4G transmissions require big cell towers to transmit longer frequency waves. 5G however is built to optimise data transmission and has leaner infrastructure, using small cell base stations with beamforming to coordinate transmissions. 5G is also a more energy-aware standard and will enable smart sleep modes more effectively as well as extend coverage using lower bands while increasing capacity and speed with carrier aggregation. Fast and effective data transmission enables the system to return to a low-load state faster with corresponding energy usage. We will activate this energy-saving feature on our network when available.

Benefits of 5G in the corporate world

Leveraging our new 5G networks, companies can increase the energy efficiency of delivering data to their customers. They can also develop innovative green technologies and help reduce the carbon footprint of their operations and customers globally.

- Our reliable network and ICT services and solutions allow corporate customers to maintain productivity while lowering emissions from reduced transportation.
- Our 5G Multi-access Edge Compute (MEC) platform enables low latency monitoring of campuses, environments and facilities through IoT applications that are connected to autonomous systems like robots and drones, leading to a reduction of emissions from reduced number of field trips taken by the operational teams while improving productivity.
- Video analytics enabled by our MEC platform can identify faulty products at the assembly line for Industry 4.0 scenarios and take them out before hitting the supply chain, thereby saving emissions from customers returning faulty products to the manufacturer who will need to ship replacement products.
- IoT applications for smart buildings can optimise space utilisation, energy and cooling efficiency based on real-time occupancy. Such IoT sensors can leverage our MEC through inbuilding 5G coverage or WiFi which can be reached from any fixed or cellular network. This multi-network capability allows existing brown field IoT deployments to optimise energy consumption of devices by shifting all data processing to the edge, therefore increasing battery life of devices and also lowering emissions from reduced field trips to replace batteries.

PRODUCT STEWARDSHIP

Our approach to product stewardship considers the impact of our products and services before they reach our stores, during our operations and after their useful life. We manage our waste resulting from Singtel and Optus branded products, and also review waste data to glean insights that help to improve the recyclability, reusability and reduction of our waste.

Effective waste management

Electronic, packaging and corporate wastes such as paper are key sources of wastes generated across our operations and value chain. We are committed to reducing, reusing and recycling wherever possible and support national waste management targets under Singapore Green Plan 2030 and Australia's Recycling and Waste Reduction Act 2020. There are global concerns around e-waste being a fast-growing category of waste, given the increasingly digital lifestyle which has been further accelerated by the pandemic. Within our operations, we have put in place an e-waste recycling process to ensure proper management of our used equipment and track the recycling rate.

Under the Extended Producer Responsibility (EPR) scheme introduced by NEA in July 2021, Singtel Group bears the responsibility for collecting and treating our products when they reach the end of life, based on our market share. In Singapore, we contribute to this new regulated e-waste management system and retired ReCYCLE, our e-waste recycling programme in partnership with SingPost launched in 2017. From January to December 2021, we put 181.6 tonnes of products to market for both our consumer and enterprise segments. From July 2021 to March 2022, we collected 2.7 tonnes of consumer e-waste and were responsible for 2.3 tonnes of all the consumer e-waste collected island-wide under the scheme.

In Australia, we have been partnering Mobile Muster since 1998 to facilitate the recycling of mobile devices and accessories via our Optus stores. During the year, we diverted 5.61 tonnes of e-waste from landfills, saving 12.45 tonnes of emissions while conserving 63.55 tonnes of mineral resources through the programme. We also have a modem recycling programme to supplement Mobile Muster for customers to recycle their old modems at any of our retail stores in Australia.

Enabling sustainable packaging

Sustainable packaging directly and indirectly contributes to our carbon footprint and environmental impact across our value chain, from resource utilisation to product packaging and management of these waste streams.

Reducing plastic waste with GOMO's half-sized SIM card

Our all-digital mobile brand GOMO launched its half-sized SIM card in December 2021, which reduced plastic waste, and introduced environmentally friendly materials to the packaging:

- Packaging Envelope (holds the backing card) –140gsm Enviro wove, 100% recyclable and FSC certified
- Backing Card (SIM card is pasted on this) – 300gsm Woodfree card, 100% recyclable and FSC certified

Comparing the dimensions between the old and new packaging, we reduced the total area of the main envelope and additional manual by approximately 30%, from 182,810 mm² to 126,800 mm².

By 31 March 2022, we saved 42.95 kg of acrylonitrile butadiene styrene plastic (ABS plastic) and polyvinyl chloride (PVC), a 7% reduction in materials for all GOMO SIM cards, full and half. Through these initiatives, we hope to nudge consumers and our retailers to be conscious of their packaging waste. We will continue to collaborate with suppliers to explore alternative materials such as recycled materials to be used in our packaging.

Old packaging (full SIM)		**Total Area**	**182,810 mm²**

Main Envelope

285 mm x 466 mm = 132,810 mm²
(open size)

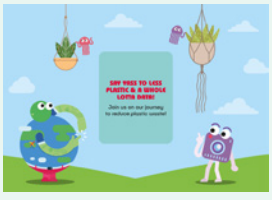
Additional manual

Lotus card: 5 x 100 mm x 100 mm = 50,000 mm²
(estimation as the card is irregularly shaped)

New packaging (half SIM)		**Total Area**	**126,800 mm²**

Main Envelope

560 mm x 190 mm = 106,400 mm²
(open size)



Backing card

170 mm x 120 mm = 20,400 mm²

Total Reduction	**30%**

Under the Resource Sustainability Act, Singtel is required to report our packaging waste as part of the Mandatory Packaging Reporting. The list of regulated products and our reporting obligations are categorised into three packaging categories: primary packaging for Singtel branded products, service packaging used by all Singtel retail channels, and all packaging used for products exclusively imported for our business.

We report our packaging data and 3R (reduce, reuse and recycle) plans to NEA annually, starting from this year. We submitted our first report and 3R plans in March 2022 for calendar year 2021. During that year, the total amount of packaging used by Singtel and NCS was 147.14 tonnes, with paper being our top material (see Figure 9). We will focus on packaging reduction and increasing the use of recycled content in our packaging materials. We will also take a targeted approach to tackle each type of unique waste that we are responsible for, such as bags and SIM cards.

In Australia, we have been committed to the principles of the Australian Packaging Covenant Organisation (APCO) since 2007 to drive systemic change in the way we create, collect and recover our product packaging. For the fifth consecutive year, Optus was awarded the APCO Award

for our sustainable packaging achievements and efforts in the telecommunications sector.

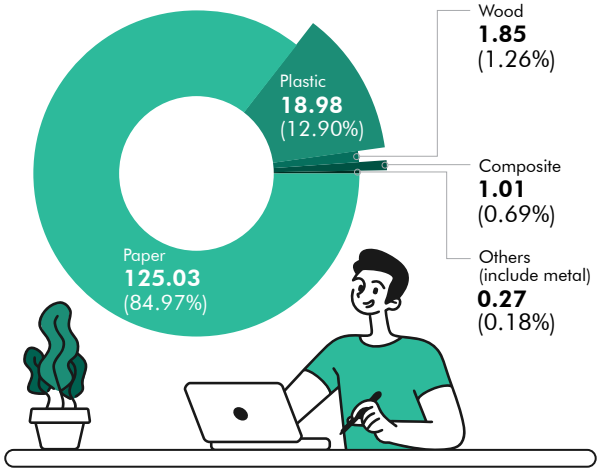
We are also committed to continuous improvement and are working hard to remove single-use plastics from packaging design and enhance the uptake of Australasian Recycling Label (ARL) to reduce recycling confusion. We have introduced a new sustainable packaging checklist for all new Optus-branded devices.

Environmental performance

During the year, there was no environmental legislation related fine or non-monetary sanction, as well as legal action against Singtel or Optus.

We publicly disclose our environmental targets and metrics aligned with the latest GRI standards and our performance data is externally assured. Our stakeholders can therefore better understand our efforts and progress in this area. We will also communicate any material driver and impact on the company's income statement, cashflows or balance sheet using the TCFD framework.

Figure 9: Singtel and NCS packaging materials by weight (tonnes)



Solar panels on the rooftop of NCS Bedok Data Centre