



Independent Review

Independent review of selected Subject Matter contained in Macquarie Group Limited's 2018 Annual Report

1. Purpose

The purpose of this document is to define the selected Subject Matter (the selected Subject Matter) contained within Macquarie Group Limited's (MGL) 2018 Annual Report and the Carbon and Energy Data FY2018 page located at www.macquarie.com/esg that have been included in the scope of PwC's limited assurance engagement.

2. Scope and the selected Subject Matter

The selected Subject Matter that MGL requested be included within the scope of PwC's limited assurance engagement comprised the following selected corporate sustainability information for the 12 months ending 31 March 2018 (the reporting period):

- a) total electricity consumed from MGL's corporate offices, data centres and base building consumption (where MGL owns and occupies the building) around the world
- b) total direct emissions from refrigerants, natural gas and diesel usage (Scope 1) from MGL's corporate offices and base building consumption (where MGL owns and occupies the building) around the world
- c) total indirect emissions from electricity usage (Scope 2) from MGL's corporate offices, data centres and base building consumption (where MGL owns and occupies the building) around the world
- d) Scope 3 emissions associated with short, medium and long-haul flights procured by MGL
- e) management's assertion that carbon offsets have been purchased and retired for the 2018 reporting period representing a quantity of greenhouse emissions offset greater than the sum of b), c) and d).

3. Basis of preparation

Organisational boundary

Corporate offices and data centres

Macquarie's corporate offices and data centres are defined as:

- offices leased by MGL operating entities globally which are also occupied by MGL staff and have a Net Usable Area (NUA) – the area that can be fitted out by the tenant greater than 100m²
- data centres around the world where MGL has oversight of electricity usage and pays for this usage
- new offices from business acquisitions from the month of acquisition.

The following exclusions have been applied in determining the reporting boundary for corporate offices:

- offices or buildings that are owned or managed by an MGL entity but are not tenanted by Macquarie staff
- serviced offices and data centres used by Macquarie staff where MGL has no oversight of the energy usage of the office or data centre. Energy costs for serviced offices are typically included as part of a service fee
- joint venture offices (where the joint venture is the only Macquarie related occupant of the office). Joint venture offices are defined as offices where Macquarie staff may be located as part of a joint venture business activity but where Macquarie has limited ability to influence the operation of these offices and does not have oversight of the data required to calculate greenhouse gas (GHG) emissions.

Base building

Macquarie's base buildings are defined as:

- offices or buildings where Macquarie owns and occupies the building. Base building energy refers to the energy required to operate the mechanical plant, lifts and lighting in the lobby and other communal areas.

The following exclusions have been applied in determining the reporting boundary for base buildings:

- energy use in this category excludes tenanted energy use in Macquarie owned and operated buildings.

Business air travel

Business air travel is defined as travel ticketed through Macquarie's Travel Management Companies for the primary purpose of business. Where business trips booked through Macquarie's Travel Management Companies include staff-funded spousal travel or personal leisure arrangements made as an aside to a business trip, this has been included in 'business air travel'.

Calculating and measuring GHG emissions and energy use

Energy use and GHG emissions

Direct emissions associated with diesel, natural gas and refrigerants usage (Scope 1 emissions)

Approximately 74 percent of Scope 1 emissions data for the reporting period was obtained directly from actual meter usage data, supplier or landlord invoices. The remaining Scope 1 emissions within the organisational boundary were estimated as follows:

- Diesel usage - where no tank meter readings were available, fuel usage was estimated based on engine performance data from diesel generator data sheets.
- Natural gas usage - where no invoiced data was available, usage was estimated based on usage in comparable office.
- Refrigerants - emissions associated with refrigerant usage were estimated based on refrigerant charge and leakage rates in accordance with the *National Greenhouse and Energy Reporting (Measurement) Determination*.

Emission factors outlined in *Measurement of GHG emissions* have then been applied to determine the equivalent direct emissions associated with diesel and natural gas consumed (Scope 1 emissions).

Total electricity consumed

Approximately 87 percent of the electricity data for the reporting period was obtained directly from actual tenancy or building data. The remaining 13 percent of energy consumption was estimated by one of the following:

- where invoiced data existed for an office for part of the reporting period, determining daily electricity consumed for that part of the reporting period and extrapolating this out to the remainder of the reporting period for that office
- where historical data exists for the office this is used to estimate the electricity consumed for the reporting period
- where no invoice data was available for a particular office, estimating electricity consumed for that office based on the Net Lettable Area of the office and the average electricity consumption per square metre of other offices in the same region.

Emission factors outlined in *Measurement of GHG emissions* have then been applied to determine the equivalent indirect emissions associated with electricity consumed (Scope 2 emissions).

Other indirect emissions associated with business air travel (Scope 3 emissions)

Air travel data was based on reports provided by International SOS, the organisation contracted to track MGL staff travel and provide emergency assistance where required.

Emission factors outlined in *Measurement of GHG emissions* have then been applied to mileage to determine the equivalent indirect emissions associated with business air travel (Scope 3 emissions).

Measurement of GHG emissions

The following emissions factors have applied in calculating GHG emissions (tonnes CO₂-e):

Component	Reference documents
Australia <i>Electricity, Natural Gas, Refrigerants & Diesel</i>	<i>National Greenhouse and Energy Reporting (Measurement) Determination 2008</i> and subsequent amendments for the calculation of greenhouse gas (GHG) emissions.
New Zealand <i>Electricity</i>	Ministry of Business Innovation and Employment - Carbon dioxide equivalent emission factors for electricity generation and consumption
United Kingdom <i>Electricity & Natural Gas</i>	Department for Environment Food and Rural Affairs (DEFRA) 2017 Government GHG Conversion Factors for Company Reporting: Methodology Paper for Emission Factors.
United States <i>Electricity</i> <i>Natural Gas</i> <i>Diesel</i>	Emissions & Generation Resource Integrated Database (eGRID) (2016) The Climate Registry Information System (CRIS) (2016) <i>National Greenhouse and Energy Reporting (Measurement) Determination 2008</i> and subsequent amendments for the calculation of greenhouse gas (GHG) emissions.
Canada & Mexico <i>Electricity</i>	The Climate Registry Information System (CRIS) (2016)
Brazil, UAE, China, India, Indonesia, Philippines, Singapore, South Korea and Thailand <i>Electricity</i>	Institute for Global Environmental Strategies (IGES) GHG Emissions Data (2017)
Austria, France, Germany, Ireland, Luxembourg, Netherlands, Spain & Switzerland <i>Electricity</i>	Association of Issuing Bodies - European Residual Mixes 2016: <i>Results of the calculation of Residual Mixes for purposes of electricity disclosure in Europe for the calendar year 2016 Version 1.2, 15th June 2017</i>
Taipei <i>Electricity</i>	Taiwan - Bureau of Energy, Ministry of Economic Affairs, R.O.C (2016)
Japan <i>Electricity</i>	"Calculation methods and emission coefficients list in Accounting and Reporting System" (2015) - Ministry of Economy Trade and Industry (Japan)
Hong Kong <i>Electricity</i>	HK Environmental Protection Department – "Guidelines to Account for and Report on Greenhouse Gas Emissions and Removals for Buildings (Commercial, Residential or Institutional Purposes) in Hong Kong" (2010)
South Africa <i>Electricity</i> <i>Diesel</i>	Institute for Global Environmental Strategies (IGES) GHG Emissions Data (2017) <i>National Greenhouse and Energy Reporting (Measurement) Determination 2008</i> and subsequent amendments for the calculation of greenhouse gas (GHG) emissions.
Malaysia <i>Electricity</i> <i>Diesel</i>	Institute for Global Environmental Strategies (IGES) GHG Emissions Data (2017) <i>National Greenhouse and Energy Reporting (Measurement) Determination 2008</i> and subsequent amendments for the calculation of greenhouse gas (GHG) emissions.
Air travel	Department for Environment Food and Rural Affairs (DEFRA) 2017 Government GHG Conversion Factors for Company Reporting: Methodology Paper for Emission Factors.

Scope 2 emissions factors used for Australian and The Americas offices, and Scope 3 emissions factors for all air travel include greenhouse gases in addition to carbon dioxide and are expressed in carbon dioxide equivalents (CO₂-e) as stipulated within the associated reference documents. Scope 2 emission factors used for the United Kingdom and remaining office locations only comprise carbon dioxide emissions (CO₂) as stipulated within the reference documents. The jurisdictional variance in approaches to Scope 2 methodology had no material effect on outcome.

Carbon offsets purchased and retired

All carbon offsets purchased were registered under the international Gold Standard issued by the Gold Standard Foundation, Voluntary Carbon Standard issued by the VCS Association or US Climate Action Reserve protocol.



Independent Limited Assurance Report to the Directors of Macquarie Group Limited over selected Carbon and Energy Data reported for the 12 months ending 31 March 2018

Scope

In accordance with the terms of engagement letter dated 29 March 2018, we were engaged by Macquarie Group Limited (**MGL**) to perform an independent limited assurance engagement in respect of selected subject matter (the **Subject Matter**) reported within the Environmental Social and Governance Section of MGL's Annual Report and the *Carbon and Energy Data FY2018* page located at www.macquarie.com/esg for the 12 months ended 31 March 2018 (the **period**).

The Subject Matter was chosen by MGL and comprises:

- a) Total electricity consumed from MGL's corporate offices, data centres and base building consumption (where MGL owns and occupies the building) around the world;
- b) Total emissions (tCO₂-e), which comprise:
 - Scope 1 emissions from MGL's corporate offices, data centres and base building consumption (where MGL owns and occupies the building) around the world (tCO₂-e);
 - Scope 2 emissions from electricity usage from MGL's corporate offices, data centres and base building consumption (where MGL owns and occupies the building) around the world (tCO₂-e);
 - Scope 3 emissions associated with short, medium and long-haul flights procured by MGL (tCO₂-e); and
- c) Management's assertion that carbon offsets have been purchased and retired for the reporting period representing a quantity of greenhouse emissions offset greater than total emissions noted in point b above.

The criteria (the **Criteria**) against which we assessed the Subject Matter are the definitions and approaches presented within the *Independent Review* page located at www.macquarie.com/esg, as at 4 May 2018.

MGL's responsibilities

The Management of MGL are responsible for the Subject Matter and for the preparation of the Subject Matter in accordance with the Criteria.

Our Independence and Quality control

We have complied with relevant ethical requirements related to assurance engagements, which include independence and other requirements founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour.

In accordance with Auditing Standard ASQC 1 *Quality Control for Firms that Perform Audits and Reviews of Financial Reports and Other Financial Information, Other Assurance Engagements and Related Services Engagements* the firm maintains a comprehensive system of quality control

PricewaterhouseCoopers, ABN 52 780 433 757
One International Towers Sydney, Watermans Quay, Barangaroo NSW 2000
T: +61 2 8266 0000, F: +61 2 8266 9999, www.pwc.com.au

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including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Our responsibilities

Our responsibility is to express a limited assurance conclusion based on the procedures we have performed and the evidence we have obtained.

Our engagement has been conducted in accordance with the Australian Standard on Assurance Engagements (ASAE 3000) *Assurance Engagements Other Than Audits or Reviews of Historical Financial Information* and the Australian Standard on Assurance Engagements (ASAE 3410) *Assurance Engagements on Greenhouse Gas Statements*. These standards require that we plan and perform this engagement to obtain limited assurance about whether anything has come to our attention to indicate that the Subject Matter has not been prepared, in all material respects, in accordance with the Criteria, for the Period. The procedures we performed were based on our professional judgement and included:

- enquiries of management
- analytical procedures
- testing of selected data to source information
- re-performance of calculations
- walk-through of key processes and controls
- testing over the consolidation and reporting process applied by MGL

The procedures performed in a limited assurance engagement vary in nature and timing from, and are less in extent than for, a reasonable assurance engagement and consequently the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had a reasonable assurance engagement been performed. Accordingly, we do not express a reasonable assurance opinion.

We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our conclusion.

Use of report

This report was prepared for the Directors of MGL. We disclaim any assumption of responsibility for any reliance on this report to any persons or users other than Directors of MGL, or for any purpose other than that for which it was prepared.

Inherent limitations

Because of the inherent limitations of any non-financial performance information, given both its nature and the methods used for determining, calculating and estimating such information, it is possible that fraud, error or non-compliance may occur and not be detected. A limited assurance engagement is not designed to detect all instances of non-compliance of the Subject Matter with the Criteria, as it is limited primarily to making enquiries, of the Management of MGL, and applying analytical procedures. The limited assurance conclusion expressed in this report has been formed on the above basis.



This report relates to Subject Matter contained in the Environmental Social and Governance Section of MGL's Annual Report and the *Carbon and Energy Data FY2018* page located at www.macquarie.com/esg for the 12 months ended 31 March 2018. The Management of MGL are responsible for the integrity of MGL's website. We have not been engaged to report on the integrity of MGL's website. This report refers only to the Subject Matter described above. It does not provide an opinion on any other information which may have been hyperlinked to or from these statements.

Conclusion

Based on our review, which is not an audit, nothing has come to our attention that causes us to believe that the Subject Matter has not been prepared, in all material respects, in accordance with the Criteria for the 12 months ended 31 March 2018.

PricewaterhouseCoopers

PricewaterhouseCoopers

John Tomac

John Tomac
Partner

Sydney
4 May 2018

Carbon and energy data FY2018



	Units	Baseline (1)	FY11	FY12	FY13	FY14	FY15	FY16	FY17(2)	FY18	Change		
											Prior Year %	Baseline %	
Scope 1 Direct	Diesel generator, natural gas and refrigerant emissions ⁽³⁾	tCO2-e	-	-	-	-	-	-	-	433	490	13	-
Scope 2 Indirect	Electricity emissions:	tCO2-e											
	— corporate offices and data centres ⁽⁴⁾		49,632	51,941	52,497	46,499	42,389	41,699	38,876	36,322	34,361	(5)	(31)
	— base buildings ⁽⁵⁾		-	-	-	-	-	1,558	2,188	1,946	1,799	(8)	n/a
	Total electricity emissions		49,632	51,941	52,497	46,499	42,389	43,257	41,064	38,267	36,160	(6)	(27)
Scope 3 Indirect	Business air travel emissions ⁽⁶⁾	tCO2-e	78,018	79,330	73,260	63,334	48,870	41,954	40,721	36,674	40,277	10	(48)
Total Indirect Emissions	Total Scope 2 and Scope 3 ⁽⁷⁾	tCO2-e	128,941⁽¹⁾	131,271	125,757	109,833	91,259	85,211	81,785	74,941	76,436	2	(41)
Total emissions	Total Scope 1,2 and Scope 3	tCO2-e	128,941⁽¹⁾	131,271	125,757	109,833	91,259	85,211	81,785	75,374	76,926	2	-
Energy	Total Macquarie energy use ⁽³⁾	TJ	237	268	275	243	231	228	215	208	202	(3)	(15)

		Units	Baseline (1)	FY11	FY12	FY13	FY14	FY15	FY16	FY17 ⁽²⁾	FY18	Change		
												Prior Year %	Baseline %	
Per Capita Emissions	Electricity emissions per capita:	tCO2-e per person												
	— corporate offices and data centres		3.93	3.35	3.55	3.4	3.05	2.97	2.70	2.67	2.41	(10)	(38)	
	— base buildings		–	–	–	–	–	0.11	0.15	0.14	0.13	(12)	14	
	Total emissions per capita		3.93	3.35	3.55	3.4	3.05	3.08	2.86	2.81	2.54	(10)	(35)	
	Business air travel emissions per capita	tCO2-e per person	5.34	5.11	4.95	4.64	3.51	2.99	2.83	2.70	2.83	5	(47)	

(1) Note that the baseline for Scope 2 electricity emissions is FY2009 while, due to data availability, the baseline for Scope 3 business air travel emissions is FY2010. Total Scope 2 and Scope 3 emissions reductions are calculated based on a FY2010 baseline.

(2) Some numbers in this column have been revised from last year's Annual Report to reflect updated invoice data.

(3) Scope 1 emissions and associated energy use were not reported prior to FY2017. Scope 1 emissions are not considered material, comprising <1% of total reported emissions.

(4) Macquarie corporate offices and data centres are defined as:

- space leased by Macquarie operating entities that are also occupied by Macquarie staff and have a Net Usable Area greater than 100m²
- data centres where Macquarie Group has oversight of electricity usage and pays for this usage
- new space from business acquisitions from the month of acquisition
- including Australian and international corporate offices.

(5) Base building refers to the energy required to operate a building and excludes tenanted energy use. It includes the mechanical plant, lifts, and lighting in lobby and other common areas. Base building applies only where Macquarie owns and occupies the building. This comprises 50 Martin Place and 9-19 Elizabeth Street Sydney.

(6) Business air travel is defined as travel ticketed through Macquarie's Travel Management Companies for the primary purpose of business.

(7) Since 2010, Macquarie has maintained its carbon neutral commitment by reducing and offsetting emissions from its office energy use and business air travel. In FY2018, to meet this commitment, Macquarie purchased and retired a diverse portfolio of voluntary carbon offsets.