2022 GC3 Innovators Roundtable

November 8-10, 2022

Roundtable Report

Introduction:

On November 8-10, 2022, the annual GC3 Innovators Roundtable, hosted by Dow, was held in Philadelphia, PA. This event convened leading innovators, companies of all sizes (from startups to the largest chemical companies and brands), investors, and government officials to accelerate scale and adoption of green and sustainable chemistry solutions. The hybrid event provided both in-person and virtual attendees with the opportunity to meet and engage with companies across sectors and the value chain, governments, service providers, and non-governmental organizations to address barriers and potential solutions; gain direction on best practices; identify opportunities for collaboration; and acknowledge the need for supportive regulations and policies to accelerate green and sustainable chemistry's growth and implementation across the value chain.

Although a broad range of companies and other constituencies were present, a number of common challenges to green and sustainable chemistry were shared among the group.

Key Takeaways:

The following were broad areas of focus of discussions at the roundtable:

1. Barriers that impede the adoption and growth of green and sustainable chemistry
2. Solutions and best practices from a variety of perspectives that support the adoption and scale of green and sustainable chemistry solutions.
3. Needs and opportunities for new innovative chemistries, tools, metrics, policies, and collaborations.

Seven key themes surrounding successful implementation of green chemistry solutions emerged from the Roundtable.

1. There is an increasing need and desire to drive solutions across the value chain. It is critical to build greater trust, good will, challenge us, and have more a effective orchestration of the ecosystem of innovation to drive solutions at scale. Villifying specific actors will not accelerate sustainable chemistry. Driving solutions will require long term partnerships to ensure change across the supply chain - between manufacturers and retailers; between regulators and industry; and advocates, researchers, and educators. Such partnerships take time, transparency, trust, understanding, and compromise but can lead to lasting solutions. Lack of collaboration is often a result of the mismatch of goals between companies along the supply chain and other stakeholders. Multiple players such as consumers, regulators, and investors are needed for accelerating the adoption of green chemistry. Short- and long-term strategies (like regulation), partnerships. and solutions will be needed. The drivers for sustainable chemistry are clear and resistance is an activity of incumbency which must be addressed to move forward.
2. Environmental justice is an increasingly important but under recognized focus in advancing sustainable chemistry. There are an increasing number of attributes companies must address in the evaluation of the safety and sustainability of chemicals and products which include greenhouse gas impacts, circularity, toxicity and now environmental justice. While there has been much focus on decarbonizing the chemicals sector (and downstream sectors), less attention has been paid to its impacts on communities of color and other vulnerable populations as well as the

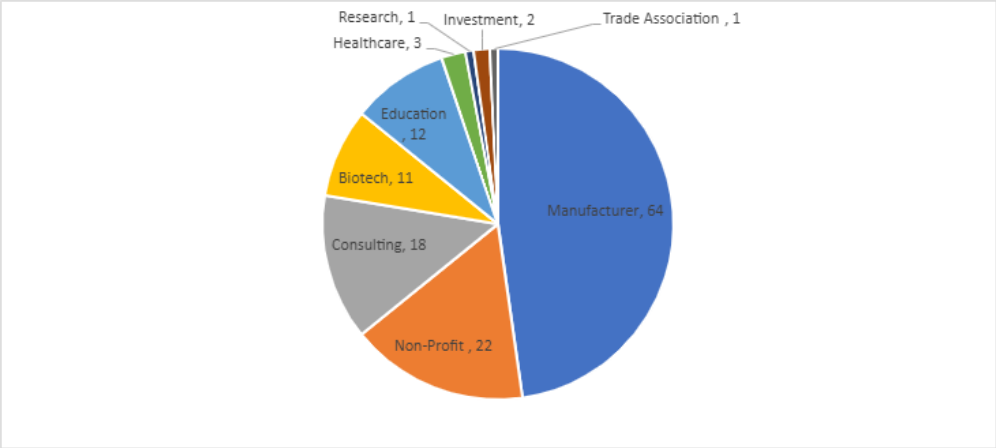
availability of products of and economic opportunities from sustainable chemistry to those communities. Investors and regulators are now asking these questions. There is a need for enhanced education and understanding of the lived experience and impacts on upstream and downstream communities impacted by chemical pollution, the financial and reputational risks associated with these impacts, and the basic questions to ask about environmental justice impacts in product manufacturing and sourcing.

3. There is a need for better **communication** throughout the supply chain to advance sustainable chemistry. Companies often have different goals, lengths of time for innovation, demands/drivers, and levels of understanding and information. Increased supply chain information and understanding can help accelerate the innovation process – ensuring that key needs are communicated to innovators. Additionally, there is a need for clear communication around how sustainable chemistry can address major sustainability challenges around climate and other ESG goals. This is important for communication with investors. We need to communicate in a language that will motivate and engage different stakeholders.
4. Government plays a critical role in advancing sustainable chemistry. There is a need for better coordination across government agencies to share priorities and identify opportunities. There is room for more interaction between government and industry in addressing chemical innovation priorities as well as research and commercialization needs and incentives. Ultimately, government policy can level the playing field for sustainable chemistry to advance. Current activities to implement the Sustainable Chemistry R&D Act and the Inflation Reduction Act provide a unique opportunity to build a whole of government approach to advancing sustainable chemistry
5. Green and Sustainable Chemistry innovations must meet and balance increasing sustainability demands, along with cost and performance. Investors are increasingly measuring companies on their climate impact (eg scope 3 emissions), impacts on biodiversity, and increasingly toxicity. Balancing these multiple sustainability goals will require clear criteria as to what is "safer" and what is "sustainable" as well as ways to measure this (such as the Chemical Footprint). Achieving these multiple goals will require discussion and dialogue around sustainability criteria for technologies that can achieve certain goals (such as climate neutrality and circularity) but may have controversies or concerns about impacts, such as carbon capture and advanced recycling. It is important to avoid perfect being the enemy of the good while ensuring that new burdens, particularly on disadvantaged communities, are not created while achieving other sustainability goals.
6. There is a need for **innovations** to meet goals set by sustainability frameworks (such as carbon neutrality) and **regulations** while also maintaining high performance and quality standards. While companies often want to be ahead of regulations, achieving desired functionality as well as safety requirements at a similar price as the incumbent is a common barrier for sustainable chemistry innovation. Innovative solutions are necessary, and these must be available at scale. Innovators need to move beyond just "decarbonization" to application. Sustainable chemistry must provide a value – a solution to a problem that companies face. Solutions will be niche if they do not address a problem with adequate cost/performance. Industry-wide solutions, particularly those that are drop-ins for existing capital (that can slide into existing processes) are important though innovations that need new infrastructure should not be ignored. Time to adopt is a huge factor in innovation where different goals and deadlines within the industry supply chain are common barriers to overcome. As such, there is a need to break down barriers to scale though, for example, government policies, shared facilities, and patient capital for investment.
7. **The education and preparation of future chemists,** engineers, and business leaders is necessary to drive systemic change in the development and application of green and sustainable chemistry in the future. Programs and curriculum development, including education on key tools and case

studies are ways to introduce green and sustainable chemistry to support and prepare early career professionals to be change agents in business, government, and academia. Professional education is also key to ensure the workforce is prepared for sustainability challenges. A need for long term partnerships with companies and governments as well as supportive policy is key to ensuring higher education and professional education adequately prepares the sustainable chemistry workforce of the future.

GC3 Event Participants and Feedback:

The GC3 Innovator's Roundtable consisted of participants from companies across sectors and the value chain as well as consultants, academics, government, and non-profits.



Participants also represented a variety of roles within each organization including regulatory, product stewardship, R&D, and sustainability. Their titles ranged from CEO to Vice President, Administrator, to Manager and Researcher.

The hybrid format of the Innovator's Roundtable was introduced this year with 70% of participants in-person the remaining 30% virtual. 100% of survey respondents rated that they would likely recommend the event to a colleague. 89% of total responses expressed that they likely would attend another GC3 event.

Next Steps:

Based on the Roundtable discussions, GC3 will be engaging a series of discussion groups to develop best practices or criteria for addressing environmental justice in green and sustainable chemistry innovation as well as safety and sustainability criteria for guiding and evaluating green and sustainable chemistry innovations. GC3 will also be exploring ways to more effectively "orchestrate" the green and sustainable chemistry ecosystem to bring together companies, government agencies, investors, and others to address innovation challenges and accelerate adoption and scale of solutions. GC3 will also be working to develop a more robust database of case studies of both successful and less successful innovations in green and sustainable chemistry to continue evolving its programmatic offerings and the strategic levers it seeks to pull. To leverage the rapid policy development in Europe and build stronger Transatlantic collaboration in green and sustainable chemistry innovation, GC3 will be building a stronger European presence with its second in person Roundtable, hosted by Covestro, on June 13-15, 2023.

The next GC3 Innovator's Roundtable will be hosted by Millpore Sigma at their corporate headquarters in St. Louis, MO on November 14-16, 2023.

If you are interested in becoming a member or sponsoring the engagement efforts of the GC3, please contact Jennifer MacKellar, Program Director, at jenny@greenchemistryandcommerce.org.

"We look forward to working with you as we strengthen our organization's impact in accelerating the growth of green and sustainable chemistry solutions"
Joel Tickner, Executive Director of the GC3