

Developing pilot accounts for packaging materials WP4

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Finlands miljöcentral
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Overview of the work in WP4

- **Objective: to develop sustainable methodology for the accounting of packaging material flows on a national scale**
- Primary data collection succeeded very well
- Data acquisition: Stakeholder collaboration with key data providers RINKI Ltd and Palpa has been very intensive and fruitful; survey to enterprises yielded ~90% response rate (except of wood packages)
- Accounts on the packages delivered to the Finnish market was the most laborious task – lot of detailed methodological issues and development – yielded the most valuable results and advances
- Packaging waste accounting with high granularity requires future development despite the advances made in the project
- Sustainability: the approach could be taken into use for the packaging accounts in Finland but practical issues need to be resolved
- Additional dissemination for the Finnish stakeholders will be arranged during spring 2023

About packaging

- Material used for containment, protection, handling, delivery and presentation of products
 - e.g. inside a transport package there can be individually packed products in a group package
 - All parts attached to the package, such as labels and reinforcements, are considered packages
- Packaging can be mono- or multimaterial
- Packaging can be divided into business and consumer packaging depending on their end user
 - It might only become packaging at the time of use.
- The packaging materials assessed were paper and cardboard (fibre), plastics, metal, glass and wood

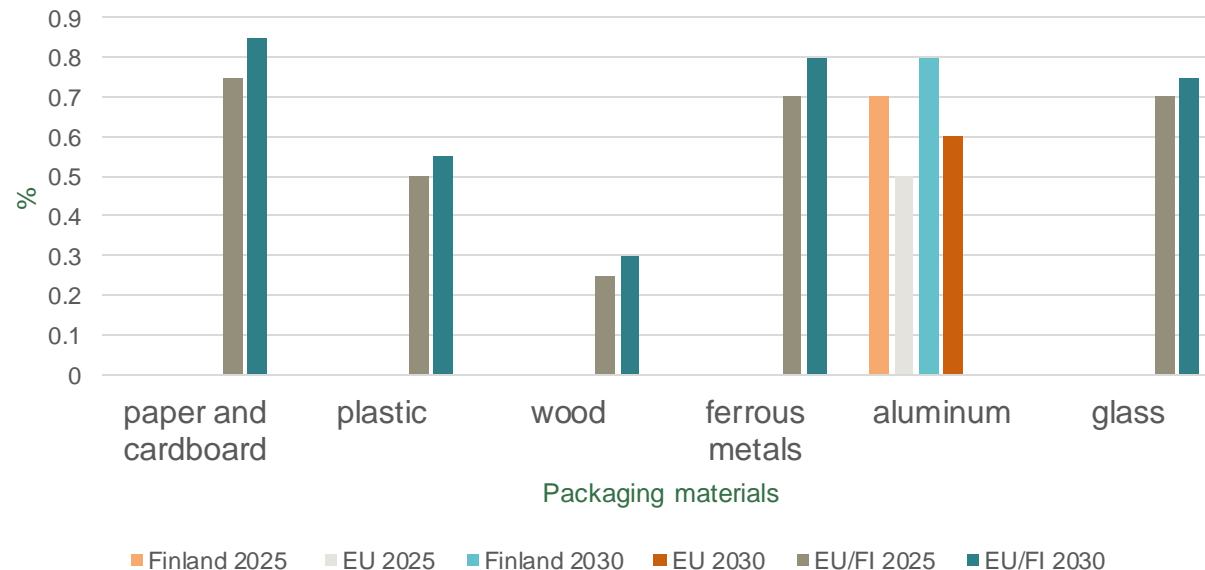


Packaging materials in circular economy



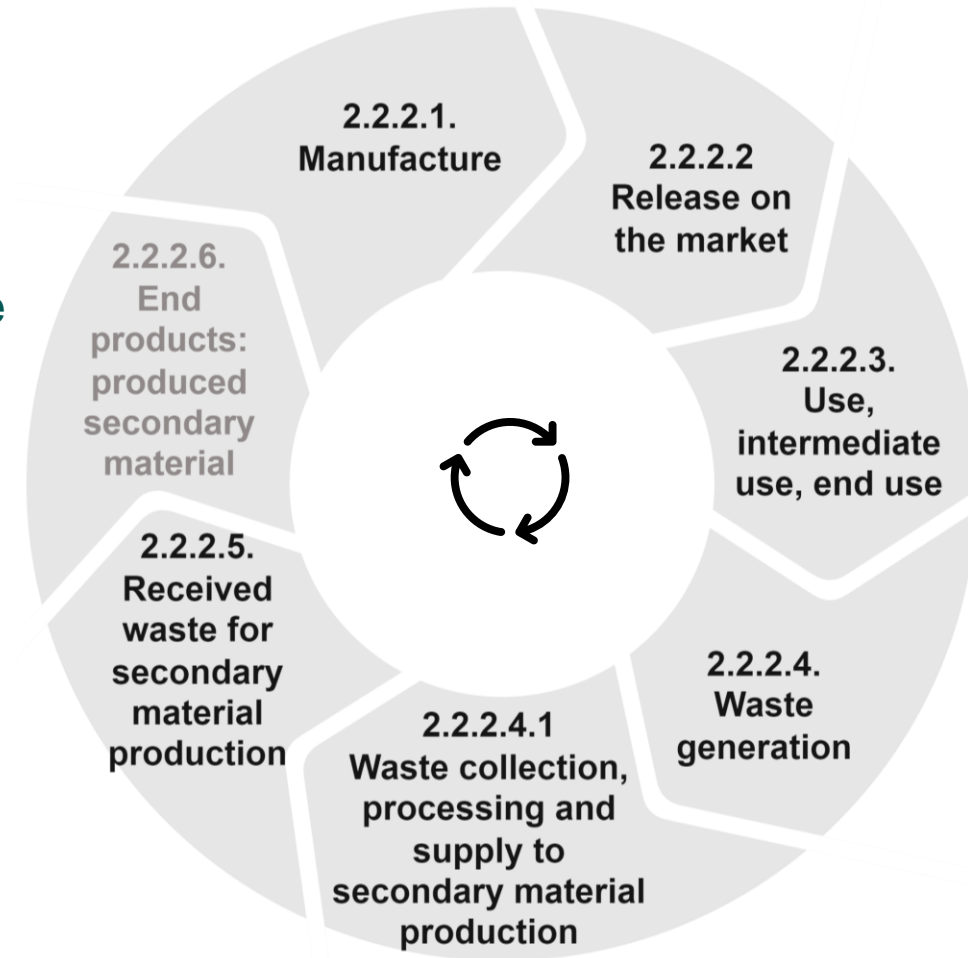
- Packaging uses a significant amount of resources in the EU and globally
 - The goal for the EU is that by 2030 all packaging waste is recyclable or reusable in an economically viable way
 - The goal of the EU Action Plan for Circular Economy (2020) is in addition to recycling to reduce packaging and the amount of packaging waste

Recycling targets according to EU and Finnish National Regulations



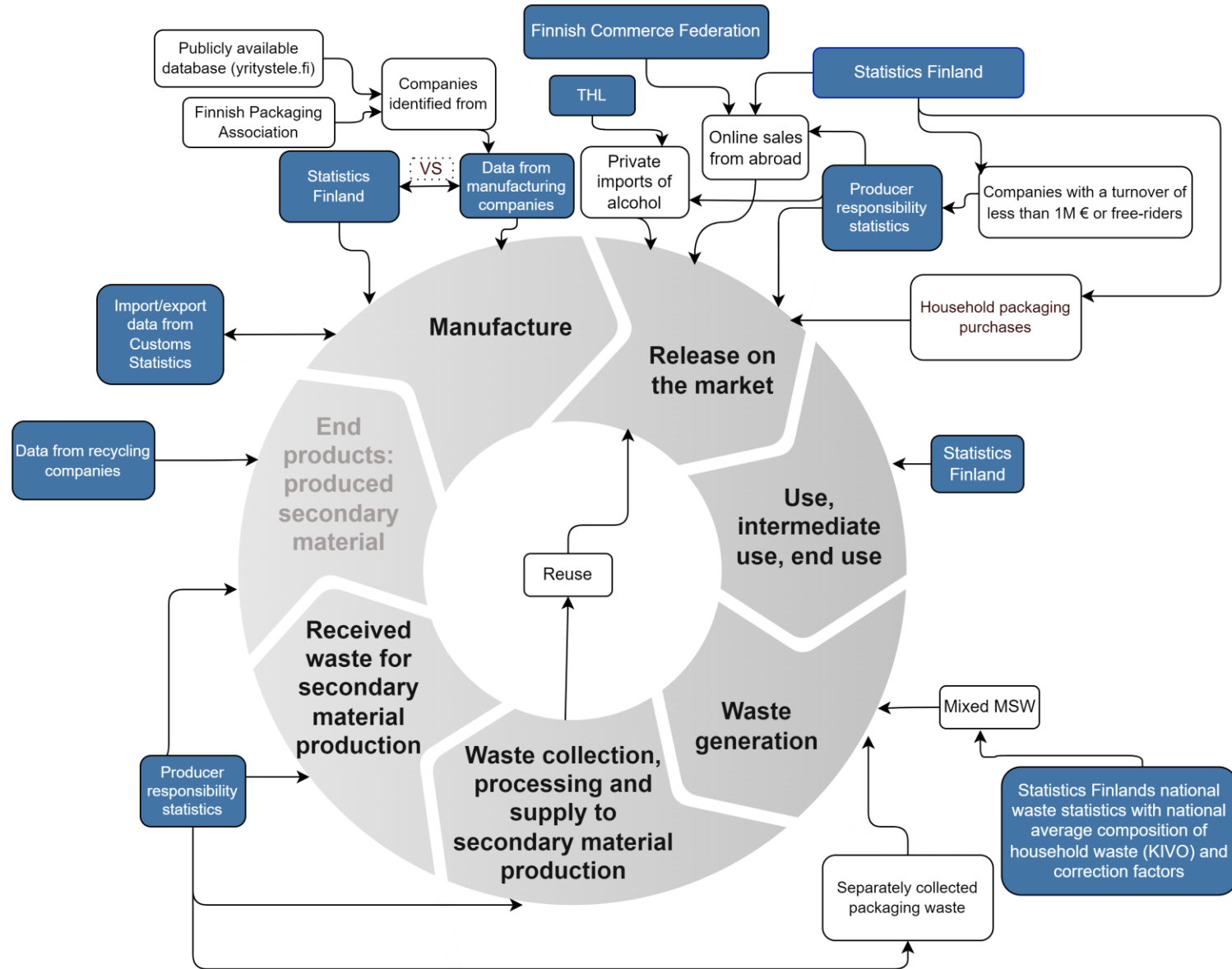
Packaging accounts

- The accounts enable the monitoring of developments towards circular economy and diminished packaging flows
 - Accurate and reliable computational data are needed on the entire life cycle of packaging; i.e. their manufacture, supply, use and recycling
- Quantities and qualities of mono- and multimaterial packaging
 - Relevance in assessing the recycling potential of packaging
- Methodology is needed to estimate the amount of packaging remaining outside the national statistics (e.g. producer responsibility) and waste statistics (e.g. mixed municipal solid waste)
 - Method must be reproducible in Finland and possibly also in other EU countries



Data sources

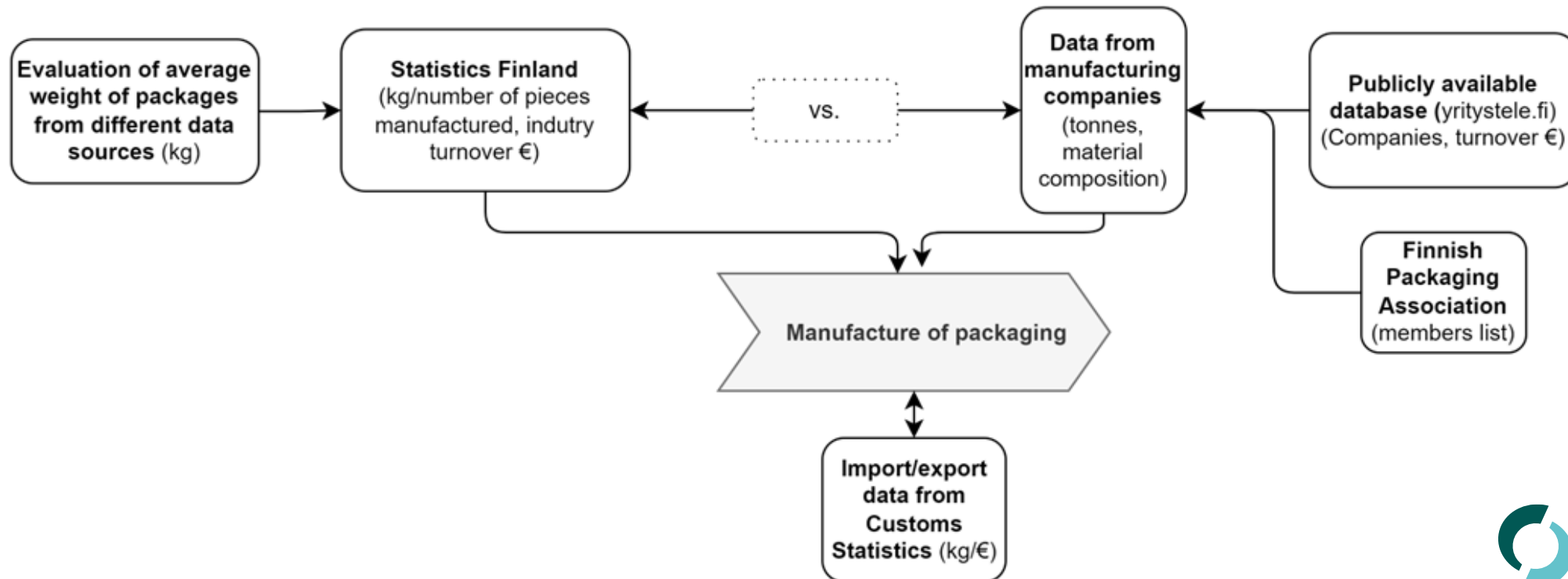
- The chosen year 2020
- Chosen examples;
 - paper & cardboard packages
 - Plastic packages



Methodology: Manufacture of packages

Survey vs. Statistics

- Survey to packaging manufacturers in Finland
- Statistics: Manufactured packages in kg/number of pieces, evaluation of average weight of packages
- Customs statistics (import/export)



Results:

Manufacture of packages

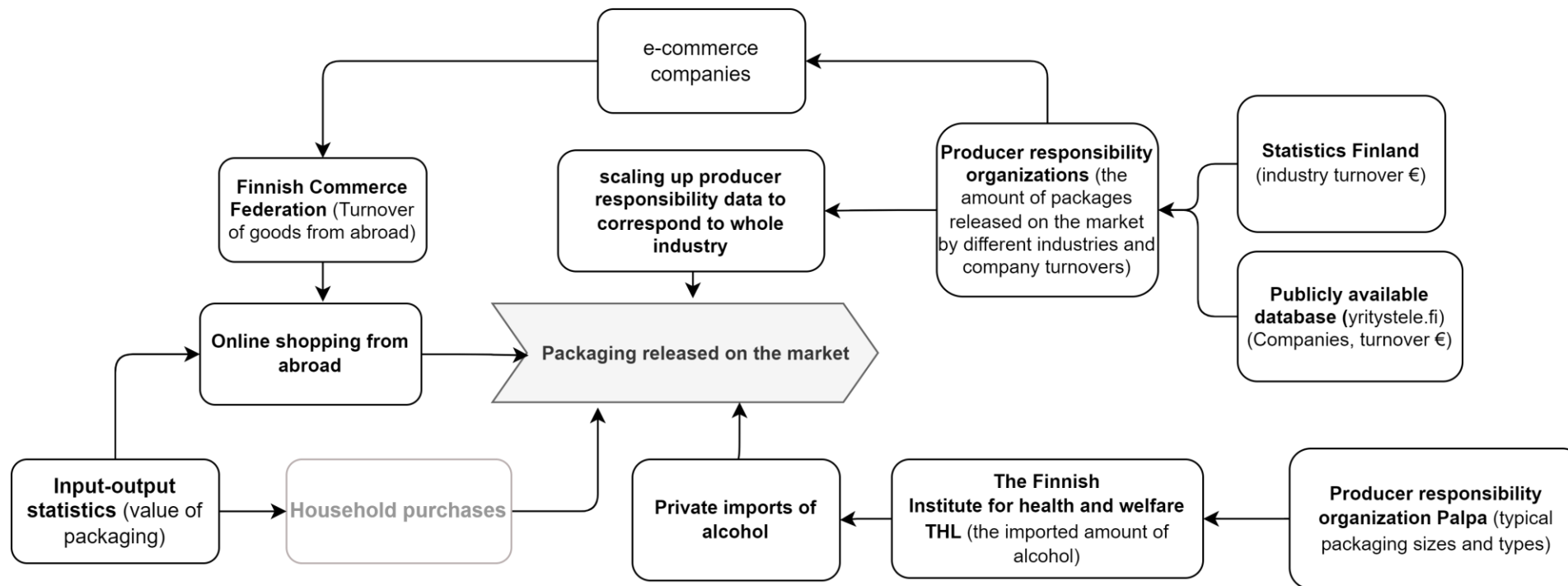
Paper & cardboard packages	amount/ t	Plastic packages	amount/ t
package manufacturers	198 000	package manufactures	123 000
- monomaterial	167 000 (85%)	- monomaterial	98 000 (80%)
- multimaterial	30 000 (15%)	- multimaterial	25 000 (20%)
import	48 000	import	65 000
export	7 000	export	17 000
total (manufacture+import-export)	238 000	Total (manufacture+import-export)	171 000

- Survey coverage: plastic 96%, paper&cardboard 90%, metal 90%, wood 11% (Glass packaging not manufactured in Finland)
 - Division into mono- and multimaterial packages
- Challenges:
 - Materials that only become packages through their use (e.g. paper sheets)
 - Companies that manufacture packages with a different NACE affiliation

Methodology:

Packages released on the market

- **Data from Rinki and Palpa + estimates on:**
 - <1 milj. € turnover companies & free-riders
 - Private imports: alcohol, average packaging sizes and types
 - Online sales from abroad



Methodology:

Packages released on the market by industry

- Packages on the market: creating industry-specific accounts

- Data sources:

RINKI and PALPA customer register:
turnover and NACE classification for
>4000 companies

**Asiakastieto web portal and Statistics
Finland's microdata on enterprises and
industries (NACE affiliation and revenues):
Data validation**

- Determination of appropriate level of aggregation to guarantee confidentiality (>7 enterprises per industry): 164 individual industries for which accounts were compiled
- Data classification according to materials (5 different) separating business and consumer packages

Methodology: Packages released on the market by industry

- Upscaling RINKI numbers i.e. accounting for the enterprises not included in the raw data by RINKI
 - Was done before merging the industries (to avoid error)
 - It was assumed that the companies release the same amount of packages to the market in relation to their turnover
 - Upscaling was not done for those industries, where packing is occasional
- Correcting the RINKI data: some (consolidated) corporations reporting for their daughter companies, which might have different NACE-classification
- Summing up RINKI and PALPA data
 - Upscaling for PALPA-data was not needed since ~100% of all deposit beverage packages were included in the raw data

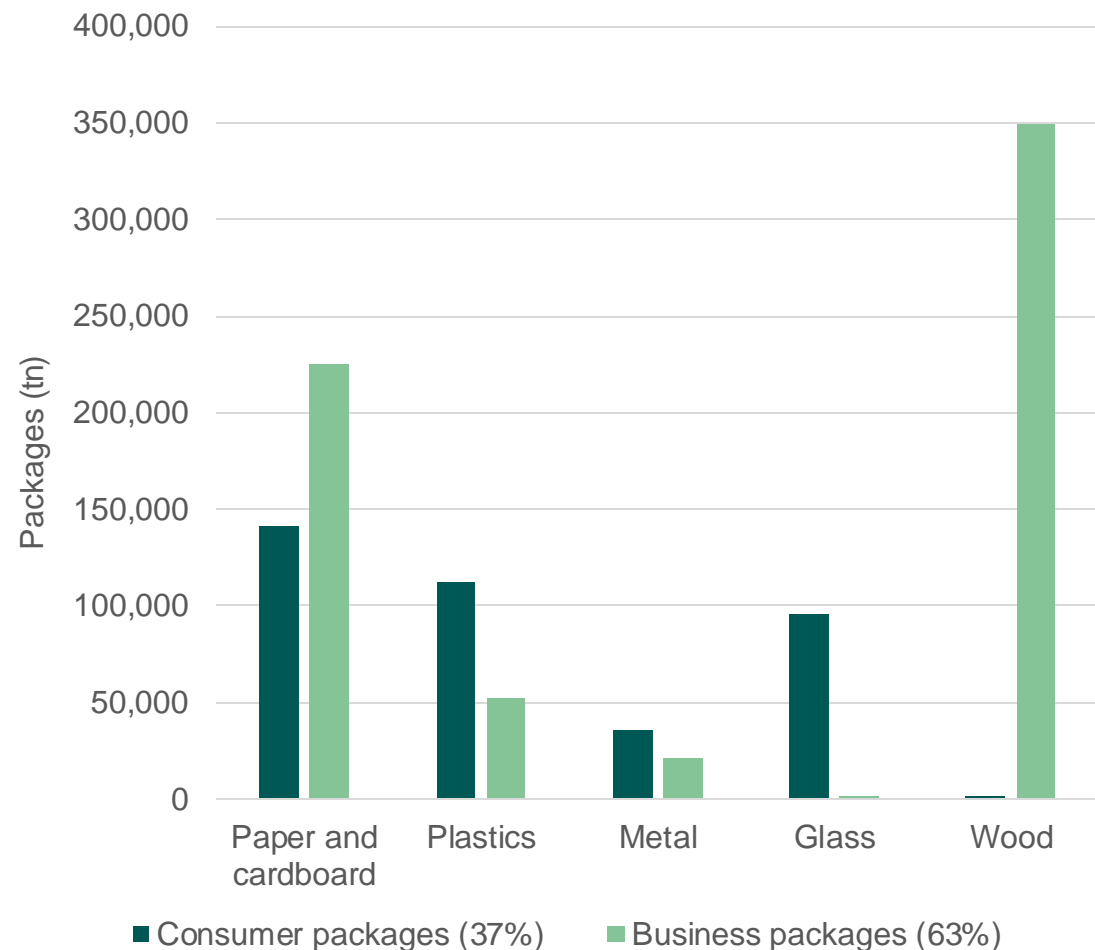
Results: Packages released on the market 1/2

Packages: tn	Paper and cardboard	Plastics	Metal	Glass	Wood	Total
RINKI: Upscaled numbers	358 000	145 000	35 000	31 000	289 000	858 000
PALPA: Beverage packages		17 000	20 000	61 000		98 000
Online shopping from abroad	7 790	2 428	159	322	5	10 705
Private imports (alcohol)	306	29	820	4518	0	5 673
Repaired pallets					63 000	63 000
Total	367 000	164 000	57 000	96 000	352 000	1 036 000
Producer responsibility statistics ¹	338 000	157 000	54 000	85 000	301 000	935 000
Packages excluded in the raw data by RINKI ²	24 %	18 %	17 %	13 %	4 %	16 %

¹ Pirkanmaa Centre for Economic Development, Transport and the environment

² <1M € turnover companies & free-riders

Results: Packages released on the market 2/2



- Challenges
 - Other packages from private imports
 - Uncertainties in estimating the packages from online sales
 - Household purchases, estimates 16 400 t and 14 000 t for paper and plastics respectively, (may enter the waste stream)

Results:

Packages released on the market by industry

NACE code and description	Paper and cardboard (tn)	Plastics (tn)	Metal (tn)	Glass (tn)	Wood (tn)	Sum (tn)	Share
46+47 Wholesale trade and retail trade, except of motor vehicles and motorcycles	191 000	74 000	21 000	54 000	110 000	450 000	47 %
10 Manufacture of food products *	70 000	39 000	4 000	7 000	19 000	139 000	14 %
11 Manufacture of beverages	8 000	16 000	16 000	30 000	3 000	72 000	7 %
25 Manufacture of fabricated metal products, except machinery and equipment	10 000	2 000	1 000	0	27 000	41 000	4 %
17 Manufacture of paper and paper products	16 000	3 000	3 000	0	14 000	36 000	4 %
01-97 Total	358 000	162 000	56 000	92 000	289 000	956 000	

Only RINKI- and PALPA data included

* Retail trade of foods and drinks is combined with manufacture of food products

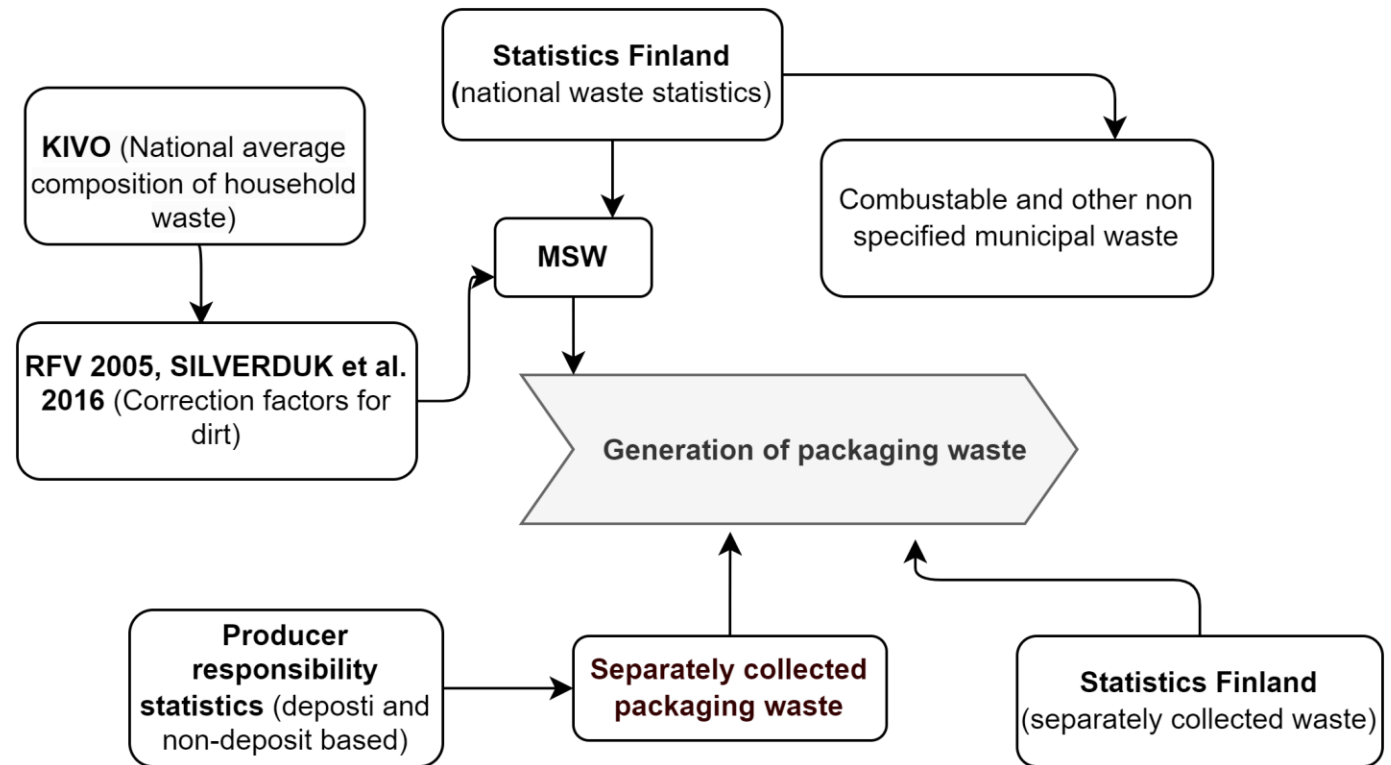
Methodology:

Generation on packaging waste by industry

- Packages on the market can be regarded equal to the volume of packaging waste
- Generation of packaging waste in different industries is a challenging task as industry-specific data on packaging waste is not collected/available and reported data typically contains overall sum of e.g. plastics waste
- Combining the data on packages on the market with economic input-output statistics provides means to produce estimates how packages are moving with products from the industry packing the product to industries (and households) acquiring the product
 - In this regards, preliminary estimates will be calculated but further work is needed to improve data accuracy

Methodology: Distribution of packaging waste to separate collection and mixed municipal solid waste (MSW)

- Separately collected packaging waste and mixed municipal solid waste (MSW)
 - MSW distribution for service industry and household waste



Results:

Distribution of packaging waste to separate collection and mixed municipal solid waste (MSW)

Paper and cardboard packaging waste	amount/ t
separate collection	336 000
mixed MSW	75 000
- service industry	26 000 (35%)
- households	49 000 (65%)
total	411 000

Plastic packaging waste	amount/ t
separate collection	62 000
mixed MSW	107 000
- service industry	37 000 (35%)
- households	70 000 (65%)
total	169 000

- Separate collection: Producer responsibility statistics, deposit and non-deposit based systems
- MSW estimated composition and factors for dirt
- Challenges
 - The uncertainty of dirt factors used
 - The uncertainty of the composition of mixed MSW
 - Packaging in other waste fractions; combustable and other non specified, littering, household combustion etc.

Producer responsibility statistics: Packaging waste received for secondary material production

Paper & cardboard packaging waste	amount/ t	Plastic packaging waste	amount/ t
recycled	332 000	recycled	41 000
incinerated	6 000	incinerated	115 000
total packaging waste recycled +incinerated	338 000	total packaging waste recycled +incinerated	156 000

- The ability of recycling facilities to recycle packaging and the recyclability of packaging

Results: packaging flow in Finland in 2020

Life cycle stages	Fiber packaging/t	Life cycle stages	Plastic packaging/t
Manufacture	238 000	Manufacture	171 000
Release on the market	368 000	Release on the market	165 000
Separate collection	336 000	Separate collection	62 000
Packages in mixed MSW	75 000	Packages in mixed MSW	107 000
Waste generation estimate	411 000	Waste generation estimate	169 000
Received for secondary material production	332 000	Received for secondary material production	41 000
Energy recovery (producer resp.)	6 000	Energy recovery (producer resp.)	115 000

Thank you

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