



Executive Summary: Equity-centered Strategies for Circularity: Focus on Inorganic Materials, June 16, 2021

Workshop focus questions:

- How do we make environmentally beneficial, healthy materials recovery systems economically viable and convenient for stakeholders across cements and metal?
 - Develop an evidence-based evaluative framework to evaluate progress in circularity.
- What are scalable approaches to materials and product design that deliver on performance, are economically feasible, consider full life cycle impact, and do not place inequitable burden on underserved communities?
 - Methods must share the distribution of incentives and benefits through thoughtful regulations and system-aware materials innovation.

Company presentations from Holcim, Turner/Hochtief, Apple, Verizon, and Boeing

focused on topics that linked across firms and disciplines. From a sourcing and supply perspective, discussion centered on increasing usable material streams by reducing contamination, improving sourcing and supply certainty, using performance-based metrics, and improving production processes. Taking a value chain approach, an important topic was developing innovative business models to make recovery a reality at scale and incentivized as an easy choice given fragmented and localized markets. The discussion expounded on tradeoffs between durability and recyclability (in contrast with organic materials), and modularity and placement of materials in the modules to ensure that disassembling for reuse is easy (which has not been successful at scale to date). Other key considerations included data availability (to ensure a match between demand-supply volumes), infrastructure innovation (e.g., how to track, report out on how things are being used), and policy implications, both around flexibility of materials use within standards and those that enable movement of material to leverage incentives upstream and downstream. Other themes emerging from the presentations included ambiguity and variation in legislation; how secondary supply chains restricted by waste shipment policy cannot compete with the ease of sourcing primary materials; and that metals and minerals extraction has a disproportionate impact on biodiversity hotspots.

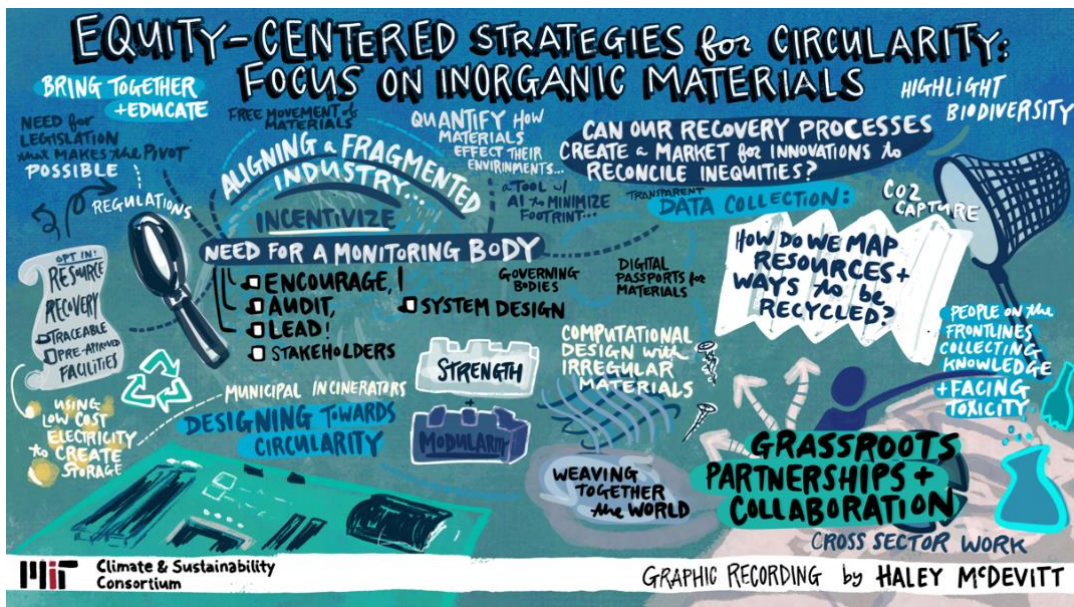
An MIT Faculty Round Table moderated by [Mavhunga](#) had participation from [Selin](#), [Allanore](#), [Chiang](#), [Mueller](#), [Kirchain](#), and [Ponce](#). Selin discussed hazardous chemicals management and technical information interacting with policies, while Allanore focused on the development of new processing technologies that are designed to accommodate feedstocks across many metals, touching on the importance of cost-effective and environmentally respectful processing technologies, and establishing centralized but local processing facilities. Chiang's focus was using electrochemistry as a tool for materials production, accounting for value that can be obtained based on separation processes, and Mueller focused on designing for a low carbon-built environment through reduced materials use enabled by computational design. Other points centered on economically efficient pathways to reduce impacts and increase circularity (Kirchain) and how take-back models can leverage ecommerce networks or traditional networks using the open backhaul capacity for recovery (Ponce).

Across the workshop discussion included the need for improvements in digital data to ensure consistent quality. Examples include standardizing material classification and product labeling, establishing data collection standards and tagging, matching between sources and



sinks, and tracing material across industries. One idea the participants discussed was creating a global map and establishing guidelines for major waste streams across industries coupled with data collection to ensure for safe and efficient flows. The conversation focused on the safe transboundary movement of waste materials with strong traceability and accountability, and the need to improve treatment of difficult-to-recycle products globally while ensuring equitable treatment of workers. The idea of a *resource recovery lane* would facilitate the efficient and traceable transboundary movement of known recoverable materials to pre-approved best in class recovery facilities. However, governance concerns are central to these efforts - especially for vulnerable populations impacted by material circularity. When discussing who was missing from the conversation, participants brought up the communities impacted, disassemblers (e.g., demolition crews and disassembly facilities), regulators, designers, and recyclers. Proposed follow up activities include:

- Create and leverage traceability via materials and component fingerprints for circularity in metals and minerals
- Drive equity within material extraction and recovery in developed and developing economies
- Unlock post-consumer recycling through material flow interventions and green passport development
- Scaling equity-centered circularity strategies beyond use of recycled content



Themes drawn out by Haley McDevitt, artist & graphic facilitator highlighted working across industries to push for improvements and changes in data collection and creating a recovery process that allows for innovations and reconciles inequities. [Image Linked Here.](#)