



10th Annual GC3 Innovators Roundtable

Session Summaries

Wednesday, April 29th

Session IV

Are We Succeeding? Measuring Progress in Green Chemistry

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While the definition of green chemistry has been mostly solidified, metrics are all over the map, with many being proxy measures. We have an opportunity to think intentionally about green chemistry metrics at different levels—molecular, product, company, and so on. “Preferred” lists of ingredients/processes are important to accelerate progress. To move toward the triple bottom line of protecting the economy, people, and planet, we need to build on existing work and develop improved metrics and tools at every level.

Process mass intensity (PMI) is a useful green chemistry metric in industry due to its front-end, proactive approach. However, the most common sustainability metrics are still carbon footprint, CO₂ production, water usage, and life cycle assessment. Tools such as Sanofi’s ID cards allow evaluation of a chemical’s hazards, physical properties, cost, and possible substitutions, but there are multiple such guides which are not always in agreement. Other important process considerations include energy usage, process safety, and product degradation potential. Often, there is insufficient toxicity data to make an informed decision.

Herman Miller develops goals that create movement within the company. In addition to company-wide goals such as zero waste, reduced water and energy use, they have created eco-inspired product scorecards which account for ease of disassembly, materials toxicity, recycled/biobased content, LCA, and more. Herman Miller has encountered challenges in creating their metrics, including scalability, data gaps, keeping up the speed of production, and ensuring that the goals are really worthwhile and embedded within the company.

The Chemical Footprint Project is a corporate-level tool to evaluate systems for chemical management. It is focused on public benchmarking and recognizing leadership in safer chemistry, and designed to work alongside related tools. A “chemical footprint” is defined as the total mass of high-concern products sold by a company or used in its manufacturing operations and by its suppliers. The framework of the CFP includes management strategy, chemical inventory, progress measurement, and public disclosure. A beta version of the tool will go online in June. The Green Chemistry Checklist can also help companies elevate green chemistry within their firm.

Opportunities for Safer Chemicals and Products

- metrics are currently all over the map; need unification/simplification
- metrics for bio-based materials

Key Drivers for Green Chemistry

- company desire for sustainability and safer products/processes
- investors could potentially choose green chemistry oriented companies

Challenges for Implementation

- complexity of product manufacturing makes universal metrics challenging
- sustainability metrics are distinct from green chemistry; potentially confusing

Helpful Actions

- unifying metrics at each level
- making it easy for companies to implement green chemistry policies

Role for the GC3

- connecting companies at different stages of metric implementation
- publicizing helpful metrics and tools