



TREASoURcE

**Municipal rigid plastic collection
and recycling campaign in
Tampere region, Finland
-
Collection and sorting**

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1. Introduction

Aim of the report is to describe how the rigid plastic collection and recycling campaign conducted in autumn 2023 in Tampere region was planned and which kinds of findings and learnings the campaign gained from collection and sorting phases. The campaign was organized by Ekokumppanit and Pirkanmaa Waste Management Company.

Rigid plastic is not under producer responsibility in Finland. Thus, there is not national wide recycling process existing. Few local processes are in place for example in capital area. In Pirkanmaa there has been a pilot in Orivesi to jointly collect and recycle packaging plastics and rigid plastics. Finland's National Plastic Roadmap 2.0 aims to start and extend the recycling to other plastic products than packaging. It recommends starting pilots to identify how different plastic waste streams could be collected.

Aim of the campaign was to pilot the rigid plastic collection and recycling process in Tampere region, identify the composition of the collected plastics and collect & analyze learnings from the pilot and its process phases.

2. The pilot

This chapter describes how the collection and recycling pilot was organized.

2.1 Collection

Two-month long collection period (Time: 18.9. – 18.11.2023) was organized in two big waste stations in Tampere region by Pirkanmaa Waste Management Company, the company handling municipal waste management in the area. Two months were selected as the initial estimation was that it takes some time before consumers notice the campaign and start to bring waste to the collection points. The target group for the campaign was households.

Collection points were:

- Tarastenjärvi waste station, Tampere
- Koukkujärvi waste station, Nokia

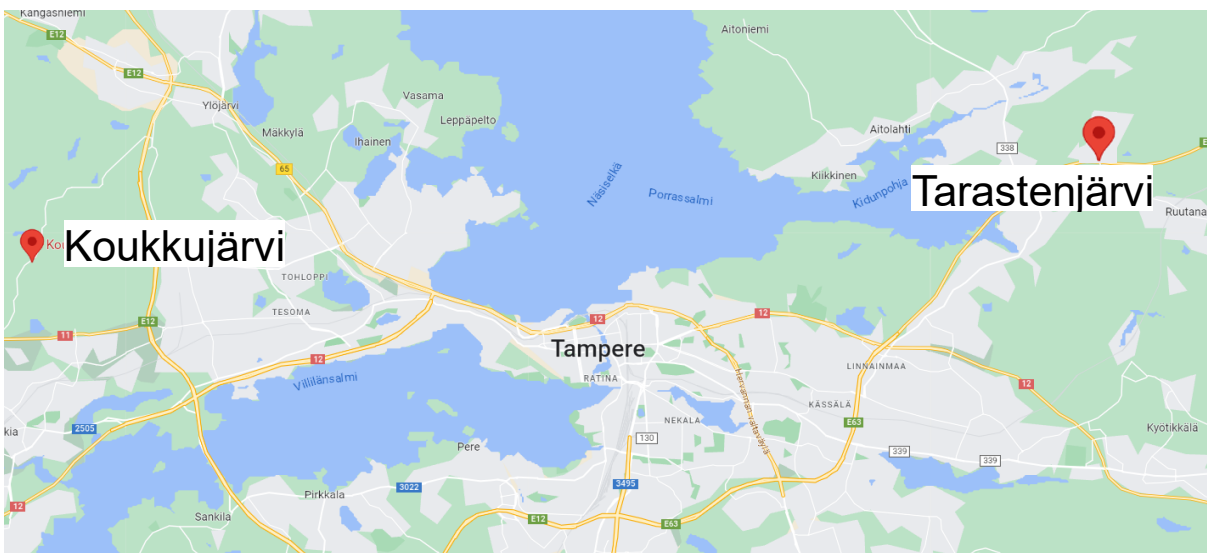


Figure 1 Waste collection points

Citizens could bring materials to container dedicated to rigid plastic waste. The aim was to see what kinds of plastics were brought to the collection. Thus, the type or size of plastics was not limited anyhow. The only criteria were the waste needed to be rigid plastic. Packaging plastics were not allowed as they have separate collection points.



Figure 2 Collection container



2.2 Sorting and further utilization

From the beginning the goal was not only to collect the rigid plastics but also ensure that as much of the materials as possible get back into circulation. The company called Hyötykeräys Oy was selected as a partner for the further sorting and processing the plastics. The company aims to find reuse and recycling routes for the collected material.


2.3 Recycling

Small scale samples of collected plastics were shredded and taken to Technical Research Centre of Finland (VTT) for analyses. Goal was to identify the possibilities for mechanical and chemical recycling. Results of recycling are not covered in this document.

2.4 Feedback survey

During the campaign there was a possibility to give feedback about the collection either in Finnish or English. The QR code and link for the survey was available in both waste management centers as well as on Pirkanmaa Waste Management and Ekokumppanit web pages.


* Required

1. I brought plastics to * 


Koukkujärvi waste station

Tarastenjärvi waste station

I did not bring any plastics, but I'd like to propose development ideas

2. Which grade would you give to the campaign? 

☆ ☆ ☆ ☆ ☆

3. Which works well? Which would need development? 

Enter your answer

Submit

Figure 3 Feedback survey template

Response rate for the survey was quite low: total 23 persons answered. The average rating 4.23/5 was given to the campaign. Results are seen in Attachment 1.

3 Results

3.1 Amount of collected plastics

In two-month period total 30.84 tons of waste was collected: 20.14 tons were brought to Koukkujärvi station in Nokia, 10.7 tons were brought to Tarastenjärvi, Tampere. When both Tampere and Nokia are taken into account it makes in average 0.11 kg per habitant in two months.

Based on KIVO there are approximately 1.6 % of rigid plastics in mixed waste in Finland (KIVO n.a.). In 2021 total 1 720 691 tons of mixed waste was collected in Finland (Tilastokeskus 2023). In estimation amount of rigid plastic was around 27 531 tons. This equals 4.97 kg per habitant, and when scaled to two-month period it would mean 0.83 kg per habitant. Based on calculations rigid plastic collection campaign reduced the number of rigid plastics in mixed waste around 13.3 % per habitant in Nokia and Tampere.

3.2 Composition of collected plastics

As recycling processes for different plastic types varies the composition study was done to identify different processing possibilities. The study was done with co-operation with Tampere University of Applied Science (TAMK) Project work course. The project team planned, conducted and analyzed the results with co-operation with TREASoURcE project partner Ekokumppanit and Pirkanmaa Waste Management Company.

The group went through ~1800 kg plastic waste sample. The result shows that over the half of the plastics were PP, 23 % was HDPE and 8 % PVC.

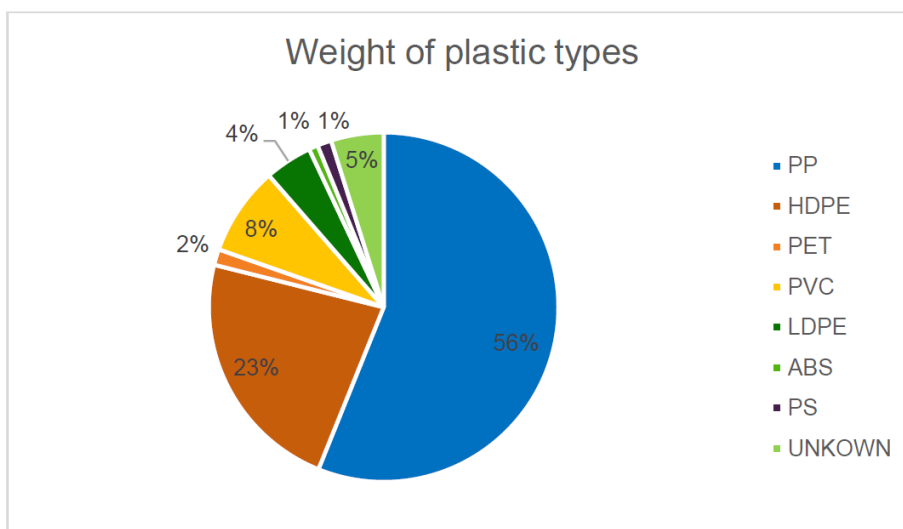


Figure 4 Distribution of plastic types by weight



Table 1 shows the most common items in each plastic type category.

Table 1 Common items in the sample

	Materials
PP	Plastic chairs, plastic tables, car parts, toys, suitcases
HDPE	Pipes, big cylindrical containers, fuel containers
PVC	Pipes

The separate report “Rigid plastic composition study” describes in detail how the study was planned and executed.

3.3 Collection

During the pilot rigid plastic waste was collected to two big waste stations. The feedback from consumers indicated that those who brought the plastics in waste stations found the process easy. There were some suggestions that collection points should be closer to the residential areas to reduce the threshold for bringing the waste. Some of the answers also pointed out that it is challenging to bring waste to the big waste stations if you do not have own car. There were suggestions that collection could be organized for example at supermarkets.

The project team evaluated that for consumers the easiest solution might be to collect packaging plastics and rigid plastics to the same container. This would also decrease the amount of transportation and containers (space) needed for the collection. The challenge of joint collection might be that currently packages are under producer responsibility as rigid plastic do not have any national funding system existing. The routes for further processing might vary.

As the sorting of plastics is often seen as challenging phase there were discussions if consumers could do presorting by plastic types at the collection points. This would mean that different plastic types were collected to different containers. From consumer point of view this would make the process more difficult. It would also need multiplied times space and logistics at collection phase. Even at the big waste stations there are limited amount of space for containers that limits the number of collected fractions. There is also high risk of failure, and some level sorting would be needed after collection anyhow.

The feedback from citizens and findings from composition study revealed that instructions and education towards consumers but also for employees working with the process is needed. Especially instructions are needed for following cases:

- How to handle items that have some non-plastic parts
- Possible limitations for the plastic types
- Can items contain residues such as oil spills

The selected recycling processes determines how the above things are instructed.

One finding was that having collection in waste stations might improve the quality of material as there are employees that can guide and support consumers.

3.4 Sorting

After collection phase plastics were transported to company called Hyötykeräys Oy that sorted the material and aims to find reuse and recycling possibilities for it. Based on them the main plastic types were PP, HDPE and PVC that supports the TAMK's results. The waste contained a lot of canisters and barrels. Number of pipes was lower than expected. Some of the canisters had oil residues.

Based on the estimation around 55 % was material that could be easily utilized further. Around 22 – 23 % was non-plastics such as insulation materials or metallic parts.

The rest, 22 – 23 %, were challenging materials that includes fractions such as

- PVC: There are some possibilities to utilize PVC pipes, but other PVC items are not circulating at the moment. Also PVC pipes are challenging and expensive to process.
- Some HDPE cannisters have fuel residues or markings of hazardous waste.
- Composites and alloys

The technology and processes for plastic recycling are developing in fast speed, which can change the markets and possibilities quickly.

Overall sorting and identification of plastics is crucial. Rigid plastic contains different types and mixtures. Sorting is done manually in many companies, and identification of all fractions is difficult. The current volumes for rigid plastics are small, partly due to the fact that the possibilities for their reuse have not been fully identified. Systematic collection and increased information would certainly increase recycling volumes. Bigger volumes could make process cheaper and give possibilities to develop them. New technologies are needed to identify plastic items efficiently.

3.5 Economic challenges and drivers

Rigid plastic is not under producer responsibility that means producers do not need to organize and cover the cost related to recycling of them. There is not any national wide funding system for the process either. Thus, the cost for collection and recycling needs to be covered in other ways such as fees from consumers bringing the waste. This might slow down the recycling of rigid plastics.

There is a tentative decision to include municipal waste incineration fully into EU Emission Trading System (ETS) in 2028. The final decision will be made in 2026. This would mean that burning fossil-based material such as plastics would be penalized. Some countries such as Sweden and Denmark have joined to ETS already. (Ministry of Economic Affairs and Employment of Finland 2023) This might speed up the need to sort out and recycle the rigid plastics from mixed plastics.



4 Summary

The rigid plastic collection and recycling pilot showed that there is a clear need for the rigid plastic recycling in Tampere region. There were not any critical bottlenecks or challenges during the campaign. If process is continued and / or scaled up some topics are needed to be evaluated and considered further. Table 2 summarizes the main findings from the campaign.

Table 2 Main findings from the campaign

Topic	Main Findings
Collection	Clear instructions for consumers and employees needed ~22-23 % of collected material was non-plastics Few dominating plastic types Collection points' short distance to residential areas appreciated by citizens
Sorting	Crucial for the process Often manual process Different types and mixtures make identification difficult New sorting technologies needed Higher material volumes are needed to develop processes
Funding	Rigid plastic not under producer responsibility, no national funding system existing Recycling fee might reduce the motivation of consumers to recycle rigid plastics EU emission trading system may increase the need to sort out plastics from mixed waste



References

Ministry of Economic Affairs and Employment of Finland. 2023. Jätteenpolton sisällyttäminen päästökauppaan. Available:

https://tem.fi/documents/1410877/2414868/J%C3%A4tteenpolton+sis%C3%A4llytt%C3%A4minen+p%C3%A4st%C3%A4st%C3%B6kauppaan_Loppuraportti.pdf/293053c7-2ebe-a68d-9970-1c7c31643057/J%C3%A4tteenpolton+sis%C3%A4llytt%C3%A4minen+p%C3%A4st%C3%A4st%C3%B6kauppaan_Loppuraportti.pdf?t=1683115001189

Sumi Oy. 2022. Muovipakkausten kierrätysaste kasvoi viime vuonna maltillisesti. Available:

[Muovipakkausten kierrätysaste kasvoi viime vuonna maltillisesti - Sumi Oy](#)

Suomen Kiertovoima (KIVO). NA. Kotitalousjätteen keskimääräinen valtakunnallinen koostumus.

Available: [Kotitalousjätteen keskimääräinen valtakunnallinen koostumus | KIVO](#)

Tilastokeskus. 2023. Suomen virallinen tilasto (SVT): Jätetilasto [verkkajulkaisu].

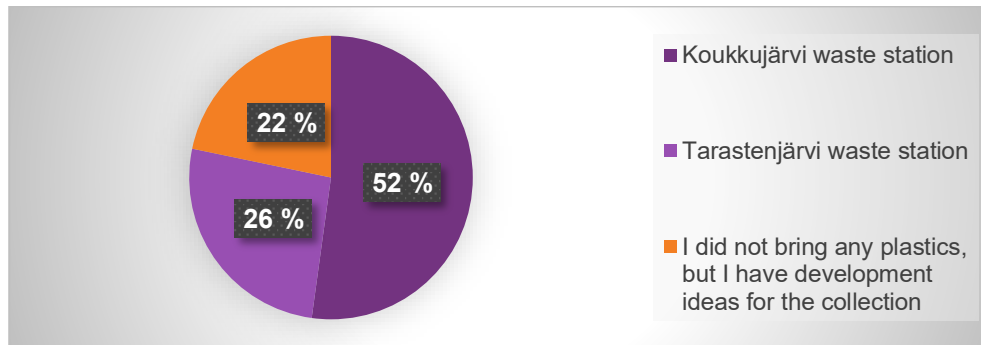
ISSN=1798-3339. Helsinki: Accessed: 5.1.2024.

Available: <https://stat.fi/tilasto/jate>

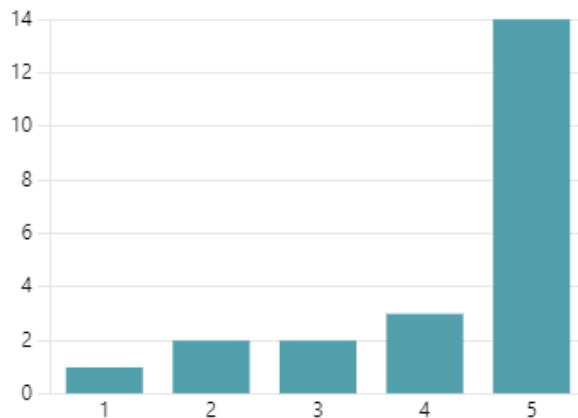
Attachment 1

Feedback survey results

1. I brought plastics to



2. Which grade would you give to the campaign?



3. Which works well? Which would need development?

Mikä kampanjassa toimi hyvin? Mitkä asiat vaatisivat vielä kehittämistä?	Which works well? Which would need development? (Translated into English)
Tästä olisi kannattanut ehkä tiedottaa vielä laajemmin. Kampanja itsessään on erittäin hyvä ajatus sillä kovan muovi on sinänsä turha kaatopaikkajätteenä. Kyseessä kun on arvokas materiaali.	Perhaps it would have been worthwhile to communicate about this even more widely. The campaign itself is a very good idea because hard plastic in itself is useless as landfill waste. It is a valuable material.
Helppo toimittaa jätelavalle. Jätteiden lajittelu on helppoa. Toivottavasti ei ole vain kokeilu.	Easy to deliver to the waste pallet. Sorting waste is easy. I hope it's not just an experiment.
Loistavaa, että kovamuovia kerätään! Tämä vakituiseksi ja Nekalaan myös keräyspiste.	It's great that hard plastic is being collected! This is a permanent and also a collection point for Nekala.
Hyvä palvelu, näitä myös isojen markettien kierrätyspisteelle. Lisää markkinointia.	Good service, these could be located at the recycling points of big supermarkets. More marketing.



tarkennusta onko muovilaatuja, joita ei saa tuoda? pitääkö esimerkiksi muoviamparista poistaa metallikahva?	Clarification, are there any plastic grades that may not be imported? for example, does the metal handle have to be removed from the plastic bucket?
Hyvä kampanja! Sopiva ajankohta, voisi uusia keväälläkin !?	Good campaign! A suitable time, could you renew in the spring as well!?
Kovamuovin keräyksellä on kova tarve. Kotitalouksista löytyy monenmoista kovamuovia jolle ei ole erillistä keräystapaa (esim. Vanhat puutarha kalusteet, lasten lelut, pulkat, kukkaruukut, tynnyrit yms.) vaan nämä joutuvat sekajätteeseen. Kuten tiedämme muovi ei maadu(!) Näille tarvittaisiin oma keräys"astia". Loistava keräys, vain tiedottaminen ontuu. Löysin tämän tiedotteen Pirkanmaan jäte huollon sivuilta vahingossa etsiessäni muuta tietoa. Olisi saatava pidempiaikainen keräys ja näkyvämpi tiedottaminen keräyksestä.	There is a strong need for the collection of hard plastic. There are many types of hard plastic in households for which there is no separate collection method (e.g. old garden furniture, children's toys, sticks, flower pots, barrels, etc.) but these end up in mixed waste. As we know, plastic doesn't stick to the ground(!) These would need their own collection "container". Great collection, only the information is lame. I found this announcement on the website of Pirkanmaa Waste Management Company by accident while looking for other information. There should be a longer collection and more visible information about the collection.
Paikka , helpous	Location, easiness
Olin saarella olevalla mökillä tuskailnut nurkissa lojuvaa muovista tavaraa. Huomasin tämän kamppanjan ja kävin hakemassa mökiltä kaiken kovamuovijätteen, mitä löysin. Asiointi sujui ja muovinkeräys oli helposti käytettävissä paikassa. Suuret kiitokset! Pääsin eroon itselleni turhasta muovista ja ne hyödynnetään! Toivottavasti kampanja saa jatkoa.	At the cabin on the island, I was tormented by the plastic stuff lying in the corners. I noticed this campaign and went to pick up all the hard plastic waste I could find from the cottage. The transaction went well and the plastic collection was in an easily accessible place. Thank you very much! I got rid of unnecessary plastic for myself and they will be put to good use! I hope the campaign continues.
Erittäin hyvä kokeilu.	A very good experiment.
Tärkeää, että tätäkin materiaalia kerätään! Voisiko keräys laajentua myös jäteasemille? Esim. Nekala ja Vuores?	It is important that this material is also collected! Could the collection also be expanded to waste stations? For example, Nekala and Vuores?
En o kuullut koko kampanjasta!	I have not heard about the campaign!
Hyvä, että tällainen keräys järjestetään :) Lisää tiedotusta.	It's good that this collection is organized :) More communication.
Joka kunnassa/kaupungissa pitäisi olla kovamuovinkeräyspiste (esim. paikoissa jossa on pahvin keräys, vaatekeräys ym. niitä vihreitä keräyslaatikoita)	Every municipality/city should have a hard plastic collection point (e.g. in places where there is cardboard collection, clothing collection, etc. those green collection boxes)
Kaivattu keräys. Kärryllinen neljältä perheeltä. Jäteasemalla kaikki toimi hyvin. Kehittämiseen, jos keräys olisi avoinna vaikka vuoden kahden välein.	A much needed collection. A cart from four families. Everything worked well at the waste station. For development, if the collection was open for example every two years.
Ei tarvinnut etsiä laatuumerkintöjä.	There was no need to look for quality labels.
Erinomaista kannustaa ihmisiä tuomaan jätettä, joka normaalisti maksaa ilmaiseksi.	It's great to encourage people to bring waste that normally costs free.
Laajempi tiedotus ja keräysmahdollisuus myös autottomille!!!! Esim. keskustaan tai kauppakeskusten yhteyteen johon pääsee myös julkisilla kulkuneuvoilla. Nyt jäi kierrätykset kierrättämättä koska en päässyt paikalle mitenkään.	Wider communication and collection opportunity also for people without a car!!!! E.g. to the city center or shopping malls that can also be reached by public transport. Now the recycling was not done because there was no way I could get there.
Oli kiva, että pystyi palauttamaan isompaa muovia erikseen, ettei tarvi sekajätteeseen.	It was nice to be able to return larger plastic separately, so that it doesn't need to be mixed waste.
Parantaa kierrätysmahdollisuuksia todella paljon	Improves recycling possibilities a lot
Saadaan arvokas uudelleen käytettävä aine pois polttojakeesta	A valuable reusable substance is removed from incineration faction.
Olen pitkään toivonut tällaista kovan muovinkierrätystä mutta koska se saataisiin ulottumaan esim. maatalouteen jossa tätä tulee paljon esim. pesuaine - utarehoito- happotynnyrit 200 l ja sitä pienemmät 60 -20 l. näistä kertyisi huomattava määrä raaka ainetta uudelleen käyttöön esim viemäri ja rumpuputket sadevesi ja raken nus palju astiat.	For a long time, I have hoped for this kind of hard plastic recycling, but when it would extend to e.g. agriculture, where there is a lot of this, e.g. detergent - udder care - acid drums 200 l and smaller 60-20 l. these would accumulate a considerable amount of raw material for reuse, e.g. sewer and drum pipes, rainwater and construction so many dishes.



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