Buildings, Infrastructure & Housing (BIH) Working Group Meeting
Maine Climate Council
March 8th, 2024, 10am -12pm
Virtual via Zoom

Meeting Purpose: The Buildings, Infrastructure & Housing Working Group met to discuss **reducing the amount of embodied carbon** in new buildings by addressing market barriers to the use of climate-friendly building products, as well as **resilience considerations** for new buildings.

In attendance:

Working Group Members: Ellen Belknap, Andrew Barrowman, Tom Twist, Don McGilvery, Jeff Marks, Jesse Thompson, Rozanna Patane, Representative Christopher Kessler, Daniel Dixon, Ania Wright, Sharon Klein, Dale Basher, Jason Shedlock, Naomi Beal, Michael Stoddard, Kathleen Meil

Staff: David Plumb

Ellen Belknap (Architect with SMRT) gave a presentation on embodied carbon:

- SMRT focuses on large sustainably developed buildings
- Embodied carbon 101: carbon that comes from the extraction of raw materials, transport, manufacturing the product, construction, demolition, waste, end of life (essentially it is all the carbon that is not operational).
- There is a growing importance of embodied carbon as operational carbon (the carbon emitted by energy use in buildings) has been declining.
- Exponential roadmap: smaller footprint, energy efficient, emission-free building, low-carbon materials
- Embodied carbon measurements and calculators: ICE database, Cove.Tool, Athena EcoCalculator, etc.

Carbon Footprint of Different Materials

- *High*: aluminum, steel, concrete, etc.
    - Cement is the worst material because a lot of CO_2 is released during manufacturing. Steel is also bad for the same reason.
- *Middle*: timber, wood, etc.
    - Wood is a good material to use in Maine due to the high amount of this resource in the state. 60% lower carbon footprint of wood vs steal. Mass timber can easily be panelized and fire resistant.
- *Climate negative*: bamboo, straw-bale, hemp fiber, sheep wool, wood fiber products
- Essentially, below ground material are often worse and above ground materials are better, in terms of carbon footprints.

Discussion during presentation

- Where is the wood coming from? That can be important in terms of transportation carbon.
- Carbon calculators calculate the distance traveled of materials but the machines on the construction site and the travel of construction workers to sites is not accounted for.
- We need to be careful to not double count emissions.

Project case studies

- *Bangor savings bank & Kennebec Water district*: solar array on top, geothermal heating, near net zero buildings. Operation carbon is low; however, buildings have embodied carbon: steel, concrete, glass.
- *USM student center:* Mass timber, recycled steel and concrete
- *AVESTA, Scarborough*: Wood stub, cellulose insulation, concrete slab, double glazed windows, low energy, advanced air sealing

*Contractors often do not want to use wood instead of steal, because it is more expensive.

[Building Emissions Accounting for Materials (BEAM)](#) reports:

Single family house

- Worst case:
    - concrete slab + foam insulation
    - Insulated concrete forms, steel stud interior.
    - Closed spray foam
    - 30 kg CO_2 per square foot
- Best case:
    - double plywood floor over rigid foam insulation
    - CROFT Straw panel walls, wood stud interior
    - TimberHP loose fill
    - 6 kg co2 per square foot

*Helpful to figure out what materials grow fast and how we can trap their carbon inside buildings.

Learning from others

- BOSTON Mass Timber Accelerator Program
- UMass Amherst
- West Coast – education and awareness to public
- Europe – Netherlands Mandates, Sweden's climate declaration, France's pioneering LCA approach
- Buy clean program – Federal
- Maine lead by example – use more timber and prioritize wood

<u>Policy Recommendations</u>:

- Increase awareness/educate
    - Shift climate action focus to include both operational and embodied carbon (whole life carbon)
- Funding
    - Pursue grants to support manufactures to develop environmental product declarations (EPD)
- Develop legislation to:
    - Require whole life carbon calculations on projects above xxx SF
    - Require EPDs on steel and concrete, on projects above xxx SF or $$$

Discussion on policy recommendations

- What is the cost gradient with best- and worst-case scenarios?
    - Barrier: Wood and mass timber makes it more expensive
- Is there any low embodied carbon steel and concrete? How much lower is it compared to the regular?
    - Yes, there is and we can easily get the information on carbon and cost
    - Strategies do not have to be all or nothing, and we can do a mix of materials.
- Try to retrofit the big concrete/ brick buildings: those are good for retrofit.
- Stop encouraging the use of spray foams and encourage more sustainable products (cellulose)
- Have the state help with barriers by covering the difference of using wood versus steel/concrete
- Need better education for construction workers, contractors, students, etc.
- There is currently no standard calculator, so we would need that to require policy to calculate embodied carbon.

Resilience

Shared definition of resilience in buildings: "*the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse climate events (flooding, winds, high temps, etc.)*"
- Focus on climate and weave in energy into the definition

Things to signal in the plan on resilience?
- Call-out: how do we support homeowners in flooding basements: drainage, insulation
- Resilience as a changing/evolving concept, economic resilience
- Need to prepare for forest fires in Maine (because we are getting less snow, drier, and windier conditions)
- Tax policy and energy policy to help with home repair
- Buildings near coast: how will we deal with that?
- Safe spaces for communities if houses are destroyed or damaged.

We need to keep focused on what is actionable and fundable

- 3 Buckets:
    1. Things that have been baked in from the beginning of the MCC
    2. Things that are new opportunities and new technologies
    3. All the other things we care about
        - These things will probably not make it into the recommendations, but we still care about them.