



LITHUANIAN - SWISS COOPERATION PROGRAMME

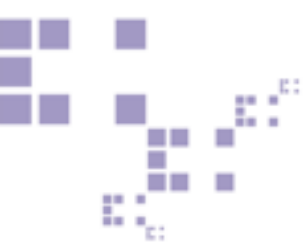
Improvement of Environmental Performance of Single Use Paper Cups in the Context of Circular Economy

Different paper cup alternatives towards closed loop
economy

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Key issues

- 1) Coffee cups structure
- 2) Coffee - to - go culture
- 3) Stuck in linear model

Paper 95%
Polyethylene 5%



Over 1000 coffee-to-go spots



3721 tons annually



Linear model



Lithuanian situation

Key producers for hot drinks in Lithuania:

Coffee-to-go chains: Coffee Inn (32 units); Vero Cafe (29 units); Caif Cafe (15 units); Šviežia kava (7 units), and other smaller coffee shops.

Petrol stations: 517 petrol stations are situated in Lithuania (Orlean, Statoil, Neste, Lukoil, etc.).

Vending machines: public places like airports, stations, supermarkets, offices, universities, hospitals, etc.

Newsstands: Lietuvos spauda and Narvesen (337 units in 49 Lithuanian cities).

Fast food restaurants: McDonalds, Hesburger, KFC, etc.

Total amount of the biggest coffee-to-go shops in Lithuania is 937.

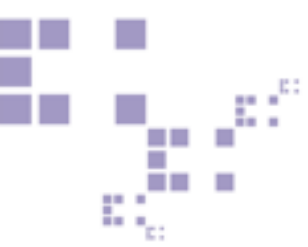




Lithuanian situation

- According to Environmental Protection Agency data, **3721 tons** of combined packaging waste was generated in 2015, Lithuania.
- This number does not reflect precise amount of combined packaging waste generated in Lithuania. As producers those companies pay pollution taxes every year for the packaging waste they generate (**579 eur. per ton**, which is 2,154,459.00 eur. annually in Lithuania).
- 8000 producers submitted tax returns in 2015.
- Companies pay landfill tax which is 21, 72 euro per ton (80,820.12 eur. annually in Lithuania).

It is made an assumption that 70% of combined packaging will be possible to collect after installing a separate collection system. That would be **2604,7 tons** of packaging waste with the prevailing material paper.

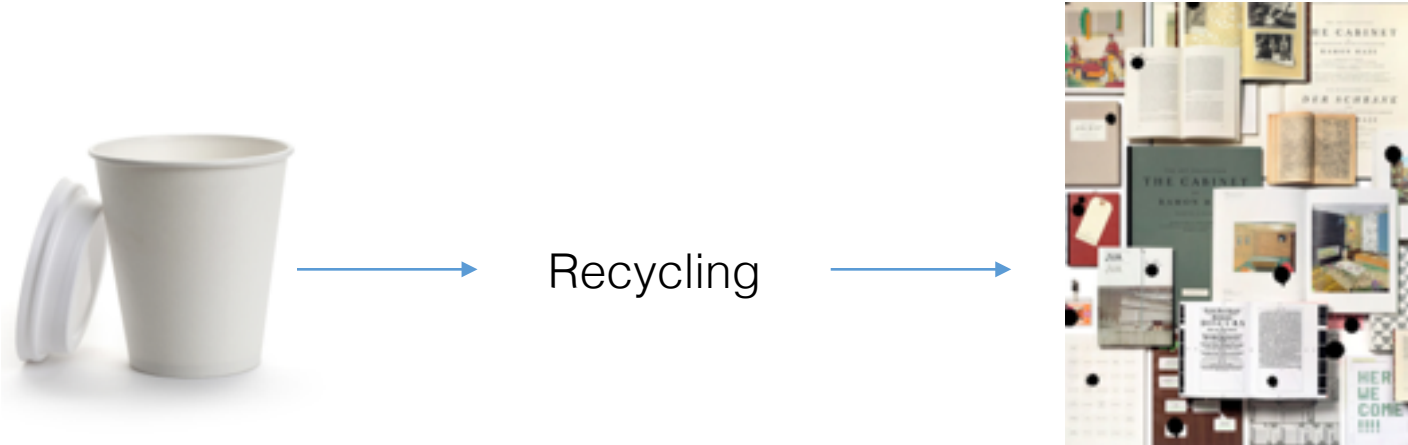


Alternatives



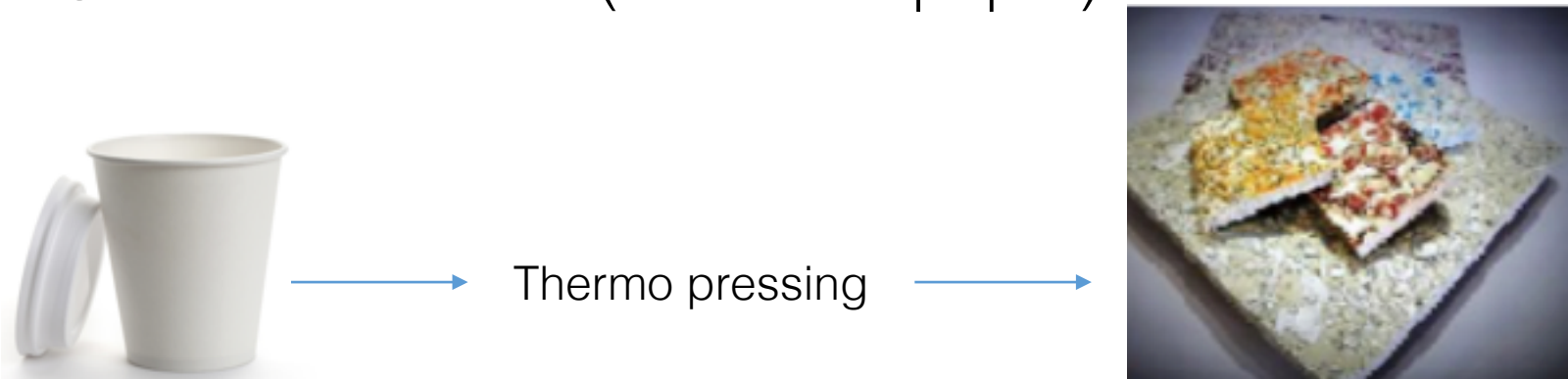
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I. Earth Coating (PE + CaCo₃) + kraft paper



Paper

II. Standard structure (PE + kraft paper)



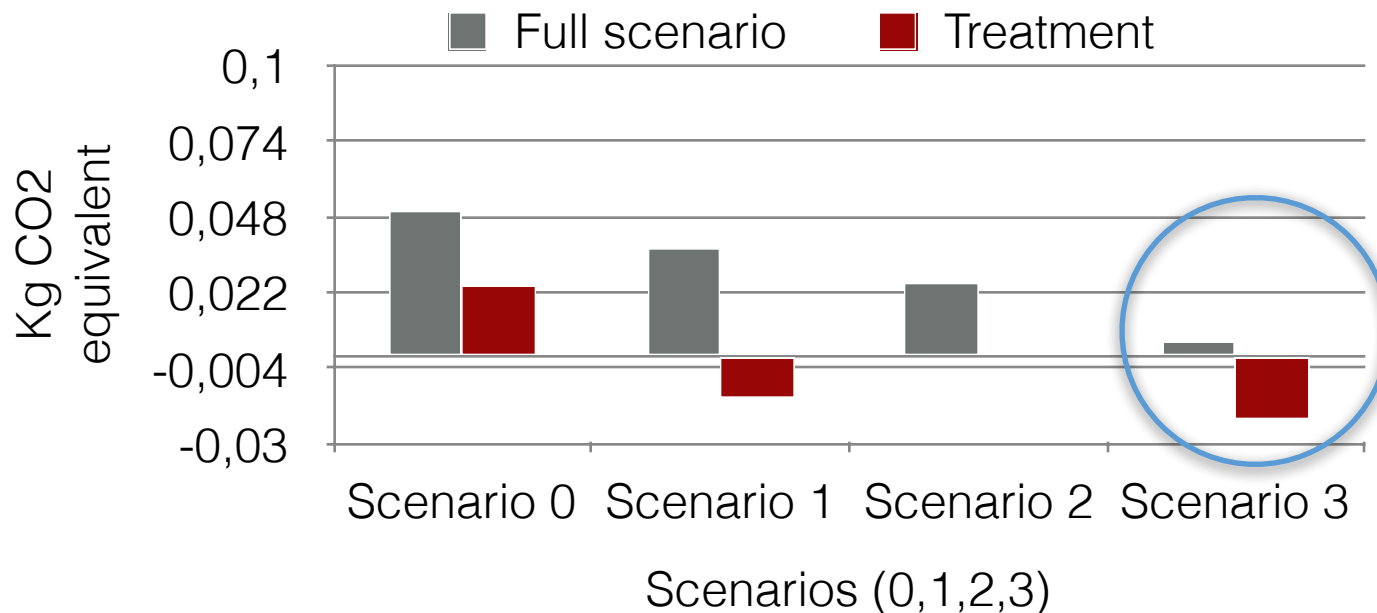
Construction boards

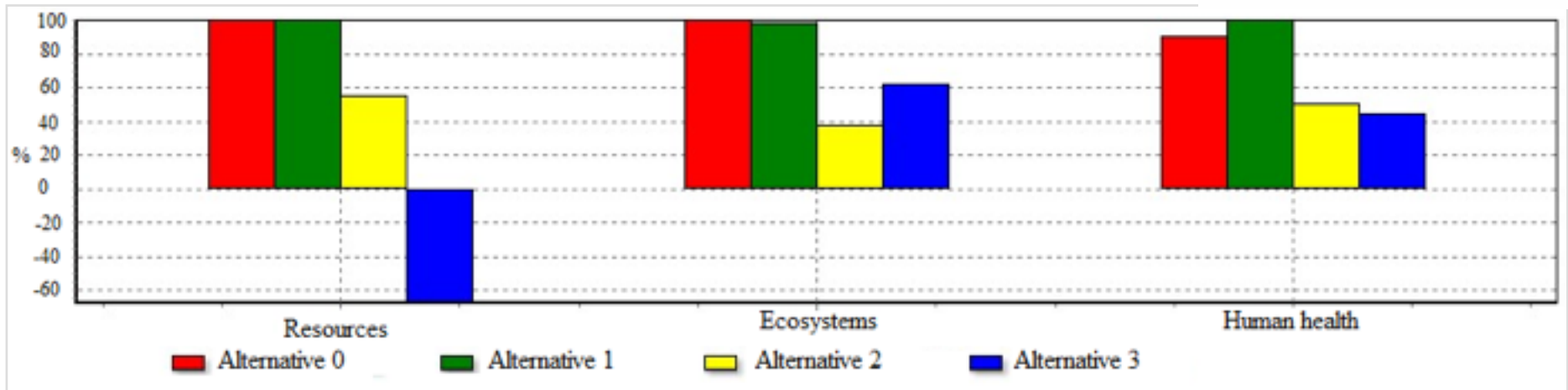


Life cycle assessment

- Scenario 0:** paper cup → Landfill
- Scenario 1:** paper cup → Incineration
- Scenario 2:** paper cup + EarthCoating → Paper recycling
- Scenario 3:** paper cup → Construction boards

Functional unit: 12 oz (middle size) paper cup that weights 11.53 g.





Scenario 0 and scenario1 have the greatest impact on resources, ecosystems and human health according to LCA ReCiPe Endpoint (E) method, damage assessment category.

Alternative 2 has 40 % lower impact on resources, 60 % lower impact on ecosystems and 50 % lower impact on human health.

Alternative 3 has the lowest impact on resources, ecosystems and human health categories.



Economics

PP - payback period

N - annual economic benefit

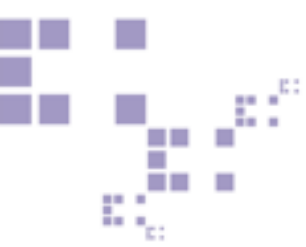
PP (2 Scenario) = $529\,719 / 2\,359\,246 = 0.2$ years

PP (3 Scenario) = $1\,228\,871 / 2\,990\,247 = 0.4$ years

N (2 Scenario) = 2 359 246 eur.

N (3 Scenario) = 2 990 247 eur.

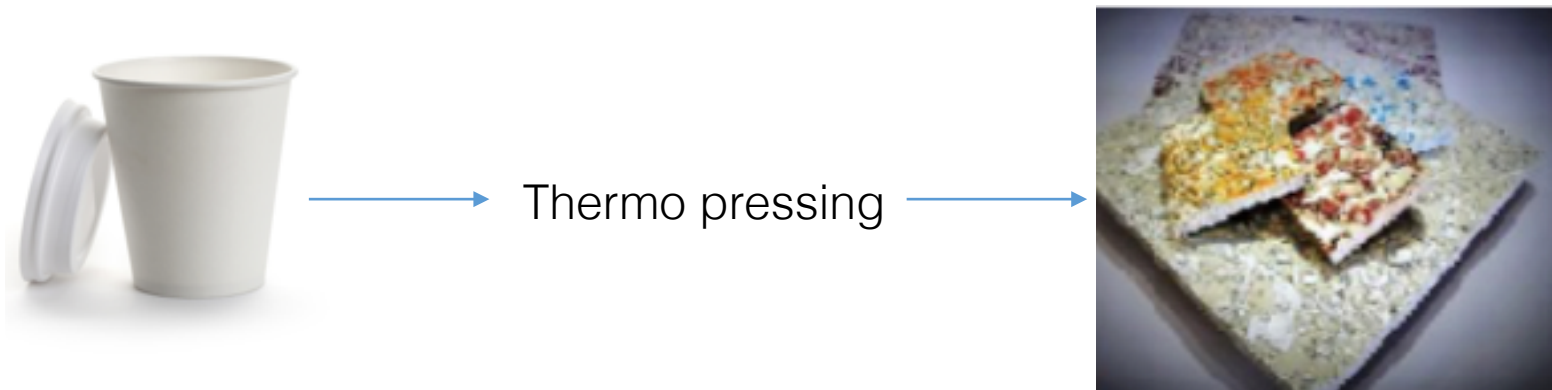
According to economic assessment, payback period (PP) of second scenario would be 2.4 months, payback period (PP), for the third scenario would be 4,8 months, assuming that packaging collection rate is 70%.



Recommendations

LCA showed that Scenario 3 has the best environmental performance and economic indicators, this technology can also use tetra packs and other types of combined food packaging.

II. Standard structure (PE + kraft paper) paper cups



Construction boards