

"EPR contribution for CO₂ eq¹ savings updated with Eurostat data 2022"

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This paper will be delivered in the form of Power Point Presentation

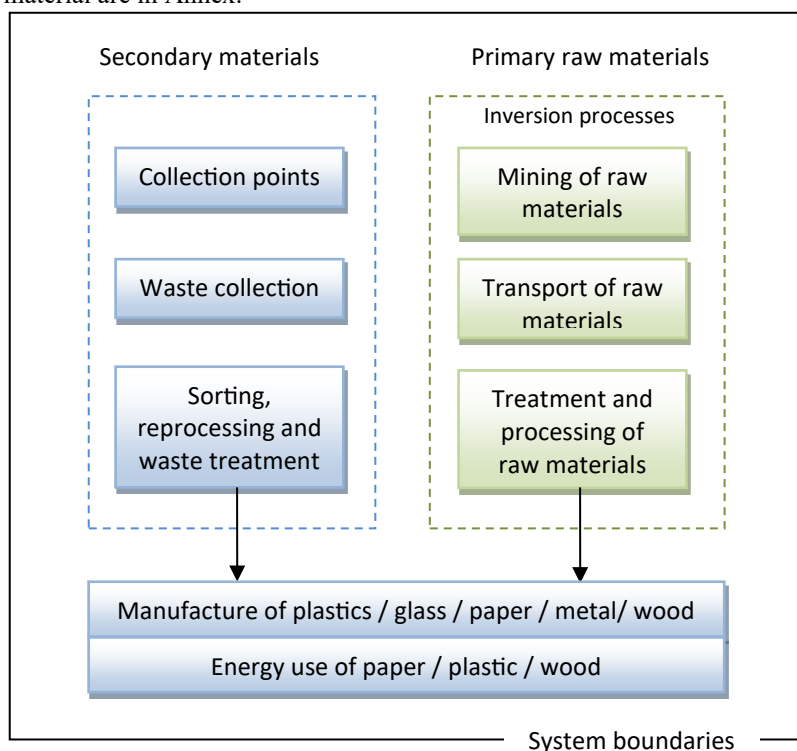
The Extended Producer Responsibility (EPR) model is based on the polluter-pays principle, which aims to include producers of material goods in the management and treatment of waste and keep raw materials and goods in the economic circle. The benefits of EPR schemes for packaging can include improvements in waste prevention, reuse and recycling, reduced use of virgin/primary material, increased availability and use of recycled material, and generation of economic value from materials that would otherwise be thrown away or cause damage to the natural environment. Reuse and recycling also saves energy use and reduces emissions of CO₂ associated with virgin material processing and use, and helps to reduce incineration of plastic waste. It can also provide financial benefits, with fees paid by producers helping to reduce the cost to governments of waste collection and management.

Definition of LCA parameters for evaluation of environmental effects of EPR

The use of LCA to assess environmental impacts of recycling and recovery of packaging waste does not cover the entire packaging life cycle (from cradle to grave) but only a part of it. This means from picking up waste packaging from collection points (containers, bags, collection yards, etc.) to the level where the material or energy produced from the secondary raw material replaces the same product/semi-product produced from the primary raw material (example: glass melt) – known as inversion process.

1. Setting goal and scope definition

System boundaries and processes in the assessed system: a collection of waste from collection points, their collection, processing, transport of outputs, energy utilization of part of outputs, landfilling of part of outputs up to material utilization of parts of outputs, ie. entry into the next life cycle at the level of replacement of the primary raw material with secondary raw material obtained from the processing of individual types of waste. A general scheme for defining the boundaries of the packaging waste system is in the picture. Detail boundaries for each material are in Annex.



^{1 1} qualified estimation

The function of the assessed system is the management of wastepaper, plastics, glass, metal, and wood, with focus on packaging, contained in municipal waste and trade waste. As this is not the entire life cycle of the product, so we do not know use stage, the declared unit has been determined.

Declared unit (DU) is treatment with one kg of waste.

2. Inventory analyses

- Material inputs related to the collection system and treatment process for each commodity
- Total transport requirements for collection and transport to sorting lines and waste treatment plants
- Material and energy inputs on the sorting and treatment line
- Transport of sorted secondary raw materials for final processing
- Transportation of waste from sorting to incinerators, landfills
- Material and energy inputs related to the recycling process
- Inputs and outputs related to the energy recovery
- Material and energy inputs related to the disposal on the landfill
- Inversion processes energy production, production of granules, production of pulp, act.
- Data from the SimaPro database

3. Impact assessment

Based on the results of the inventory analysis, the results of the impact category indicators Total energy consumption (MJ) and Global warming (kg CO₂ eq.) are calculated.

4. Interpretation

In the interpretation phase, the results of the inventory analysis and impact categories are evaluated, and conclusions and recommendations are formulated.

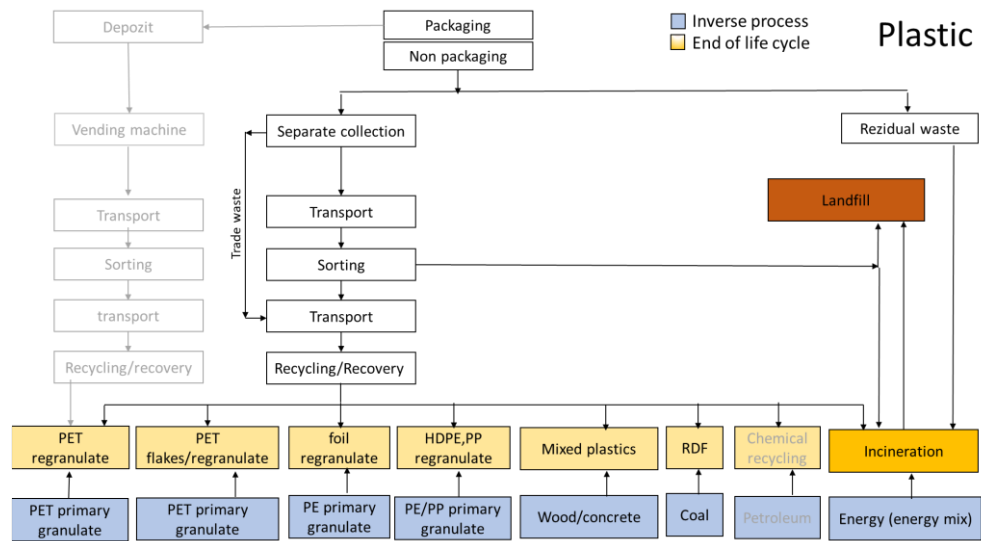
Main factors which influence the results of LCA

- Definition of a function of the system and functional unit
- Determination of system boundaries
- Quantity and flow of individual commodities and groups of packaging waste passing through different nodes of waste management technologies from collection to treatment and replacing of raw materials or energy or are landfilled.
- Quality of primary data and knowledge about waste management technologies used for packaging waste treatment as collection, transport, sorting, recycling, recovery, disposal etc.
- National energy mix
- Inversion processes - what material in what form is replaced by secondary raw material produced from packaging waste, the same with energies.
- Data from environmental databases as SimaPro (Data is updated every year in the light of new experiences and knowledge, could be different results over time for the same input data from the inventory analysis)

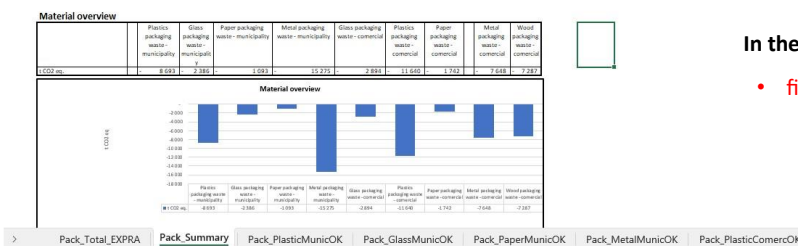
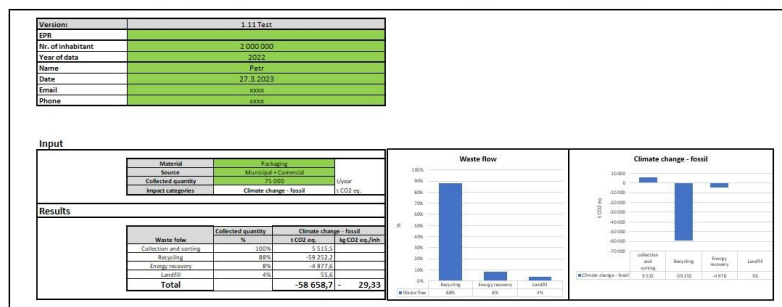
Calculation tool for CO₂ eq savings (EXPRA members)

- The model is created in EXCEL.
- The model is now built on the basis of the waste streams known from the operation of the EKO-KOM system.
- The calculations use primary data and parameters of the collection, recycling, and recovery of waste known and created in the EKO-KOM system, including the calculated environmental impacts of individual processes per declared unit.
- The model makes it possible to model specific flows of individual methods of recycling and waste recovery in terms of the amount of waste passing through each type of technology.
- The model makes it possible to model waste flows collected within municipal systems, but also waste flows from other packaging waste generators (shops, HORECA, industry, etc.)

Example of the basic flow in the tool (plastic)



Calculation tool for CO₂e savings (Example of material sheets)

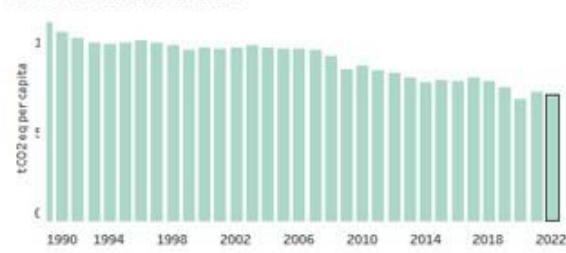


In the model it is necessary to:

- fill in the identification data

Emissions per capita in EU-27

Hover over the bars to see emissions



Source: <https://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer>

Annual percentage change emissions per capita in EU-27

Hover over the bars to see percentage change



Savings in CO₂ eq emissions due to recycling and recovery of packaging waste is equal to 0,7%-0,9% of total greenhouse gas emissions of EU-27



European Environment Agency presented total greenhouse gas emissions per capita in EU-27 in 2022 - 7 t CO₂ eq per capita

<https://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer>

The CO₂ eq saving per inhabitant achieved by recycling and using packaging waste is comparable to the average production of CO₂ emissions of a new passenger car over the distance 490-610 km



Average emissions from new passenger cars registered in Europe in 2020 - 107.5 gCO₂/km

<https://www.eea.europa.eu/ims/co2-performance-of-new-passenger>