myclimate – The Climate Protection Partnership

Ecological Lifestyles: Benefits of Secondhand Products Sold through Internet Platforms

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Basic Assumption and Aim of Study

- Our basic assumption of the study was:

«With the purchase of secondhand products over Internet platforms we can avoid the manufacturing, transport and packaging of new products.»

Aim of the study:
Figure out environmental benefits of purchasing secondhand products compared to new goods.

Overview Product Categories & Products

Product Category	Products (5 most sold)
Furniture	Sofa, Bed, Table, Cupboard, Bureau, Chair
Toys	Lego, Playmobil, Training bike, Toy tractor, Football table
Sport Articles	Bicycle, Home trainer, Trailer (Bicycle), Snowboard, Skis
Small Household Appliances	Coffee machine, Sewing machine, Vacuum cleaner, Microwave, Ironing board
Large Household Appliances	Washing maschine, Fridge, Dishwasher, Tumbler, Baking oven
Electronics	Smartphone, TV, Tablet, Laptop, Digital camera
Baby & Child	Pram, Maxicosi, Child car seat, Playpen, Cot
Clothes & Accessoires	Bag, Watch, Shoe, Jacket, Evening dress

Functional Unit and System Boundary

- Functional Unit:
  1 specific product of each category, e.g. 1 sofa, 1 bicylce, 1 chair, 1 jacket.

- System boundary:
  - Products are assessed from cradle-to-gate, including the transport to Switzerland.
  - Use-phase and end-of-life phase have not been considered in this study.

- Time frame 1 year
  (Sept 2013 – Aug 2014)

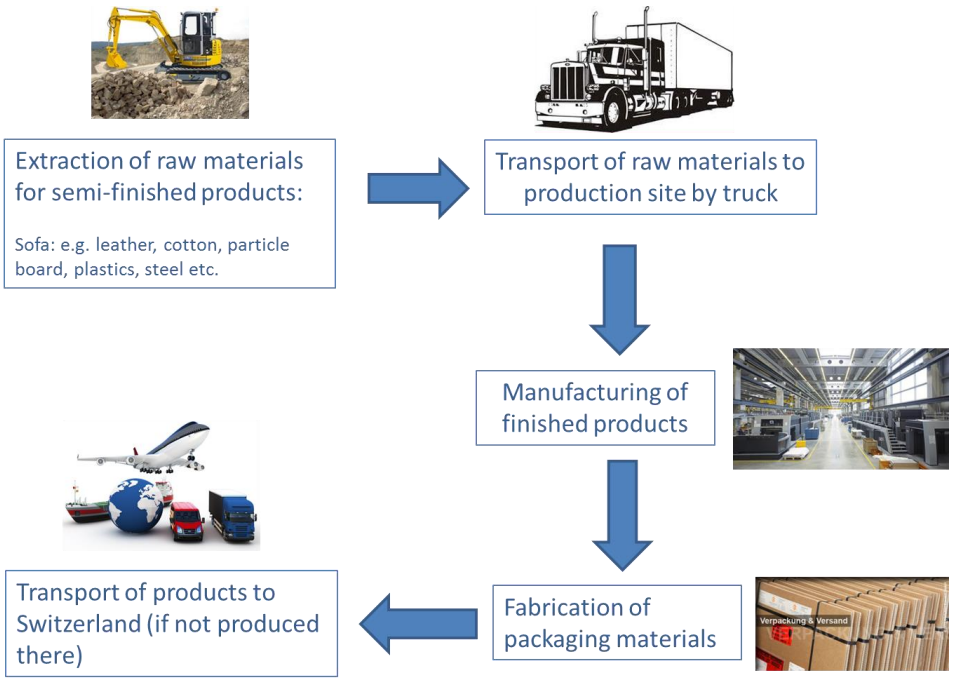


Figure: System boundary on the example of a sofa

Data Inventory

- Internet search
  - Existing LCAs
  - End-of-life studies
  - Instructions for product manufacturing
  - Product declaration of manufacturers
  - EPDs (Environmental Product Declarations)
  - Product weights according to traders
  - Own estimations, weight measuring
- Raw materials, production processes
- Suitable datasets from CH ecoinvent database
- Comparison of products - scaling

Methods (Manufacturing, Packaging)

- **Manufacturing:**
  Assessment of raw materials (e.g. aluminium, wood), Manufacturing processes (from ecoinvent database), e.g. injection moulding, wire drawing, extrusion, coating

- **Packaging:** Assessment of Euro-Pallet, corrugated board (protection), Styrofoam (protection of corners), plastic film (fixation)

- **Datasets** for packaging materials (ecoinvent):
  - EUR-flat pallet
  - packaging, corrugated board
  - polystyrene Mix, 30% Recycling
  - packaging film, LDPE

Methods (Transport, Extrapolation)

- **Transport:**
  - Depending on the product, a specific calculation setup has been applied – production in Asia (China/India), USA or Europe

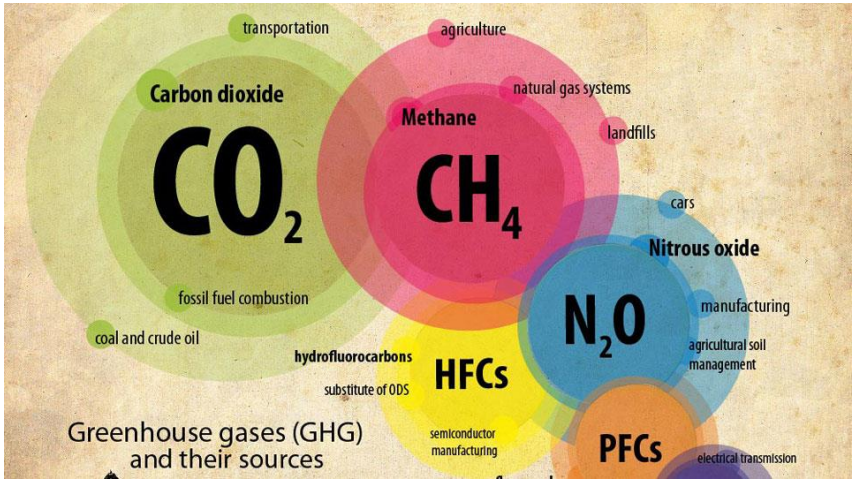
  - Transport from Asia by transoceanic freight ship to Rotterdam, by inland barge to Basel, by truck delivery to Switzerland; Transport from production site in Europe by truck to Switzerland

- **Extrapolation:**
  - 1. To cover all the sold products within the studied product categories: scaling up to 67% of all the products (safety margin of 33%) → not 100%, as expected
  - 2. To cover all the sold products of all the product categories (including game consoles, garden tools, books etc.): scaling up to 67% of all the products (safety margin 33%)

Results

- Total greenhouse gas emissions of products, and per kg of product

- Extrapolation to all the sold tutti products from 31 August 2013 – 1 September 2014



Source: http://www.presstv.ir/

GHG-emissions of the studied products

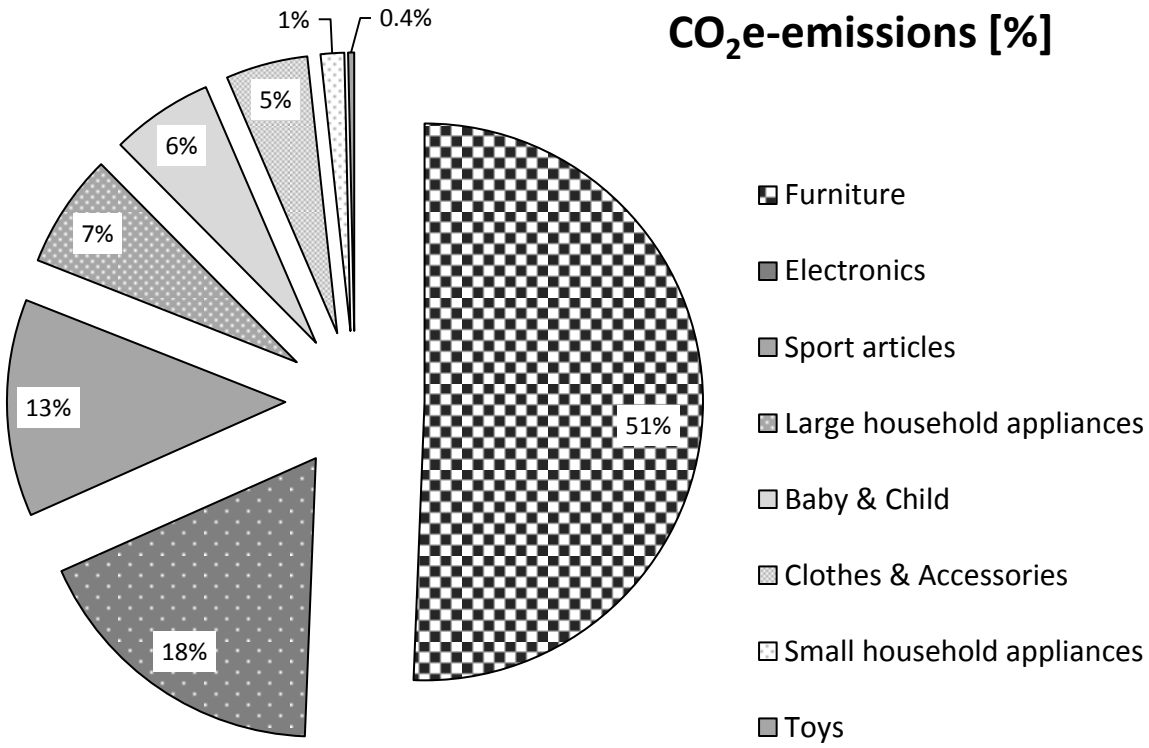
- Top-5 articles:
  - TV (~640 kg CO_2e)
  - Fridge (~435 kg CO_2e)
  - Baking oven (~410 kg CO_2e)
  - Sofa (~380 kg CO_2e)
  - Washing machine (~315 kg CO_2e)

- Bottom-5 articles:
  - Shoes (~16 kg CO_2e)
  - Training bike (~13 kg CO_2e)
  - Average Lego set (~12 kg CO_2e)
  - Watch (~11 kg CO_2e)
  - Average Playmobil set (~4 kg CO_2e)

- CO_2e-emissions per kg of product:
  - Smartphone (~330 kg CO_2e/kg)
  - Tablet (~200 kg CO_2e/kg)
  - Digital camera (~150 kg CO_2e/kg)
  - Jacket (~80 kg CO_2e/kg)
  - Watch (~70 kg CO_2e/kg)

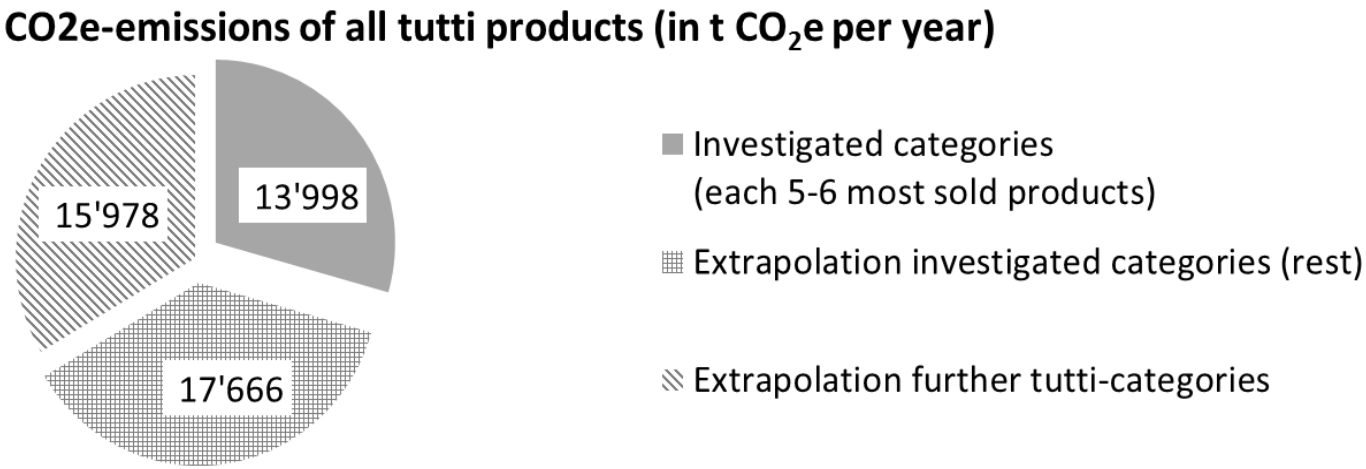
- Bottom-5 articles per kg of product:
  - Table (~1.6 kg CO_2e/kg)
  - Playpen (~1.4 kg CO_2e/kg)
  - Football table (~0.9 kg CO_2e/kg)
  - Bureau (~0.8 kg CO_2e/kg)

Total GHG emissions of studied categories



Total of all the investigated sold products: approx. 14’000 t CO_2e per year

Extrapolated GHG-Emission all tutti products



Total of all the purchased products in the investigated categories:
~31’000 t CO_2e
(conservative extrapolation with a safety margin of 33%)

Total of all the products including not assessed categories like books, game consoles or gardening equipment:
~47’600 t CO_2e

Comparison to daily life activities

- **47’600** t CO_2e equals:

  - **20’000** return flights Zurich – New York (economy)

  - **4’000** times around the world by car of 8 Liters/100 km

  - **85’000** average households’ electricity consumption per year

  - Assimilation of CO_2 by **380’000** beech trees over 10 years – equals **530** football fields full of trees

Major impacts and challenges

- Most important impacts (in products):
  - Cotton for furniture/clothes
  - Leather for furniture/clothes/shoes/accessories
  - Printed wiring boards for electronics
  - Particle boards for furniture

- Challenges:
  - Compromises to define «average product»
  - Data collection
  - Assumptions for packaging and transport activities
  - Extrapolation from average product categories to overall CO_2e-emissions (safety margin)
  - Questions about use-phase: real-life situation, more/less CO_2e-impact of power consumption compared to manufacturing of product (depending on power-mix!*)?

* Example of «old» versus «new» fridge in CH or GER

Conclusions

- Saved GHG-emissions by tutti.ch Internet platform are remarkable
- Reduction in GHG-emissions, but also improvement in resource and energy efficiency in general
- Second-hand platforms can contribute a lot to more sustainable lifestyles and more ecological production&consumption patterns
- Second-hand platforms can be seen as sensible complement to the sharing economy

Potential questions for further research

- Use-phase: at what point of time is the purchase of a new electronic product justified (case-to-case investigations)
- Rebound-effects: in which cases is the purchase of a second-hand product really replacing the purchase of a new good?
- What is/are the social profile(s) of the tutti.ch platform visitors/buyers?
- What can producers do to foster the purchase of second-hand products (stability, life-expectancy, design, …)

Interactive website

Interactive website to illustrate emission figures on www.klima.tutti.ch

Questions

Thank you for your attention!

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