June 3, 2022

Dr. Alondra Nelson
Acting Director
White House Office of Science and Technology Policy
Eisenhower Executive Office Building
1650 Pennsylvania Avenue NW
Washington, DC 20502

Re: Request for Information on Sustainable Chemistry, White House Office of Science & Technology Policy (OSTP); Document Number 2022-07043, 87 FR 19539

Dear Dr. Nelson:

The undersigned organizations are pleased to provide comments regarding the White House Office of Science & Technology Policy (OSTP) Request for Information on Sustainable Chemistry. We represent a coalition of companies and trade associations across the value chain of the broad economy to advocate for commonsense approaches to chemicals policy that support business, environmental, economic, and public health goals.

The following offers our feedback on the issues you raised:

- **The definition of sustainability and sustainable chemistry should be flexible and grounded in science and lifecycle thinking.** Companies define sustainability based on their priorities in reducing use of resources and environmental impacts; promoting health and safety; enhancing the lives of people and communities; and, making their processes and products more circular. We suggest that OSTP remain flexible in how it defines sustainable chemistry, promote a principles-based approach, and avoid unnecessary precision and prescription, to allow stakeholders to apply this concept to their own circumstance. The concept should be flexible enough to encompass an engineered process and/or approach in improving product performance and sustainability. Federal policy should not advance a one-size-fits-all solution, but promote innovation, and reward incremental progress when particular chemistries or products improve their sustainable performance and/or reduce their environmental footprint.
    - Other important factors can be found in the EPA Green Chemistry Challenge criteria, specifically the factors outlined under Applicability and Impact, where it mentions the concepts of practicality, cost-effectiveness, and applicability to a broad range of manufacturing supply chains.[1]

- **Flexibility drives competitiveness.** By promoting a principal-based approach, stakeholders are capable of driving creativity and innovation in the development of sustainable chemistries and processes, thus enabling competition in the U.S. and global marketplace. Such

- [1] See details for the US EPA Green Chemistry Challenge criteria at https://www.epa.gov/greenchemistry/green-chemistry-challenge-selection-criteria.

competition will lead to continuous improvement of more sustainable chemicals, products and processes which would otherwise be suppressed by prescriptive approaches.

- **There should also be flexibility when considering the overlap and complementary nature of green chemistry and sustainable chemistry** There are many examples of important commercial products that originate from sustainable (e.g., renewable resource) platforms that are not necessarily "green" with respect to their chemistry. Biofuels, certain active ingredient pharmaceuticals, and biopesticides are examples. Where the concepts overlap, this should be recognized. However, green goals should not exclude chemistry that is sustainable in other lifecycle aspects. A blending of these concepts is preferred that accounts for these distinctions and other factors (e.g., resource efficiency and pollution prevention) to help categorize products and processes as "sustainable" or "green."

- **The supply chain for finished goods benefits from advances in sustainable chemistry.** Chemicals affect manufacturing supply chains as raw materials, building blocks to make other molecules, and ingredients in formulated mixture or processing aids. Therefore, any advancement in sustainable chemistry will have a multiplier effect throughout the supply chains that use those more sustainable products.

  A supply chain can be viewed as a series of steps (processes) that is necessary to produce a finished good. Many of those initial steps are directly related to chemistry, so the earlier steps are prime targets for advances in sustainable chemistry.

  For example, a typical solar panel is composed of different material layers, each of which is the result of a refining or chemical process. The most significant reductions in environmental impact, will often occur in the series of chemistry reactions employed to make each layer. From the advanced plastic substrates that keep the delicate silicon solar cells in place, to the polyfluorinated (PFAS) coating to help keep dust, snow and debris off the outer glass layer, products of different chemistries are made in a series of reactions. If the energy used for a chemistry reaction can be reduced, or a different substance with reduced hazardous properties is available that also offers the same product features and specificity, then the overall environmental and human health footprint of the product could be reduced. Equally important is identifying opportunities to improve processes, which could reduce the potential for hazardous waste.

- **Federal resources should focus on basic research needed to advance breakthrough innovations in key areas, including catalysis and materials science, to support lifecycle analysis, more sustainable end products, and chemistry end of life.** Catalysts can promote desirable reactions while minimizing side reactions, which means a greater yield of products that benefit people and the environment, while reducing waste.

  Materials science is evolving at a rapid pace. New substances and novel physical forms of known substances can play a critical role in sustainable chemistry. For example, metal-organic frameworks are being explored for use in membranes to purify water. These novel molecules have the largest surface area of any known substance and can be constructed at the molecular level to be so selective that membranes made from these frameworks can efficiently separate lithium from sea water.

There are established, very large volume processes to make building block materials with installed infrastructure and often commodities with low margins. These receive little attention by funding agencies and academic researchers due to their perceived maturity, or even invisibility since they are captive and intermediates. Yet, these are foundational. There needs to be a mechanism to bring forward project ideas for federal support.

Research should also prioritize technologies that reduce climate and other environmental impacts that are critical for sustainability. This effort should include technologies that advance the development, innovation, and application of carbon capture, storage, and utilization; advanced recycling; bio-based alternatives; renewable energy generation, and circularity.

Machine learning and artificial intelligence offer great potential for accelerated materials discovery – from inherent properties (including toxicology) through to application performance and life-cycle impact. The underlying framework, though, needs fundamental attention. That is nomenclature beyond SMILES for more complex structures to enable ML/AI.

Data sharing is also a challenge as full life cycle assessments often require information one does not have or is proprietary elsewhere in the value chain.

EPA should consider a center of excellence and public-private partnerships to focus on research, development, and deployment of sustainable chemistry innovation and lifecycle analysis.

- **Sustainability entails a philosophical and practical approach to chemistry for which we should develop consensus-based metrics.** Sustainability can reveal itself in many ways, some of which can be measured quantitatively and some of which cannot. Reductions in waste are often quantified as part of engineering process management, as are reductions in operating temperatures and pressures. Captured carbon can be achieved by proper disposal of non-degradable materials. Enhanced performance is usually captured and measured for marketing and product specification practices. OSTP would be well suited as a convenor to bring stakeholders together to share best practices and develop consensus metrics.

- **OSTP should engage stakeholders in a national dialogue on advanced recycling as part of sustainable chemistry.** Advanced recycling, also known as molecular or chemical recycling, is a process or series of processes that take a used plastic material and change it at the molecular level to make a new building block (intermediate) or a feedstock for plastics manufacturing. Going from a polymer back to a monomer results in little degradation and will allow a material to be recycled almost indefinitely.

Recycling innovation and infrastructure is at a critical juncture. EPA is seeking comment on whether it should treat advanced recycling as a waste management process when it is a manufacturing process. OSTP can and should play a vital role in facilitating a national dialogue that brings advanced recycling to the forefront of sustainable chemistry.

- **Materials neutral approaches, environmental tradeoffs, and ensuring competition should be weighed when developing technologies.** Federal investments should not pick winners and losers in the marketplace but rather promote materials neutral solutions supporting the broad suite of chemistries and technologies across the competitive landscape. Accordingly, agency officials should not attempt to distort the marketplace by creating artificial demand where actual consumer demand does not exist. Nor should tax policy be used to favor one industry or material over another. Sustainable chemistry has enough financial incentives through reduced waste and energy, and enhanced safety and environmental performance, that it does not require special governmental intervention.

- **Sustainable chemistry must seek to strike a balance of policy interests.** To minimize unintended adverse consequences, federal policies related to sustainable chemistry should consider the potential impacts on other critical interests, such as national defense, homeland security, public safety, critical supply chains, and others.

Companies are leading in the sustainability space, and they are doing so because it is a key part of their business priorities. We look forward to working with you and the interagency community to advance a strong federal sustainable chemistry approach.

Sincerely,

American Fuel and Petrochemical Manufacturers
American Petroleum Institute
Croplife America
Flexible Packaging Association
Plastics Industry Association
PRINTING United Alliance
U.S. Chamber of Commerce