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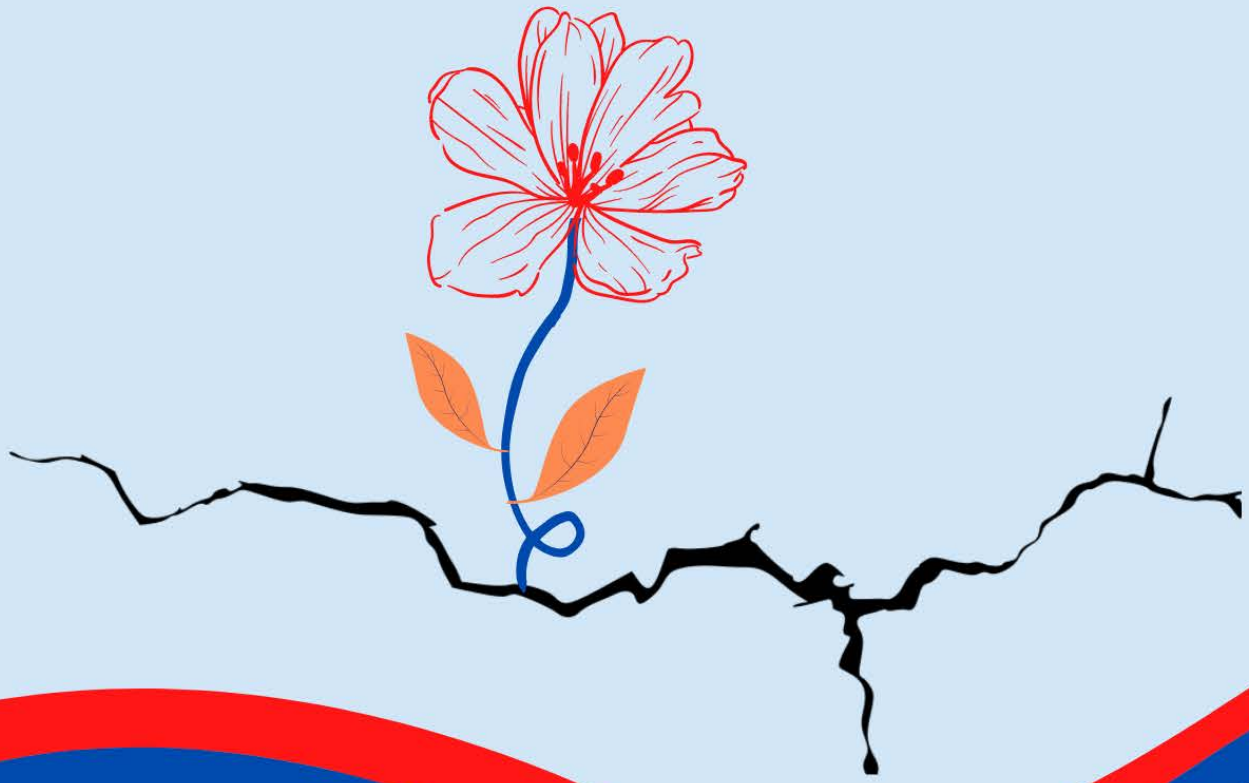
Co-Learning Plan Series

Virtue and Policy in the Michigan Circular Economy

Jacob Namovich



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Virtue and Policy in the Michigan Circular Economy

Michigan State University

Center for Community and Economic Development

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Foreword:

This co-learning plan is the product of exposure to circular economy resources disseminated by leading voices in the field, predominantly from the European region. What was particularly important when comparing their ideologies with those of the U.S. has been maintaining the end-goal of intergenerational sustainability in mind.

Anything less than an ambitious pursuit of circularity will result in a substantial loss in opportunity and will further entrench our systems in the linear economy. Communicating the benefits and challenges associated with the circular economy will be key in garnering public support for the transition. The EU and the Ellen MacArthur Foundation have demonstrated the realistic potential this paradigm shift can bring. Their rhetoric reinforces the notion that with more rapid transitions, will come more abundant benefits. It is therefore in the interest of Michigan to align with other states that have accepted this truth and drive state-wide transformation.

The events of COVID-19 have reminded us of our inescapable connection with the natural world, the fragility of our supply chains, and our responsibility to our fellow humans. Globally, public and private institutions are adopting greater adherence to social and environmental responsibility. To truly build back better, the circular economy must be embraced by the United States and embedded in all development henceforth.

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Introduction:

Horsey Horseless was described in its patent as being "both useful and ornamental… [for] the body of a motor vehicle of a general rectangular configuration and provided with a raised box portion". It was a solution that Battle Creek, Michigan inventor Uriah Smith introduced on March 13th, 1899 to a rapidly evolving United States transportation landscape. Despite innovations in steam power throughout the industrial revolution, early iterations of motor vehicles only became effective in delivering their service with the advent of the gasoline engine in the last quarter of the nineteenth century. This powerful technology transformed fossil fuel hydrocarbon chemical energy into mechanical energy. Not until 1893 did the U.S. see domestic manufacturing and development of these gasoline vehicle variants (Library of Congress, n.d.). Alien to a predominantly horse-drawn era, the audibly violent combustion of the gasoline fuel from unrefined automobiles disrupted the long-standing conditions of transportation. This novel stimulus imposed a great deal of stress upon the steeds, who responded uncontrollably with carts in tow.

Smith's invention sought to address this problem. Horsey Horseless (Figure 1) took a typical motor vehicle body and mounted a wooden bust of a horse that would face incoming traffic. This feature was meant to dampen the unintended disturbances of motor vehicles as they approached actual horses. Alas, Uriah Smith's technology did not see the cultural uptake that he might have hoped for. Perhaps he had not foreseen the meteoric and revolutionary rise of Detroit, the "Motor City". With flourishing enterprise like the Ford Motor Company, highly industrialized processes made the formerly exclusionary motor vehicle good into a more accessible and integral factor of American culture and economics. Whole systems began to build on the capacities that motorized transportation offered, leaving behind the days of horse and carriage. The economy subsequently saw increased activity among sectors whose inputs contributed to the manufacturing of these vehicles, as well as government subsidization for infrastructure construction and upkeep.

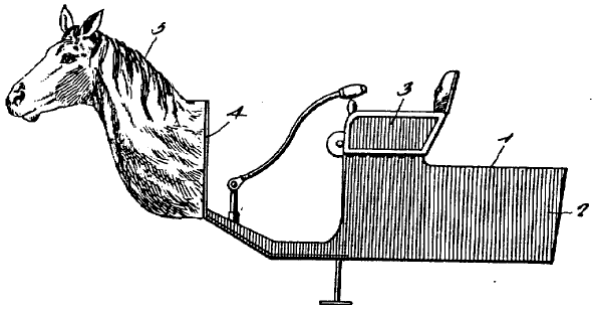

***Figure 1**: Patent Design 30,551 "Horsey Horseless" by Uriah Smith (Application filed March 13, 1899, Issued April 11, 1899)*

Although Horsey Horseless was lost with time, Smith had nonetheless worked to bridge two seemingly incongruent paradigms. The economic prosperity seen by the early 20th century auto industry supply chain only materialized because of the absolute benefits it offered, the flexibility of the economic systems it occupied, and a willingness to collectively lean into a new system of operation. For change in the modern era, Michigan must couple the creative sympathy of Smith with the faith of early automobile adopters to build on it's incredible legacy and shift the culture yet again.

Part 1: The U.S. and Sustainable Development

The world is rapidly changing around our industrious, individual human lives in the U.S. Succeeding a pivotal message from the year prior, gargantuan investment firm BlackRock's CEO Larry Fink reinforces that "[t]he events of [COVID-19] have only further strengthened [BlackRock's] sense of responsibility to… advance sustainable investing and contribute to a more resilient economy" in his 2021 letter to shareholders. Fink underlines how policy will be key in ensuring desirable outcomes that enable global synchronization about sustainable development. Technology and innovation lie focal in his vision for the pursuance of an "inclusive", "long-term", and "risk-adjusted" economy (Fink, 2021). Overseas, the European Union has "enshrined into EU law" a Green Deal that will be central to the COVID-19 economic recovery strategy in the region, where they seek to develop a "modern, resource-efficient and competitive economy" (EU, n.d., 2019). Coupled with this is €100 billion in spending that will work to ensure a just transition, thereby elevating member countries collectively (EU, 2020). The U.S.' allies in South Korea have adopted an equally voluntary New Deal that sees $144 billion in investments focused on driving job creation, fostering "social safety nets", as well as "green infrastructure and industrial sector[s]" by 2025 (Chowdhury, 2021). This collection of global action, philosophy, and intent is all made possible under the mutual understanding that not only environmental, but also longstanding or emerging social and economic challenges can be addressed through a calculated and comprehensive green economy development plan.

From exiting the Paris Climate Agreement in 2017, to reentering in 2021, steadfast goals supporting the private-public collaborative interface on sustainability in the United States have long been stunted by oscillations in political leadership. Periods of governmental abstinence from ambitious sustainable development saw the responsibility thrust upon states, including several in the Midwest, driving coalitions such as the bipartisan U.S. Climate Alliance to fill the vacuum in coordinated efforts on sustainable transitions and development during the previous presidential term. In September of 2020, Governor Gretchen Whitmer announced with Executive Order 2020-182 that Michigan will pursue carbon neutrality by 2050 to mitigate state, and national risks posed by climate change (Whitmer, 2020). However, intermittent action on the national stage exposes our broad financial systems to growing climate-related risks in the long-term. This has inspired many in the private sector, such as Mr. Fink, to leverage their influence and signal an immediate economic argument for corporate sustainability.

Thus, President Biden has entered a landscape far different from his preceding position in the White House: leaders in the private sector are ready to work alongside policy and adopt best practices. In April of 2021, the Biden administration committed the U.S. to 50% reductions of 2005-level greenhouse gas (GHG) emissions by 2030 in a virtual summit with world leaders (Wh.gov, 2021a). Opportunities advertised in the White House briefing for this goal include: 1) investments in infrastructure and innovation; 2) economic resilience and job creation; 3) ameliorated environmental health outcomes; and 4) domestic supply chain development (Wh.gov, 2021a). Despite these valuable steps toward a green national economy, there remains dissimilarity between the explicit messaging of the Biden climate plan and those of climate-

leading nations in the EU. Throughout the campaign trail and to this day, the Biden team draws focus to clean energy, carbon capture and storage technologies, and vague innovation. Yet, they consistently exclude formal attention to less-direct vectors of emissions, thereby constraining the expediency of the U.S.' efforts to reach and exceed its decarbonization goals. UN-endorsed, Dutch not-for-profit Circle Economy's *The Circularity Gap Report 2019* estimates that "62% of global greenhouse gas emissions (excluding those from land use and forestry) [are] released during the extraction, processing and manufacturing of goods to serve society's needs; only 38% are emitted in the delivery and use of products and services" (Bell et al., 2019). While it is imperative that the energy sources powering these supply chains are decarbonized, so too is it crucial to reimagine the systems that necessitate their use.

As the United States' most vulnerable regions are increasingly subject to economically unsustainable and biophysically inhospitable realities on account of climate change, national migration patterns are expected to emerge. For example, the Ypsilanti, Michigan-based *American Society of Adaptation Professionals* (ASAP) are studying how, with less volatile environmental patterns under climate change, the great lakes system represents ideal conditions for fleeing climate migrants (ASAP, n.d.). The infrastructural, social, and economic costs imposed by climate change vary nationally. This means leveraging the circular economy as a catalyst for local green development will prove an essential tool for Michigan's leadership to address disproportionate climate burdens nationally, while also creating green jobs and fostering sustainable systems. Not only will this shift reimagine Michigan's relationship with the natural world, but it will embody the innovation that has long been touted as a staple of American culture. It demands that Americans reacquaint themselves with the natural systems they occupy, create new relationships with the materials and energy that provide them with such a high quality of life, and manifest value in their communities.

Part 2: Defining a Virtuous Circular Economy

Kate Raworth, economist at Oxford and author of *Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist* provides a model to guide thinking about the socio-environmental world and a framework for optimizing our place in it. The Doughnut of social and planetary boundaries (Figure 2) reasons that a flourishing human society exists between an ecological ceiling and a social foundation. Outward movement from the center of the model represents increasing resource use. The social foundation entails "internationally agreed minimum social standards", consisting of 12 metrics governing the human wellbeing of a society. Anything below this minimum would see key quality of life outcomes 'shortfall' (DEAL, 2021). When a society delivers on these social metrics, but exhibits excessive resource use, they risk 'overshooting' planetary boundaries. Observable in red are the modern categories and corresponding magnitudes of shortfall or overshoot among metrics like political voice or climate change. Raworth asserts that the only way that society can occupy the optimum, or the light green region, is by building systems that are regenerative and distributive by design.

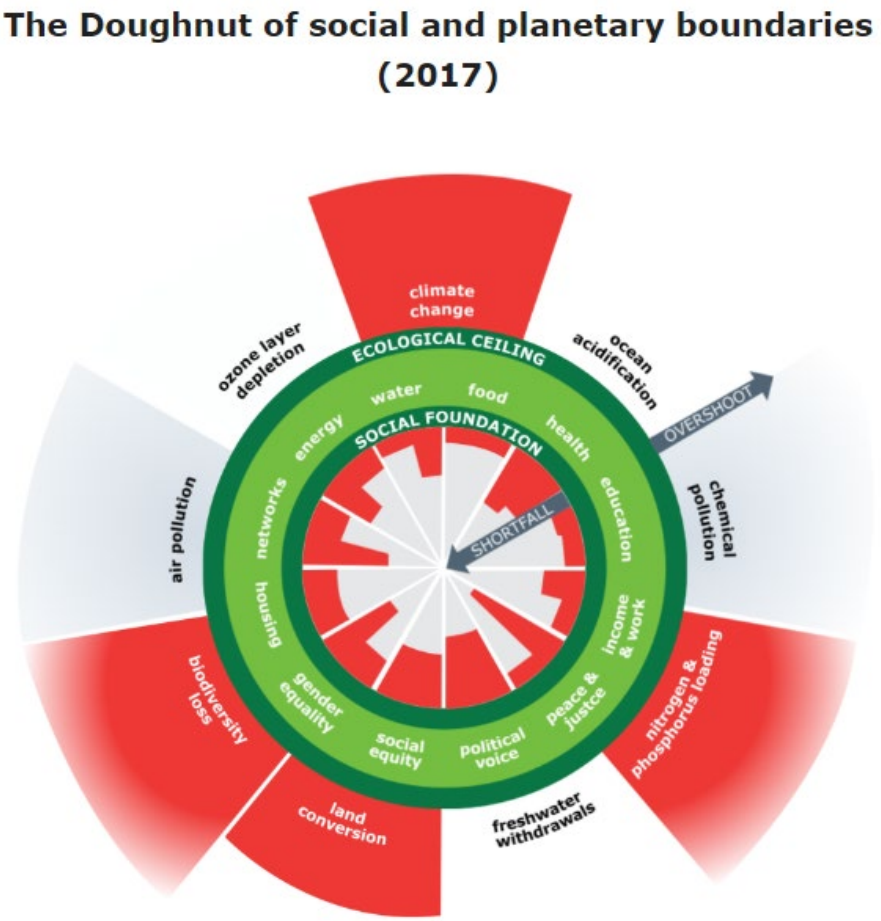

Figure 2: Doughnut of Social and Planetary Boundaries (Raworth, 2017)

The hegemonic "linear" or "take-make-use-lose" economic paradigms traditionally deploy supply chains which are structured to demand massive material and energy inflows for the creation of products that are disproportionately designed for discard in landfill at the end of their use phase (DEAL, 2021). Under the lens of thermodynamics, the energy invested and embodied in these materials represents a vast inefficiency with respect to maintaining the value of natural and processed resources. The dogmatic attachment of some to this models' greatest shortcomings likely stem from the absolute short-term benefits it has generated for the ruling economic and political elites. From fishery stock collapse, to exponential increase of anthropogenic carbon PPM in the atmosphere, humans are rapidly approaching the Earth's "ecological ceiling" under the precondition of economic growth requiring proportional resource throughput. It is inarguable that contemporary economies proficiently supply goods and services for needs, but just like Mr. Smith's invention of Horsey Horseless, traditional growth models are hitched to a dated paradigm.

With a new set of principles, Americans can frame the conversation of what the circular economy should look like, and guide how the transition process can by operationalized.

Fundamental to this is asking ourselves what outcomes we hope to expect from it. What seeds does humanity hope to sow for those who come after us? The United Nations Intergovernmental Panel on Climate Change's (IPCC) released their Sixth Assessment Report (AR6) in August of 2021. One of its many takeaways is the inescapable, near-future trajectory of the Earth's climate as past and future greenhouse gases drive changes at unprecedented rates. The World Commission on Environment and Development's 1987 Brundtland Report defines and describes sustainable development as follows:

> *"Humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs. The concept of sustainable development does imply limits - not absolute limits but limitations imposed by the present state of technology and social organization on environmental resources and by the ability of the biosphere to absorb the effects of human activities. But technology and social organization can be both managed and improved to make way for a new era of economic growth*."
>
> -*Brundtland Commission* (UN, 1987)

Aristotle understood virtue as the fulfillment of an "essential purpose", or rather, delivering the truest functions that an entity was designed to deliver. The Ellen MacArthur Foundation (EMF) defines the three virtuous principles of the circular economy as 1) designing out waste and pollution; 2) keeping products and materials in use; and 3) regenerating natural systems. Where current systems are often designed to translate resource throughput to profits, a virtuous circular economy seeks to "decouple growth from the consumption of finite resources" (EMF, n.d.) and transition the systems supporting everyday needs into models that work in the long-term.

Popular concepts like recycling or upcycling are often characterized as "circular," but may not deliver on the essential nature of the circular economy. For example, the "plastics circular economy" employs chemical or mechanical recycling as principal solutions for mitigating downstream or 'post-consumer' plastic waste. However, converting these polymers back into useful substances can nonetheless be capital, resource, and energy intensive. Yet, recycling waste management options are consistently promoted as the 'circular' solution – an outcome favorable to stakeholders who have the most to lose from regulations on certain materials. Although recycling is recognized as integral to the EMF's circular economy toolkit, it is used discriminately in the process of recapturing irreparable products for resource reclamation. The EMF Circular Economy Systems Diagram (Figure 3) reveals that of all resource value retainment strategies for finite materials possible under a circular system, recycling sees the greatest detachment of a resource from its original product. What delineates circular recycling from traditional recycling is that recapture of materials for recycling is performed on objects designed for circularity. For example, imperative functions or performances such as sterility may best be achieved through low-carbon, compostable single-use plastics that, once disposed of, can only be managed safely by workers through industrial composting processes.

Industry programs such as the American Beverage Association's *Every Bottle Back* campaign works to perpetuate poor product and supply chain design under the label of 'circular' recycling (ABA, n.d.). While recycling is important for diverting waste from landfills in the short-term, aggressive and innovative action must be taken to ensure a virtuous circular economy. Markets that can be driven by effective recycling will be short-lived if the ultimate destination for development is circularity. Moreover, by substituting aggressive action with solutions that perpetuate poor product design, producers fail to decouple economic growth from material throughput. Firms merely change the sourcing of their materials *without any obligation* to retain the useful life of their products in order to maximize profits and remain competitive.

Equally as important in engineering these systems is the contradiction of creating materially circular processes which design out waste and keep resources in use, but inherently degenerate natural systems. As mentioned in Part 1, the supply chain of a product plays no small role in its emissions footprint (Bell et al., 2019). Additionally, should a product require energy for reuse, the emissions footprint may be dominated by the use phase of that good. If the overall emissions generated by the successful extension of a product's useful life are unreasonably high for the biosphere to absorb, then it is intrinsically unvirtuous.

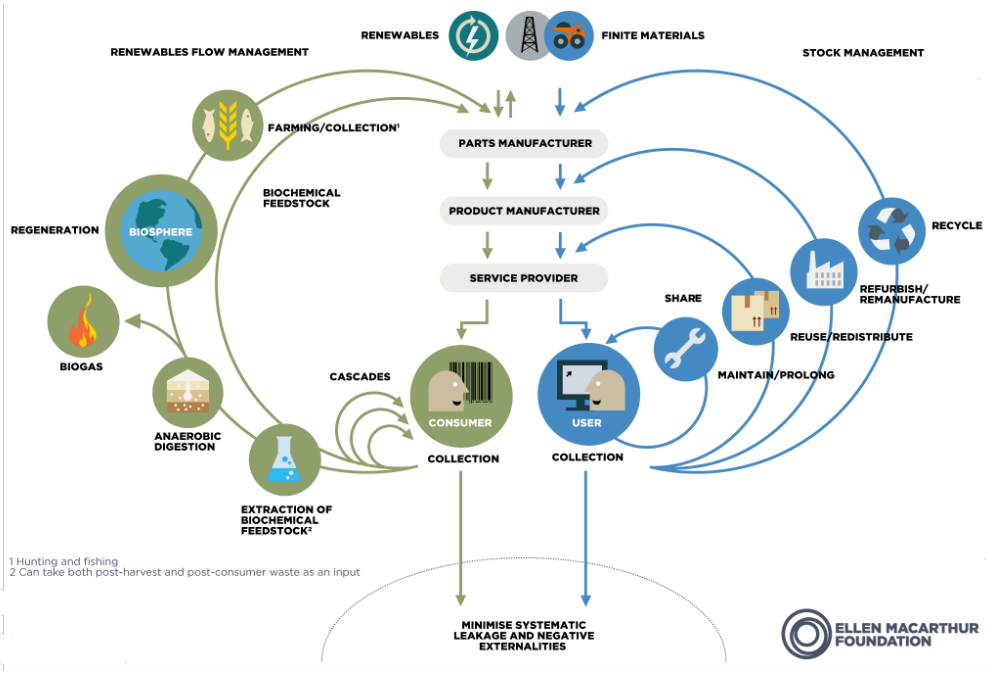

Figure 3: Circular Economy Systems Diagram (2019)

Part 3: The State of Michigan Circularity

"Pure Michigan" is no stranger to the environmental externalities born by technology, industry, and crass decision making. From the deleterious lead poisoning of low-income and predominantly Black residents in the Flint Water Crisis or Benton Harbor, to the burdensome dumping of per- and polyfluoroalkyl (PFAS) compounds by Wolverine World Wide Tannery in

Rockford, Michigan has become sensitive to the dangers that breed from environmental racism and negligence (EPA, n.d.). However, these are merely symptoms of much larger problems that the state continues working to resolve.

As of the fiscal year 2020, the Michigan Department of Environment, Great Lakes and Energy (EGLE) reports a total of 52,697,247 cubic yards of solid waste disposed of in Michigan landfills (See Table 1). Of this total, over 17.2% and 6.2% is waste that is imported from Canada and other U.S. states, respectively. These trends have remained quite constant over the past decade (See Figure 4) (EGLE, 2021). EGLE's NextCycle Michigan initiative reports 53% of such waste stemming from "commercial and institutional sectors." They also report that from 2015 to 2018, Michigan recycling has risen from 15% to 18% following infusions of investment in materials management programs (NextCycle, 2020). The state government has made the explosion of these rates a priority for the next decade, with initial goals seeking 30% by 2025, and 45% in the years thereafter as end markets are developed for various waste product. At the current rate of 18% recovery, Michigan's material recovery facilities have an overall waste throughput of 366,232 tons per year and to achieve a 45% rate of recovery capacity, 1,285,639 tons per year is required. Such expansions will necessitate the creation of 100 new drop off sites across the state as a function of county waste output (Ibid).

TABLE 1
SOLID WASTE DISPOSED IN MICHIGAN LANDFILLS
(All Figures in Cubic Yards)

Fiscal Year	Michigan	Canada	Other States	Totals
FY 2011	35,857,919	6,983,127	2,886,955	45,728,001
FY 2012	34,485,534	6,512,223	2,912,750	43,910,507
FY 2013	34,233,158	7,594,716	2,785,700	44,613,574
FY 2014	36,281,718	7,639,167	2,830,235	46,751,120
FY 2015	36,862,512	8,090,942	2,672,899	47,626,353
FY 2016	37,488,887	8,883,958	2,690,793	49,063,638
FY 2017	37,723,925	10,572,922	2,307,845	50,604,692
FY 2018	39,932,328	9,770,385	2,742,502	52,445,215
FY 2019	43,324,503	9,534,163	2,845,978	55,704,644
FY 2020	40,386,639 [3]	9,053,889 [4]	3,256,719 [5]	52,697,247 [6]

Table 1: Solid Waste Disposed in Michigan Landfills

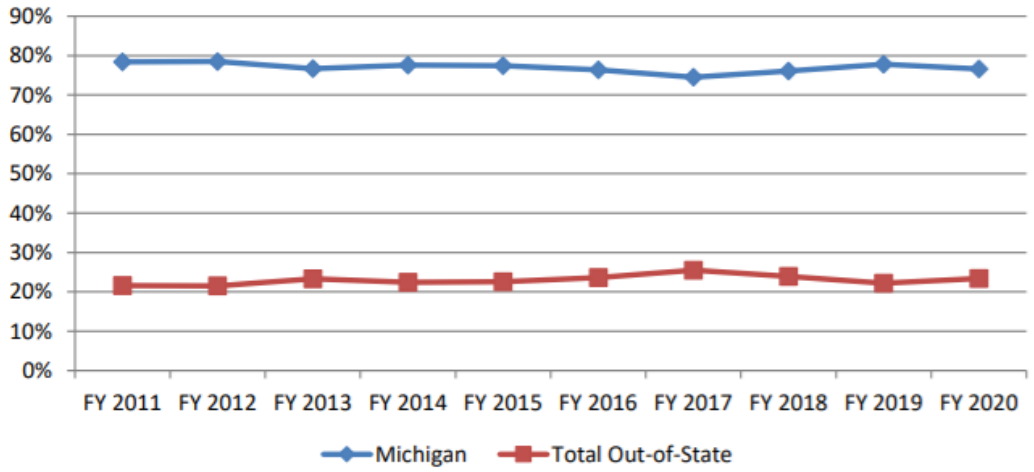

Figure 4: Michigan and Out-of-State Waste as Percentage of Total Disposal in Michigan Landfills

In addition to the material recovery sector present in Michigan, there are two forerunning organizations of interest when analyzing 'circularity' in the state: NextCycle Michigan and the Michigan Materials Marketplace.

NextCycle Michigan:

The NextCycle Michigan program is an EGLE-led initiative developed in partnership with the Ann Arbor-based Resource Recycling Systems (RRS) organization. Described as the next step in the state's "recycling and recovery economy", NextCycle has partnered with over 30 public and private entities to divert waste streams from landfills and help the state reach a 45% recovery rate. Elisa Seltzer, senior consultant at RRS, describes NextCycle as "a data driven initiative that is looking to fill the gaps in the supply chain [to] reduce waste going to landfills", while also "increasing access [to comprehensive drop-off centers]; reaching underserved communities; looking through a strong lens of climate, diversity, equity, and inclusion; and also bringing in and leveraging other private and public sector partners [to drive higher diversion rates]… and spur strong end markets".

EGLE reports that $97 million is being allocated for the development of recycling infrastructure and innovation in the state. The economic activity that NextCycle projects from this recycling capacity increase are $9 billion in potential total annual labor income, as well as $33 billion in economic output in developed end-markets. In tandem with materials management is funding for NextCycle's "Innovation Challenge", which "is a multi-track idea incubator that provides technical support and subject matter expert mentoring to move ideas towards implementation" (NextCycle, n.d.). Seltzer describes these challenge criteria as centered around "demonstrable impact" in reduction and/or reuse efforts. This flexible structure roughly resembles what Alan Kay, renowned computer scientist, discussed with the Ellen MacArthur

Foundation on the subject of innovation and scaling up the circular economy. He describes the availability of programs like the "Innovation Challenge" as foundational for such efforts.

> *"As the immensity of the [natural system limitations] starts impinging on us, we have to go away from funders trying to pick goals. It's natural, it's their money, they're responsible. But all the good funders in history let the people who are going to do the work pick the goals. What the funders did was to put together a vision – which is not the same as a goal and is not the same as a mission – a vision is a picture of a future state of things which would be really nice if we had."*
> *– Alan Kay, 2020 EMF Summit* (EMF, 2019)

As mentioned in Part 2 of this document, recycling operates under the materials management paradigm, and can only be described as 'semi-circular' – using some principles of circularity while not establishing others. When asked about the place of NextCycle in the broad scheme of Michigan's circular economy, Seltzer commented that while industry leaders are answering the calls for corporate sustainability and recycling is a state priority supporting carbon neutrality, the Whitmer Council on Climate Solutions does not yet have a workgroup on supply chain materials management. Nevertheless, NextCycle Michigan is guiding the governmental discussion on circularity in the state.

Michigan Materials Marketplace:

The Michigan Materials Marketplace (MMM), alternatively, addresses waste and recycling through enterprise. Organized by the United States Business Council for Sustainable Development (USBCSD), the MMM works to foster business-to-business partnerships where waste products from one business can be implemented into the useful processes of another. This type of thinking favors models of production somewhat akin to the examples set by eco-industrial parks like Denmark's Kalundborg (Figure 5). A central challenge to these eco-industrial parks is the trust that must be built between disconnected entities. If one business relocates or rolls back on production, changes in co-product inflows can expose companies that use the resources to risk. MMM's strategy leverages business collaboration, web-based platforms, and consultation to activate the potential of industrial participation in semi-circular practices. The MMM welcomes the use of "Circular Economy" in how they communicate their project model. An interesting dimension of the USBCSD's work on circular systems is that it has established similar hubs in Austin, TX , Tennessee, Ontario, and Ohio. As will be covered in the next section, such work will be essential for creating a nation-wide effort on circularity.

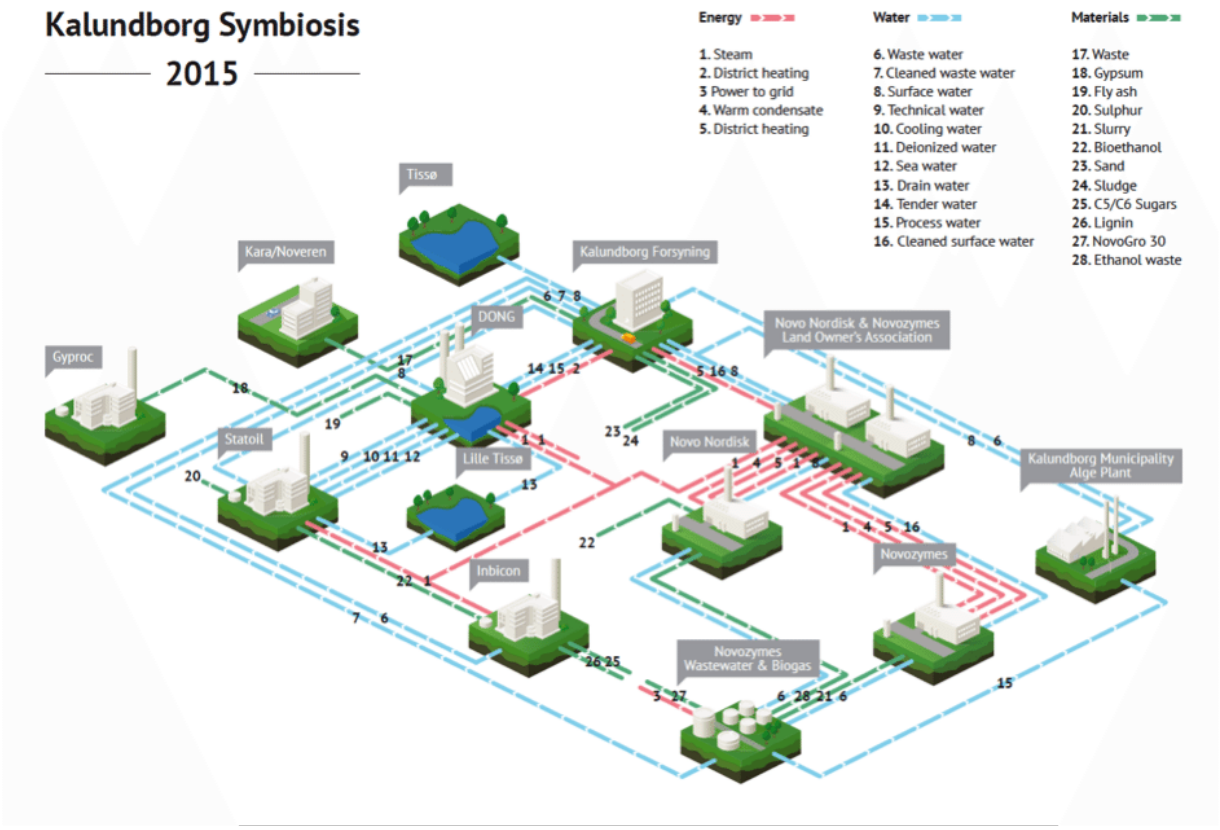

Figure 5: Kalundborg Eco-Industrial Park Model (2015) (Singh, 2016)

Part 4: The Plight of Michigan's Predisposition

There are broad and unavoidable barriers to circularity in the U.S. Where entire EU nations and their economies can frequently fit into one of our states, the U.S. faces the realities of space and regional power. The unfortunate reality of this social organization is that there is little room to shift practices without top-down policy driving national circularity. What makes the EU an ideal archetype of circular transitions is that they codify into law a common language and process by which all constituents participating in the system can operate and plug into one another. Conversely, U.S. state laws and priorities on waste differ, which limits the power and reach of monetary mechanisms and regulations to incent industries into alternative behaviors, collaborating around circularity, and establishing effective communication networks with government.

Designing meaningful eco-industrial parks like Kalundborg requires high proximity of industries to one another, but that isn't always possible or economically practical in the United States. Perhaps this challenge might be addressed in Biden's push for domestic supply chains. The topic of international markets further complicates the ability of firms to deliver on wholly circular models unless there is broad homogeneity, or accessible policy landscapes, for the circular economy globally. The U.S Census reports Michigan's imports by final destination

amounting to over $115.952 billion in 2020, a value accounting for 5% of the total national share, and a -18.5% reduction from 2019 (Census, 2021a). Furthermore, Michigan exported $59.921 billion in commodities making up 3.1% share of the nation's total export in 2020 at a -21.2% change from 2019 (Census, 2021b). These are all exchanges that under a circular paradigm, must share common goals and techniques for ensuring that virtuous circular design and procedure is conducted.

Beyond the localization of circular-leaning organizations in Michigan, the creation of a broad culture around circularity nationally can capitalize on untapped opportunity. Arnoud Passenier, senior strategic advisor of circular economy at the International Department of the Ministry of Environment in The Netherlands, works with other nations to help develop their circular goals. In speaking with the EMF about universal circular policy goals, Passenier paints an image of high potential among nations and regions that have not yet embedded themselves too deeply in the recycling or semi-circular economy. He believes that stunted or underdeveloped systems can design pathways which 'leapfrog' the various stages that semi-circular systems have experimented with over time. The EU Green Deal includes an excerpt detailing how "[i]t takes 25 years – a generation – to transform an industrial sector and all the value chains. To be ready in 2050, decisions and actions need to be taken in the next five years" (EU, 2019). Why then are government initiatives only focused on recycling in Michigan? Under a virtuous circular paradigm, perhaps the waste streams of scale that enable the supply for robust recycling markets might not exist.

Part 5: The Importance of Government-Enterprise Collaboration

To develop an efficient path forward, Michigan must create policy centered around the feedback of industry native to, or operating in, the state. As mentioned in Part 4, NextCycle Michigan is already "meeting [stakeholders] where they are" to develop government-industry partnerships in the pursuit of strong end-markets. Consistently expressed across actors featured by the EMF who are involved in transition processes overseas was the conditional nature of these partnerships in manifesting circular change. Passenier attributes the highly successful policy programs in advancing Dutch circularity to consensus between industry, the public, and government. Beyond the material and energy flows, information flows are also central to any economy. Alan Kay describes how the wicked problem of linear economics – take-make-use-lose – is that "[all systems] are non-linear" (EMF, 2019). There will be no broad stroke policy mechanism to remove us from this organization of society and economy. The consent and participation of stakeholders across the state will be the only way any substantial strides towards circularity can be achieved. Fundamentally, the quality and design of products entering the market are dependent on the firms that manufacture them. Leaders cannot endlessly promote post-consumer solutions to upstream problems, as they justify waste.

Part of what makes post-consumer solutions so appealing to industry is that it fits into the comfortable and forecasted 'linear' paradigm. Up until investor signaling for corporate sustainability reached critical mass, private sector leaders were still making decisions under a

linear paradigm with lasting impacts financially. Acting off forecasts for plastic demand in the coming decades, "the U.S. chemical and plastics industry has invested extensively in new production capacity." The World Business Council for Sustainable Development (WBCSD) *Circular Economy Practitioner Guide* and the EMF *Financing the Circular Economy* both recognize the "premature or unanticipated write-downs, devaluations or liability conversions" of assets as a risk visited upon linear value chains (Andrew Morlet et al., n.d.; wbcsd, n.d.). During the EMF Summit 21, *Growth in a Circular Economy* panelist Audrey Choi, Chief Sustainability Officer at Morgan Stanley, confirms that sustainability-focused investors are cautious of stranded assets beyond the energy sector (EMF, 2021). In *Financing the Circular Economy*, the EMF references corporate movements like the *New Plastics Economy Global Commitment* as "increasing the use of recycled content [and thus reducing] virgin plastics demand", despite recent investments in production capacity (Andrew Morlet et al., n.d.).

It is therefore key that industry risks are identified under climate change and/or a green transition, and that they are appropriately managed with government intervention to create an even playing field toward circularity. The Biden administration's May 2021 Climate-Related Financial Risk executive order sees to the development of a strategy for:

> *(a) the measurement, assessment, mitigation, and disclosure of climate-related financial risk to Federal Government programs, assets, and liabilities in order to increase the long-term stability of Federal operations;*
>
> *(b) financing needs associated with achieving net-zero greenhouse gas emissions for the U.S. economy by no later than 2050, limiting global average temperature rise to 1.5 degrees Celsius, and adapting to the acute and chronic impacts of climate change;*
>
> *(c) areas in which private and public investments can play complementary roles in meeting these financing needs — while advancing economic opportunity, worker empowerment, and environmental mitigation, especially in disadvantaged communities and communities of color.* (Wh.gov, 2021b)

Part 6: Business Opportunities Under the Circular Economy: Corporate, Small, and Entrepreneurship

Competition is a sacrosanct component of the United States economy across both sides of the political aisle. A central tenant of Biden's climate goals is to maintain the United States' competitiveness on the global stage, while also ensuring supply chain security. Abroad, major brand like Ikea and H&M are exploring their unique pathways towards circularity. The question then arises: how will the U.S. compete? The same *Growth in a Circular Economy* EMF Summit 21 segment contained the following quote:

> *"If you are a company manufacturing a product, you generally compete on price… That is about extracting every little bit of value that we can on the [race] to the bottom. We need to turn that on*

its head so that you have this generation of value, whereby you are racing to the top. So, you are competing on price, but in a different way. You build a circular model, [and you work to] offer that for less money."

– Dame Ellen MacArthur

Wolfgang Blau, former COO at Conde Nast, now Visiting Research Fellow at Oxford University and EMF trustee, follows up to this quote by stating "[the transition has] significant investment risks, and it is not a given, just because circular economy extends as a whole, that it will work out for that individual company" (EMF, 2021). The concern Blau raises is important when discussing publicly traded companies whose primary responsibility is to shareholders. While many investors now recognize the ecological ceiling of our planet, there remains a large portion of society, especially in the West, that believe in traditional growth models. Despite the increasing desire to go circular, the realities of existing companies constrain the room to pivot in industrial practices. This could explain why the beverage industry maintains inefficient product design. There are sunk costs in capital, the value chain has been rationalized, and a precedent for return-on-investment expectations has already been set. Without extreme risk-taking measures and effective communication with shareholders, their transition will be slow.

Where competition on pricing has in recent years squeezed out small and medium sized business – not to mention the devastating effects of the COVID-19 pandemic on those that remained – circularity creates new opportunity in this space. The EMF has continually advocated the power of local systems in advancing global circularity. Where industry incumbents have cemented their rule in the linear economy, startups and small businesses have the unique chance to rewrite the playbook on supply chains. Circular design is rife with opportunity that hasn't been seized upon by leading industry groups for the reasons outlined above. Foundational to Doughnut economics is the concept of distributive economies, wherein the benefits are dynamic and shared.

Part 7: Extended Producer Responsibility:

A tool increasingly pursued by individual states to drive upstream innovation has been the passing of extended producer responsibility (EPR) legislation. In the linear economy, the responsibility of producers over their product traditionally goes as far as the point of sale. EPR redefines the scope of this producer responsibility and extends it to the entire life cycle of the product through to the post-consumer, end-of-life (EoL) stage that has historically been shouldered by public dollars. The 2021 OECD report *Modulated Fees for Extended Producer Responsibility Schemes (EPR)* defines the policy structure as follows:

"Producers can individually or collectively fulfill their EPR obligations. In individual producer responsibility (IPR) systems, producers take responsibility for their own products, whereas in collective producer responsibility systems (CPR) producers of the same product type collaborate and pay an EPR fee to a Producer Responsibility Organisation (PRO). EPR fee modulation is the

modification of fees paid by producers in a CPR scheme based on measurable product characteristics."

– *OECD, 2021* (Andrew Brown et al., 2021)

By enforcing fees on EoL management, firms are incentivized to create products that are readily recyclable or mitigate post-consumer management. In 2021, Maine and Oregon became the only states in the nation to have successfully passed packaging CPR bills. Several other states such as New York are looking to follow suit (*NY State Senate Bill S1185C*, n.d.). These two case studies, while similar in goals, differ in execution. Role of government and industry in fee scheduling is of principal focus when drawing comparisons. Where Maine adopted a government-led approach to EPR management, Oregon placed more power in the hands of industry to design PRO plans. The performance of either case has yet to be demonstrated. Michigan, like all states in the U.S., could equally pass EPR legislation. Not only would this aid in driving essential upstream action, but this policy would also rapidly accelerate the timeline for Michigan's recycling rate goals. The introduction of EPR to a state will also incentivize discourse and involvement of the private sector, thereby driving the public-private collaboration mentioned in Part 5.

Part 8: Policy Options for Michigan:

Based on the analysis above, the following recommendations are proposed:

I. Extended Producer Responsibility and a Revised Part 115 of the Solid Waste Management of the Natural Resources and Environmental Protection Act:

Michigan's Solid Waste Law Part 115 is 25 years old. Recently, the Michigan Recycling Coalition has presented an eight-bill update to the law. An effective revision to the Michigan Solid Waste Law could dawn new opportunities in responsible resource management and be coupled with a robust Extended Producer Responsibility bill. Changes to Part 115 should include formal definitions of circularity to qualify circular business models and claims. Developing or applying metrics around this definition will be instrumental in setting an example for state-based conventions around circularity.

II. Establish a Supply Chain Environmental Impact Assessment Workgroup in the Council on Climate Solutions:

Scope 3 emissions represent GHGs incurred along the value chain of a product or service. This dimension of the state's carbon footprint has not yet been represented in the Michigan Council on Climate Solutions. For many industries, these vectors of emissions can represent a significant portion of their overall footprint. Equally as important as preserving material value of goods, is demonstrating reductions in overall environmental impact of products. This aligns with the third virtuous circular principle of the Ellen

MacArthur Foundation: Regenerating Natural Systems. Quantifying life cycle GHG emissions estimates, water depletion, ecosystem preservation, toxic substance release data is possible through policy supporting mandatory disclosure. These metrics will allow for comparative analysis of environmental performance among products and processes.

III. Continue to Expand Innovation Opportunities:

The state can expand upon programs like the NextCycle Michigan Innovation Challenge to spur new business model and system designs that draw on the truest potential of the circular economy vision. Furthermore, leveraging the U.S. EDA Economic Development Districts (EDDs) to generate coordination around circular value and innovation will not only deliver on regional sustainable development goals, but also create efficient, interconnected, and competitive local economies. The circular economy is a paradigm shift and must occur throughout all systems in Michigan. Expanding the scope of this innovation into less immediate and demonstrable areas of impact such as education, governance, and community will be essential for a comprehensive transition.

IV. Coalition Building with Other States in Support of National Circularity Agendas:

Through coalition building with other interested states, effective signaling to the federal government for top-down legislation on circularity can be achieved. These partnerships will be vital for scaling up the circular economy through homogenized policy and advocacy landscapes. By creating a shared narrative around circular development, the U.S. can usher in a globally competitive circular economy.

Conclusion:

The shift to a circular economy is a complex task with responsibility falling on all levels of our state and country. In this unique opportunity of societal rearrangement, intentional steps to address equity and justice that are inexorably tied to the linear economy must be addressed. Jobs must be dignified and resourced; oppositionists must be heard and included in the conversation; and younger generations must be enrolled in the attitudes, beliefs, and behaviors of the circular paradigm. There are a multitude of ways this future can manifest, but it all begins with how strongly we lean into policy that enables the transition.

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