TASK FORCE ON RESILIENT EFFICIENT BUILDING

AFTER MEETING FOLLOW UP

81st Legislative Assembly
2021-2022 Interim

The following comments and policy suggestions were received after the meeting on June 14, 2022:

Comments from Lucy Vinis:

1. Cities supported the ability for local adoption of the Oregon Reach Code in 2022, additionally, this was recommendation #26 from the Oregon Global Warming Commission report to the 2020 Legislature, "Allow cities and counties to adopt the state Reach Code as the mandatory base code for buildings in their jurisdiction.' On behalf of cities, I ask that this recommendation be moved forward by this Task Group for support in the 2023 Legislative Session.

2. Moreover, because building codes are the most efficient and cost effective way to reduce energy use and carbon emissions within the building sector; the state, through the Building Codes Division and the various advisory boards, must address the climate crisis head on. Again, this is in line with the 2020 Oregon Global Warming Commission report to the legislature, specifically recommendation #22. 'Establish stronger codes and incentives to reduce GHG emissions in new and existing buildings.'

The 1975 law that created the Oregon Energy Codes states "That the basic human needs of every citizen, present and future, shall be given priority in the allocation of energy resources, commensurate with perpetuation of a free and productive economy with special attention to the preservation and enhancement of environmental quality."

This is still relevant today, yet must be updated to address greenhouse gases in addition to energy resources. I recommend that this Task Group support revising ORS 455 to broaden the scope of BCD and the Boards considerations by replacing the mention of 'energy' and 'energy efficiency' with 'Greenhouse Gases (GHG)' and 'GHG reductions' that point back to achieving the carbon reduction goals of ORS468A(1)(c).

3. Lastly, and most importantly, is the work of equity, inclusion, and representation. Mayors across the country are working to implement more equity in our public processes, addressing the systematic exclusion of BIPOC communities, addressing the needs and rights of renters, and ensuring our systems work for all. The state of Oregon, specifically in regard to the building code process must do the same. To assist in making sure that the interests of every citizen get an equal voice in the development of building codes, I suggest changing the makeup of the BCD advisory boards in ORS 455 to include people who represent the interests of groups who occupy, own, and study buildings—as well as those the design and build them. This includes renters, community service organizations, public health officials, city sustainability offices, embodied carbon specialists, facility managers, affordable housing developers, and affordable housing advocates to name a few. During my first year in office, I had the privilege of meeting with Jaqueline Patterson, who at the time was the NAACP's

Senior Director for Environment and Climate Justice. When I asked her what was the one thing I could do, as Mayor, to assist the BIPOC community in Eugene related to climate action? Her answer, teach people about utilities and how they function and their role in being engaged and involved in the future of the energy sector. I believe that the work of this Task Force is similar in opportunity, we have the ability to redirect how our state acts in regard to the built environment. Our current system has not solved the climate crisis or drastically changed Oregon's trajectory in reducing carbon emissions. We must change that system to accomplish our shared goals.

Comments from Kim Heiting:

NEW BUILDINGS

Ban the use of resistance heat in new construction--given it has twice the emissions of gas furnaces or electric heat pumps.

Pursuant to the Taskforce mission, require a source-based evaluation of building energy use when modeling efficiency.

To ensure accuracy, consistency and enforceability, any building reach code development focused on emissions shall be based on the ASHRAE 105 standard for building energy performance and greenhouse gas emissions.

To ensure emissions benefits are not overstated, use actual use vs. modeled energy use. Furthermore, compare savings of electric heat pumps and gas furnaces in cold and peak heating conditions in PGE and PacifiCorp territories instead of modeled assumptions to ensure emissions benefits are realized.

A reach code must ensure a logical progression of building codes that consider market readiness and enforceability.

Eliminate masonry wood-burning fireplaces in new construction and in their place require gas fireplaces for power outage backup and air quality benefits.

Require full lifecycle cost analysis for energy code changes.

Where building codes impact the development and functioning of energy grid infrastructure, require Public Utility Commission oversight and direct engagement and input from energy utilities, the Oregon Department of Energy and the Northwest Power and Conservation Council as primary stakeholders and energy system experts.

"Emissions from buildings" in the residential sector are predominantly from electric power. Because of this, insulation, windows and other durable shell measures should be prioritized in the code.

Resilience should be an important consideration as we plan for multiple options for energy in different outage scenarios.

The impact of code changes on the resource adequacy of the regional electric grid should be a key consideration.

Maintain Oregon's tradition of prescriptive and performance paths to achieve energy goals. Keep those paths clear and simple to maintain our history of high code compliance and enforceability.

EXISTING BUILDINGS

Prioritize removal of mold, asbestos, radon, lead solder and copper pipes to improve healthier buildings.

To ensure accuracy, consistency and enforceability, any building code development focused on emissions shall be based on the ASHRAE 105 standard for building energy performance and greenhouse gas emissions.

To ensure emissions benefits are not overstated, use actual use vs. modeled energy use. Furthermore, compare savings of electric heat pumps and gas furnaces in cold and peak heating conditions in PGE and PacifiCorp territories instead of modeled assumptions to ensure emissions benefits are realized.

INSTITUTIONAL/PUBLIC BUILDINGS

Require any efficiency upgrade or retrofit decision for new or existing public buildings to be based on lowest first cost and lowest operating cost.
Require full lifecycle cost analysis prior to any energy upgrades in public buildings.
Place emphasis on resilience (with consideration for power outage scenarios) in design of public building energy systems.

FINANCIAL TOOLS AND INCENTIVES

Fund masonry, site-built woodburning fireplace changeout to lower emissions and improve air quality.
Incentivize bundling of upgrades to high efficiency furnaces and water heaters together in existing buildings.
Incentivize replacement of 80% furnaces with 95% furnaces (which are equivalent to a 9.5HSPF or 278% efficient heat pump) in existing buildings.
Develop a fund and a program to replace electric resistance heating targeting low-income households.
Provide incentives to low-income households for ventilation.
Incentivize the removal of mold, asbestos, radon, lead solder and copper pipes to improve to healthier builders.
Create an energy efficiency resiliency fund. Prioritize repairs and upgrades with the greatest carbon reduction ROI. Prioritize those repairs or upgrades that last the life of the building vs. heating or water heating equipment that has a much shorter end of life.
Provide a fund or incentives for heat-recovery ventilation, especially for ductless heat pump systems that don't offer ventilation as a product feature.
Fund a statewide wood-stove changeout program that targets uncertified stoves.
Incentivize program to replace oil space heat in the moderate to low income and rental markets.
Plan for incentives for gas heat pumps for space and water heating in new and existing buildings, especially for retrofitting existing gas equipment – allowing a leap from federal minimum efficiency to industry maximum efficiency.

Comments from Mike Goodrich:

I would like to see us explore an easy to navigate and understand statewide uniform Incentive "code" or "program" for providing incentives to retrofits or new construction for work focused on reducing energy use and/or carbon at levels above code or otherwise mandated. Through our current system of boards appropriate "levels" of improvement or "points" could be assigned to work that reflect the value to our decarbonization efforts of the voluntary improvements being made. Those levels or points could be created using either prescriptive terms like adding prescribed amounts of additional insulation, replacing windows and/or doors with those of higher efficiency, upgrading appliances, etc. Levels of improved calculated performance could also be included in those lists. The goal would be to provide a list of easy choices tied to predictable and timely incentive levels to contractors and building owners for either updating existing buildings or constructing new ones to levels greater than currently mandated. Doing this on a statewide level in a more uniform and predictable format could provide greater inclusivity and access for all Oregonians making it more likely that they would utilize it and, as a result, tap into both the enormous level of opportunities available for carbon savings in existing buildings but also encourage

a greater uptake by those engaged in new construction. If the system was straightforward enough and funded to do so, it could be possible to administer through the existing code enforcement resources or even potentially flow the incentive dollars through those existing local frameworks.

Comments from Kerry Meade, Executive Director, Northwest Energy Efficiency Council (NEEC)

Northwest Energy Efficiency Council (NEEC) is a non-profit business association representing efficiency businesses in the Pacific Northwest. For over 25 years, NEEC members have worked to advance building efficiency and performance projects that have saved energy while also providing economic and workforce development for the region. The Pacific Northwest efficiency industry is one of the strongest in the nation and has long been a leader both in terms of the amount of efficiency delivered to the region as well as the program approaches and policies offered. Over the last few weeks, we have tracked the discussions of the Resilient and Efficient Buildings Taskforce with great interest. With the recent passage of the 100% Clean Electricity legislation, as well as state goals to reduce carbon emissions, we believe it is important to note some critical principles to consider as this taskforce develops recommendations for resilient and efficient buildings:

• **Focus on Whole Building Performance at the Meter:** As we bring increasing volumes of clean power to the electrical grid, we need to also shape building energy loads to better align with grid needs. Focusing on the energy performance of a building at the meter allows businesses and building owners to consider how best to align with grid needs and potential grid price signals through the mix of tools available to them: energy efficiency, demand response, onsite renewable generation, distributed battery storage etc. This also provides the opportunity to do away with the outdated "measure level cost effectiveness" requirements that are still in place in Oregon.

• **Develop Building Performance Standards**: While the state energy code will address newly constructed facilities, current building emissions come from existing buildings, and many of these have inefficient and antiquated operational approaches and equipment. Building performance standards provide guidance around minimum building performance and encourage building owners to examine operational and maintenance plans in a proactive manner. These policies are in place in Washington State as well as in several cities across the nation. We know they help bring buildings up to modern standards and will support Oregon in achieving its carbon reduction goals.

• **Foster Market Development**: Decarbonizing the built environment requires innovation. This is an opportunity to create local jobs and bring new concepts to reality, but legislators need to create frameworks that provide opportunities for private businesses to innovate new business models. In California, the State recently launched a program called "Market Access." This program targets a statewide peak period energy shortfall and encourages businesses to bring any non-emitting project that can save energy during that peak. The Commission streamlined the contracting process and removed red tape to speed-up the process for getting projects approved. Performance for these projects is measured at the meter based on the actual results achieved; since this assures that ratepayers only pay for actual savings, cost-effectiveness was entirely waived. This is a great example of how to encourage market development and innovation in meeting the challenges of the clean energy transformation.

Comments from Eli Spevak:

For assembling ideas from task force members, it's really helpful to have us lump ideas into pre-determined 'buckets'. In addition to the 4 you outlined last meeting (new bldgs, existing blogs, incentives and public blogs), I'd propose one more: *structural changes in the way OR agencies operate* in order to advance building decarbonization efforts.

In terms of specific suggestions, my experience is mostly within the new building area. I support the sorts of code changes contemplated in the Reach code. And I'm also particularly interested seeking out any code changes that would both decrease GHG *and decrease construction costs*. There aren't many opportunities in this direction, but I think I've found a couple:

(1) Oregon could follow the lead of Texas, Montana, and Memphis, TN to provide an alternative to sprinklers for small multifamily buildings (up to 4, maybe 6, units). Although Oregon already provides a way to avoid sprinklers in side-by-side townhomes, there's no such provision for stacked units, which are more efficient & affordable to build and provide naturally accessible homes. This change is particularly timely in Oregon now, to support the full range of 2-4 unit 'middle housing configurations now allowed on most residential lots following the passage of HB2001.

(2) Follow Seattle's lead by allowing taller 1-stair buildings, subject to height limits and caps on how many apartments are allowed per floor (also see Germany, Austria, Mexico, Japan…). Although this seems like an arcane rule, it provides significant climate and livability benefits in mid-scale buildings, where corridors between egress stairs drive designs where units are long, thin, and only have light/air at one end (the other end is the corridor). Allowing a single egress stair, in addition to the elevator, in buildings up to 6 stories means there's less internal circulation space to build and condition (lower costs, lower GHG emissions) and more units get light/air from 2 sides

Attached [below] are short overviews of each of these ideas, include references to other places where they have already been adopted. I recognize that these ideas may be too granular to toss into our mix of suggestions. But they may also be some of the only ideas with potential to get widespread agreement across the task force - since they would both save $ and reduce GHG.

In the proposed 'structural change' bucket, I hope this committee can propose a change to the mandate of the Energy Trust of Oregon. Like most such agencies in the US, ETO's programs are designed specifically to increase efficiency - even if that may not represent the best investment strategy to achieve Oregon's climate or equity goals. Oregon should direct ETO to elevate climate and equity goals *above* efficiency. Comparable agencies in NY and CA have already made this shift. And this *does* mean that ETO programs would no longer be fuel-neutral. Although this may be a bitter pill for gas advocates to accept, it's the right move for decarbonizing our state's building sector, especially all the headway we're making (and will continue to make) at decarbonizing Oregon's electric grid.

Proposal: Allow buildings with up to 4 or 6 units to be constructed under the Oregon Residential Specialty Code <u>*or*</u> continue to apply the commercial code to 3+ unit buildings, but don't require sprinklers until they exceed 4 or 6 units (likely coupled with a requirement to build with 1-hr construction)

Why?

- Decrease construction costs.
- Support less expensive homes to buy or rent – and to heat/cool.
- Reduce embodied carbon of building components (e.g. less drywall, fewer stairs) and ongoing carbon benefits from smaller, attached and/or stacked units.
- Align building code threshold with HB2001 zoning ordinance that allows up to 4-unit buildings on most residential lots and with mortgage loan products that serve 1-4 unit buildings.
- Increase likelihood of ground floor flats, suitable for mobility-impaired residents. Note that under current rules, there's a strong incentive to build side-by-side townhomes separated by 2-hr walls, which typically have stairs and lack ground floor bedrooms.
- Increase natural daylight in homes. None that in small stack-flat buildings, all homes get natural light on 2-3 sides, whereas with townhomes some homes get daylight just from two (narrow) ends.
- Some general contractors and subcontractors work almost exclusively with ORSC, such that they steer clear of 3+ unit buildings. Such contractors would be more comfortable & capable of building 3 and 4 unit buildings if they could use the code they already know.

Precedent

- In Nov. 2021, Memphis and Shelby Counties in Tennessee amended their building code to allow structures with 3-6 dwelling units to be reviewed under residential code instead of commercial code.
- Both Texas and Montana, sprinklers aren't required until buildings have more than 4 units.

More info

- https://opticosdesign.com/blog/memphis-tn-amends-local-building-code-to-allow-up-to-six-units-under-residential-building-code-irc-to-enable-missing-middle-housing/
- Texas and Montana:

Texas Code Modification:

Section 903.2 Where required is amended by adding the following text at the end of said section:

In addition to the requirements of this section, an automatic sprinkler system shall be provided throughout all new buildings and structures as follows:

1. Where the building area or fire area exceeds 12,000 square feet (1115 m^2).

2. Where the height exceeds two stories regardless of area.

Section 903.2.4 (Group F-1) is amended by replacing "three" with "two" in item "2".

Section 903.2.7 (Group M) is amended by replacing "three" with "two" in item "2".

Section 903.2.8 (Group R) is amended by adding the following exceptions:

Exceptions:

1. R2 occupancies with 4 or less units.

2. Boarding houses (transient), rooming houses (transient), bed and breakfast inns and other similar occupancies (not including hotels or motels) containing not more than four guest rooms for which rent is paid and that are occupied by transient guest only.

Montana:

(12) Delete Subsection 903.2.8 and replace with the following:

"1. An approved automatic sprinkler system installed in accordance with Section 903.3 shall be provided in all Group R buildings meeting any of the following criteria:

"a. 9 or more transient guests or 5 or more transient guestrooms;

"b. 9 or more occupants in other than dwelling units;

"c. 5 or more dwelling units; or

"d. more than 2 stories.

"2. In lieu of the above required automatic sprinkler system in buildings not more than three stories above the lowest level of exit discharge, each transient guestroom may be provided with at least one door leading directly to an exterior exit access that leads directly to approved exits.

"3. "Transient guest" for the purpose of this subsection shall mean an occupant who is primarily transient in nature, staying at one location for 30 days or less."

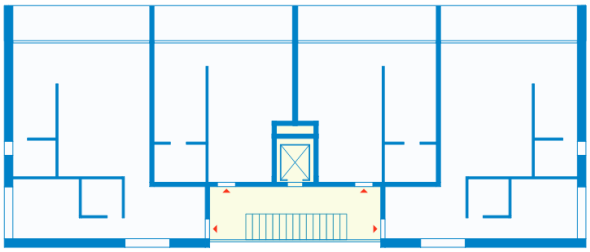
Proposal: Allow a single stair to meet egress requirements in taller buildings, subject to caps on units per floor and distance from each unit to stairwell.

Why?

- Decrease construction costs.
- Provide more livable space per floor by reducing building volume for circulation.
    - Single stair "Point access block": 6.5% of floor plate for circulation
    - Single-loaded corridor with 2 stairs: 16% of floor plate for circulation
    - Double-loaded corridor with 2 stairs: 13% of floor plate for circulation.
- *Crunching the numbers:* Using the numbers above, an 800 sq ft apartment in a multifamily building with 2 exit stairs requires roughly twice (104 sq ft. vs. 52 sq ft) the floor area as the same sized apartment in a building with 1 set of exit stairs. If construction costs are $250/sf, that's a savings of ~$13K/unit in construction costs, not to mention the embodied energy of the materials and long-term reductions in heating, cooling and maintenance costs from additional floor area for circulation.
- Provide alternatives to double-loaded corridors, which don't allow units to get natural light from more than one side or benefit from cross-ventilation.
- Support a wider variety of unit types and sizes than found in buildings designed around double-loaded corridors – and provide greater flexibility for bedrooms to be located on the quiet side of a building that abuts a busy street.
- Support community-oriented designs, where doors open to shared central stairs (often with daylight or skylight and smoke/heat exhaust) rather than onto long hallways with stairs at each end.
- Unlock denser, more compact urban development patterns as lower carbon alternative to lower density, sprawling development.

Precedent

- Seattle, WA (up to 6 stories with single stair, capped at 4 units per floor)
- Germany (up to 4 per floor); Austria (up to 8 per floor); max travel distance of 115' to stairwell. Also Mexico, Japan…



Diagrammatic Point Access Block floor plan, 93% efficient floor plate

Point Access Blocks, compact single stair buildings with units centered around the stairway, are one of the most basic building forms found in post-industrial cities. ***They provide compact, low-carbon, and livable multifamily housing.*** This report presents our research on the benefits of Point Access Blocks over other means of vertical access. These benefits include:

- **Increased livability**
- **Lower embodied carbon**
- **Lower operational carbon**
- **Lower cost**
- **Increased compactness**
- **Ability to cross ventilate**
- **Accessibility options for low-rise**
- **Elimination of long corridors**
- **No decrease in fire safety risk**
- **Unlocks small lot development**

More info

- https://www.larchlab.com/city-of-vancouver-report-on-point-access-blocks/
- https://slate.com/business/2021/12/staircases-floor-plan-twitter-housing-apartments.html