

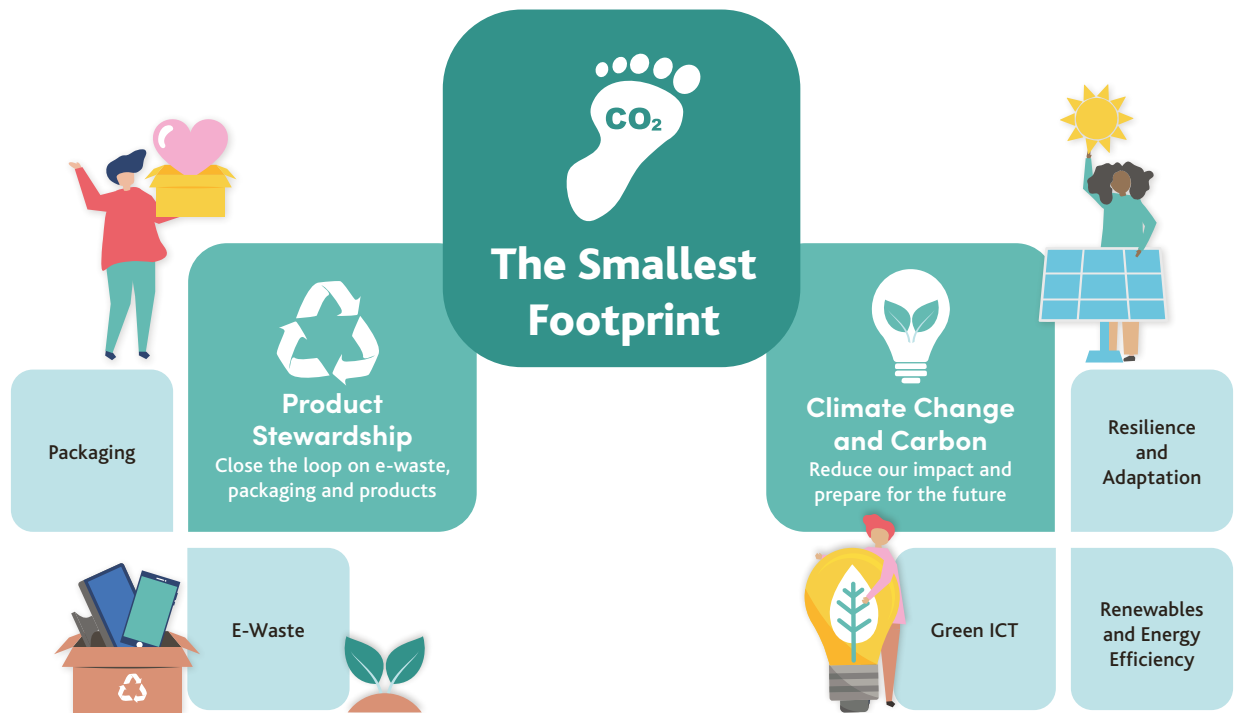
03 Environment

The Smallest Footprint

We are committed to minimising our environmental impact and building operational resilience to the effects of climate change on our business and the communities we serve.

As a leading communications group transforming and connecting people and communities, we are also a driver and enabler of positive environmental impact. The Singtel Group Environment Strategy guides our focus on climate action and product stewardship (see Figure 1). Please refer to our [website](#) for more details.

Figure 1:
Singtel Group's Environment Strategy



ADDRESSING CLIMATE CHANGE

CLIMATE CHANGE AND CARBON

We adopt an active and holistic approach in addressing the threat of climate change through mitigation and adaptation efforts, focusing on improving our energy performance and efficiency measures, as well as building resilience across our operations. Both climate action and environmental sustainability are a journey towards our goals and the Singtel Group has taken progressive steps since FY2015 (see Figure 4 on page 17).

In recognition of our environmental sustainability efforts, Singtel won Singapore's highest environmental accolade, which is the President's Award for the Environment 2019 organised by the Ministry of the Environment and Water Resources.



Vice President of Group Sustainability Andrew Buay receiving on behalf of Singtel the President's Award for the Environment 2019 from Singapore President Halimah Yacob and Minister for the Environment and Water Resources Masagos Zulkifli

THE TELECOMMUNICATIONS INDUSTRY AS AN ENABLER OF DECARBONISATION

Singtel's active participation in the GSM Association (GSMA) Board and its Climate Action Committee helps to chart the strategic direction of environmental sustainability for the ICT and mobile industry. GSMA is an industry organisation that represents the interests of over 750 mobile network operators worldwide.

In February 2020, we supported the landmark science-based sector-specific decarbonisation pathway to reduce greenhouse gas (GHG) emissions across the ICT industry sector to reach net zero emissions, announced through a collaboration between Science Based Targets initiative (SBTi), GSMA, International Telecommunication Union and Global e-Sustainability Initiative.

This includes emission reduction trajectories for mobile, fixed and data centre operators to meet the Paris Agreement goal of limiting global warming to 1.5°C, designed to substantially reduce the risks and mitigate the effects of climate change.

“This is a breakthrough and Singtel is pleased to have played a critical role in shaping this global collaboration for a sector pathway to net zero carbon in the ICT sector. We are glad this is now an industry movement which will enable collaboration in energy efficient technologies within the industry and with suppliers.”

CHUA SOCK KOONG
Singtel Group CEO and
Deputy Chair of GSMA Board



Singtel Solar Monitoring Solution supports Singapore's solar targets

During the year, we leveraged our ICT capabilities to help decarbonise HDB public housing flats and meet the national solar target commitment of 540 megawatt-peak (MWp) in Singapore by 2030.

Our Solar Monitoring Solution provides an IoT and diagnostic platform which gives project owners end-to-end, real-time monitoring of the performance of their solar equipment, such as inverters and power meters, to ensure that the solar energy harnessed is fully optimised.

More aggressive climate targets



Singtel Group CEO shares our environmental sustainability journey with Temasek portfolio companies' leaders

In July 2019, Singtel became the only Southeast Asian company among a pioneer group of 28 global companies to commit to keeping global temperature increase within 1.5°C and net zero emissions by 2050.

This is an extension of our climate action commitment in 2017 when we became the first company in Asia outside of Japan to have our 2030 absolute carbon reduction targets approved by SBTi.

Climate change is a global issue that requires urgent action from all of us, and governments and businesses must lead the charge.

Singtel has proactively implemented initiatives to make the transition to a clean energy future and build resilience in our operations.

We have now deepened our commitment to meet the more aggressive 2050 target. We believe these efforts will drive efficiency, innovation and use of renewable energy within the business, and rally our partners and vendors in the ecosystem to work together to achieve a positive outcome.

03 Environment

The Smallest Footprint

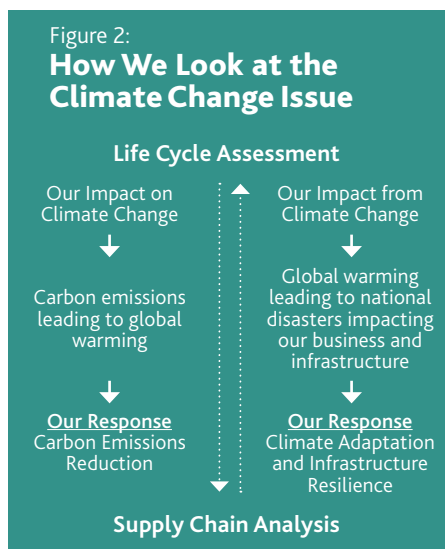


NCS Bedok Data Centre, one of the largest single-roof solar-powered data centres in Southeast Asia

We approach the topic of climate change from two perspectives: impact on climate change from the business' growing carbon footprint and impact from climate change on our business resilience and continuity such as during climate disasters (see Figure 2). We continue to work on both areas to ensure that we increase our positive impact on climate change and reduce its negative impact on our business and the community we serve.

IMPACT ON CLIMATE CHANGE

We give a progress update of our efforts and results from our ongoing energy efficiency and renewable energy initiatives in this report.



RENEWABLE ENERGY

In October 2019, we signed our first solar Power Purchase Agreement (PPA) in Singapore which saw the installation of a 1.65 MWp solar power system on the rooftop of our NCS Bedok Data Centre. The system was commissioned in March 2020 and became one of the largest single-roof solar-powered data centres in Southeast Asia.

The system is expected to produce about 2,059 MWh of clean energy per year, enough to power 462 four-room HDB flats for a month. Our carbon emissions are also expected to reduce by 864 tCO₂e annually. Please refer to our [website](#) for more details.

We continue to explore renewable energy options in Australia, where many projects have been affected by the economic uncertainty caused by COVID-19. PPAs are part of our energy efficiency plans to support Singtel Group's 2030 SBTi and 2050 net zero carbon targets.

ENERGY PERFORMANCE AND EFFICIENCY

Based on our FY2022 energy roadmap, we have been working on programmes targeting energy reduction across key energy intensive touch-points of our operations in Singapore and Australia, such as network infrastructure, data centres, satellite earth stations and office buildings. Please refer to Figure 3 and our [website](#) for more details.

BCA Green Mark Award (Platinum) for NCS Hub



NCS Hub was awarded the Green Mark Award (Platinum) by the Building and Construction Authority in 2020. The award rates a building on environmental criteria such as energy and water efficiency, and environmental protection.

Key building conservation features:

- Chiller plant with <0.60 kW/tonne efficiency
- 24% improvement in air distribution
- Energy saving T5 lightings/LEDs at offices and common areas
- LEDs with motion and lux sensors in washrooms
- PUB water efficient fittings



Figure 3:
Examples of Energy Programmes and Achievements



Retrofitting M&E equipment and energy optimisation

In Singapore, we continue to retrofit our Fan Coil Units to the type using solar thermal to absorb heat from the sun and improve efficiency of the compressor. 32 units were completed from 2017 to 2019. We also perform energy optimisation on our Heating, Ventilation and Air-Conditioning (HVAC) systems.

Estimated energy savings and emissions avoidance:

- Kim Chuan 1 Data Centre: 1,058 MWh/year (3,809 GJ/year) or 444 tCO₂e/year
- NCS Bedok Data Centre: 113 MWh/year (407 GJ/year) or 47 tCO₂e/year



Switching to energy-saving lighting

We have made progressive efforts in retrofitting physical architecture with LED lightings in Singapore.

Estimated energy savings and emissions avoidance:

- Geylang Telephone Exchange: 120 MWh/year (431 GJ/year) or 50 tCO₂e/year



Replacing Uninterruptible Power Supply (UPS)

We replaced two conventional-type UPS to modular units at our data centres in Singapore.

Estimated energy savings and emissions avoidance:

- NCS Bedok Data Centre: 126 MWh/year (454 GJ/year) or 53 tCO₂e/year



Converting to energy efficient mobile base stations

We continue to upgrade our mobile networks in Singapore and convert to energy efficient mobile base stations.

Energy efficient mobile base stations:

- 99.64%
- To achieve 100% by end-2020



Replacing, overhauling and optimising chillers and related equipment

We regularly replace and overhaul chiller units and related Mechanical and Engineering (M&E) equipment which have been in operation for 15 years and more, at our exchanges and office buildings in Singapore. Eight out of 22 chillers have been replaced last year with another six to be upgraded by end-2021.

In Australia, we have an ongoing multi-year Mobile Shelter Cooling Upgrade initiative to replace current fresh air fans with modern DC variable speed fans and larger intake units. This comes with the capability to double the air intake and reduce reliance on air conditioners. During the year, 270 sites were upgraded, bringing the total to 1,100 sites.

Estimated energy savings and emissions avoidance:

- Potential reduction of 6,141 MWh (22,108 GJ) annually when all 22 chillers are replaced
- Reduction of carbon footprint by 2,649 tCO₂e per year in Singapore
- 2,490 MWh/year (8,964 GJ/year) or 2,042 tCO₂e per year in Australia



MAKING PROGRESS WITH TCFD

We have adopted a staged approach for Task Force on Climate-related Financial Disclosures (TCFD), starting with our operations in Australia as the country is more exposed to climate risks and disasters compared to Singapore. We can then iterate the learnings for our Singapore operations. During the year, we issued a Request for Information calling for external risks modelling experts to partner us on our TCFD journey.

In FY2021, we plan to work with a consultant on a more targeted and granular assessment of a pilot geographical network location in Australia to help us refine the internal preparatory work we have done in the past two years. We will undertake financial risk modelling aligned with climate scenarios and the associated impact, as well as interdependencies of climate risks for our business operations. This will be done

concurrently with our internal sourcing of all climate-related data and validation of historical financial assessments attributed to the physical and transitional risks of climate change.

Please refer to our [website](#) to see how Singtel applies the TCFD framework against where we believe are our key physical, transition and other climate risks.

Environment

Climate Change and Carbon

IMPACT FROM CLIMATE CHANGE

We prepare our business for climate change impact and mitigate Singtel Group's carbon footprint through renewable and ongoing organic energy efficiency initiatives.

CLIMATE CHANGE RESILIENCE

Business resilience against climate change is a priority for the Singtel Group as we continue to integrate resilience and adaptation into our business and network operations. We constantly review current and new climate related risks and trends in countries that are prone to natural disasters, like Australia. We can then prepare ourselves and respond to such risks promptly to safeguard our network infrastructure while continuing to serve our customers' communications needs.

As part of the Australian Business Roundtable for Disaster Resilience and Safer Communities (ABR), we continue to work with businesses to build climate and disaster risk reduction knowledge and also influence decisions made by governments, businesses and communities. Through our active involvement in ABR, we help to shape the country's first National Disaster Risk Reduction Framework.



Optus SATCATS trucks provide communication coverage at disaster zones

We further enhanced our climate resilience adaptation during the year with an A\$800,000 investment to buy new equipment and retrofit our power generators.

We are currently exploring 4G-accessible small cells to complement our current disaster management fleet of four SATCATS trucks. If feasible, this will improve our deployment of mobile coverage solutions in affected disaster zones.

Retrofit

- Equip 37 power generators with:
- Additional 3 phase 415v outlets
 - Remote supervisory system
 - Quick connect fuel inlets to allow connection to long run fuel pods
 - Shelter interconnection lead



Purchases

- 9 trailer mounted diesel refuelling systems
- 30 long run portable diesel fuel pods
- 5 Tipper Trailers



Bushfires recovery with Green Shoots programme



Nicole Fosteris, Optus Local Channel Executive Manager (second from left), Tom O'Dea, Optus Territory GM of Central New South Wales (NSW) (first from right), and the RFS brigade from Parkes NSW

The unprecedented devastating bushfires in late 2019 affected more than one billion wildlife, caused an estimated A\$4.4 billion in economic losses, released 350 million tonnes of carbon emissions equivalent to Australia's annual emissions, and destroyed homes, businesses and lives.

We set up the Optus Green Shoots bushfire grants programme to support the rebuilding efforts of regional economies and small businesses adversely affected by the bushfires. Our assistance includes:

- Covering the costs of volunteer firefighters' mobile services for December 2019 and January 2020
- A dedicated customer care hotline for volunteer firefighters and those affected by bushfires
- Giving our people uncapped, paid emergency service and military leave for volunteering efforts related to the disaster
- 2,000 grants, a complimentary tablet, A\$100 monthly credit for 24 months, and technology support for eligible small businesses

"With the Green Shoots grants, we are committed to working alongside small businesses hardest hit and helping them on the road to recovery."

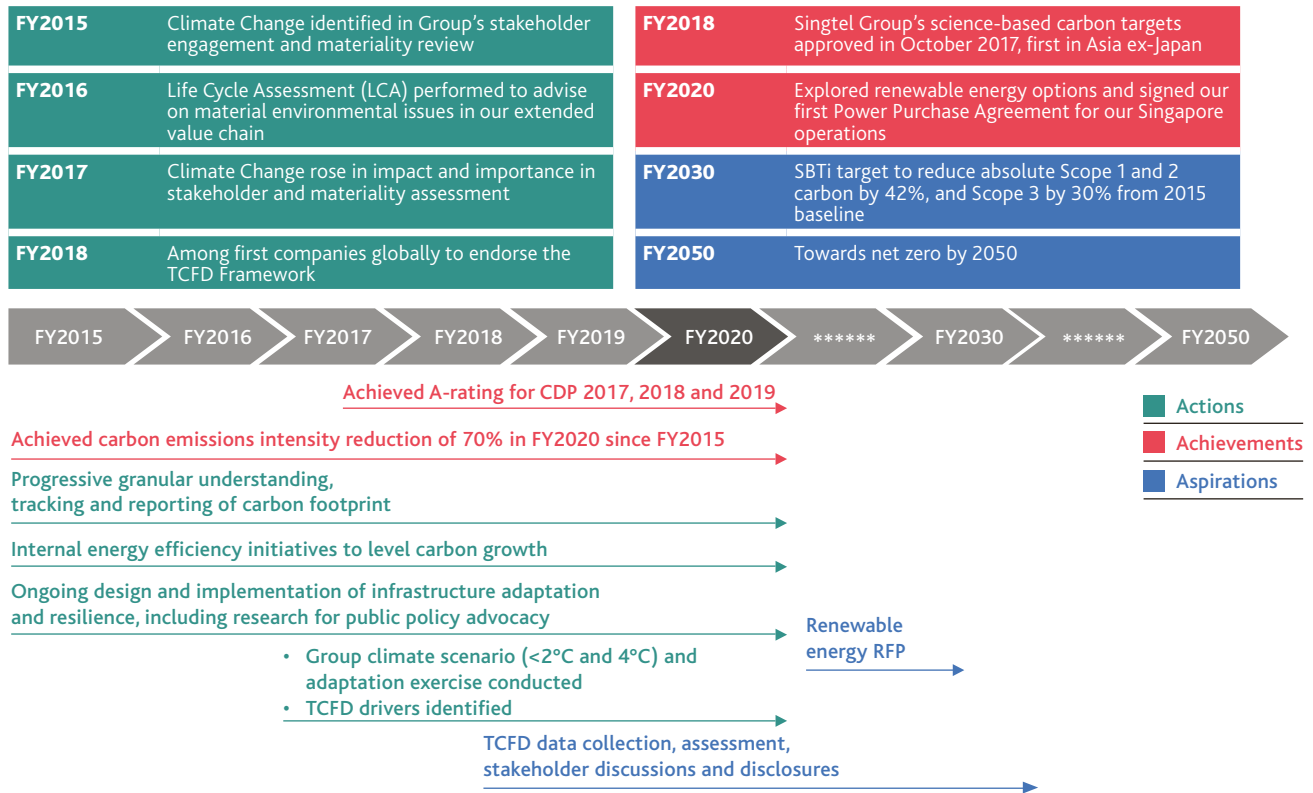
ALLEN LEW

CEO of Group Strategy and Business Development and former Optus CEO

Environment

Product Stewardship

Figure 4:
Singtel Group's Climate Action Journey Towards 2050



WASTE MANAGEMENT

In May 2019, the Australian government committed A\$3 million to support four new recycling education and resource recovery projects to increase recycling rates and reduce waste to support its 2025 National Packaging Targets.

As part of Singapore's Zero Waste Masterplan, the government passed the Resource Sustainability Act in September 2019. The Mandatory Packaging Reporting and Extended Producer Responsibility (EPR) e-waste frameworks will become effective on 1 January 2021 and 1 July 2021 respectively.

Electronic, packaging and corporate wastes such as paper are key sources of wastes generated across our operations and value chain. Hence we focus on reducing and recycling our waste by collaborating with partners and suppliers and redesigning our product offerings to minimise our impact in this area.

E-WASTE

The Singapore Government is tackling e-waste with the Extended Producer Responsibility (EPR) scheme to be implemented in July 2021 and Singtel is committed to playing our part and contributing towards this national environmental effort.

E-waste is the most material waste stream in our sector, due to the potential pollutive nature of metal, plastic and battery from mobile phones. Our focus is on increasing the recovery and recycling of mobile phones from our customers.

ReCYCLE, our e-waste recycling programme with SingPost, saw a 580% compounded growth in collection rates since its launch on World Environment Day in 2017. Our effort has recovered over 46,300 kg of mobile phones, batteries and accessories to date.

In Australia, we recycle over 98% of our own e-waste and continue to support the Mobile Muster programme, a national industry-wide collaboration stewardship scheme that allows customers to recycle their old mobile phones at any Optus store. We diverted 3,728 kg of e-waste or 50,182 handsets and batteries from landfills in Australia in 2019, saving 8.3 tonnes of carbon emissions and conserved 42.2 tonnes of mineral resources.

PAPER WASTE

We encourage our customers in Singapore to go paperless by promoting e-billing services. We have also switched to FSC-certified photocopying paper at our offices in Singapore since September 2012. With our paperless strategy, we reduced paper use by 49% during the year compared to FY2016 usage levels.

Environment

Product Stewardship

SUSTAINABLE PACKAGING

Sustainable packaging has both direct and indirect contributions to our carbon footprint and environmental impact on our value chain, from resource utilisation to product packaging and all the way to their waste streams.



We have been committed to the principles of the Australian Packaging Covenant Organisation (APCO) since 2007. In FY2020, we received an APCO Award for our sustainable packaging achievements and efforts in the telecommunications sector, making significant improvements in the areas of Consumer Engagement, Packaging Design, Packaging Material Efficiency and Business to Business Packaging, improving our points by 17 to 72. This is the third consecutive year we have been awarded by APCO as a high performing member.

Our commitment to sustainability packaging

In Australia, we updated and consolidated our Sustainable Packaging Strategy into ten targets for 2019-2021 and aligned to the National Packaging Waste targets to make all packaging 100% reusable, recyclable or compostable by 2025. As part of this journey, all foils, celloglaze, spot UV and finishes that make packaging unrecyclable, have been removed from our products. We have also included the FSC and recycling logos on the reverse side of our prepaid SIM packaging.



Optus team receiving the APCO Award for the Telecommunications category last year, receiving the accolade of 'Leading' Australian company for our sustainable packaging efforts and best practices

Singtel and Optus Celebrate World Environment Day with Project LESS (Little EcoStepS)

In 2019, we ran Project LESS across Singtel and Optus, which aims to promote a culture of LESS – Little EcoStepS – to engage our staff in playing an active part in environment conservation. By inculcating an environment friendly ethos, we hope to reduce our carbon footprint through little acts that can collectively make a big difference.

2019 was designated as the Year Towards Zero Waste in Singapore. Singtel supported this national campaign with a year-long Project LESS consisting of lunchtime talks, workshops, roadshows and eco-trips for staff. We launched 'The Last Straw' campaign that encouraged our 12,000-plus employees in Singapore to reduce the use of disposables at our staff cafeterias. In celebration of World Environment Day and in support of the Say YES to Waste Less campaign by the National Environment Agency, we gave each employee a special lunchbox and a set of utensils for their takeaway food purchase. Through such initiatives, we hope to empower them in embracing a sustainable lifestyle.

In Australia, we organised a panel session 'Our role as stewards of Planet Earth', consisting of keynote speaker Karina May Reyes-Antonio, National Geographic Explorer 2018, Rebecca Gilling, Deputy CEO of Planet Ark and staff advocates. We also hosted an environment-themed marketplace with participation from eco-friendly retailers and non-profit partners like Mobile Muster.



Reusable lunchbox for every employee in Singapore



Engaging panel discussion on everyone's role as stewards of planet earth

Environment

Environmental Performance Indicators

Environment	SINGTEL			OPTUS			SINGTEL GROUP		
	2020	2019	2018	2020	2019	2018	2020	2019	2018
Total energy use (GJ)	1,466,802	1,347,094	1,395,100	1,834,722	1,749,622	1,724,106	3,301,524	3,096,716	3,119,206
Energy intensity (GJ/\$million revenue)	180	161	169	219	194	191	200	178	181
Energy intensity (GJ/TB*)	0.30	0.35	0.43	0.49	0.59	0.71	0.38	0.46	0.55
(i) Electricity Use (GJ)	1,448,584	1,323,825	1,372,809	1,805,476	1,719,144	1,692,773	3,254,060	3,042,969	3,065,582
Electricity Use (MWh)	402,384	367,729	381,336	501,521	477,540	470,215	903,905	845,269	851,551
Electricity Intensity (GJ/\$million revenue)	177	158	167	216	191	187	197	175	178
Electricity Intensity (GJ/TB)	0.30	0.35	0.42	0.48	0.58	0.70	0.38	0.45	0.54
Electricity Intensity (kWh/TB)	83	97	118	133	160	195	105	125	151
(ii) Fuel use from non-renewable sources (GJ)	16,748	22,877	21,935	28,782	30,014	30,869	45,530	52,891	52,804
(iii) Fuel use from renewable sources (GJ)	1,470	392	356	464	464	464	1,934	856	820
Solar energy (MWh)	408	109	99	129	129	129	537	238	228
Total carbon emissions (tonnes CO ₂ equivalent) ¹	162,566	164,629	174,391	427,706	418,060	418,760	590,272	582,689	593,151
(i) Scope 1	3,741	4,085	3,367	2,140	2,567	2,725	5,881	6,652	6,092
Refrigerants	2,545	2,455	1,828	134 ²	470 ²	589 ²	2,679	2,925	2,417
Fuel combustion	484	733	587	304	291	329	788	1,024	916
Company fleet	712	897	952	1,702	1,806	1,807	2,414	2,703	2,759
(ii) Scope 2	153,650	154,152	164,470	412,932	402,290	399,257	566,582	556,442	563,727
(iii) Scope 3	5,175	6,392	6,554	12,634	13,203	16,778	17,809	19,595	23,332
Contractor fleet	254	411	687	1,138	1,264	1,168	1,392	1,675	1,855
Air travel	3,040	4,000	3,845	4,853	5,738	8,004	7,893	9,738	11,849
Employee commute	1,731 ³	1,821	1,821	6,643 ³	6,201	7,606	8,374	8,022	9,427
Retail franchisees	150	160	201	N.A.	N.A.	N.A.	150	160	201
Carbon Intensity (tCO ₂ e/\$ million revenue)	20	20	21	51	46	46	36	34	34
Carbon Intensity (tCO ₂ e/TB) ⁴	0.03	0.04	0.05	0.11	0.14	0.17	0.07	0.08	0.10
Total Water Use (m ³)	864,646 ⁵	753,238	752,207	68,737 ⁶	78,774	74,235	933,383	832,012	826,442
Water Intensity (m ³ /\$million revenue)	106	91	90	N.A.	N.A.	N.A.	56	48	47
Total Waste: hazardous and non-hazardous (tonnes)	7,658	7,538	6,289	883 ⁷	2,294 ⁷	2,197 ⁷	8,541	9,832	8,486
Total Non-Hazardous Waste by disposal method (tonnes)	1,567	2,130	2,227	690 ⁷	1,683 ⁷	1,972 ⁷	2,257	3,813	4,199
Incineration with energy recovered	1,376	1,972	1,968	N.A.	N.A.	N.A.	1,376	1,972	1,968
Landfill	0	0	0	568	1,476	1,720	568	1,476	1,720
Recycle / Reuse	191	158	259	122	207	252	313	365	511
Total Hazardous Waste by disposal method (tonnes)	6,091	5,408	4,062	193 ⁷	611 ⁷	225 ⁷	6,284	6,019	4,287
Incineration with energy recovered	324	282	388	N.A.	N.A.	N.A.	324	282	388
Landfill	777	776	593	6	8	3	783	784	596
Recycle / Reuse	4,990	4,350	3,081	187	603	222	5,177	4,953	3,303
Customer E-waste Recycling (tonnes)	66	63	36	4	4	4	70	67	40

Footnotes:

* TB refers to terabyte of data transported across our network.

- The carbon emissions reported in the table are based on the reporting requirements of the WRI and WBCSD 'GHG Protocol Corporate Accounting and Reporting Standard'. The equivalent CO₂ emissions for electricity use are calculated based on the updated simple operating margin grid emission factors from the National Environment Agency and electricity supplier emission factor in Singapore for the relevant time period and from corresponding states in Australia. Scope 1 direct emissions and Scope 3 indirect emissions are calculated using BEIS (Department for Business, Energy & Industrial Strategy) Greenhouse gas reporting: conversion factors 2019, NGERs and WRI.
- Optus uses a combination of air, water and refrigerant cooling systems. Refrigerants tracked from FY2018.
- Employee commute carbon emissions data updated with FY2020 employees numbers. Optus data updated with new survey conducted in 2019 and applies to Optus Sydney campus.
- Covers Scope 1 and 2 only.
- Total volume withdrawn from municipal water supplies and includes use of 180,799 m³ NEWater instead of potable water. Water stress areas are not applicable.
- Total volume withdrawn from municipal water supplies and includes rainwater harvesting of 10,876 m³ instead of potable water. Water use covers Optus Sydney campus and Optus Melbourne office only.
- Data covers waste directly managed by Optus' contracted waste vendor.