

Applying circular economy concept in food industry: challenges and opportunities



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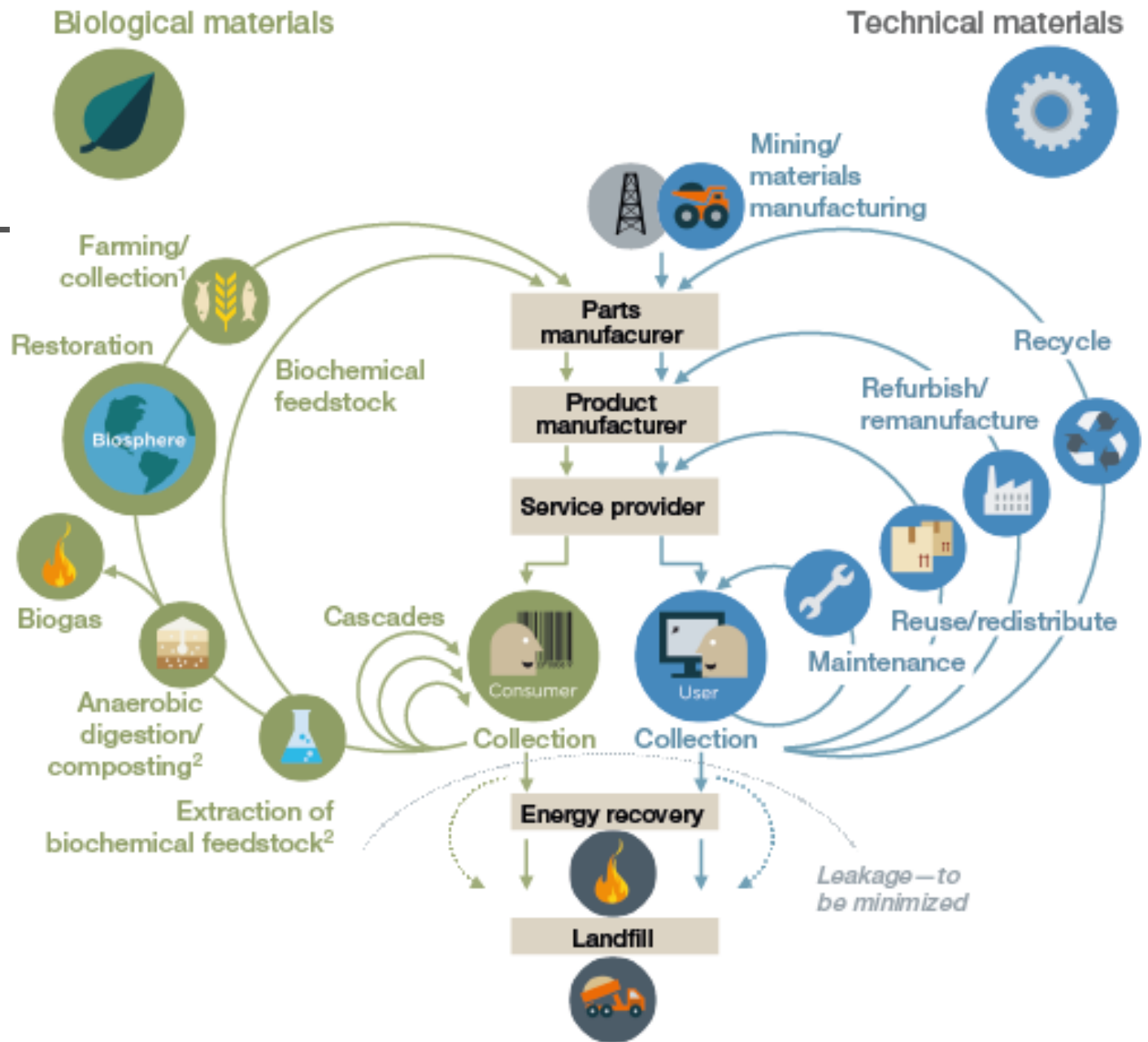
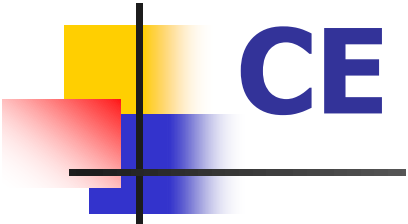
What is circular economy?

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



The 4 principles of CE

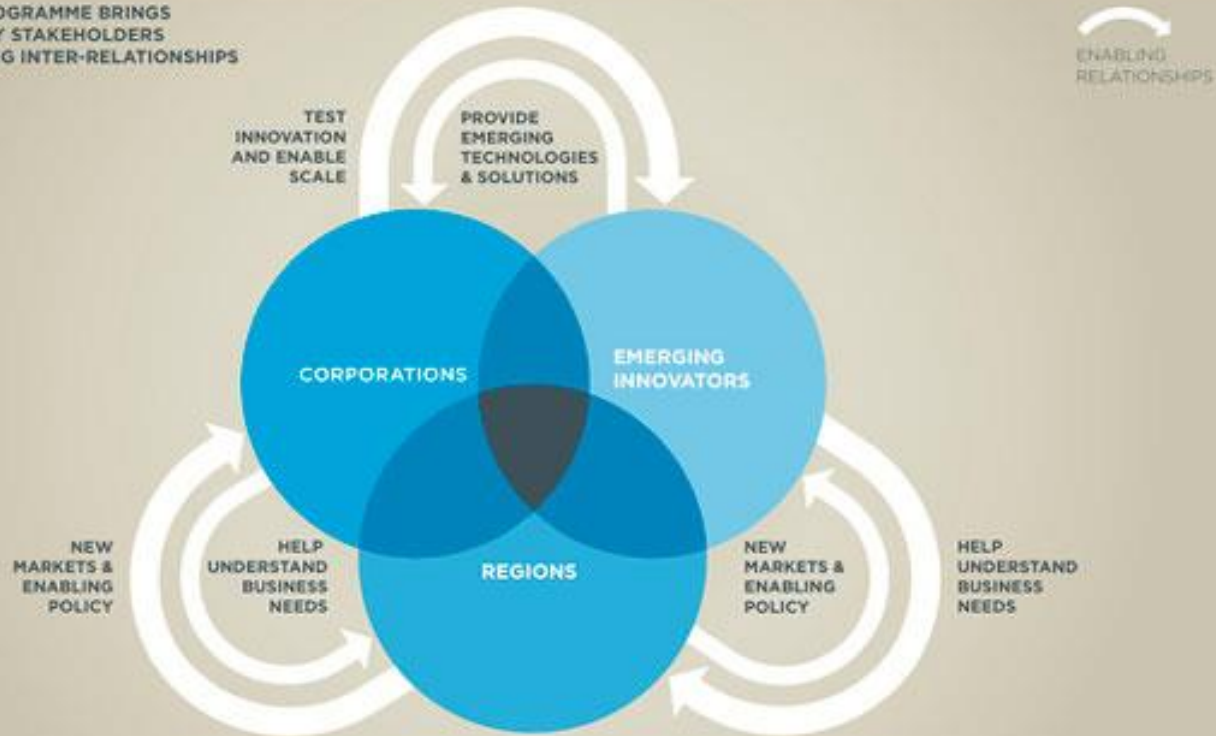
1. Minimise the use of inputs and eliminate waste and pollution.
2. Maximise the value created at each stage.
3. Manage flows of bio-based resources from and back into the biosphere, and recover and retain flows of non-renewable resources in closed loops.
4. Establish mutually beneficial relationships between companies within each circular chain.



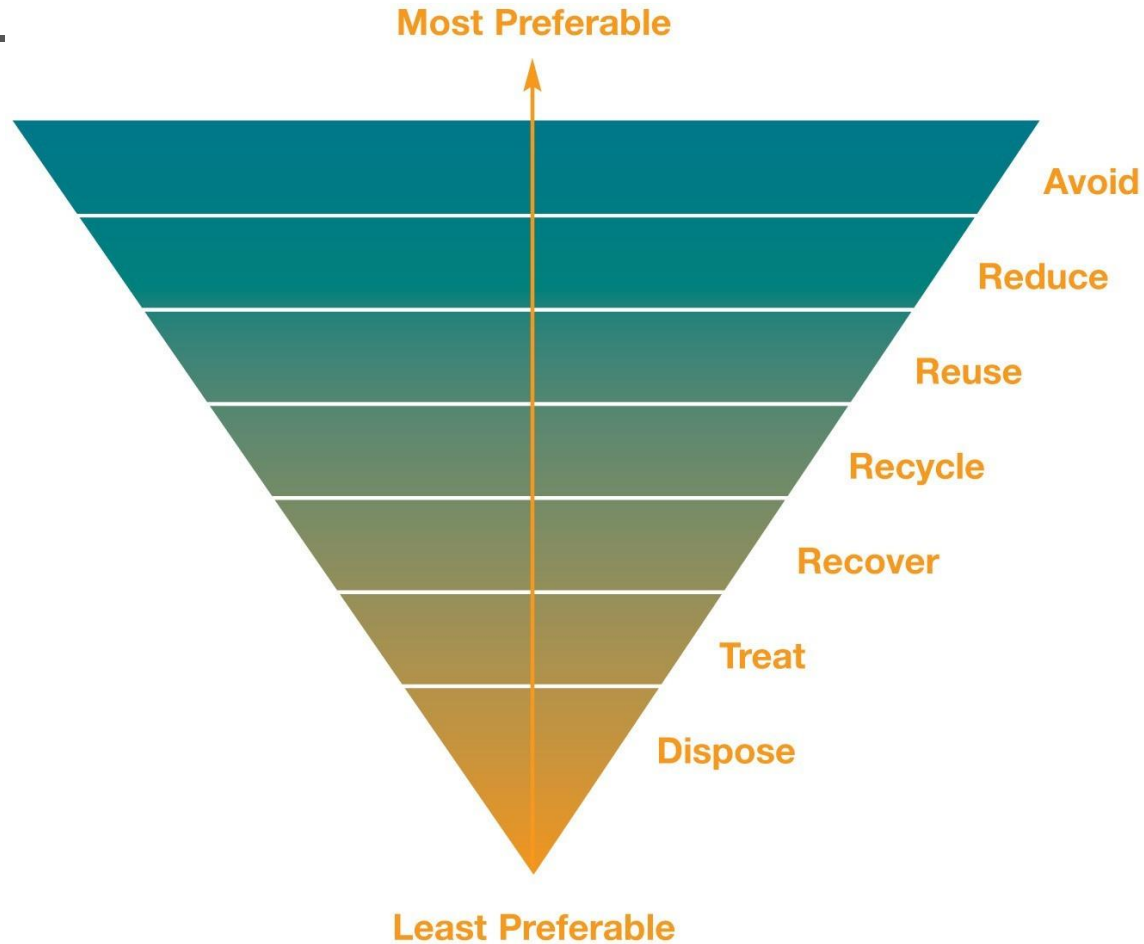
CE – Key stakeholders and enabling relationships

CIRCULAR ECONOMY KEY STAKEHOLDERS AND ENABLING RELATIONSHIPS

THE CE100 PROGRAMME BRINGS TOGETHER KEY STAKEHOLDERS WITH ENABLING INTER-RELATIONSHIPS

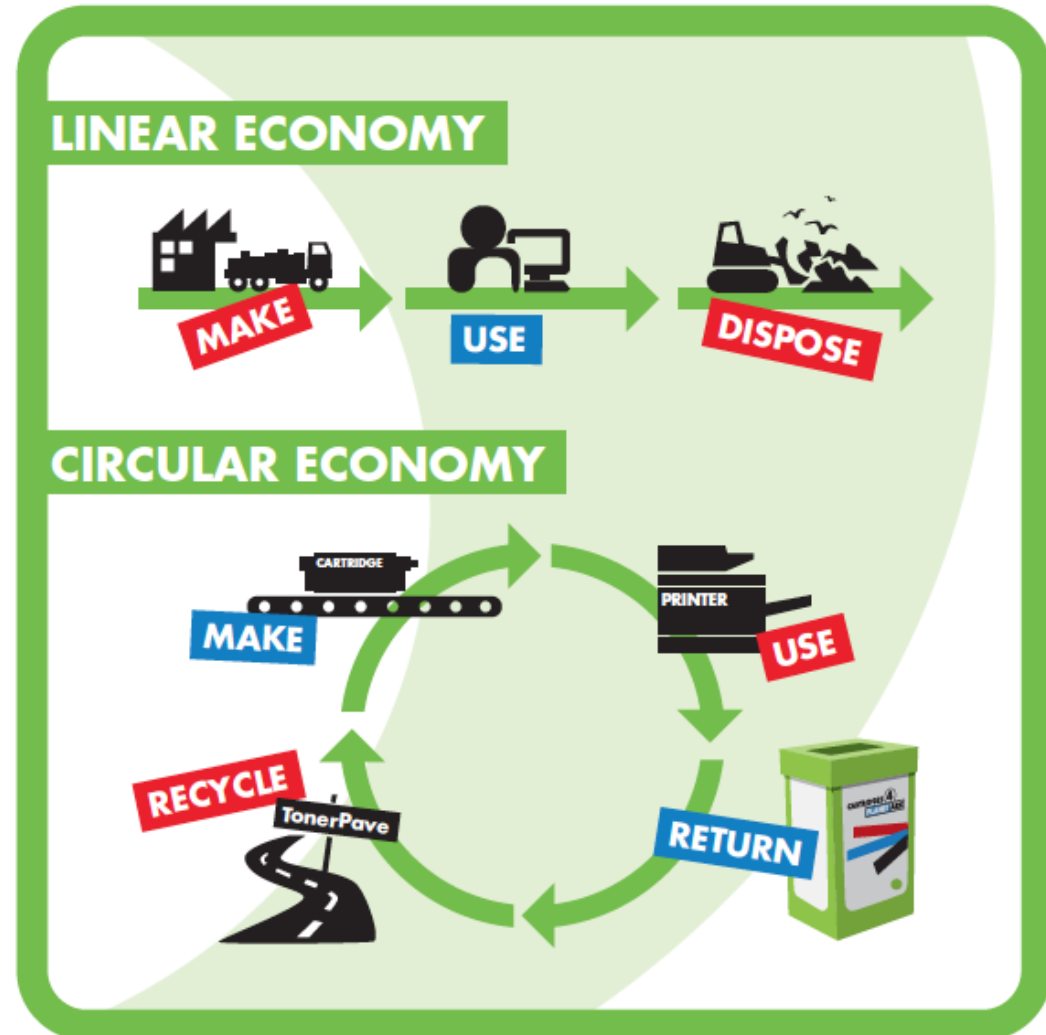


Pyramid of waste management



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
- eutrophication
- biodiversification affected



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, penalties 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 % 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 % was landfilled, 24 % incinerated, 27 % recycled and 15 % composted).
- For the EU there has been a significant increase in the share of municipal waste recycled or composted, from 18 % in 1995 to 42 % 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

		Examples			
RE generate 	<ul style="list-style-type: none"> Shift to renewable energy and materials Reclaim, retain, and restore health of ecosystems Return recovered biological resources to the biosphere 	    			
Share 	<ul style="list-style-type: none"> Share assets (e.g. cars, rooms, appliances) Reuse/secondhand Prolong life through maintenance, design for durability, upgradability, etc. 	   			
Optimise 	<ul style="list-style-type: none"> Increase performance/efficiency of product Remove waste in production and supply chain Leverage big data, automation, remote sensing and steering 	     			
Loop 	<ul style="list-style-type: none"> Remanufacture products or components Recycle materials Digest anaerobic Extract biochemicals from organic waste 	       			
Virtualise 	<ul style="list-style-type: none"> Books, music, travel, online shopping, autonomous vehicles etc. 	      			
Exchange 	<ul style="list-style-type: none"> Replace old with advanced non-renewable materials Apply new technologies (e.g. 3D printing) Choose new product/service (e.g. multimodal transport) 	    			

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



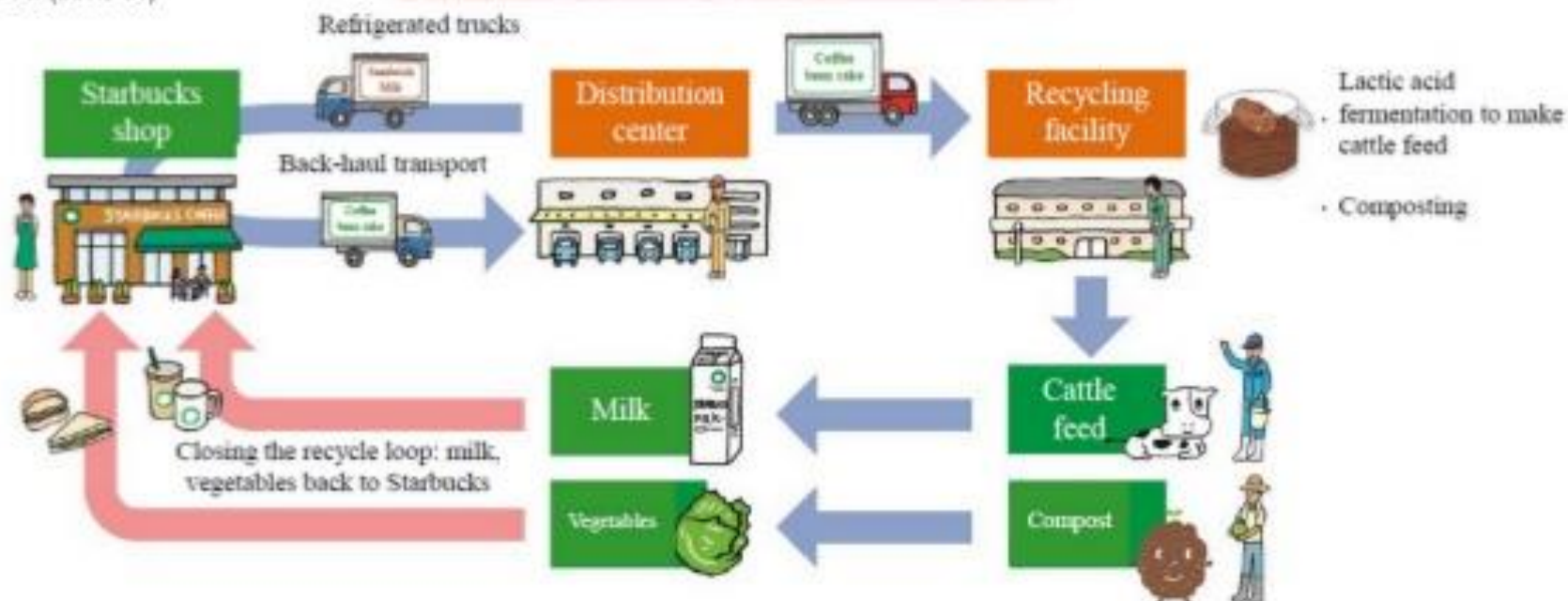
Levers to apply CE in agriculture

- 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.)

Recycling coffee beans to make milk



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.

HOW BRANDS ARE BECOMING MORE CIRCULAR

RESHAPING THE RECYCLING INDUSTRY



EcoScrap: A 4-year-old American company, EcoScrap 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: 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.



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 network
- Identify opportunities for projects
- Become research partners