

DOMICOLOGY:
A
COMPREHENSIVE APPROACH
TO
STRUCTURAL ABANDONMENT

Rex L. LaMore, Ph.D.
MSU Center for Community and Economic Development & Urban
and Regional Planning Program

<https://domicology.msu.edu/>

-
- Why are there abandoned structures in our communities?



Factors contributing to blight and abandonment

Social

- Racial Segregation
- Population loss
- Housing preference change
- Commercial preference change
 - (Malls→Amazon)
- Anthropogenic hazards
 - (Chernobyl/War)
- Crime and perceived safety

Economic

- Job loss
 - Competition
 - Automation
 - Loss of non-renewable resource (mining town)
- Amazon Effect

Governmental

- Small box government/inflexible municipal boundaries
- Declining public revenues
- Decline in the quality of public services
- Poor schools

Other

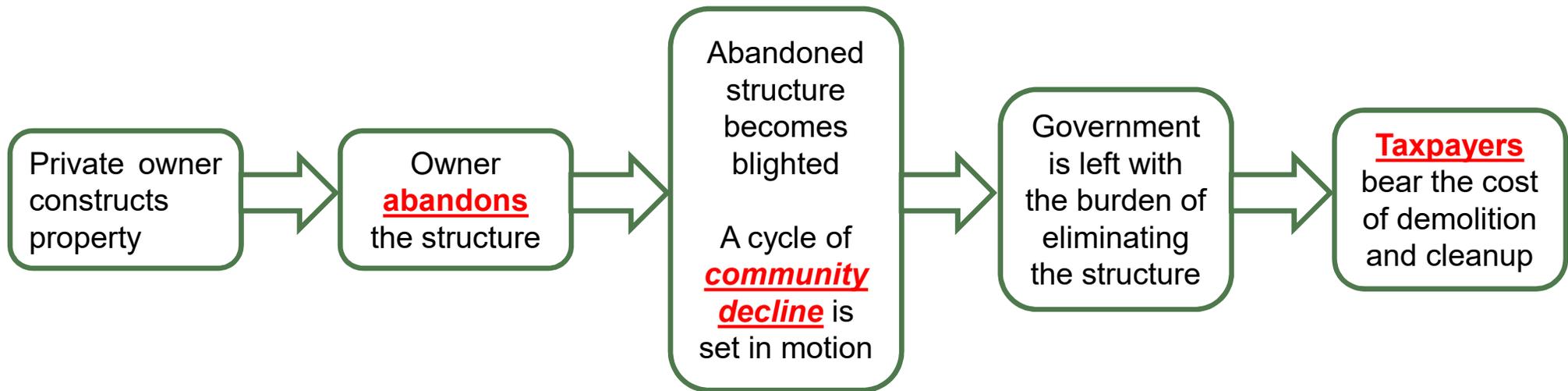
- Natural Disasters



-
- Why are there abandoned structures in our communities?
 - Why does the public have to pay for the removal of these structures?



To summarize: current system of abandonment



- Why are there abandoned structures in our communities?
- Why does the public have to pay for the removal of these structures?
- What are alternative paradigms to our current built environment ?



If we decided that abandonment was not acceptable...

What would we do next?

Reactive:

Cope with currently abandoned structures

- **What would we do with the structures** that are already or soon-to-be abandoned?
- **How can we find value** in these obsolete structures to reduce the cost of removal?

Proactive:

Embrace lifecycle paradigm for future structures

- **What would we do to STOP** future abandonment?
- **How would we secure the financial resources** to remove obsolete structures?

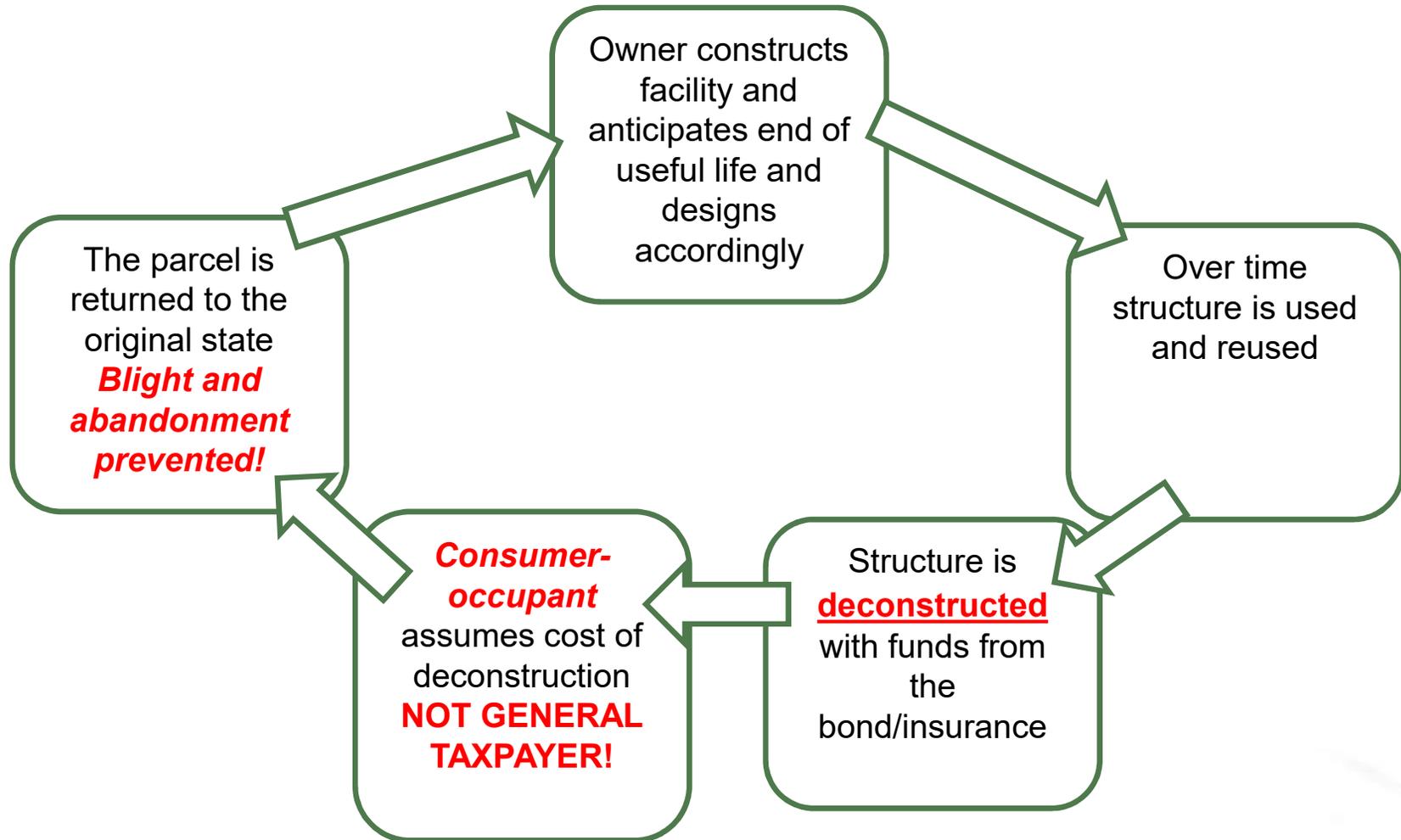


If we decided that our current built environment paradigm was not acceptable, what might we do? Might we reimagine our built environment that:

- We would recognize that the built environment **has a life cycle**
- We would **plan, design, construct, use, reuse & deconstruct** with this life cycle in mind
- We would develop public policies to provide **financial assurances** that at the end of a structures useful life there would be the necessary **resources to remove the structure**
- We would **support product development** that reuses salvage materials
- **Support businesses** that collect and sale these products
- **Encourage consumers to purchase** these products where appropriate



The Alternative Paradigm



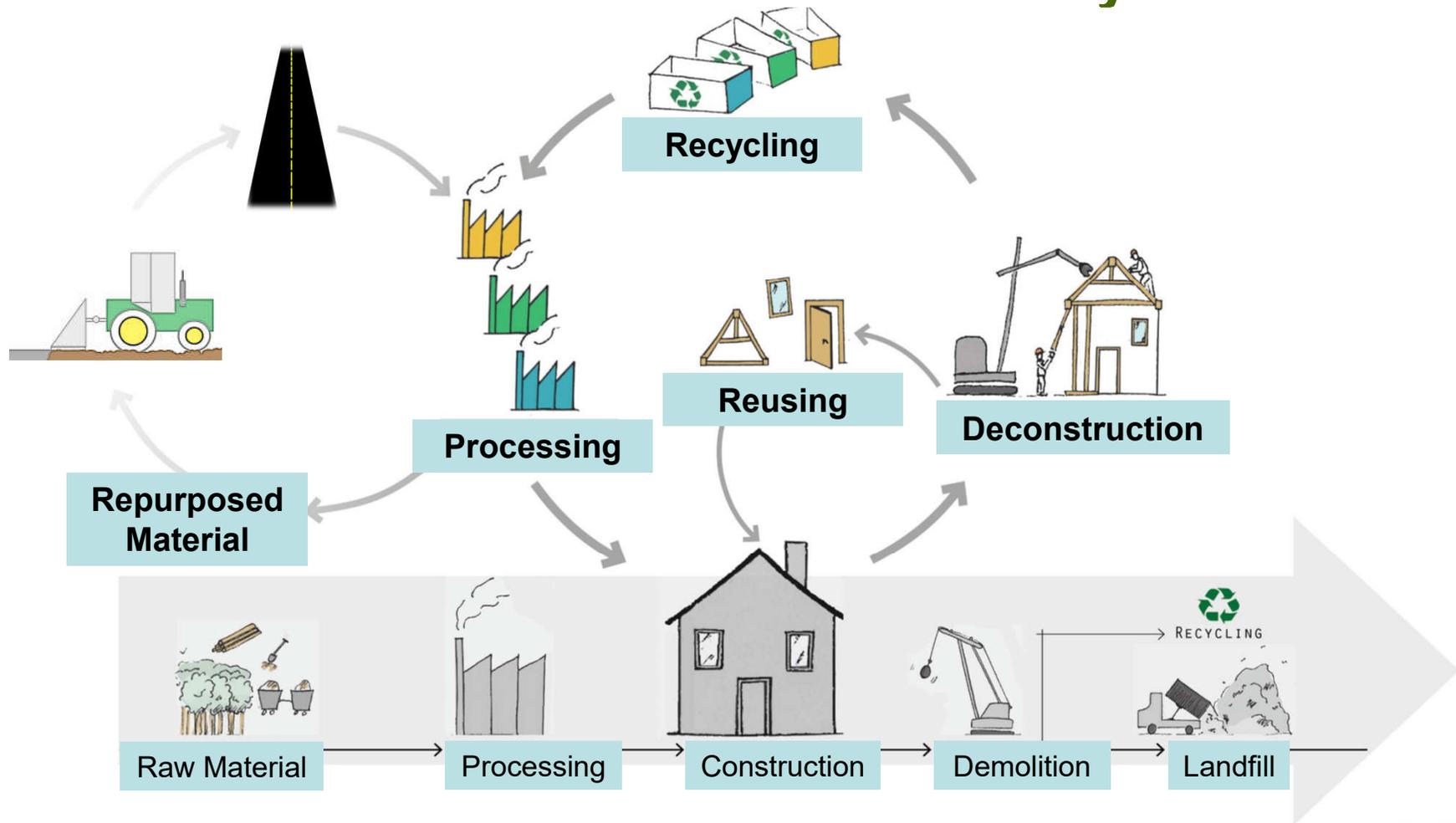
Welcome to the world of

Domicology

The study of the economic, social, and environmental characteristics relating to the life cycle of the built environment.



New Structural Paradigm: Circular Built Environment Ecosystem



Structural Abandonment

“Waste is a wholly human concept.”

Steve Breyman

Rensselaer Polytechnic Institution



DOMICOLOGY:
A
COMPREHENSIVE APPROACH
TO
STRUCTURAL ABANDONMENT

Rex L. LaMore, Ph.D.
MSU Center for Community and Economic Development & Urban
and Regional Planning Program

<https://domicology.msu.edu/>

Session Overview

- Examine our current relationship with the built environment.
- Examine the social, economic and environmental consequences associated with abandonment.
- Propose a **new built environment paradigm** to reduce the negative effects of blight.
- Explore methods of financing blight removal that reduces the burden on vulnerable people and places.
- Introduce the Concepts of a Circular Economy

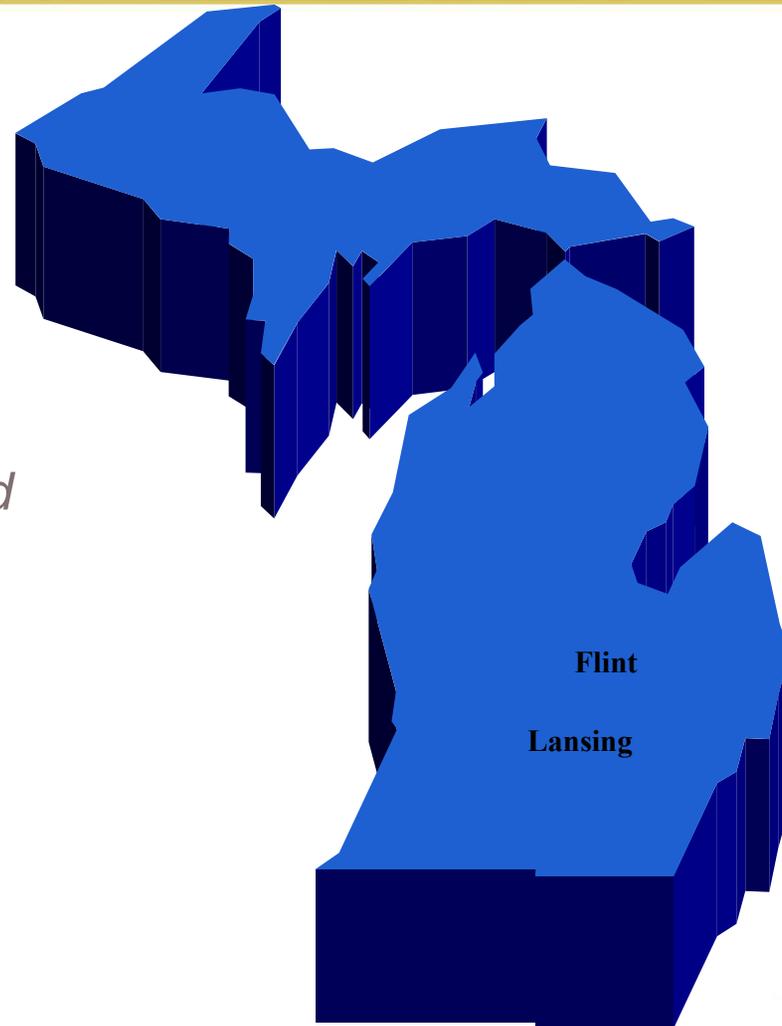


Michigan State University
Center For Community and Economic
Development

OUR MISSION:

Create, apply, and disseminate valued knowledge through responsive engagement, strategic partnerships, and collaborative learning.

We are dedicated to co-creating sustainable prosperity and equitable economies with communities.



Factors contributing to blight and abandonment

Social

- Racial Segregation
- Population loss
- Housing preference change
- Commercial preference change
 - (Malls→Amazon)
- Anthropogenic hazards
 - (Chernobyl/War)
- Crime and perceived safety

Economic

- Job loss
 - Competition
 - Automation
 - Loss of non-renewable resource (mining town)
- Amazon Effect

Governmental

- Small box government/inflexible municipal boundaries
- Declining public revenues
- Decline in the quality of public services
- Poor schools

Other

- Natural Disasters



BLIGHT IS...



...a public nuisance.



...an attractive nuisance.



...fire damaged or is otherwise dangerous.



...has code violations posing a severe and immediate health or safety threat.



...open to the elements and trespassing.



...already on Detroit's BSEED Demolition list.



...owned or is under the control of a land bank.



...has had the utilities, plumbing, heating or sewerage disconnected, destroyed, removed, or rendered ineffective.



...a tax-reverted property.



...has been vacant for 5 consecutive years, and not maintained to code.

[BLIGHT REMOVAL TASK FORCE PLAN]

Structural Abandonment in the United States

Residential Properties Vacancy

- **7.4 million** homes are **currently vacant** and **not being marketed for sale or rent** in 2012
 - (The Joint Center for Housing Studies of Harvard University).
- **~40%** of the nation's **vacant homes** are **located in just 10%** of all census tracts
 - (Duke 2012).



Source: http://articles.chicagotribune.com/2013-07-24/news/sns-rt-us-usa-detroit-blight-20130724_1_blight-removal-blight-problem-urban-blight

Structural Abandonment in the United States

Commercial Properties Vacancy

- **>two dozen malls** have **shut down in the last four years** and another **60 malls** are on the brink.
 - (New York Times Report)
- **36%** of commercial properties are vacant in Detroit, Michigan as estimated.
 - (Detroit Works Project 2012)



Source: <https://www.youtube.com/watch?v=QmNyVFibCIQ>

Vacant Properties: The True Cost to Communities

Austin, TX:

- **blocks with vacant buildings** compared to blocks without:
 - **3.2x drug calls**
 - **2x violence calls**
 - **1.8x theft calls**

St. Louis, MO:

- has spent **\$15.5M**, or **\$100 per household**, on **vacant building demolition** in the past 5 years.

Philadelphia, PA:

- found a **\$7,627 net loss in value** for houses **within 150 feet of a vacant or abandoned property** in a 2001 study.
- spends **\$1.8M** per year **cleaning vacant lots**.

Detroit, MI:

- spends **\$800k** per year, on **vacant building demolition**.

United States:

- **>12,000 fires** break out in vacant structures each year in the US.
 - Resulting in **\$73M property damage annually**.
 - Most are the result of **arson**.



Source: <https://www.theguardian.com/cities/2014/apr/03/the-death-of-a-great-american-city-why-does-anyone-still-live-in-detroit>

Costs to Homeowners

- Higher Insurance Premiums
 - Proximity to vacant/abandoned properties makes obtaining homeowner's insurance, mortgages, and loans for home improvement more difficult.
 - Insurance companies pay attention to neighborhood dynamics.
- Poorer Quality of Life
 - Abandoned buildings = social fragmentation
 - Feelings of isolation weaken the community.
 - Large numbers of vacant buildings symbolize that no one cares.
 - Increases likelihood that property values will continue to decline, resulting in further abandonment.
 - Aesthetic impact of abandoned properties
 - Not easily quantified in dollars



Source: <https://www.vectorstock.com/royalty-free-vector/money-eye-house-character-cartoon-style-vector-17877149>

Health Impacts

- Industrial and commercial sites may contain other contaminants.
 - There are approximately 450,000 sites considered **brownfields** in the U.S.
- **Lead and asbestos** are highly dangerous health and safety hazards and found in many older structures.
 - Lead can cause lifelong learning and behavioral problems in children if they are exposed at a young age. Asbestos is a carcinogen.
 - Demolition can produce large amounts of ambient lead and asbestos dust.
 - Pre-removal of asbestos by certified workers is often required (increases cost of demolition and deconstruction)
- Demolition done using a **“wetting” process** can reduce these hazards, but does not eliminate lead dust completely



Wet demolition on the 10,000th Detroit demolition from the Detroit Blight Removal Task Force.

Source: <https://www.freep.com/story/news/local/michigan/detroit/2016/07/19/detroit-reaches-blight-milestone-10000-demolitions/87284392/>

Economic Impacts

- The removal of all the currently estimated abandoned residential properties (**7.4 million**) could cost over **\$88 billion dollars** (not including brownfield remediation costs).
 - The full cost of demolishing an average residential property is around **\$12,619** (City of Detroit-Blight Taskforce, 2016).
- Abandoned properties inherently **decrease the tax revenues available to public entities** to support public safety, debt retirement, public works maintenance and other critical social needs.
 - Local government financial stress due to loss revenues.



Source: <https://www.nytimes.com/2009/09/12/your-money/mortgages/12money.html>

Environmental Impacts

- Construction & Demolition waste (US EPA)
 - **136 million** tons generated each year
 - **¼** of all landfill waste



Source: <https://www.cityofpacificgrove.org/living/green-pg/solid-waste-recycling/solid-waste-recycling-information-business/debris-recycling>

- Hazardous materials
 - Increase the potential for public health concerns
 - Substantially increasing the public costs of demolition and clean up



Source: <https://www.todayshomeowner.com/video/how-to-remove-and-dispose-of-asbestos-siding-and-roofing/>

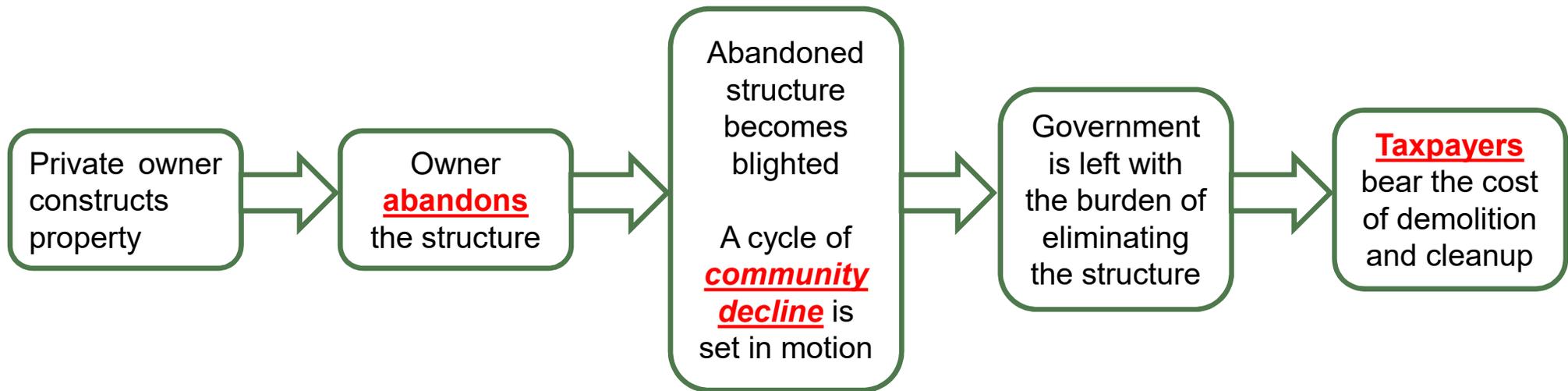
Environmental Impacts

- It is estimated that there are more than 450,000 brownfields in the U.S.
 - Cleaning up and reinvesting in these properties increases local tax bases, facilitates job growth, utilizes existing infrastructure, takes development pressures off of undeveloped, open land, and both improves and protects the environment.
- As 2016, there were 1,328 Superfund Sites listed
 - Michigan has 65 on the National Priority List
 - <https://www.epa.gov/superfund/national-priorities-list-npl-sites-state#MI>



Source: <http://greatlakesecho.org/2017/03/13/environmentalists-wonder-about-impact-of-michigan-brownfield-bills/>

To summarize: current system of abandonment



Summary of structural abandonment

NOT GOOD for people and places:

- It presents clear **health and safety hazards**
- It is **expensive** and we are **paying for it**
- It is an **unsustainable** use/abuse of resources

This is **our issue!**

SO WHY DO WE ALLOW IT?



If we decided that our current built environment paradigm was not acceptable, what might we do? Might we reimagine our built environment that:

- Recognize that the built environment **has a life cycle**
- We would **plan, design, construct, use, reuse & deconstruct** with this life cycle in mind
- We would develop public policies to provide **financial assurances** that at the end of a structures useful life there would be the necessary **resources to remove the structure**
- We would **support product development** that reuses salvage materials
- **Support businesses** that collect and sale these products
- **Encourage consumers to purchase** these products where appropriate



Welcome to the world of

Domicology

The study of the economic, social, and environmental characteristics relating to the life cycle of the built environment.



If we decided that abandonment was not acceptable...

What would we do next?

Reactive:

Cope with currently abandoned structures

- **What would we do with the structures** that are already or soon-to-be abandoned?
- **How can we find value** in these obsolete structures to reduce the cost of removal?

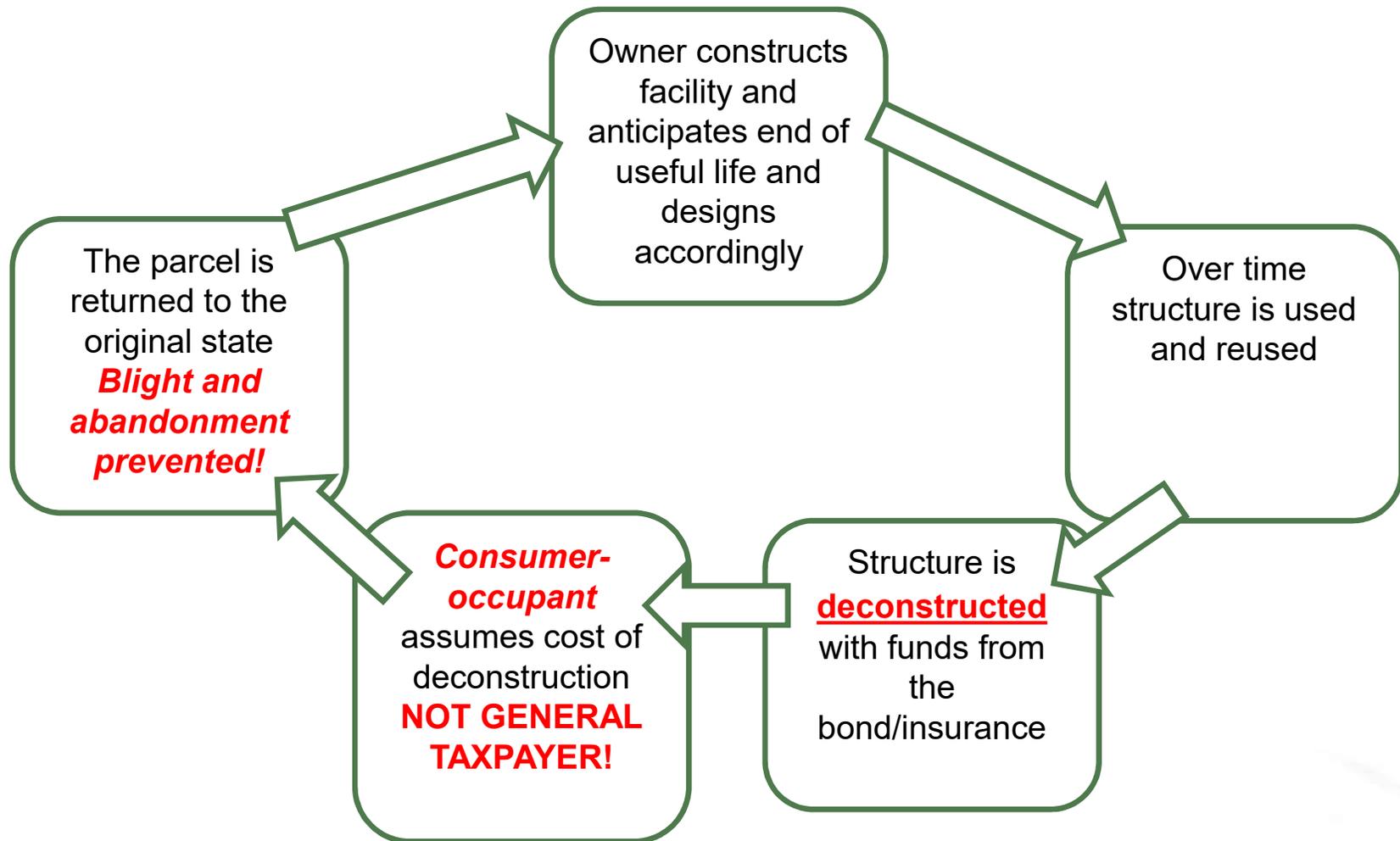
Proactive:

Embrace lifecycle paradigm for future structures

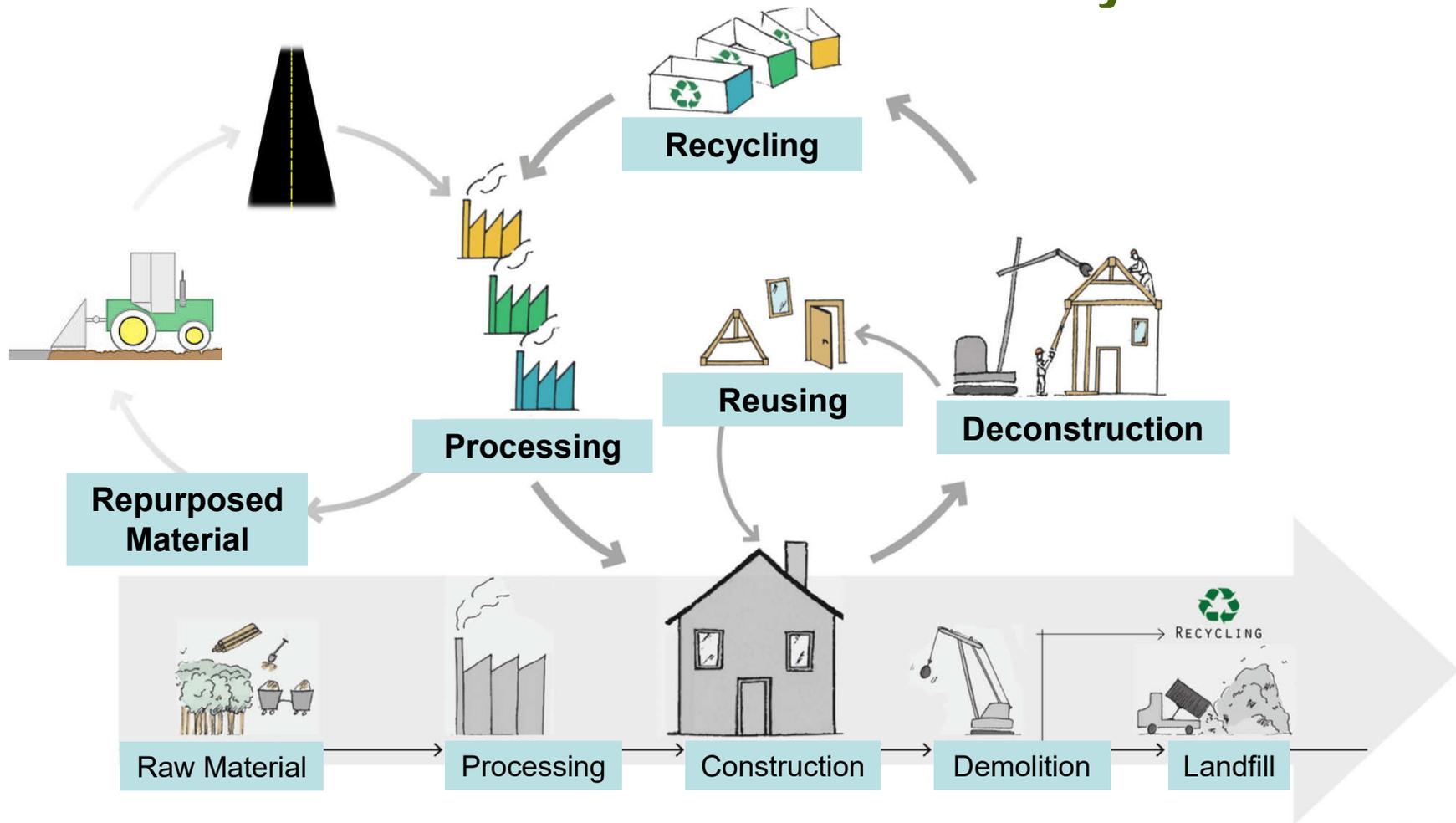
- **What would we do to STOP** future abandonment?
- **How would we secure the financial resources** to remove obsolete structures?



The Alternative Paradigm



New Structural Paradigm: Circular Built Environment Ecosystem



Policies and Practices to reduce taxpayers cost for blight removal

- Reactive Methods:
 - Adopt Local Ordinances that
 - Require a material reuse survey prior to demolition
 - Require a minimum % of material diversion from the landfill
 - Require structural deconstruction
- Proactive Methods:
 - Extended producer responsibility
 - Require that new construction
 - Purchase a deconstruction Bond
 - Secure a deconstruction Insurance policy



Source: <https://cdn1.vectorstock.com/i/1000x1000/59/20/c/artoon-money-saving-money-glass-vector-12235920.jpg>

Bonding

- Developer purchases the bond and it is secured with the local government entity for the cost of deconstruction.
 - This is already a practice for certain structures such as Wind Turbines, Solar Panels, Cell Towers.
- Cost of the bond can be assessed at the time of final building inspection.
 - The bond will be necessary for the issuance of the occupancy permit.



Source: <https://www.credibly.com/incredibly/business-capital-101/small-business-loan-bad-credit-okay/>

Insurance

- What is insurance?
- Examples of mandatory insurance
 - Michigan No-Fault Insurance
 - Affordable Care Act
 - Flood insurance
- Deconstruction Insurance Policy (DIP)
 - Seeks to hold those who use or construct structures accountable for the structure's end of life cost.



Source: <http://dailycaring.com/what-does-long-term-care-insurance-cover/>

Cost Estimate Formula

The cost estimate formula of an insurance policy for abandoned residential and commercial properties would follow as:

$$P_M = ((C_{SF} * S) / T) - X$$

Where P_m : Insurance Monthly Premium

C_{SF} : Deconstruction Cost per Square Feet

S : Floor Space (Sq. Ft.)

T : Length of Occupancy (Years/Months)

X : Value of Salvaged Materials (USD\$)



Cost Estimates

Insurance Premium Cost of Residential Property

C_{SF} = \$20 per sq. ft.

S = 2,600 sq. ft.

T = 70 years

X = \$32,000 estimate; however the true value of salvage materials depends on the local salvage market, quality of material, and sale price of salvaged materials

$$P_M = ((C_{SF} * S) / T) - X$$
$$= (\$20 * 2,600 \text{ s.f.}) / 70 / 12$$

=\$62 per month (minus value of salvage materials)

Cost Estimates

Insurance Premium Cost of Commercial Properties

C_{SF} = \$20 per sq. ft.

S = 6,500 sq. ft.

T = 30 years

X = \$80,000 estimate; however the true value of salvage materials depends on the local salvage market, quality of material, and sale price of salvaged materials

$$P_M = ((C_{SF} * S) / T) - X$$
$$= (\$20 * 6,500 \text{ s.f.}) / 30 / 12$$

=\$361 per month (minus value of salvage materials)

Local Actions you may wish to consider Ordinances

These ordinances can reduce the practice of landfilling C&D material:

- Requiring deconstruction of dwellings built before a certain age
 - Milwaukee requires this for a structure built in 1929 or earlier
- Debris Diversion requirements
 - Specifies by volume or weight a % of structural material from C&D projects that must be diverted from a landfill- examples Cook County, Ill. & Austin, TX.
- Require a Deconstruction Survey
 - To obtain a demolition permit a deconstruction survey required that identifies and values reusable materials - Palo Alto California
 - Usually coupled with a debris diversion requirement



Source: <https://www.clipartmansion.com/clipart/cartoon-city-hall.html>

Circular Economy

- Viewing the world from a Domicology perspective leads us to examine an overarching transformational concept of circular economy:

What is a circular economy? (Ellen MacArthur Foundation)

- Looking beyond the current take-make-waste extractive industrial model, a circular economy aims to **redefine growth**, focusing on positive society-wide benefits. It entails gradually **decoupling economic activity from the consumption of finite resources, and designing waste out of the system**. Underpinned by a transition to renewable energy sources, the circular model builds economic, natural, and social capital. It is based on three principles:
 - Design out waste and pollution
 - Keep products and materials in use
 - Regenerate natural systems

<https://youtu.be/zCRKvDyyHml>



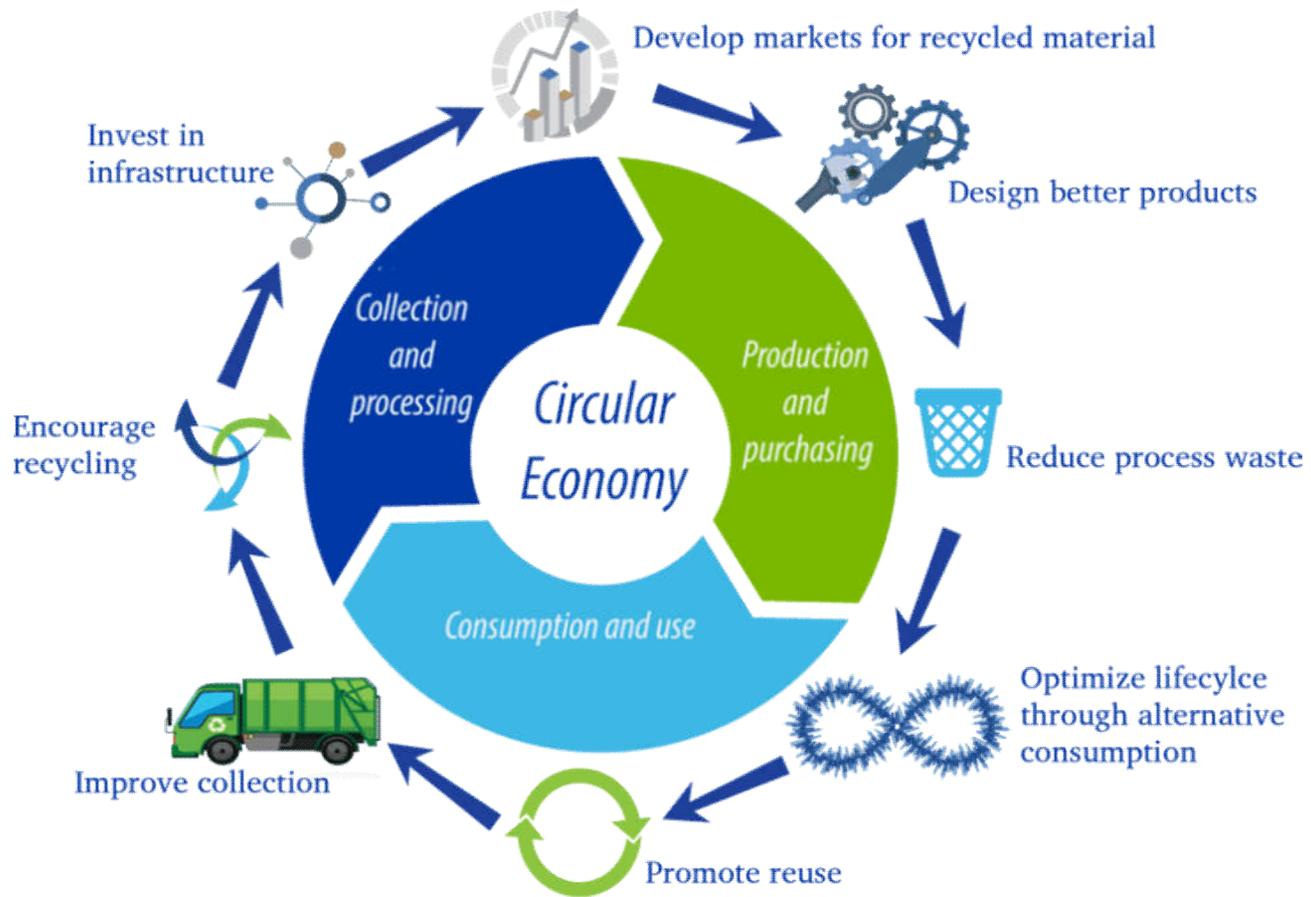
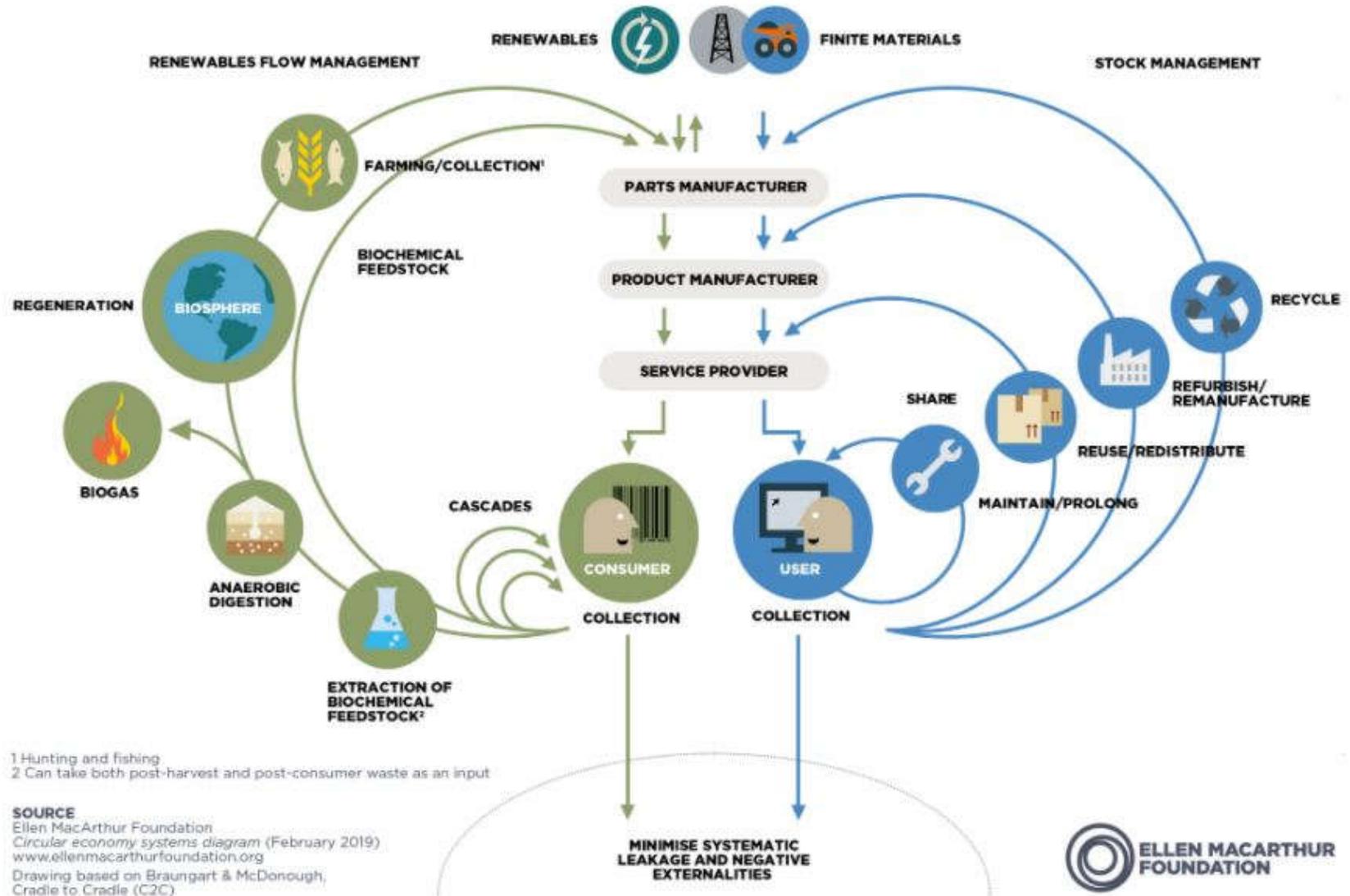


Image: Sustainable Global Resources Ltd.
Recycling Council of Ontario



1 Hunting and fishing
2 Can take both post-harvest and post-consumer waste as an input

SOURCE
Ellen MacArthur Foundation
Circular economy systems diagram (February 2019)
www.ellenmacarthurfoundation.org
Drawing based on Braungart & McDonough,
Cradle to Cradle (C2C).

Circular economies facilitate the development of new jobs, innovative technologies, and increased economic activity around various regionally developed supply chains and material flows that allow communities to capture and leverage the value of regional production capacity to create more environmentally sustainable economic activity. .



Circular Economies

- Identify and promote new markets in sustainable products and services
- Develop local supply chains

MICHIGAN STATE UNIVERSITY

Structural Abandonment

“Waste is a wholly human concept.”

Steve Breyman

Rensselaer Polytechnic Institution



Questions or comments?



DOMICOLOGY:
A
COMPREHENSIVE APPROACH
TO
STRUCTURAL ABANDONMENT

- Rex L. LaMore, Ph.D. MSU Center for Community and Economic Development & Urban and Regional Planning Program

<https://domicology.msu.edu/>