Low rise multifamily proposal discussion

Duane Jonlin, City of Seattle 6/2/22

1. Suggested additional code changes
2. Cost comparison information
3. Pros and cons

1. Suggested Additional Code Changes (in Red)

RESIDENTIAL BUILDING. For this code, ((~~includes,~~)) the following building types are residential buildings:

1. Detached one- and two-family dwellings
2. Multiple single-family dwellings (townhouses)
3. ((~~and Group R-2,~~)) Group R-3 ((~~and R-4~~)) buildings three stories or less in height above grade plane (Note to reviewers: *because WA doesn't use R-4*)
4. Group R-2 ((~~buildings~~)) occupancy areas in buildings three stories or less in height above grade plane whose dwelling units are accessed directly from the exterior
5. Accessory structures ~~thereto~~ to residential buildings

Group R-2 buildings with *dwelling units* accessed from interior corridors or other interior spaces are not *residential buildings*.

R401.1 Scope. This chapter applies to residential buildings. Group R-2 ((~~buildings~~)) occupancy areas with dwelling units accessed from enclosed interior corridors or other enclosed interior spaces must comply with the WSEC--Commercial Provisions. Other Group R-2 occupancy areas are permitted to comply with the WSEC – Commercial Provisions, in lieu of the WSEC – Residential Provisions.

> **Exception**: Water heaters that each serve only an individual Group R-2 dwelling unit in a building three stories or less above grade plane are permitted to comply with the requirements of the WSEC – Residential Provisions.

Four potential locations for "pointers," where R-2 occupancy is mentioned in the code:

R405.2 Performance-based compliance. Compliance based on total building performance requires that a proposed design meets all of the following: (items 1 – 4 unaffected)

5.. For structures serving Group R-2 occupancies, the annual carbon emissions shall be less than or equal to 70 percent of the annual carbon emissions of the standard reference design. See Section R401.1 and *residential building* in Section R202 for R-2 scope.

R406.3 Additional energy efficiency requirements. Each dwelling unit in a residential building shall comply with sufficient options from Table R406.2 so as to achieve the following minimum number of credits: (Items 1, 2, 3 and 5 unaffected)

4. Dwelling units serving R-2 occupancies. See Section R401.1 and *residential building* in Section R202 for R-2 scope: .....4.5 credits

TABLE R406.2
FUEL NORMALIZATION CREDITS

System Type	Description of Primary Heating Source	Credits	
		All Other	Group R-2[b]
1	Combustion heating equipment meeting minimum federal efficiency standards for the equipment listed in Table C403.3.2(4) or C403.3.2(5)	0	0

b – See Section R401.1 and *residential building* in Section R202 for R-2 scope.

TABLE R406.3
ENERGY CREDITS

Option	Description	Credit(s)	
		All Other	Group R-2[b]
1. EFFICIENT BUILDING ENVELOPE OPTIONS Only one option from Items 1.1 through 1.7 may be selected in this category. Compliance with the conductive UA targets is demonstrated using Section R402.1.5, Total UA alternative, where [1-(Proposed UA/Target UA)] > the required %UA reduction			
1.1	Prescriptive compliance is based on Table R402.1.3 with the following modifications: Vertical fenestration U = 0.24	0.5	0.5

b – See Section R401.1 and *residential building* in Section R202 for R-2 scope.

2. Cost comparison information

Options Table, General: The commercial code C406 options for R-2 multifamily cost very little extra, while the residential code R406 options for R-2 multifamily have definite costs attached.

Options table costs for R-2 in the commercial energy code. The following credits are available for the 2021 code. It appears that the reduced pipe sizing credit alone will provide more than the 41 credits required under the new credit system, while *reducing* construction cost, and there are many other options.

- **#20: 42 credits Hot water distribution right-sizing using plumbing code Appendix M** (*reduces* construction cost)

(Other available high-credit options)

- #28: 19 credits Residential dishwasher & fridge with Energy Star “Most Efficient” label
- #07: 31 credits High performance DOAS
- #14: 14 credits Renewable energy
- #21: 13 credits Hot water temp maintenance
- #25: 24 credits Reduced air leakage

(More available low-cost, low-credit options)

- #09: 4 credits 10% lighting power reduction
- #11: 6 credits: High-efficacy lamps
- #12: 8 credits main lighting switch for whole unit
- #23: 3 credits low-flow shower heads
- #29: 6 credits Energy Star “most efficient” label washer & dryer

Options table costs for R-2 in the residential energy code. For residential, the TAG has recently approved the NEEA/Ecotope package of R406 changes (21-GP2-073). The required 6.5 credits could be provided for an R-2 multifamily building by any of several sets of options. One group is shown below with heat pump heating and another with electric resistance heating. These appear to be the least expensive packages available for multifamily, and the cost for either package will be considerably higher than the cost for meeting the commercial code options.

Electric resistance package (in **bold**) (additional options in standard font)

- **System 2: (-0.5) credits for electric resistance space heating**
- **Credit 1.2: 1.0 credits for U-0.20 windows**
- **Credit 5.5: 3.0 credits for split system HPWH**
- **Credit 6.1: 1.5 (or whatever) credits for solar**
- **Credit 7.1: 1.5 credits for Energy Star appliances**

Heat pump package (in **bold**) (additional options in standard font)

- **System 2: 2.0 credits for heat pump space heating**
- **Credit 5.5: 3.0 credits for split system HPWH**
- **Credit 7.1: 1.5 credits for Energy Star appliances**
- Credit 1.2: 1.0 credits for U-0.20 windows
- Credit 3.4: 2.0 credits for ductless mini-split

Other differences between commercial and residential codes potentially impacting cost:

- Most opaque envelope R-values will be slightly *less* stringent

Component	**Residential**	**Commercial**
Ceiling	**60**	49
Wood wall	**20+5 or 13+10**	20+3 or 13+7
Floor	30	**38**
Below-grade wall	**10 or 21+5 TB**	10 or 19
Slab on grade	**10 for 4 ft**	10 for 2 ft

- Fenestration U-values will be *more* stringent

Component	**Residential**	**Commercial**
Windows	0.30	**U-0.26**
Skylights	U-0.50	**U-0.45**

- Air barrier leakage resistance requirement will be *more* stringent

	Residential	**Commercial**
Test requirement	3 ACH 50	**0.25 (0.40) @75 Pa**

- Required ERV efficiency will be slightly more stringent

	Residential	**Commercial**
Efficiency	1.0 cfm/W	**1.2 cfm/W**

3. PROS AND CONS

Pros	
Comment	**Jonlin response**
WSEC-C is easier to interpret/apply for Group R-2 developments; WSEC-R more appropriate for single family, duplex, townhouses.	
It is awkward to have projects that must meet IBC, but are under WSEC-R	
In some developments, there are both 3 and 4 story garden-style apt buildings on the same site, so it is awkward to have them under different energy codes. It would be convenient to allow construction of 3 and 4-story woody walkups under one code	Changed proposal to give builders the option to use commercial energy code for 1, 2, or 3-story garden-style apartments.
Commercial code has been less costly than residential code	

Cons	
Comment	**Jonlin response**
Moving these structures under the commercial energy code will have a real and negative impact on housing affordability	Commercial code for multifamily appears to be less costly than residential code
This will remove a large segment of the licensed, bonded, and insured builders from pursuing these projects	General contractors' licenses and bonding are not based on which portion of the energy code is used
developers will no longer see these projects as a viable investment and will turn their attention to other projects – such as luxury homes, luxury townhomes, etc	This change may make low-rise multifamily more attractive to developers, not less.
Split between low and high rise might have been based on envelope area to volume ratio	David Goldstein of NRDC, who was involved in the original negotiations for ASHRAE 90, does not recall this argument, and thinks it may have been based on fire department ladder reach of the time. Also, multifamily buildings have surface-to-volume ratios similar to those of commercial buildings.
This change should originate at model code level	Such changes more typically originate at state and local level, and are subsequently taken up by national model codes. (California recently created a single code applicable to all multifamily buildings.)