

# **BUILDING A MORE SUSTAINABLE ECONOMY IN MICHIGAN**

Priority Actions for  
Supporting an  
Extended Producer and  
Circular Economy

Michigan State University  
Center for Community and  
Economic Development  
*EPR White Paper — June 2020*

**Building a More Sustainable Economy in Michigan:  
Priority Actions for Supporting an Extended Producer and Circular Economy**

MSU Center for Community and Economic Development

EPR/Circular Economy White Paper

June 2020

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## **Executive Summary**

A circular economy is an economic model that aims to benefit business and society while conserving environmental resources. This paper outlines our process of collaboration and consensus building around ways to advance the circular economy in Michigan. This text serves not only as a launching point for the circular economy and the related practice of extended producer responsibility initiatives in the state, but as a blueprint for knowledge networking. Our investigation suggests that the success of circular systems in Michigan will rely not only on addressing the challenges and opportunities outlined throughout this paper, but on the robust and comprehensive collaboration of a broad set of stakeholders including industry, policy makers, community leaders, and researchers. It was found that a focused effort informed by research, financial implications, and accountability are key factors in the success of extended producer responsibility initiatives. Incentives and penalties, design and life-cycle analysis, and resilient supply chains will all be important elements in the implementation of circular economy initiatives. Programs that center around product take-back, reusable packing, and modular and repairable design have heightened interest among those surveyed in this work and thus may serve as primary avenues for greater extended producer responsibility and circular economy proposals.

## **Introduction**

The Michigan State University, Center for Community and Economic Development (CCED) was established in 1968 as a research and outreach unit of MSU committed to creating, applying, and disseminating valued knowledge through responsive engagement, strategic partnerships, and collaborative learning.<sup>1</sup> CCED is dedicated to empowering communities to create sustainable prosperity and an equitable economy. As a unit of University Outreach and Engagement in the Office of the Provost, CCED initiates and supports faculty-student collaboration with innovative thinkers and doers to address challenges confronting our society.

CCED is engaged in a number of university/community partnerships including our U.S. Department of Commerce, EDA University Center for Regional Economic Innovation (REI),<sup>2</sup>

<sup>1</sup> <https://ced.msu.edu/>

<sup>2</sup> <https://reicenter.org/>

and our recent collaboration with the State of Michigan Department of Environment, Great Lakes and Energy, Material Salvage and Reuse Innovation Hub<sup>3</sup> which supports the growth of the structural salvage and reuse sector in our state.

In the spring of 2019 in response to a growing concern about solid waste policies and practices in Michigan, CCED reached out to colleagues across the campus to form a multi-disciplinary faculty network<sup>4</sup> to better understand what research and outreach opportunities might exist in Extended Producer Responsibility (EPR) policies and the broader field of Circular Economy.

The team's initial efforts focused on examining current Extended Producer Responsibility models and policies in Europe and Canada resulting in the publication in November 2019 of a "white paper" on EPR.<sup>5</sup> The focus on Extended Producer Responsibility enlarged over time to include looking at other policies or initiatives that enable a Circular Economy. Currently, there are no federal EPR initiatives, but nearly 40 states have an EPR policy on at least one product type.<sup>6</sup> Canada and the EU have a more comprehensive, uniform series of EPR policies that some argue eliminate confusion when conducting business in multiple regions. The challenges of developing and implementing efficient and effective EPR policies and practices with private industry and public support are complex and require substantial forethought, analysis, and rigorous monitoring.

With the support and guidance of a multidisciplinary research team and in consultation with policymakers, business leaders and others, the MSU research team began a strategic initiative to more fully understand the challenges and opportunities to advance EPR and the Circular Economy in Michigan. This white paper describes the actions taken and discusses the findings and recommendations identified to develop EPR and Circular Economy programs in the State of Michigan.

<sup>3</sup> <https://ced.msu.edu/media/e-newsletters/cnv-vol-30-no-1-spring-2020/material-salvage-and-reuse-innovation-hub-project-update>

<sup>4</sup> See Appendix 1

<sup>5</sup> <https://domicology.msu.edu/upload/Deconstruction%20Insurance%20Policy%202.pdf>

<sup>6</sup> [https://www.productstewardship.us/page/State\\_EPR\\_Laws\\_Map](https://www.productstewardship.us/page/State_EPR_Laws_Map)

## **Importance**

Currently, producers are often able to externalize the costs of the disposal of the waste they generate. In many cases these “externalized” costs are substantially borne by the public in waste disposal, environmental cleanup costs subsidized by the public sector, and long-term environmental degradation. Michigan municipalities pay an estimated \$25-\$30 per ton to dispose of waste.<sup>7</sup> EPR creates a system of incentives with the capability of influencing the design of products to be more environmentally and economically viable, thus reducing the generated waste stream. Many EPR policies shift material disposal to the original producer/consumer, who in turn internalize costs associated with product consumption.

Ultimately, the shifting of financial burden off the general public and on to the producer has the potential to incentivize eco-friendly and life-cycle oriented design by the producer that may reduce resource and energy use by decreasing waste generation. EPR policies for packaging specifically have been shown to be resilient to market shocks. For example, in 2017 when China’s Green Fence policy ramped up their standards for recyclables, Canada and Europe, who both have EPR policies, had lower waste contamination rates and were thus able to adjust to the increased standards. In contrast, the U.S. material recovery facilities are struggling to meet these demands.

### *EPR’s Economic Development Opportunities*

Extended producer responsibility policies, outreach, and behaviors serve as important facets in creating circular economies that are concurrently structured as local development tools. Circular economies can help build resilient economic systems of reuse and recycling that reduce the average consumer’s environmental footprint. The material salvage and reuse market (including structural) in Michigan is estimated to generate more than \$80 Million in sales annually and employs nearly 3.5% of the state’s workforce according to a study titled “Structural Material Reuse and Recycling Market Study” done at the MSU CCED conducted by Josh Weidenaar and

<sup>7</sup> <https://www.hourdetroit.com/community/waste-matters-the-state-of-michigans-trash/>

Shelby Kurland.<sup>8</sup> An expansion of this policy can be an important economic development initiative that promises job creation while simultaneously providing direct environmental benefits by reducing waste and limiting natural resource consumption

### *Why Is EPR Important for Michigan?*

At the end of 2019, the Michigan legislature demonstrated a renewed focus on the recycling industry in the state by providing access to much-needed resources. The legislative support enabled the Department of Environment, Great Lakes, and Energy (EGLE) to create funding opportunities to support the recycling industry including building end-use markets for recycled materials; expanding rural recycling facilities to include electronics; supporting scrap-tire cleanup and end-use markets; and grants supporting agricultural, greenhouses, and marine plastics recycling opportunities.<sup>9</sup> Such initiatives move the state closer to a circular economy by reducing waste and improving material salvage and reuse. A report by the Product Stewardship Institute notes that the implementation of retailer take-back policies for unused paint could bring \$15 million annually back into the state of Michigan.<sup>10</sup>

That economic benefit is for only one product. Further gains can be brought to Michigan by enacting similar policies on materials such as paper, packaging, and plastics (PPP), tires, mercury thermostats, and textiles. Furthermore, environmental benefits are realized as more of the waste stream is recycled, thereby maximizing the initial investments made on virgin materials, while also driving down landfilling and limiting opportunity for pollution by creating eco-friendly waste solutions supported by the manufacturer.

Extended Producer Responsibility is a key to designing products that are more effectively recycled or reused. This is an important tool in creating a circular economy, which is vital to constraining our resource overconsumption and stimulating economic development while achieving the UN Sustainable Development Goals.

<sup>8</sup> <https://domicology.msu.edu/upload/Material-Market-Study-web.pdf>

<sup>9</sup> [https://www.michigan.gov/egle/0,9429,7-135-70153\\_69695\\_76895---,00.html](https://www.michigan.gov/egle/0,9429,7-135-70153_69695_76895---,00.html)

<sup>10</sup> <https://www.michiganrecycles.org/wp-content/uploads/2018/01/ProductStewardshipPaintCareFactSheet.pdf>

## Methods

### *Addressing the Problem*

A society's ability to successfully address problems largely depends on its capacity to understand the causes of these problems and to conceive of and effectively implement strategies that eliminate or minimize the sources of distress. Few institutions in modern society have both the capacity and the responsibility to generate and apply new ideas that address "wicked problems," i.e., those problems in which there is a lack of consensus as to their causes and a lack of obvious solutions.<sup>11</sup>

The ability to build a broad actionable consensus and design strategic initiatives based on sound evidence is a unique role the MSU Center for Community and Economic Development performs. In undertaking these initiatives CCED engages a broad-based advisory committee of MSU scholars and others to guide and inform the work. In the spring of 2019 CCED undertook the exploration of EPR, a thus more broadly Circular Economics, with the establishment of an interdisciplinary team of scholars and practitioners. The research team formed around this project began their work by analyzing the EPR practices of Canada and Europe to identify critical elements of successful models and the inherent challenges faced in their transitions. This was followed by meetings with key Michigan subject matter experts who spoke with the established faculty network.

### *Hosting of Key Informants*

Steven Noble is the program coordinator for the Michigan Department of Environment, Great Lakes, and Energy (EGLE)'s Electronics Takeback Program. In 2008, Michigan passed legislation for an Industry EPR system that requires manufacturers of printers, laptops, computers, and monitors to take back 60% of last year's sales volume by weight and responsibly dispose of the materials.<sup>12</sup> Noble noted that Michigan's EPR law on electronic waste (e-waste)

<sup>11</sup> Benveniste, G. (1989). *Mastering the Politics of Planning*. San Francisco: Jossey Bass. p. 15.

<sup>12</sup> [http://www.legislature.mi.gov/\(S\(sipokkyz22c4dxclwqxhu243\)\)/documents/mcl/pdf/mcl-451-1994-II-5-173.pdf](http://www.legislature.mi.gov/(S(sipokkyz22c4dxclwqxhu243))/documents/mcl/pdf/mcl-451-1994-II-5-173.pdf)

lacks proper accountability and enforcement measures and could be modified to better enforce rules on collection and disposal.

Noelle Bowman is a board member of the Product Stewardship Institute, who is a leading voice in the fight for EPR policies. In her time at the solid waste division of Washtenaw County, Noelle worked with the institute to create a plastic bag tax of 10 cents, and talked about her experience with the state banning plastic bag taxes/bans to avoid patchwork legislation.<sup>13</sup> Her experience indicated that a statewide approach to EPR would be the best route.

### *Development of Delphi Survey*

In order to identify the short- and long-term pathways to a circular economy, the research looked to gather input and information from a broad set of stakeholders. The team utilized a modified Delphi method<sup>14</sup> survey to establish common topics which then advised the agenda for the group's virtual forum, discussed in the next section. Survey items were developed under the guidance of the faculty network, who created action items in five different areas relevant to the circular economy including 1) Extended Producer Responsibility, 2) Recycling, 3) Public Policy, 4) Producer & Consumer Attitudes, and 5) Sourcing. A list of informed stakeholders participated in this research process, as identified and contacted by the faculty network. Invitees were asked to commit to completing two rounds of surveys and attending the virtual forum. This strategy is conducive to the Delphi technique, promoting collaboration through recurrent participation.

Participants, including the faculty network, were asked to rate each item based on how important addressing them is to advancing the circular economy in Michigan. Each item, regardless of category, was rated independently on a four-point scale with “not important at this time” = 1, “somewhat important” = 2, “important” = 3, “very important” = 4. At the end of each category and at the conclusion of the survey, the opportunity for comments was provided for respondents to justify their rating or suggest additional items they would like addressed.

<sup>13</sup> [https://www.mlive.com/news/2016/12/ban\\_on\\_local\\_plastic\\_bag\\_bans.html](https://www.mlive.com/news/2016/12/ban_on_local_plastic_bag_bans.html)

<sup>14</sup> Yousuf, M. I. (May 2007). Using Experts' Opinions Through Delphi Technique. Pract. Assess. Res. Evaluation. Vol 12(4). ISSN 1531-7714

The first survey included 48 items identified by the research team and faculty network. To advance from the first survey into the second round, the item had to receive an individual mean rating higher than its category's overall mean. Twenty-five items received mean scores high enough to advance to the next round, and four new items were included based on the comments in round one, giving 29 total items to be rated in the second round. The outcomes of the survey series informed the agenda of the virtual forum.

### *Virtual Forum Format*

A collaborative forum served as the last phase of the Delphi technique. Each stakeholder who received the two-round survey was also invited to attend the virtual forum. The program consisted of a brief review of the research thus far, a guest panel<sup>15</sup> of three subject matter experts representing government, business, and a global non-profit to stimulate conversation, and then small group discussions around the prioritized items identified through the survey. The groups then reconvened to report on the conclusions found during these roundtable discussions.

Though originally designed for an in-person event, the forum was conducted through Zoom Video Communications software. Guests were asked to register for the event before receiving the meeting link. A slide deck was projected via the screen sharing function throughout the conference. The guest panel discussed predetermined and audience questions, provided through the applications live-chat, for approximately 50 minutes.<sup>16</sup> A short break was given and then all participants were released into five focus groups, one representing each survey category, via Zoom's breakout rooms function. Each room had a designated facilitator, who projected the items prioritized for their group (as determined by the survey results) and moderated the conversation to ensure equitable contributions amongst the participants. Each room also had an assigned recorder who took notes of the conversation to aid in the conclusionary report-out session at the end of the forum. Participants were provided each room's discussion items and were asked to select their desired breakout room upon registration. Some modifications were made to keep the number of guests in each group reasonable. The minimum group size was three

<sup>15</sup> See Appendix 2

<sup>16</sup> [https://mediaspace.msu.edu/media/Michigan+Circular+Economy+Forum/1\\_yxox1j7x?st=521&ed=4069](https://mediaspace.msu.edu/media/Michigan+Circular+Economy+Forum/1_yxox1j7x?st=521&ed=4069)

participants and the maximum room size was eight participants. Feedback from attendees noted that smaller rooms allowed for in depth and meaningful discussion while larger rooms allowed for a diversity of opinions and ideas. A total of 34 people participated in the breakout room discussions. Breakout rooms were in session for approximately 75 minutes and then participants were called back to the main room. Facilitators reported out on each room's findings. The forum ran for just over three hours.

## Results

### *Survey Findings*

The first round of the survey saw 24 complete responses. Items ranked above their category's mean were advanced to this next round. The second round had 18 complete responses. High ranking items from this round were prioritized for discussion in the virtual forum. These items with their round-two mean importance (1 = “not important at this time” to 4 = “very important”) are listed in **Table 1** and shown in **Figure 1**.<sup>17</sup>

**Table 1.** Questions and results from the Delphi instrument.

#	Item	Mean
1.1	Create industry-specific Producer Responsibility Organizations, whose job is to support the collection, reuse and recycling of products based on that specific industry.	3.06
1.2	Introduce incentives and penalties to mitigate commercial waste production.	3.39
1.3	<b>Mean of Extended Producer Responsibility Section</b>	3.22
2.1	Design products for recovery and recycling.	3.56

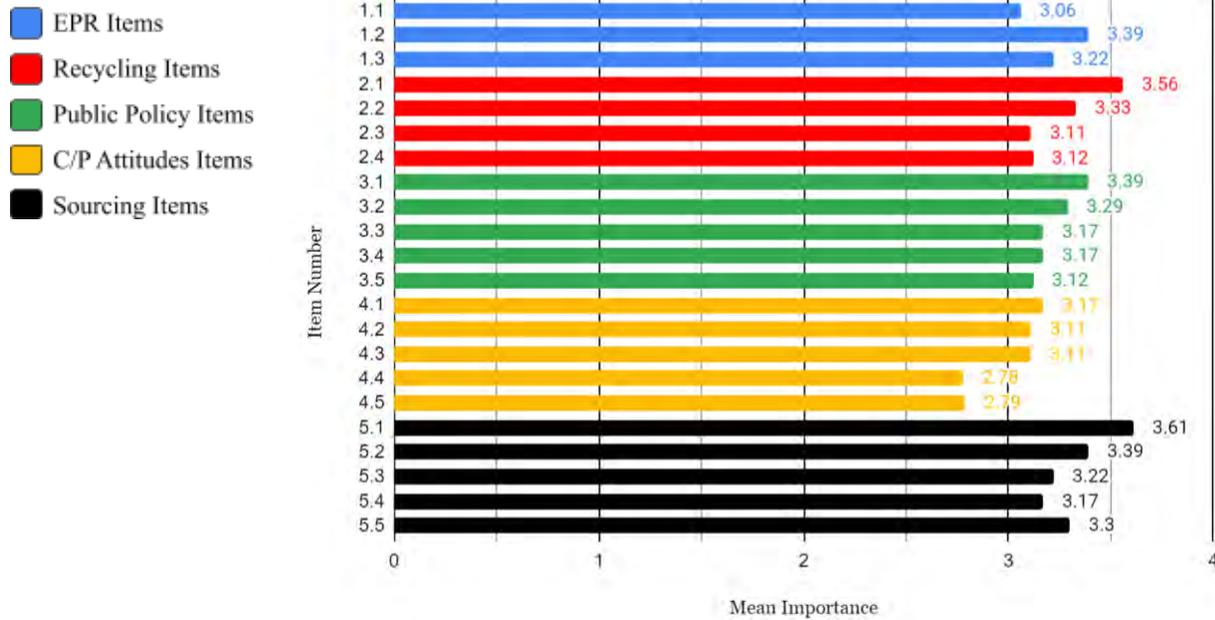
<sup>17</sup> Only the items discussed during the forum are reported in Table 1 and Figure 1. The mean of each section was calculated using all of the items from the respective section, even if they were not chosen for discussion at the forum.

2.2	Increase landfill tipping fees to incentivize waste reduction.	3.33
2.3	Mandate recycling infrastructure in a variety of spaces such as schools and multi-family homes.	3.11
2.4	<b>Mean of Recycling Section</b>	3.12
3.1	Expand deposit laws to include more containers.	3.39
3.2	Introduce state-endorsed goals for reducing waste generation.	3.29
3.3	Provide a true cost life-cycle assessment coupled with legislation to create incentives for the circular economy.	3.17
3.4	Expand take-back legislation to include products beyond E-Waste (such as plastic packaging, paper, tires, automobiles, etc.).	3.17
3.5	<b>Mean of Public Policy Section</b>	3.12
4.1	Design products for disassembly/repair (e.g. modular items).	3.17
4.2	Support increased funding for research and outreach in consumer awareness and education on circular economy/extended producer responsibility in Michigan.	3.11
4.3	Increase the accessibility to repair and refurbishment centers to consumers.	3.11
4.4	Identifying changes in management practices and prerequisites that must be in place before the circular economy can be successfully deployed.	2.78
4.5	<b>Mean of Consumer/Producer Attitudes Section</b>	2.79

5.1	Incentivize recycled and reduced material input over raw material input.	3.61
5.2	Incentivize the implementation of reusable packaging.	3.39
5.3	Support research into toxic material alternatives.	3.22
5.4	Support research into alternatives for difficult-to-recycle commodities.	3.17
5.5	<b>Mean of Sourcing Section</b>	3.30

In **Table 1** we observe the rankings of each item from round two that was discussed during the forum. The top-rated items across all of the categories were: incentivize recycled and reduced material input over raw material input (item 5.1); design products for recovery and recycling (item 2.1); introduce incentives and penalties to mitigate commercial waste production (item 1.2); introduce state-endorsed goals for reducing waste generation (item 3.2); and incentivize the implementation of reusable packaging (item 5.2).

Figure 1: Mean of Survey Items



**Figure 1** presents a visualization of the findings reported in Table 1. The results are color coded by categories. Categories allowed survey respondents and forum participants to give special focus to items within specific facets of the circular economy. Blue represents the Extended Producer Responsibility category, which focuses on systems of incentives that extend the responsibility of the producer to the end of a product's life cycle. Red items are of the Recycling category, highlighting opportunities or challenges in recycling markets that have capacity for expansion to support the circular economy. Public Policy items are represented with green; this group focuses on policy opportunities and challenges that can align incentives to operate a more circular economy in the state. The items from the Consumer and Producer Attitudes category, representing attitudes and behaviors of consumers and producers that contribute to the linear economy and account for market shifts, are shown in yellow. Lastly, the Sourcing items are represented in black, which highlight ways to strengthen supply-chain relationships to increase proper resource and waste management.

*Summary of the Virtual Forum Discussions*

The Extended Producer Responsibility items focused on **systems of incentives** that extend the responsibility of the producer to the end of a product's life cycle; typically, responsibility is financial or physical in nature. The discussions in the EPR groups noted that actions should be taken to **create feedback loops across the supply chain**. End-of-life must be addressed at the **design** stage so resources can be reclaimed. The group concluded that **producer responsibility organizations should be created** to supply financial support for product disposal, including recycling or proper management of hazardous waste. The recycling group noted that EPR policies should be **implemented for materials the state is unable to efficiently recycle**. Government oversight was also an action point, with a **need for policies that apply meaningful restrictions, penalties, or fines to ensure producers pay the true cost of the life cycle**. EPR policies are meant to bring industries together, to examine their impacts and to collaborate towards more efficient and eco-friendly supply chains.

The Recycling group set out to discuss opportunities or challenges in recycling markets that have capacity for expansion to support the circular economy. There have been lots of investments in recycling, but the **disconnect between manufacturers and recyclers makes the process ineffective** and frustrating. To combat this, we must **invest in end-market developments** and look to connect local manufacturing with the recovery facilities. **Leveraging landfill tipping fees** may be an avenue to support and drive sustainable design, material management, and infrastructure expansion. A need for **uniform and continuous generation of data on Municipal Solid Waste (MSW)** at the county level and material flow was identified as crucial to advance MSW management. This would help the state create materials management plans; including setting goals, making decisions, and tracking progress. **Accessibility** of recycling services and infrastructure was also a concern. The ability to shift funds between counties may help support rural and underserved communities, collection in multi-family dwellings, and allow the pursuit of progressive recycling programs like organics collection. The enactment of **House Bills 5812-5817** may advance some of these concerns.<sup>18</sup>

<sup>18</sup> [https://domicology.msu.edu/upload/whitepapers/HB5812-5817\\_whitepaper\\_WEB.pdf](https://domicology.msu.edu/upload/whitepapers/HB5812-5817_whitepaper_WEB.pdf)

Our Public Policy group discussed opportunities and challenges that can align incentives to operate a more circular economy in the state. Public policy will be fundamental in Michigan's shift towards a circular economy. The group discussed **expanding bottle deposits laws** onto other beverage containers, which would likely succeed via ballot initiative rather than as legislative action. Such an expansion would likely see push back from retailers and grocers, a critical collection point, as they would have to increase infrastructure. A **modification in the distribution of "unclaimed deposit,"** towards such business, may garner support. Similarly, an expansion of general take-back programs was discussed. There is a need to improve the current **electronic-waste take-back initiatives**. Then such programs could be expanded towards items such as batteries and automobiles. HB 5812-5817 addresses many concerns set forward throughout the forum, including a state-endorsed recycling rate goal and an accessibility benchmark, but does not mention the increase of landfill tipping fees or address **construction and demolition (C&D) waste**.

The Consumer and Producer Attitudes group discussed behaviors and preferences of manufacturers and the public that contribute to the circular economy. The success of repairable/modular products depends on the type of product, its design, and the consumer's willingness to recycle and reuse. The current design of electronics, for example, makes them difficult to repair. To combat this, **right-to-repair legislation** must be enacted, and planned obsolescence must be restricted. It is generally unknown how willing consumers are to repair products or how accessible such services are. Currently, it seems that retailers hold the responsibility to **educate consumers** about repair and disposal options. Support from manufacturers could make this information more accurate and widespread. The group identified existing mechanisms that should be expanded to promote circular systems. This included **promoting certified pre-owned products and leasing practices**, bundling repair and maintenance services within regular billing to internalize restoration costs (e.g. AppleCare), and making appliance part numbers publicly available to promote do-it-yourself repairs. In all, the group found that the concepts of sustainability that must be considered and implemented by producers and consumers are not new, but do require effort, money, and policy for implementation.

The **Sourcing** group's objective was to identify ways to strengthen the supply chain relationships to increase proper resource and waste management. The discussion largely focused on **reusable packaging**. Uniformity of reusable packing would be helpful in solving logistical issues. Other logistical issues may be addressed through local distribution centers, which are likely most effective in urban areas. **Third-party owners of packaging** may incentivize package returns. The involvement and **input of consumers, distributors, and collectors are important** in decision making in the reusable supply chains. In that, they noted that being a conscious consumer is a privilege. **Removing elitist barriers from making sustainable choices** will be paramount. Additionally, incentivizing just consumers to participate in sustainable practices, such as returning reusable packaging, will not be enough to create meaningful change. A community mindset, like the sense of pride perpetuated by the Pure Michigan campaign, will help create individual motivations.

## **Conclusions**

As the first ever broad-based effort in Michigan with the expressed purpose of identifying short- and long-term strategies for advancing extended producer responsibilities and circular economy initiatives, the results, while useful, also suggest there is much work to do to change our current unsustainable product production-consumption paradigm. In all, this process concluded that interconnected networks to support ongoing collaboration, innovation, and product responsibility must be created and uplifted. Industry-specific producer responsibility organizations must explore and implement ways to take financial or physical responsibility for their contributions to the waste stream. Systems and life-cycle thinking must become a fundamental principle amongst industry professionals and connecting product design with locally sourced and recycled material inputs should become a priority of manufacturers.

Government departments must also supply funding and accountability measures for industry and community initiatives around circular systems. Starting points could include developing better systems of measuring and analyzing MSW, expanding take-back and recycling reach and awareness, and including C&D waste in diversion plans. Michigan House Bills 5812-5817 introduced in early 2020 show promising change around waste management for the state, and passage should be supported, but further acknowledgments of C&D waste and leveraging tipping fees could bolster the impact of these proposed policies.

Perhaps most importantly, consumers must be empowered to make purchasing decisions beyond the *lowest price* preference and be informed of the *true cost* of producing and disposing of goods. Although the external costs of production practices may not be revealed in retail prices, the burden of production is being borne somewhere in society. Until consumers are able to be discerning in their purchasing behavior, it will be difficult to advance economic systems that support extended producer responsibilities or circular goods production. Today's consumers directly affect the availability of resources for future generations. We live on a finite planet and wastefully depleting our natural resources endangers future generations who will also rely on them. Those living today borrow the planet's finite resources and vulnerable ecosystems from their progeny. This is the inherent stewardship contract of one generation to the next. Strong extended producer practices and effective circular economy policies are owed to those who will come after us.

### **Acknowledgments**

The MSU research team would like to acknowledge the support and guidance of the participants in the surveys and the forums. Their input was invaluable to the process. We would also like to recognize the singularly important contributions of our MSU CCED Research Assistants Ethan Jodoin and Lea Dyga. Whose dedication and professionalism in this project design and implementation were absolutely critical to this undertaking. Thank you also to Laura Young, MSU Sustainability Program Coordinator, for sharing her expertise on virtual event coordination and offering support during the forum.

## Appendices

### *Appendix 1 - MSU Faculty Network*

- **Rafael Auras**, Professor of Packaging
- **Amy Butler**, Director of Sustainability
- **Courtney Carignan**, Professor of Food Sciences
- **Satish Joshi**, Professor of Agricultural, Food, and Resource Economics
- **Rex LaMore**, Director of the MSU Center for Community and Economic Development
- **Monireh Mahmoudi**, Assistant Professor of Packaging
- **Robert Richardson**, Professor of Community Sustainability
- **AnnMarie Schneider**, Institute for Public Policy and Social Research
- **Susan Selke**, Professor of Packaging
- **Vedat Verter**, Chairperson, Department of Supply Chain Management, John H. McConnell Chair of Business Administration

### *Appendix 2 - Guest Panelists May 29, 2020 Forum*

- **Carolyn Billetdeaux** - Global Sustainability Manager, Amcor
- **Shannon Bouton** - Global Executive Director, McKinsey.org
- **Vedat Verter** - Chairperson, MSU Department of Supply Chain Management; John H. McConnell Chair of Business Administration, MSU Broad College of Business

# **Circular Economy - Round 2**

## **Survey Flow**

ROUND TWO For this round of the survey, a series of key topics connected to the circular economy will be presented as headers with issues and actions related to them listed below. You are tasked with rating each item on how necessary they are to accelerate the circular economy in Michigan. Please rate each item independently. At the end of each section you will be asked to identify which item in that section you feel is most important. Your individual response will remain anonymous. Your participation in this survey is voluntary and you are welcome to terminate your enrollment in the survey at any time. Your responses will be used to advise the agenda for our MI Circular Economy Forum on May 29th, 2020. Your expert input is greatly appreciated. This round of responses will close on May 15th to prepare for our forum.

### DEFINITION

A **Circular Economy** is an alternative to a traditional linear economy (make, use, dispose) in which we keep resources in use for as long as possible, extract the maximum value from them whilst in use, then recover and regenerate products and materials at the end of life.

WRAP and the circular economy (2013, January 24). Retrieved from <https://www.wrap.org.uk/about-us/about/wrap-and-circular-economy>

You can learn more about circular systems through the Ellen MacArthur Foundation. Here's one of their videos: <https://www.ellenmacarthurfoundation.org/circular-economy/concept>

Q1. Extended Producer Responsibility - System of incentives that extends the responsibility of the producer to the end of a product's life cycle, typically responsibility is financial or physical in nature.

	Not Important at this time (1)	Somewhat important (2)	Important (3)	Very Important (4)
Create industry specific Producer Responsibility Organizations, whose job is to support the collection, reuse and recycling of products based on that specific industry. (Q1_1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Introduce incentives and penalties to mitigate commercial waste production. (Q1_2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q1b. Which of these items do you find most important?

- Create industry specific Producer Responsibility Organizations, whose job is to support the collection, reuse and recycling of products based on that specific industry. (4)
- Introduce incentives and penalties to mitigate commercial waste production. (5)

Q2. Recycling - Opportunities or challenges in recycling markets that have capacity for expansion to support the circular economy

	Not Important at this time (1)	Somewhat important (2)	Important (3)	Very Important (4)
Design products for recovery and recycling. (Q2_1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increase landfill tipping fees to incentivize waste reduction. (Q2_2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use landfill tipping fees to support research, public education & awareness, and strategic growth of reuse/salvage industries. (Q2_3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improve sorting and separation technologies and trainings to enhance efficiency of MRFs. (Q2_4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increase consumer education. (Q2_5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mandate recycling infrastructure in a variety of spaces such as schools and multi-family homes. (Q2_6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Incentivize/encourage multi-stream collection. (Q2_13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q2b. Which of these items do you find most important?

- Design products for recovery and recycling. (1)
- Increase landfill tipping fees to incentivize waste reduction. (2)
- Use landfill tipping fees to support research, public education & awareness, and strategic growth of reuse/salvage industries. (3)
- Improve sorting and separation technologies and trainings to enhance efficiency of MRFs. (4)
- Increase consumer education. (5)
- Mandate recycling infrastructure in a variety of spaces such as schools and multi-family homes. (6)
- Incentivize/encourage multi-stream collection. (13)

Q3. Public Policy - Policy opportunities & Challenges that can align incentives to operate a more circular economy in the state

	Not Important at this time (1)	Somewhat Important (2)	Important (3)	Very Important (4)
Expand deposit laws to include more containers. (Q3_1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Impose a disposal cost on “single-use products.” (Q3_2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Expand “take-back” legislation to include products beyond E-Waste (such as plastic packaging, paper, tires, automobiles, etc). (Q3_3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Introduce state endorsed goals for reducing waste generation. (Q3_4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provide a true cost life-cycle assessment coupled with legislation to create incentives for the circular economy. (Q3_5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Introduce an Advanced Disposal Fee on a variety of products upon the consumer’s purchase to fund the proper recycling or disposal at the product’s end of life. (Q3_6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Encourage local government engagement around circular systems through community events such as town halls. (Q3_13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q3b. Which of these items do you find most important?

- Expand deposit laws to include more containers. (1)
- Impose a disposal cost on “single-use products.” (2)
- Expand “take-back” legislation to include products beyond E-Waste (such as plastic packaging, paper, tires, automobiles, etc.). (3)
- Introduce state endorsed goals for reducing waste generation. (4)
- Provide a true cost life-cycle assessment coupled with legislation to create incentives for the circular economy. (5)
- Introduce an Advanced Disposal Fee on a variety of products upon the consumer’s purchase to fund the proper recycling or disposal at the product’s end of life. (6)
- Encourage local government engagement around circular systems through community events such as town halls. (13)

Q4. Consumer/Producer Attitudes - Attitudes and behaviors of Consumers and Producers that contribute to linear economy and account for market shifts.

	Not Important at this time (1)	Somewhat Important (2)	Important (3)	Very Important (4)
Design products for disassembly/repair (e.g. modular items). (Q4_1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increase the accessibility to repair and refurbishment centers to consumers. (Q4_2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increase customer accessibility to reusable container use. (Q4_3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increase the popularity of product repair and refurbishment. (Q4_4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Support increased funding for research and outreach in consumer awareness and education on circular economy/extended producer responsibility in Michigan. (Q4_5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Identifying changes in management practices and prerequisites that must be in place before the circular economy can be successfully deployed. (Q4_6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Create educational (k-12, and college) and volunteer opportunities to introduce people of all ages to the circular system. (Q4\_10)



Support competitions between municipalities or counties and measure who is leading the way to change and then learn from them, celebrate their success, and share their best practices. (Q4\_11)



Q4b. Which of these items do you find most important?

- Design products for disassembly/repair (e.g. modular items). (1)
- Increase the accessibility to repair and refurbishment centers to consumers. (2)
- Increase customer accessibility to reusable container use. (3)
- Increase the popularity of product repair and refurbishment. (4)
- Support increased funding for research and outreach in consumer awareness and education on circular economy/extended producer responsibility in Michigan. (5)
- Identifying changes in management practices and prerequisites that must be in place before the circular economy can be successfully deployed. (6)
- Create educational (k-12, and college) and volunteer opportunities to introduce people of all ages to the circular system. (10)
- Support competitions between municipalities or counties and measure who is leading the way to change and then learn from them, celebrate their success, and share their best practices. (11)

Q5. Sourcing - Strengthening supply chain relationships to increase proper resource and waste management.

	Not Important at this time (1)	Somewhat Important (2)	Important (3)	Very Important (4)
Incentivize recycled and reduced material input over raw material input. (Q5_1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increase regulations on the life-cycle of hazardous substances. (Q5_2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Incentivize the implementation of reusable packaging. (Q5_3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Support research into toxic material alternatives. (Q5_4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Support research into alternatives for difficult-to-recycle commodities. (Q5_5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q5b. Which of these items do you find most important?

- Incentivize recycled and reduced material input over raw material input. (1)
- Increase regulations on the life-cycle of hazardous substances. (2)
- Incentivize the implementation of reusable packaging. (3)
- Support research into toxic material alternatives. (4)
- Support research into alternatives for difficult-to-recycle commodities. (5)

Q19. Is there any other input you have about the circular economy in Michigan you would like to offer?

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*Appendix 4 - Complete Survey Results, Round 2*

**Descriptives in Survey Order**

<b>Descriptive Statistics</b>			
Q1_1	18	3.0556	.87260
Q1_2	18	3.3889	.77754
Q2_1	18	3.5556	.51131
Q2_2	18	3.3333	.97014
Q2_3	18	3.0000	.90749
Q2_4	18	3.0000	.76696
Q2_5	18	3.0556	.80237
Q2_6	18	3.1111	.83235
Q2_13	18	2.7778	1.00326
Q3_1	18	3.3889	.69780
Q3_2	18	3.0556	1.10997
Q3_3	18	3.1667	.78591
Q3_4	17	3.2941	.58787
Q3_5	18	3.1667	.92355
Q3_6	18	3.0556	1.05564
Q3_13	17	2.7059	.84887
Q4_1	18	3.1667	.92355
Q4_2	18	2.9444	.87260
Q4_3	18	2.6111	.91644
Q4_4	18	2.6667	.97014
Q4_5	18	3.1111	.75840
Q4_6	18	2.7778	.94281
Q4_10	17	2.7059	.84887
Q4_11	18	2.3889	1.03690

Q5_1	18	3.6111	.50163
Q5_2	18	3.1111	.96338
Q5_3	18	3.3889	.84984
Q5_4	18	3.2222	1.00326
Q5_5	18	3.1667	1.09813
Valid N (listwise)	17		

## Descriptives in Order of Importance

### Descriptive Statistics

	N	Mean	Std. Deviation
Q5_1	18	3.6111	.50163
Q2_1	18	3.5556	.51131
Q3_1	18	3.3889	.69780
Q5_3	18	3.3889	.84984
Q1_2	18	3.3889	.77754
Q2_2	18	3.3333	.97014
Q3_4	17	3.2941	.58787
Q5_4	18	3.2222	1.00326
Q5_5	18	3.1667	1.09813
Q4_1	18	3.1667	.92355
Q3_5	18	3.1667	.92355
Q3_3	18	3.1667	.78591
Q2_6	18	3.1111	.83235
Q5_2	18	3.1111	.96338
Q4_5	18	3.1111	.75840
Q2_5	18	3.0556	.80237
Q3_6	18	3.0556	1.05564
Q3_2	18	3.0556	1.10997

Q1_1	18	3.0556	.87260
Q2_4	18	3.0000	.76696
Q2_3	18	3.0000	.90749
Q4_2	18	2.9444	.87260
Q4_6	18	2.7778	.94281
Q2_13	18	2.7778	1.00326
Q4_10	17	2.7059	.84887
Q3_13	17	2.7059	.84887
Q4_4	18	2.6667	.97014
Q4_3	18	2.6111	.91644
Q4_11	18	2.3889	1.03690
Valid N (listwise)	17		

### EPR by Importance

		N	Mean	Std. Deviation
Q1_2	Introduce incentives and penalties to mitigate commercial waste production.	18	3.3889	.77754
Q1_1	Create industry specific Producer Responsibility Organizations, whose job is to support the collection, reuse and recycling of products based on that specific industry.	18	3.0556	.87260
Valid N (listwise)		18		

## Recycling by Importance

		N	Mean	Std. Deviation
Q2_1	Design products for recovery and recycling	18	3.5556	.51131
Q2_2	Increase landfill tipping fees to incentivize waste reduction.	18	3.3333	.97014
Q2_6	Mandate recycling infrastructure in a variety of spaces such as schools and multi-family homes.	18	3.1111	.83235
Q2_5	Increase consumer education.	18	3.0556	.80237
Q2_4	Improve sorting and separation technologies and trainings to enhance efficiency of MRFs.	18	3.0000	.76696
Q2_3	Use landfill tipping fees to support research, public education & awareness, and strategic growth of reuse/salvage industries.	18	3.0000	.90749
Q2_13	Incentivize/encourage multi-stream collection.	18	2.7778	1.00326
Valid N (listwise)		18		

## Public Policy by Importance

		N	Mean	Std. Deviation
Q3_1	Expand deposit laws to include more containers.	18	3.3889	.69780
Q3_4	Introduce state endorsed goals for reducing waste generation.	17	3.2941	.58787
Q3_5	Provide a true cost life-cycle assessment coupled with legislation to create incentives for the circular economy.	18	3.1667	.92355
Q3_3	Expand take-back legislation to include products beyond E-Waste (such as plastic packaging, paper, tires, automobiles, etc.).	18	3.1667	.78591
Q3_6	Introduce an Advanced Disposal Fee on a variety of products upon the consumer's purchase to fund the proper recycling or disposal at the product's end of life.	18	3.0556	1.05564
Q3_2	Impose a disposal cost on single-use products.	18	3.0556	1.10997
Q3_13	Encourage local government engagement around circular systems through community events such as town halls.	17	2.7059	.84887
Valid N (listwise)		17		

## Consumer/Producer Attitudes by Importance

		N	Mean	Std. Deviation
Q4_1	Design products for disassembly/repair (e.g. modular items).	1 8	3.1667	.92355
Q4_5	Support increased funding for research and outreach in consumer awareness and education on circular economy/extended producer responsibility in Michigan.	1 8	3.1111	.75840
Q4_2	Increase the accessibility to repair and refurbishment centers to consumers.	1 8	2.9444	.87260
Q4_6	Identifying changes in management practices and prerequisites that must be in place before the circular economy can be successfully deployed.	1 8	2.7778	.94281
Q4_10	Create educational (k-12, and college) and volunteer opportunities to introduce people of all ages to the circular system.	1 7	2.7059	.84887
Q4_4	Increase the popularity of product repair and refurbishment.	1 8	2.6667	.97014
Q4_3	Increase customer accessibility to reusable container use.	1 8	2.6111	.91644
Q4_11	Support competitions between municipalities or counties and measure who is leading the way to change and then learn from them, celebrate their success, and share their best practices.	1 8	2.3889	1.03690
Valid N (listwise)		1 7		

## Sourcing by Importance

		N	Mean	Std. Deviation
Q5_1	Incentivize recycled and reduced material input over raw material input.	18	3.6111	.50163
Q5_3	Incentivize the implementation of reusable packaging.	18	3.3889	.84984
Q5_4	Support research into toxic material alternatives.	18	3.2222	1.00326
Q5_5	Support research into alternatives for difficult-to-recycle commodities.	18	3.1667	1.09813
Q5_2	Increase regulations on the life-cycle of hazardous substances.	18	3.1111	.96338
Valid N (listwise)		18		

## Category Means by Importance

	N	Mean	Std. Deviation
Sourcing Mean	18	3.3000	.63338
EPR Mean	18	3.2222	.62361
Public Policy Mean	18	3.1222	.42827
Recycling Mean	18	3.1190	.35419
Cons Prod. Attitudes Mean	18	2.7956	.53348
Valid N (listwise)	18		