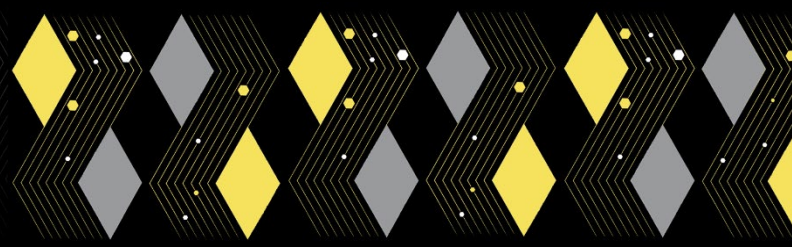


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# **SESSION B: SUSTAINABILITY ROUNDTABLE PREPRINTS**

*December 13-15, 2021*

*Sheraton New York Times Square*



# Enabling Progress Towards Increased Polymer Circularity

*Kathryn L. Beers; Material Measurement Laboratory, National Institute of Standards and Technology (NIST), United States Department of Commerce*

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## Introduction of research

The convergence of global trade disruptions with an increasing awareness of the environmental impacts of mismanaged plastic is driving all stakeholders along the full supply chain of plastics production to pursue opportunities to improve the life cycle and circularity of plastic materials. NIST has initiated a circular economy program which is investigating root problems, and establishing research, standards and data efforts targeting at facilitating adoption of new manufacturing, recovery and reprocessing technologies, while simultaneously supporting a better understanding the environmental impacts of current and past practices.

The NIST effort includes support for economic tools, documentary standards and a future data infrastructure that will improve decision making. For example, we are engaged in a comparison of multiple life cycle assessment tools on defined subset of polymer materials to evaluate these tools and determine gaps for this sector of the economy, and an assessment of mass balance accounting methods as they pertain to circular polymers.<sup>1</sup> We are participating in development of documentary standards through ISO/TC 323 on the Circular Economy<sup>2</sup> and exploring needs for supporting or improving marketplaces for post-industrial polymer scrap. We are also in the design stages of a resource registry targeted at supporting the US Circular Economy.

A second arm of the program is focused on fundamental polymer science targeting improved materials design for end of life, and improved re-processing technologies. Our team spans molecular dynamics and modeling, synthesis of model materials, and improving understanding of thermodynamics of polymer blend and blend processing. This research thrust is also linked to our growing effort in supporting the use of machine learning and artificial intelligence to advance measurements, such as those used to sort plastic materials at end of life.

Finally, the full impacts and improvements afforded by conversion to circularity can only be measured through high quality, reproducible and repeatable environmental assessment of plastic in our water, land and air. Both the NIST excellence in analytical measurement, along with our convening role between industry and government, and collaborative work with other Federal agencies and international metrology institutes, are being engaged in this process of developing the tools and a structure for information sharing that will be critical to knowing we are making a difference and informing policy and regulation.

## Conclusion

Circular Economy concepts are sure to move beyond single-use plastics or managing the exponentially growing problem of thermoplastic waste. How and where these concepts spread to other markets will be determined by a complex web of influences including awareness of the broader environmental impacts of human consumption, and demands of consumers, brands and global governments.



## References

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1. NIST Workshop: Assessment of Mass Balance Accounting Methods for Polymers, May 3-5, 2021. <https://www.nist.gov/news-events/events/2021/05/nist-workshop-assessment-mass-balance-accounting-methods-polymers>.
2. <https://www.iso.org/committee/7203984.html>

## About the speaker



Kathryn Beers, is the program director for the Circular Economy at NIST. She is engaged across the Institute in activities related to plastics recycling, new materials design, and environmental impacts of plastic waste. The program includes elements of future data challenges, economics and manufacturing. Her own research has included a range of polymer science and engineering areas. She has been recognized with the President’s Early Career Award in Science and Engineering (PECASE), the Arthur S. Flemming Award for public service, the CMU Alumni Achievement Award and as a Fellow of the American Chemical Society. Kate earned a BS from The College of William and Mary and MS and PhD degrees from Carnegie Mellon University.



# A Sustainable Outlook for the U.S. Cosmetics Industry



*Hayley Peri; Dandi Day*

*Hayley Peri; Dandi Day and Dr. Nicole Acevedo; Elavo Mundi Solutions.*

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## Introduction of research

Sustainability is a multi-faceted topic with emerging fields of concentrations and interpretations. Due to lack of clarity, mutual language, and access to information, the sustainability's rapid evolution poses significant challenges to innovate new products. The research presented collects the current state of sustainability from multiple perspectives to support industry newcomers, brands, marketers, formulators, and curious international entities to accelerate a collective work toward a sustainable future in the U.S. The research supports the creation of efficient and flexible methods to operationalize the concept for the U.S. cosmetic industry, as the globe comes together from all sectors to participate in sustainable solutions.

## Sustainability Global Outlook

The United Nations (UN) provides the broadest, most acceptable, and harmonized approach to sustainability with the UN Global Compact, The Agenda 2030, and the UN Sustainable Development Goals (SDGs).

- The UN is comprised of 193 nations.
- The UN Global Compact is the world's largest corporate sustainability initiative.
- The Agenda 2030 is a plan of action for people, planet and prosperity to strengthen universal peace in larger freedom.
- The 17 Sustainable Development Goals and 169 targets seek to realize the human rights of all, and to achieve gender equality, and the empowerment of all women and girls.

## Global Cosmetic Industry

Sustainability requires prioritization chemical policy to protect our vulnerable populations to reduce inequalities and build equity. Due to government and culture, participation in chemical policy and cosmetic safety varies by geography. There are currently over 12,500 chemicals approved for use in the global cosmetics industry. The majority of chemicals have not been fully assessed for impacts on ecological health by global regulatory bodies or publicly accountable agencies.

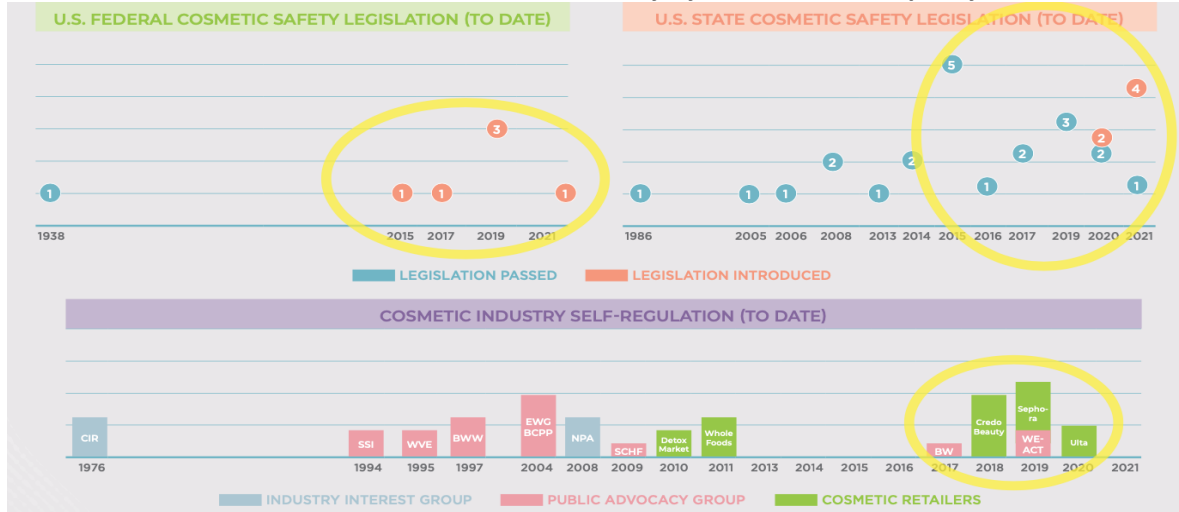
## U.S. cosmetic industry framework and dynamics

The U.S. cosmetic industry is comprised of 7 entities working together: U.S. federal government, state government, cosmetic industry interest groups, public advocacy interest groups, cosmetic retailers, brands, consumers. We face several challenges that have been defined by "clean beauty" in the most recent years, due to the complexities of globalization, U.S. policy, and an accelerated marketplace.

- Brands and retailers create and define their own internal standards.
- Lack of robust support for ingredient safety standardization across cosmetic industry in U.S.
- Inconsistent supply chain transparency
- Implementation of 'clean' standards perceived as a burden on the product development process by some manufacturing partners, regulatory professionals, and cosmetic chemists



### Current state of the U.S. Cosmetic Industry dynamics based on policy movement



### Sustainability in trends, products, and consumer conversations

Agenda 2030 and the SDGs appear in trends and marketing claims. The organization of trends triggered by events and policy aligned with the SDGs provide a framework of understanding to communicate, anticipate change for innovation, and identify consumers main concerns. Sustainability trends include: green beauty, conscious beauty, clean beauty, blue beauty, circular/upcycled beauty, vegan, biodiversity, social impact.

### SUSTAINABILITY TRENDS + THE UN SDGS OVERVIEW

UN SDG	DESCRIPTION	GREEN BEAUTY	CONSCIOUS BEAUTY	CLEAN BEAUTY	BLUE BEAUTY	CIRCULAR/UPCYCLED BEAUTY	VEGAN BEAUTY	BIODIVERSITY	SOCIAL IMPACT
1	No Poverty							✓	✓
2	Zero Hunger							✓	✓
3	Good Health and Well-being	✓	✓	✓	✓			✓	✓
4	Quality Education							✓	✓
5	Gender Equality			✓					✓
6	Clean Water and Sanitation	✓	✓	✓	✓			✓	✓
7	Affordable and Clean Energy	✓						✓	✓
8	Decent Work and Economic Growth	✓	✓	✓	✓	✓		✓	✓
9	Industry, Innovation and Infrastructure	✓	✓	✓	✓	✓	✓	✓	✓
10	Reduced Inequality		✓	✓	✓			✓	✓
11	Sustainable Cities and Communities							✓	✓
12	Responsible Consumption and Production	✓	✓	✓	✓	✓	✓	✓	✓
13	Climate Action	✓	✓	✓	✓	✓	✓	✓	✓
14	Life Below Water	✓	✓	✓	✓	✓	✓	✓	✓
15	Life on Land	✓	✓	✓	✓	✓	✓	✓	✓
16	Peace and Justice Strong Institutions	✓	✓	✓	✓	✓	✓	✓	✓
17	Partnerships to Achieve the Goal	✓	✓	✓	✓	✓	✓	✓	✓

*Dandi Day assessment for conversation only and not confirmed or endorsed by the UN.*

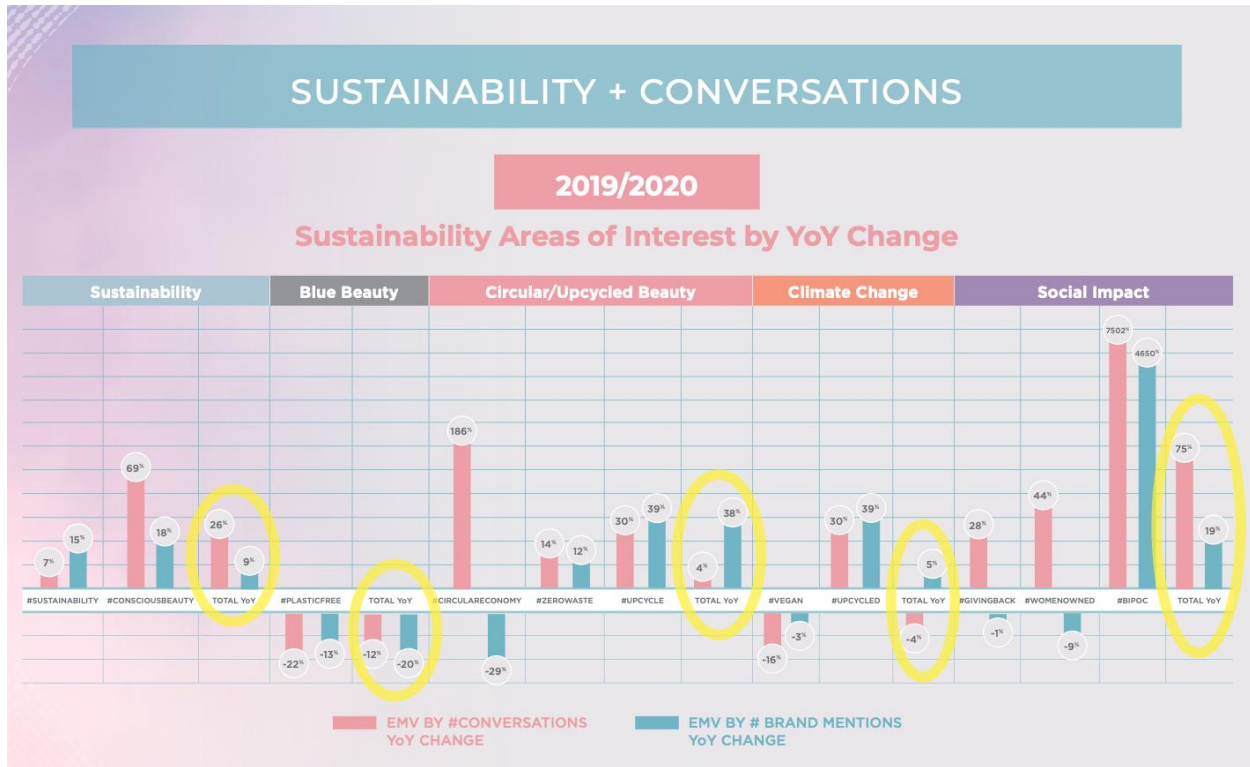




UN SDG harmonized goals, and the sustainability trends provide a framework to effectively communicate and align with purposeful and clear areas to support sustainability initiatives. Sustainability in products can move toward direct support of the SDGs through ingredient selection as the supply chain moves toward sustainable commitments with the UN Global Compact.

Sustainability in consumer conversations through a proprietary metric provided by Tribe Dynamics, provides an accurate indication of the brand’s social relevance as reflected by real consumer involvement by measuring engagement with social media content. We were curious to the 2019/2020 sustainable market size from brand participation and EMV as well as the year-over-year changes. The analysis helps us to:

1. Understand consumer and brand engagement with segments of sustainability
2. Investigate conversation drivers
3. Help indicate immediate demand for new product development



The most significant change in conversations centered around sustainability trend social impact.

**Systemic Opportunities**

A deeper look at social impact indicates the biggest conversation shift to #BIPOC - black indigenous people of color. The events of 2020 created a tipping point that forcing a global reckoning of the ramifications of systemic racial injustice throughout every level of our social and economic structures. Advocacy groups and consumers a clearing a path for regulatory and marketplace shifts to meaningfully reduce the use of harmful chemicals in cosmetic products marketed specifically to communities of color.



### **Sustainability and Policy**

Global and domestic chemical policy reform is in process to address collective concerns and movement toward sustainable practices. In 2020, the European Environment Agency (EEA) released the EU Chemicals Strategy for Sustainability toward a toxic-free environment. Safe-and-sustainable-by-design to avoid harmful chemicals in the life cycle of substances, materials, and processes.

Given the recent and strong state level regulatory push across the U.S., substantial changes in federal regulatory oversight that address cosmetic safety seem more certain. The Safe Cosmetics and Personal Care Products Act introduced into Congress in 2019 and still under review as of September 2021.

### **Sustainability technology tools**

In order to implement and accelerate development product creators require support of newly developed technology tools to meet qualify and verify internal policies, partners, and starting materials. Such new tools support clean beauty, sustainability measurement, and company culture.

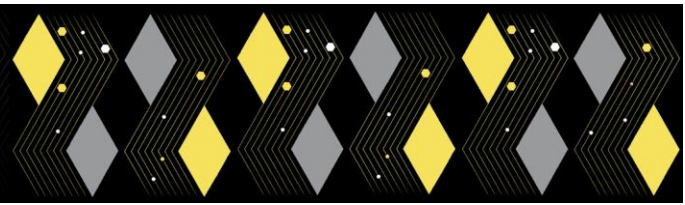
### **Conclusion**

Globalization, democracy, and commerce translate to slow due process for regulations and policy change in the U.S. The UN Sustainable Development Goals (SDGs) is an industry agnostic initiative that provides the most globally harmonized and accepted framework to focus on specific crisis that threatens people and the planet. Every country varies in their governmental infrastructure that affects the market. Sustainability is a collective meeting point for global beauty industry and U.S. with respect to each geographies culture. Beauty industry collaboration and harmonization toward the UN SDGs framework provides collective purpose and participation to dissipate crisis for the next generations. The U.S. and global industry have not realized harmonization, nor do we anticipate that a possibility, due to cultural and governmental differences. At present vulnerable communities such as women, infants, children, and BIPOC communities are the most exposed due to limitations in chemical safety policy. The most productive way forward to operationalize sustainability for the U.S. beauty industry requires an adoption of a company's clear framework that anticipates governmental policies with creation and implementation of internal policy to operationalize standards.

### **References**

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Hoffman Peri, Hayley and Dr. Nicole Acevedo. "Dandi Day Sustainability Report and Solutions 2021." 2021.



### About the speaker



Hayley Peri contributes a 360 degrees outlook to the Beauty Industry with almost 20 years of experience spanning professional use, retail, brand, formulations, manufacturing, and sales and marketing. Her education includes a B.S. in Biology with a focus on education, and a minor in psychology. She feels very fortunate to blend her passions for science, art, culture, and philanthropy in service to the Beauty Industry.

She is most well-known on the West Coast as a technical educator to shift traditional formulations to consumer-friendly preservation systems and natural alternatives to controversial ingredients. Her niche in specialty chemicals and R&D successfully launched Clean Beauty solutions with global Forbes Fortune top chemical companies and established innovations in the U.S. market.

Currently, her expertise focuses on sustainability, ingredient highlights, innovation, and community to align with the United Nations Sustainable Development Goals. Her daily mission is to connect brands with ingredient manufacturers doing good for people and the planet to create change one product at a time.

She is an ingredient storyteller, thought leader, and B2B influencer with a vision to create a conscious community within the Beauty Industry. The community consists of product creators, brands, service providers, and non-profits. A portion of proceeds from the community fund sustainable initiatives such as research for the Upcycled Food Association, ending child labor with the Responsible Mica Initiative, education for girls through beauty with Power Beauty Living, and biodiversity conservation in Sumatra, Indonesia with the Batu Kapal Conservation.

Hayley is a sustainability visionary with a strong belief that together the Beauty Industry community can be the solution to create positive change for the well-being of people and the planet, one day at a time.



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