



March 9, 2022

Stoyan Bumbalov, Managing Director
Washington State Building Code Council
PO BOX 41449
1500 Jefferson St SE
Olympia, WA Z98504

sbcc@des.wa.gov

Re: WSEC-2021 Preliminary Cost Benefit Analysis – Public Comment

Dear Mr. Bumbalov,

Please find enclosed our public comments on the Preliminary Cost Benefit Analysis (CBA) pertaining to the major proposed changes in the WSEC-2021 CR-102. We appreciate the opportunity to participate in the code development process. We hope our comments on proposals 103 and 136, based on decades of industry experience, are fully considered for integration into the final Cost Benefit Analysis.

Energy codes are essential tools in decarbonizing the built environment and the construction industry at large. So, the key question before the council is not if, but how to move forward responsibly. Understanding what code proposals do *not* require is just as important as understanding what they intend to accomplish. If I can emphasize two critical points, it is that 1) the proposed heat pump space heating and heat pump water heating proposals (primarily) only impact new construction, and 2) new construction is where these technologies are integrated for little or no cost premium. McKinstry fully supports the heat pump space heating and heat pump water heating proposals because they target the most feasible and cost-effective place to create impact and enable a ramp period for us collectively, industry participants, building owners and manufacturers, to get ready for more sweeping electrification code changes coming in the future.

Please do not hesitate to contact me with any questions or clarifications.

Sincerely,

Michael Frank, P.E. | Vice President, Engineering & Design, McKinstry
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WSEC-2021 Preliminary CBA Public Comment

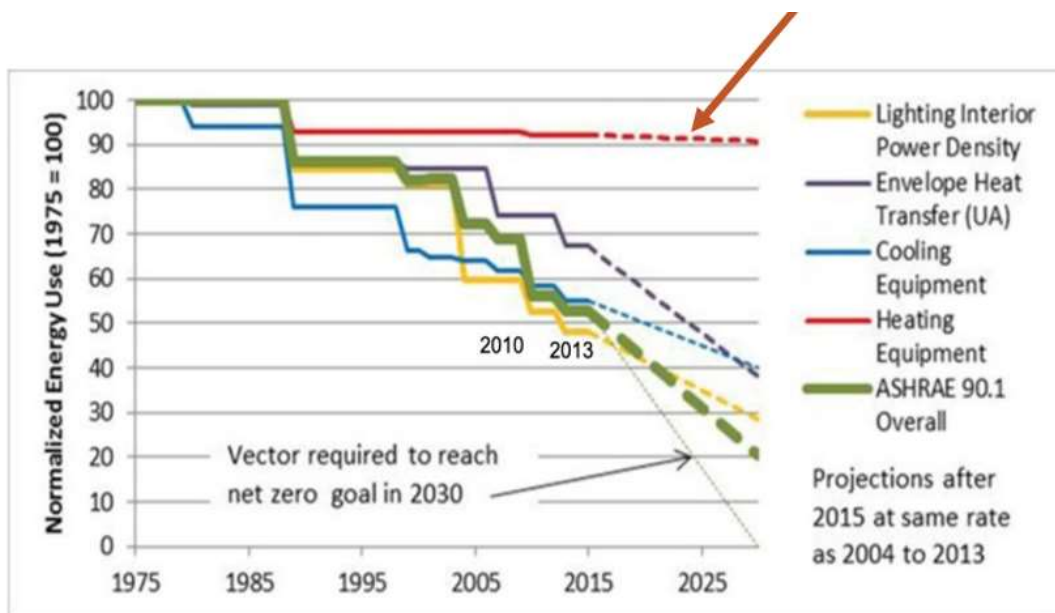
GENERAL COMMENTS: PAGES 1-3

While much of the cost benefit analysis is at the individual building level, it is important to consider community level costs and benefits. Many safety and environmental requirements don't provide a financial return at the individual level. This is part of why the Administrative Procedure Act exists – to ensure Washington State agencies consider statewide and long-term costs and benefits to our collective community. Adding a note to this affect in the first few pages of the CBA would be beneficial.

HEAT PUMP SPACE HEATING AND WATER HEATING, PROPOSALS 21-GP1-103 AND 136

Brief Description: We suggest adding a sentence at the end of the description to clarify the proposal has minimal impact on existing buildings and **does not require existing building conversions to heat pumps** except in the case of major renovations. Much discussion of this proposal has focused on challenges with existing building retrofits; it is critical that stakeholders understand the impact of this proposal is 99% on not-yet constructed new commercial buildings. Buildings built today will last for generations – we must ensure they are set up for long-term success, not costly near-term retrofits.

Purpose of Code Change: One element missing from this section is a discussion of the limited progress of the WSEC in terms of heating efficiency. Our national model and state codes have been immensely successful in improving envelope, lighting, and cooling performance; however, we've made little progress in heating efficiency since the 1970's. Without targeted heating efficiency requirements, we are missing important opportunities to meet our seventy percent energy reduction and zero fossil-fuel greenhouse gas emissions buildings targets.



Improvement in ASHRAE Standard 90/90.1 (1975-2013) with Projections to 2030. Courtesy of Pacific Northwest National Laboratory.

Review Process: No comments.

Probable Benefits vs Probable Costs: Our thoughts regarding additional context and content to potentially be included in this section are provided here.

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Regarding Probable Costs:

- The submitted LCCA is imperfect in that it does not account for the probable need of near-term retrofits of baseline fossil fuel-fired heating systems. **When that cost is added in year 7 or 10, a heat pump system installed in year 0 will always be more cost effective.** Industry knowledge today suggests electric heat pumps are a less risky solution (in terms of acquiring needed heating emissions reductions) than relying on alternative pathways. It is critical for Washington Stakeholders to understand that we can accrue deep energy and emission savings for little or no upfront cost if heat pumps are incorporated into new buildings now. Retrofitting buildings is a far more challenging hurdle; possible, but more difficult.
- If costs are isolated to individual elements, percent differences amongst mechanical systems or components can be quite high. Evaluation of **total MEP system costs** inclusive of all impacted systems and design and construction costs is more appropriate. Through this lens, the impact of the heat pump space heating proposal on total installed and commissioned MEP system cost is anywhere in the range of -3% to +5%. MEP system cost is in turn only a portion of total project cost, often dominated by land acquisition, architectural, structural, and tenant or occupant needs.
- The first cost premium or savings from a heat pump system is highly dependent on both the selection of the baseline and the proposed system type. While a heat pump VRF system is certainly less costly than a gas boiler and air-cooled chiller hydronic design, an air-to-water heat pump hydronic system compared to an all air-based DX-gas RTU option will certainly show a premium. An owner who may have opted for rooftop DX gas units can now select rooftop heat pumps. An owner who may have selected gas-fired boilers can now select air-to-water heat pumps with electric boilers (or with gas-fired boilers in climate zone 5). That is all to say that there is flexibility in how a building owner can choose to meet the proposed requirements. And with flexibility in approach and design comes flexibility and variation in first cost.
- Code requirements have a history of driving down costs through innovation and economies of scale. Our market has adapted and innovated to react to efficiency stringency changes for chillers, for DOAS, and for controls (as examples). With the adoption of this provision, we would expect new equipment options to only continue expanding, driving down costs and increasing competition.
- Importantly, a growing portion of new commercial construction square footage is already subject to these requirements as Seattle, Shoreline, Bellingham, and others have adopted or are considering adopting these amendments. These early adopters are shouldering learning and training costs that will benefit other Washington communities should these proposals get adopted statewide.
- Lastly, costs and case studies of potential alternatives to electric heat pumps such as gas-engine heat pumps, gas-fired absorption heat pumps, green hydrogen, or renewable natural gas have not been made available for stakeholder consideration.

Regarding Probable Benefits:

- With code-driven changes, suppliers have dependable markets and buyers, designers and engineers have clear direction, building owners have leverage to drive innovation, and everyone moves forward together – ultimately driving down costs and normalizing change. A major benefit of driving the adoption of heat pumps through the energy code is this step-level change, resulting in overall statewide cost savings. This same rate of change is not easily accomplished in new construction through other mechanisms such as utility incentives or tax credits.

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- It is likely that an outcome of this requirement will be the installation of cooling in more multi-family housing. While this benefit will increase summer energy use, it will also improve the quality of life for many thousands of Washingtonians.
- Another likely outcome of this code proposal is greater engagement between utility providers and building operators to leverage load management measures to mutual advantage and cost savings. A key benefit of the heat pump water heating proposal is built-in thermal storage. This system storage not only enhances localized building resiliency but is potentially a future cash-flow if utilities incent load shifting.
- In terms of safety and air quality, combustion-free designs exclude use of the Fuel Gas Code and eliminate items such as utility trenching, gas piping, gas meters, gas regulators, combustion ventilation air and exhaust infrastructure, safety sensors for carbon monoxide, safety alarms, and safety shut-off valves.