

Understanding the flow

Insight into battery containing WEEE streams

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Stichting OPEN

Stichting OPEN is a Producer Responsibility Organization (PRO) and executes the legal extended producer responsibility (EPR) for electrical appliances, lamps, solar panels and batteries through central coordination and collective cooperation

As single PRO we do this for over 15.000 manufacturers and importers in the NL

Strategic focus: maximizing the collection of discarded equipment, solar panels and batteries and reusing these collected products as high-quality as possible: as a product or part through preparation for reuse or as a raw material through high-quality recycling



Understanding the composition of our streams shapes our strategy

1

What our network sees today

Collection data, sorting analyses and leakage figures from across the Dutch network.

2

What we are doing about it now

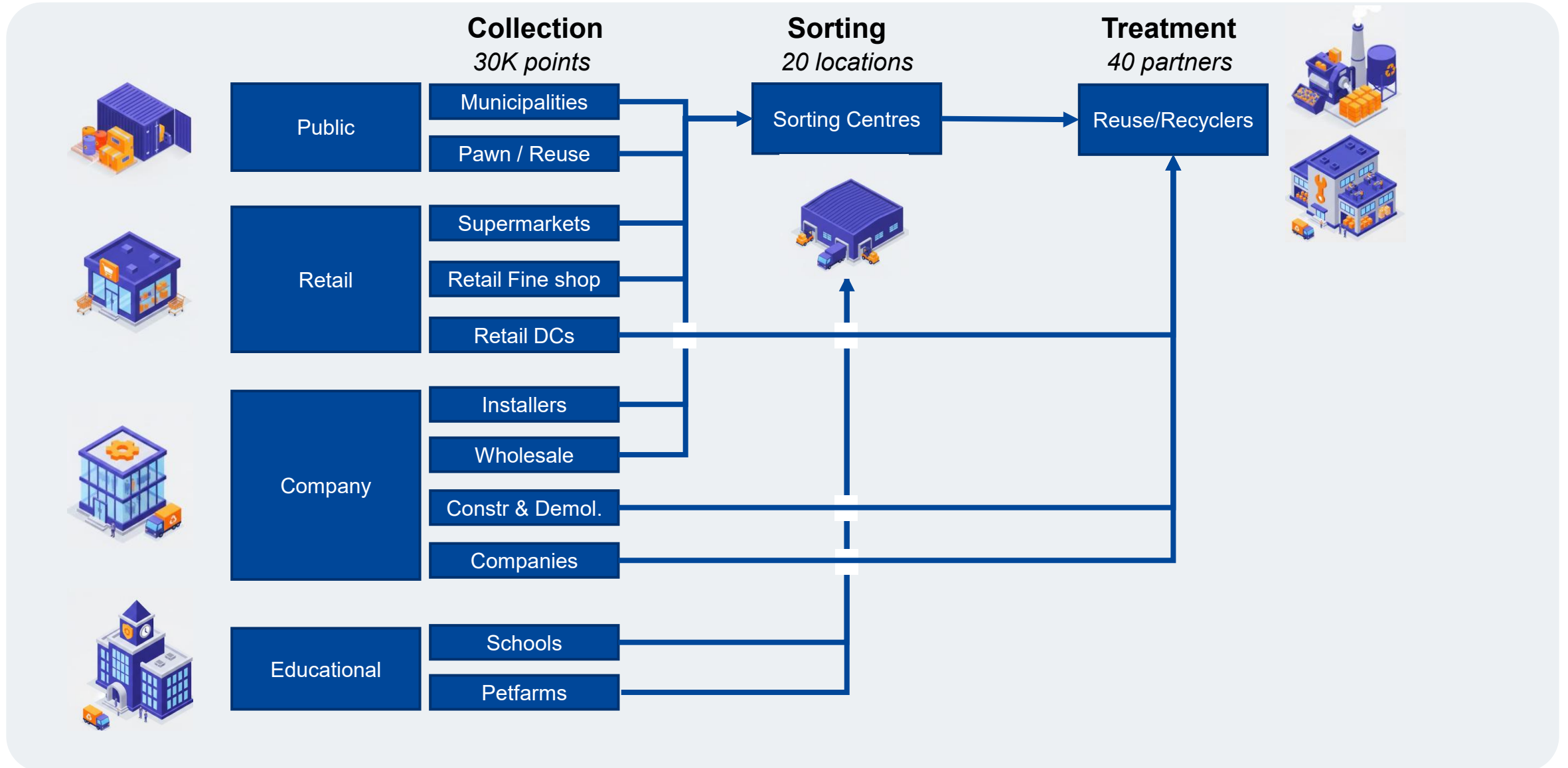
The Battery Fires Prevention Taskforce, independent fire monitoring and public awareness campaigns.

3

Where detection & prevention are heading

From manual sorting today to smarter, AI-assisted detection tomorrow.

Our collection network: from source to recycler



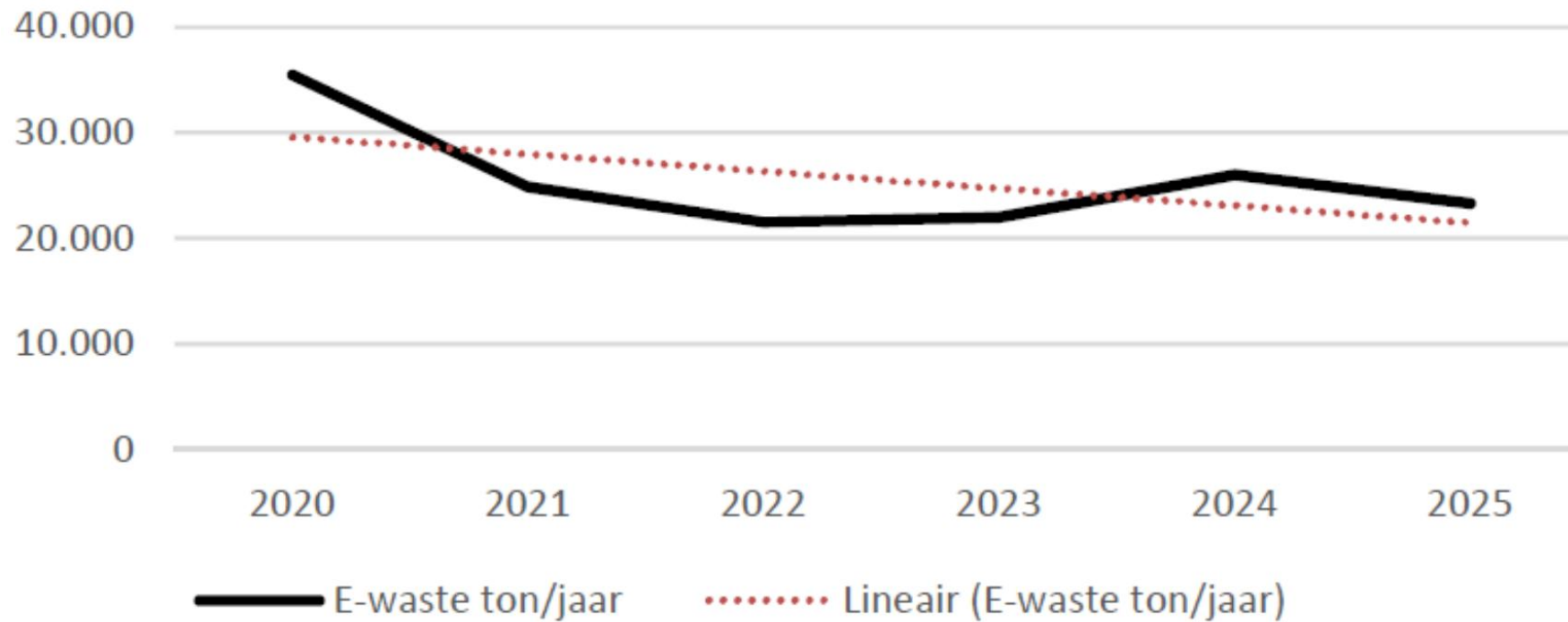
Batteries and WEEE move through dedicated, safety-first channels

- 5,650 t portable batteries, 450 t e-bike batteries and 240,000 t electronic appliances collected annually
- Battery-containing WEEE is sorted at sorting centers and transported separately to specialized recyclers
- Batteries are collected only in steel drums or containers — no more plastic
- Transport follows ADR; large-scale storage follows the Dutch PGS 37-2 directive
- Every incident in our network is logged: cause, impact and follow-up

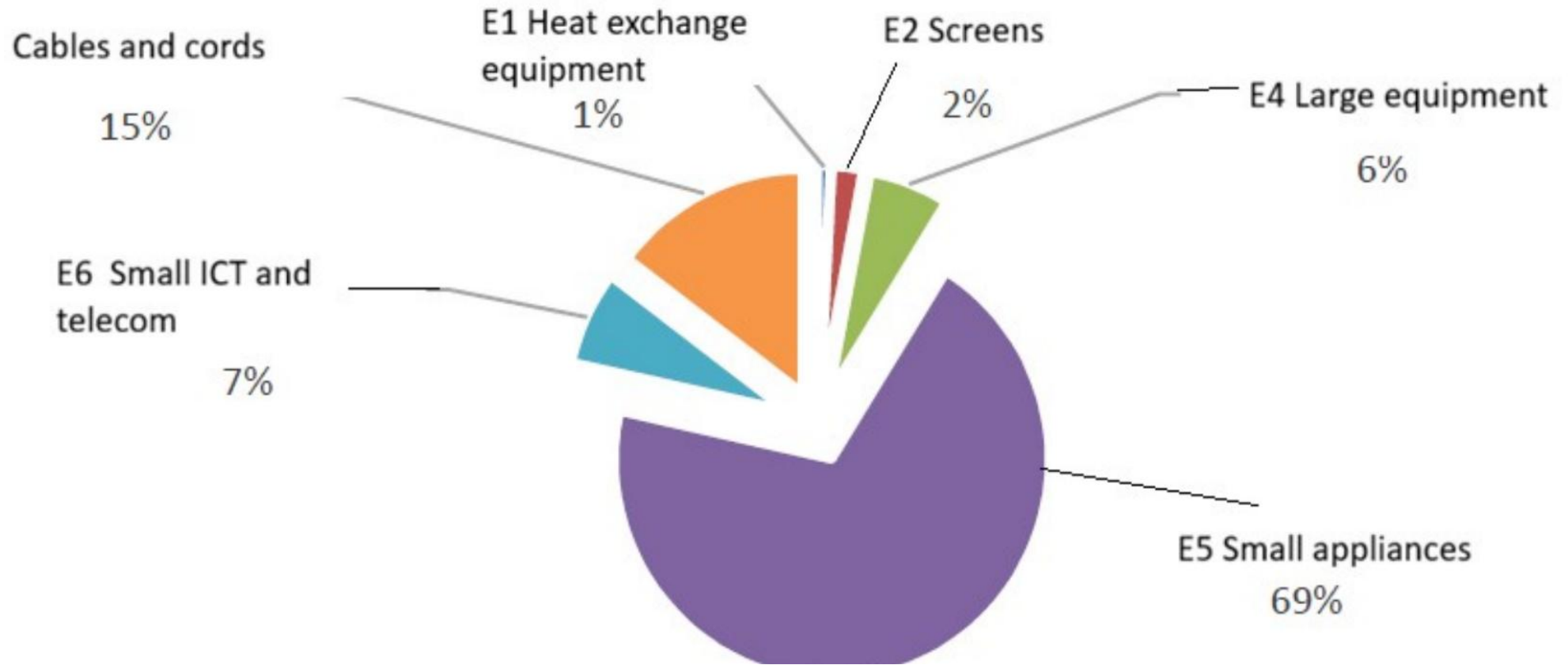


0.9% of Dutch household waste is e-waste — 23,232 t annually

- Survey conducted every year (Eureco)
- Contains valuable information about the leakage of e-waste
- Equals 1.3 kg per inhabitant per year



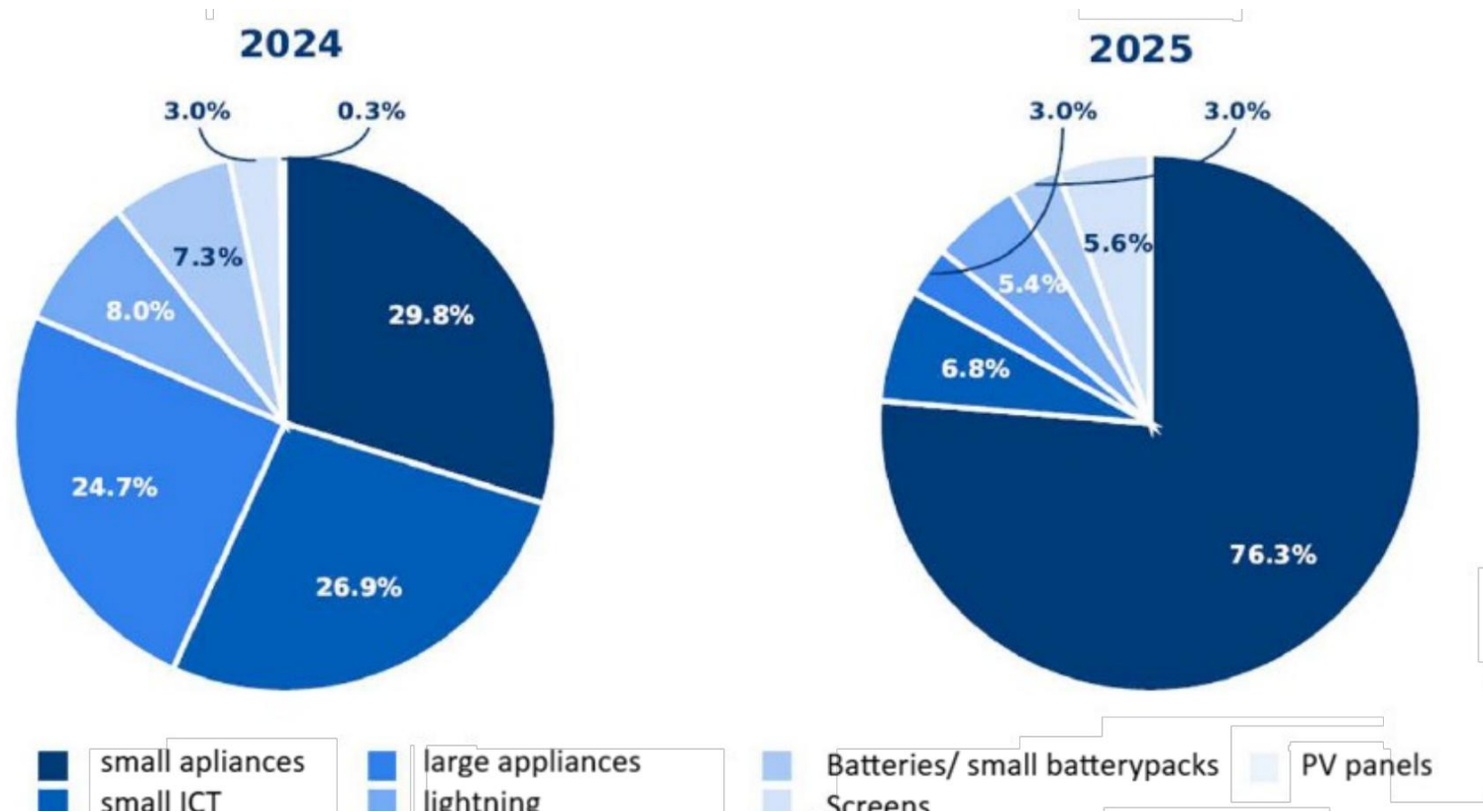
Small appliances dominate the leakage: 69% of e-waste in household waste



- 23,232 tonnes equals 67.8 million appliances, of which 25.9 million can contain removable, ordinary (alkaline) batteries
- 5 to 6 million appliances contain non-removable lithium batteries, of which single-use vapes form the largest share (3.4 million a year)

SME waste tells the same story: 29,000 tonnes of WEEE in 2025

- 2.65 million tonnes of small-enterprise waste goes to Dutch waste incineration facilities
- This contains 29,000 tonnes of WEEE (1.1% — up from 20,900 t / 1.1% in 2024)



1,980t batteries (100 million units) still end up in residual waste

- Survey conducted every year (Eureco); tracks the leakage and the types of batteries involved

Netherlands (2.646 million tonnes)	Tons of batteries within household waste	Batteries (numbers/year)	% of household waste
Loose batteries	1,460 tons	74 million	0.055%
Batteries within appliances	520 tons	26 million	0.020%
Total	1,980 tons	100 million	0.075%

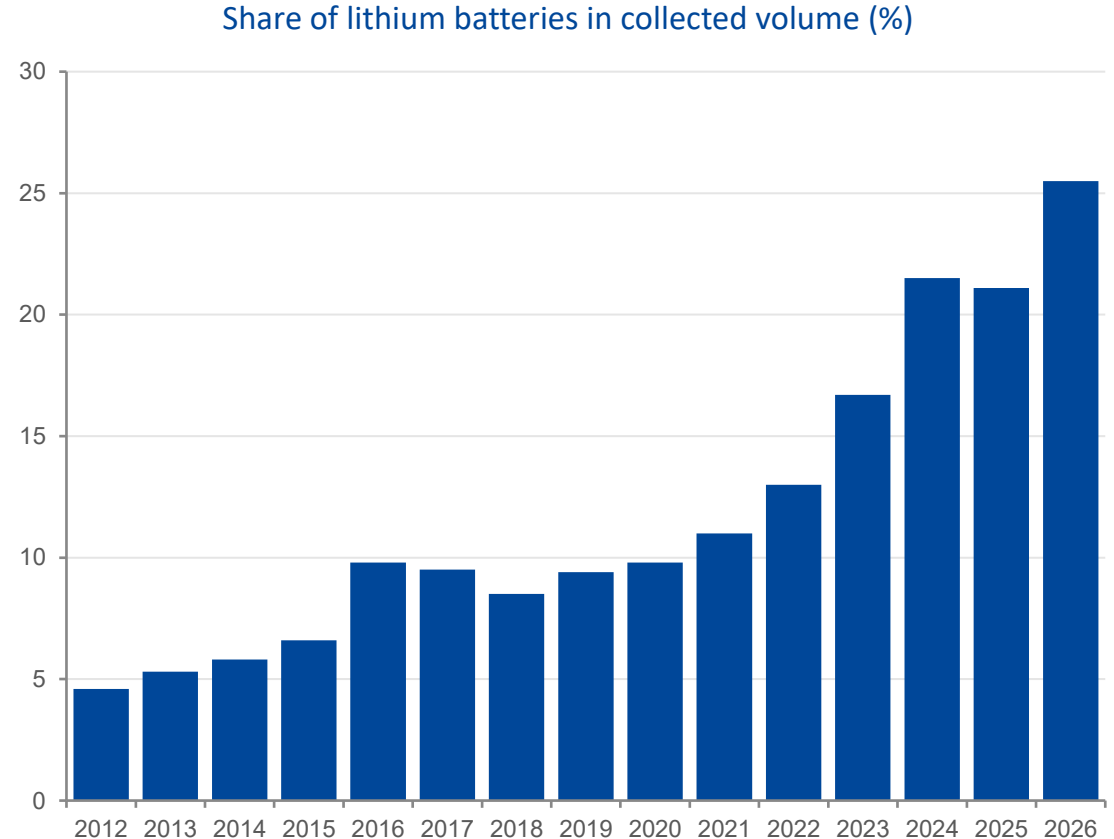
94% of batteries in waste are alkaline — the fire risk is within the lithium share

Batteries in residual waste	2025 — numbers	2025 — weight	2024 — numbers	2024 — weight
Alkaline	94.0%	96.7%	93.7%	81.2%
Zinc	2.0%	1.6%	3.3%	14.8%
Ni-MH	1.0%	0.7%	0.2%	2.9%
Ni-Cd	0.0%	0.0%	2.5%	0.2%
Lithium (incl. button cells)	3.0%	1.0%	0.2%	0.5%
Lithium-ion	0.0%	0.0%	0.1%	0.5%
Total	100.0%	100.0%	100.0%	100.0%

- Most batteries are not responsible for fires (alkaline, zinc, Ni-MH, Ni-Cd). If a deposit return scheme is ever implemented, it should target lithium / lithium-ion only.

The perfect storm: three challenges are converging

- **Batteryfication:** Increase in share of lithium (-ion) batteries, both loose and embedded in appliances
- **Fires:** 3 battery-related fires per month in household waste collection trucks
- **Illegal imports:** 7 million e-cigarettes discarded in household waste every year



Stichting OPEN has led the Battery Fires Prevention Taskforce since 2022

Background

- Established around 2020 by several branches: waste collectors, waste recyclers, demolition companies, municipal waste collection companies
- Limited improvements in the first years — on behalf of the Ministry of Environment, Stichting OPEN was asked to re-start these activities
- For the last 4 years, Stichting OPEN has been in the lead to improve the situation

Initial results

- Awareness campaigns are doing well — Stichting OPEN designs and executes these with support of the branches
- Data collection on e-waste and batteries within residual waste is well underway
- Data on the cause of fires is a mixed bag — reluctance to share insight into causes, but more information is slowly becoming available

Progress is real, but not yet fast enough

- It's still common practice to mix e-waste into metals (more profit + less cost) — even though "Wecycle for Businesses" collected 75,000 tons of B2B e-waste from the metal scrap sector
- Lack of collection solutions for B2B waste via the main waste collectors (as they prefer mixed collection in their standard 1,100 litre DIN containers)
- Growing awareness within part of the metal scrap sector: introducing input controls & penalties for WEEE and batteries in scrap
- More technical solutions emerging: infrared fire detection / hot-spot detection
- More information is slowly becoming available and raises awareness (see fire monitor)



Tracking fires through the news, since 2018

- The Afvalgids Fire Monitor scans Dutch media for waste-related fires
- Records go back to 2018, building an independent, long-term pattern
- Used alongside our own collection and sorting data to understand where risk concentrates



829 unique waste fires since 2018 — and rising

- 2,225 news articles (2018–2025) about fires, of which 829 are unique fires in waste (double counting removed)
- On average 9.3 fires per month between 2018 and 2025
- Rising over time: 19.3 fires per month on average in 2025
- Not every fire is caused by batteries — but the increase is most likely driven by lithium batteries

829

unique fires
2018–2025

19.3

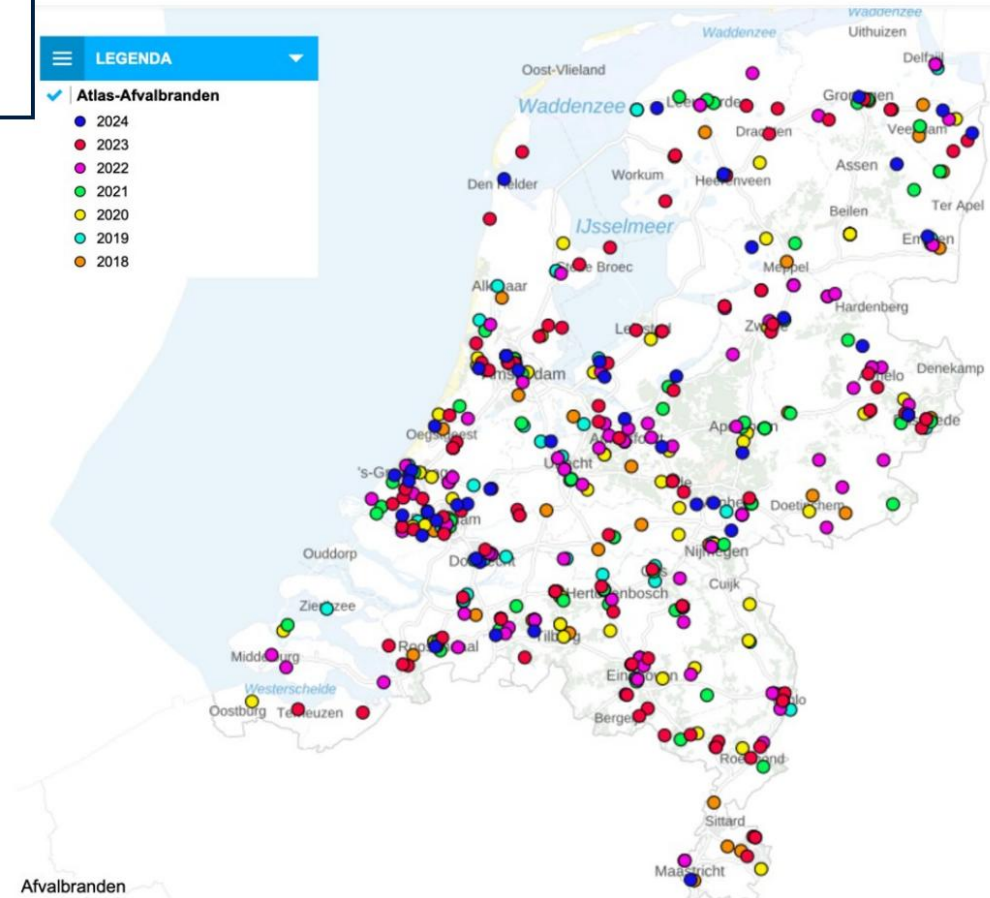
fires / month
avg. 2025

213 waste fires reported across the Netherlands in 2025 alone



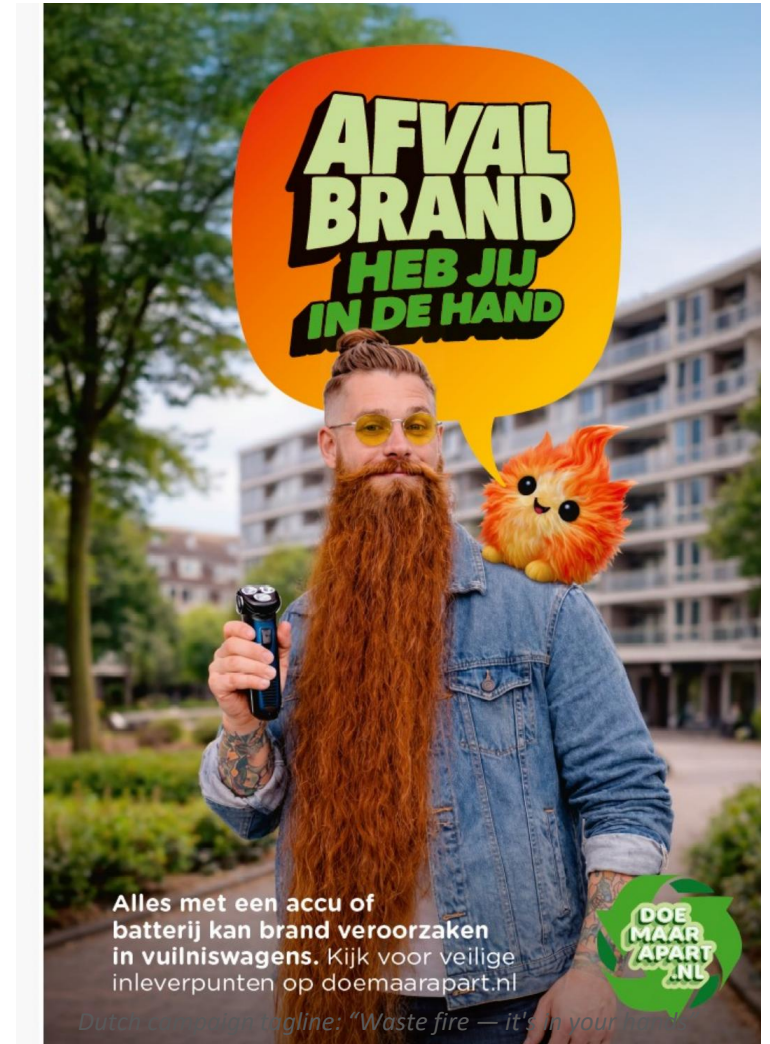
News items plotted over time and on a map

2018	55
2019	72
2020	58
2021	66
2022	85
2023	99
2024	181
2025	213 (t/m 11-2025)



“Keep It Apart”: a multi-channel awareness campaign

- Multi-channel approach: social media, radio, TV
- Website: www.doemaarapart.nl
- Core message: any battery or power pack can start a fire in a garbage truck — find a safe Wecycle drop-off point!



From manual sorting today to smart detection tomorrow

- Sorting of batteries from household waste = operational
- Battery-containing WEEE: manual sorting operational in all sorting centres; automated sorting is being explored
- Detection is exploring two concrete tracks: an AI-driven sampling methodology (“steekproef 2.0”), and simple detection gates with warning light after manual sorting — a first step toward battery-free downstream flows
- WEEE containing battery sorting through X-ray / shape-recognition sorting line is a notable independent innovation we are tracking closely with a host of network partners



Where we go from here

Recap: the challenges

- Rising lithium (-ion) battery share
- Increasing share of battery containing WEEE
- A real problem:
 - 3 fires / month in collection trucks
 - 7 million e-cigarettes discarded a year

What we do now

- Safety-first collection network
- Active Taskforce Battery Fires Prevention
- Independent fire monitoring
- “Keep It Apart” awareness campaign

Where we're heading

- AI-assisted sampling (Steekproef 2.0)
- Introducing sorting detection gates & automated sorting
- Working with market partners in test & trial pilots to develop new innovation



nu inzamelen voor
hergebruik van morgen

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