NEWPORT VENTURES

October 19, 2017

Governor's Office of Energy
755 N. Roop, Suite #202
Carson City, NV 89701

Re: Recommendation to Adopt 2018 IRC Mechanical Ventilation Requirements alongside the 2018 IECC

Dear GOE Staff:

Thank you for the opportunity to provide comments regarding NV GOE's proposal to adopt the 2018 IECC. Newport and the Home Ventilating Institute are supportive of this effort and request that NV GOE take steps to ensure that the tight dwelling units that will be built to this code are also equipped with mechanical ventilation systems to provide minimum acceptable indoor air quality.

Building tight dwelling units is an excellent approach to saving energy and improving comfort. However, pursuing tight construction without providing for minimum acceptable indoor air quality compromises building durability and occupant health. Recognizing this, the model code requires tight construction in the IECC and requires mechanical ventilation for minimum acceptable indoor air quality in the IRC.

By retaining the building air tightness requirements of the IECC, the Nevada Governor's Office of Energy has made excellent strides towards improving the energy efficiency of Nevada's dwelling units. However, our reconnaissance of jurisdictional code adoptions shows that about 80% of jurisdictions in Nevada have not adopted the complementary requirement for mechanical ventilation in the IRC. To ensure that tight dwelling units are provided with mechanical ventilation in Nevada, we urge the NV GOE to amend the 2018 IECC to include the mechanical ventilation requirements of the IRC. An example of another state that has taken similar action is Illinois, which adopts a state-wide energy code that is amended to include requirements for mechanical ventilation; jurisdictions are then free to adopt and amend their own version of the IRC.

The biggest health benefit of mechanical ventilation relates to improvements in indoor air quality. Indoor air can be many times more polluted than outdoor air, and the average American spends 90 percent of the day inside. Ventilation systems can significantly improve a home's air quality by removing allergens, pollutants, and moisture that can cause mold problems.

When homes rely solely on air leakage through walls, roofs, and windows to provide fresh air, there is no control over the source or volume of air that comes into the house. In fact, air leaking into the

Mechanical Ventilation is Necessary for Healthy Indoor Air

- Helps remove harmful allergens, pollutants, and moisture from homes.
- Provides fresh air in accordance with model codes and standards minimum requirements.
- Provides more balanced fresh air rates across all seasons.
- Helps mitigate risk of formaldehyde emissions and concentrations.
- Helps improve occupant health issues such as asthma and other respiratory issues.

house may come from undesirable areas such as the garage, attic, or crawl space. Common indoor air pollutants in new homes include biological pollutants (mold spores, dust mites, bacteria, viruses, pollen, animal dander); combustion pollutants (including carbon monoxide, nitrous oxides, and particulate matter); volatile organic compounds (VOCs) emitted from many paints, glues, and other building materials (this is called “off-gassing”); and, in some areas of Nevada, radon. Proper mechanical ventilation will assist in pollutant removal and control, providing a healthier indoor environment within Nevada’s comfortable, efficient homes. The attached proposal is offered to assist NV GOE with this effort.

Thank you for the opportunity to provide this comment; I would be happy to answer any follow-on questions.

Sincerely,

Mike Moore

Mike Moore, P.E.
ASHRAE 62.2 Indoor Air Quality Subcommittee Chair

Proposal: Replace Section R403.6 of the IECC as follows. Note that the proposed text is copied from the IRC. The only significant exception to this is listing ASHRAE 62.2 as an optional, alternative path that gives builders more options for compliance. The Northern Nevada Energy Code Amendments also list ASHRAE 62.2 as an optional path.

R403.6 Mechanical ventilation (Mandatory). The *building* shall be provided with ventilation that complies with the requirements of this section. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.

R403.6.1 Equipment listing. Exhaust equipment serving single *dwelling units* shall be *listed* and *labeled* as providing the minimum required airflow in accordance with test standard ANSI/AMCA 210-ANSI/ASHRAE 51.

R403.6.2 Duct length. The length of exhaust and supply ducts used with ventilating equipment shall not exceed the lengths determined in accordance with Table R403.6.2.

Exception: Duct length shall not be limited where the duct system complies with the manufacturer's design criteria or where the flow rate of the installed ventilating equipment is verified by the installer or approved third party using a flow hood, flow grid or other airflow measuring device.

TABLE R403.6.2
DUCT LENGTH

DUCT TYPE	FLEX DUCT								SMOOTH-WALL DUCT							
Fan airflow rating (CFM @ 0.25 inch wc[a])	50	80	100	125	150	200	250	300	50	80	100	125	150	200	250	300
Diameter[b] (inches)	Maximum length[c, d, e] (feet)															
3	X	X	X	X	X	X	X	X	5	X	X	X	X	X	X	X
4	56	4	X	X	X	X	X	X	114	31	10	X	X	X	X	X
5	NL	81	42	16	2	X	X	X	NL	152	91	51	28	4	X	X
6	NL	NL	158	91	55	18	1	X	NL	NL	NL	168	112	53	25	9
7	NL	NL	NL	NL	161	78	40	19	NL	NL	NL	NL	NL	148	88	54
8 and above	NL	NL	NL	NL	NL	189	111	69	NL	NL	NL	NL	NL	NL	198	133

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.
a. Fan airflow rating shall be in acordance with ANSI/AMCA 210-ANSI/ASHRAE 51.
b. For noncircular ducts, calculate the diameter as four times the cross-sectional area divided by the perimeter.
c. This table assumes that elbows are not used. Fifteen feet of allowable duct length shall be deducted for each elbow installed in the duct run.
d. NL = no limit on duct length of this size.
e. X = not allowed. Any length of duct of this size with assumed turns and fittings will exceed the rated pressure drop.

R403.6.3 Whole-house mechanical ventilation system. Whole-house mechanical ventilation systems shall be designed and provided in accordance with this section or in accordance with ASHRAE 62.2.

R403.6.3.1 System design. The whole-house ventilation system shall consist of one or more supply or exhaust fans, or a combination of such, and associated ducts and controls. Local exhaust or supply fans are permitted to serve as such a system. Outdoor air ducts connected to the return side of an air handler shall be considered to provide supply ventilation.

R403.6.3.2 System controls. The whole-house mechanical ventilation system shall be provided with controls that enable manual override.

R403.6.3.3 Mechanical ventilation rate. The whole-house mechanical ventilation system shall provide outdoor air at a continuous rate of not less than that determined in accordance with Table R403.6.3.3(1) or of not less than that determined in accordance with Equation 403-1.

Ventilation rate in cubic feet per minute – (0.01 x total square foot area of house) + [7.5 x (number of bedrooms + 1)] **Equation 403-1**

Exception: The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25 percent of each 4-hour segment and the ventilation rate prescribed in Table R403.6.2.3(1) or by Equation 403-1 is multiplied by the factor determined in accordance with Table R403.6.2.3(2).

403.6.3.4 Fan efficacy. Fans used to provide whole-house mechanical ventilation shall meet the efficacy requirements of Table R403.6.3.4.

Exception: Where an air handler that is integral to tested and *listed* HVAC equipment is used to provide whole-house mechanical ventilation, the air handler shall be powered by an electronically commutated motor.

TABLE R403.6.3.4
WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM FAN EFFICACY[a]

FAN LOCATION	AIR FLOW RATE MINIMUM (CFM)	MINIMUM EFFICACY (CFM/WATT)	AIR FLOW RATE MAXIMUM (CFM)
HRV or ERV	Any	1.2 cfm/watt	Any
Range hoods	Any	2.8 cfm/watt	Any
In-line fan	Any	2.8 cfm/watt	Any
Bathroom, utility room	10	1.4 cfm/watt	< 90
Bathroom, utility room	90	2.8 cfm/watt	Any

For SI: 1 cfm = 28.3 L/min.
a. When tested in accordance with HVI Standard 916.

TABLE R403.6.2.3(1)
CONTINUOUS WHOLE-HOUSE MECHANICAL VENTILATION SYSTEM AIRFLOW RATE REQUIRMENTS

DWELLING UNIT FLOOR AREA (square feet)	NUMBER OF BEDROOMS				
	0-1	2-3	4-5	6-7	> 7
	Airflow in CFM				
< 1,500	30	45	60	75	90
1,501 - 3,000	45	60	75	90	105
3,001 - 4,500	60	75	90	105	120
4,501 - 6,000	75	90	105	120	135
6,001 – 7,500	90	105	120	135	150
> 7,500	105	120	135	150	165

For SI: 1 square foot = 0.0929 m^2, 1 cubic foot per minute = 0.0004719m^3/s.

TABLE R403.6.2.3(2)
INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION RATE FACTORS[a,b]

RUN-TIME PERCENTAGE IN EACH 4-HOUR SEGMENT	25%	33%	50%	66%	75%	100%
Factor[a]	4	3	2	1.5	1.3	1.0

a. For ventilation system run time values between those given, the factors are permitted to be determined by interpolation.
b. Extrapolation beyond the table is prohibited.

R403.6.4 Local exhaust systems. Where provided, *local exhaust* systems shall be designed and installed in accordance with this section or in accordance with ASHRAE 62.2.

R403.6.4.1 Local exhaust rates. *Local exhaust* systems shall be designed to have the capacity to exhaust the minimum air flow rate determined in accordance with Table R403.6.4.1.

R403.6.4.2 Exhaust air recirculation. Exhaust air from bathrooms and toilet rooms shall not be recirculated within a residence or circulated to another *dwelling unit* and shall be exhausted directly to the outdoors. Exhaust air from bathrooms, toilet rooms and kitchens shall not discharge into an *attic*, crawl space or other areas inside the building. This section shall not prohibit the installation of ductless range hoods in accordance with the exception to IRC Section M1503.3.

TABLE R403.6.4.1
MINIMUM REQUIRED LOCAL EXHAUST RATES FOR ONE- AND TWO-FAMILY DWELLINGS

AREA TO BE EXHAUSTED	EXHAUST RATES
Kitchens	100 cfm intermittent or 25 cfm continuous
Bathrooms-Toilet Rooms	Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s