Energy Code Testimony
Summary of Proposed Modifications
2021 Code Adoption Cycle
March 2022

Testimony From	Mod	Summary	Recommendation
Mike Moore, Broan-NuTone	X	DEDICATED OUTDOOR AIR SYSTEM (DOAS). A ventilation system that supplies 100 percent outdoor air primarily for the purpose of ventilation ~~and is a separate system from the zone~~ without requiring operation of a space conditioning system fan for outdoor air delivery. *Rationale: Modifications to the proposed definition are intended to clarify that an outdoor air ventilation system's duct work can be integrated with a heating or cooling system's duct work and still be considered a DOAS, provided that the operation of the heating or cooling system's fan is not interlocked with the operation of the outdoor air ventilation system. An example of such a system is an HRV or an ERV that is ducted to the supply trunk of a dwelling unit's space conditioning system, whose operation does not automatically trigger the operation of the space conditioning system's air handler. This configuration can be used to assist with outdoor air distribution while minimizing fan energy use and first-costs of ducting.*	
	X	DEMAND CONTROL KITCHEN VENTILATION (DCKV). A system that provides automatic, continuous control over exhaust hoot and, where provided, makeup air fan speed in response to ~~temperature, optical, or infrared (IR)~~one or more sensors that monitor cooking activity or through direct Communications with cooking appliances. *Rationale: Modifications to the proposed definition are intended to make the definition less prescriptive and more broadly applicable for its intended purpose. For example, some DCKV systems operate while using TVOC sensors or other air quality sensors that are not listed in the definition. Rather than list all of the sensor types that could be used in the definition, the definition could simply address "one or more sensors that monitor cooking activity." The modification also recognizes that not all DCKV systems are necessarily provided with makeup air. Makeup air requirements are determined within the mechanical code and should not be triggered by application of a definition within the energy code.*	

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	X	C403.3.5.2 DOAS fan power. For a DOAS that does not have at least one fan or fan array with fan electrical input power ≥ 1 kW, the total combined fan power shall not exceed 1 watt per cfm of outdoor air as calculated in accordance with Equation 4-10 using design maximum airflows and external static pressures. For a DOAS with at least one fan or fan array with fan electrical input power ≥ 1 kW, the DOAS shall comply with the fan power limitations of Section C403.8.1. DOAS total combined fan power shall include all supply, exhaust and other fans utilized for the purpose of ventilation. This fan power restriction applies to each DOAS in the permitted project, but does not include the fan power associated with the zonal heating and cooling equipment. Exception: DOAS complying with Section C403.8.4. *Rationale: This exception is needed to avoid conflict with Section C403.8.4, which establishes minimum fan efficacy requirements for low-capacity ventilation fans.*	
		Correct the conversion typo in Table C403.8.4	
	X	C403.4.1.7 Demand responsive controls. ~~All thermostatic~~ Thermostatic controls for heating or cooling systems shall be provided with demand responsive controls capable of increasing the cooling setpoint and decreasing the heating setpoint by no less than 4°F (2.2°C). The thermostatic controls shall be capable of performing all other functions provided by the control when the demand responsive controls are not available. Systems with direct digital control of individual zones report to a central control panel shall be capable of remotely increasing the cooling setpoint and decreasing. *Rationale: This modification would clarify that thermostatic controls on ventilation systems need not comply with this provision. An example is a smart ventilation system control that modulates the ventilation airflow based on outdoor temperatures with the objective of shifting ventilation operation away from the peak load conditions to save energy while maintaining acceptable indoor air quality.*	
Kevin Kajita Jonathan Lewis Chelene Whiteaker David Streeter **WA Hospital Assoc.**	X	Add exception for critical facilities required to have emergency backup power to HP requirements in both new and existing facilities. 18. **Essential facilities.** Including but not limited to I-2 occupancies and related medical facilities that by regulation are required to have in place redundant emergency backup systems. Prefer Option 2 of C503.5	

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Jonny Kocher, RMI	X	Modify Sections C403.1.4 and C503.4.6, and C404.2.1 and C503.3 to add an exception for Group I-2 *After consulting with members of the Washington State Hospital Association and Providence Health & Services, I would like to offer the following modest changes to the Heat Pump Proposals 103 and 136 as currently drafted in the CR102. The purposes of these modifications are to allow a specific and narrow exemption of Group I-2 buildings (hospitals and other healthcare facilities) from the requirements of the heat pump proposals..*	
Andi Burnham	X	Modifications to Table C407 for correlation with other changes: Add Section C403.1.4 (if 103 passes) to require HP space heating Exempt Sections C403.8.1 and C403.8.4: This requires all fans >1 kW comply with the fan power budget, no option to "trade" fan power in the energy model. Should the fan power budgets be excluded from the mandatory requirements of C407 to allow design flexibility?	
Eric Vander Mey, Rushing	X	Various editorial changes throughout the document. C103.2, C402.2.6, C402.2.7 C402.5.11, C403.2.3, Table C403.3.2(15)*, C403.5.1, C403.3.5.5, C403.5, C403.7.6.1, C403.7.6.2, C403.8.4, C404.2.1, C404.2.2, C404.2.1.5, C405.7.1, C406.1.1, C406.1.1.1, C406.1.2, Table C406.2, C406.2.2, C406.2.2.4, C406.2.2.4.2, C406.2.2.5.2, Equation 4-17, C406.2.6.1, C406.2.6.2, C406.2.13.3, C406.2.15*, C406.2.16*, C406.2.17*, C406.2.18, C406.3.4, C406.3.5, Table C407.5, C407.3, C407.3.3.1, C407.3.3.2, Table C407.3(3), C411.1.1.2*, C411.3, C411.3.1 *These proposals go beyond editorial	
Eric Vander Mey, Rushing	X	Add new exception 1b to Section C403.5, Economizers, for Group R-2 that comply with a higher ERV effectiveness, and editorial corrections to exception 5.	
Michael Hedrick, McKinstry	X	The CR102 specifically requests input on elements of the code where options are provided; regarding C402.2, we prefer Option 2. Broadly, the proposed recommendations below address: • Control of electric resistance heat for defrost or supplemental heating in air-to-air heat pumps. • Clarity of sizing requirements for air-to-air heat pumps. • Guidance for coil sizing in light of application specific and common manufacturer limitations. • Control strategies for heat pump domestic hot water heaters. • Clarifying compliance options for gas fired hot water boiler replacements. • Adding an heating energy storage option for C406 load management credits.	

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Mike Kennedy	X	CMU Wall footnote Option 2 preferred Various suggestions on modifications: This submission also contains the results of a cover to cover read of the code to locate areas where the code was in ambiguous, unclear, or in error. The items are classified and prioritized, and are mostly not critical. A number of the items are simple issues that staff is likely to be able to correct without deliberation but a number will require Council or TAG deliberation. I have tried to provide suggested language. Most of the comments are contained in the following table. Given the length of the code there are definitely cases where I have misread code and for sure missed issues. And in some cases I'm not familiar enough with the topic to definitively declare a problem, and can just note that it is confusing. I recommend that these issues be checked with subject matter experts and the resulting work reviewed.	
Mike Kennedy	X	Modifications to Section C403.3.4 Boiler requirements. *These changes reflect changes made to the same proposal during the 2024 IECC code collaboration process where it received considerable scrutiny. This language has not been through the IECC public review but it is a general improvement in the language and is likely to be very nearly the same as the 2024 IECC. The changes include:* • *Clear separation between process and non-process boilers* • *Language clean-up with better incorporation with the existing Boiler System definition* • *One substantive new exception from oxygen controls for multifamily buildings.* *The new exception was a concern raised by the IECC subcommittee that because these controls were found to be not cost-effective in apartments according to the Title 24 case study, they should be exempt from IECC. The proposed language covers the majority of potentially non cost-effective building types in the committee's opinion*	
Mike Kennedy	X	Table C404.2, Minimum Performance of Water Heating Equipment *Revisions here primarily result for review by many people as part of the IECC process. They include:* • *adding footnote describing table top and grid enabled water heaters and* • *adding footnote indicating to look in C404.2.1 for further requirements.* • *Footnotes are reordered to be in order of occurrence* • *Referenced standards are updated* *A few small changes to footnotes*	

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Mike Kennedy	X	Section C406 edits: Suggested changes to this section address all discovered issues except the do not fully address the allowed heat pump type and associated sizing sections in C406.2.6.	
Mike Kennedy	X	Suggested edits to C407 -Table C407.2: Add Renewables and Compressed Air Systems; C407.3: I'm proposing to delete the bit in C411 that says "and subtracted from the proposed site energy use". This is to keep C411 okay for reference from other sections such as C406 Text added here now	
Mike Kennedy	X	Section C411 Edits: *This file contains proposed changes to C411.1, C411.2, and the first paragraph of 411.3.* *The issues in C411.1 are potentially significant and in working with a few people it was not possible to come to consensus on one set of suggested language. This file presents C411.1 issues and then presents 3 possible revisions to address them.* *The issues in C411.2 are also significant but the fixes were not controversial.*	
Ian Robinson	X	Revise carbon emission factor for natural gas in Table C407.3(1) from 11.7 to 19.0, and adjust Table C407.3(2) to correlate. *A Carbon Emissions Factor of 11.7 lb/therm for natural gas represents only the point-of-use CO2 emissions of complete combustion of natural gas. It does not include any of the carbon emissions associated with production, transmission, leakage, or incomplete combustion of natural gas, and is therefore a vast underestimate of the climate impact of natural gas energy use. The warming effect of fugitive emissions of natural gas during production and distribution is of particular concern, due to the high global warming potential of Methane as a greenhouse gas. Methane has a 20-year global warming potential of 84.0. The 2011 EPA greenhouse gas inventory placed the US natural gas leakage rate at 2.4% from well to city, according to analysis published in the Proceedings of the National Academy of Sciences and recent studies from the Environmental Defense Fund indicate that methane emissions from the US oil and gas industry may be 60% higher than EPA estimates. Using this 2.4% estimate and the 20-year GWP of methane to reflect the urgency of the climate emergency, a more appropriate carbon emissions factor for natural gas would be 19.0 lbm CO2e/Therm. Using the 80-year GWP of methane would reduce the impact of fugitive emissions, however given the urgency of the climate crisis the 20-year GWP seems more appropriate.*	

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Laurel Schandelmier, Glumac	X	• C403.1.1, HVAC TSPR: recommend clarifying that only the stated building types that require DOAS, and that are ventilated, are applicable to this section. • C406: I recommend either clarifying or adding another column for lab buildings that might be Group B, since their strategies are going to be different from typical office buildings. • C406: Overall, it seems there are far more available credits to residential occupancies than to commercial building types. Suggest adding more options for commercial (especially Group B) as the available strategies may be very limited in terms of viable collections of pathways. • C407: I recommend adding a separate BPF for lab buildings that is higher than that of All Others. • C411.2: I recommend clarifying/adding that C407 TBP projects can avoid this PV via a reduced BPF. • C411: Buildings over 20 stories are exempt from solar readiness requirements. Should that exception be applied to renewable energy requirements as well? Supports changes for heat pump space and water heating.	
Eric Truskoski, Bradford White	X	**New definitions.** Single-pass should be defined as single-pass heat pump water heater, and multi-pass should be defined as multi-pass heat pump water heater. **C404.2.1.3** The WSCEC has laid out installation requirements that are overly prescriptive. We recommend the SBCC defer to the installation requirements specified by manufacturers of commercial HPWHs. The proposed requirements may force an installation, which may not be the best solution; does not comply with the manufacturer's installation and operation manual; and/or may limit improvements in known and unknown technologies. **C404.2.1.5** This section refers to alarm and/or control requirements of the system. If applicable, we suggest such requirements to be more appropriate in the Mechanical Code than the Energy Code. Do not adopt changes in 103 (heat pump space heating), 136 (heat pump water heating). Do not adopt 206 (load management) until finalized by ASHRAE 90.1. Do not change the gas-fired and oil-fired boiler minimum efficiency requirements in Table C403.3.2(6) until final appeal and DOE action.	

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Bob Gunn, Seinergy	X	**Summary**: we support the proposed changes C405.3, with minor modifications to clarify that proposed 1.9 umol/j efficacy standard will be assessed at the lamp level where fixtures have serviceable lamps. *Our understanding is the WAC is trying to align with California's Title 24 energy code and with ASHRAE 90.1. However, the proposed language lacks the key components to correctly align the proposed language with California's Title 24 energy code and with ASHRAE 90.1. In the New Buildings Institute's proposal for this amendment, they state, "This efficacy requirement allows the most efficacious double-ended high pressure [sic] sodium luminaires and LED luminaires to be installed." However, the currently proposed language would limit growers to using only LED technology. As is, the proposed language would unintentionally restrict the industry and could cost $60 per square foot more than even efficacious double-ended high pressure sodium luminaires. This also threatens to undermine or eliminate utility rebates for early adopters of LED.*	
Nicholas Hagedorn, Hawthorne	X	*We agree with the Washington State building council that the (PPE) standard of 1.9 µmol/J is an acceptable strategy to create market transformation to more energy efficient lighting in the Controlled Environment Horticulture industry. Our concern is that the vague language used to express this will leave things open to interpretation by both regulators and cultivators which may negatively impact WA States goal of decreased carbon emissions in addition to potentially damaging the vulnerable WA cannabis industry:* C405.3: All permanently installed luminaires used for plant growth and maintenance shall have a photosynthetic photon efficacy of not less than 1.7 µmol/J for greenhouses and not less than 1.9 µmol/J **measured at the lamp level where luminaires have serviceable lamps** for all other indoor growing spaces	
Amanda Falkenhagen, Rushing	X	I would like to submit public review comments for the 2021 WSEC draft as noted below: **Section C405.5.1**: Suggest clarifying if the efficacy of 100 lumens/watt is based on initial lumens or delivered lumens. **Section C405.2.8.3:** Suggest removing the struck through portion below to provide greater clarity. The current working is bulky and difficult to interpret. **High end trim.** Luminaires subject to high end trim shall be initially configured with the following: 1. Programmed to limit the initial maximum lumen output or maxi-mum lighting power to 85 percent or less of full light output or full power ~~from full output~~ or to meet the target light level documented in project sequence of operations using the least amount of power.	

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Michael Rosenberg, PNNL	X	As the developer of the HVAC Total System Performance Ratio (TSPR) approach in the Washington State Energy Code and the proponent of 21-GP1-61, I would like to propose several changes to improve TSPR and account for additional energy savings strategies. These changes came out of public stakeholder input that was received while TSPR proposal was evaluated for inclusion in ASHRAE Standard 90.1. The following changes have been incorporated into the free TSPR calculation tool developed by Pacific Northwest National Laboratory and will be made available to Washington State users if approved by the Council. 1. Clarifies in Table D601.11.1 that HVAC Systems 3 and 4 include split systems in addition to single packaged systems. 2. Fixes a mistake where VAV systems and DOAS systems were not included in the list of system types where number of stages for direct expansion cooling coil number of stages should be specified. 3. Fixes a mistake where packaged VAV systems and DOAS systems were not included in the list of system types where furnace efficiency should be specified. 4. Adds variable flow primary and variable flow secondary chilled and heating water plant loop configurations to those that can be credited using TSPR. 5. Heating plant loop temperature control is added as a parameter that is available for credit. 6. Water loop heat pump loop temperature control is added as a parameter that is available for credit.	
Michael Rosenberg, PNNL	X	As the proponent of 21-GP1-36 I worked with the Energy Code TAG to modify the proposal to improve it to reach consensus among the various stakeholders. One issue that was left unresolved was how to account for potential code changes to the electricity carbon emission factors (0.7 lbs./kWh to 0.44 lbs./kWh) and limitations on fossil fuel space and water heating that could potentially end up in the 2021 Washington State Energy Code. Those changes would result in the need to adjust the Building Performance Targets **(Table C407.3(2))** and Site Energy Performance Factors **(Table C407.3(3))** that were submitted in my original proposal. At the time of TAG approval of 21-GP1-70, I committed to updating those tables once the status of those two proposals was clarified, and to submit those updates as public review comments. I also incorporated several improvements to the calculation of performance factors based on stakeholder feedback. Therefore, if the new amendments to electricity emission factors and limits to use of fossil fuels for space and water heating are advanced in the code, **please replace the two tables with those shown below**. If the emission factors are updated to some value other than what is shown in the public review draft, or if the draft is amended to exempt some building types from the limitations on fossil fuel space or water heating, I can update the values in the tables below appropriately.	

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Rupal Choksi, Madison Indoor Air Quality	X	As a manufacturer of stand-alone dehumidifiers as referenced in **Section C403.15**, we support and applaud the state of Washington's efforts to improve the efficiency of the indoor horticulture industry. The efficiencies proposed in 1.1 and 1.2 are easily achievable by any manufacturer. Even so, we have two comments for you to consider. Comment 1: A bit of clarification may be required, perhaps informally, on what testing conditions are to be used based on the install method of the standalone dehumidifier referenced in 1.1 and 1.2. Even so, we support the wording as it will not provide a substantial barrier to entry for any manufacturer and substantially improve the efficiency of the indoor horticulture industry. Comment 2: We would like to address the requirement in 2. and 3. that states, "…*with on-site heat recovery designed to fulfill at least 75 percent of the annual energy for dehumidification reheat…"* and how it compares to the requirements in ASHRAE 90.1-2019. In doing so, we suggest that the on-site heat recovery be increased to 90 percent from 75 percent-- "…*with on-site heat recovery designed to fulfill at least ~~75~~ 90 percent of the annual energy for dehumidification reheat…"*	