OSTP's Definition of "Sustainable Chemistry", and the Process to Develop It, Must Advance Environmental Justice and Fully Reflect the Office's Equity Action Plan

Sustainable Chemistry Cannot be Achieved Without Ending and Remedying Disproportionate Impacts on Communities of Color, Low-Income Communities, Indigenous Communities, Farmworkers, and Other Constituencies Disproportionately Impacted by Chemical Hazards

This comment to the Office of Science and Technology Policy (OSTP) in response to the Request for Information (RFI) on Federal programs and activities in support of sustainable chemistry (published in Federal Register Vol. 87, No. 64) is submitted on June 3, 2022 by Coming Clean, the Environmental Justice Health Alliance for Chemical Policy Reform (EJHA), and the Lowell Center for Sustainable Production at the University of Massachusetts Lowell.

People of color, low-income people, Tribes and Native/Indigenous communities, women, children and farmworkers are disproportionately impacted by unsustainable chemistries, from increased exposures to hazardous chemicals during feedstock extraction, during the production of chemicals, materials, and products, during their use, as well as after disposal at waste sites, which are located overwhelmingly near these communities and are documented to release chemicals into adjacent air, soils, and water bodies.[1,2,3] Poor and people of color communities across the US from Mossville, Louisiana to Kettleman City, CA, to low-wage workers ranging from farmworkers to domestic cleaners, to children living in lead-contaminated homes have suffered from a legacy of toxic chemical contamination and subsequent impacts.[4] It is for these reasons that the federal government must prioritize the prevention of these impacts through sustainable chemistry research, innovation, applications, and incentives for the creation and use of chemicals, materials, products, and manufacturing processes that are non-hazardous and do not disproportionately impact low-income and communities of color.

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[1] Johnston J and Gibson JM. Indoor Air Contamination from Hazardous Waste Sites: Improving the Evidence Base for Decision-Making. *Int J Environ Res Public Health*. 2015;27;12(12):15040-57. doi:10.3390/ijerph121214960.

[2] Ringquist, E. J. (2005). Assessing evidence of environmental inequities: A meta-analysis. Journal of Policy Analysis and Management: The Journal of the Association for Public Policy Analysis and Management, 24(2), 223-247.

[3] Mohai, P., Pellow, D., & Roberts, J. T. (2009). Environmental justice. Annual review of environment and resources, 34, 405-430.

[4] Landrigan PJ, Suk WA, and Amler RW. Chemical Wastes, Children's Health, and the Superfund Basic Research Program. *Environmental Health Perspectives*. 1999;107(6): 423-7. doi:10.1289/ehp.99107423.

The White House Office of Science and Technology Policy's Equity Action Plan[5] states clearly that: "For science and technology to benefit all people, there needs to be deliberate approaches to embed equity considerations throughout the development of science and technology policy." The Plan also notes that "OSTP has and will continue to actively engage with the public and recognizes it is especially important to diversify who has an opportunity to participate in the policy-making process." To date, OSTP's process to work toward a definition of "sustainable chemistry" does not seem to reflect these commitments, and could be seen as undermining equity considerations and participation from those most affected by "unsustainable" (i.e. hazardous or toxic) chemistry.

Based on the RFI, it does not appear that OSTP has made a deliberate effort to embed equity considerations in this RFI process (beyond simply mentioning "environmental justice" as one consideration), nor to have made any significant effort to actively encourage participation and input by diverse constituencies, especially communities and constituencies disproportionately impacted by chemical production, use, and disposal. OSTP's "Past Events" list[6] includes only two "sustainable chemistry outreach events," focused on business and industry: Specifically a small business outreach event and a webinar focused on "the science, technology, and innovation needs of the chemical industries." Despite the fact that the RFI notes OSTP's "great interest" in receiving input from "people from communities impacted by" sustainable chemistry technologies "including but not limited to environmental justice communities," there is no information on OSTP's site or in the Request for Information about outreach done to communities of color, low-income communities, Indigenous communities, farmworkers, or - as the Equity Action Plan puts it - to any communities or constituencies "adversely affected by persistent poverty or inequality." Federal government efforts on sustainable chemistry must go beyond basic research and technology development to incorporating understanding of how the chemistry lifecycle disproportionately impacts certain communities so that these considerations can be built into federal funding and other actions that ensure that sustainable chemistry innovation not only does no harm but also benefits those communities most impacted to date.

As OSTP proceeds in developing and finalizing a definition of "sustainable chemistry," a sustainable chemistry strategic plan, funding criteria or priorities for sustainable chemistry, and any other related policies, plans, or actions, the Office should:

- Proactively identify equity and environmental justice issues and concerns, and include specific and measurable questions, actions and outreach to ensure they are addressed before any definition, plan, or actions are finalized;
- Create and execute a robust equity and environmental justice outreach and participation plan that includes communities and constituencies disproportionately

[5] Executive Office of the President. Office of Science and Technology Policy Executive Order 13985: Equity ActionPlan. January 2022. https://www.whitehouse.gov/wp-content/uploads/2022/04/04-2022-EO13985_OSTP_EquityAction-Plan_FINAL.pdf . Accessed June 2, 2022.

[6] White House Office of Science and Technology. Past Events. https://www.whitehouse.gov/ostp/events-webinars/past-events/. Accessed June 2, 2022.

impacted by chemical hazards throughout all stages of development and finalization of this definition, plan, and any related policies or actions;
- Ensure that the definition, strategic plan, and funding/investment guidelines or priorities align with and advance the federal government's Justice40 commitment (i.e. at least 40% of federal funds supporting sustainable chemistry research and programs should specifically benefit and protect disproportionately impacted communities).

Toxic chemical exposures contribute to costs equivalent to more than 10% of global GDP.[7] The US-based Collaborative on Health and Environment links chemical exposures to more than 180 different illnesses. Fossil fuel refining, chemical production, and transport are particularly problematic for communities of color. The US EPA concluded in 2018 that risks from facilities filing under its Risk Management Plan Rule affect minority and low-income populations to a greater degree than other populations. The agency found that communities living within a mile radius of facilities storing hazardous chemicals and with incident risks had 10 percent more low-income populations and 11 percent more minority populations compared to U.S. averages. Facility incidents will likely increase as climate change increases the vulnerability of plants located near coastlines, such as in Louisiana and Texas. The Government Accountability Office notes that 31% of RMP facilities are within areas that may be subject to increased climate related impacts. Low income and communities of color are disproportionately located within these areas.[8]

States that already contain a large number of petrochemical facilities are seeing increased growth of existing facilities and the opening of new facilities. Since 2015, seven new petrochemical facilities have been approved along the stretch of the Mississippi River in Louisiana known as Cancer Alley, which is home to predominantly Black and low-income communities of color. According to a 2014 report by the Environmental Justice Health Alliance for Chemical Policy Reform, neighborhoods near chemical and energy production facilities in the US have Black and Latino populations 75% and 60% higher than the national average, respectively, and 50% higher poverty rates.[9] Specifically in Cancer Alley for data collected in 2005, people in low-income tracts bore a cumulative cancer risk 12% more than people in high-income tracts, and those in predominantly Black areas bore a cumulative cancer risk 16% more than individuals in predominantly White areas, with formaldehyde and benzene as the two

[7] Grandjean P and Bellanger M. Calculation of the disease burden associated with environmental chemical exposures: application of toxicological information in health economic estimation. *Environmental Health*. 2017; 5;16(1):123. doi:10.1186/s12940-017-0340-3.

[8] US Government Accountability Office. Chemical Accident Prevention: EPA Should Ensure Regulated Facilities Consider Risks from Climate Change. GAO22-2104494, February 2022. https://www.gao.gov/assets/gao-22-104494.pdf

[9]Orum P, Moore R, Roberts M, and Sánchez J. *Who's in Danger? Race, Poverty, and Chemical Disasters: A Demographic Analysis of Chemical Disaster Vulnerability Zones*. Environmental Justice and Health Alliance For Chemical Policy Reform. 2014.

major chemical contributors to these risks.[10] The UN Human Rights Commission condemned the growth of these petrochemical facilities in this area, noting that it infringes on their right to a healthy environment and an adequate standard of living for these communities.

Sustainable Chemistry needs to prevent chemical impacts and environmental injustices going forward, restore communities and workers that have been disproportionately harmed by chemical exposure or that face ongoing legacy exposures and support their growth beyond restoration,[11] and focus on equity and justice at all stages of the chemical lifecycle, particularly:

- **Oil and gas extraction**. The environmental, health and social impacts of oil production, transport, refining, and consumption are significant and widespread.[12] Gas pipelines and oil refineries disproportionately impact communities of color.[13] More than 17 million people live within 1 mile of an active oil and gas well,[14] and while oil and gas themselves are hazardous, processes such as hydraulic fracturing ("fracking") incorporate the use of many more toxic chemicals, which pose exposure risks for workers and surrounding communities.
    - **Technology needs**: Alternative feedstocks, such as sustainably grown and harvested biomass, which pose lower community risks.

- **Chemical production**. High temperature and pressure requirements at modern petrochemical facilities, along with the storage of hazardous chemicals, results in extensive accidental releases to air and water, as well as physical and psychosocial hazards to nearby communities near facilities. Given the proximity of communities to massive petrochemical facilities, members of these communities are often instructed to "shelter in place". According to the US Chemical Safety Board, in 2021 there were 81 accidental releases at industrial chemical plants involving substantial property damage,

[10] James W, Jia C, and Kedia S. Uneven magnitude of disparities in cancer risks from air toxics. *Int J Environ Res Public Health*. 2012;3;9(12):4365-85. doi:10.3390/ijerph9124365.

[11] The Louisville Charter for Safer Chemicals: A Platform for Creating a Safe and Healthy Environment Through Innovation. 2021. https://www.louisvillecharter.org. Accessed May 27, 2022.

[12] O'Rourke, D., & Connolly, S. (2003). Just oil? The distribution of environmental and social impacts of oil production and consumption. Annual Review of Environment and Resources, 28(1), 587-617.

[13] Donaghy T and Jiang C. Fossil Fuel Racism: How Phasing Out Oil, Gas, and Coal Can Protect Communities. Greenpeace USA; Gulf Coast Center for Law & Policy; The Movement for Black Lives. 2021. https://www.greenpeace.org/usa/reports/fossil-fuel-racism/#exec-summary. Accessed May 23, 2022.

[14] Czolowsky ED, Santoro RL, Srebotnjak T, and Shonkoff SCB. Toward Consistent Methodology to Quantify Populations in Proximity to Oil and Gas Development: A National Spatial Analysis and Review. *Environmental Health Perspectives*. 2017;125(8). https://doi.org/10.1289/EHP1535.

serious injuries, and/or fatalities.[15] Many of these accidents involve platform chemicals such as benzene, styrene, cumene, and cyclohexane, which form the base of – and embed toxicity and legacy environmental justice impacts – in the entire chemical and product supply chain. Along with their derivative chemicals, they are used extensively in different processes, materials, and products.[16] Communities are impacted by these releases – both physically by the chemical exposures and psychologically.[17] Given the sheer size and concentration of these facilities in certain areas of the US, the cumulative health burden of emissions is enormous.

    - **Technology needs**: Inherently safer chemical processing technologies that are fossil carbon-free and that use lower pressure and heat and avoid the use of toxic and hazardous chemicals. Alternative distributed manufacturing processes that are smaller, less concentrated, and generate less waste and emissions.

- **Product manufacturing and use**. Manufacturing facilities using toxic and hazardous chemicals are disproportionately located in communities of color.[18] Permitted emissions from such facilities to air and water include chemicals that are known carcinogens, reproductive toxicants, and neurotoxicants. Existing pollution standards insufficiently protect environmental justice communities from the cumulative hazards they pose.[19] Additionally, workers in a large number of industries (including agriculture) are regularly exposed to toxic or hazardous chemicals. However, occupational exposure standards apply to only a small subset of these chemicals, which may not adequately protect workers. Small- and medium- sized businesses frequently lack sufficient knowledge of chemical hazards to adequately protect workers. Workers in many chemically intensive industries, such as farming, domestic and industrial cleaning, construction, nail salons, floor finishing, and autobody shops tend to be disproportionately from communities of color, including immigrant workers who may not know of their legal protections. For instance, floor finisher workers in Massachusetts are majority Vietnamese immigrants,

[15] US Chemical Safety Board. Accidental Release Reporting Rule Data. https://www.csb.gov/the-csbs-accidental-release-reporting-rule-data/. Accessed May 23, 2022.

[16] Tickner J, Geiser K, and Baima S. Transitioning the Chemical Industry: The Case for Addressing the Climate, Toxics, and Plastics Crises. *Environment: Science and Policy for Sustainable Development*. 2021;63:6,4-15. doi:10.1080/00139157.2021.1979857.

[17] Cutchin MP, Martin KR, Owen SV, and Goodwin JS. Concern About Petrochemical Health Risk Before and After a Refinery Explosion. *Risk Anal*. 2008;28(3):589–601. doi:10.1111/j.1539-6924.2008.01050.x.

[18] Faber DR and Krieg EJ. Unequal Exposure to Ecological Hazards 2005: Environmental Injustices in the Commonwealth of Massachusetts. A Report by the Philanthropy and Environmental Justice Research Project. Northeastern University. 2005. https://www.issuelab.org/resources/2980/2980.pdf. Accessed May 23, 2022.

[19] U.S. EPA Office of the Inspector General. Management Alert: Prompt Action Needed to Inform Residents Living Near Ethylene OxideEmitting Facilities About Health Concerns and Actions to Address Those Concerns. 2020. https://www.epa.gov/sites/default/files/2020-03/documents/_epaoig_20200331-20-n-0128_0.pdf. Accessed June 3, 2022.

many of whom have died on the job from preventable causes having to do with lack of knowledge or access to safer alternatives.[20] Such risks could be mitigated through the use of safer, more sustainable chemicals.[21] From lack of access or economic resources to purchase safer, more sustainable products, low-income and communities of color are exposed to dangerous chemicals such as flame retardants, solvents, plasticizers, hair lighteners, and straighteners during everyday product use from discount retailers[22] and other stores.

    - **Technology needs**: Process and product redesign innovations (pollution prevention and toxics use reduction) that reduce or eliminate the use of toxic chemicals and generation of waste in manufacturing processes, e.g., through process redesign and closed-loop production. Green chemistry solutions and safer alternatives to address priority chemicals and chemical functions that disproportionately expose workers and members of communities of color.

- **Disposal and end of life**. Hazardous waste facilities are disproportionately located in communities of color.[23] Further, some types of hazardous waste, such as e-waste, end up in open landfills in places like Ghana and China where they are burned for sellable materials,[24] often exposing child laborers to toxic substances and contributing to air and water pollution both locally and worldwide. Recycling operations involving hazardous chemicals, such as battery recycling, are also disproportionately located in communities of color, along with newer "chemical recycling" facilities – a proposed "sustainable chemistry" solution that has not been adequately evaluated for its health and environmental impacts or sustainability benefits. Recent reporting on these facilities has shown that the methods used, such as pyrolysis, gasification, and others, emit

[20] Kriebel D, Jacobs MM, Markkanen P, and Tickner J. Lessons Learned: Solutions for Workplace Safety and Health. Lowell Center for Sustainable Production. University of Massachusetts Lowell. 2011. https://www.uml.edu/docs/Lessons%20Learned%20Solutions%20for%20Workplace%20Safety%20and%20Health%2C%20full%20report_tcm18-232340.pdf. Accessed May 24, 2022.

[21] See U.S. Occupational Safety and Health Administration. Transitioning to Safer Chemicals: A Toolkit for Employers and Workers. Accessed 6/3/2022 at https://www.osha.gov/safer-chemicals

[22] A Day Late and A Dollar Short: Discount Retailers Are Falling Behind on Safer Chemicals. The Campaign for Healthier Solutions. February 2015. https://ej4all.org/assets/media/images/Report_ADayLateAndADollarShort.pdf. Accessed May 27, 2022.

[23] Mohai, P., & Saha, R. (2015). Which came first, people or pollution? Assessing the disparate siting and post-siting demographic change hypotheses of environmental injustice. Environmental Research Letters, 10(11), 115008.

[24] Wirtu, Y. D., & Tucho, G. T. (2022). E-waste: Growing environmental and health problems and its management alternatives in developing countries. Environmental Reviews, (ja).

hazardous chemicals, particulate matter, and pose other environmental and social concerns.[25]

- **Technology needs**: Process and product redesign innovations (pollution prevention and toxics use reduction) that reduce or eliminate the use of toxic chemicals and generation of waste in manufacturing processes. Green chemistry solutions and safer alternatives to address priority chemicals and chemical functions that inhibit the non-toxic recycling of materials. Green chemistry solutions that enable longer life and disassembly and reuse of materials.

As the Federal Interagency Strategy Committee established under the Sustainable Chemistry R&D Act begins to define Sustainable Chemistry and the priorities for research and innovation, it is critical that the Committee consider the following:

- *Communities most impacted by unsustainable chemistry – Black, Indigenous, fenceline, low-income, communities of color, farmworkers, and other environmental justice communities – are already engaged in local and federal discourse on issues relevant to the Federal Interagency Strategy Committee established under the Sustainable R&D Act and must be an integral part of the discussions and decision-making concerning sustainable chemistry going forward*, including discussions on research and innovation, piloting, siting, and investment priorities for Sustainable Chemistry.
- *The definition of Sustainable Chemistry must involve safety at a minimum* as is the case with the European Commission's effort to define and develop criteria for Safe and Sustainable by Design (SSbD) chemicals.[26] This effort should set a vision towards the prevention of impacts – from raw material extraction to production, transport, recycling, and disposal. All workers (including those who work from home) should be able to work in a safe environment without being forced to choose between an unsafe livelihood and unemployment.
- *The definition of Sustainable Chemistry should explicitly prioritize innovations and investments that do not create new hazards or exposures for already impacted communities and, in fact, actively eliminate or significantly reduce hazards and exposures*. Such innovations and investments should be subject to assessments that evaluate and prevent trade-offs to and cumulative impacts on disproportionately impacted communities at all stages of the product lifecycle.
- *The federal government should prioritize research, development, demonstration, and investment to benefit those communities most impacted by unsustainable chemistry*, including sustainable chemistry research that addresses past and ongoing harms from dangerous chemicals and supports community restoration.

[25] Singla V. Recycling Lies: "Chemical Recycling" of Plastic is Just Greenwashing Incineration. National Resources Defense Council. 2022. https://www.nrdc.org/sites/default/files/chemical-recycling-greenwashing-incineration-ib.pdf. Accessed May 24, 2022.

[26] See https://ec.europa.eu/environment/strategy/chemicals-strategy_en

- *The federal government should ensure that products of sustainable chemistry are available at a reasonable cost to communities* (including workers) who are least able to afford them as compared to more affluent businesses and consumers.
- *The federal government should prioritize the training of present and future generations regarding the integration of social and environmental justice issues and diverse cultural perspectives into chemistry education.* Prioritization of training grants should be directed towards Historically Black colleges and universities and Tribal colleges and universities.
- *The federal government should require that all federal grants awarded toward chemistry education require teaching of the principles of Green Chemistry and Engineering.*
- *The federal government should ensure that training and opportunities to meaningfully participate in the sustainable chemistry economy are targeted towards communities historically impacted by unsustainable chemistry.*
- *The federal government should ensure that funding and support are available for just community and worker transitions away from production of toxic chemicals.*

The Principles of Environmental Justice (https://ej4all.org/assets/media/documents/ej4all-Principles2.pdf) and The Louisville Charter for Safer Chemicals (https://louisvillecharter.org) provide critical guardrails for the Interagency Committee to consider in developing federal research and innovation programs and incentives policies to support sustainable chemistry, and the identification of and restriction to producing only chemicals shown to be necessary and safe throughout their lifecycle.

Submitted electronically to JEEP@ostp.eop.gov on June 3, 2022 by:

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Environmental Justice Health Alliance for Chemical Policy Reform is a national network of grassroots environmental and economic justice organizations and advocates in communities that are disproportionately impacted by toxic chemicals

Lowell Center for Sustainable Production at the University of Massachusetts Lowell, which uses rigorous science and innovative strategies to develop practical solutions that promote environmentally sound systems of production and consumption