

Life FoodPrint:

«Development of an integrated strategy for reducing the carbon footprint in the food industry sector»

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Introduction



Climate change is one of the biggest challenges mankind will face in the coming years; and food production is responsible for a significant part of the greenhouse gas emissions (estimated to contribute around 15-30%).

EU has already put in place various mechanisms to control and reduce these emissions, such as energy audits and environmentally friendly product design.

In this framework, **Life FOODPRINT** is expected to help tremendously towards this direction.



Objectives



Main goal of the Life FOODPRINT project is the development of an **integrated strategy for reducing the carbon footprint** in the food industry sector, focusing on pastry and flour products.

Scope includes **all the supply chain** of products (farming, ingredients production, product manufacture etc), as well *direct* and *indirect* activities (energy consumption, waste and wastewater management, logistics e.tc.).





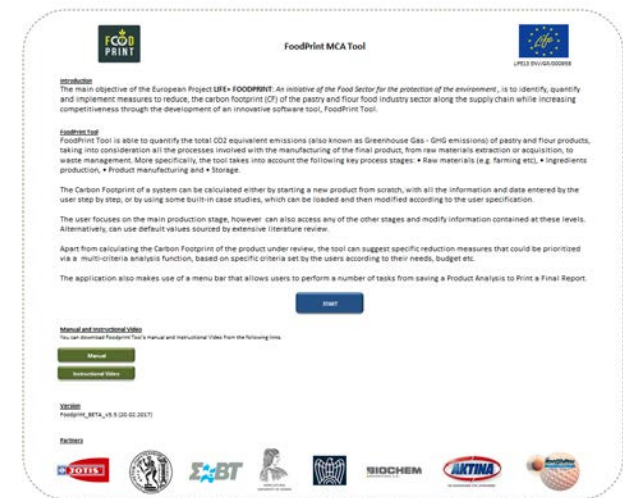
Methodology (1/2)



Steps followed:

1. Literature review, extensive audits & GHG emissions mapping.

2. Development of a relevant database and a robust software tool that can calculate and evaluation GHG emissions of pastry and flour products.

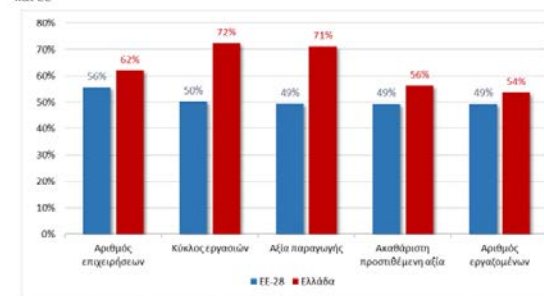


1. Large scale demonstration of the developed tool in 6 pastry and flour food industries in Greece and Italy.

4. Implementation of the measures provided by the software tool in the supply chains of two of the participating food industries – one in Greece and one in Italy.
5. Development of a national recommendation plan in regard to the reduction of GHG emissions from pastry and flour food industries in Greece and Italy.



Σχήμα 1: Ποσοστό επί του συνόλου των πέντε πρώτων κλάδων μεταποίησης σε Ελλάδα και ΕΕ





Sources of Emissions



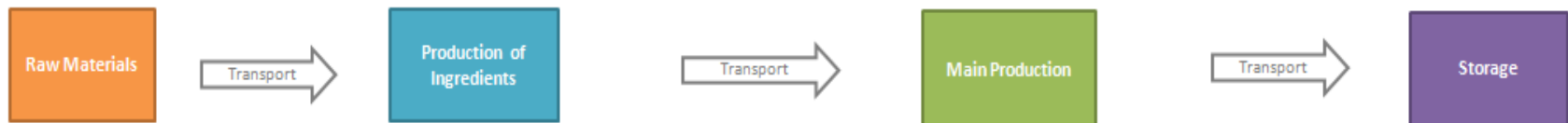
A. Raw Materials / Farming

e.g. use of nutrients and fertilizers, energy consumption etc

B. Ingredients & Product Manufacture

- ✓ Energy consumption
- ✓ Waste & wastewater management
- ✓ Packaging

C. Transportation



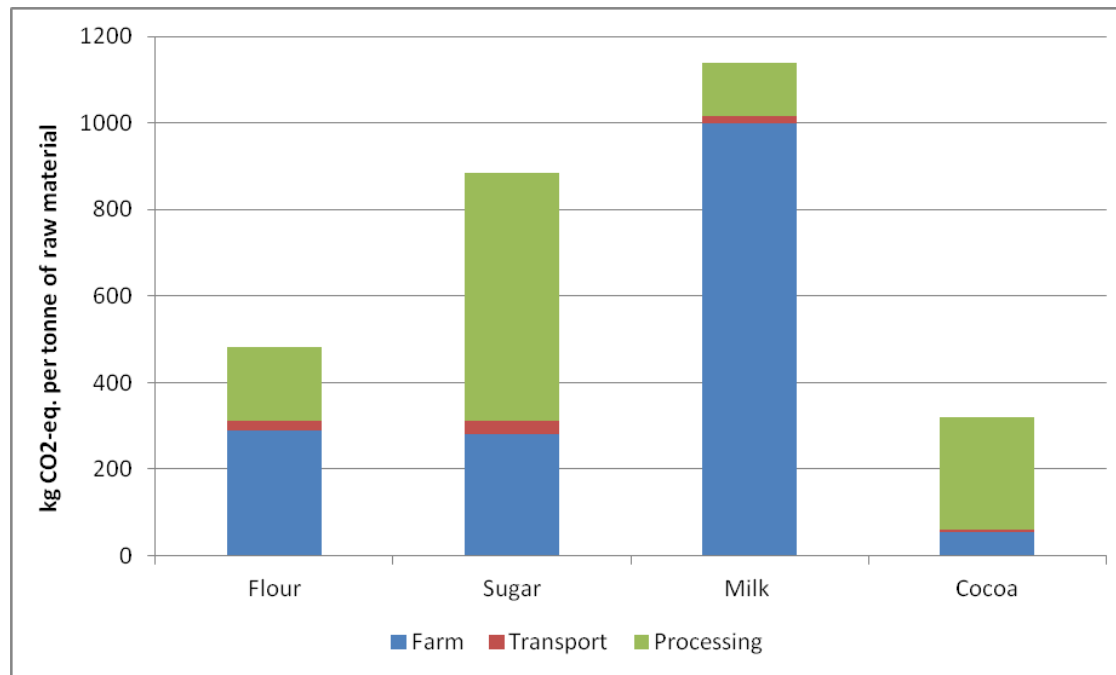
4 pillars of achieving this reduction:

- ✓ utilization of soil, plants and trees characteristic to "lock" CO₂
- ✓ better use of nutrients and fertilizers
- ✓ better management of livestock
- ✓ use of renewable energy and more efficient use of fuel in the fields



Organic agriculture has a great ability for mitigation through its efficient nutrient cycles and soil management, such as the use of green and animal manure, diversified crop rotations, use of cover crops and composting, that leads to soils that are typically enriched in carbon and soil biodiversity (EC, 2009)

The assessment of the carbon footprint of the four main raw materials used in pastry (**flour, sugar, milk, cocoa**) showed that the higher carbon footprint comes from the production of milk with 1,140 kg CO₂-eq., followed by sugar (884 kg CO₂-eq.), flour (482 kg CO₂-eq.) and cocoa (320 kg CO₂-eq.).





Product Manufacture



Energy consumption

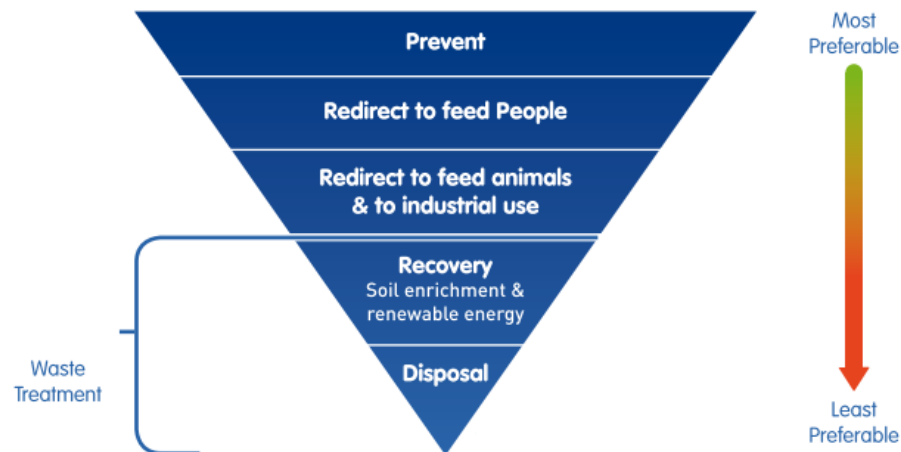
Regarding energy, project team focused on the following tasks:

- Analysis of various production lines & dedicated processes techniques
- Comparing of BATs to commonly existing methods
- Development of procedures/methods for data collection from food processing
- Collection of real time data from selected products production lines
- Mapping of processes with mass flow and energy flow data for development of reference library
- Analysis of technical market solutions provided with analytical cost estimations
- Preparation of “Best Available Investments” reports for efficient decision making procedures (pilot)

Waste management

Solid waste from production process ($\sim 1\text{-}2\%$ of production), is mainly losses from yeasts, underweight products, products with improper form etc.

Solid waste produced also from products returns ($\sim 1\text{-}2\%$ of production).





Product Manufacture



Wastewater management

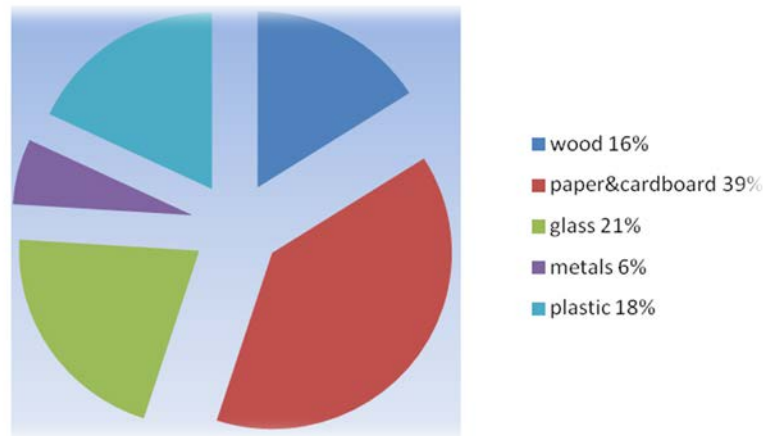
Food industries, have significant amount of waste from wastewater treatment plants. This category includes the residues of screenings, sediment or thin layers from thrombosis clarifier provisions, the excess biomass from the clarifiers of biological treatment facilities, while smaller amounts of solids issue from liquids refinery units.

The production of residuum coming from the surplus biomass is limited and range from 0,3 kg SS / kgBOD5 to 0,4 3 kg SS / kgBOD5 that are removed.

At medium and high load of biomass, the amount of the surplus is 0,5-0,7 kg SS / kg BOD5.

Packaging

Packaging waste in Europe is commonly formed from the following materials :

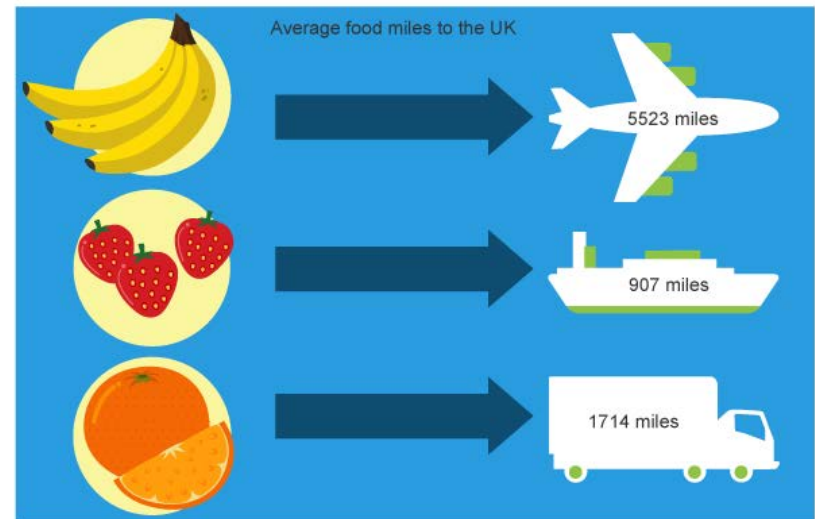


Recycling benefit should be taken into consideration by excluding primary sources and introducing recycled and more eco-friendly materials in the production of components of packaging.

Almost every transition from one stage to the next requires transportation, and combustion of fossil fuels emits great amount of GHG gases.

Transportations occur mainly through trucks, ships and trains. When transporting food products is usually required extra equipment, such as refrigerator.

According to calculations, 25% of total transportations is food transportation (Eurostat, 2011).



(DEFRA)





Software tool (1/2)



In the framework of Life **FOODPRINT**, developed a robust **software tool** that can:

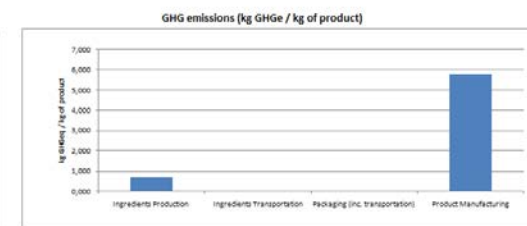
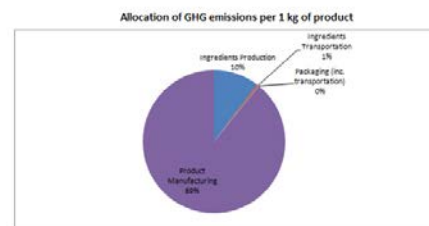
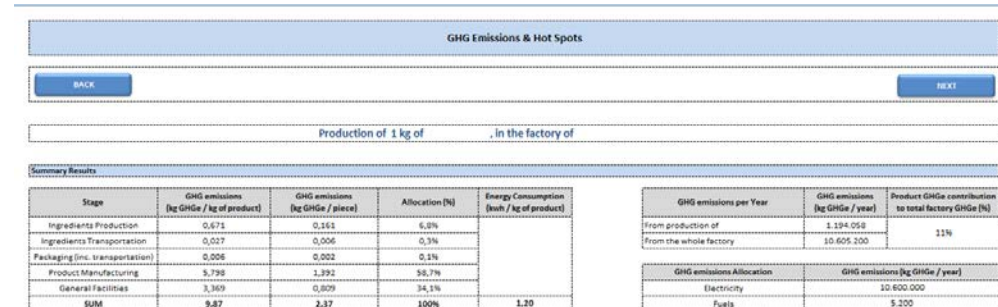
- to calculate the CF of food products along the supply chain
- to identify the Carbon hotspots contributing in raising the CF of products along the value chain
- to quantify the contribution of each activity to the overall CF of each product
- to propose and prioritize GHGs emissions measures to promote energy and resource efficiency, as well as reduced waste & wastewater generation.



Software tool (2/2)



The software tool was modeled based on an excessive literature review, complicated audits at various food industries in Greece and Italy, as well as a robust database that contains indicators calculated from various product lines.





Large scale demonstration



A large scale demonstration of the developed software tool was performed in 6 pastry and flour food industries in Greece and Italy.

Furthermore, specific reduction measures provided by the software tool were implemented in 2 of the participating food industries.

From the pilot implementation of the measures in the two industries involved in the project, it has been shown that the carbon footprint reduction can be at least 15%, while in some cases it **may exceed 40%!**



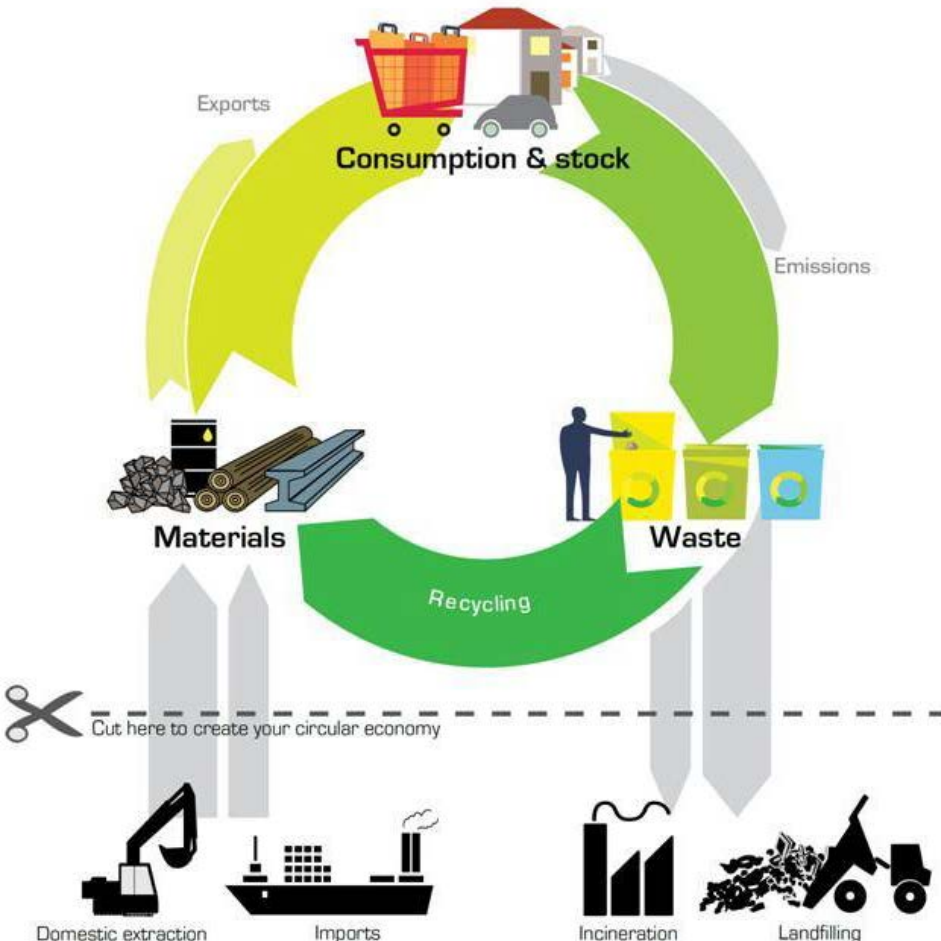
Next Steps



Introduction of the first Greek and Italian industry that has effectively lowered the CF of its products and successfully **labeled them** to the market, in a pilot scale.

Development of a **National Recommendation Plan** in regard to the reduction of GHG emissions from pastry and flour food industries in Greece and Italy and increasing these industries competitiveness in the future.

Circular Economy



The transition to a more **circular economy** is essential for carrying out the agenda of resource efficiency, drawn up as part of the 'Europe 2020' for smart, sustainable and inclusive growth.

Larger and sustainable improvements in efficiency performance of resources are feasible and can lead to **substantial economic benefits**.



Thank you for your attention

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