 5 requirements for new fenestration when more than 25 percent of an existing building's fenestration is being replaced. The Minnesota Conservation Code for Existing Buildings permits one-for-one replacement of all existing windows and the replacement glass must meet the requirements for new installations in order

¹⁵ See Table 3.2 of ASHRAE 90.1-2019.

to improve the energy efficiency of the windows.¹⁶ The proposed modification to delete the language of exception 8 of section 5.1.2 is necessary to prevent conflict between code requirements.

The proposed new exception 8 provides an exception from section 5 building envelope requirements for historical elements and features of historical buildings undergoing renovations or a change of occupancy or use. Proposed exception 8 is consistent with the exception to proposed rule part 1323.0420, subpart 1, which requires historical buildings undergoing alteration to comply to section 5 requirements for building envelopes to the greatest extent possible without alteration of historical features and elements. Both exceptions are reasonable because each historical building is able to comply to a different extent and to different requirements of the standard. Some historical buildings can be altered to add insulation to the attic space but for other historical buildings attic insulation is impossible due to historic elements or features. The designer is to indicate which features are historical so that the building official is aware of which features cannot comply with energy efficiency requirements. The proposed modification to the exception is reasonable because it improves the energy efficiency of historical buildings while still maintaining historic components, elements, and systems.

Subp. 3. ASHRAE 90.1 section 5.1.3. The proposed subpart adds exception 9 to section 5.1.3 pertaining to the insulation requirements for roof replacement work. The proposed subpart contains similar requirements as existing part 1323.0402, subpart 1, that is being repealed. Existing part 1323.0402, subpart 1, is being repealed for consistency with the organization and formatting of ASHRAE 90.1-2019. The proposed exception to section 5.1.3 is necessary because ASHRAE 90.1-2019 does not exempt roof replacement work from compliance with the roof envelope requirements located in Table 5.5-6 and 5.5-7. Exception 9 is a limited exception to required roof R-values where there are structural capacity limitations or there is not enough space between existing rooftop conditions (existing equipment, structures, etc.) and the space needed to install the normally required amount of insulation. The exception for roofs with structural capacity is new and is necessary to address circumstances where the existing roof assembly cannot support the additional load. Where there is not enough space or structural capacity to comply with insulation requirements, the required maximum insulation thickness will be dictated by the space available because of the existing rooftop conditions. The exception permits the use of the highest R-value roof insulation possible and the R-value of the insulation cannot be reduced and the U-factor of the roof assembly cannot be increased. This is a reasonable exception because the cost that would result from altering existing roof obstacles to meet new roof insulation requirements would be disproportionate to the energy savings from the thicker insulation.

1323.0514 CLIMATE.

The proposed subpart modifies section 5.1.4 of ASHRAE 90.1-2019 to list the Minnesota counties that are in climate zone 7 and states that the other Minnesota counties are assigned to climate zone 6A. The unmodified language refers code users to ASHRAE Standard 169, Table B-1, “U.S. Climate Zones by State and County” for this information so it more convenient for the code user to include climate data specific to Minnesota within the rule. The most recent edition of ASHRAE 169 revised climate zones based on more recent weather data and resulted in several counties in Minnesota being reassigned to warmer climate zones. ASHRAE 169 assigns the following counties

¹⁶ See Section 505.1 of the 2020 Minnesota Conservation Code for Existing Buildings, https://codes.iccsafe.org/content/MNEBC2020P1/chapter-5-prescriptive-compliance-method#MNEBC2020P1_Ch05_Sec505.1.

previously in climate zone 7 to climate zone 6A: Becker, Clay, Grant, Kanabec, Mille Lacs, Otter Tail, and Wilkin. The Commercial Energy TAG concluded that these counties should be assigned to climate zone 6A due to warming trends. Furthermore, the code requirements for buildings located in counties assigned to climate zone 7 are more stringent and costly when compared to code requirements for buildings located in counties assigned to climate zone 6A.

ASHRAE 169 assigns Fillmore, Houston, and Winona counties to climate zone 5A instead of climate zone 6A, to which they were previously assigned. The Commercial Energy TAG concluded Fillmore, Houston, and Winona counties should remain in climate zone 6A so that Minnesota continues to have only two climate zones. The ASHRAE 90.1-2019 requirements for climate zone 6A are similar to those of climate zone 5A so there is little impact on costs or energy efficiency by assigning Fillmore, Houston, and Winona counties to climate zone 6A. The addition of a third climate zone in Minnesota could create confusion with little benefit to energy efficiency. It is reasonable Minnesota counties to be assigned to two climate zones for the continued uniform enforcement and application of code requirements.

1323.0543 SECTION 5.4.3 AIR LEAKAGE.

Subpart 1. ASHRAE 90.1 section 5.4.3.1 Continuous air barrier. The proposed subpart deletes exception 1 of section 5.4.3.1 that exempts semiheated spaces in climate zone 6 from continuous air barrier requirements. A continuous air barrier is a combination of interconnected materials, assemblies, sealed joints, and components of the building envelope that minimize air leakage into or out of the building envelope. It is necessary for semiheated spaces in Minnesota counties in climate zone 6A to have a continuous air barrier in order to prevent the migration of heated air through the building envelope that would result in increased in energy use in the winter to maintain the temperature of the space. Furthermore, the deletion of exception 1 means a continuous air barrier for semiheated spaces is required for both climate zones in Minnesota, which will result in more uniform application and enforcement of the code.

Subp. 2. ASHRAE 90.1 section 5.4.3.1.1 Whole-building air leakage. The proposed subpart adds exception 4 to section 5.4.3.1.1. Exception 4 permits alternate air leakage testing procedures and requirements for Group R or Group I occupancies, which are residential occupancies containing dwelling units or sleeping units. Group R occupancies include apartments, dormitories, and hotels and Group I occupancies include assisted living facilities, nursing homes, groups homes, hospitals, and detention centers.¹⁷ The proposed amendment requires the testing of individual units, of which a weighted average is taken as a part of calculations to determine the building's overall air leakage rate. The alternative test procedures for Group R or Group I occupancies are necessary to more accurately determine air leakage levels and to conform to industry testing standards for sample testing rather than wholesale testing of large multifamily dwellings.

1323.0553 SECTION 5.5.3 OPAQUE AREAS.

Subp. 1. ASHRAE 90.1 section 5.5.3.1 Roof insulation. Section 5.5.3.1 is modified to require mechanical and other roof curbs to have R-10 insulation. The standard permits insulation for skylight curbs to either have the same R-value that is required for insulation placed above a roof deck or an R-5

¹⁷ See Minnesota Building Code [Section 310](#) for a complete description of Group R occupancies and [Section 308](#) for a complete description of Group I occupancies.

value, whichever is less. In southern Minnesota, the required R-value for insulation placed above the roof deck is R-30 and in northern Minnesota, the required R-value is R-35.¹⁸ Because the required R-value for insulation placed entirely above the roof deck in Minnesota is higher than R-5, it is unlikely the curb insulation will have the same R-value as the roof insulation so it is necessary to modify the standard to require mechanical and other roof curbs to have at a minimum R-10 insulation. A roof curb is an elevated platform or metal frame on a roof that supports mechanical equipment or skylights above the roof and penetrates the roof. It is necessary to insulate roof curbs to prevent damage caused by condensation on the inside of the curb and to improve energy efficiency by preventing heat loss through the penetration in the roof.

The proposed subpart increases the required thermal resistance of the roof curb insulation from R-5 to R-10 to provide protection to ductwork that is connected to rooftop equipment. Other ducts that are exposed to the exterior of the building are required to have R-12 insulation due to Minnesota's cold climate so it is reasonable to require curb insulation to have a higher thermal resistance than R-5 for consistency with other code requirements for the protection of ductwork. The Department has decided to require R-10 insulation for equipment curbs because curbs with R-12 insulation are not readily available and equipment curbs with R-10 insulation can be easily fabricated or purchased. It is reasonable to require R-10 curb insulation because it provides additional protection of ductwork but is a readily available product.

The proposed subpart requires R-10 insulation for all roof curbs, including skylight curbs because different insulation requirements for roof curbs may cause confusion as to code requirements. The application of R-10 insulation requirements to all roof curbs will improve energy efficiency while ensuring consistent application and enforcement of the code. Furthermore, the additional cost for R-10 insulation will be offset up the energy savings it provides. Currently, roof curbs are insulated with 1.5-inch fiberglass panels that cost \$.94 per square foot. To comply with the proposed rule, roof curbs will be insulated with 2-inch extruded polystyrene at a cost of \$1.06 per square foot. For a typical mechanical roof curb of 4 feet by 4 feet and 12 inches in the height, the insulation costs will increase from \$15.04 to \$16.96 per curb. The proposed subpart is reasonable because it provides additional energy savings and protection of ductwork at a modest cost while simplifying code requirements.

An exception is added to the proposed subpart to exempt historical buildings with roof slopes two units vertical in 12 units horizontal or less (low slope roofs) from requirements for roof insulation. This is the industry standard for what is considered a low slope roof and is consistent with the description of low slope roofs in the Minnesota Building Code.¹⁹ The Department proposes exempting these roofs due to the costs to insulate a low slope roof that has not been previously insulated. ASHRAE 90.1-2019 requires R-35 insulation to be installed above the roof deck for buildings located in climate zone 7. The cost to insulate a low slope roof with 7-inch extruded polystyrene in compliance with this requirement is \$8.26 per a square foot. This cost was determined by averaging the cost of extruded polystyrene insulation obtained from three nationally recognized building materials retailers in three different locations in Minnesota. The cost to insulate a low slope roof can be burdensome for small businesses or governments. For example, the Minnesota Building Code establishes an occupant load density of 1 person per 150 square feet in business occupancies. Based on that occupant load density, a one-story business with 50 employees in a historic building would have a roof of

¹⁸ See Table 5.5-6 and 5.5-7 of ASHRAE 90.1-2019.

¹⁹ See Minnesota Building Code sections [1504.4](#), [1504.6](#), and [1504.7](#).

approximately 7,500 square feet. The cost to replace an uninsulated low slope roof of 7,500 square feet with a code compliant insulated roof is approximately \$62,000. Roof insulation is an effective way to prevent heating and cooling loss and improve energy efficiency of building. However, the costs to insulate a low slope roof is overly burdensome and the payback period for this renovation is lengthy. Furthermore, the proposed rules require other historical building elements and features undergoing renovation to comply with the proposed rules. Those renovations are less costly while improving the energy efficiency of historical buildings.

The proposed rules require historical buildings with pitched roofs to comply with insulation requirements because the cost to insulate a pitched roof is significantly less the cost to insulate low slope roofs. The attic space allows the pitched roof to be insulated with blown fiberglass R-60 insulation at a cost of \$2.12 a square foot. As a result, the cost to insulate a 3,000 square foot pitched roof is \$6,360. It is reasonable to require historical buildings with pitched roofs to be insulated because it is a cost-effective way of improving energy efficiency.

Subp. 2. ASHRAE 90.1 section 5.5.3.3 Below-grade wall insulation. The proposed subpart modifies section 5.5.3.3 by adding a second sentence to specify that below-grade walls must be insulated on the exterior side of the wall or integral to the wall, meaning insulation on the interior side of the wall is no longer permitted. This is necessary because when the interior side of below-grade foundation wall is insulated there is often an interruption in insulation where the wall transitions to above-grade, resulting in heat loss. When the insulation is placed on the exterior side of the wall or is integral to the wall, then the continuity of the insulation from the below grade to above grade condition is improved, thereby reducing heat loss. Additionally, insulation on the interior wall can cause condensation during the winter months by exposing even small portions of cold foundation walls to warm moist interior air, causing microbial growth that results in overall poorer air quality for building occupants. It is necessary to require below grade walls to be insulated on the exterior side of the wall or integral to the wall to improve the energy efficiency of the building by preventing heat loss and improve the air quality for the health and safety of building occupants.

1323.0611 SCOPING FOR HEATING, VENTILATING, AND AIR CONDITIONING.

Subpart 1. ASHRAE 90.1 section 6.1.1.3.6 Rooftop HVACR. The proposed subpart adds a subsection to require new insulated curbs to be installed when new rooftop equipment is installed or existing equipment is replaced. As discussed above in the proposed amendments to part 1323.0553, subpart 1, a roof curb is an elevated platform on a roof that supports mechanical equipment above the roof and penetrates the roof. Because the curb penetrates the roof and extends above the roof insulation, it must be insulated in order to improve the energy efficiency of the building by preventing heat loss. This subpart also requires the curbs to be of sufficient height to allow for the installation of insulation in compliance with the standard when roof replacement occurs. This modification is necessary because often roof curbs are replaced when rooftop equipment is replaced rather than when the roof is replaced.

This subpart also clarifies that the replacement curbs must be of sufficient height to accommodate the installation of future rooftop insulation in compliance with the standard when roof replacement occurs. Mechanical curbs are often replaced at the time of equipment replacement rather than roof replacement because of the expense associated with moving the mechanical equipment. However, the building owner or mechanical contractor replacing the equipment may not consider or be aware of the impact of curb height on a future roof replacement. ASHRAE 90.1-2019

requires replacement roof work to comply with roof envelope requirements located in Table 5.5-6 and 5.5-7 and the energy code provides a limited exception from these requirements where structural limitations and rooftop conditions do not provide enough space to install the required amount of insulation. If the energy code in effect at the time of roof replacement requires deeper rooftop insulation, then the shorter existing curbs cannot accommodate the increase in insulation depth. The exception permits reduced insulation when roof curbs are of insufficient height to allow the required insulation depth in the roof, resulting in greater heat loss and a less energy efficient building. It is reasonable to require new insulated curbs of sufficient height when the equipment is replaced or installed to improve the current energy efficiency of the building and allow for more energy improvements at the time of roof replacement.

Subp. 2. ASHRAE 90.1 section 6.1.1.4 Heating of commercial parking facilities prohibited. The proposed subpart adds a section that prohibits the heating of most commercial parking facilities. Existing part 1323.0401, subpart 2, references the statutory prohibition on the heating of commercial parking facilities in Minnesota Statutes, [section 216C.20](#). Existing part 1323.0401, subpart 2 is proposed to be repealed to align with the standard numbering because the requirements for the heating of commercial parking structures are addressed in section 6 of ASHRAE 90.1-2019; therefore, it is necessary to repeal existing part 1323.0401, subpart 2, and relocate the prohibition on the heating of commercial parking facilities to this subpart for consistency with the formatting and organization of ASHRAE 90.1-2019.

The prohibition on the heating of commercial parking facilities has been revised to add two exceptions from the prohibition because the existing rule language has caused confusion with designers and building officials as to which parking facilities are permitted to be heated. The first exception is for parking facilities that are open to the public but accessory to private parking and the portion of parking open to the public is less than 10 percent of the total number of spaces. An example is an apartment building with parking for residents and a limited number of spaces available for the public. This exception is reasonable because the parking is primarily private, and the public spaces are incidental. The second exception is for vehicle showrooms used for vehicle sales. The second exception is reasonable because although vehicle showrooms are used for commercial purposes and open to the public, their primary use is for sale and purchase of vehicles and not as a parking facility. Therefore, vehicle showrooms do not have constant opening and closing of large garage doors through which there would be significant heat loss. The proposed subpart clarifies requirements which will result in more uniform application and enforcement of the code.

Subp. 3. ASHRAE 90.1 section 6.1.1.5 Prohibition of once-through water use permits. This proposed subpart adds a section that prohibits once-through water use permits for cooling systems in accordance with Minnesota Statutes, [section 103G.271](#), subdivision 5. Existing part 1323.0401, subpart 3, has identical language to the proposed subpart but is repealed to align with the standard numbering because heating, ventilation, and air conditioning requirements are addressed in section 6 of ASHRAE 90.1-2019. The prohibition of once-through water use permits relates to heating, ventilation, air conditioning, or refrigerating systems that circulate the groundwater once through the system and then discharge it. The reference to the statutory provision is needed for the convenience of energy code users so they are aware of the requirements for once-through water systems.

1323.0642 SECTION 6.4.2 CALCULATIONS.

Subpart 1. ASHRAE 90.1 section 6.4.2.1.1 Climatic Data Design Conditions. This proposed

subpart adds a section to ASHRAE 90.1 to direct code users to climatic data design conditions needed for the calculation of heating or cooling loads in order to properly size equipment. Code users can use either the climatic data provided in Table 6.4.2.1, which is located in proposed subpart 2, or the weather data published in ASHRAE Standard 169-2013, which is the edition that is referenced in ASHRAE 90.1-2019. Table 6.4.2.1 is a revised version of a table located in existed part 1323.0403, subpart 1, and is included in the proposed rule to provide a convenient easy, to use reference that includes the most pertinent data for equipment sizing. The weather data provided by ASHRAE Standard 169-2013 is much more extensive and unnecessary for most projects.

Code users who calculate heating and cooling loads using ASHRAE Standard 169-2013 must round the design temperature to the nearest whole number to simplify calculations and for consistency with standard practice. The winter design conditions used to calculate the heating load is the mean extreme annual temperature. It is necessary to use the mean extreme annual temperature to ensure the heating system is properly sized to protect the building and its systems against extreme cold. The climatic design condition that is to be used to calculate the cooling load in the summer is 1 percent of the annual of cooling design conditions, which is reasonable to ensure the building will be adequately cooled during the summer months by an appropriately sized system. An oversized cooling system is detrimental to occupant comfort because it does not dehumidify the air. Instead, an oversized system cools the space too quickly and then shuts off, without sufficiently exposing the air to cooling coils to allow for dehumidification.

Subp. 2. Table 6.4.2.1 Climatic Design Conditions. This proposed subpart adds a table to section 6.4.2 with climatic data design conditions for several cities in Minnesota. The climatic data design conditions are the same as data published in ASHRAE Standard 169-2013 but are included in the rule for the convenience of code users. ASHRAE Standard 169-2013 includes extensive weather data that is unnecessary for most projects, so the Table 6.4.2.1 provides a convenient, easy to use reference for the most pertinent data to properly size equipment. This is similar to a table located in existing part 1323.0403, subpart 1, that is being repealed to align with the standard numbering and relocated to this subpart because ASHRAE 90.1-2019 addresses heating and cooling in section 6. The table has been revised and updated with more recent ASHRAE Standard 169-2013 data to ensure the correct calculation of heating and cooling loads, so equipment is properly sized.

1323.0643 SECTION 6.4.3 CONTROLS AND DIAGNOSTICS.

Subpart 1. ASHRAE 90.1 Section 6.4.3.4.2 Ventilation system control. The proposed subpart modifies exception 1 by replacing the ASHRAE 90.1 language with “[Reserved].” The first sentence of exception 1, as written in the standard, allows any building less than three stories in height to be equipped with nonmotorized dampers for exhaust and relief, thereby exempting buildings from motorized damper requirements based on height rather than the size of the ventilation system. This would allow large ventilation systems to be equipped with exhaust and relief dampers that cannot be automatically shut down when the building is not in use, which would result in unnecessary air leakage and heat loss. The proposed rule deletes this sentence in order to improve energy efficiency of large ventilation systems. The second sentence of exemption 1, as written in the standard, contains requirements for wind protection of outdoor air intakes and is relocated to exception 2, which permits small ventilation systems to be equipped with nonmotorized dampers. The proposed rule inserts “[Reserved]” in place of the ASHRAE 90.1 language in order to preserve the numbering of the exceptions in the current order, which is necessary to maintain internal references within the standard.

Subp. 2. ASHRAE 90.1 Section 6.4.3.4.2 Ventilation system control. Exception 2 exempts small ventilation systems from motorized damper requirements. This proposed subpart modifies exception 2 by adding “relief” to the list of design elements. The proposed modification clarifies that nonmotorized dampers are permitted to be used for relief, meaning dampers are allowed to relieve air pressure from a building in small ventilation systems. This clarification is necessary because model standard language permits the use of nonmotorized dampers for intake and exhaust purposes in small ventilation systems of 300 cfm or less, so it is reasonable to permit nonmotorized dampers to be used for relief as well.

The second sentence is added to require nonmotorized dampers used for outdoor air intakes to be protected from direct exposure to wind. This requirement was located in exception 1 but is relocated to exception 2 to add requirements for the protection of nonmotorized dampers used in very small systems. It is necessary to protect nonmotorized outdoor air intakes from wind exposure to prevent excess airflow from entering the ventilation system.

1323.0644 SECTION 6.4.4 HVAC SYSTEM CONSTRUCTION AND INSULATION

ASHRAE 90.1 Section 6.4.4.1.2. Section 6.4.4.1.2 requires HVAC return ducts and plenums to be thermally insulated. There are four exceptions to the requirement. The proposed subpart deletes Exception 2, which exempts ducts and plenums located in heated spaces, semiheated spaces, or cooled spaces. Exception 2 is deleted for consistency with Table 6.8.2 and to carry forward existing requirements for duct and plenum insulation. See proposed rule 1323.0680, subpart 1, modifying Table 6.8.2 of ASHRAE 90.1-2019. Therefore, the deletion of Exception 2 does not change insulation requirements for ducts and plenums but rather aligns this section with Table 6.8.2 and current insulation requirements.

1323.0680 SECTION 6.8 MINIMUM EQUIPMENT EFFICIENCY TABLES.

Subpart 1. ASHRAE 90.1 Table 6.8.2 Minimum Duct Insulation R-Value. The proposed rule deletes ASHRAE 90.1 Table 6.8.2 and replaces it with a table that is located in current part 1323.0403, subpart 12a. The Minimum Required Duct and Plenum Insulation table in current part 1323.0403, subpart 12, is being repealed and relocated here for consistency with the formatting and organization of ASHRAE 90.1-2019. The proposed table and footnotes a through f are identical to the table and footnotes located in the current subpart that is being repealed. This table provides specific requirements based on duct locations. The R-values, vapor retarder, and weatherproof barrier requirements are different for interior ducts and exterior ducts based on the location of the ductwork in the building and the design temperature difference between the air in the duct and the temperature outside of the duct. The table currently in Minnesota rule is preferred over the ASHRAE 90.1 Table 6.8.2 because it streamlines requirements for both climate zones in Minnesota and better addresses the protection of duct work in Minnesota’s climate.

Footnote g is new and added to the table to clarify areas where exhaust ducts do not have to be insulated. Insulation is not required for ducts on the exterior of the building if low leak dampers are installed at the roof or wall line or the exhaust operates continuously. It is not necessary to insulate under these conditions because the low leak dampers in those locations prevent outside air from entering the building. Ducts that continuously produce exhaust do not need to be insulated because there is no need to maintain the temperature of air exhausted from the building and the continuous operation of the exhaust ducts prevents outside air from entering. Therefore, the insulation of these dampers and ducts are an unnecessary expense that would not improve energy efficiency.

Subp. 2. ASHRAE 60.1 Table 6.8.3-1 Minimum Piping Insulation Thickness Heating and Hot-Water Systems. This subpart modifies Table 6.8.3-1 by adding footnote f. Footnote f clarifies that insulation is not required for piping that is a part of the radiant heating systems. The heat transmitted by the pipes in a radiant heating system heats a space, so insulation of the pipes would make the system ineffective and inefficient. The proposed amendment provides necessary clarification to ensure the proper function of a radiant heating system.

1323.0711 SECTION 7.1.1 SERVICE WATER-HEATING SCOPE.

The proposed rule part modifies section 7.1.1.3 to require the insulation of existing accessible piping that is not undergoing replacement and the installation of heat traps at the time of building service water-heating equipment and storage water heater replacement. ASHRAE 90.1-2019 requires new and replacement piping to be insulated in accordance with section 7.4.3. The proposed rule part modifies section 7.1.1.3 to also require the insulation of existing piping that is not undergoing replacement but is accessible within the work area of the storage water heater replacement. The cost to install pipe insulation is approximately \$2 per linear foot, which is recovered by the energy savings it provides within the first year of installation. It is reasonable to require the insulation of existing accessible piping because it is a cost-effective means to improve energy efficiency by mitigating heat loss.

The last sentence of the proposed rule part adds a sentence to section 7.1.1.3 to require vertical pipes risers to be equipped with a heat trap in compliance with section 7.4.6 when the storage water heater is replaced. A heat trap prevents the unwanted convection of heated water out of the storage water heater and have been required for new installations since 2009. The cost to install a heat trap is approximately less than \$100 for a standard storage water heater and that cost is mitigated by the energy savings the device provides. Heat traps can be easily installed when the storage water heater is being replaced because the adjacent piping is disconnected. It is reasonable to require the installation of a heat trap because it improves energy efficiency by preventing unwanted circulation of the water in and out of the top of the hot water storage tank.

1323.0753 SECTION 7.5.3 BUILDINGS WITH HIGH-CAPACITY SERVICE WATER HEATING SYSTEMS.

Section 7.5.3 requires buildings with high-capacity service water-heating systems to have high efficiency systems of at least 90%. However, there are three exceptions in which the high efficiency system will not be required. The first exception in the standard is for systems where 25% of the annual service water-heating requirement is provided by site-solar energy or site-recovered energy. The proposed rule increases the required 25 percent to 50 percent to more proportionately offset the energy losses from less efficient gas service water-heating systems with renewable energy sources. The proposed modification is reasonable to ensure that the less efficient system does not use more energy provided by fossil fuels than an efficient system.

The exception is also modified to clarify that site-solar energy or site-recovered energy used to qualify for the exception is not permitted to be used to comply with other requirements of the standard. ASHRAE 90.1-2019 allows for other trade-offs between site-solar energy or site-recovered energy and less efficient building equipment, so it is necessary to clarify that site-solar energy or site-recovered energy cannot be designated for compliance with more than one standard requirement. That is, it cannot be counted twice. This proposed modification will result in more uniform application

and enforcement of the code.

1323.0842 SECTION 8.4.2 AUTOMATIC RECEPTACLE CONTROL.

The proposed rule part deletes section 8.4.2 of ASHRAE 90.1-2019 which requires automatic controls for receptacles and branch circuits to limit power usage by plugged appliances and devices when the building is unoccupied. Receptacles are openings, such as electrical outlets, connected to a wired power source use to power electrical equipment and components and branch circuit feeders control power to the outlets. Section 8.4.2 requires automatic controls to stop power to 50 percent of receptacles in offices, conference rooms, print/copy rooms, break rooms, classrooms, and individual workstations and 25 percent of the branch circuit feeders to stop power to future outlets. The automatic controls turn off the flow of electrical power to the receptacle, or outlet, when the building is not in use by means of a timed schedule, occupancy sensor, or automatic signal from another system such as an alarm system that indicates when the building is unoccupied. The requirement is intended to reduce unnecessary power usage by only providing power to appliances that need power when the building is unoccupied. For example, a computer is plugged into an outlet which provides continuous power, but the monitor is plugged into an outlet that does not provide power when the building is unoccupied. The cost to install both automatic control receptacles and receptacles that provide continuous power as well as branch circuit feeders is approximately an additional \$70 per each fifteen electrical amp circuit that serves eight outlets spaced at six feet on center.

This additional cost does little to improve the energy efficiency of the building because automatic control receptacles go unused by building occupants who prefer outlets that continuously provide electricity. Occupants connect power strips and extension cords to receptacles that provide continuous electricity, thereby creating a hazardous condition. Extension cords are not intended for continuous use and can be a fire ignition hazard, electric shock hazard, or tripping hazard. It is reasonable to delete the requirements for automatic controls for receptacles and branch circuit feeders because they often provide little energy efficiency benefit and may pose a hazard due to the behavior of building occupants.

1323.0940 SECTION 9.4 MANDATORY LIGHTING PROVISIONS.

The proposed rule part adds subsection section 9.4.4 to refer code users to the lighting requirements for parking lot lighting in Minnesota Rules, chapter 8885. Current rule part 1323.0401, subpart 4, contains the same reference to Minnesota Rules but is being repealed for consistency with the organization and formatting of ASHRAE 90.1-2019.

Repealed Sections

The following rule parts are repealed because the amendments correspond with the International Energy Conservation Code (commercial provisions), which is no longer proposed for adoption. The Department is now adopting the 2019 edition of ANSI/ASHRAE/IES Standard 90.1 Energy Standard for Buildings Except Low-Rise Residential Buildings, with new amendments and numbering so these rule amendments are no longer applicable.

1323.0010 INCORPORATION BY REFERENCE OF THE INTERNATIONAL ENERGY CONSERVATION CODE – COMMERCIAL ENERGY PROVISIONS.

Subpart 3. References to Administration.

1323.0020 REFERENCES TO OTHER CODES.

- Subpart 2. Building code.**
- Subpart 3. Residential code.**
- Subpart 4. Electrical code.**
- Subpart 5. Fuel gas code.**
- Subpart 6. Mechanical code.**
- Subpart 7. Plumbing code.**
- Subpart 9. Energy conservation code.**
- Subpart 10. Property maintenance code.**
- Subpart 11. Accessibility code.**

1323.0100 ADMINISTRATION FOR COMMERCIAL ENERGY CODE.

1323.0201 SECTION C201, GENERAL.

1323.0202 Section C202, GENERAL DEFINITIONS.

1323.0303 SECTION C303, MATERIALS, SYSTEMS, AND EQUIPMENT.

1323.0401 SECTION C401, GENERAL.

1323.0403 SECTION C403, BUILDING MECHANICAL SYSTEMS.

1323.0404 SECTION C404, SERVICE WATER HEATING (MANDATORY).

1323.0408 SYSTEM COMMISSIONING.

Regulatory analysis

This part addresses the requirements of Minnesota Statutes, section 14.131 (a), which require state agencies to address a number of questions in the SONAR. For most questions, the response is general and applies to this rulemaking as a whole. In some cases, the response will depend on a specific amendment being proposed and specific detail will be provided.

A. Description of the classes of persons who probably will be affected by the proposed rule, including classes that will bear the costs of the proposed rule and classes that will benefit from the proposed rule.

The classes of persons who likely will be affected by the proposed rules include building officials, engineers, architects, commercial building contractors, mechanical contractors, suppliers, building owners and managers, managers and owners of historical buildings, and other building users.

The classes of persons who will likely bear the costs of the proposed rule include building owners who build new buildings or add to, alter, renovate or repair existing buildings subject to this code, including historical buildings. Only the existing building portions that are added, altered, renovated, or repaired must meet the new energy efficiency requirements of the code.

The classes of persons who will likely benefit from the proposed rule include building owners and ultimately, the general public, because the proposed rule will improve energy efficiency standards and provide better environmental protection by updating regulations for the energy efficient design of commercial buildings.

B. The probable costs to the agency and to any other agency of the implementation and enforcement of the proposed rule and any anticipated effect on state revenues.

The probable costs to the agency or any other agency for the implementation and enforcement of the proposed rule include costs associated with educating those who administer and enforce the code and costs for new code books. Code books would cost a maximum of \$177 per person.

The probable costs to any other agency of implementation and enforcement include costs for code

books for building officials and other entities involved with enforcement of the code, and any educational expenses necessary for training on the proposed rule. The anticipated cost of educational seminars is approximately \$170 per person.

There is no anticipated effect on state revenues as a result of the implementation and enforcement of the proposed rule.

C. A determination of whether there are less costly methods or less intrusive methods for achieving the purpose of the proposed rule.

There are no less costly or intrusive methods for achieving the purpose of the proposed rule, which is to improve building energy efficiency. Specifically, the proposed rule adopts and amends ASHRAE 90.1-2019 because it is the most comprehensive and up-to-date standard for energy efficiency in commercial buildings. There are two nationally recognized energy efficiency standards for commercial buildings, ASHRAE 90.1 and the IECC, which is adopted and amended by the current chapter 1323. The requirements of the IECC are based upon ASHRAE 90.1 and the 2018 edition of the IECC permits the use of ASHRAE 90.1-2016 as an alternative compliance path.

The two similar compliance paths for energy efficiency in commercial buildings has resulted in confusion as to the applicable requirements. The adoption of ASHRAE 90.1-2019 as the only compliance path for energy efficiency in commercial buildings will result in predictable code application and enforcement, which will tend to lower costs by reducing the complexity of review by local and state boards and other entities responsible for code interpretation and review.

D. A description of any alternative methods for achieving the purpose of the proposed rule that were seriously considered by the Agency and the reasons why they were rejected in favor of the proposed rule.

The Department considered waiting until ASHRAE 90.1-2019 is adopted by the 2021 IECC and then adopting the 2021 IECC. However, the ASHRAE 90.1-2019 is the basis for the 2021 IECC and the Department concluded that adoption of ASHRAE 90-2019 will allow for the implementation of the most up-to-date energy efficiency practices.

E. The probable costs of complying with the proposed rule, including the portion of the total costs that will be borne by identifiable categories of affected parties, such as separate classes of governmental units, businesses, or individuals.

The proposed rule will only apply to new construction or any addition, alteration, or repair. It is difficult to identify actual compliance costs associated with the construction or remodeling of a new or existing building because these costs depend on a building's design, use, age and condition, and the extent of the alteration. However, the Department has identified some modest cost increases for upgrades to exterior lighting, insulation for roof curbs, and replacement of building service water-heating and more significant costs for renovations to the building envelope of historical buildings.

Proposed rule part 1323.0420, subpart 2, requires an existing building undergoing a change of occupancy or use to comply with the exterior lighting power allowances and automatic lighting control requirements for new buildings. To meet the exterior lighting power allowances, the building must be equipped with LED exterior fixtures instead of high-pressure sodium vapor wall fixtures. The initial cost of a LED fixture is approximately \$50 and the cost of a comparable that high pressure sodium vapor fixture is \$30. However, the higher cost of the LED fixture is offset by the energy savings provided by LED fixtures and lower replacement costs.

Proposed part 1323.0553, subpart 1, requires all roof curbs to be insulated and increases the

minimum insulation R-value from R-5 to R-10. The cost of R-5 insulation is \$.94 per a square foot and the cost of R-10 insulation is \$1.06 per square foot. For a typical mechanical roof curb of 4 feet by 4 feet and 12 inches in the height, the insulation costs increase from \$15.04 to \$16.96 per curb. However, this increased insulation will lower energy costs and provide additional protection of duct work.

Proposed part 1323.0711 will increase the cost for replacement building service water-heating by requiring the existing, accessible piping to be insulated. The cost to install pipe insulation is approximately \$2 per linear foot, which is recovered by the energy savings that is provided during the first year. The proposed rule also requires vertical pipe risers to be equipped with a heat trap at a cost of approximately \$100, and the cost is mitigated by the energy savings the device provides.

The proposed rules will significantly increase the cost to renovate the building envelope of a historical building. Proposed rule part 1323.0210, subpart 1, expands the scope of the Minnesota Commercial Energy Code to include all historical buildings and proposed part 1323.0420, subpart 1, requires the alteration of any historical building to comply with the standard to the greatest extent possible without alteration of historic elements or features, meaning that any renovation to a historical building must comply with the requirements of chapter 1323, including requirements for the building envelope, lighting, water heating and HVAC.

In order to estimate the cost of compliance with the proposed rules, the Department examined the costs to renovate different building elements in compliance with the proposed rule for a historical building located in climate zone 7. The counties in Minnesota are assigned to either climate zone 7 or climate zone 6A as discussed in the proposed amendments to part 1323.0514. The Department's analysis focused on the northern counties in Minnesota located in climate zone 7 because the requirements for that climate zone are slightly more restrictive than the requirements for climate zone 6A. However, the estimated costs for renovations are similar for both climate zone 7 and climate zone 6A. The Department's costs estimates are based on an average of costs obtained from three nationally recognized building materials retailers in three different locations in Minnesota.

The Department anticipates a cost increase for alterations to the building envelope as a result of the proposed rules. Alterations to the building envelope include replacement roofs, windows, and doors and non-cosmetic alterations to exterior walls. The Department examined costs of these alterations for climate zone 7, which includes the northern counties of Minnesota, and determined the most significant cost increase is to a replace a roof that has not been previously insulated. The Department found the cost to insulate a pitched roof with blown fiberglass R-60 insulation is \$2.12 a square foot. Therefore, the cost to insulate a 7,500 square foot roof is \$15,900.

There are cost increases for window and door replacement as well as for non-cosmetic alterations to exterior walls. The Department determined the cost to replace a window in compliance with ASHRAE 90.2-2019 is \$22 per linear foot for framing and \$15 per square foot for insulated glass. The cost to replace a typical 236 square foot store front window is \$2,948 for the framing and \$3,540 for replacement glazing. The cost of to replace a typical 42 square foot door in compliance with the proposed rules is \$1,400. Lastly, the Department determined that the cost to insulate an exterior wall in compliance with the proposed rule is \$3.45 per square foot for 3-inch extruded polystyrene with an R-value of R-15.2 so the cost to insulate 254 square foot wall is approximately \$900. However, an exterior wall is only required to be insulated if it is not a historical element and the wall is opened to add the supplementary wood necessary to expand the thickness of the wall to allow insulation to be installed. Insulation will not be required for repairs or cosmetic alterations to exterior walls such as painting.

The proposed rules will not significantly increase the cost to renovate lighting, water heating, and HVAC in historical buildings. Any lighting fixtures undergoing renovation in a historical building that are not historical features are most likely to be replaced with LED fixtures because they are the most readily available option. Similarly, there is less efficient HVAC and water heating equipment available, but that equipment is more difficult to obtain and is at a similar cost as more energy efficiency options making it less likely to be selected to replace inefficient, older equipment.

There would be small costs to a municipal building department associated with a need for building officials to implement and update procedures, such as training, to purchase new code books, or to revise certain documents, such as building permits. As stated previously, code books cost approximately \$177 per person. The anticipated cost of educational seminars is approximately \$170 per person. With respect to updating procedures and documents, most of the procedures and documents are currently in place, so the changes would likely be revisions to current practices. This cost should be negligible.

F. The probable costs or consequences of not adopting the proposed rule, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals.

A consequence of not adopting the proposed rule would be using outdated materials and methods. Because current chapter 1323 is based on the 2018 version of the IECC commercial provisions, which is based on the 2016 edition of ASHRAE 90.1, the methods and materials are all from 2016 or earlier. Such older methods may prove to be less efficient and outdated materials will be more difficult to obtain. Manufacturers do not have a financial incentive to maintain an inventory of outdated materials. As a result, failure to update chapter 1323 by not adopting the proposed rule would have a negative impact on the administration, safety, application and enforcement of Minnesota's commercial energy code provisions.

The costs associated with not adopting the proposed rule will likely be borne by building owners, to whom the costs of purchasing outdated equipment and materials would be passed.

G. An assessment of any differences between the proposed rule and existing federal regulations and a specific analysis of the need for and reasonableness of each difference.

As discussed above on page 8, Minnesota is required to certify to the federal DOE that its updated commercial energy provisions meet or exceed the requirements of the 2016 edition of ASHRAE Standard 90.1. The adoption of ASHRAE 90.1-2019 will allow Minnesota to certify to the federal DOE that its commercial energy provisions meet or exceed the requirements of that standard.

H. An assessment of the cumulative effect of the rule with other federal and state regulations related to the specific purpose of the rule.

There is no cumulative effect related to the specific purpose of the rule. The purpose of the proposed 1323 rule is to update the Commercial Energy Code. Although there is no cumulative effect related to the specific purpose of the 1323 rule, it is one chapter of the twenty- two chapters that make up the Minnesota State Building Code, which is a single set of coordinated building construction regulations that apply throughout the state of Minnesota. There are no other building codes that can be used or enforced in this state. When the Department adopts the individual rules that make up the Minnesota State Building Code, the Department works with other state agencies that may also regulate certain buildings to ensure that requirements in the Minnesota State Building Code are not cumulative.

As discussed above on page 8, Minnesota is required to certify to the federal DOE that its updated

commercial energy provisions meet or exceed the requirements of the 2019 edition of ASHRAE 90.1. Although there is therefore federal oversight of the Minnesota commercial energy code, there are no federal regulations that would create a cumulative effect with the proposed rule.

In the Request for Comments, the Department requested information on any cumulative effect of the proposed rule with federal or state regulations:

Additionally, the agency requests any information pertaining to the cumulative effect of this rule with other federal and state regulations related to the specific purpose of the rule. Cumulative effect means the impact that results from incremental impact of the proposed rule in addition to other rules, regardless of what state or federal agency has adopted the other rules.²⁰

The Department did not receive any information in response to this request.

Notice Plan

Minnesota Statutes, section 14.131, requires that an agency include in its SONAR a description of its efforts to provide additional notification to persons or classes of persons who may be affected by the proposed rule or must explain why these efforts were not made.

Notice

This Additional Notice Plan was reviewed by the Office of Administrative Hearings and approved in an September 8, 2022 order by Administrative Law Kimberly Middendorf.

Our Notice Plan includes giving notice required by statute. We will mail or email the Dual Notice, which will contain an easily readable and understandable description of the nature and effect of the proposed rule, to everyone who has registered to be on the Department's state building code rulemaking mailing list under Minnesota Statutes, section 14.14, subdivision 1a. We will also give notice to the Legislature per Minnesota Statutes, section 14.116.

Our Notice Plan also includes giving additional notice to associations and trade groups not required by statute. The Department will mail the Dual Notice to the following interested industry groups or associations. Those groups or associations are as follows.

Additional notice plan

The Department intends to send an electronic notice with a hyperlink to electronic copies of the Notice, SONAR and the proposed rule amendments to:

- a. All certified building officials involved in code administration. This list includes all municipal building officials responsible for administration of the Minnesota State Building Code.
- b. Association of Minnesota Building Officials
- c. Minnesota Mechanical Contractors' Association
- d. Minnesota Society of Professional Engineers
- e. Association of Minnesota Counties
- f. League of Minnesota Cities
- g. Minnesota Board of Electricity
- h. Minnesota Plumbing Board
- i. American Institute of Architects - Minnesota
- j. Building Owners and Managers of Minneapolis and St. Paul

²⁰ 46 S.R. 564 (Oct. 25, 2021).

- k. Minnesota Manufactured Home Association
- l. Minnesota Department of Commerce
- m. Builders Association of Minnesota
- n. Housing First Minnesota
- o. Minnesota Chamber of Commerce
- p. Building Owners and Managers Association
- q. Minnesota Housing Finance Agency
- r. Minnesota Multi-Housing Association
- s. Minnesota State Historic Preservation Office
- t. Minnesota Historical Society
- u. Fresh Energy
- v. Center for Energy and the Environment
- w. Midwest Energy Efficiency Alliance
- x. Responsible Energy Codes Alliance
- y. Minnesota ASHRAE Chapter

Our Additional Notice Plan did not include notifying the Commissioner of Agriculture because the rules do not affect farming operations per Minnesota Statutes, section 14.111.

Performance-based rules

Minnesota Statutes, section 14.002, requires state agencies, whenever feasible, to develop rules that are not overly prescriptive and inflexible, and rules that emphasize achievement of the Department's regulatory objectives while allowing maximum flexibility to regulated parties and to the Department in meeting those objectives.

Minnesota Statutes, section 326B.106, subdivision 1, authorizes the Department to establish by rule a code of standards for construction. This statute requires the code to "conform insofar as practicable to model building codes generally accepted and in use throughout the United States." At the same time, this statute mandates that, "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."

The commercial provisions of ASHRAE 90.1-2019 establish minimum requirements for building systems using prescriptive and performance-based provisions. The proposed rules that contain amendments to the ASHRAE 90.1-2019 commercial provisions incorporate the philosophy required by Minnesota Statutes, section 326B.106.

Consult with MMB on local government impact

As required by Minnesota Statutes, section 14.131, the Department consulted with the Commissioner of Minnesota Management and Budget ("MMB") concerning the fiscal impact and benefits the proposed rules may have on units of local government. This was done on July 14, 2022, by providing MMB with copies of the Governor's Office Proposed Rule and SONAR Form, the proposed rules, and the near-final SONAR. On September 8, 2022, the Department received a memorandum dated the same day from MMB Executive Budget Officer Kwesi Pasley which provided general comments and concluded as follows:

However, a local unit of government may incur substantial costs when (1) renovating a historical building as they are exempt from compliance under the current rule; (2) renovating portions of a

building that fall under Chapter 1323 that have not been deemed historically significant; and (3) making changes to the use or occupancy of a building. Local governments may also incur costs associated with purchasing new code books (\$177 per person maximum) and any educational expenses (\$170 per person maximum) necessary for the training of enforcement officials.

The Department will submit a copy of its correspondence with MMB and the response received from that agency to OAH at the hearing or with the documents it submits for ALJ review.

Impact on local government ordinances and rules

Minnesota Statutes, section 14.128, subdivision 1, requires an agency to make a determination of whether a proposed rule will require a local government to adopt or amend any ordinances or other regulation in order to comply with the rule. The Department has determined that the proposed amendments will not have any effect on local ordinances or regulations. Local government that currently enforce the Minnesota State Building Code will continue to enforce the Minnesota State Building Code in their jurisdiction.

Costs of complying for small business or city

Minnesota Statutes, section 14.127, subdivisions 1 and 2, require an agency to “determine if the cost of complying with a proposed rule in the first year after the rule takes effect will exceed \$25,000 for any one business that has less than 50 full-time employees, or any one statutory or home rule charter city that has less than ten full-time employees.”

The Department has considered whether the cost of complying with the proposed rules in the first year after the rules take effect will exceed \$25,000 for any small business or small city. A small business is defined as a business (either for profit or nonprofit) with less than 50 full-time employees and a small city is defined as a city with less than ten full-time employees. The Department has determined that it is possible that a small business or small city that owns a historical building that is undergoing renovation may incur costs in excess of \$25,000 in the first year after the rules take effect. The Department is unaware of how many historical buildings will be affected by the proposed rules in part because buildings that are eligible to be listed on the National or State Register of Historic Places but are not listed are considered historical buildings for the purpose of the proposed rules.²¹ The Department is also unaware of how many historical buildings owned by small businesses or small cities need or intend to undergo renovations, the extent of the renovations, or the costs of those renovations.

It is difficult to quantify the actual costs for renovation of an existing historical building because design, age, historical features and elements, and condition of the building, among, other factors, have a significant impact on costs. Furthermore, the proposed rules do not require a historical building to undergo renovation during the first year the rule is in effect and only requires that the portion of the building undergoing renovation to conform to the energy efficiency requirements for existing buildings to the greatest extent possible without alteration to historical features and elements.

In order to estimate the cost of compliance with the proposed rules, the Department examined the costs to renovate different building elements in compliance with the proposed rule for a historical building located in climate zone 7. The counties in Minnesota are assigned to either climate zone 7 or climate zone 6A as discussed in the proposed amendments to part 1323.0514. The Department’s

²¹ See [Minnesota Rules, part 1300.0070, subpart 12a](#).

analysis focused on the northern counties in Minnesota located in climate zone 7 because the requirements for that climate zone are more slightly more restrictive than the requirements for climate zone 6A. However, the estimated costs for renovations are similar for both climate zone 7 and climate zone 6A. The Department obtained these estimates by averaging material costs obtained from three national recognized building materials retailers in three different locations in Minnesota.

The Department has determined that the cost of complying with the proposed rules in the first year after the rules take effect may exceed \$25,000 for a small business or small city undertaking a substantial renovation of a multiple elements of a historical building. However, it is unlikely that every element or space within the historic building will be undergo alteration or replacement at the same time. For example, during the first year the rule is in effect the owner of a historic building may choose to replace the windows and defer other alterations or forgo them because they are unnecessary.

For a typical two-story historic main street building in Minnesota, the cost of replacing a 236 square foot storefront window in compliance with this rules chapter would be approximately \$6,488 which includes \$2,948 for the framing at a cost of \$22 per linear foot and \$3,540 for the insulated glass at a cost of \$15 per square foot. The second-floor windows in this style of building are typically historical and would be exempt from compliance with these rules. A replacement door for this style of building would cost \$1,400. It is unlikely that a small business or small city would own and renovate a historic building with a sufficient number of doors and windows being replaced in the same year and that are not historical features to increase costs by \$25,000.

The Department also reviewed the costs to insulate exterior walls in a historical building in climate zone 7. The proposed rules only require exterior walls to be insulated if they are not a historical element and the wall is opened to add the supplementary wood necessary to expand the thickness of the wall to allow insulation to be installed. Exterior walls that are historical, undergoing repair, or cosmetic changes such as repainting are not required to comply the proposed rule. The cost to insulate an exterior wall in accordance with the proposed rule is \$3.45 per square foot for 3-inch extruded polystyrene with an R-value of R15.2. For a typical Minnesota main street building, the cost to insulate a back alley wall that is 382 square feet is \$1,352 and the cost to insulate the street side wall of 254 square feet is \$900. The other walls would not be insulated because they are either shared walls with other buildings or exempt due the historical significance of the façade. The Department believes it is unlikely that the cost to insulate exterior walls will exceed more than \$25,000 in the first year for any small business or small city because it is unlikely all the exterior walls would be opened and furthermore many exterior walls will be exempt because of their historical significance.

The proposed amendments require insulation for replacement roofs of historical buildings with slopes greater than two units vertical in 12 units horizontal. These roofs can be insulated with blown fiberglass R-60 insulation at a cost of \$2.12 a square foot. As a result, a pitched roof replacement would have to be approximately 11,792 square feet in size in order to meet the \$25,000 cost threshold. The Department considers it unlikely that a small building or small city would own a historical building with a pitched roof of that size.

The Department has concluded that the regulatory threshold of \$25,000 may be exceed for small business and small cities in the first year after the rule takes effect if a small business or small city intends to perform a substantial renovation to historical building that includes the alteration of multiple building elements or features such as a renovation that includes a replacement of an uninsulated pitched roof, windows, and doors and extensive renovations of the exterior walls. However, the

Department considers it unlikely that that a historical building owned by a small city or small business would require these all these extensive renovations or that they would occur in the same year.

Witnesses and SONAR exhibits

Witnesses and other staff

- 1) The agency expects that the proposed amendments will be noncontroversial. In the event that a hearing is necessary, the agency anticipates having the listed authors testify as witnesses in support of the need for and reasonableness of the rules.
- 2) Ms. Brittany Wysokinski, Minnesota Department of Labor and Industry. Ms. Wysokinski is a staff attorney to the Department and will introduce the required jurisdictional documents into the record.
- 3) Mr. Greg Metz, Building Plan Review Manager, Minnesota Department of Labor and Industry. Mr. Metz will testify about technical aspects and the background of the proposed amendments.
- 4) Other Department of Labor and Industry Staff, if necessary, will testify about the technical aspects of the proposed amendments, the background of the proposed amendments, and the Department's interest in amending chapter 1323.
- 5) Energy Code Technical Advisory Group members, if necessary, will testify about the technical aspects of the proposed amendments, the background of the proposed amendments.

SONAR exhibits

- 1) ASHRAE 90.1-2019
- 2) Current Minnesota Commercial Energy Code
- 3) All links within this document are available online.
- 4) Copies of CCAC meeting agenda and minutes are available online.²²
- 5) Copies of the Commercial Energy Code TAG agendas and meeting notes are available online.²³

Conclusion

In this SONAR, the agency has established the need for and the reasonableness of each of the proposed amendments to Minnesota Rules, chapter 1323. The agency has provided the necessary notice and in this SONAR documented its compliance with all applicable administrative rulemaking requirements of Minnesota statute and rules.

Based on the forgoing, the proposed amendments are both needed and reasonable.

Nicole Blissenbach

Nicole Blissenbach, Temporary Commissioner
Department of Labor and Industry

²² See <http://www.dli.mn.gov/about-department/boards-and-councils/construction-codes-advisory-council>.

²³ See <http://www.dli.mn.gov/about-department/boards-and-councils/commercial-energy-code-technical-advisory-group-tag>.

9/9/2022

Date