Life cycle assessment of wall pegs

Background

In this study there is a comparison between wall pegs produced from raw materials and wall pegs produced from plastic waste by Plasteriet.

Plastic is collected from some companies nearby Plasteriet and from Trondheim residents, who donate it. It comes to Plasteriet already washed. After that, the workers sort it by type and colour. It goes to shredding machines where into flakes. Under pressure and with heat the melted flakes are injected into moulds. The product then cools down within a few seconds and is ready to use.

Goal and scope definitions

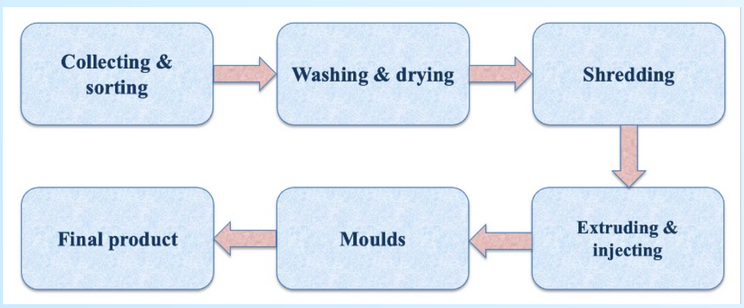
This work is being done to evaluate the life cycle of wall pegs made from plastic waste, as well as comparing them with wall pegs available in retail. 1 wall peg is used as the unit of comparison. The life cycle assessment of wall pegs from the store is only evaluated by the production of materials for making hooks. The life cycle assessment of a plastic wall peg does not include production waste and unusable plastic that enters the company.

Inventory analysis

Plastic waste come to *Plasteriet* from Trondheim citizens, who donate it, and from some companies nearby (not further than 10 km from *Plasteriet*). A bicycle is used as a means of transport, so no emissions from the delivery of plastic from are implied or considered. The types of plastic that the company works with are polypropylene and polyethylene. In this work, material for the wall pegs is polypropylene (PP), which is mainly used for bottles, food containers, toys.Most of the plastic supplied to the company is food-grade plastic: containers for various products, packages for shampoos, shower gels, children's toys. Three types of wall pegs produced by *Plasteriet* are being compared. These are 19 g, 13.5 g and 7.5g wall pegs made from polypropylene.

Special equipment is used for the wall pegs manufacturing (produced by *Plasticpreneur* company). To assess the life cycle, the approximate amount of material in a simplified form was calculated, which goes into the production of this equipment.

The production steps are shown in the figure below:



Comparable wall pegs

№	1	2	3	4
Wall pegs				
№	5	6	7	8
Wall pegs				
№	9	10	11	4
Wall pegs				

Results

To obtain the results, the SimaPro LCA software and Ecoinvent database were used. The graphs below show the contributions of the various resources in the category to making the wall peg. Electricity, steel, wood, plastic, water, and plastic recycling process are presented on the pie charts. It can be seen on the graphs, that electricity contributes the most into global warming and fossil recourse scarcity (39% and 59%). Water using contribute the most into fine particulate matter formation (49%), terrestrial acidification, (57%) freshwater eutrophication (75%), marine eutrophication (82%), and water consumption categories (60%). The plastic recycling process itself contribute the most into ozone formation (51%), terrestrial ecotoxicity (58%), freshwater ecotoxicity (68%), marine ecotoxicity (64%). Wood contributes the most into land use category (64%), and steel into mineral resource scarcity (31%).

The contribution of every process into life cycle assessment categories is shown below: