

Green Finance Impact Report

2019





Introduction

Macquarie Group Limited (“Macquarie”) is pleased to present its first Green Finance Impact Report for the nine months to 31 March 2019¹.

This report relates to Macquarie’s GBP 2,100 million loan facility of which GBP 500 million constitutes green financing (“green tranches”). It provides information on the environmental benefits (“green impact”) of the eligible projects² which have been notionally allocated³ green tranche financing.

The approach presented in this report is consistent with [Macquarie’s Green Finance Framework](#) (“GFF”) which was developed in accordance with the APLMA⁴ Green Loan Principles. Macquarie has utilised the expertise of the Green Investment Group (“GIG”) Green Investment Ratings team to demonstrate the green impact of its eligible projects. The full Impact Report is available in Appendix 1.

The GIG was formed in 2017, following Macquarie’s acquisition of the UK’s Green Investment Bank. The fully integrated business brought together the Green Investment Bank and Macquarie Capital’s existing renewable team to create a global leader in green investment, dedicated to supporting the growth of the global green economy. GIG is a specialist in green energy principal investment, project delivery and portfolio management and related services.

¹ This report is dated to 31 March 2019 to align with Macquarie’s financial year end.

² See glossary for definition of eligible projects.

³ See glossary for definition of notional allocation.

⁴ Asia Pacific Loan Market Association.

Summary of green metrics

Macquarie's focus on green energy saw over 90 projects under development or construction as at 31 March 2019, with Macquarie acting in a range of roles including co-developer, financial adviser and equity investor across these projects.

The green impact and associated metrics referenced throughout this report:

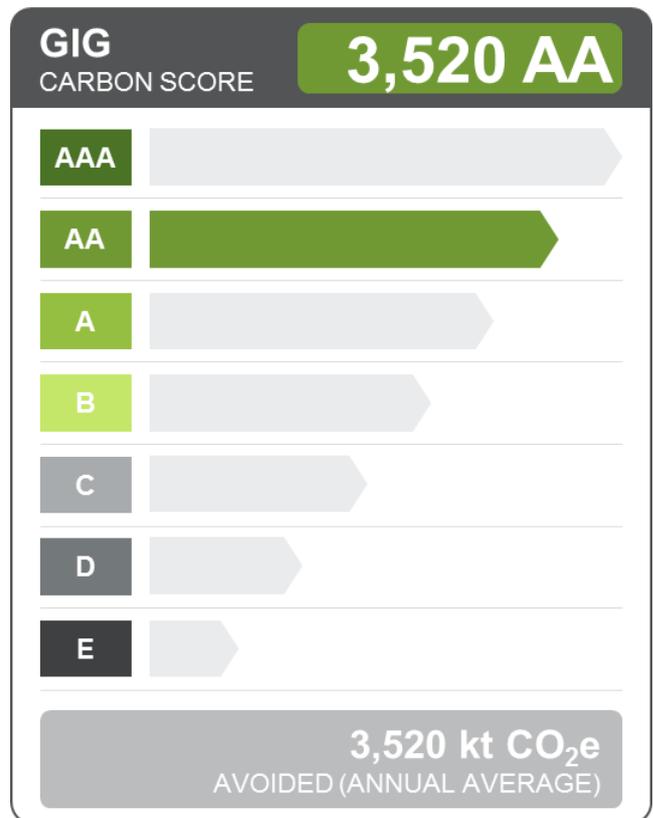
1. incorporate all the eligible projects which have been notionally allocated green tranche financing from the drawdown date, 26 July 2018, to 31 March 2019. This is in line with the Green Loan Principles and allows full transparency and disclosure of each project that has been supported by the green tranches.
2. reflect the total green impact derived from 100% of those projects that have been notionally allocated green tranche financing, and not just the proportional impact of the green tranches. This approach has been adopted, as the GFF's 'Management of proceeds' described on page 8 does not support proportional allocation due to the revolving allocation of the use of proceeds (i.e. as above, projects may not necessarily be supported by the facility for the entire reporting period).

GIG Carbon Score

A recent innovation from the Green Investment Ratings team is the GIG Carbon Score. While other measures of GHG emissions only consider the emissions produced during a project's operational phase, the GIG Carbon Score also considers the emissions across the project's entire lifecycle.

The rating shows the aggregated GIG Carbon Score for Macquarie's green tranches is 3,520 AA. The rating of AA is due to the location of some of the eligible projects in lower carbon intensive grids (e.g. UK and Sweden). A higher rating of AAA could be achieved by projects in countries with higher carbon intensive grids, which would therefore avoid greater GHG emissions.

The GIG Carbon Score shows the quantified greenhouse gas emissions avoided (3,520 kt CO₂e/yr) combined with GIG's Carbon Rating (AA), which indicates the portfolio lifecycle emissions avoided relative to the counterfactual (a scenario in which the projects were not built).⁵ This globally applicable approach allows investors to compare the relative performance of projects using an emissions avoided measure. Full details of the GIG Carbon Score methodology is provided within the Green Impact Report in Appendix 1.



⁵ For renewable energy projects, the GIG Carbon Score is a measure of a project's lifecycle GHG emissions compared to the emissions of energy taken from the local grid.

Renewable energy capacity



627 MW
of **renewable energy** in **development**



783 MW
of **renewable energy** in **construction**



610 MW
of **renewable energy** in **operation**

The **portfolio** is forecast to produce almost

7,000 GWh per year
enough to **power over 1.1 million households** for a year

Calculated using the average household electricity data for the relevant country of the underlying projects available from the World Energy Council, and based on 2014 data (see <https://www.worldenergy.org/data/>)

The **portfolio** is forecast to avoid greenhouse gas emissions of

3,520 kt CO₂e per year
equivalent to **taking over 700,000 cars off the road for a year**

Calculated using the US EPA Greenhouse Gas Equivalencies Calculator (see <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>)



Macquarie's green financing transaction

Climate change and the associated legislative and regulatory responses present significant challenges for society and the global economy. Green financing has an important role to play in supporting the global energy transition, and investor appetite for these products is rising.

In June 2018, Macquarie issued a GBP 2,100 million loan facility of which GBP 500 million constitutes green financing. The green tranches were issued in accordance with Macquarie's GFF. The GFF was established to demonstrate how Macquarie and its entities intend to enter into green financing transactions⁶ to fund projects that will deliver environmental benefits to support Macquarie's business strategy.

The details of the GBP 500 million green tranches are as below:

	Tranche A1	Tranche B1
Issuer	Macquarie Group Limited	Macquarie Group Limited
Issue Date	13 June 2018	13 June 2018
Maturity Date	13 June 2021	13 June 2023
Tenor	3 years	5 years
Total Volume	GBP 250m	GBP 250m
Structure	Revolver	Term
Drawdown date	Not applicable	26 July 2018
Drawn Volume as at 31 March 2019	0	GBP 250m
Use of Proceeds	In accordance with Macquarie's Green Finance Framework	In accordance with Macquarie's Green Finance Framework

⁶ See glossary for definition of green financing transactions.

From the drawdown date to 31 March 2019, the amount notionally allocated to eligible projects was GBP 250m. This amount represents the drawn B1 tranche. The A1 tranche remained undrawn throughout the reporting period and therefore was not allocated to eligible projects.

The eligible projects which have been notionally allocated funding from the green tranches are summarised in the following table.

Eligible projects	Location	Technology	Stage	Percentage of Macquarie funding ⁷	Total energy capacity (MW)	Total GHG emissions avoided (kt CO ₂ e/yr) ⁸
Canadian Breaks	US	Onshore Wind	Construction	100% ⁹	200	426
Överturingen Wind Park	Sweden	Onshore Wind	Construction	100% ⁹	235	33
Energy Pratham Godo Kaisya	Japan	Solar PV	Pre-construction	100%	12	6
Formosa I	Taiwan	Offshore Wind	Construction	50% ⁹	120	253
Formosa II	Taiwan	Offshore Wind	Pre-construction	75%	376	767
Rampion Offshore Windfarm	UK	Offshore Wind	Operational	25%	400	577
Lal Lal Wind Farm	Australia	Onshore Wind	Construction	20%	228	482
Nagano Solar Farm	Japan	Solar PV	Pre-construction	100%	18.6	12
Tochigi Solar Farm	Japan	Solar PV	Pre-construction	100%	16.4	9
Murra Warra Wind Farm 2	Australia	Onshore Wind	Pre-construction	50%	204	603
Westermost Rough Offshore Windfarm	UK	Offshore Wind	Operational	50%	210	354
Total					2,020	3,522

⁷ Reflects the share of the projects funded by Macquarie at the time of allocation.

⁸ Total GHG emissions avoided are based on 100% of those projects that have been notionally allocated green tranche financing. GIG has assessed the weighted average green impact forecast accuracy for the portfolio at Level 3 (Good). Refer to the Green impact section on page 9 for further information.

⁹ The funding percentage was subject to variation during the reporting period. As of March 2019, Macquarie funding to Överturingen Wind Park, Formosa I and Canadian Breaks was 50%, 25% and 0%, respectively.



Approach

The GFF under which the green tranches were issued was developed in accordance with the APLMA Green Loan Principles. It was supported by a Second Opinion External Review by Sustainalytics and was noted to be credible and impactful.

The framework is based on four core components

1. use of proceeds
2. process for project evaluation and selection
3. management of proceeds
4. reporting

Use of proceeds

Under the GFF, the use of proceeds of each green financing transaction is notionally allocated against the financing or re-financing of eligible projects which provide clear environmental benefits.

The GFF explicitly recognises several broad categories of eligibility for projects with the objective of addressing key areas of environmental concern such as climate change, natural resources depletion, loss of biodiversity, and air, water and soil pollution.

The proceeds from the green tranches have so far been applied towards financing solar, offshore wind and onshore wind projects across the globe. Going forward, we may extend the use of loan proceeds to support further renewable energy, energy efficiency, waste management, green buildings and clean transportation projects.

Activities and lending to an industry or technology which directly involves fossil fuels, nuclear or biomass suitable for food production are specifically excluded under the GFF.

Process for project evaluation and selection

Macquarie has established a Green Finance Working Group ("GFWG") who have responsibility for governing and implementing the GFF. The GFWG currently comprises representatives from the Environmental and Social Risk ("ESR") team and the GIG Green Investment Ratings team who hold the in-house green expertise, as well as representatives from Group Treasury and Macquarie Capital.

Business units will identify potential eligible projects based on the criteria in the GFF's use of proceeds. Potential eligible projects are submitted to the GFWG for review and confirmation that they qualify under the GFF. This includes the preparation of a suitable Green Opinion¹⁰ provided by the GIG Green Investment Ratings team where appropriate.

The Green Investment Ratings team is responsible for confirming that the projects:

- fall within one of the eligible project categories defined in the GFF
- are anticipated to provide clear environmental sustainability and/or climate change mitigation benefits in terms of the contribution to one or more of GIG's Green Purposes¹¹.

In addition to meeting the green loan eligibility criteria, all projects are assessed under Macquarie's group-wide ESR policy and ESR assessment tool during the investment decision process. The ESR policy and tool provide a robust due diligence process and evaluate ESR issues including labour and employment practices, climate change, human rights, resource efficiency, pollution prevention, biodiversity and cultural heritage. The approach is based on international guidelines including the International Finance Corporation Performance Standards.

Management of proceeds

The proceeds of the green tranches have not been credited to a dedicated account and are rather deposited in Macquarie's general funding accounts. We have developed an internal governance process to notionally allocate proceeds against eligible projects in an appropriate manner (as required in the Green Loan Principles). Through the GFWG, Macquarie maintains a register of green financing transactions and eligible projects and has implemented a monitoring and reporting process to ensure that:

- the total funding required¹² for eligible projects is greater than the outstanding principal amounts due on green financing transactions
- eligible projects are owned within the consolidated entity¹³ which raises the green financing transaction that is notionally allocated against the eligible projects
- eligible projects do not have other financing (a) secured¹⁴ against them, or (b) attributable to them in respect of another 'use of proceeds' obligation.

Reporting

This report is designed to outline Macquarie's compliance with the GFF and contain information on the allocation reporting and impacts of outstanding green financing transactions. The report is publicly available on Macquarie's website and will be revised annually.

Assurance

PwC has been engaged to provide independent assurance over Macquarie's compliance with the obligations contained within its GFF over the reporting period.

Claims relating to the green impact estimated in relation to the GFF were outside the scope of PwC's assurance engagement.

¹⁰ Green Opinion is an opinion provided by the Green Investment Ratings Team on the prospective transaction. It includes information on the anticipated environmental sustainability and/or climate change mitigation benefits of the projects to be financed by the transaction and will be a requirement for any transaction included in the eligible projects' portfolio.

¹¹ As listed in GIG's Green Investment Principles, available from www.greeninvestmentgroup.com/green-impact.

¹² This is calculated as the legal commitment Macquarie has agreed to invest in an eligible project as reflected in contractual arrangements entered into by Macquarie, irrespective of whether the commitment is drawn or undrawn. This includes, but is not necessarily limited to, the purchase price for an eligible project, the total committed exposure to an eligible project or an equity contribution to an eligible project.

¹³ Macquarie Group Limited and its subsidiaries.

¹⁴ Secured in this instance is defined as projects where external financing is either secured against Macquarie's investment (with no letter of credit in place) or has recourse back to Macquarie.

Green impact

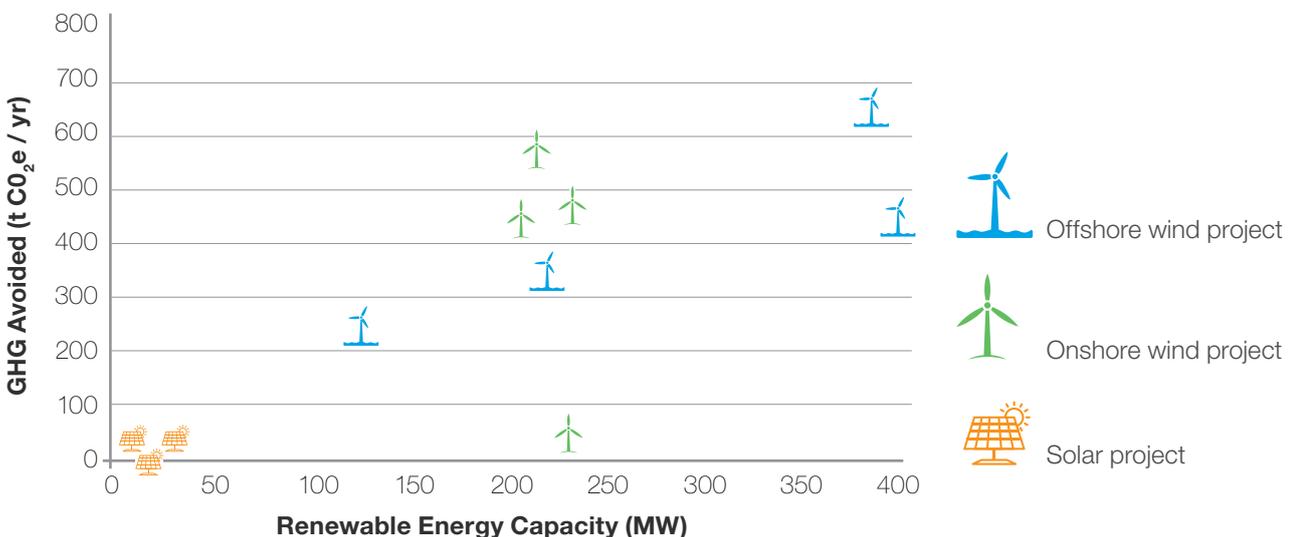
GIG (and formerly GIB) has been a pioneer in the development of green impact reporting since 2012. The Green Investment Ratings team provides advice and data insights to investors by measuring the transition to a global greener economy and promoting the environmental benefits of investing into green infrastructure.

Macquarie has utilised the expertise of the GIG Green Investment Ratings team to demonstrate the green impact of the proceeds from the green tranches. In line with the Green Loan Principles, the green impact has been calculated for all the projects to which proceeds have been notionally allocated green tranche financing from the drawdown date to 31 March 2019. This allows full transparency and disclosure of each green project that has been supported by the GFF. The full Impact Report is available in Appendix 1.

Forecasted green impact of eligible projects

GHG emissions avoided (carbon dioxide equivalent)		
Average annual	3,520	kt CO ₂ e / yr
Remaining lifetime	82,223	kt CO ₂ e
Other emissions to air avoided (oxides of nitrogen)		
Average annual	4,706	t NO _x / yr
Remaining lifetime	110,805	t NO _x
Fossil fuels consumption avoided (oil equivalent)		
Average annual	1,328	kt oe / yr
Remaining lifetime	30,955	kt oe

The forecasts are based on the total green impact derived from 100% of those projects that have been notionally allocated green tranche financing, and not just the proportional impact of the green tranches.



Green impact forecast accuracy

Green impact forecast accuracy is an assessment of the level of confidence that can reasonably be placed on the accuracy of any quantified green impact forecast. GIG have assessed the weighted average green impact forecast accuracy for the portfolio at Level 3 (Good). The forecasts and green impact forecast accuracy are subject to the methodology, assumptions, limitations and methods set out in Appendices 2 and 3 of the Impact Report.

The majority of the projects within the portfolio are in development (with some potential for design and capacity change), or in construction and as such actual performance is unknown. This results in a Level 3 (Good) green impact forecast accuracy which is likely to improve as more projects become operational and there is more confidence in the quantified green impact metrics.



The GIG Green Impact Report

The GIG Green Impact Report, which uses GIG's robust green impact methodology, provides best-practice green impact performance disclosure. The report has unique features developed using GIG's proprietary methodology and shows quantified, globally comparable green performance data for a project or portfolio including:

- greenhouse gas emissions avoided, calculated according to the internationally harmonised approach for greenhouse gas accounting¹⁵
- metrics for avoided fossil fuel consumption (tonnes of oil equivalent), air pollutant emissions (nitrous oxides, oxides of sulphur, particulate matter), and, where applicable, waste to landfill avoided and materials recycled and recovered
- a measure of accuracy of the forecast green impact, derived from project technology type, stage of project development, location of the project/country governance, and input data quality
- the performance against the UN Sustainable Development Goals ("SDGs") and their associated targets. Targets to which the portfolio (or project) directly contributes, and those Targets to which the portfolio or project indirectly contributes.

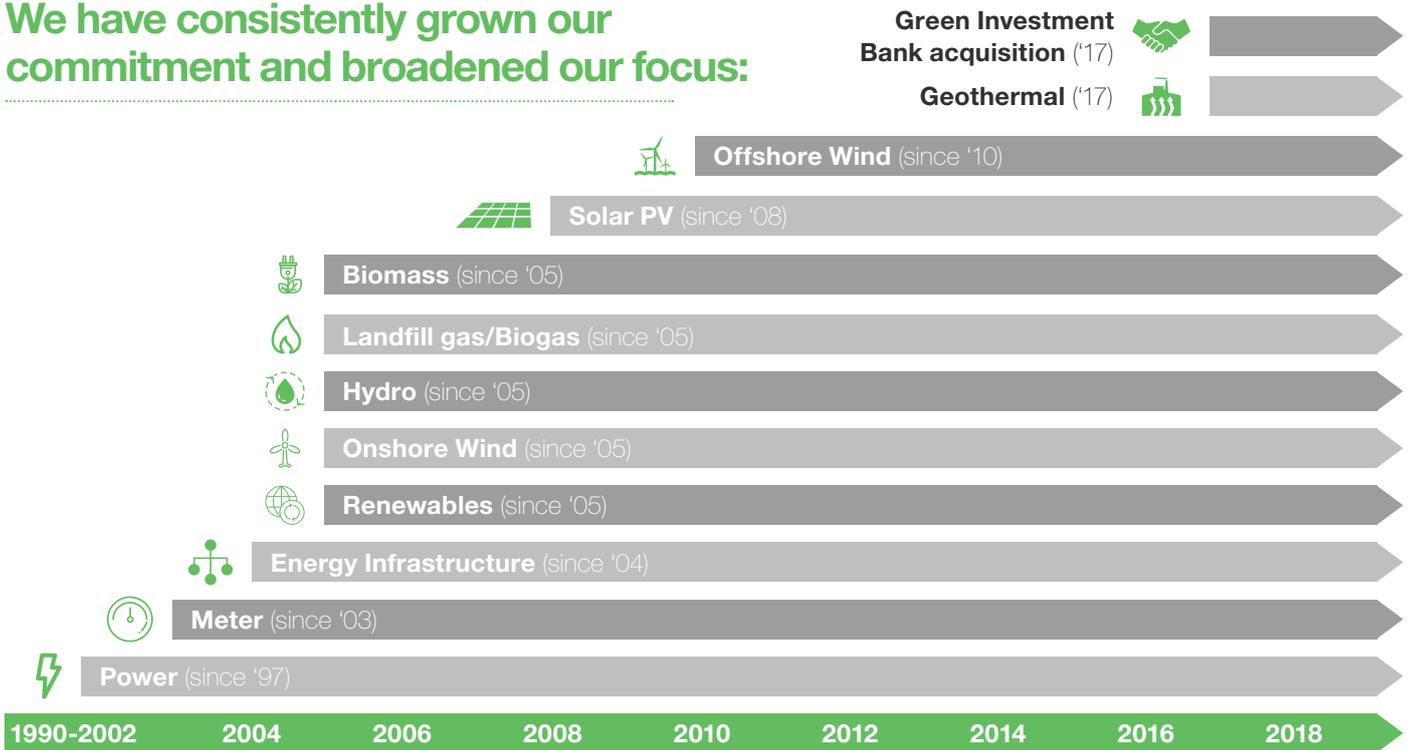
¹⁵ The GHG Protocol for Project Accounting - www.ghgprotocol.org/standards/project-protocol

Macquarie and green investment

Macquarie is a global diversified financial group providing asset management, leasing and asset financing, retail banking and wealth management, market access, commodity trading, corporate advisory and principal investment. The diversity of our operations, combined with a strong capital position and robust risk management framework, has contributed to our 50-year record of unbroken profitability.

Macquarie has a substantial and longstanding commitment to the renewable energy sector, supporting the transition to a lower carbon economy by servicing clients across various renewable energy technologies including solar, wind, waste to energy, bioenergy and energy efficiency.

We have consistently grown our commitment and broadened our focus:



Drawing on our global network, sector expertise and strong record, Macquarie provides a diverse range of products and services with an ESG focus to corporate, government and institutional clients. Our activities span the investment cycle from research on alternative energy to tailored capital solutions for the development and construction of renewable assets.

Principal investment

- investment in development projects, platforms and businesses
- debt and equity investment
- asset financing, including demand side management, energy efficient assets, distributed generation and battery storage and electric vehicles

Advisory

- financial advisory
- debt and equity arrangement
- green financial institution advisory
- green impact assesment, reporting and ratings

Asset management

- real asset management, including green infrastructure
- securities investment management and structured access to funds
- equity-based products and alternative

Trading

- emission allowances and renewable energy certificates
- inventory financing for environmental markets
- derivative financing for renewable energy projects
- environmental risk management solutions

Research

- specialist ESG and alternative energy research
- corporate and investor ESG engagement programmes

Onshore wind

As the cost of renewable energy continues to fall, governments around the world look to maintain investment and capacity growth while reducing reliance on traditional subsidies. In this challenging environment, Macquarie was able to bring a number of onshore wind developments to financial close, utilising innovative corporate power purchase agreements (PPAs).

With partners SCA Energy AB, GIG commercialised, structured and financed Överturingen Wind Park – a 235 MW onshore wind development in central Sweden. The project is underpinned by a fixed-volume PPA with Norsk Hydro, one of the largest aluminium companies in the world. With a term of 29 years, the PPA is understood to be one of the longest corporate wind energy PPAs in the world.

In the US, GIG successfully developed and commercialised Canadian Breaks, a 200 MW onshore wind farm which will help avoid 450 kt CO₂e per year. The use of long-term power contracts enabled GIG to deliver a robust project structure in an area with exceptional natural wind resources but a constrained transmission system. Macquarie Capital provided 100% of the sponsor equity.

In Australia, Macquarie Capital also made significant investments in Lal Lal Wind Farms and the Murra Warra Wind Farm.

The structuring applied to these projects allows renewable energy generated from intermittent sources to not only compete with fossil fuel generation on cost, but also on reliability. It is one way in which commercial PPAs can improve the attractiveness of renewable generation, helping to support efficient investment in new infrastructure as subsidy revenues diminish.



Offshore wind

Macquarie's Green Investment Group is a leading non-utility investor in offshore wind. In the UK – the world's leading offshore wind market - GIG has backed approximately 50% of the country's installed capacity including the 400 MW Rampion and 210 MW Westermost Rough developments.

From the established offshore wind markets of Western Europe, the sector is now growing into new and emerging markets across Asia where the growing need for power is creating real opportunity for low carbon investment. Together with Swancor, Taiwan's leading offshore wind developer, and other partners, Macquarie is developing the Formosa offshore wind projects, which will add an additional 1.9 GW of renewable energy into the Taiwanese market.

Formosa I is Taiwan's first operational offshore wind project. Developed alongside Swancor and Ørsted, the first phase of 8 MW has been successfully operating for over 12 months, with the second phase of 120 MW due to complete construction in late 2019.

Formosa II is a further development project with Swancor and a diverse set of local partners. It has a total planned installed capacity of 376 MW and will supply power to approximately 380,000 households by 2021.

Solar

The falling cost of solar generation is making the technology increasingly competitive and attractive to utilities, independent power producers and corporates. Innovations, such as co-location with storage, are also increasing the flexibility of our energy system, enabling an ever-higher integration of solar power.

A regulatory shift provided the perfect backdrop for Macquarie Capital to acquire two solar assets from Trina Solar under a PPA. The assets are located in Nagano and Tochigi, Japan, and have a joint capacity of 35 MW.



Glossary

CO ₂ e	Carbon dioxide equivalent; a unit of measurement used to compare emissions from various greenhouse gases relative to their global-warming potential.
counterfactual	A scenario in which the eligible projects were not built.
eligible projects	<p>Eligible projects refer to projects which fall within the categories below and which are or have been originated by the various business units of Macquarie.</p> <ul style="list-style-type: none"> • renewable energy • energy efficiency • waste management • green buildings • clean transportation
ESR	Environmental and Social Risk
GFF	Macquarie's Green Finance Framework
GFWG	Green Finance Working Group
GHG	Greenhouse Gases
GIG	Green Investment Group
green finance transactions	These include bonds, loans and other debt or financing structures which support eligible projects, as defined in the GFF.
green impact	Environmental benefits of the use of proceeds of the green tranches.
green opinion	Opinion provided by the Green Investment Ratings team on the eligible project. It includes information on the anticipated environmental sustainability and/or climate change mitigation benefits of the project. A green opinion is a requirement for any project to be considered eligible in respect of the green tranches.
green tranches	The tranches of the MGL GBP 2,100 million loan facility which constitute as green financing. This includes tranches A1 and B1, totaling GBP 500 million.
Kt	Kilotonne, equal to 1000 kilograms.
legal commitment	The dollar amount Macquarie has agreed to invest in an eligible project as reflected in contractual arrangements, irrespective of whether the commitment is drawn or undrawn. This includes, but is not necessarily limited to, the purchase price for an eligible project, the total committed exposure to an eligible project or an equity contribution to an eligible project.

MW	Megawatt is a unit for measuring electrical power, equal to one million watts
notional allocation	<p>The allocation of outstanding green financing to eligible projects at any point during the reporting period (not just as at 31 March 2019) irrespective of whether the legal commitment of the eligible project is drawn.</p> <p>While notional allocations can be made against undrawn funding, we have been careful to allocate against drawn balances only in order to ensure the greatest green impact.</p>
PPAs	Power purchase agreements
SDGs	United Nations Sustainable Development Goals
reporting period	The period from July 2018 (first drawdown date) to March 2019.

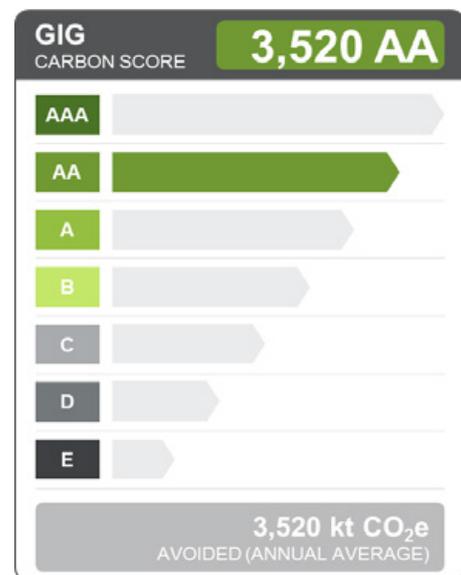
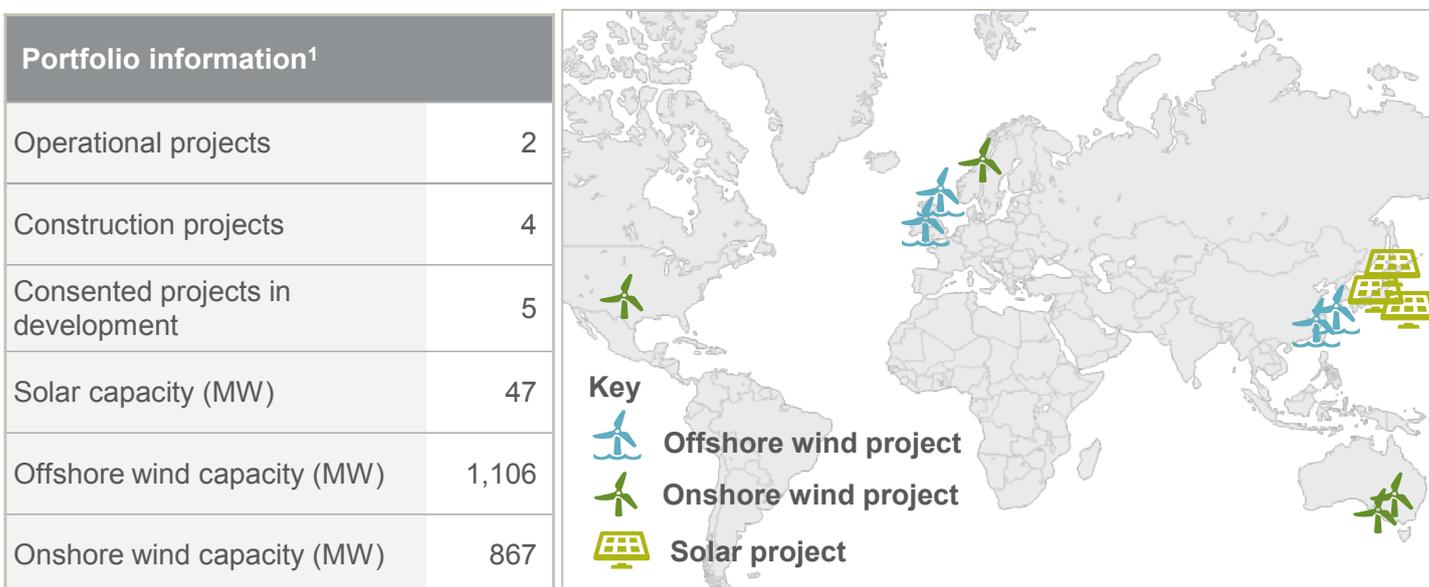
Appendix 1

1. Introduction

The Green Investment Ratings ('GIR') team of Green Investment Group Limited ('GIG') has prepared this Green Impact Report (the 'Report') in connection with the Macquarie Group Limited ('MGL') GBP 2,100 million loan facility; of which GBP 500 million constitutes as green financing ('green tranches'). This Report covers those projects that were supported by the green tranches between July 2018 to 31 March 2019; (together, the 'Portfolio'). The GIR team has forecast the Portfolio's avoided: greenhouse gas ('GHG'); emissions to air; and fossil fuels consumption (together, the 'Green Impact') of the Portfolio, as summarised below. The forecasts are based on the total Green Impact derived from 100% of those projects that have been notionally allocated green tranche financing. This Report also considers the Portfolio's alignment with the United Nations Sustainable Development Goals.

The Portfolio's GIG Carbon Score is 3,520 AA. Refer to page 2 and the methodology in Appendix 2 for further information on how this is calculated.

The Report is aligned with the reporting recommendations in Section 4 of the Green Loan Principles, Dec 2018.



Green Impact: Forecast

GHG emissions avoided (carbon dioxide equivalent)	
Average annual	3,520 kt CO ₂ e / yr
Remaining lifetime	82,223 kt CO ₂ e
Other emissions to air avoided (oxides of nitrogen)	
Average annual	4,706 t NO _x / yr
Remaining lifetime	110,805 t NO _x
Fossil fuels consumption avoided (oil equivalent)	
Average annual	1,328 kt oe / yr
Remaining lifetime	30,955 kt oe

Important note: This Report has been prepared by GIG on the basis of, and should be read in conjunction with, the methodology assumptions, limitations and other terms set out in Appendices 2, 3 and the Important Notice and Disclaimer, Appendix 4. This is not a due diligence report and should not be relied upon as such. If appropriate, recipients and users of this Report should conduct their own separate environmental, social and governance enquiries and assessments. This Report is provided for information purposes only and does not constitute and shall not be deemed to be in any way an offer or invitation or solicitation of any offer or invitation to sell or purchase shares or invest in any Project. This Report has not been filed, lodged, registered or approved in any jurisdiction and recipients of this document should keep themselves informed of and comply with and observe all applicable legal and regulatory requirements.

¹ Please see Appendix 1 for further details of the projects within the Portfolio

2. Green Impact Forecast

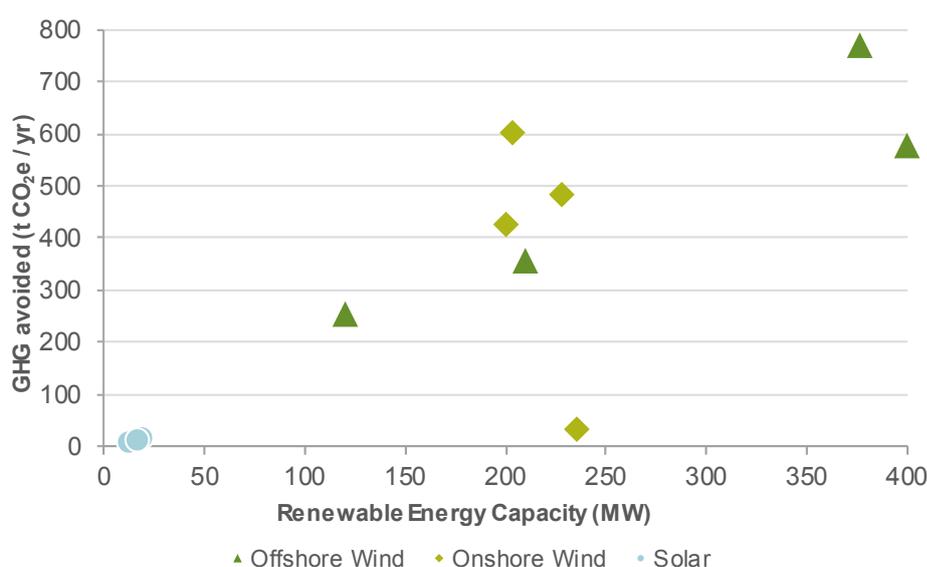
In this Report we use the term ‘Green Impact’ to refer to the GHG, emissions to air and fossil fuels consumption avoided by the Portfolio, as defined in Appendix 2. Forecasts are based on data provided to the GIR team and are subject to our assessment of Green Impact Forecast Accuracy (as set out on page 3). The forecasts and Green Impact Forecast Accuracy are subject to the methodology, assumptions, limitations and methods set out in Appendices 2 & 3.

Greenhouse gas emissions avoided

The Portfolio is forecast to avoid emissions of over 3,500 kt CO₂e / yr

Avoidance of GHG emissions (measured in carbon dioxide equivalent: CO₂e), both actual and forecast, is derived by comparing the emissions associated with each underlying project to a counterfactual (alternative method of energy generation). In this case, the counterfactual is local marginal grid emissions of where the project is located.

The Portfolio is forecast, in aggregate, to avoid over 80,000 kilotonnes CO₂e over the remaining lifetime of the constituent projects.



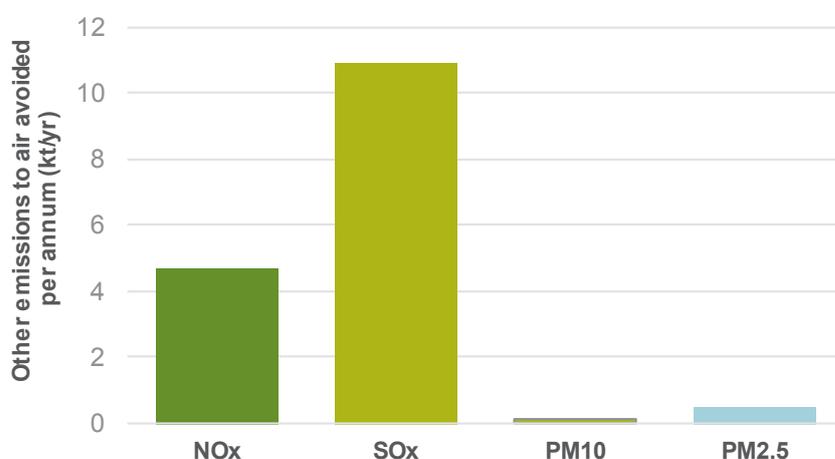
Greenhouse gas emissions avoided (carbon dioxide equivalent)	
Average annual	3,520 kt CO ₂ e / yr
Remaining lifetime	82,223 kt CO ₂ e

Other emissions to air avoided

The Portfolio is forecast to avoid emissions of almost 5,000 t NO_x / yr

Other emissions to air avoided is a measure of net air pollutant emissions compared to the counterfactual method of energy generation. Quantified air pollutant emissions include oxides of nitrogen (NO_x), oxides of sulphur (SO_x), particulates up to 10 micrometres (µm) in diameter (PM₁₀) and particulates up to 2.5 µm in diameter (PM_{2.5}).

The Portfolio is forecast to result in the avoidance of almost 5,000 tonnes NO_x, 11,000 tonnes SO_x and a total of almost 600 tonnes of particulate matter per year.



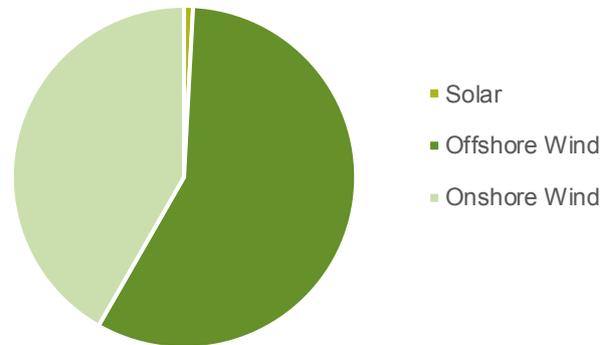
Emissions to air avoided	
Average annual nitrogen oxides	4,706 t NO _x / yr
Average annual sulphur oxides	10,880 t SO _x / yr
Average annual 10µm particulate matter	102 t PM ₁₀ / yr
Average annual 2.5µm particulate matter	471 t PM _{2.5} / yr

Fossil fuels consumption avoided

The Project is forecast to avoid almost 1,500 kt oil equivalent annually

Fossil fuels consumption avoided is a measure of the net consumption of coal, oil and gas avoided, compared to the counterfactual method of grid-based electricity generation, and is normalised to tonnes of oil equivalent (t oe).

The Portfolio is forecast, in aggregate, to avoid an average of almost 1,500 kilotonnes t oe per year. When the underlying projects are aggregated based on technology, they are anticipated to avoid an average of 11 kilotonnes t oe per year for solar projects, 763 kilotonnes t oe per year for offshore wind and 554 kilotonnes t oe per year for onshore wind.



Fossil fuels consumption avoided	
Average annual	1,328 kt oe / yr
Remaining lifetime	30,955 kt oe

3. Green Impact Forecast Accuracy

Green Impact Forecast Accuracy is our assessment of the level of confidence that can reasonably be placed on the accuracy of any quantified Green Impact Forecast. It is based on information provided to the GIR team (set out in Appendix 1) and on the methodology referred to in Appendix 2.

We assess Green Impact Forecast Accuracy at levels ranging from Level 1 (Low) to Level 5 (Very High), which represent the combined and weighted average of a series of factors, according to our in-house experience of the sensitivity of each element. See Appendix 2 for further detail.

We have assessed the weighted average Green Impact Forecast Accuracy for the Portfolio at Level 3 (Good).

The majority of the projects within the Portfolio are in development (with some potential for design and capacity change), or in construction and as such actual performance is unknown. This results in a 'Good' Green Impact Forecast Accuracy which is likely to improve as more projects become operational.

Level 3 (Good)



4. Contribution to the Sustainable Development Goals

The United Nations Sustainable Development Goals¹ (SDGs) are a set of 17 goals for sustainable development, defined by 169 SDG Targets to be achieved by 2030. The GIR team has considered the performance of the Portfolio against the SDGs and their associated Targets. The assessment has identified those Targets to which the underlying projects contribute directly (associated SDGs shown as full coloured icons below), and those Targets to which the projects indirectly contribute to (inverted coloured SDG icons below).



Direct contribution

Goal	SDG Target	Portfolio Contribution
	<p>Target 3.9 Reduce deaths and illnesses from air pollution</p>	<p>According to the World Health Organization, air pollutants such as nitrogen oxides (NO_x), sulphur oxides (SO_x) and particulate matter (PM) can lead to premature death and illnesses such as stroke, heart disease, lung cancer and chronic respiratory diseases.² Avoidance of fossil fuel electricity generation due to renewable generation of the Portfolio is forecast to avoid emissions of harmful air pollutants:</p> <ul style="list-style-type: none"> - 4,706 tonnes of NO_x / yr - 10,880 tonnes of SO_x / yr - 573 tonnes of particulate matter / yr
	<p>Target 7.2 Increase substantially the share of renewable energy in the global energy mix</p>	<p>2 GW of renewable energy generation capacity is supported by the Portfolio. Of this 1.4 GW is in development or construction.</p>
	<p>Target 9.1 Develop quality, reliable, sustainable and resilient infrastructure</p>	

¹ <http://sustainabledevelopment.un.org/sdgs>

² World Health Organization, Ambient air pollution - a major threat to health and climate: <https://www.who.int/airpollution/ambient/en/>

Indirect contribution

Goal	SDG Target	Portfolio Contribution
 <p>12 RESPONSIBLE CONSUMPTION AND PRODUCTION</p>	<p>Target 12.2 Achieve the sustainable management and efficient use of natural resources</p>	<p>Avoidance of fossil fuel electricity generation due to renewable generation is forecast to avoid the consumption of 1,328 kilotonnes of oil equivalent annually.</p>
 <p>13 CLIMATE ACTION</p>	<p>Target 13.3 Improve human and institutional capacity on climate change mitigation.</p>	<p>The Macquarie GBP Loan Facility in itself raises awareness and improves institutional capacity on climate change mitigation and negative impact reduction. The Portfolio is forecast to avoid 3,520 kilotonnes CO₂e of greenhouse gas emissions annually</p>

Appendix 1

Portfolio: Key Project Data

Project name	Technology	Location	Capacity (MW)	Stage	Commencement of operations
Canadian Breaks	Onshore Wind	US	200	Construction	2019
Överturingen Wind Park	Onshore Wind	Sweden	235	Construction	2020
Energy Pratham Godo Kaisya	Solar PV	Japan	12	Pre-construction	2019
Formosa 1	Offshore Wind	Taiwan	120	Construction	2020
Formosa 2	Offshore Wind	Taiwan	376	Pre-construction	2020
Rampion Offshore Windfarm	Offshore Wind	UK	400	Operational	2018
Lal Lal Wind Farm	Onshore Wind	Australia	228	Construction	2020
Nagano Solar Farm	Solar PV	Japan	18.6	Pre-construction	2019
Tochigi Solar Farm	Solar PV	Japan	16.4	Pre-construction	2020
Murra Warra Wind Farm 2	Onshore Wind	Australia	204	Pre- construction	2020
Westermot Rough Offshore Windfarm	Offshore Wind	UK	210	Operational	2015

Appendix 2

Terms and Conditions: Terminology and Methodology

Terminology

Green Impact

The Green Impact metrics covered by this Report are identified in the header and executive summary. “Green Impact” is a collective term referring to the environmental benefits which have been calculated in accordance with GIG’s methodology to be, or to be reasonably likely to be, delivered by the project(s) to which this Report refers. The collective term can include defined metrics such as tonnes carbon dioxide equivalent avoided (t CO₂e), tonnes oil equivalent avoided (toe) and tonnes (t) of other air pollutant emissions avoided.

Green Impact Forecast Accuracy

“Green Impact Forecast Accuracy” is an expression of the level of confidence that, in the opinion of GIG, can reasonably be placed on the accuracy of any quantified Green Impact forecast. This assessment of forecast accuracy is described in levels as follows: Level 1 (Low), Level 2 (Moderate), Level 3 (Good), Level 4 (High), and Level 5 (Very High).

Methodology

The Green Impact and Green Impact Forecast Accuracy assessments presented in this Report are based on GIG’s approach to assessing Green Impact using the methodologies set out within its proprietary green investment principles, policies and the associated processes of the Green Investment Handbook¹. The Green Impact assessment has applied proprietary modelling techniques and comparative data developed and owned by GIG, or by third party owners and made available under licence to GIG.

Green Impact calculation

GIG’s initial calculation of the Green Impact of each project is produced by comparing relevant information and data derived from that project against relevant counterfactual (or baseline) data for the assumed environmental impacts that would occur if the project did not take place, based on GIG’s proprietary reference sources or provided to GIG by relevant third parties or

obtained from publicly available sources. The resultant estimated Green Impact is then subject to further qualitative evaluation before production of GIG’s formal Green Impact Report.

For grid-connected projects that generate electricity, the counterfactual is assumed to be marginal electricity generated from the local electricity grid, which includes resources consumed to supply grid electricity. GIG’s methodology calculates the net Green Impact of the project by comparing its likely emissions to those of a marginal grid electricity mix, using the methodology set out in the International Financial Institutions (IFI) approach to GHG accounting for renewable energy projects² and the IFI approach to GHG accounting for energy efficiency projects³.

GIG’s methodology calculates results for likely Green Impact on an annual and lifetime basis. The Green Impact reported is 100% of the Green Impact of the underlying project(s). There is no proportionate allocation of Green Impact to any particular project investment or to particular investors, all of whom may report the same Green Impact from the underlying project(s).

Exclusions

The counterfactual of marginal grid electricity does not include the total quantifiable lifecycle environmental burdens (e.g. resources consumed during construction, or indirect emissions during operations such as those from associated transport vehicles) associated with energy generation. Therefore, to produce a valid comparison, the calculation of Green Impact for the project(s) assessed in this Report is based solely on the operational phase of the relevant project(s), and does not include a full lifecycle assessment of the project(s) unless specifically stated otherwise. This approach is aligned with the Greenhouse Gas Project Protocol⁴. GIG’s assessment does not include a review of any underlying project’s environmental and/or social, permitting, licencing or other compliance status.

Green Impact Forecast Accuracy

Green Impact Forecast Accuracy is determined from a number of project parameters that include the project technology, stage of project development, and location of the project, together with GIG’s opinion of the input data quality. These parameters have been assigned values that represent the degree to which they affect the accuracy of the forecast Green Impact, and are used to produce Forecast Accuracy scores for three elements: Data quality, Technology & development stage, and Local governance⁵. The Forecast Accuracy scores for the three elements are weighted according to GIG’s in-house experience of the sensitivity of each element and combined to derive an overall level of Green Impact Forecast Accuracy.

Carbon Score

Our Carbon Score shows the quantified greenhouse gas emissions avoided combined with our Carbon Rating. The Carbon Rating is a measure of a project’s lifecycle greenhouse gas emissions compared to the emissions of the counterfactual. Projects with the lowest lifecycle emissions relative to the counterfactual would score the highest ratings from AAA to B. Projects with lifecycle emissions similar to the counterfactual would score a C, and projects with greater emissions would score a D or E. The emissions of the counterfactual are derived from the IFI approaches to greenhouse gas accounting – please see above for details. Where we do not have project-specific information on lifecycle emissions, we use the median harmonised values from the US National Renewable Energy Laboratory’s Lifecycle Assessment Harmonization.⁶

¹ www.greeninvestmentbank.com/green-impact

² <http://documents.worldbank.org/curated/en/2015/12/25514886/ifi-approach-ghg-accounting-renewable-energy-projects>

³ <http://documents.worldbank.org/curated/en/2015/12/25514884/ifi-approach-ghg-accounting-energy-efficiency-projects>

⁴ www.ghgprotocol.org/standards/project-protocol

⁵ Local governance scores are determined from datasets of indicators from the World Bank, Transparency International and United Nations University Institute for Environment and Human Security

⁶ www.nrel.gov/analysis/sustain-lcah.html

Appendix 3

Terms and Conditions: Assumptions, Limitations and other terms

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Project data

GIG has relied in good faith on publicly available data and data and information made available in connection with the relevant project(s) by the original Client and/ or relevant third parties, and has assumed that such data and information is complete, accurate and up to date.

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Appendix 3

Terms and Conditions: Assumptions, Limitations and other terms

Reference data

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GIG calculates Green Impact using reference data obtained from, among others, by the Ecoinvent life cycle inventory datasets for the calculation of environmental impacts. Green Impact is also calculated based on data supplied by the International Energy Agency (“IEA”), specifically from the 2015 editions of the World Energy Statistics and Balances dataset and the CO2 Emissions from Fuel Combustion dataset.

Any limitations and caveats that are applicable to the Ecoinvent and IEA datasets, as published on their websites, are also applicable to the results presented in this Report.

GIG’s method is designed to work with a limited number of key inputs and to be globally applicable, and makes some simplifying assumptions in order to achieve this degree of flexibility.

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Appendix 4

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Appendix 2



Independent Reasonable Assurance Report to the Directors of Macquarie Group Limited over compliance with the Macquarie Green Finance Framework for the nine months ended 31 March 2019

Opinion

We have undertaken a reasonable assurance engagement on Macquarie Group Limited's (MGL) compliance, in all material respects, with the obligations contained within the *Macquarie Green Finance Framework - June 2019 (GFF)*, for the nine months ended 31 March 2019 (the **period**).

In our opinion, MGL has complied, in all material respects, with the obligations contained within the GFF for the period.

Basis for opinion

We conducted our engagement in accordance with Standard on Assurance Engagements ASAE 3100 *Compliance Engagements* issued by the Auditing and Assurance Standards Board.

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

MGL's responsibilities

MGL is responsible for:

- (a) Identification of the obligations contained within the GFF;
- (b) The compliance activity undertaken to meet the obligations contained within the GFF; and
- (c) Identification and implementation of controls which will mitigate those risks that prevent the obligations contained within the GFF being met and monitoring ongoing compliance.

Our independence and quality control

We have complied with the independence and other relevant ethical requirements relating to assurance engagements, and apply Auditing Standard ASQC 1 *Quality Control for Firms that Perform Audits and Reviews of Financial Reports and Other Financial Information, and Other Assurance Engagements* in undertaking this assurance engagement.

Our responsibility

Our responsibility is to express an opinion, on MGL's compliance, in all material respects, with the obligations contained within the GFF, for the period. ASAE 3100 requires that we plan and perform our procedures to obtain reasonable assurance about whether MGL has complied, in all material respects, with the obligations contained within the GFF, for the period.

An assurance engagement to report on MGL's compliance with the obligations contained within the GFF involves performing procedures to obtain evidence about the compliance activity and controls

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implemented to meet the obligations contained within the GFF. The procedures selected depend on our judgement, including the identification and assessment of risks of material non-compliance with the obligations contained within the GFF.

Inherent limitations

Because of the inherent limitations of an assurance engagement, together with the internal control structure, it is possible that fraud, error or non-compliance with compliance requirements may occur and not be detected.

A reasonable assurance engagement for the period does not provide assurance on whether compliance with the obligations contained within the GFF will continue in the future.

Use of report

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PricewaterhouseCoopers

PricewaterhouseCoopers

John Tomac

John Tomac
Partner

Sydney
4 July 2019

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