

# LCA-calculations in Circwaste project

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# LCA calculation setup

## Both impacts and potential benefits of recycling

- Plastics: mechanical recycling
- Waste electronic equipment
- Biowaste: composting and anaerobic digestion (biogas)
- Metals: approximated as aluminum and steel
- Mixed waste: energy recovery (electricity and heat)
- Paper: re-pulping
- Cardboard: re-pulping



# Modelling

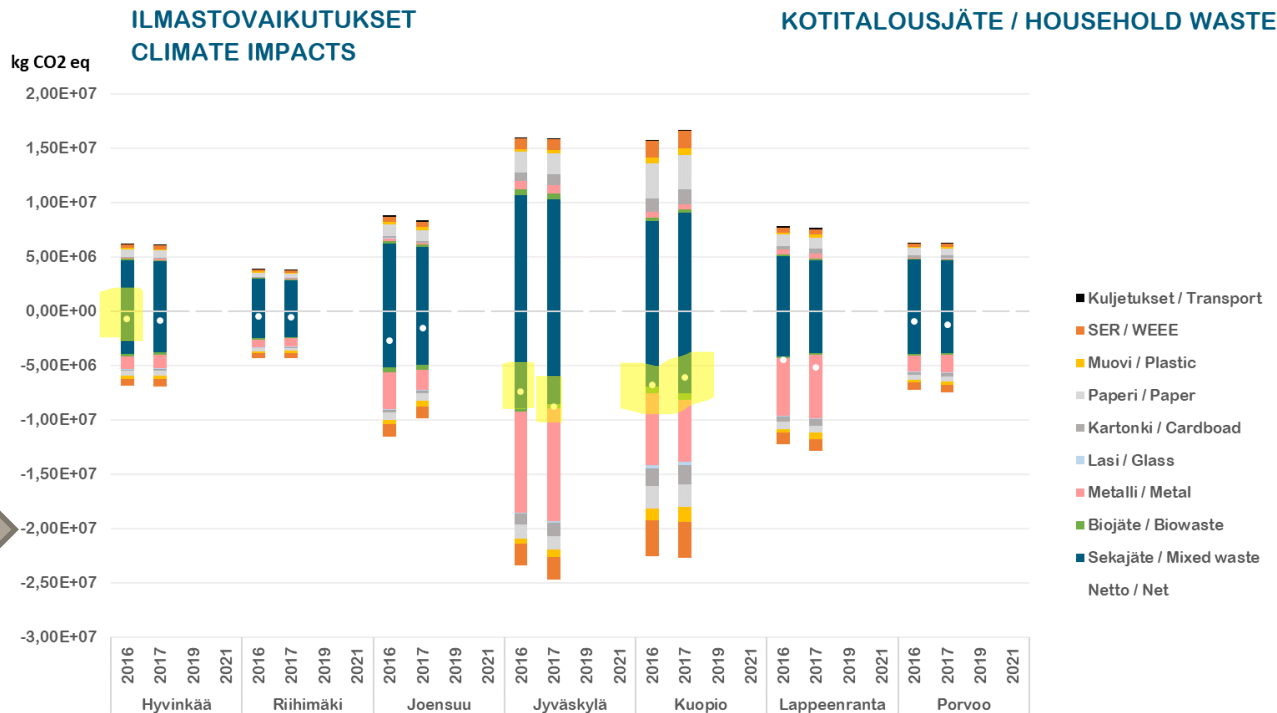
- Impact assessment based on the ReCiPe Hierarchist LCIA method:
  - Global warming (kg CO<sub>2</sub>-eq)
  - Freshwater eutrophication (kg P-eq)
  - Marine eutrophication (kg N-eq)
  - Mineral resource scarcity (kg Cu-eq)
- Inventory analysis based on the ecoinvent 3.5 database
  - Ferrous metals (kg)
  - Non-ferrous metals (kg)
  - Sand (kg)
  - Clay (kg)
  - Other minerals (kg)
  - Biomass (m<sup>3</sup>)

# Interim results

Impacts

Net impact

Potential benefits



SYKE

# MERIVESIEN REHEVÖITYMINEN MARINE EUTROPHICATION

# KOTITALOUSJÄTE / HOUSEHOLD WASTE

kg N eq

6,00E+03  
5,00E+03  
4,00E+03  
3,00E+03  
2,00E+03  
1,00E+03  
0,00E+00  
-1,00E+03  
-2,00E+03

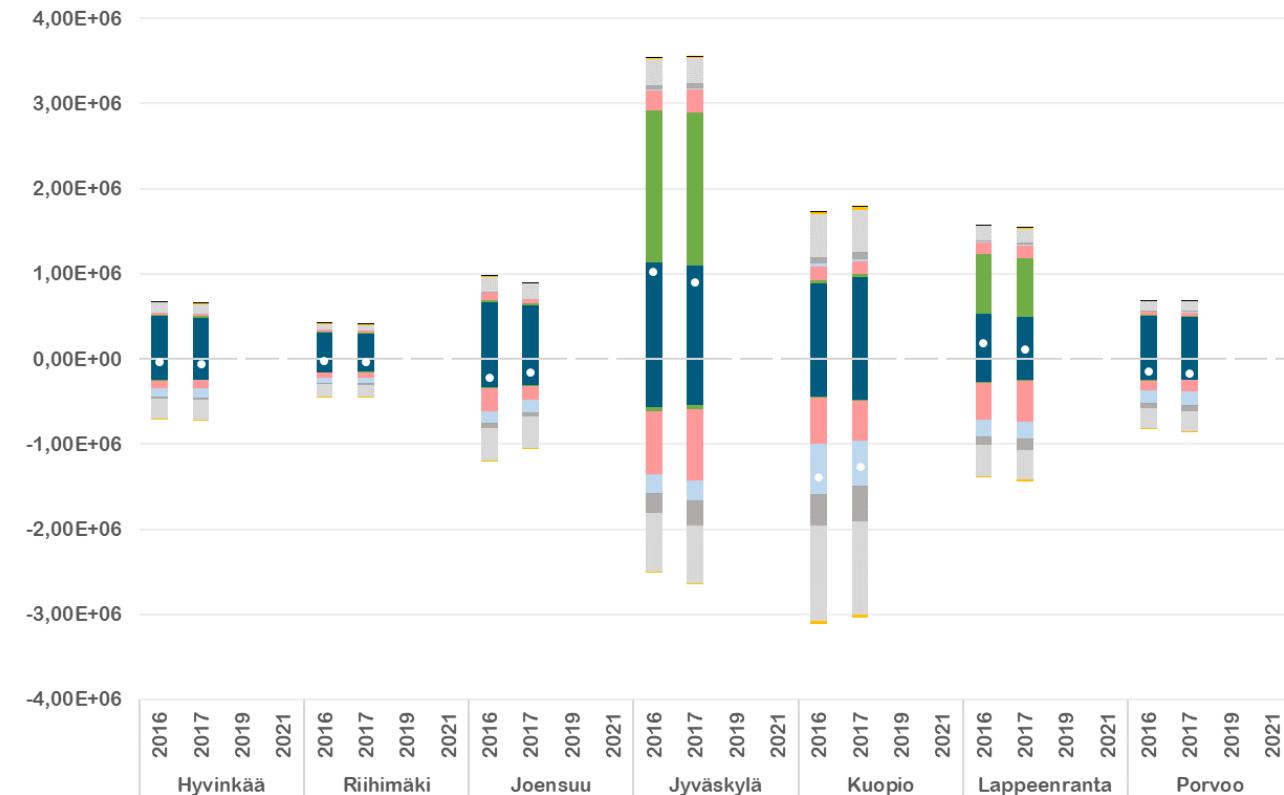
Hyvinkää				Riihimäki				Joensuu				Jyväskylä				Kuopio				Lappeenranta				Porvoo							
2016	2017	2019	2021	2016	2017	2019	2021	2016	2017	2019	2021	2016	2017	2019	2021	2016	2017	2019	2021	2016	2017	2019	2021	2016	2017	2019	2021				

- Kuljetukset / Transport
- SER / WEEE
- Muovi / Plastic
- Paperi / Paper
- Kartonki / Cardboard
- Lasi / Glass
- Metall / Metal
- Biojäte / Biowaste
- Sekajäte / Mixed waste
- Netto / Net



## MUUT MINERAALIT OTHER MINERALS

kg



## KOTITALOUSJÄTE / HOUSEHOLD WASTE

- Kuljetukset / Transport
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# Interim result discussion

- The calculation process is undergoing a revision.
- The avoided impacts with recycling are mostly higher than the impacts recycling cause. However, also opposite results are seen.
  - Subject of revision and sensitivity analysis.
- If one impact is positive but another negative, which do we choose? – question of priorities...
  - New, better solutions in recycling and reuse to tackle the problems?



## Interim result discussion (2)

- Crediting recycling and having a no-recycling as the alternative case make it look like it is positive to generate waste, but it ought to be understood, that it is only to reduce the negative impacts of consumption.
- The work is a showcase, an example, but the data was not originally collected for LCA.
  - Indicator data is difficult to find.
  - Case specific data is needed for more accurate calculus.



# Next steps

- Calculation setup recheck
- Data for the years 2019 and 2021
- Ferrous and non-ferrous metal shares
- Sensitivity analysis (?)

# Thank you for your attention!

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