Connecting Food Industry with Agriculture Based on the Principle of Circular Economy

Anca Ioana Nicolau
Dunarea de Jos University of Galati
Faculty of Food Science and Engineering

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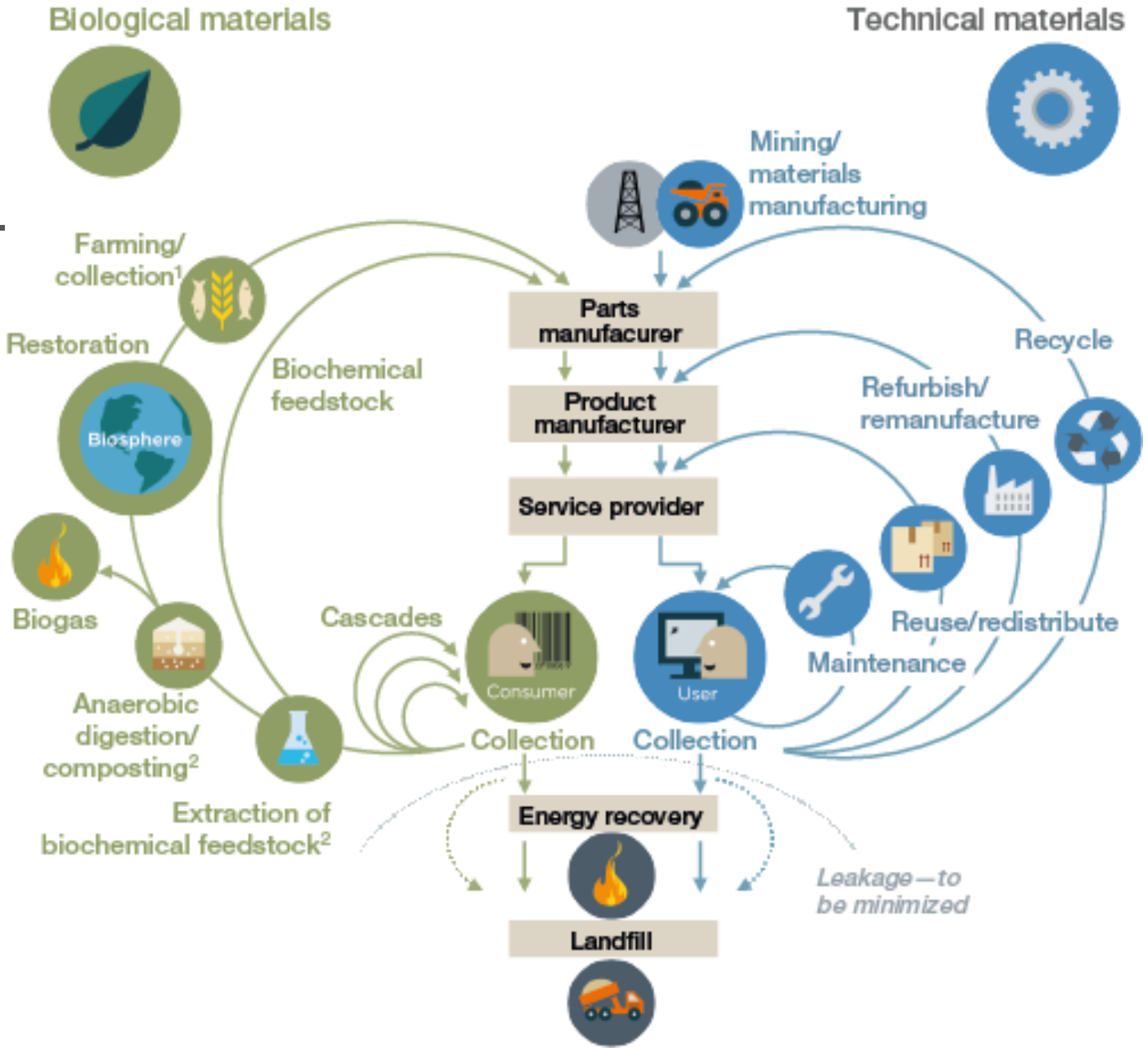
What is circular economy?

- Circular economy (CE) is an industrial economy that is producing no waste and pollution, by design or intention, and in which material flows are of two types, biological nutrients, designed to reenter the biosphere safely, and technical nutrients, which are designed to circulate at high quality in the production system without entering the biosphere.

CE


Biological materials
Technical materials
Mining/
materials
manufacturing
Farming/
collection[1]
Restoration
Biosphere
Biochemical
feedstock
Parts
manufacurer
Product
manufacturer
Service provider
Recycle
Refurbish/
remanufacture
Biogas
Anaerobic
digestion/
composting[2]
Cascades
Consumer
User
Maintenance
Reuse/redistribute
Collection
Collection
Extraction of
biochemical feedstock[2]
Energy recovery
Landfill
Leakage—to
be minimized

The 4 principles of the circular economy

1. Minimise the use of inputs and eliminate waste and pollution.

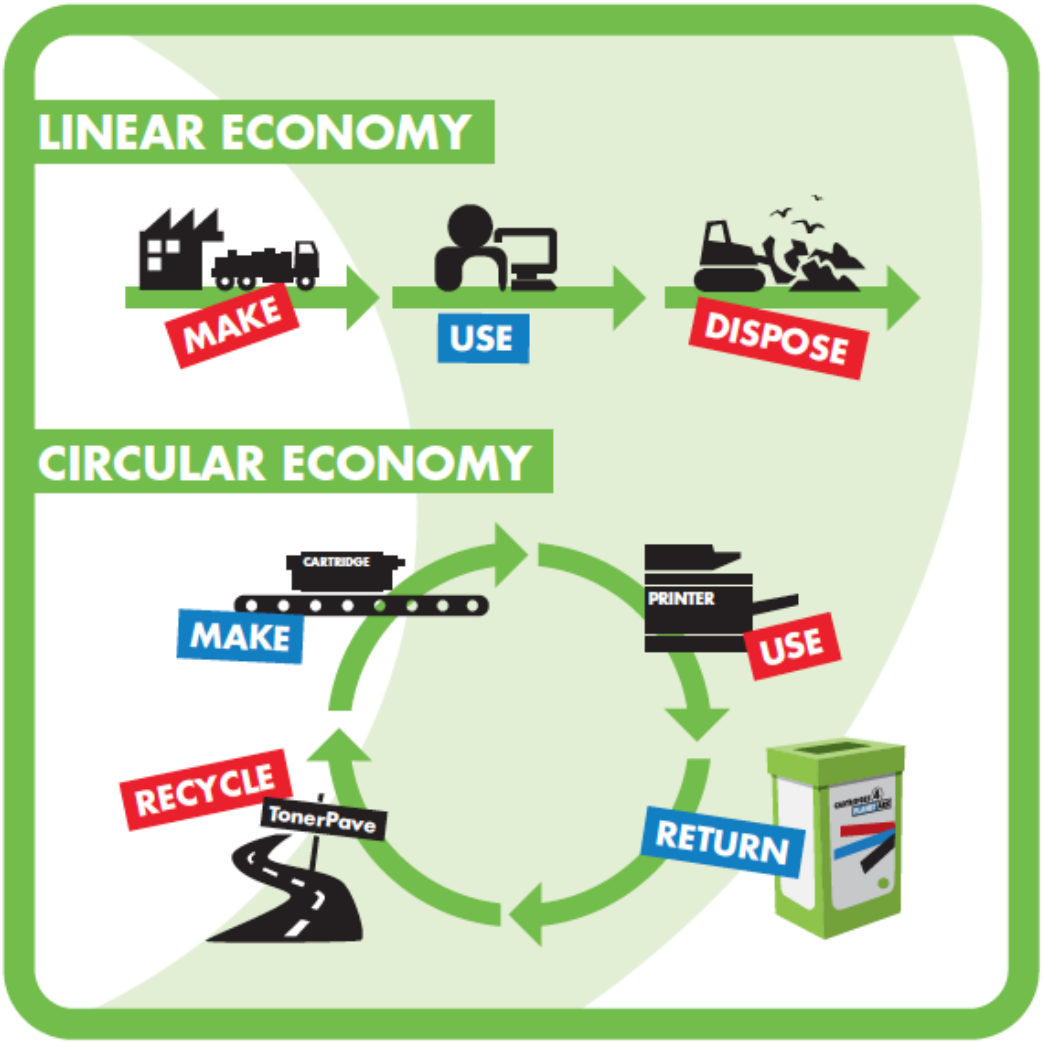
2. Maximise the value created at each stage.

3. Manage flows of bio-based resources from and back into the biosphere, and recover and retain flows of non-renewable resources in closed loops.

4. Establish mutually beneficial relationships between companies within each circular chain.

Shift in economy

From
"cradle to grave"
to
"creadle to creadle"



Major problems associated with the present food system

- Wastefulness

  - 1/3 of food is lost or wasted before consumption/ 20% is lost along the supply chain

  - fertilisers not completely used

- Decrease of healthy components

  - less K, Fe, and vitamins in fruits and vegetables now than during the 50s

  - presence of toxicants

- Increase of environmental externalities

  - P flows tripled compared with pre-industrial era

  - eutrophycation

  - biodiversification afected

Is Romania prepared for CE?

- Romania is the UE country that currently has the lowest recycling rate and risks infringement and penalties for this.
- Romania's target for collecting is 62%. If not, penalities will be 200.000 euro/day (73 mil. euro/year).
- A tax of 2 LEI (EUR 0.44) for each kilogram of recyclable packaging placed on the market and unrecovered has created a big debate in Romania, pinning the local food producers against the Environment Ministry and local environment organizations. The new tax became effective on January 25.

Is Romania prepared for CE?

- Romania generates 389 kg of municipal waste per person, while 313 kg of municipal waste is treated per person.
- Figures from Eurostat show that 99 percent of waste treated is put into landfills, with only 1 percent recycled and composted, making the country the worst in this regard in Europe.

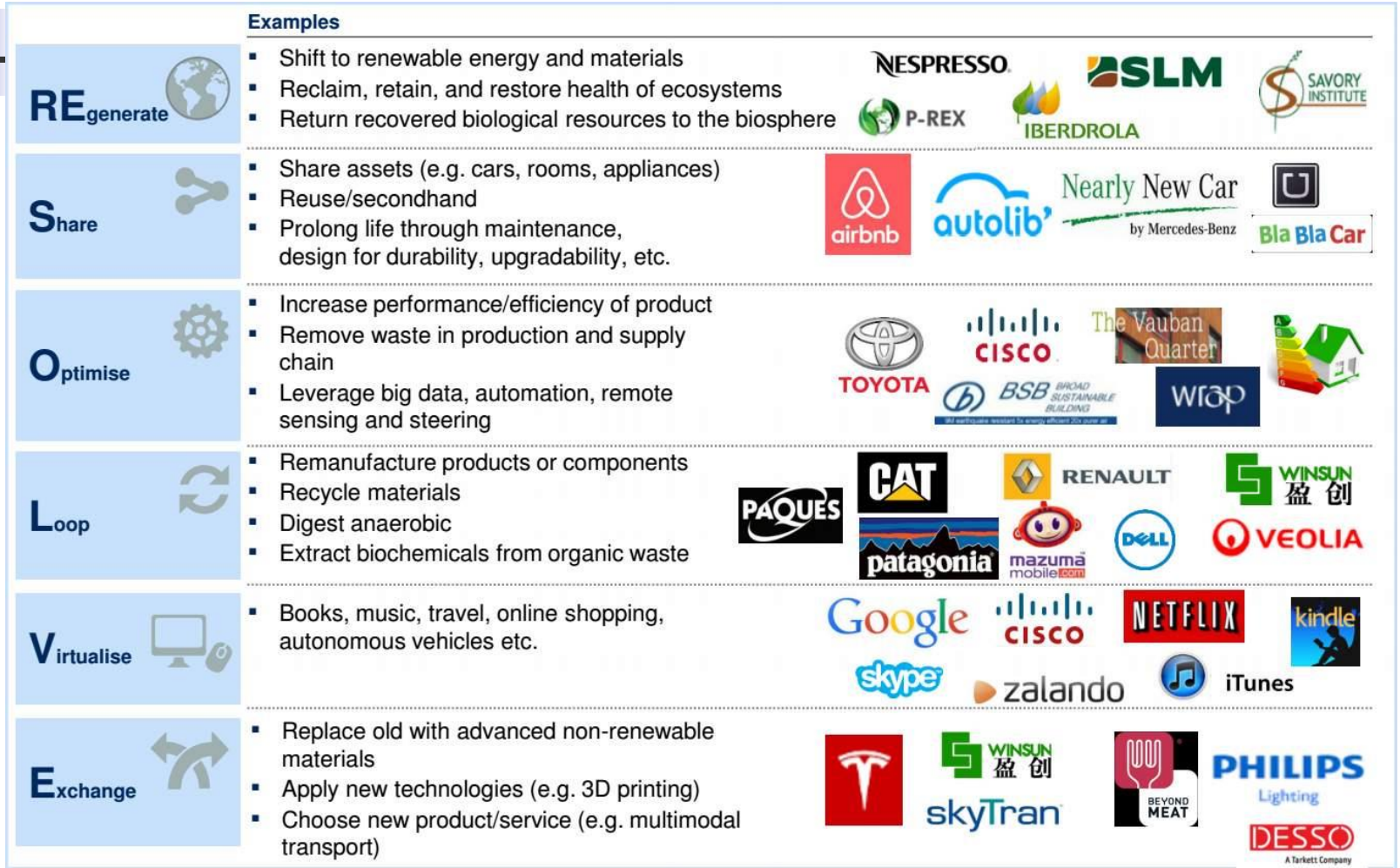
Is Europe prepared for CE?

- The country with the next lowest recycling/composting rate is Slovakia, where 13 percent of that 313kg of treated waste per person is recycled or composted.
- In the EU28, 492 kg of municipal waste was generated per person in 2012, while 480 kg of municipal waste was treated per person (34 percent was landfilled, 24 percent incinerated, 27 percent recycled and 15 percent composted).
- For the EU there has been a significant increase in the share of municipal waste recycled or composted, from 18 percent in 1995 to 42 percent in 2012.

Building blocks for CE in Europe

- Europe-wide quest for learning, research, and opportunity identification
- Development of a value-preserving materials backbone – a core requirement for strengthening European industrial competitiveness
- Initiatives at the European, national, and city levels to enable inherently profitable circular business opportunities to materialise at scale
- Development of a new governance system (a new "cockpit") to steer the economy towards greater resource productivity, employment, and competitiveness.

ReSOLVE framework



McKinsey's "REsolve" framework, which isolates six strategies to incorporate circular economy concepts into a business.

Levers to apply CE in agriculture

- Application of more resource-efficient agricultural practices and regenerative farming practices
- Closing loops of nutrients and other materials
- Restoration and preservation of natural capital
- Developing peri-urban and urban farming
- Developing digital supply chains.

HOW BRANDS ARE BECOMING MORE CIRCULAR

FINDING NEW USES FOR WASTE (cont'd.)

Starbucks: The coffee chain is determining how to make the most of the food and coffee waste it generates. So far, Starbucks and its co-developers have applied for a patent on a cattle feed made with coffee grounds that's being used in Japan. In 2012, Starbucks Hong Kong launched a partnership with the City University of Hong Kong in hopes of creating a biorefinery that can process the company's waste into succinic acid, a key ingredient in bioplastics, detergents and medicines.

Image credit: Business Wire

HOW BRANDS ARE BECOMING MORE CIRCULAR

RESHAPING THE
RECYCLING INDUSTRY

EcoScraps: A 4-year-old American company, EcoScraps collects food waste from restaurants, schools, supermarkets and elsewhere, creating garden products rich in organic nutrients. Last year the company struck its first nationwide distribution deal, with Target.

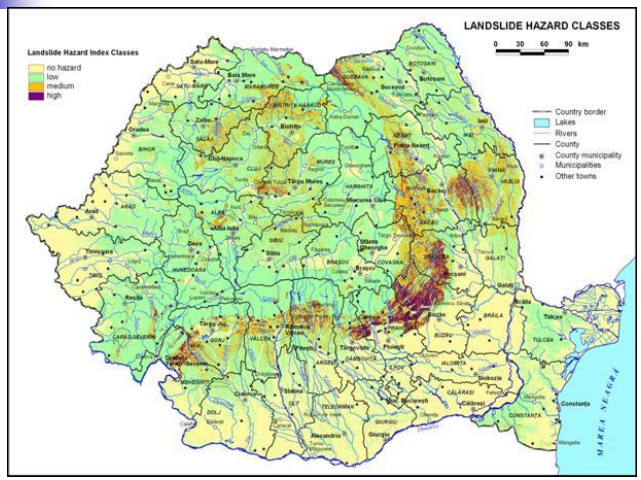
ReGrained
BREW GOOD. BAKE GOOD. DO GOOD.

ReGrained: This small San Francisco company takes the "spent" grain from the beer brewing process and converts it into high-fiber granola bars. Noting that only about 10% of the ingredients that breweries use make it into the finished product, ReGrained repurposes barley and hops into products like Honey Almond IPA bars and encourages consumers to "eat beer."

TerraCycle: Founded in 2001 by a Princeton undergrad, TerraCycle collects and then repurposes difficult-to-recycle packaging and products, creating new materials and products. The company works with more than 100 major brands in 23 countries, with an estimated $20 million in sales for 2013.

Image credits: EcoScraps; ReGrained; TerraCycle

Could UGAL contribute to introduction of CE in Romania and Europe?



- University for education and research
- Multidisciplinary university
- Modern infrastructure for research

Research project experience

- UGAL was partner in a project aiming to repopulate the Danube with sturgeons

Project ideas to support CE

- **New materials.** Development of multifunctional bioplastics for packaging (bio-based, compostable and biodegradable). Development of nanomaterials.
- **Bioprocesses**
- **Bioeconomy**
- **New services**

Steps to make together

- Join CE100 netwowork
- Become research partners
- Identify opportunities for projects