

08 Environment

We are committed to understanding, managing and minimising our environmental footprint across our value chain, including our business operations, suppliers and customers.

OUR APPROACH DMA

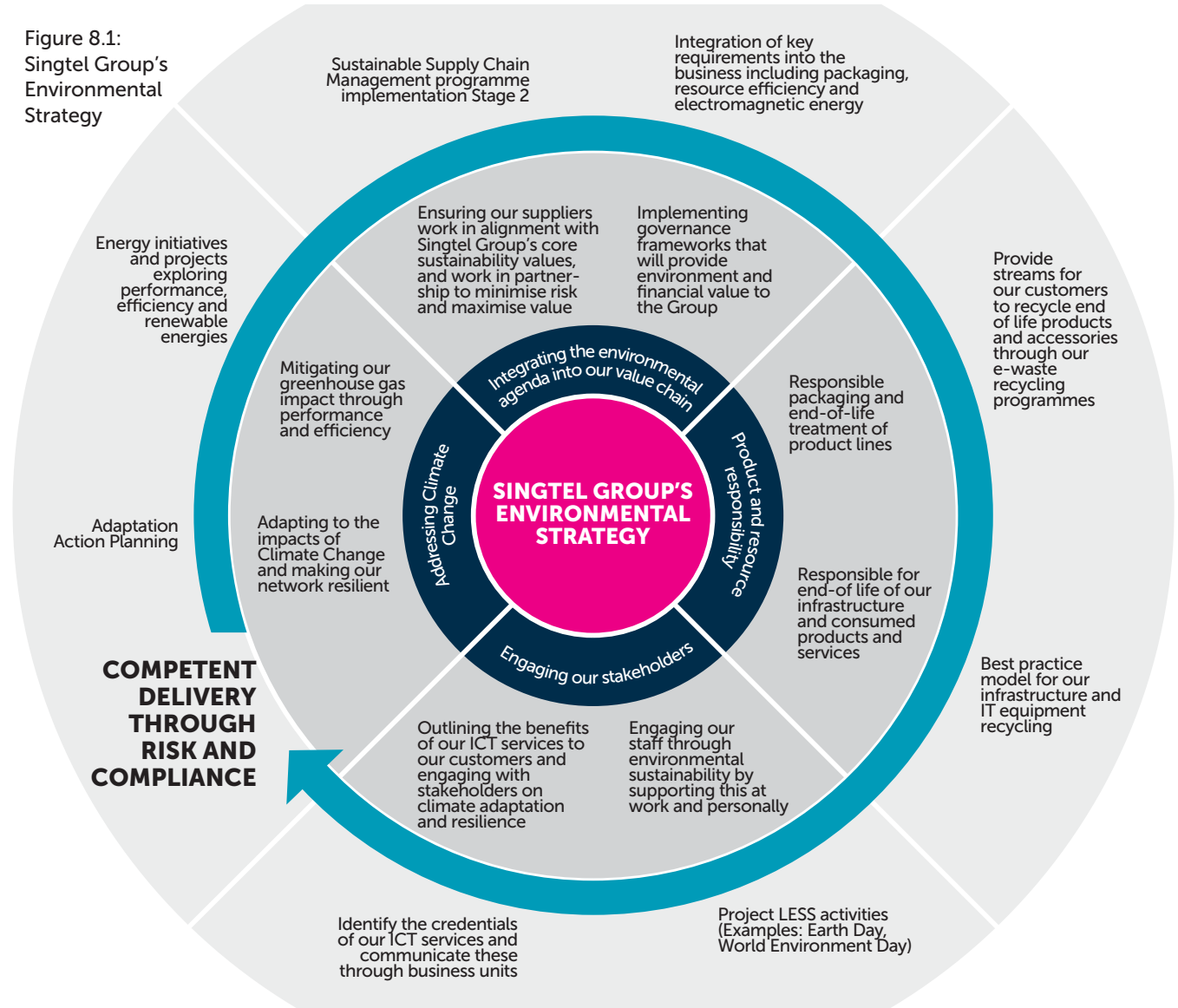
2015 has been a milestone year in the global effort of tackling climate change. The COP 21 agreement in Paris has presented an opportunity to businesses like ours to contribute towards the low carbon transition of the Singapore and Australia economies. In response, we have continued to strengthen our environmental programmes this year, focusing on strategic initiatives that we believe will yield greater impact over the long term.

The emphasis of our environmental activities has been across four strategic pillars:

- Addressing climate change
- Integrating the environment agenda into our value chain
- Engaging our stakeholders on environmental issues
- Product and resource responsibility

We are guided by our Environmental Management System (EMS) which supports our commitment towards climate change. Aligned with the ISO 14001 management system, it provides direction on the management of key environmental aspects in the planning, design, construction and operation of our core network. This approach also reflects our support towards the precautionary principle of the 'Rio Declaration on Environment', 1992. We have begun scoping an ISO 14001 implementation and certification for selected areas of our Optus network that some of our key stakeholders considered more material, and targeted for completion in 2017. G4-14

Figure 8.1:
Singtel Group's
Environmental
Strategy



LIFE CYCLE ASSESSMENT OF OUR BUSINESS OPERATIONS

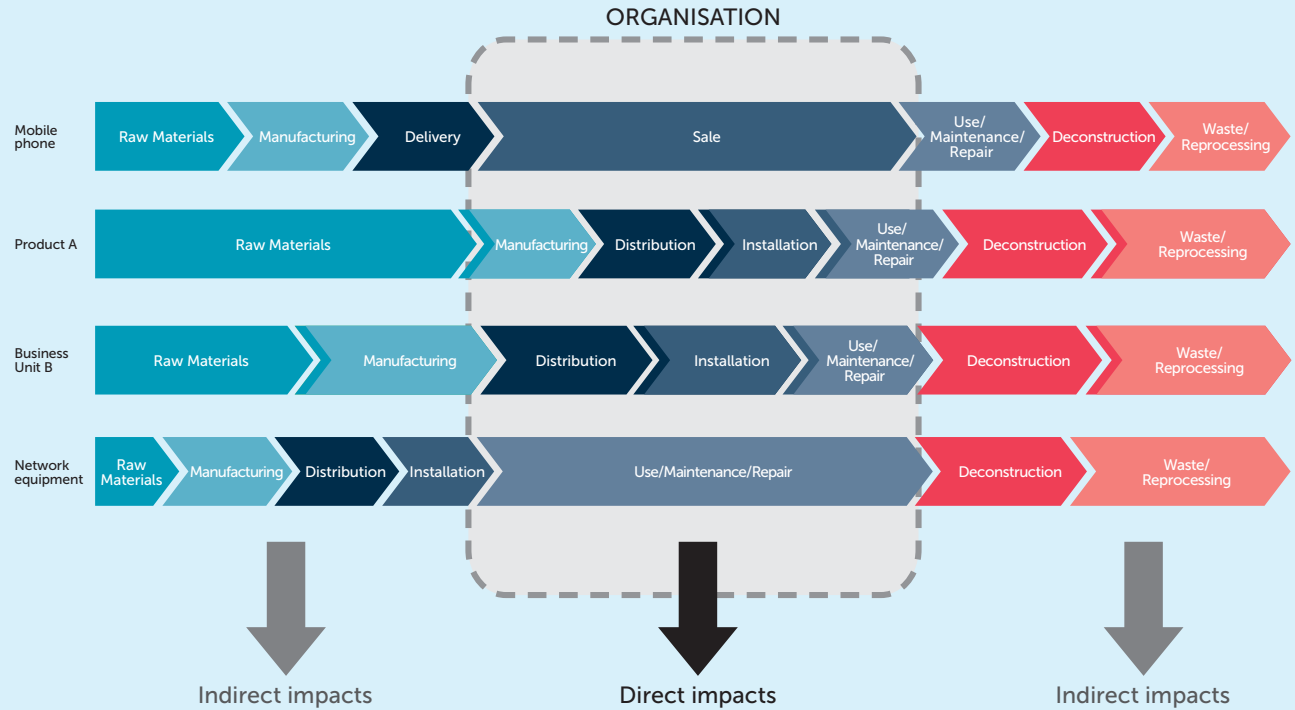
This year we undertook a comprehensive organisation-wide Life Cycle Assessment (LCA), looking at the direct and indirect impacts of our whole business operations. The LCA looked at key areas across our business and our top 90 suppliers, including consideration of sector-specific economic forces and social hotspots, such as human and labour rights issues.

The LCA demonstrated that carbon and climate change were the material issues requiring the most attention across our business, as well as how we manage our equipment at the end of its useful life. Our strategy on climate change and waste management are discussed in this chapter.

The review found that around two-thirds of the identified environmental and social impacts are outside our direct control. In order to address these impacts, we must do what we can to influence the practices within our supply chain. We are implementing these findings methodically, and have also used the LCA to guide the transformation of our procurement strategy.

The knowledge that we gained from this LCA will be used to feed back into our materiality assessment, allowing us to sharpen our focus on the activities that are the most relevant to our business and our supply chain.

Figure 8.2: Life Cycle Assessment



ADDRESSING CLIMATE CHANGE

Climate Action is one of the UN Sustainable Development Goals and we strive towards addressing this. **SDG 13**

As our networks expand to support increasing data usage, coverage and reliability, we constantly face the challenge of decoupling our carbon footprint and business growth.

We aim to address the threats of climate change through both mitigation and adaptation efforts.

We focus on improving energy performance and efficiency while continuing to investigate the viability of sustainable sources of energy on a more impactful scale. We also focus on building and maintaining a resilient network in the face of climate change.

ENERGY PERFORMANCE AND EFFICIENCY **SDG 7**

In FY2016, over 95% of the Group's total emissions came from electricity and fuel use. Therefore, improving energy efficiency and minimising overall consumption and dependence on non-

renewable energy sources are key areas of action in our environmental strategy.

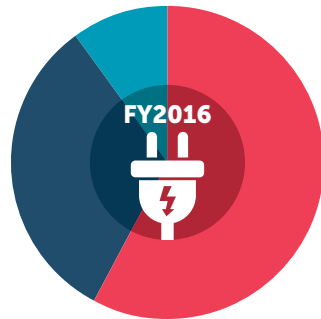
The Group's total energy use and energy intensity increased to 3.04 million GJ and 179 GJ/\$ million revenue in FY2016 respectively. The main areas of energy use within our Group include network infrastructure (telephone exchanges, base stations, mobile access network and satellite earth stations), data centres, office buildings and retail stores.

The increase in energy use in Australia is attributed to our significant growth in

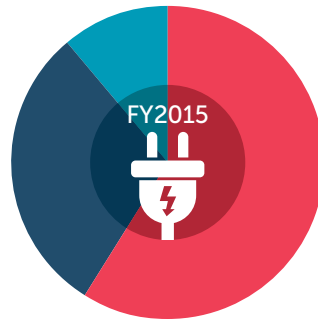
network coverage and capacity as part of our goal to deliver superior customer experience to our mobile customers. Energy generation in Australia is also primarily coal fired with high carbon coefficients.

Recognising this, we are in the process of working through a major energy intensity improvement programme at Optus. We will invest in more efficient equipment, test new technologies and explore economically viable options to increase our production of on-site renewable energy. This is a two-year

SINGTEL GROUP'S ELECTRICITY USE BREAKDOWN



Network	58%
Mobile	32%
Corporate	10%



Network	59%
Mobile	30%
Corporate	11%

plan which will see a number of proofs of concepts undertaken, with implementation planned throughout FY2017 and FY2018. We are initially setting a kWh/TB intensity target as we are work on several indicators and targets internally. We will be working to determine the most relevant energy efficiency targets across the business over the next 12 months.

This exercise will also enable us to set realistic carbon emission intensity targets. We are focusing resources internally to make sure that these target metrics are relevant and reflect our business drivers that support rapidly increasing consumption of entertainment content, a connected society and economy where enterprise customers are also outsourcing their operations to us to achieve their own operational efficiencies. This will effectively allow us to anticipate and manage our future climate impacts.

We have been implementing a number of other energy efficiency measures and projects during the year in Australia. They include upgrading our multifunction office devices (combined printer, photocopier, fax, scanner), deploying modern switching equipment at our exchanges, installing movement sensors in our meeting rooms and changing to more fuel-efficient vehicles within our fleet.

In Singapore, we continue to enjoy savings from our chiller overhaul and replacement and energy saving lighting system projects implemented over the past few years.

• Chiller Overhaul and Replacement Programme

Chillers are often a building's single biggest user of electricity. It is important that our chillers operate in the most efficient manner. We achieve this through our chiller overhaul



Optus employees enjoying car-sharing service

and replacement programme, implemented in Singapore in 2011.

We have continued the cyclical replacement of ageing chiller units, targeting those that have been in operation for 15 years or more. In FY2016, two units of 200 RT chillers serving Comcentre Tower and one unit of 150 RT chiller were replaced with higher efficiency units. For Katong 2 Exchange, three units of 250 RT chillers as well as all the associated pumps and cooling towers were replaced, resulting in an even higher improvement of 40% in efficiency.

The replacement of these six chillers created an estimated energy savings of 4,764 GJ (equivalent to 574 tCO₂e). We plan to replace another seven chiller units in the coming year.

EN6 EN19

• Energy Saving Lighting System

Our first trial of the Performance Enhancement Lighting Management System (PELMS) was at the Telok Blangah Telephone Exchange in Singapore in 2012, allowing lighting levels to be automatically managed based on motion detection. The project achieved average savings of about 45% of the lighting budget for the building. In FY2016, we enhanced this initiative and replaced using LED tubes at our office located at the Katong II Telephone Exchange achieving estimated energy savings of 55 GJ (equivalent to seven tonnes of CO₂e per year). EN6 EN19

Environment

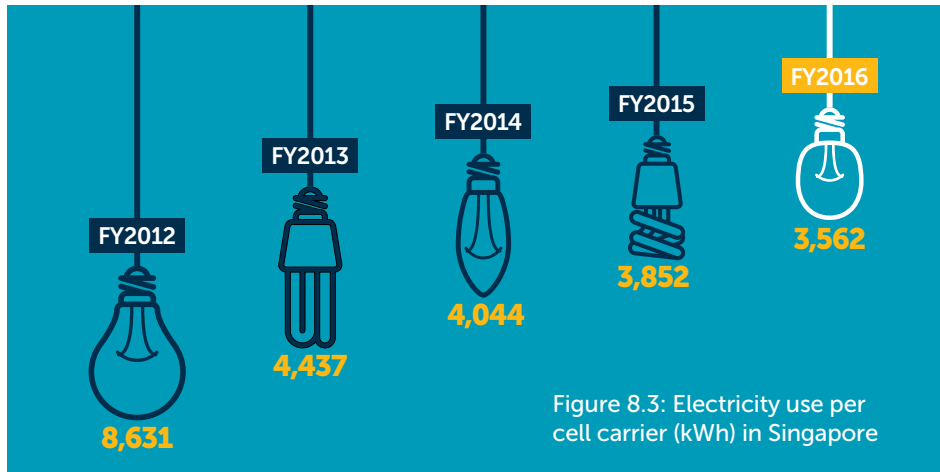


Figure 8.3: Electricity use per cell carrier (kWh) in Singapore

ENERGY EFFICIENT MOBILE BASE STATIONS

Over the past three years, we have implemented a plan to upgrade and convert existing mobile base stations to energy efficient stations in Singapore and Australia.

As at 31 March 2016, 97% of all our base stations in Singapore, both new and existing, has been converted to 'green' base stations. Although the absolute electricity use from our base stations increased by 10 GWh in FY2016 compared to FY2015, we achieved a 5% reduction in energy use per cell carrier and have seen a steady reduction in the trend (see Figure 8.3).

In Australia, we have upgraded more than 6,400 base stations, including the installation of 'smart meters'. This exceeds our original target by 8%. The ability to track consumption usage trends with these meters greatly enhances our ability to identify sites where we can effectively implement energy efficiency measures.

In addition, we replaced over 3,000 air conditioners at our mobile phone base stations with temperature controlled fans to leverage 'free cooling' when the external ambient temperature is low during the cooler months, thus helping us to further improve our energy performance.

SUSTAINABLE ENERGY SOURCES

EN6 EN19 SDG7

In addition to our energy efficiency initiatives, we actively explore opportunities to utilise alternate forms of energy for our operations. Since 2009, we have used several sustainable energy sources for our operations in Singapore in an effort to reduce our reliance on electricity from the grid (see [website](#) for details).

BUILDING RESILIENCE

We understand the importance of our role as a leading provider of ICT services to our customers and community. Hence we are working to 'future-proof' our network against the impact of climate change.

Investing in resilient and innovative infrastructure to build sustainable cities and communities has been identified as one of the UN Sustainable Development Goals. **SDG 9** **SDG 11**

We cannot address this systemic issue alone, hence we actively collaborate with others in our efforts. We are a founding partner and active member of the Australian Business Roundtable (ABR) for Disaster Resilience and Safer Communities, as well as a member of the Australian Green Cross Business Adaptation Network (AGCBAN). In both partnerships, we work with other major Australian companies on the agenda of building resilience. **G4-16** **SDG 11** **SDG 13** **SDG 17**

THE ECONOMIC COSTS OF THE SOCIAL IMPACT OF NATURAL DISASTERS

In March 2016, ABR presented two reports to the Australian government on climate adaptation and resilience. *The Economic Cost of the Social Impact of Natural Disasters* is the first economic analysis of the social impacts and costs of natural disasters. A second report *Building Resilient Infrastructure* demonstrated the business case of building resilient infrastructure, instead of spending billions of dollars to recover from the damage caused by climate change related disasters.

THE COST OF RECOVERY

The true cost of natural disasters is at least **50% greater** than previous estimates.

It is estimated that the total cost of natural disasters in Australia in 2015 exceeded

A\$9 billion

This is expected to double by 2030 and to reach an average of

A\$33 billion annually by 2030



Singtel volunteers planting trees as part of the Coney Island rehabilitation programme in 2015

VALUE CHAIN INTEGRATION

We understand the importance of environmental risks in our value chain and we are committed to collaborating with environmentally responsible suppliers.

A major step in this effort has been to develop an accurate understanding of the environmental impact of our activities across our value chain. The group wide Life Cycle Assessment (LCA) completed this year assessed our total environmental and social footprint, including suppliers upstream and consumers downstream. We have used the results of the LCA to

improve our Sustainable Supply Chain Management (SSCM) programme, and have put in place our new SSCM strategy and framework to help us become an industry leader by 2020 (see page 21).

STAKEHOLDER ENGAGEMENT ON ENVIRONMENTAL ISSUES

Our key area of external stakeholder engagement on environmental issues has been in the area of climate change adaptation. Through our internal adaptation exercises and the work of the ABR, we have actively engaged and advocated the issues with government as well as environment and climate related agencies in both Singapore and Australia.

The Singtel Group is committed to ensuring that our people have opportunities to learn about environmental issues and volunteer in this space. Since the launch of our Project LESS (Little Eco Steps) environmental campaign in Singapore in 2011, we have invited subject matter experts to talk to our employees and organised eco-trips to places of environmental interest and eight runs of the popular annual Plant-A-Tree Day. We have also introduced several initiatives such as our electronic waste recycling programme and saying NO to sharks' fin. **SDG 13**

CLIMATE ADAPTATION AND RESILIENCE STUDY

This year, we studied the future impacts of climate change on our Group's business. This has helped identify the climate risk areas most critical to us, and how we can build resilient infrastructure in the future to protect our network for our customers and the broader community.

Through a combination of internal consultation and climate modelling, the key network vulnerabilities and interconnection of impacts were documented. These have been used to understand the future impact of occurrences – such as changes in rainfall intensity and temperatures on our network – and to identify options for an adaptation action plan in response to these risks.

We now have an adaptation roadmap and action tracker, which we are embedding into our corporate processes and using to establish governance structure, policy and reporting framework specific to climate adaptation. We will be using the plan to quantify the financial cost of these climate externalities, and develop and implement long-term climate change resilience strategies for both Singapore and Australia.



SDG 13

Environment



Recycling bins at Singtel and Optus retail outlets to encourage proper disposal of electronic waste



SUSTAINABLE TRANSPORT

At our Optus Campus in Sydney, we use all profits from the onsite carpark to fund the Optus Express buses which provide free rides to work, as well as bike facilities, events and education programmes. This year we reinvested A\$2 million into this initiative and over half of our Sydney employees now use sustainable transport to get to work.

SDG 11

PRODUCT AND RESOURCE RESPONSIBILITY

We actively monitor our waste management practices both as part of doing business and in the corporate office environment. We continued to undertake initiatives in FY2016 to create awareness among employees and promote best practices in waste management. Our efforts in this space support the UN Sustainable Development Goal on Responsible Consumption and Production.

SDG 12

In Australia, we are in the process of conducting a thorough audit of our domestic waste to set a baseline of our waste separation and disposal

practices. We will be running a number of programmes to change people's behaviours towards waste, and then further audits to measure the effect on our domestic waste.

Electronic waste is an area where we continue to maintain our focus. E-waste contains a combination of valuable and reusable raw materials as well as materials that are toxic. We encourage our customers and employees to reduce, reuse and recycle e-waste through a number of initiatives.

- We offer our customers a buy-back scheme so that end-of-contract phones can be reused. As part of

this scheme, we destroy all data and resell or recycle the devices.

- In Australia, we have been proudly supporting Mobile Muster since 1998, enabling customers to recycle their old mobile phones free of charge by taking them to any Optus retail outlet. **G4-16**
- In Singapore, we work with our e-waste vendor and organise regular roadshows at our key office premises to encourage our people to dispose their unwanted e-waste. We also provide recycling facilities at our outlets so that customers can bring back products and accessories that have reached the end of their life.

- We are committed to responsible packaging and have responsibilities under the Australian Packaging Covenant (APC). This year we commenced a packaging review with a multi-stakeholder group to implement a best-in-class packaging campaign. This has identified some key initial improvements in our choice of cardboard products. We also improved our APC rating from 3.3 to 4 out of 5 points in their latest assessment. **G4-16** **SDG 17**

Environmental Performance Indicators

EN3

EN5

EN8

EN15

EN16

EN17

EN18

EN23

Environment	SINGTEL		OPTUS		SINGTEL GROUP	
	2016	2015	2016	2015	2016	2015
Total energy use (GJ)	1,379,633	1,338,904	1,657,262	1,533,360	3,036,895	2,872,264
Energy intensity (GJ/\$million revenue)	180	182	178	155	179	167
(i) Electricity Use (GJ)	1,358,030	1,316,905	1,618,544	1,494,342	2,976,574	2,811,247
Network	920,165	848,989	818,904	801,349	1,739,069	1,650,338
Mobile	235,294	247,855	715,108	610,268	950,402	858,123
Corporate	202,572	220,061	84,532	82,724	287,104	302,786
Electricity Intensity (GJ/\$million revenue)	177	179	174	151	175	163
(ii) Electricity use from renewable sources (GJ)	405	303	463	464	868	768
(iii) Fuel use from non-renewable sources (GJ)	21,198	21,696	38,255	39,018	59,453	60,714
Total carbon emissions (tonnes CO₂ equivalent)¹	174,112	176,454	420,827	402,750	594,938	579,205
(i) Scope 1	4,629	5,947	2,614	2,694	7,243	8,641
Refrigerants	3,174	4,477	N.A. ²	N.A. ²	3,174	4,477
Fuel combustion	525	446	355	252	880	698
Company fleet	929	1,024	2,259	2,442	3,188	3,466
(ii) Scope 2	163,416	164,577	394,249	374,825	557,665	539,402
(iii) Scope 3	6,067	5,931	23,964	25,231	30,030	31,162
Contractor fleet	813	766	4,810	6,954	5,623	7,720
Air travel	3,180	3,141	9,442	8,564	12,621	11,705
Employee commute ³	1,821	1,821	9,712	9,713	11,533	11,534
Retail franchisees	253	202	N.A.	N.A.	253	202
Carbon Intensity (tCO₂e/\$ million revenue)	23	24	45	41	35	34
Total Water Use (m³)	756,398	691,389	70,254⁴	60,422 ⁴	826,652	751,811
Total Waste - hazardous and non-hazardous (tonnes)	4,223	4,015	1,503	1,425	5,726	5,440

Footnotes:

¹ The carbon emissions reported in the table is 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 in Singapore for the relevant time period and from corresponding states in Australia. Scope 1 direct emissions are calculated using the 2010 Guidelines to EFRA/DECC's GHG conversion factors for company reporting (Annex 1). Scope 3 other indirect emissions are calculated using the 2010 Guidelines to conversion factors for DEFRA/DECC's GHG company reporting (Annex 6 and 7).

² Optus uses a combination of air, water and refrigerant cooling systems. Refrigerants are not included in this report for consistency with the reporting requirements set by the Australian National Greenhouse and Energy Reporting Act 2007.

³ Employee commute carbon emissions data will be updated only when there is a significant change in our company's operations or workforce.

⁴ Water use for Optus Sydney campus only.