

Bio-Based transition

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The lesson does not require any materials but network connection and a computer to access the platform where the lesson will be displayed. The lesson itself consist in watching the video from the next link: <https://youtu.be/-YDvPI28LQk> and answer the Quiz.

Quiz

First question:

What is a biobased company?

- A. A company with Recycling products.
- b. Linear company.
- c. A company with products from a biological origin that can be biodegradable or recycled.

Correct Answer: c

Explanation:

- A. A biobased company is not only a company with recycling products.
- B. is not linear

Second question:

What is the importance of change to biobased:

- a. Biobased is a linear company then it is good for society
- b. with a biobased company, the environment is safe
- c. A biobased company can be circular and helps the environment reducing the climate changes and pollution

Correct Answer: c

Explanation:

- A. Is not linear
- B. The environment will not be save only with the biobased companies

Third Question:

Give 3 ways to facilitate companies to change to the circular economy:

- a. Government support, eco-label, Promotion of organic
- b. Government support, promotion of biobased, usual network
- c. Promotion of organic, focus on technologies, high costs.

Correct Answer: A

Explanation:

- B. usual network means the usual partnership. But to a circular economy the partnerships are really important and if they are circular or biobased is better and a linear that is usual.
- C. high costs is not a facilitate way

Fourth Question:

Why a biobased product can be in devastating comparing with a fossil product?

- a. Fossil products are more expensive but they are more usual. Then the people prefer to buy them instead of a biobased product.
- b. The biobased products aren't usual, they are usually more expensive and the technology to

produce is difficult and new.

c. The biobased products are more expensive, the technology is new and difficult, but the people accept the new product well and think the quality is higher.

Correct Answer: B

Explanation:

A. fossil products are not more expensive

C. The people don't normally accept the biobased products

Fifth Question:

What is the principal difference between a linear and a circular economy?

a. biobased products

b. recycle waste

c. Cost

Correct Answer:

Explanation:

A. is correctly but not all biobased products come from a circular economy.

B to be a circular economy it must not have waste. All the waste needs to be recycled and back to be the raw material.

C. The costs are different between them but is not the main difference

Transcripts of the video. <https://youtu.be/-YDvPI28LQk>

1. Background

Nowadays the world is moving by the petrochemical industry. Our plastic, fuel and even food are made by it. We have used at least 135 billion barrels of oil since 1870 (science daily, n.d.). Moreover, 294 billion liters of CO₂ were produced from the burn of this amount of petrol, it is equal to 118 Olympic pools.

One of the most common examples is the plastic production. Nowadays, the plastic used is produced by PET. This last one is a chemical compound called Polyethylene terephthalate. It consists in polymerized units of the monomer ethylene terephthalate, with repeating (C₁₀H₈O₄) molecules. (Britannica, n.d.)

In 2016, it was estimated that 56 million tons of PET are produced each year, and the problem of this is that it takes about 450 years to be degraded. If you buy a bottle of water today, it will be degraded in 2469. It is almost 15 family generations! And even the recycle idea is not enough. Less than 90% of bottles aren't even recycled. All these bottles end up in the ocean or in the landfill. (Post consumers, n.d.)

2. What is bio-based

Bio-based products are wholly or partly derived from materials of biological origin, excluding materials built in geological formations or fossilised. Likewise, in industrial

processes, for example, enzymes are used in the production of chemical building blocks, detergents, pulp and paper, textiles, etc. By using fermentation and bio-catalysis instead of traditional chemical synthesis, higher process efficiency can be obtained, resulting in a decrease in energy, water consumption and a reduction of toxic waste. As they are derived from renewable raw materials such as plants, bio-based products can help to reduce CO2 emissions in the environment and offer other advantages such as lower toxicity in the products content. For example: The biobased plastics in packaging. (Comission, European, n.d.)

3. Why change to bio-based

Some of the reasons to increase interest in bio-based products lay in their benefits in relation to the reduction of resources and climate change. Bio-based products could provide additional functionalities, less resource intensive production and efficient use of all-natural resources. Nevertheless, companies, governments and consumers are confronted with numerous uncertainties. These may limit new products and technologies from growing into full-scale commercial applications. (. Standarization, European Committee for, n.d.)

4. How to change to bio-based

There are factors involved which operate at a variety of levels and are interconnected. Because of the dynamics of this situation, there are no clear buttons to be pushed allowing us to control developments directly. (Wageningen. University, n.d.)

In the study Report: a closer look at Multi-Level Perspective, LEI Wageningen UR examined which subjects should be studied in order to describe, interpret and analyse the transition to a biobased economy to find points of departure which will allow people to control this transition. As a case study, they used the replacement of fossil fuels with biofuels in road vehicles. (Wageningen. University, n.d.)

a. The society and world thinking

The researchers studied the transition process using Geels' Multi level perspective. This model was developed to study social changes which lead to the satisfaction of a social need in an entirely new way. For example, if we continue with the first example we talked at the beginning about the bio plastics, you will not only have different products and new technologies used to produce them, you will also be facing changes in the terms of the

consumers legislation and regulations, and habits. In this situation you will need to encourage the consumers to follow the correct direction and be adjusted to a new product integrated in the market. (Wageningen. University, n.d.)

b. Companies transition

To build competitive bio-based industries, suggestions include supporting the development of an eco-label for bio-based products, as well as the promotion of organic and low input farming concepts and systems, to maintain the consumer trust and confidence in bio/eco/organic food product labelling. This should be extended to encouraging the use of sustainably sourced renewable resources and materials in bio-based industries. (Comission, European., n.d.)

Companies also have to work in the improvement of the availability of sustainable and renewable raw materials in sufficient quantities and quality and at competitive prices. Renewable materials governed by a clear and coherent legal framework will encourage the industries, such as forest or bio-plastics industries.

Moreover, trading partners should be encouraged to apply equivalent environmental standards. Until such a convergence is in place, the government should balance unfair competitive advantages of non-bio-based products in order to protect bio-based production. To stimulate the demand for innovative bio-based products, it is advisable to implement the recommendations developed by the current regulations for bio-based products. Also, special actions for growing start-ups are important in a bio-based economy: for example, incentives, financial instruments, networking possibilities, research and innovation or mechanisms for technology transfer. Access to flexible, research-oriented pilot plants should be facilitated to enable companies to use pilot infrastructures during the research and development stage to test and refine industrial processes, reducing lead time and investment costs. (Comission, European, n.d.)

i. Government incentive

The problem of biobased companies is normally the product is more expensive because of the raw material and the technology used. Also, the people are more used to the conventional product and are difficult to make them go out from the comfort zone. Because of this and other points, the biobased products are disadvantage comparing with

the fossil products as PET. However, if the government incentive this economy to grow they can compete in the market equality with the fossil products.

Actually, the government are interested in it. "A further development of the biobased economy is essential if the Dutch government is going to takes the climate agreement seriously. In our scenarios, biomass represented 50 to 60% of the total amount of renewable energy in 2030. A biobased economy reduces the costs required to achieve the emission goals." says Van Meijl from Wageningen UR. Therefore it is a good scenario for both. The biobased company which the government can help with reduced taxes, loans to help create new technologies and on the other hand the government to achieve their goal to help the environment. (Wageningen University , n.d.)

ii. From a Linear to a circular

A linear company is an usual company that we most see nowadays. Their economy starts with the raw material, then the production, the used and it ends with a non-recycle waste. The produce of waste that is not recycled, for example, the PET, is the problem of this industry. It doesn't have a circular production line. It only has one straight line that ends in the garbage.

Therefore, the importance of setting real big steps towards a circular economy is increasing every day. That we need to leave the devastating linear economy behind is clear. In a circular economy, the end is not in the garbage, it backs to be a raw material and then the process starts again.

The circular economy focuses on preventing the use of new non-renewable resources and the production of waste. Both are important to maintain a world that remains livable. Bio-based materials fit very well in this approach. (Government NL, n.d.)

The steps to change it from a linear to a circular economy are first to find a way to reuse the waste. Second, analyze the cost of the transition and the payback time. Third, the quality.

Other factors are also important and need to be analyzed and tested during the transition. But the mentioned aspects are the most important. (Government Europa, n.d.)

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Biobased Transition

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Contents

01

Background

Some statistics are presented due to the current situation of natural resources taken from the land.

02

What does biobased mean?

Origin and some processes that are done in the industries nowadays.

03

Why is important to make the transition?

Advantages and benefits

04

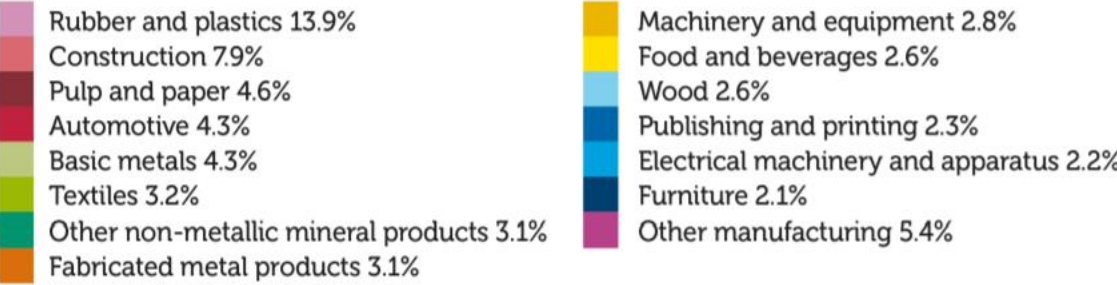
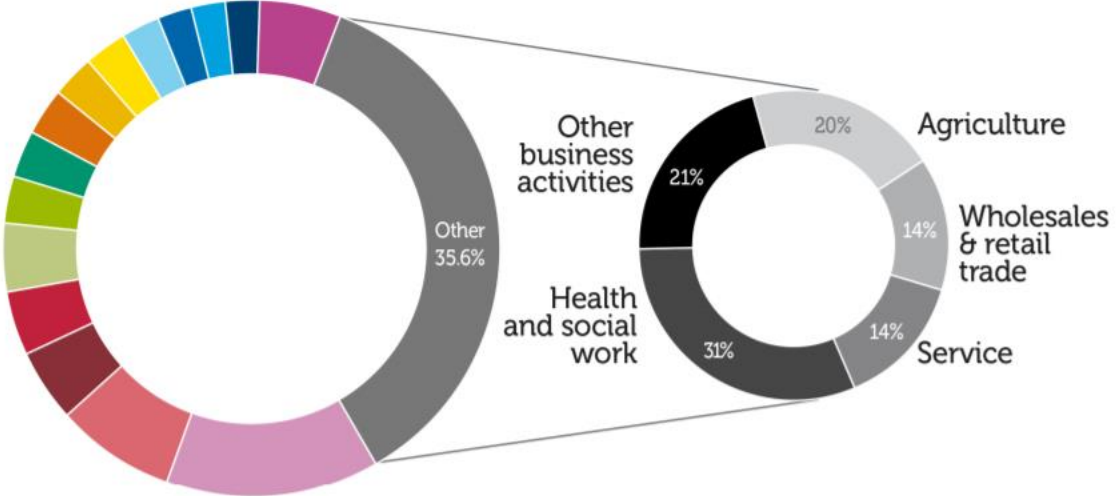
How is the impact of the transition?

Factors involved during the switch.

BACKGROUND

- At the moment, the world is moving by the chemical industry; plastic, fuel and even food are made by it.
- Nowadays, the plastic used is produced by PET. This last one is a chemical compound called Polyethylene terephthalate.
- In 2016, it was estimated that 56 million tons of PET were produced each year. The main problem is that it takes about 450 years to be degraded. Less than 90% of bottles aren't even recycled. All these bottles end up in the ocean or in the landfill.

CONTRIBUTION OF THE CHEMICAL INDUSTRY TO THE EU ECONOMY



Sources: Eurostat data (Input-Output 2000) and Cefic analysis
 Unless specified, chemical industry excludes pharmaceuticals
 Unless specified, EU refers to EU 28

So, what should we do? Brainstorm!



Biobased products

Decrease in energy, water consumption and a reduction of toxic waste.

01

Wholly or partly derived from materials of biological origin, excluding materials built in geological formations or fossilised

03

03
Advantages?

01

What are they?

05

05
Result

Biobased products in the market like, plastics in packaging

04
Not enough?

04

As they are derived from renewable raw materials such as plants, bio-based products can help to reduce CO2 emissions in the environment.

02

Where do they use them?

02

In industrial processes, for example, enzymes are used in the production of chemical building blocks, detergents, pulp and paper, textiles, etc

The transition

**Biobased
materials**



**Biobased
economy**



**Biobased
society**

“

Bio-based products could provide additional functionalities, less resource intensive production and efficient use of all-natural resources. Nevertheless, companies, governments and consumers are confronted with numerous uncertainties. These may limit new products and technologies from growing into full-scale commercial applications.

”

BUT, HOW TO MAKE THE TRANSITION?

- Because of the dynamics of this situation, there are no clear buttons to be pushed allowing us to control developments directly.
- In the study Report: a closer look at Multi-Level Perspective, LEI Wageningen UR examined which subjects should be studied in order to describe, interpret and analyse the transition to a biobased economy to find points of departure which will allow people to control this transition. As a case study, they used the replacement of fossil fuels with biofuels in road vehicles.



1. The society and world thinking



CHANGE

The opinion

You will not only have different products and new technologies used to produce them. Changes in the terms of the consumers legislation and regulations, and habits.



ADAPTING

Integration

You will need to encourage the consumers to follow the correct direction and be adjusted to a new product integrated in the market.

2. Companies transition



3. Government incentive

The problem

The product is more expensive because the raw material and the technology used are more elaborated. The people feels more comfortable using the conventional products and is difficult to make them change their mind and for instance their habits.

Incentives

However, if the government support the biobased economy to grow, companies could compete in the market equally.

Wageningen UR

“A further development of the biobased economy is essential if the Dutch government is going to take the climate agreement seriously. In our scenarios, biomass represented 50% to 60% of the total amount of renewable energy in 2030. A biobased economy reduces the costs required to achieve the emission goals.” says Van Meijl from Wageningen UR.

Win-win

Reduction of taxes, loans to create new technologies and help the environment.



4. From linear to circular economy



Reduction of waste

In a circular economy, the end life is not in the landfill. It gets back to be processed again as a raw material

Focus

Circular economy focuses on preventing the use of new non-renewable resources and the production of waste. .

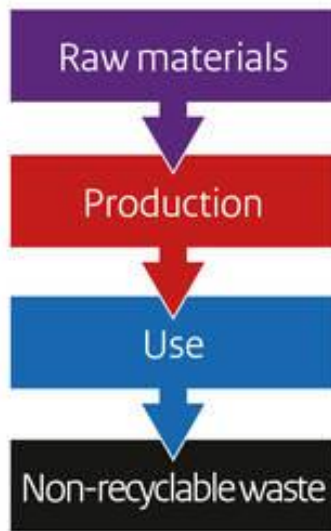
Steps

1. Find a way to reuse the waste.
2. Payback time.
3. Quality.



From a linear to a circular economy

Linear economy



Reuse economy



Circular economy





Thank you
Hope you have enjoyed the lesson!