



Code Amendment Proposal Application

Department of Consumer & Business Services

Building Codes Division

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Read the entire code amendment proposal application before completing this form. Please complete all parts before submitting your proposal and refer to the provided checklist.

APPLICANT INFORMATION

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Date: 8/26/22

Representing (if applicable): Northwest Energy Efficiency Alliance

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PROPOSAL INFORMATION

Specialty code: ORSC

Code section(s): N1101.1

Briefly explain the subject of your proposal: requires projects to achieve 2 additional measures (instead of 1) from Table N1101.1(2)

INSTRUCTIONS AND CHECKLIST

Fill in all the information above and submit this page, signed and dated, with the required supplementary information for Parts I, II, III, and IV described on page 2 of this application. This application may be submitted by mail to the mailing address above, or by email to BCD.PTSPtech@oregon.gov.

Summary checklist for the applicant:

- Part I** Code amendment language is attached in the proper format.
- Part II** Amendment proposal requirements for amending the code have been reviewed.
- Part III** Amendment proposal criteria questions have been answered and are attached.
- Part IV** If applicable, additional ORSC energy efficiency amendment proposal information is attached.

Note: One application is required for each code section you are proposing to amend. If this proposal requires changes in other sections of the code for alignment, include those changes as part of this application.

APPLICANT SIGNATURE

Signature:

Date: 8/26/22

Copyright notice: By signing this Code Amendment Proposal Application, I understand and acknowledge that the work contained in this application is original, or if not original, I have the right to copy the work. By signing this work, I understand that any rights I may have in this work, including any form of derivative works and compilations, are assigned to the Department of Consumer and Business Services Building Codes Division. I also understand that I do not retain or acquire any rights once this work is used in a Department of Consumer and Business Services Building Codes Division publication.

PART I – CODE AMENDMENT LANGUAGE

N1101.1 General. The provisions of this chapter regulate the exterior envelope, as well as the design, construction and selection of heating, ventilating and air-conditioning systems, lighting and piping insulation required for the purpose of effective conservation of energy within a building or structure governed by this code.

All conditioned spaces within residential buildings shall comply with Table N1101.1(1) and ~~one two~~ additional measures from Table N1101.1(2).

Exceptions:

1. Application to existing buildings shall comply with Section N1101.2.
2. Application to additions shall comply with Section N1101.3.
3. Heated or cooled detached accessory structures that are not habitable shall meet the following envelope requirements without any additional measures: Walls: R21/U-0.064; Roofs: R-38/U-0.027 (attic) or R-20 continuous insulation/U-0.048 (above deck); Windows: U-0.35; Opaque doors: U-0.70; Roll-up doors: U-0.50.
4. New buildings using Section N1105.3.1, Exception 3, shall select ~~two three~~ additional measures from Table N1101.1(2).

N1105.3 Installation of ducts and air handling equipment. For new construction and additions, all new duct systems and air handling equipment and appliances shall be located fully within the building thermal envelope.

Exceptions:

1. Ventilation intake ductwork and exhaust ductwork.
2. Up to 5 percent of the length of an 10 feet (2438 mm) of HVAC-system ductwork shall be permitted to be located outside of the thermal envelope.
3. HVAC supply and return ductwork outside the thermal envelope and installed in accordance with either Section N1105.3.1, N1105.3.2 or N1105.3.3 shall select ~~two three~~ measures from Table N1101.21(2). ~~Ducts deeply buried in insulation in accordance all of the following: 3.1. Insulation shall be installed to fill gaps and voids between the duct and the ceiling, and a minimum of R-19 insulation shall be installed above the duct between the duct and unconditioned attic. 3.2. Insulation depth marker flags shall be installed on the ducts every 10 feet (3048 mm) or as approved by the building official.~~

PART II – CODE AMENDMENT PROPOSAL REQUIREMENTS

This proposal is enforceable by ORSC.

Part III – CODE AMENDMENT PROPOSAL CRITERIA

Proposal

Question	Response
1. Describe the concept and purpose of this proposal.	Requiring 2 Additional Measures improves alignment with DOE ZERH while providing builders flexibility on how to achieve more efficiency.
2. What problem in the existing Oregon code or national model code is this proposal solving? How does this amendment address the issue? If you have evidence demonstrating the problem, submit that information.	The minimum target for the 2023 ORSC is DOE ZERH v6, and NEEA’s analysis indicates that additional efficiency is needed beyond the 2023 ORSC draft to achieve this target (see the “2023 ORSC NEEA Proposals Support Document” appended). DOE ZERH incorporates multiple measures in Table N1101.1(2), most notably high efficiency HVAC (AM#1 or AM#5) <u>and</u> water heating (AM#2). Thus, requiring two AMs would better align with the DOE ZERH target. AM#2 is assumed to be the next most likely option selected after AM#1/5, but using the Table N1101.1(2) approach provides builders flexibility and avoids federal preemption. (This proposal also fixes a typo in Section N1105.3).
3. Has this been proposed at the national model code level? If so, explain when it was proposed, what happened, and why it was not adopted. Provide all associated national model code hearing information and background.	This section is unique to Oregon, so this exact proposal has not been proposed at the national level. However, REPI-18-21 and REPI-19-21 are similar options-based approaches proposed for the 2024 IECC. REPI-18 would convert Section R408 to a points-based approach and require a projects to achieve 10 points (a ~10% improvement above baseline) while REPI-19 would keep the current structure and require 2 packages. The IECC-R committee chose REPI-18 over REPI-19 and approved it by a vote of 36-6. Both of those proposals would require a higher level of efficiency than what is proposed here (assuming selection of the HVAC and water heating measures in all cases).

Implementation and fiscal impact

Question	Response
1. Explain how the proposed provisions would be enforced? Are additional inspections or permits required? Describe any necessary equipment, training, tests or special certifications.	Since the Table N1101.1(2) options remain the same as in the 2023 draft, there is no change to enforcement aside from the need to verify one additional measure.
2. What is the fiscal impact of this proposal? Provide a cost benefit analysis and include the resources or methods you used to determine the fiscal impact.	For the 2,376 sq ft home, annual energy savings and incremental construction costs are \$70.53 and \$914.20, respectively, after applying the 2023 ORSC weighting factors (see Part IV). This yields a statewide simple payback of 13 years, which is within the useful life of water heating equipment.

Impacted stakeholders and other specialty codes

Question	Response
1. Was this proposal developed with people or organizations likely to be affected by it? Has it been reviewed or shared with people or organizations likely to be affected by it? If so, who, and if not, why not?	As mentioned above, similar proposals were developed for 2024 IECC. These proposals were reviewed and discussed at several meetings earlier this year by the wide range of stakeholders engaged by ICC's consensus process. REPI-18-21 As Amended , which goes beyond this proposal, was overwhelming approved.
2. Does this proposal impact other specialty codes or statewide programs?	No.

Part IV – ORSC ENERGY EFFICIENCY CODE AMENDMENT PROPOSAL CRITERIA

1. Modeled estimated energy savings

2,376 sq ft		Gas Consumption (Therms/yr)		Electricity Consumption (kWh/yr)		Total Energy Use (MMBtu/yr)	
Prototype	Weights	Baseline	Proposed	Baseline	Proposed	Baseline	Proposed
4C, Gas, Crawl	23.9%	515.48	484.60	6,432.73	6,361.48	73.48	70.15
4C, Gas, Crawl, NO A/C	12.7%	515.54	484.20	5,139.98	5,140.36	69.08	65.95
4C, Electric, Crawl	3.8%	-	-	13,069.86	11,155.77	44.59	38.06
4C, Electric, Crawl, Zonal	3.8%	-	-	12,808.53	10,938.08	43.70	37.32
4C, Gas, SOG	8.2%	538.74	507.24	6,377.06	6,304.84	75.62	72.22
4C, Gas, SOG, NO A/C	4.3%	538.79	507.24	5,143.52	5,143.24	71.41	68.26
4C, Electric, SOG	1.3%	-	-	13,223.47	11,308.69	45.12	38.59
4C, Electric, SOG, Zonal	1.3%	-	-	12,975.56	11,104.78	44.27	37.89
5B, Gas, Crawl	16.5%	645.62	613.28	6,453.94	6,385.48	86.56	83.10
5B, Gas, Crawl, NO A/C	8.7%	645.67	613.28	5,179.16	5,178.76	82.22	78.98
5B, Electric, Crawl	2.6%	-	-	15,573.33	13,567.78	53.14	46.29
5B, Electric, Crawl, Zonal	2.6%	-	-	15,316.12	13,357.41	52.26	45.58
5B, Gas, SOG	5.6%	677.47	645.92	6,383.00	6,310.60	89.51	86.11
5B, Gas, SOG, NO A/C	3.0%	677.52	645.92	5,184.22	5,184.52	85.42	82.26
5B, Electric, SOG	0.9%	-	-	15,869.54	13,869.40	54.15	47.32
5B, Electric, SOG, Zonal	0.9%	-	-	15,629.98	13,676.63	53.33	46.66
Weighted Totals:		477	451	7,358	6,990	72.79	68.92

This proposal has statewide annual savings of 26 therms and 368 kWh (3.67 MMBtu total) for the 2,376 sq ft home. Note that the baseline model adjusted air leakage to 4 ACH50 (see appended Support Document), but this result should also hold for 3.5 ACH50 due to the lack of interactive effects.

2. Increased construction costs

Scenario 1: assume AM#2a is selected

	2,376 sq ft	1,200 sq ft	Source/Assumption
c. Cost of labor	-	-	Assume same installation costs as baseline case
d. Quantity of labor	0	0	
e. Cost of materials	\$676.18	\$676.18	Grainger catalog: UEF 0.9: \$2,575.88 EF 0.67: \$1,899.70
f. Quantity of materials	1	1	1 unit per home
g. Overhead costs	\$73.54	\$73.54	12% OP calculated from RS Means (gross profit assumed at 5% with the balance overhead)
h. Profit			
i. Factors or conditions that would make an alteration, repair, change of use, or change of occupancy, or other code upgrade triggering event in an existing building more expensive to comply with	-	-	Only applies to new construction
Total Incremental Cost:	\$749.72	\$749.72	

Scenario 2: assume AM#2b is selected

	2,376 sq ft	1,200 sq ft	Source/Assumption
c. Cost of labor	-	-	Assume same installation costs as baseline case
d. Quantity of labor	0	0	
e. Cost of materials	\$1,476	\$1,476	Home Depot website: UEF 4.0: \$1,915.00 UEF 0.9: \$439.00
f. Quantity of materials	1	1	1 unit per home
g. Overhead costs	\$236.16	\$236.16	16% OP calculated from RS Means (gross profit assumed at 5% with the balance overhead)
h. Profit			
i. Factors or conditions that would make an alteration, repair, change of use, or change of occupancy, or other code upgrade triggering event in an existing building more expensive to comply with	-	-	Only applies to new construction
Total Incremental Cost:	\$1,712.16	\$1,712.16	

Applying the gas/electric weightings and the assumption that the HVAC and DHW fuels matches from the 2023 ORSC assumptions spreadsheet: **the incremental cost is \$749.72 for the majority of homes, while the statewide incremental cost for this proposal is \$914.20.**