

## Agenda – November 20, 2024

Attendance: (19) Emily Freeman (City of Boulder), Kat Slaughter (VERT Sites), Ryan Call (Eco-Cycle), Evelyn Ritter (3 E), Anna Perks (Perks Deconstruction), Meghan Wiebe (Boulder County), Evan Kruse (Diverse), Susan Renaud (CEDC), Liz Chapman (Recycle CO), Ally (Recycle CO), Brian Loma (Green Latinos), Kelsie DeFrancia (City & County of Denver), Katie Bond (CSU grad student, C&D focus), Em J (City of Lakewood), Cameron Garcia (Pitkin County), Bill Schenk, Alicia Archibald (Steamboat Springs), Mellik Gorton (CDPHE), Beth Markham (Town of Vail), Elise Harrison (NREL), Hayden Van Andel (Town of Breckenridge).

### Agenda for November 20th C&D Meeting

2:30pm: Welcome & Recent Highlights: 2025 C&D Council Leadership Team

1. [C&D Policy Toolkit webinar](#) recording now on Recycle CO's webpage.

2:35pm: Icebreaker: What was your first job, and what did you learn from it?

2:55pm: Guest Speaker - Elise Harrison (NREL): “Decarbonized Building Materials” - modular wooden construction technology

Elise's Background: Civil engineering, lived in the desert in New Mexico working with Earthships. Made her own house out of hay bales. Noticed there wasn't a scalable option.

1. Presentation: Designing for End of Life in Single-Family Homes.
2. Single-family residential homes make up about 80% of the market. 35% of landfill waste is from C&D.
3. Why do light-framed homes end up in landfills?
  - a. Our buildings are made with dissimilar materials with thousands of metal fasteners. It's easy to bulldoze a home.
  - b. What goes into a wall? A typical wall is made with drywall, latex paint, screwed to wood stud framing (nailed together with a pneumatic nail gun, which is hard to pull apart), fiberglass insulation, plastic house wrap with staples, exterior insulation, and sheeting.
    - i. **The point is, none of these materials are the same!**
    - ii. Elise would like to know more about recycling options.
4. How do we solve this problem?
  - a. We could design a home entirely out of wood-based materials.
  - b. There's a wood-based insulation.
  - c. OSB and plywood have formaldehyde coatings. We could use “1 by” material as sheeting.

- d. “Beck Fasteners” is an established German company that recently started making fasteners out of wood.
    - i. Metal nails heat up in fires, which leads to structural failure. Wood nails help keep structures strong.
    - ii. Made of 78% beech wood and 22% resin.
    - iii. The withdrawal strength of a wooden nail is 2x as strong as that of a metal nail and is more consistent. Different wood grains have different strengths.
    - iv. Not yet code approved in the U.S.
  - e. Builders can layer up wood, which acts as a firewall.
  - f. There’s still the problem of moisture barriers. This is a big problem with every home, and Elise is still working to figure this out. There’s a potential for lignan-based moisture barriers.
5. Why all wood walls?
- a. At the end of the life of a building, you can deconstruct the structure methodically. Wood can be mulched or used as biomass.
6. There’s ALWAYS a cost with green tech. We need to come up with ways to implement and scale these solutions. We’re already short on our housing supply.
7. Questions:
- a. Anna: What to do about adhesives?
    - i. Elise: Maybe there’s a way to sieve it like sand. Is there a health risk for glue in OSB if we were to use the mulch on playgrounds? For engineered wood products, the cut of the wood matters. It could be used as biofuel. NREL is currently just using pure wood for biomass but should test for wood with impurities in it, too. The moisture barrier is the biggest thing.
  - b. Meghan: Is your research goal to look towards commercialization?
    - i. Elise: Not looking that far yet. There isn’t research funding for this. Currently trying to figure out how everything could work, and then others can put the pieces together. It might make more sense for this to be a prefabricated panel. How can we do what we’re already doing without changing our labor force’s skills? The biggest barrier is code approval.
  - c. Evan: There are log cabin technologies out there. Have you integrated your tech with existing log cabin structures?
    - i. Elise: Most log cabins today have interior wood framing to add insulation. Log cabin tech doesn’t really work for larger structures.
  - d. Em J: Have you come across folks who worry about fire issues? How do wood walls compare to other fire-rating materials?
    - i. Elise: I’m focused on single-family homes. Larger buildings need higher fire ratings. Charred wood should be stronger against fires. Certain places don’t allow wood shingles.

- e. Evan: What are some other areas of interest in this space? What's on the horizon?
    - i. Elise: There's so much to research here. NREL is working on concrete and cement because it's so carbon-intensive.
8. Contact info: [elise.harrison@cudenver.edu](mailto:elise.harrison@cudenver.edu)

3:10pm: Meghan Wiebe - C&D Recoverability Guide

(<https://www.canva.com/design/DAGUO3RwRI4/Nkv4VJlZvGrzHNKMrj4W7A/edit>)

1. Ally: We did a survey and Meghan compiled the results. We identified 13 materials to fit in a "sliding scale." There are a lot of approaches to analyzing this data and presenting it to the C&D Council.
  - a. Ally prepared an infographic to communicate this information.
2. Question: Brian: Isn't gypsum recyclable?
  - a. Emily: Technically, yes, but there's no market here. This is a CO-specific resource.
  - b. Em J: Is there a company recovering gypsum and making bricks out of it? I thought maybe 5280 or Blue Bear was taking it.
    - i. Katie: Companies need clean gypsum, not used gypsum.
  - c. Ryan: I'd suggest putting a footnote on the gypsum piece to explain some of the nuance you all have shared.
  - d. Anna: A note about gypsum- we have Gypsum, CO. Our soil is naturally high in gypsum. Usually, drywall can be added as an amendment to soil as a drying agent but we don't need it as much in our soil. As mentioned, it's easier to recycle new drywall scraps rather than old drywall coming out of buildings b/c of asbestos and other contaminants.
  - e. Brian: [Gypsum Recycling: An Environmental and Industrial Solution - GreyB](#)
3. Katie: It would be good to add a footnote about Class 4 shingles, too.
4. Anna's resource: [What happens to the building materials we salvage from deconstruction sites?](#)
5. Evan: Consider translating these materials into Spanish.
6. Evelyn: [ALL FOR REUSE - ECOSYSTEM MAP](#)
7. Katie: Ally's and Meghan's graphics are great for two separate audiences.
8. It could be good to add an eye-catching statistic
  - a. 30-40% of landfill waste is from C&D
  - b. There's more waste in a house demolition than the waste an individual would generate in their entire life.

3:30pm: What do you want from your C&D Council meetings in 2025? Open discussion on 2025 goals, ideas for guest speakers/topics, etc.

1. Ryan: Have Anna Perks do a deconstruction tour! Emily mentioned doing a tour that aligns with historic preservation.
2. Meghan: We had notes that came out of the RC Summit. What are the action items that came out of that session, particularly the non-legislative side?
  - a. **Legislative**
    - i. - Pass bill to reverse requirement to landfill asphalt shingles: 5 green, 4 blue **(9 total)**
    - ii. - Require use of [recycled] aggregates in road construction/maintenance: 9 green, 14 blue **(23 total)**
    - iii. - Construction is accountable for deconstruction → thoughtful construction. (no dots)
    - iv. - Policy and Infrastructure tiered \_\_% of recycled content for buildings and construction: 2 blue, 3 green (5 total)
  - b. **Non-legislative**
    - i. - Update building codes and create/update design guidelines with an emphasis on reuse: 9 green, 11 blue **(20 total)**
    - ii. - Getting more counties to adopt/adjust ordinances to support C&D reuse: 14 green, 11 blue **(25 total)**
    - iii. - Permitting revisions to better support the processing of C&D materials at the local level: 4 green, 6 blue (10 total)
3. Em J: Can we do more with workforce training and development? Bag fee funds could help with a property acquisition for a C&D recycling demonstration. Heard that Resource Central might have plans to expand to Denver next year.
4. Beth: Vail would love updating building codes and design guides with an emphasis on reuse.
5. Emily: City of Boulder is putting out an RFP to delve into the embodied carbon of building materials. This will tie into building code updates. Won't have an update until Q3 or 4 in 2025.

3:45pm: C&D Council member updates

4pm: Meeting Adjourns