

California Bioresources Alliance Symposium 2022



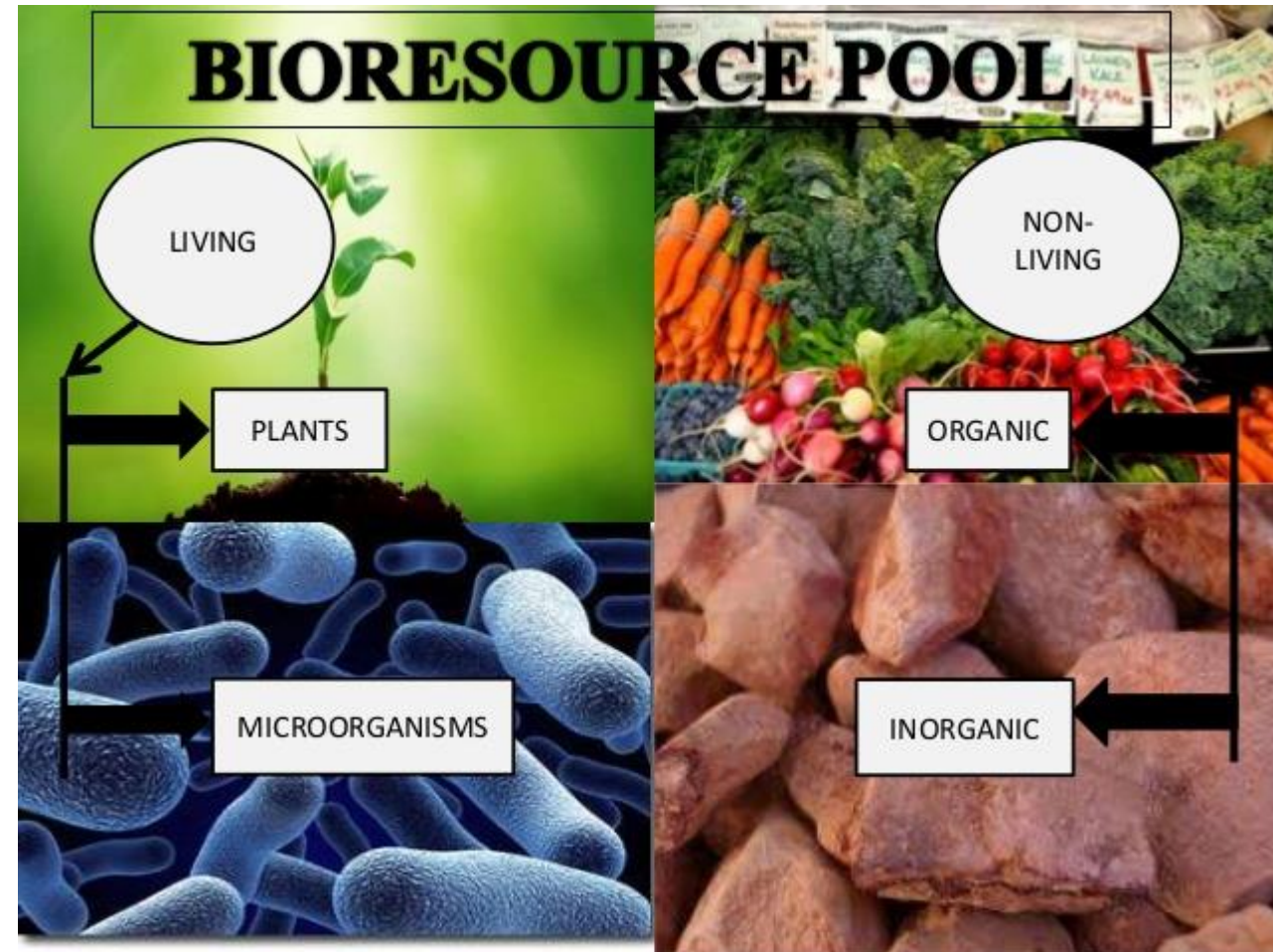
Bioresources Technology, Collaboration, Investment: Managing the Transition to Local Circular Economies in California

NOV 9 & 10, 2022, 9:00 am – 5:00 pm, both days – *A Free Zoom Symposium*

***A Brief Introduction by Dan Noble,
ACP ED of [HealthySoil.org](https://www.healthysoil.org) and President of [NobleBioresourcesInc.com](https://www.noblebioresources.com)***

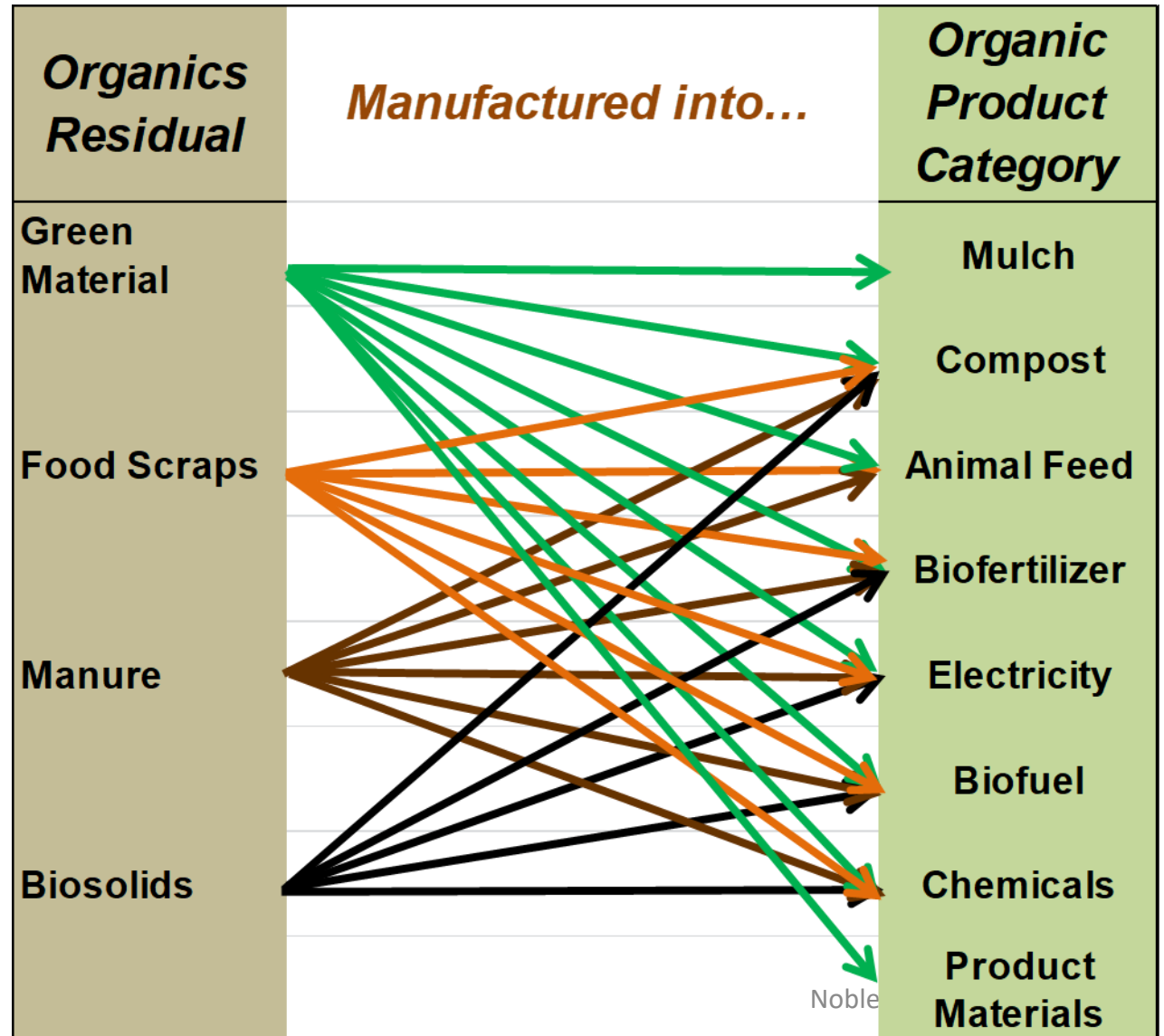
What ARE bioresources?

- **Primary** – food, fiber, feed, fuel
- **Secondary** – organic “waste”
 - Landscape clippings
 - Food scraps
 - Manure
 - Biosolids (made from sewage sludge)



What are “Bioproducts”?

- **Primary** – food, fiber, feed, fuel
- **Secondary** – Bioprocessed:
 - Green Material
 - Leafy
 - Woody
 - Food Scraps
 - Manure
 - Biosolids



Bioproduct Portfolio, or Categories

aka Categories of Value

- Mulch



- Compost



- Biofertilizer



- Biochar



- Animal Feed



- Electricity



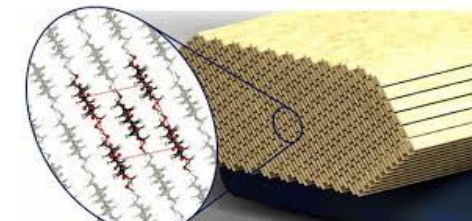
- Biofuels



- Chemicals



- Product Materials

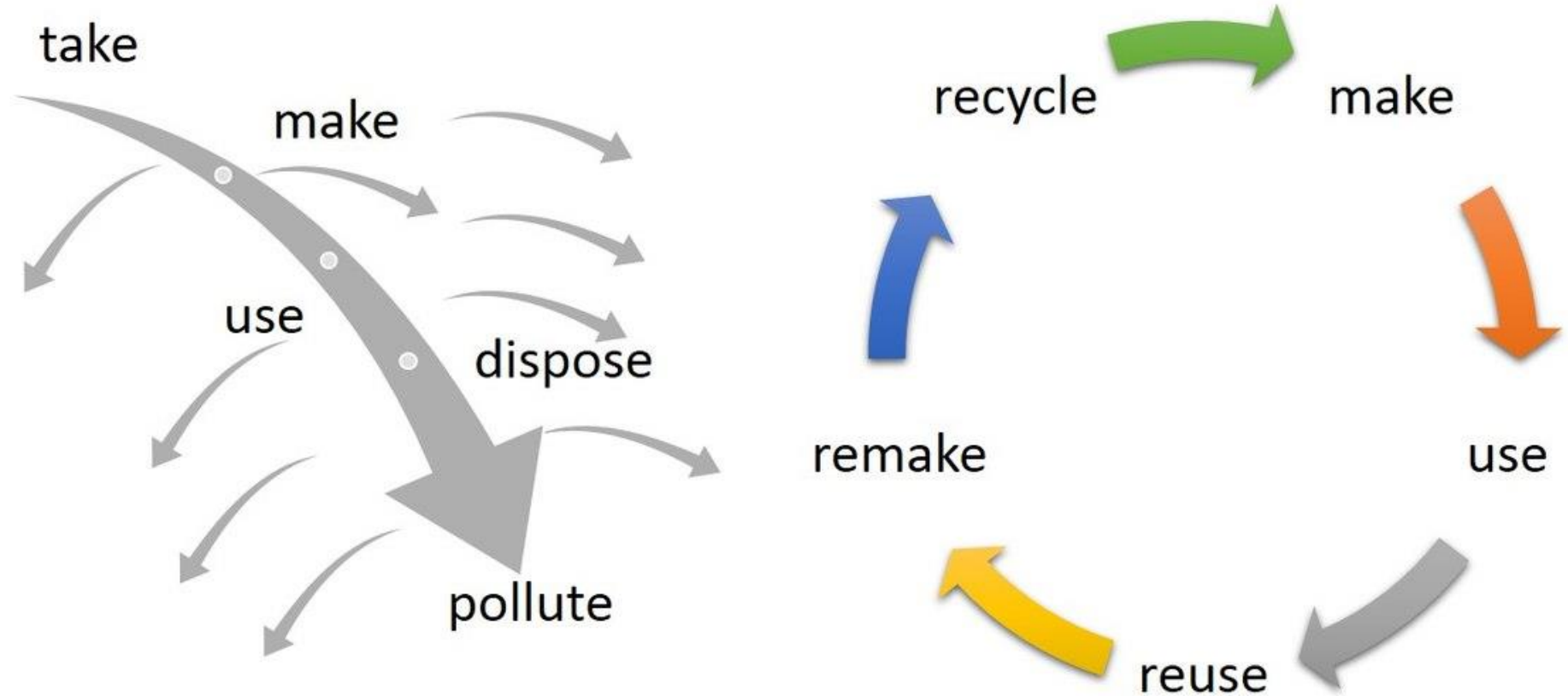


What is Bioprocessing?

- **Mulch Production**
- **Composting**
- **Biofertilizer manufacturing**
- **Biochar manufacturing**
- **Feed manufacturing**
- **Material manufacturing**
- **Chemical manufacturing**
- **Energy production**
 - Electrical
 - Fuels
 - Combined heat and power

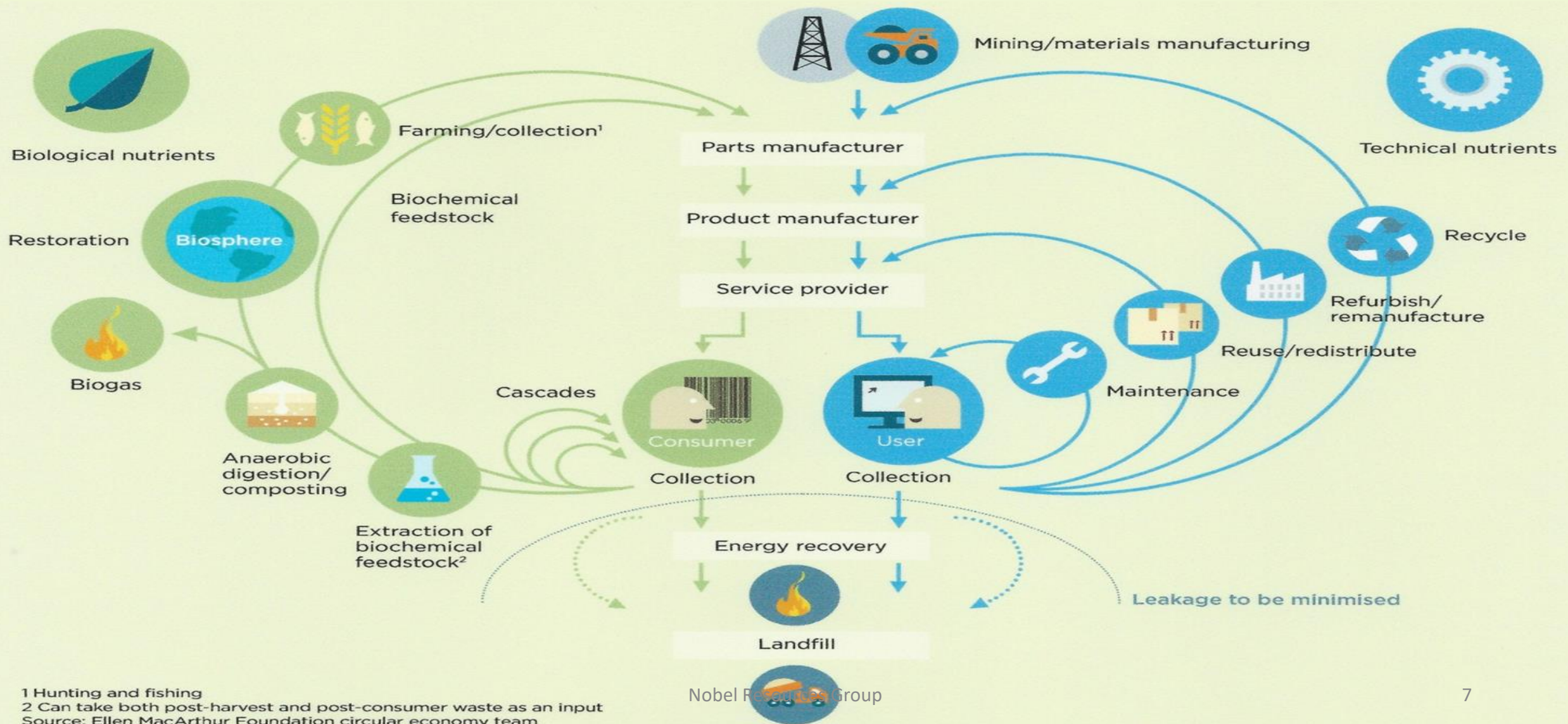


From a Waste Disposal to a Regenerative Economic Model



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Emerging Circular Economy: *an industrial system that is restorative by design*



1 Hunting and fishing
2 Can take both post-harvest and post-consumer waste as an input
Source: Ellen MacArthur Foundation circular economy team

US Bioeconomy Model*

The U.S. bioeconomy is economic activity that is driven by research and innovation in the life sciences and biotechnology, and that is enabled by technological advances in engineering and in computing and information sciences.

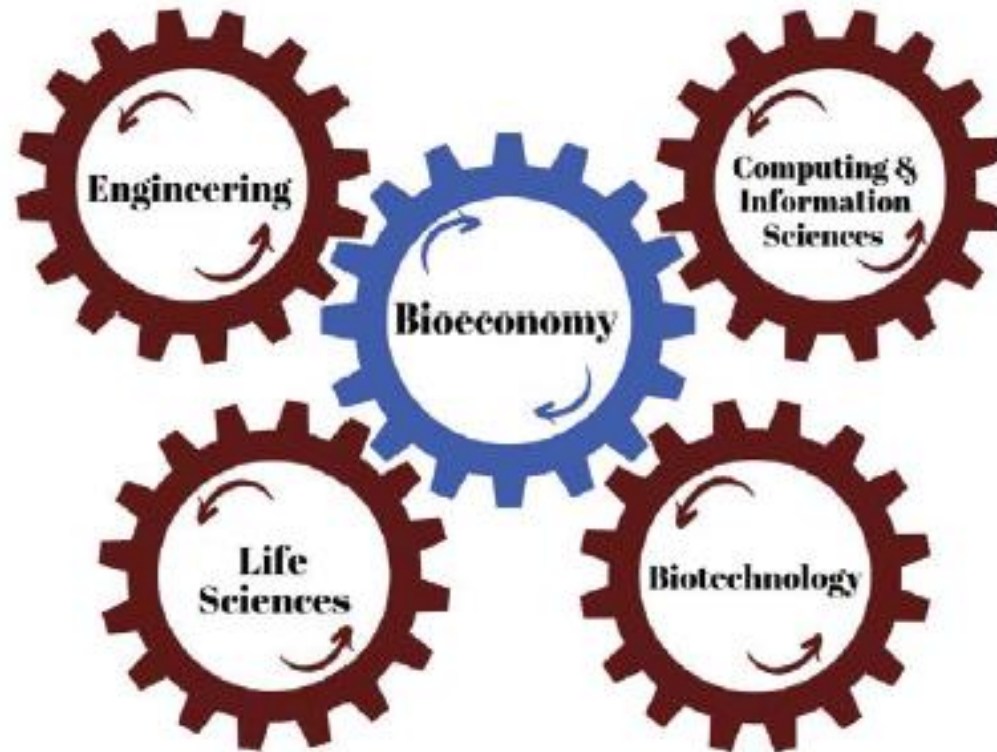


FIGURE 1-1 Four drivers of the U.S. bioeconomy.

*From "Safeguarding the Bioeconomy - NASEM - 2020" – National Academy of Sciences

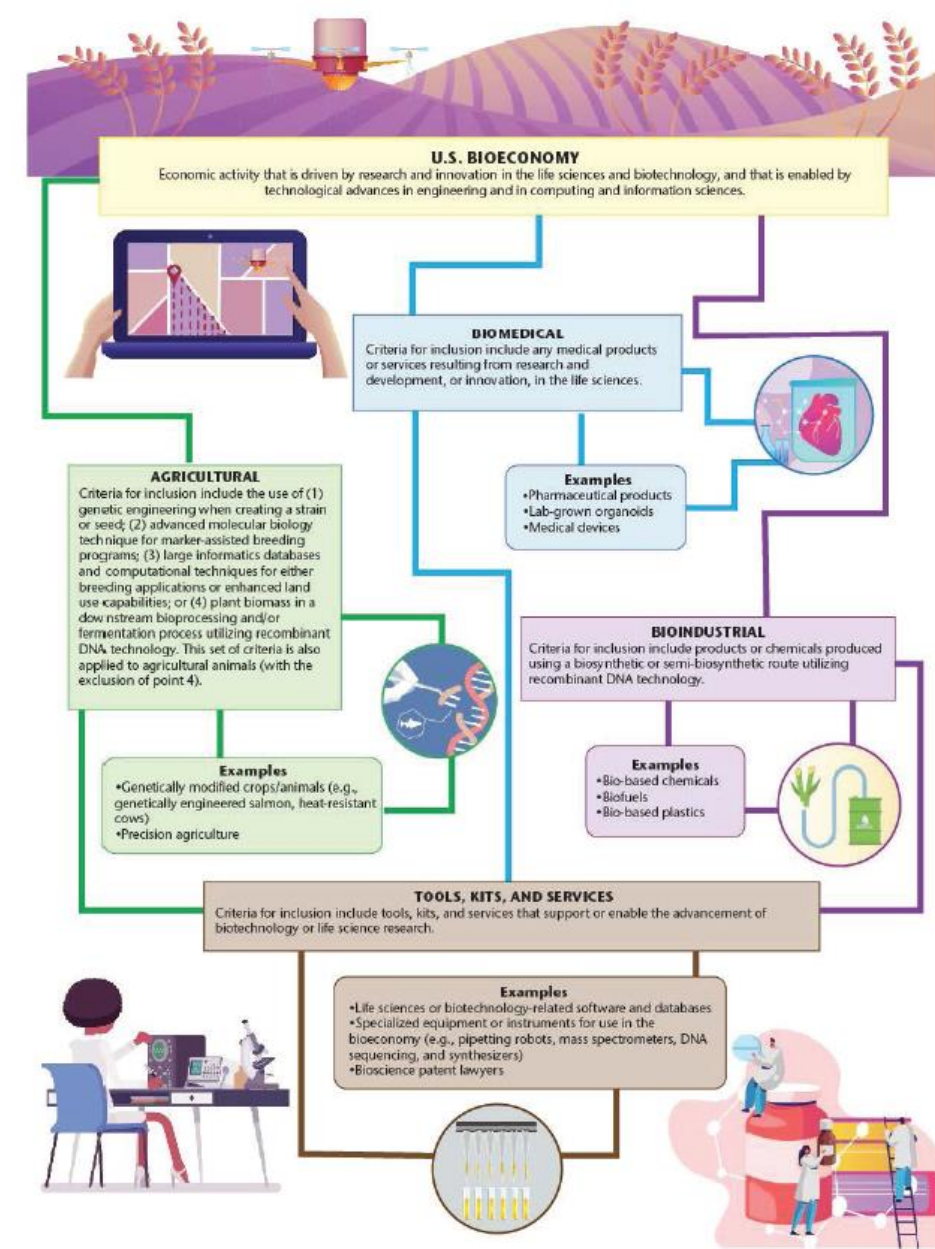
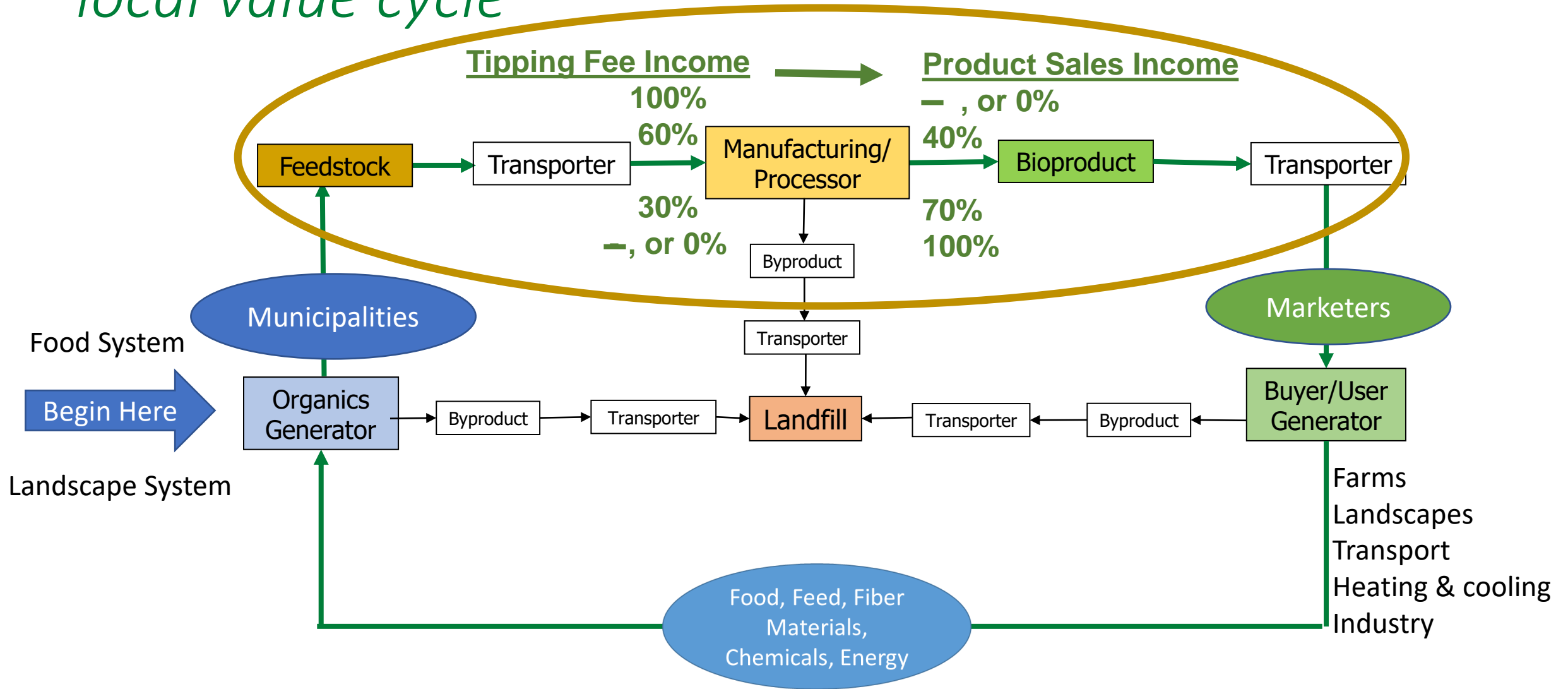
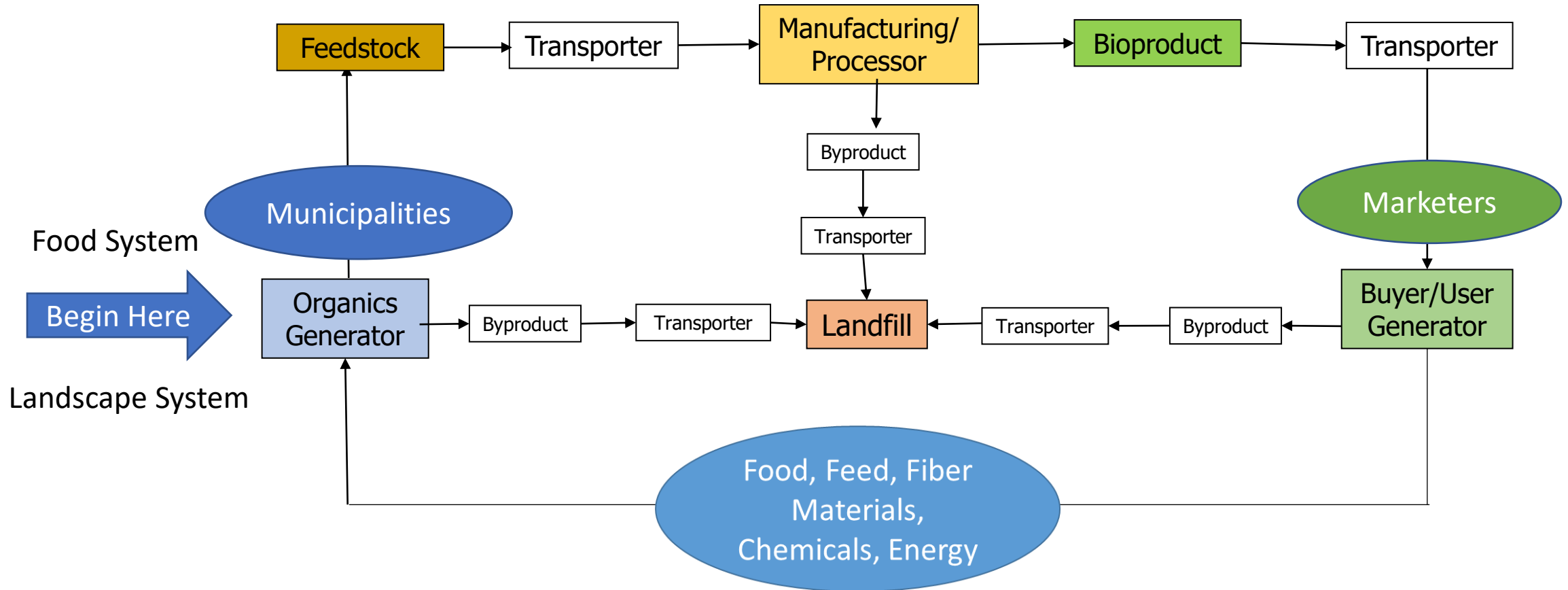


FIGURE S-1 Examples and explanations of highlighted sectors of the bioeconomy landscape that fall under the definition put forth in this report. The committee grouped the activities within the bioeconomy into three primary domains: agricultural, biomedical, and bioindustrial. Additionally, the committee identified a cross-cutting category of tools, kits, and services.

Bioresource Enterprises – *revenue sources in the local value cycle*

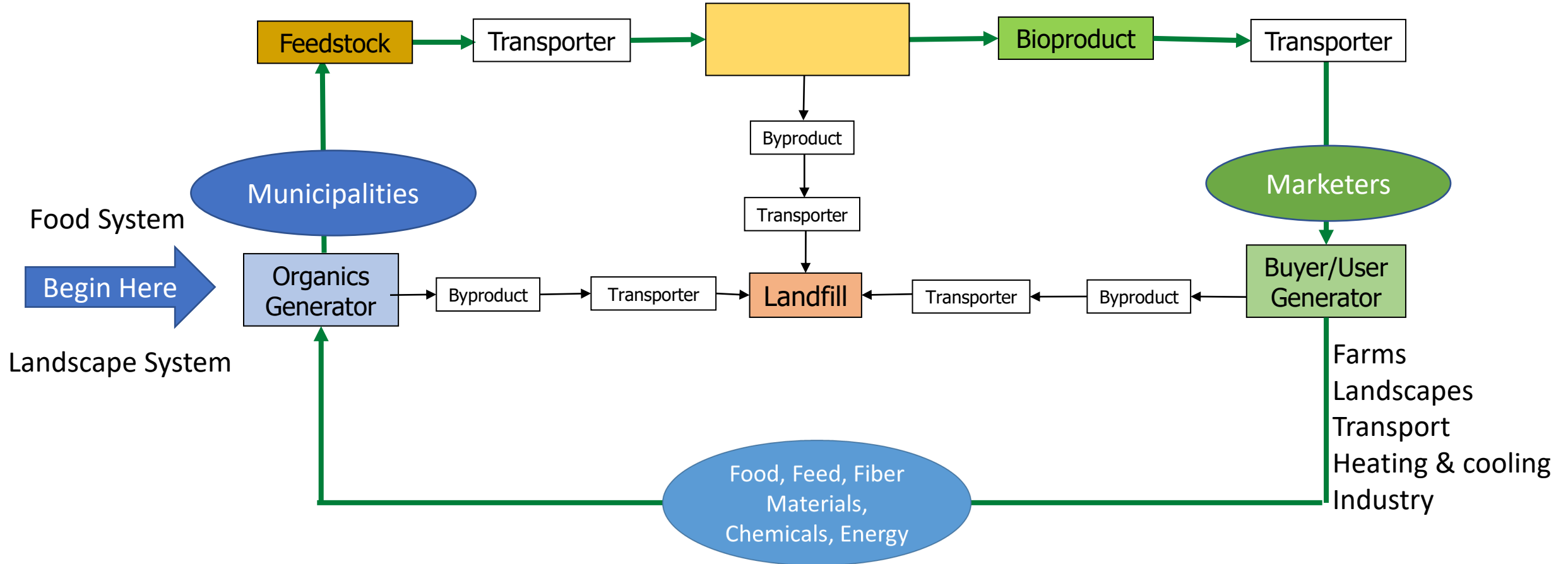


Noble Bioresources – *our bioeconomic conceptual model*



Community Bioeconomy – a local circular bioeconomic conceptual model

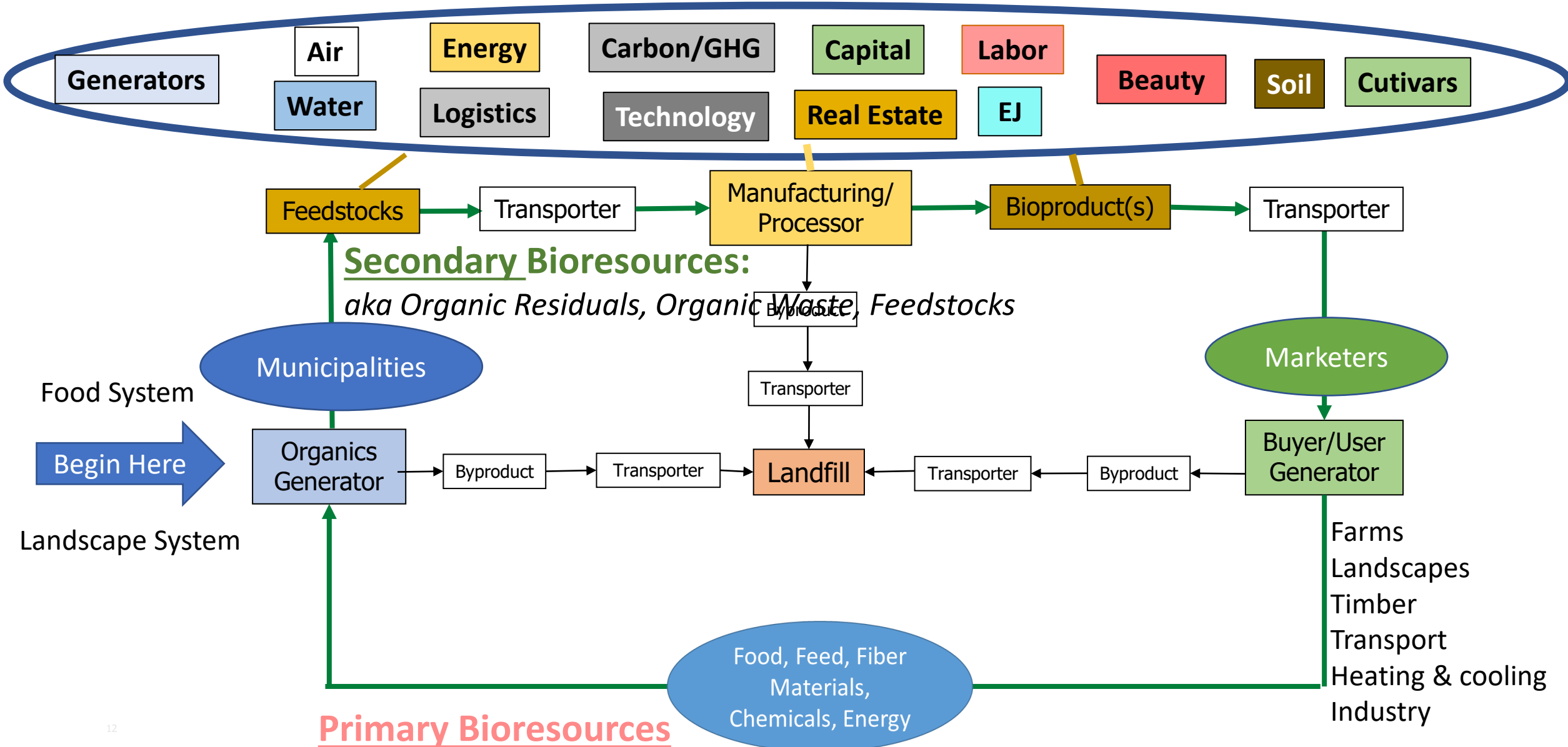
Secondary Bioresources, or Organic Residuals, Organic Waste, Feedstock



Primary Bioresources

Bioresources Markets Conceptual Model

"Tertiary Bioresources"



Bioresources Markets Conceptual Model

Sub-elements – “Tertiary Influencers”

Preprocessing (resources + Infrastructure)

1. **Generators**
2. **Air**
3. **Water**
4. **Energy**
5. **Carbon**
6. **Nutrients (NPK, etc.)**
7. **Technology/Equipment**
8. **Site(s)- Real estate**
9. **Logistics**

People, Biome, Customers

1. **Capital**
2. **Regulators + Programs** (Air, Water, Waste/CalRecycle, SB 1383; CPUC BioMAT program, CARB Low Carbon Fuel Standard, and others)
3. **Env. Justice**
4. **Community/Citizens**
5. **Beauty/Aesthetics**
6. **Labor**
7. **Soil**
8. **Land managers**
9. **Cultivars**

Noble Bioresources, Inc.

Financial Engine Design + Projects



Dan Noble, President

Dave Miles, Sr. VP

Brendan & John

Lehman, Data/Info

Architects

NobleBioresourcesInc.com

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