02

Climate Change and Environment

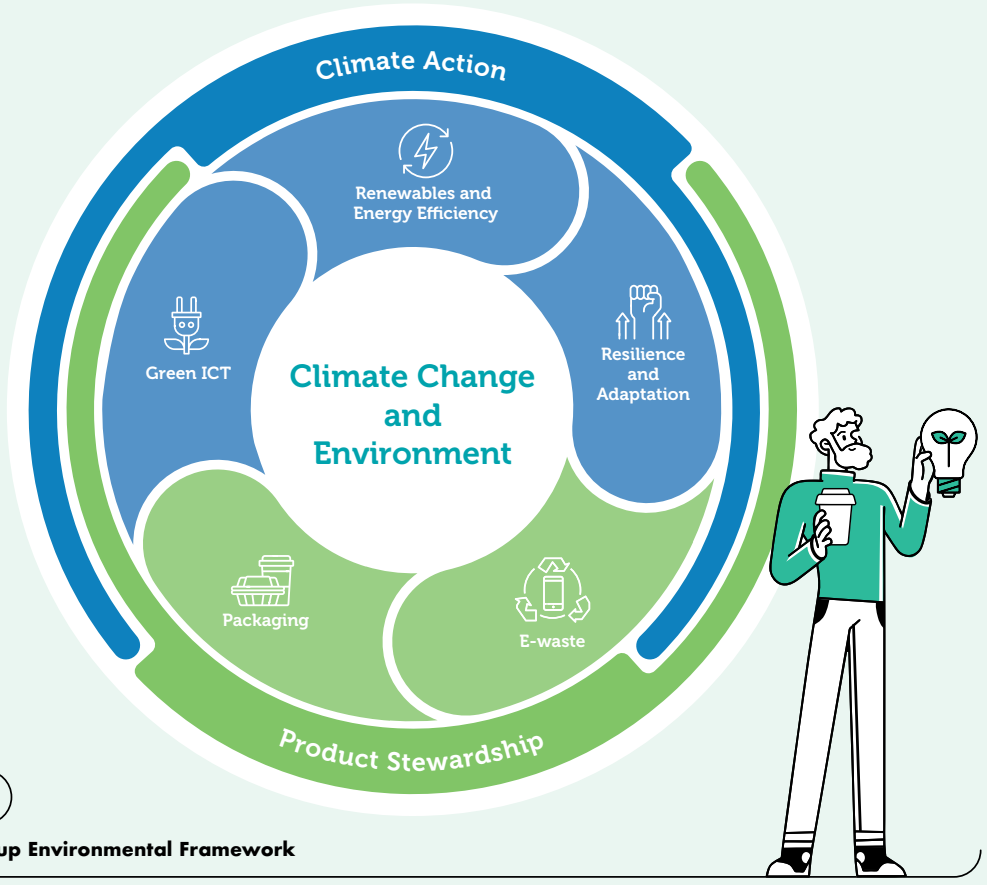


Figure 1

Singtel Group Environmental Framework

The Singtel Group is committed to minimising our environmental impact and building operational resilience to deliver long-term value to our business, stakeholders and communities. Figure 1 outlines the Singtel Group Environmental Framework. We are also guided by our Environmental Management System and Environment Policy to manage and minimise our impact. Please refer to our **website** for more information.

During the year, we also aligned our approach with our Group purpose and mapped the values and behaviours against our sustainability framework. We want to empower the present generation to accelerate climate action and safeguard the planet to chart a sustainable future for generations to come. We aim to achieve the smallest environmental footprint and support communities adversely affected by climate-related disasters, collaborating with our partners and stakeholders in the ecosystem.

The world continues to witness the effects of climate change in the form of frequent extreme weather events like droughts, floods and heatwaves. Concerned with the reliability and resilience of our network infrastructure, our stakeholders are interested in our network adaptation measures for mitigating these risks.

This is particularly relevant in Australia which is prone to natural disasters. We are committed to ensuring that our network infrastructure remains resilient before and during a severe weather event. We also provide additional support to affected customers and communities.

Maximising value creation with Singtel Group core values

Values		Climate Change and Environment
C	**Cultivate a Growth Mindset**	We learn, unlearn and relearn in an everchanging environment brought about by climate change, which poses increasing complexities and uncertainties.
O	**Operate with Integrity**	We operate sustainably and with integrity, as we have a moral obligation to meet the needs of the present generation without jeopardising the ability of future generations to meet their own needs.
M	**Make Customers First**	We empower our customers to engage in positive environmental actions, and build resilience into our networks and operations to keep people connected and safe during times of natural disasters.
M	**Maximise Teamwork**	We collaborate among our business units and work closely with partners in our ecosystem to minimise our environmental impact.
I	**Innovate with a Challenger Spirit**	We recognise that innovation is critical for the transition to net-zero and the importance of evaluating our business model, value proposition and operational practices to manage climate risks and opportunities through our decarbonisation and adaptation strategy.
T	**Take Ownership**	We are committed to minimising our environmental footprint and building operational resilience for the long-term benefit of our business, communities and customers.

For example, during the year, we responded promptly to the extensive floods that affected New South Wales and Queensland to maintain the availability of our network. Where our mobile sites were affected, we worked swiftly to restore services and deployed our portable infrastructure to boost mobile coverage at areas such as evacuation centres. We also provided additional free mobile data to customers in affected areas, set up a dedicated support hotline and contributed to flood relief efforts.

We recognise stakeholders' concern with our greenhouse gas (GHG) emissions from powering communication and connectivity through our telecommunications network and data centres. Hence we are putting a strong focus on reducing emissions through energy efficiency initiatives and are actively sourcing electricity that is backed by renewable energy sources and attributes.

We pay strong attention to how we manage our waste. For our business, the biggest waste stream is e-waste given the increased use of digital devices driven by ICT, IoT solutions and the pandemic. With heightened expectations from stakeholders on resource optimisation, companies are increasingly required to ensure product stewardship from 'cradle to cradle', that is, upstream resource to end-of-life management and/or beginning of new life with the aim of improving circularity.

The subsequent sections describe how we intend to meet these expectations and ambitions.

CLIMATE ACTION

The topic of climate change and environment is an important agenda for the Singtel Group. We have been refining our approach in tackling both risks and opportunities of climate change over the years.

Since 2017, our climate strategy and targets have been developed and aligned with internationally recognised frameworks such as Task Force on Climate-related Financial Disclosures (TCFD) and the Science-based Targets initiative (SBTi). The various studies, analyses and exercises that we have conducted have been key to guiding our strategy in managing these risks and opportunities as the global climate agenda evolves (see Figure 2 on the next page).

We recognise the importance of communicating how we manage our climate-related risks and opportunities to maintain stakeholder trust and confidence. In 2017, we endorsed the TCFD framework which aims to help financial institutions and investors understand the financial implications of climate risks on businesses. We recently completed our climate scenario analysis as part of our TCFD efforts and have published our inaugural standalone TCFD Report 2022.

In this section, we articulate our efforts to support our vision to drive long-term business environmental sustainability through our climate action plan (see Figure 3 on the next page).

Figure 2: Singtel Group climate action journey towards net-zero by 2050

FY2015

Climate change identified in Singtel Group's stakeholder engagement and materiality review

FY2016

Life Cycle Assessment (LCA) performed to advise on material environmental issues in our extended value chain

FY2017

Climate change rose in impact and importance in stakeholder and materiality assessment

FY2018

Among first companies globally to endorse the TCFD Framework

FY2018

Singtel Group's science-based emissions targets approved in October 2017, first in Asia ex-Japan

FY2020

- Only Southeast Asian company among a pioneer group of 28 global companies in July 2019 that committed to keeping global temperature increase within 1.5°C and net-zero by 2050
- Signed our first renewable energy Power Purchase Agreement (PPA) for our Singapore operations

FY2021

Completed TCFD pilot study of physical and transition climate risks of our operations in northern NSW, Australia

FY2022

- Completed our first physical and transition risks TCFD climate scenario analysis for our Singapore and Australia operations
- Published our inaugural standalone TCFD Report 2022
- Developed our full Scope 3 indirect GHG emissions inventory and baseline for our operations in Singapore and Australia
- Piloted Internal Carbon Pricing in Singapore with four projects
- Launched Singtel Group's first sustainability-linked loan, the largest Singapore-dollar denominated loan at that time

FY2030

SBTi target to reduce absolute Scope 1 and 2 GHG emissions by 42%, and Scope 3 by 30% from 2015 baseline

FY2050

Towards net-zero by 2050 in support of GSMA's pathway for the ICT and mobile industry

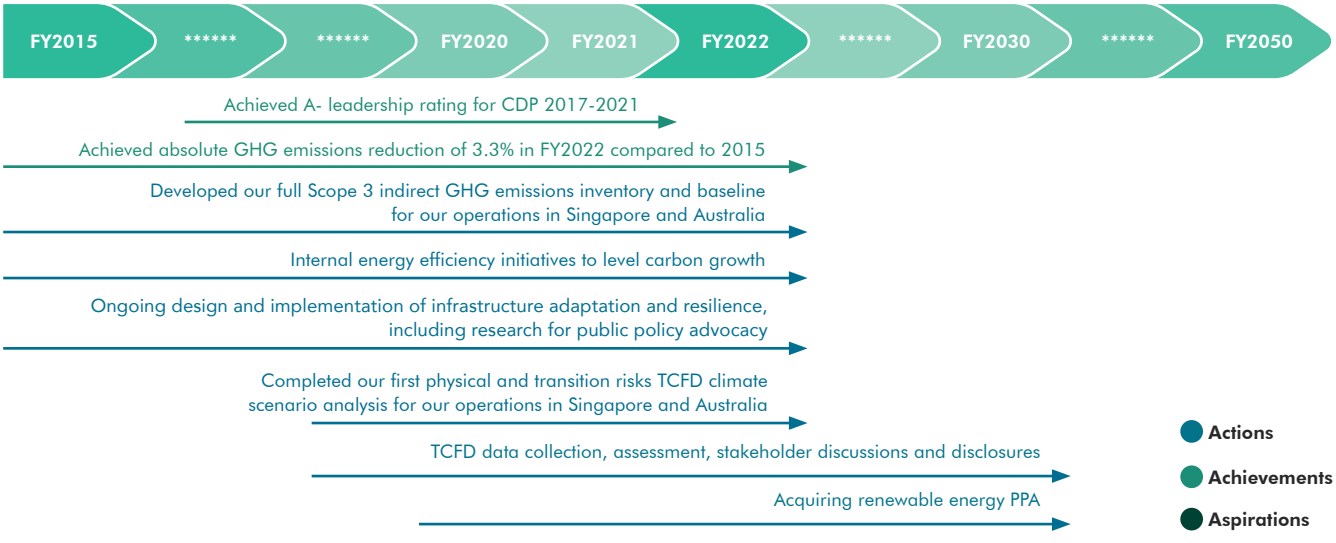


Figure 3: Singtel Group climate action plan

01

Manage GHG emissions in line with an ambitious science-based target pathway towards net-zero by 2050

02

Link emissions to financing to quantify carbon and drive change in behaviour

03

Address physical risks through network adaptation and advocate for climate action with our stakeholders

Our climate action journey during the year

Given the many interdependent yet specific dimensions of climate action, we took reference from the Corporate Climate Mitigation Blueprint published by WWF and BCG (2020) to guide us in developing our climate action plan.

1. Actively managing our value chain emissions towards net-zero

We have set rigorous corporate decarbonisation goals and targets. Our sustainability efforts are driven towards achieving a climate conscious future as we recognise our role and responsibility in tackling climate change. Our SBTi targets were aligned to a well below 2°C pathway when it was approved in October 2017 (see Figure 4). In May 2022, MSCI further assessed the implied temperature rise of Singtel Group's targets as 1.59°C.

Given that it has been five years and coupled with the updated Intergovernmental Panel on Climate Change (IPCC) report information, we are working on reviewing our SBTi targets for alignment with a 1.5°C pathway, the most ambitious goal of the Paris Agreement. In addition, we will develop a roadmap for our net-zero target by 2050 which we announced in 2019.

During the year, we completed our first full Scope 3 indirect GHG emissions assessment for FY2021 (see Figure 6 on next page) and FY2022. Our top 3 categories out of the 15 categories within Scope 3 indirect GHG emissions are purchased goods and services, capital goods and investments. Collectively they comprise 94.14% of our Scope 3 indirect GHG emissions (see Figure 5).

Figure 4: Singtel Group Scope 1 and Scope 2 baseline, performance and targets

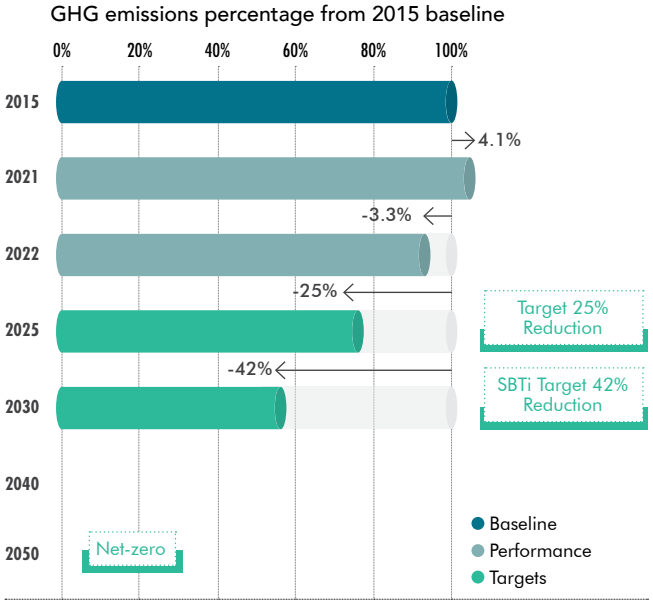
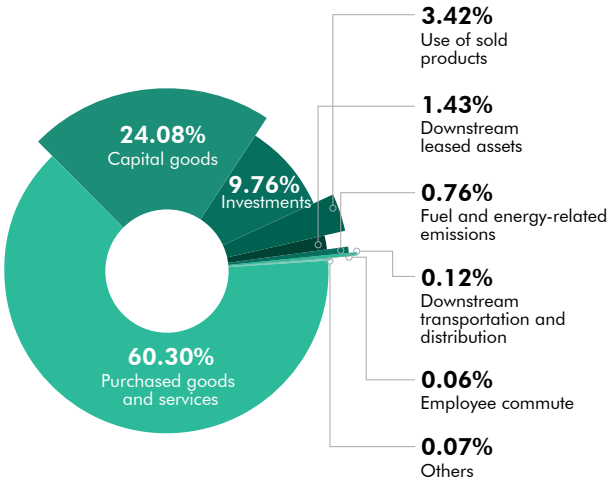


Figure 5: Singtel Group Scope 3 indirect GHG emissions profile FY2021



We will continue to refine our Scope 3 emissions through direct engagement with our key suppliers over the coming years.

Reduce value chain emissions in line with our SBTi 1.5°C ambition

We have developed the Singtel Group decarbonisation hierarchy to guide us in our reduction efforts. Our options and priorities for decarbonisation in order of preference are summarised in Figure 7 on page 17.

Through the various efforts outlined below, in 2022 we reduced absolute Scope 1 and Scope 2 emissions by 7.2% from 2021, and by 3.3% from our SBTi baseline of 2015. The following initiatives are undertaken.

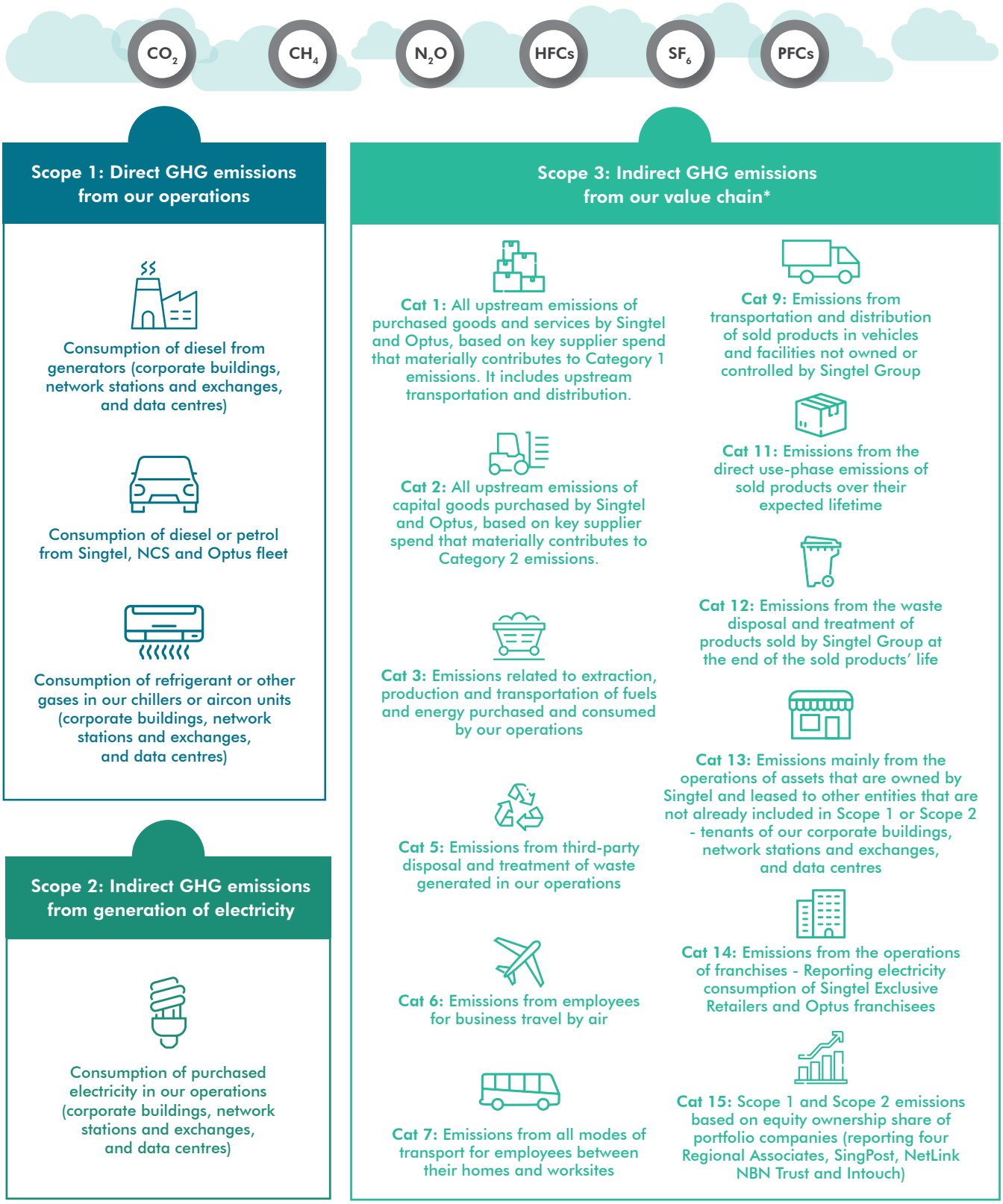
a) Reducing Scope 1 emissions through electrification

Singtel embarked on an electrification journey during the year, as we committed to switching over 21 units of our Outside Plant Engineering fleet to electric vehicles, with the aim of converting the entire Singtel and NCS fleet of 187 vehicles progressively.

b) Improving energy efficiency

We continuously look at improving our energy use and efficiency. Several of our programmes in Singapore and Australia target energy reduction across key energy-intensive touch points, such as network infrastructure, data centres, satellite earth stations and office buildings (see Table 1 on page 16). More details on our approach can be found at our **website**.

Figure 6: Singtel Group GHG emissions inventory



*Cat 4: Upstream transportation and distribution have been included in Cat 1 and Cat 2
Cat 8: Reported in Scope 1, 2 and Scope 3 Cat 1 and 2 emissions for any upstream leased assets
Cat 10: Not applicable as Singtel Group does not manufacture any products or sell products that require additional processing by the customer to use

Table 1: Energy saving efforts in Singapore and Australia

Programme	Nature of programme	Progress in FY2022
Replacing, overhauling, and optimising chillers and related equipment in Singapore	Over the years, we have been regularly replacing and overhauling chiller units and related Mechanical and Engineering (M&E) equipment at our exchanges and office buildings in Singapore, targeting those that have been in operation for 15 years or more. Our energy roadmap has been updated and extended until next year, and we will replace 28 units of older chillers and related M&E equipment located at our exchanges and office buildings.	**Estimated energy savings and GHG emissions avoidance:** To date, we have replaced 25 out of 28 chillers, with nine completed during the year. As part of the ongoing initiative, we target to upgrade the last batch of three chillers by the end of next year. 1,244 MWh/year (4,480 GJ/year) or 508 tCO_2e/year
Replacing Uninterruptible Power Supply (UPS) in Singapore	We replaced ten conventional-type UPS to modular units at our data centres in Singapore. This is a change from conventional UPS to Modular UPS where depending on the load, the UPS will determine the number of power modules in operation. The rest of the power modules will be in energy saving mode.	**Estimated energy savings and GHG emissions avoidance:** 767 MWh/year (2,762 GJ/year) or 313 tCO_2e/year
Converting to energy efficient mobile base stations in Singapore	We continue to upgrade our mobile networks in Singapore and convert them to energy efficient mobile base stations. We also activated power saving features in the 4G mobile base stations – Enhanced cell sleep mode and AI (Artificial Intelligence) powered MIMO (Multiple Input Multiple Output) sleep mode.	**Estimated energy savings and GHG emissions avoidance:** 99.73% in Singapore. 1,012 MWh/year (3,645 GJ/year) or 413 tCO_2e/year
HFC Decommissioning in Australia	Power down of obsolete HFC (Hybrid Fibre Coaxial) fixed network infrastructure.	**Estimated energy savings and GHG emissions avoidance:** 10,350 MWh/year (37,260 GJ/year) or 8,177 tCO_2e/year
Exchange Power System Upgrades in Australia	Replacement of existing power system with a 91% efficiency with equipment that has a 96% efficiency.	**Estimated energy savings and GHG emissions avoidance:** 131 MWh/year (473 GJ/year) or 104 tCO_2e/year
LED Upgrades (4 Exchanges) in Australia	Replacement of fluorescent tube lighting with LED.	**Estimated energy savings and GHG emissions avoidance:** 669 MWh/year (2,407 GJ/year) or 528 tCO_2e/year

We certify our business to external environmental standards where relevant. Three of our facilities obtained the Singapore BCA-IMDA Green Mark for Data Centres Platinum Certification in 2021: Choa Chu Kang Telecommunications Exchange, Kim Chuan Telecommunications Complex 2 and DC West. In addition, Kim Chuan Telecommunications Complex 1 and 2, NCS Bedok Data Centre and DC West are also certified to SS564 Green Data Centres and ISO 50001 Energy Management System.

Moving forward, we remain committed to developing our new facilities sustainably with the lowest possible carbon impact, highest possible energy efficiency as well as superior and innovative environmentally sustainable designs.

c) Increasing deployment of onsite renewable energy

We have further enhanced our renewable energy strategy during the year to inform and guide us as we progress (see Figure 8 on page 18).

New Singtel electric vehicle

In line with our decarbonisation strategy, Singtel Group seeks to maximise solar deployment at our premises. Since our first installation of photovoltaic panels at our Pasir Ris Telephone Exchange in 2009, we progressively increased the use of renewable energy in our network infrastructure. In the year, our renewable energy including RECs accounted for 5.8% of our energy consumption. With the installation of a 1.65 MWp solar power system on the rooftop of our NCS Bedok Data Centre under a Power Purchase Agreement (PPA) arrangement, it has generated 2,249 MWh which accounted for 13% of the data centre's consumption during the year. The solar power system, commissioned in March 2020, was one of the largest single-roof solar-powered data centres in Southeast Asia at that time.

We completed a feasibility study on all our properties during the year to assess their solar potential. We have since awarded an Engineering, Procurement and Construct (EPC) contract to deploy more renewable energy projects at up to eight Singtel sites including NCS Hub, Bukit Timah and Seletar Satellite Earth Stations, Hougang Exchange and One Serangoon North. The total capacity of these projects when completed will potentially reach 5 MWp and is expected to generate 5.4 GWh/year of renewable energy for our Singapore operations.

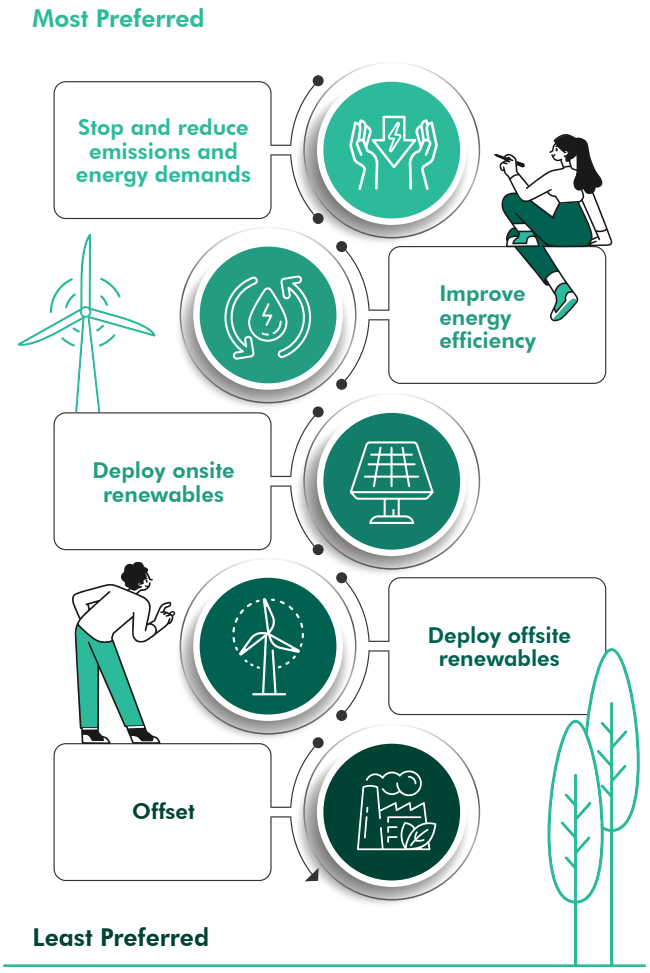
4G base station power saving features

We implemented energy saving features on our 4G mobile base stations to reduce electricity usage during low traffic hours for both outdoor and inbuilding sites.

a) **Enhanced Cell Sleep Mode:** Without this feature, cells are constantly turned on at all hours. Now, these capacity cells can detect low traffic conditions and power down to save energy.

b) **AI Powered MIMO Sleep Mode:** Based on machine learning, this feature can reduce power consumption in radios by automatically reconfiguring to a smaller MIMO (4x4 MIMO to 2x2 MIMO) and SIMO (Single Input Multiple Output) (2x2 MIMO to SIMO) configuration during low traffic hours. The feature is activated round the clock.

Figure 7: Singtel Group decarbonisation hierarchy



d) Sourcing of offsite renewable energy and attributes

Given the land and roof constraints of our property and facilities, the onsite renewable deployment will be limited for our decarbonisation efforts. It is essential for Singtel to adopt offsite renewable energy PPAs as a means to achieve our emissions reduction targets and ambition. However, Singapore has limited local renewable energy supply and Australia has certain risks linked to accelerated PPAs deployment.

We are looking to develop a portfolio of renewable energy certificates (RECs) to offset our Scope 2 emissions. In 2022, we secured 13.8 GWh of local Singapore RECs per annum from 2022 until 2025 and will start to retire these certificates from next year. We bought 2,000 I-RECs to lower our Scope 2 emissions in Singapore. We are also working to secure imported renewable energy in the coming years for our Singapore operations. In Australia, we retired 42 GWh of large-scale generation certificates (LGCs) during the year.

We are currently working on a national tender for renewable energy procurement to have 100% of our electricity requirements backed by renewable energy sources by end-2025 for our Australia operations. We will proactively seek renewable energy potential in the markets where we operate to secure renewables PPAs for our operations and buy RECs as near to our operations as possible where local RECs are limited.

e) Investing in high-quality carbon offsets

After exhausting our first four options to decarbonise our Scope 1 and 2 emissions, we will look to carbon offsets as a last resort to manage our emissions that are hard to abate. While we have not acquired any carbon credits to date, we are preparing ourselves by monitoring the standards, accounting treatment, government recognition and other developments closely.

2. Linking emissions to financing to quantify carbon and drive changes

We recognise the importance of linking sustainability and finance to include carbon considerations in business decision making processes to drive change. This includes making low-emission choices for the business and making investments in climate-related projects.

a) Sustainable finance

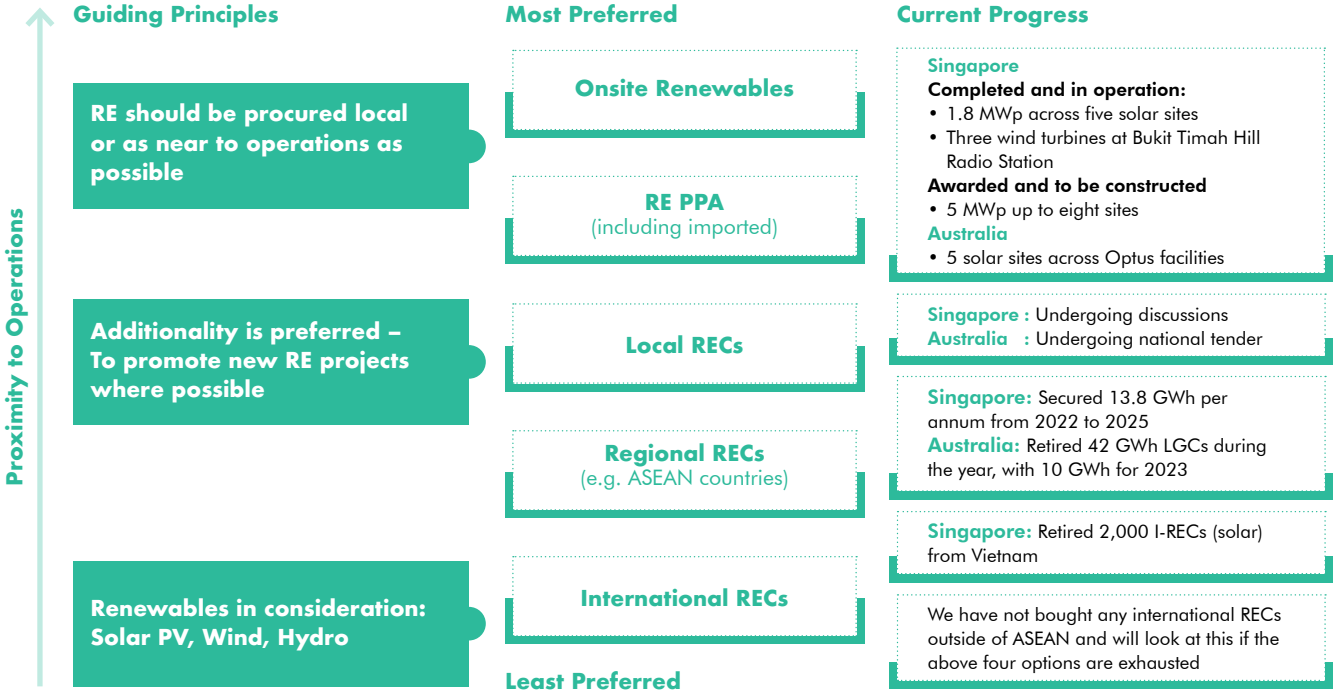
We are committed to linking our financing approach to our progress in achieving mid to long-term sustainability goals that will enable us to reach net-zero by 2050.

In April 2021, we launched our first sustainability-linked revolving credit facility of S$750 million, which was the largest Singapore-dollar denominated sustainability-linked loan in Singapore at that time. The launch marked Singtel Group's foray into sustainable financing under our new programme called Olives, that is linked to our sustainability targets. This three-year loan, provided by three local banks, features interest rate discounts pegged to pre-determined ESG targets in areas such as climate action and risk management, emissions management and workplace safety and health metrics.

Under Olives, we published the Singtel Group Sustainability-Linked Bond Framework in October 2021, which was a first for a telecommunications company in Asia Pacific. The framework outlines individual Key Performance Indicators (KPIs) and Sustainability Performance Targets (SPTs) for two different wissuers, Singtel and Optus, and allows both to issue sustainability-linked bonds (SLBs) under a single framework.

This framework affirms our commitment to net-zero emissions by 2050 and allows our investors to participate in our sustainability journey. Subsequently in November 2021, Optus priced an A$300 million seven-year fixed rate SLB, committing to reduce our Scope 1 and Scope 2 GHG emissions in Australia by 25% by 2025, compared to a 2015 baseline. This is in line with our SBTi approved 2030 targets of a 42% absolute reduction compared to the 2015 baseline.

Figure 8 : Singtel Group renewable energy strategy and approach



b) Internal carbon pricing

We conducted an internal carbon pricing (ICP) pilot for our Singapore operations where we used a shadow price of S$50 per tonne of CO_2e for energy-intensive business cases. We applied this hypothetical price for GHG emissions as a guide for business and investment decisions. With this approach, we took the first step of incorporating ICP for large capital expenditure projects that are energy intensive as a pilot, as energy consumption is a material topic for the Singtel Group.

Next year, we plan to incorporate ICP into our business processes, allowing Singtel Group to incorporate climate considerations in our decisions to incentivise investments in energy efficiency and low-carbon innovation. This will be a major step towards achieving our sustainability goal to become more resilient to regulatory climate policies and our commitment to emission reductions.

3. Address physical risks through network adaptation and advocate for climate action

Since our physical risk climate scenario analysis in 2015, we have been undertaking numerous adaptations across our Singapore and Australia operations to build resilience to natural disasters and long-term climate scenarios. We have progressively adapted our infrastructure design and

Full TCFD climate scenario assessment highlights

In 2021, we conducted a TCFD pilot in the Northern Rivers Region of New South Wales, Australia. This exercise was to assist us with identifying and narrowing down the most material physical and transition risk drivers. Drawing on the initial assessment, we performed further analysis on transition risks for insights and material financial drivers. This year, we conducted a full TCFD climate scenario analysis using three material transition levers and physical risks for both Singtel and Optus nationwide.

Physical Risk Assessment:

- >1,900 mobile sites assessed for Australia
- 82 key Singapore assets assessed, further narrowed to ten high-risk locations for financial impact analysis
- Our conclusion was that the financial impact from climate physical risks was deemed less material as the business continued to undertake proactive planning and adaptation of the infrastructure to mitigate the long-term physical effects of climate change under the different scenarios

Transition Risks:

- Key risks for Singtel are limited availability and cost of local/imported renewable energy, and market competition for low-emission ICT services like data centre
- Key risks for Optus are activism, introduction/increase of carbon taxes and volatile energy prices

Please refer to our inaugural standalone TCFD Report 2022 for a fuller discussion and disclosure on our climate scenario analysis of physical and transition risks and opportunities.

Singtel Group TCFD Journey

Governance	Strategy	Risk Management	Metrics and Targets
Singtel Board: Oversight and approval of sustainability-materiality register, SR disclosures on company's climate change strategy, plans and performance	FY2016 formal **climate adaptation and resilience planning** exercise: Inundation risks	Process of **Life Cycle Assessment**, Climate Adaptation Mapping and SBTi	Comprehensive **disclosures** in SR leading to standalone climate risk assessment and disclosure
Risk Management and Board Risk Committee: Oversight of material ESG risks	FY2017 **SBTi targets**	**External stakeholder** and government **engagement** in Singapore and Australia: ABR, TCFD, RC100	**Carbon intensity** and **SBTi** targets established in 2017 and undergoing review for refreshed targets in FY2023
Singtel Management Committee: Appointed Group Chief People and Sustainability Officer in the MC with Group Sustainability team supporting the management	FY2021 Optus CSIRO Bushfire prediction and adaptation exercise	**Risk Register** updated with climate change. But not in Top 10 as standalone risk and comes under business interruption	Financial driver and materiality **modelling completed in FY2022**
Renewable Energy MC Sub-Committee	2°C **scenario** as base with 4°C and 6°C global temperature rise by 2050 modelling for the adaptation review		
Various **Working Groups** to address specific issues such as TCFD and renewables	Updated target to meet **1.5°C** trajectory		
	Net-zero strategy and roadmap to be developed in FY2023		

standards to long-term climate scenarios like increased inundation risks, stronger cyclonic activities, rising temperature and higher bushfire frequency in Australia.

a) Collaborating with research and industry partners

The Singtel Group recognises that tackling climate change requires cross-industry partnerships to address complex issues. We collaborate with partners on innovation and technology to build resilience and capabilities against catastrophic events. We embark on research collaboration and engage subject matter experts at industry and national levels to gather intelligence and build resilience to manage climate risks and impact.

One of the major projects that we undertook in the year was the Optus 2022 Transmission Hub Resiliency project in partnership with Delta Electronics (Australia). The first stage of this project included the launch of Yes! CPX (Critical Power eXtender), a battery solution which ensures our transmission hubs can continue to operate for an extra ten to 20 hours following a failure of the main power grid. This creates an extended buffer period for power authorities to restore services or for Optus to access a site safely with a portable generator, particularly where the area has been impacted by extreme weather or natural disaster.

We formed a partnership with Redflow to deploy their battery system across 56 black spot sites under the Federal Government's Mobile Network Hardening Program (MNHP) and Strengthening Telecommunications Against Natural Disasters (STAND) programme. The batteries will increase the resilience of our network, particularly in bushfire-prone areas.

In parallel, we implemented a Phase Four upgrade of Australia's national emergency warning system to keep Australians safe by enabling access to real-time updates and emergency warnings. The system now has the capacity to reach over 500 emergency service agencies across Australia and will provide more reliable and prompt emergency messaging in communities that need it.

We actively monitor and engage in regulatory developments relating to reporting and carbon emission taxes, as well as provide annual comprehensive energy reporting to the National Green Energy Regulator (NGER). In 2020, we set up the Australian National University-Optus Bushfire Research Centre to develop a national system to detect bushfires early using an autonomous ground-based and aerial fire detection system. A constellation of satellites complements the fire detection system to spot and track fires and deploy extinguishing technologies. The programme will run until 2024.

Case study: Our ICP pilot in Singapore

During the year, we completed a pilot launch of our ICP framework on energy-intensive projects to assess its administrative feasibility and effectiveness.

One of the projects that has undergone this pilot analysis is the building of a new data centre. The proposed internal shadow carbon price was applied to the business case, using different energy consumption levels in the design for comparison. The less energy-efficient design appeared to be more economical in the original analysis. However, the inclusion of internal carbon price steered the conclusion towards the design with better power usage effectiveness (PUE) and consequently reduced the overall power consumption of the project by 7.5% over its useful life. PUE is a ratio that describes how efficiently the data centre equipment uses energy.

It was also proven that this framework has considerable potential to increase understanding, motivation and actions for reducing energy use, costs and GHG emissions at Singtel. We retrospectively applied our ICP framework on the selection of 5G network equipment. The inclusion of ICP further enhanced the decision to pursue more energy efficient equipment, which reduces overall power consumption of the equipment over its useful life by 20% while improving the total cost of ownership by 1%.

Project 1:
New Data Centre (DC)

Without ICP	Decision to go with **less energy efficient DC (PUE 1.4)** with 10% lower upfront capex investment
With ICP	Decision shift to **more energy efficient DC (PUE 1.3)** resulting in 7% reduction in utilities consumption across 20 years of useful life

Project 2:
5G Antenna Integrated Radio Equipment

Without ICP	Decision to go with **more energy efficient equipment** despite 16% higher upfront capex investment
With ICP	Widen the cost benefit and **strengthen the business case for lower-carbon option**

We play a leading role on the GSMA Board and Climate Action Committee, helping to chart the strategic direction in tackling climate change for the ICT and mobile industry. GSMA is an industry organisation that represents the interests of over 750 mobile network operators. During the year, we participated in the development of GSMA strategy paper on a circular

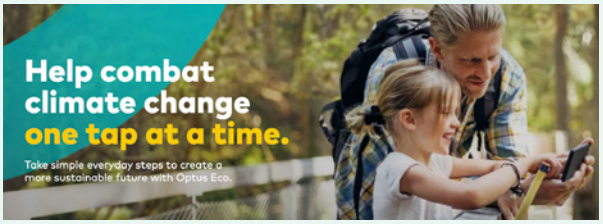
economy for network equipment and shared our climate journey with fellow members at GSMA events. At the country level, we actively partner governments and national agencies to understand emerging risks, policies and regulations. In Singapore, we engage the National Climate Change Secretariat (NCCS), Ministry of Sustainability and the Environment (MSE), National Environment Agency (NEA), IMDA and Centre for Liveable Cities (CLC). We are represented in the Pro-Tem Committee for E-waste Management Standard under the Environment and Resources Standards Committee of the Singapore Standardisation Programme. We also actively participate in business roundtables to share and discuss climate risks, TCFD and SBTi.

b) Demonstrating thought leadership

We actively share our experience to support and motivate others to start their own climate journey. Some of the notable events that Singtel was represented during the year include UNFCC Climate Neutral Now Initiative - Panel on net-zero and carbon neutral roadmap, challenges and opportunities; GSMA Asia Conference; 2021 Shared Value Summit Asia Pacific - Disasters Resilience Track Voices from COP26: Why it matters to businesses in Singapore by WWF Singapore; and Sustainability Reporting for the Future Seminar by PwC Singapore and Centre for Governance and Sustainability of National University of Singapore. Our TCFD effort was also featured as a case study for the Institute of Singapore Chartered Accountants Climate Disclosure Guide - Taking First Steps Towards Climate-related Disclosures.

c) Engaging with our employees

Earth Hour is not about reducing energy or carbon, but a powerful symbol of unity and hope in collective action. We continue to collaborate with WWF Singapore and fulfilled our commitment to Earth Hour 2022. On 26 March this year, we turned off and dimmed non-essential lighting at our properties and retail stores for an hour from 8.30pm to 9.30pm. We also encouraged our employees to pledge their support by turning off their lights at home, as well as adopt environmentally conscious habits to **'Go Beyond The Hour'**.



We launched Optus Eco which provides our customers in Australia with opportunities to reduce their own environmental footprint with simple and easy steps using My Optus App.

- **Reduce**
  Switch to paperless billing, recycle old device, modem or accessories through Mobile Muster, donate new or unwanted phone through Donate Your Device or connect with an Optus eSIM
- **Offset**
  Offset device and usage emissions to support a range of high quality and high integrity Australian carbon offset projects

d) Enabling customers to contribute to climate action

With a customer base of more than 15 million in Singapore and Australia, there exists huge opportunities for us to engage them to join us and play our part for the planet (see boxed-up story above).

Green ICT

We are constantly exploring smart mobile technologies to reduce energy consumption and emissions beyond our industry to benefit other sectors of the economy. Technology innovation in the areas of connectivity, low PUE data centres, cloud solutions, big data and IoT enable the development of energy efficient solutions that can be applied across industries and help advance decarbonisation efforts in other sectors. During the year, we focused on our 5G network rollout in Singapore and Australia to empower our customers by delivering greater speed, higher device capacity and ultra-low latency.

During network planning and implementation, we used network analytic tools to analyse traffic trending and roll out 5G with precision to meet performance demands at lower costs and greater energy efficiency. We implemented dynamic spectrum sharing to run 4G and 5G services simultaneously on the same frequencies to avoid the need of adding new energy-consuming hardware.

We also built a dual-mode core network to support both 4G and 5G services instead of operating two separate core networks.

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.