

TRASH VS. RECYCLING: IS SINGAPORE FALLING BEHIND?

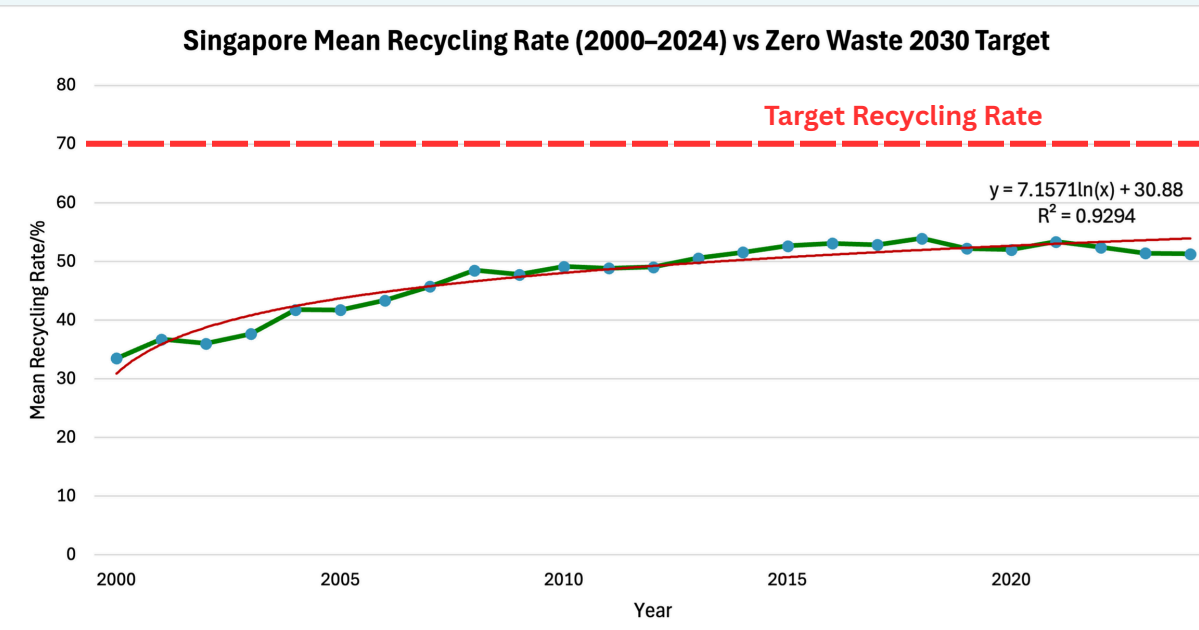


01 INTRODUCTION & OBJECTIVE

Singapore's small land area and rapidly growing population has intensified the pressure on its waste management system. From 2020–2025, the annual population growth rate rose to 1.5%, from 0.5% in the preceding 5-year period (NPTD, 2025). As consumption increases alongside population growth, **effective recycling** has become more critical than ever. Furthermore, Semakau Landfill – Singapore's only landfill – is **projected to reach full capacity by 2035**, underscoring the urgency to reduce waste sent for disposal (Earth Recycling Services, 2025).

In response, the government launched the **Zero Waste 2030 Masterplan**, which sets a target for Singapore to recycle **70% of total waste by 2030** while significantly reducing reliance on Semakau Landfill. By analysing over two decades of data on waste generation, recycling outcomes, and disposal trends, this infographic aims to **evaluate Singapore's progress towards this goal**. It highlights key achievements, identifies gaps between current performance and national goals, and sheds light on the challenges that must be addressed for Singapore to move towards a truly circular and sustainable future.

02 AVERAGE RECYCLING RATES ('00-'24)

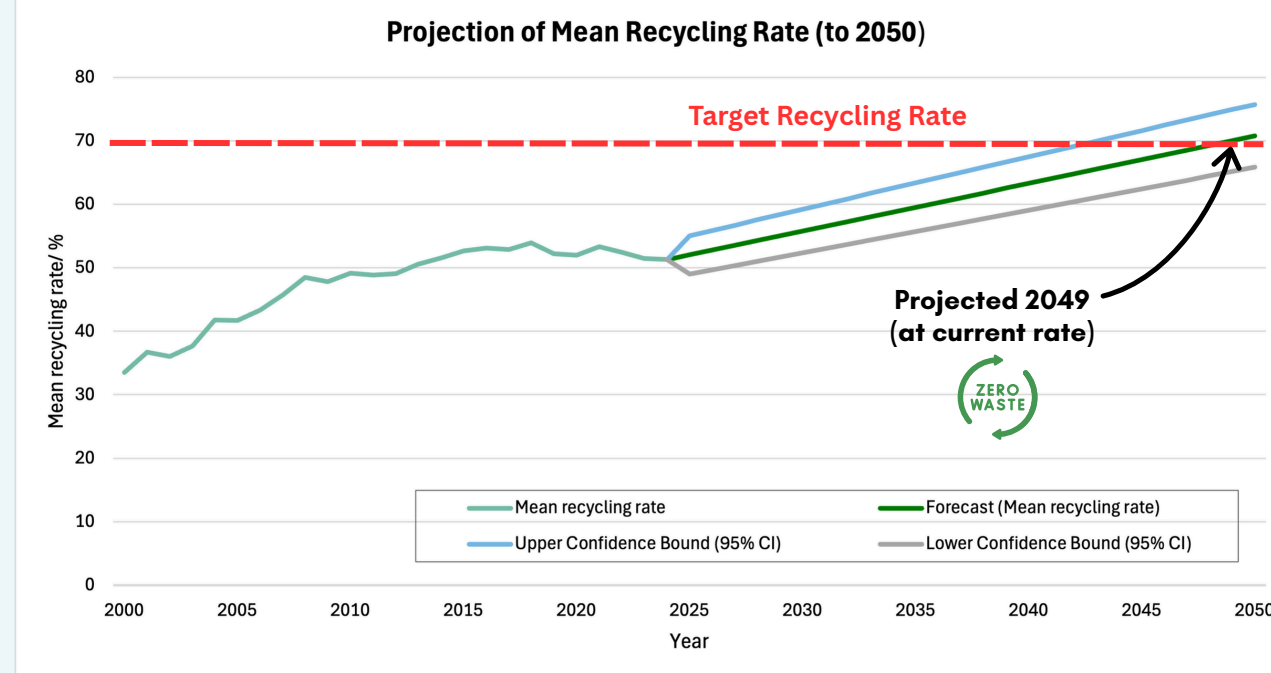


*Recycling Rate per Waste Type
= (Tonnes of Waste Recycled / Tonnes of waste generated) * 100%

This mean was calculated by **averaging the recycling rates of all waste types** included in the dataset. As observed, mean recycling rate experienced an **overall increase of 17.8% from 2000 to 2024**, signifying a gradual improvement in Singapore's recycling practices.

A **logarithmic best-fit line** was used as it effectively reflects the **faster growth of recycling rates during the initial years** following the launch of various recycling initiatives, and a **plateauing in more recent years**. The model also has an **R² value of 0.9294**, suggesting a **strong fit** for the historical data. The logarithmic trendline highlights how improvements may slow over time, suggesting the **need for policy or technological innovation** to sustain progress.

03 HOW CLOSE ARE WE TO ZERO WASTE 2030?

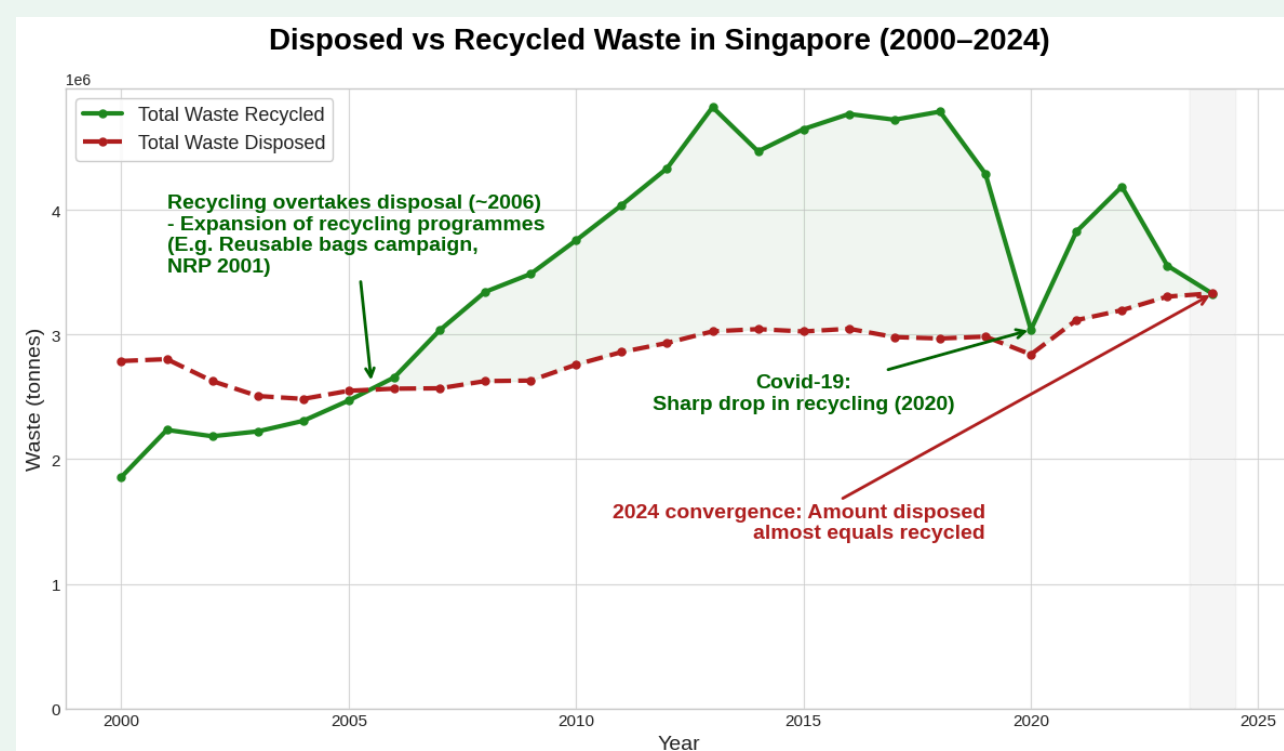


*This projection is illustrative and assumes historical trends persist, not inclusive of future policy or technological advancements.

Using the **Exponential Triple Smoothing (ETS) algorithm** – a time series forecasting model that gives exponentially decreasing weights to older data – the **mean recycling rate is projected to reach approximately 55% by 2030** and the target rate of **70% by 2049** instead, assuming historical trends persist.

The blue upper and gray lower confidence bounds accounts for uncertainty in long-term forecasting. At the projected trajectory, the **70% target is only achieved in the long term**, suggesting that **additional interventions may be required to accelerate recycling improvements**.

04 DISPOSED vs RECYCLED WASTE ('00-'24)

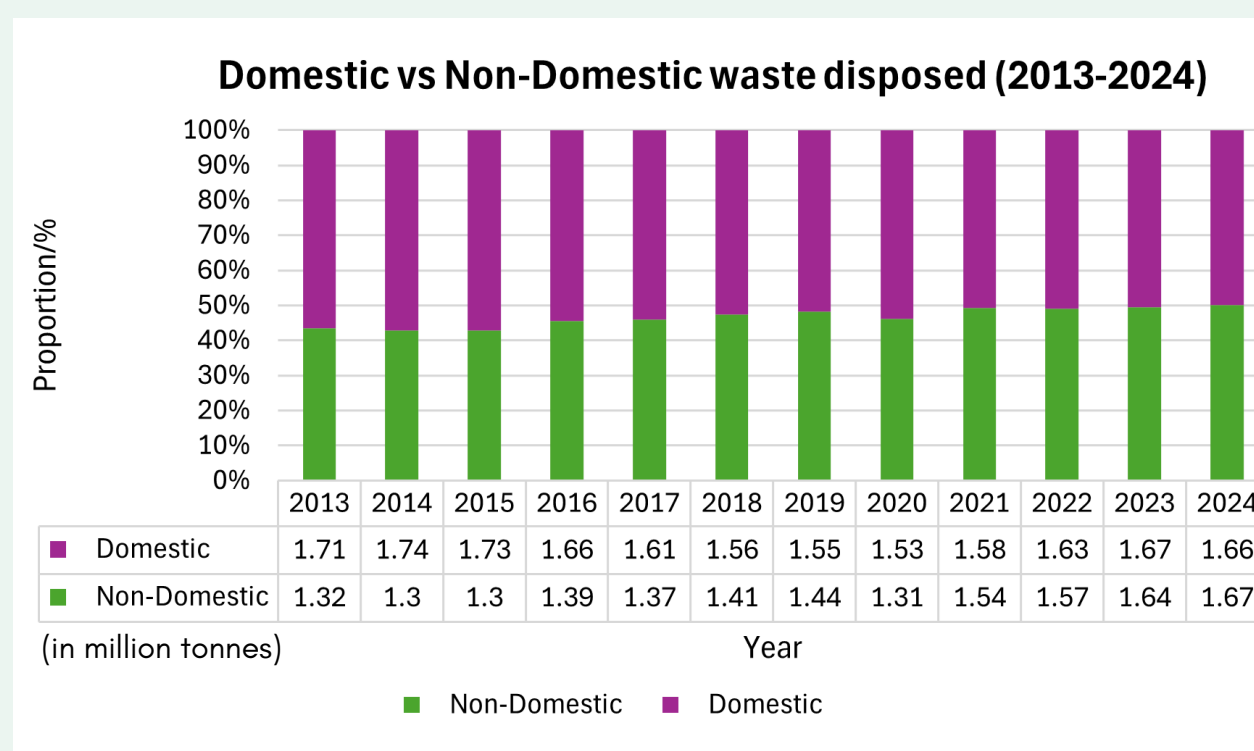


Amount recycled rises again briefly in the mid-2000s but notably converges with amount disposed by 2024 – a **warning sign about rising waste generation and lower recycling yields** for key waste streams. Overall, the trend underscores that **sustaining long-term improvements will require renewed circular economy efforts and upstream waste reduction**.

Comparing total disposed and recycled amounts across all waste types, we see that **in the mid-2000s, total waste recycled overtook the amount disposed** for the first time, driven by various recycling initiatives, like the National Recycling Programme and the 3Rs concept, gaining traction.

From 2019 to 2020, the **COVID-19 pandemic led to a significant decline in recycling** due to disruptions in industrial and C&D activity, along with temporary halts in domestic recycling operations (NEA, 2021).

05 DISPOSED WASTE (DOMESTIC vs NON-DOMESTIC)

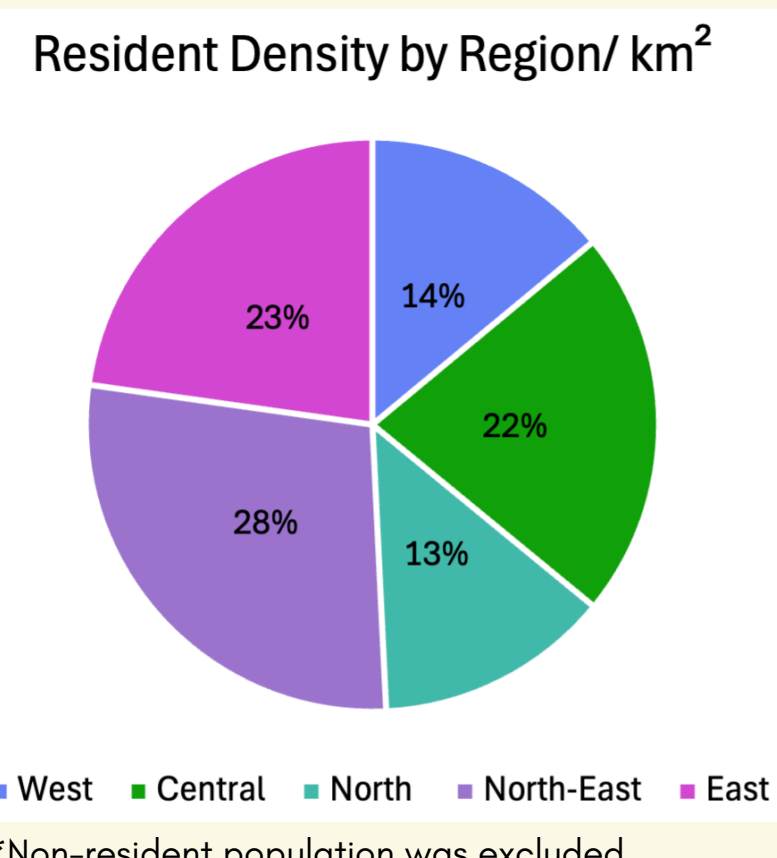
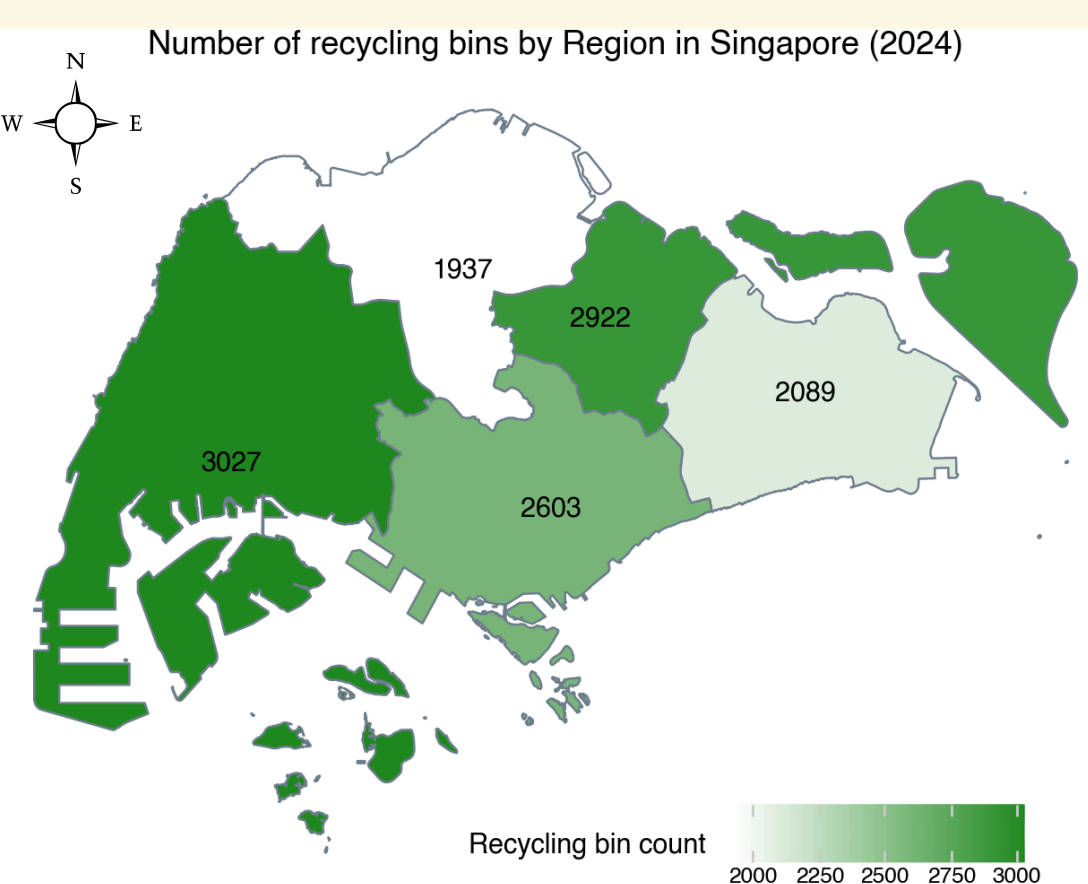


"One of the biggest challenges for improving recycling rates in Singapore is still the **mindset and behaviour of the public.**"
MS JEN TEO, EXECUTIVE DIRECTOR OF THE SINGAPORE ENVIRONMENT COUNCIL, 2021

From 2013 to 2024, we observe that domestic and non-domestic sources contribute almost equally to total waste disposed, especially from 2021–2024. However in 2019, **5.37 million tonnes of non-domestic waste** was generated, compared to **1.87 million tonnes of domestic waste** (The Straits Times, 2020).

Given that the amount of non-domestic waste generated **far outweighs** that of households but the amount of waste that is **ultimately disposed remains roughly similar** from both streams, this indicates that **households are contributing a disproportionately large amount** to the total annual waste that enters our landfill. Hence, it is evident that achieving Singapore's Zero Waste 2030 targets requires **stronger behavioural change at the household level, not just industrial and commercial regulation**.

06 ARE OUR RECYCLING BINS ENOUGH?



*Non-resident population was excluded

With recycling bin counts normalised by residential population (per 1,000 residents), the number of recycling bins available in the **North-East region** is shown to be the **most well-matched to its resident density**, ensuring high accessibility to recycling infrastructure. However, the **Central region** is revealed to be the **most under-served**, with the lowest number of bins despite having one of the highest resident densities. This could influence household recycling behaviour due to bin placements potentially being **more dispersed, resulting in greater inconvenience**.

In contrast, the **North and West regions** exhibit the **highest per-1000 residents provision**, despite having the **lowest resident densities**. This suggests that **bin allocation is influenced** not only by where people live but also by **daytime land-use patterns**, such as high industrial and commercial activity in the West, particularly in Jurong and Tuas.

These findings indicate **potential scope for reallocating or increasing recycling bins** in dense residential regions like **Central and East**, while **conducting audits** in the **North and West** to ensure current provision matches actual usage driven by both residential demand and daytime land-use patterns.

*Red = Under-provided Green = Over-provided

Area	Resident density/km ²	Resident population	Number of bins	Bins per 1000 residents (2d.p.)
Central	7350	975310	2603	2.67
East	7634	710730	2089	2.94
North-East	9380	974610	2922	3
North	4457	599400	1937	3.23
West	4692	944480	3027	3.2

*Bins per 1000 residents
= (Number of bins / Population) x 1000

07 WASTE GENERATED VS RECYCLED BY TYPE (2024)

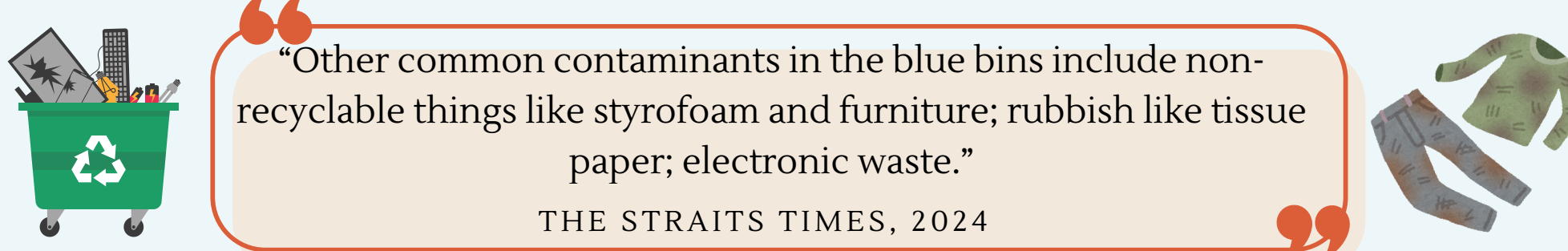


Based on 2024 data, this butterfly chart illustrates Singapore's circular economy performance through comparing waste generated and recycled by waste type. **Industrial materials** such as ferrous metals, used slag, horticultural and construction waste achieve a **near-complete recovery**, demonstrating closed-loop systems where resources are **efficiently cycled back into production**.

In contrast, **household-facing streams** like paper/cardboard, plastics and food waste exhibit **extremely low recycling rates**, revealing circularity gaps due to reasons such as contamination and limited processing capacity. As a whole, the chart illustrates that SG's **circular economy strengths lie in industrial materials** but **major leakages remain in household facing streams**. This further reinforces the need for a change in domestic recycling behaviours.

08 CONTAMINATION OF BLOOBINS

40% contamination rate of Bloobins (ST, 2024)



With contamination of our recycling bins coexisting with a plateauing recycling rate, a vicious cycle is created where **recycling efforts are negated as contaminated recyclables** have to be **diverted to incineration**, generating more waste that fills up our limited landfill.

In a 2023 household recycling survey organised by NEA, it was found that the most common items wrongly classified as items that can be recycled are small electronic appliances (41% of respondents) and old clothing (41%), suggesting that **contamination could stem from confusion**.

09 CONCLUSION

In light of these findings, more needs to be done to **raise public awareness and consciousness** around recycling. **Educational campaigns** that shift mindsets and **keep the public well-informed** remain crucial for fostering long-term behavioural change, such as by directing people to the **centralised platform, recycle.gov.sg**. Greater publicity of the platform at the estate level through digital display panels for instance, can guide residents on **how and where to recycle specific materials**, introducing appropriate options such as Cloop bins for textiles and designated e-waste collection points operated by industry stakeholders like ALBA and KGS. Together, these efforts **address commonly misclassified items** and make correct recycling decisions **more intuitive and accessible**.

Additionally, the significant impact of contamination underscores the **need for system-level design improvements**. Integrating **smart waste sorting technologies** such as BINgo – co-developed by FairPrice and ASTAR – into the National Recycling Programme (NRP) presents a viable solution. By using AI-enabled sorting and smart sensors to **identify recyclable and non-recyclable materials**, **segregating** the 2 into separate compartments of the bin while educating users through real-time feedback, BINgo can **reduce sorting errors at the source and reinforce proper recycling practices** (ASTAR, 2022).

Ultimately, a more effective recycling system requires **both individual responsibility and structural support**. To achieve Zero Waste 2030, households, communities, and policymakers must act in tandem – individuals by adopting responsible recycling habits, and institutions by designing systems that make sustainable choices easy and accessible.

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