Green Finance Impact Report 2020
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Introduction

Macquarie Group Limited ("Macquarie or MGL") is pleased to present its Green Finance Impact Report for the twelve months to 31 March 2020.

This report relates to the MGL 2018 £2,100 million loan facility of which £500 million constitutes as green financing ("green tranches"). It provides information on the environmental benefits ("green impact") of the eligible projects\(^1\) which have been notionally allocated\(^2\) green tranche financing.

MGL is also pleased to note it has raised its second green financing transaction in March 2020, a US$300 million Samurai loan facility in the Japanese market of which US$150 million constitutes as green financing. This loan was not drawn at the 31 March reporting period and is not covered by this report.

The approach presented in this report is consistent with Macquarie’s Green Finance Framework ("GFF") which was developed in accordance with the APLMA\(^3\) Green Loan Principles. Macquarie has utilised the expertise of its 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.

Macquarie’s GIG is a specialist in green infrastructure principal investment, project development and delivery, green impact advisory and the management of portfolio assets. Its track record, expertise and capability make it a global leader in green investment and development, dedicated to accelerating the transition to a greener global economy.

\(^1\) See glossary for definition of eligible project
\(^2\) See glossary for definition of notional allocation.
\(^3\) Asia Pacific Loan Market Association.
Key highlights

- 13 projects were allocated funding from the green tranches during the reporting period.
- The Green Finance Framework has been developed in accordance with the APLMA Green Loan Principles.
- £500m of green financing drawn at March 31 from 19 financiers across the globe.
- GIG Carbon Score: 3,462 AA.
- The portfolio is forecast to avoid greenhouse gas emissions of 3,462kt CO$_2$e per year equivalent to taking over 1.1 million cars off the road.
- Over 2,400 MW of renewable energy capacity generated from the eligible projects allocated to, in development, construction and operation.
- The portfolio is forecast to produce over 8,000 GWh per year enough to power over 1.9 million households for a year.
- Independent Assurance provided by PwC over Macquarie’s compliance with the Green Finance Framework.

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4 The portfolio refers to the 13 eligible projects which were allocated green financing throughout the reporting period.
5 Year on year increase in “cars off the road” is not due to change in portfolio but rather due to the updated conversion factor calculated using a petrol car based on data from UK Government Greenhouse gas reporting conversion factors. See [www.gov.uk/government/collections/government-conversion-factors-for-company-reporting](http://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting) for further detail.
6 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](https://www.worldenergy.org/data)).
Summary of green metrics

Throughout the reporting period 13 projects were allocated funding from the green tranches, delivering a significant green impact and achieving a Carbon Score of 3,462 AA.

Throughout this report the green impact and associated metrics:

1. incorporate all the eligible projects which have been notionally allocated green tranche financing from 1 April 2019, to 31 March 2020 (the “portfolio”). 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 9 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

The GIG Carbon Score is GIG’s standard mark for communicating the impact of low carbon infrastructure in helping to reduce greenhouse gas emissions. 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 3,462 AA. The rating of AA reflects the low lifecycle carbon intensity of the wind and solar power projects notionally allocated funding (see page 7), and the mix of project locations in lower carbon intensive grids (e.g. UK and Sweden) and higher carbon grids (e.g. Taiwan and Poland). Projects located in countries with higher carbon intensive grids achieve higher ratings, reflective of the effectiveness of GHG emissions reduction.

The GIG Carbon Score also shows the quantified greenhouse gas emissions avoided (3,462 kt CO\textsubscript{2}e/yr), which indicates the portfolio lifecycle emissions avoided relative to the counterfactual (a scenario in which the projects were not built). 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.

7 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.
Portfolio renewable energy capacity

209 MW of renewable energy in development

The portfolio is forecast to produce over 8,000 GWh per year enough to power over 1.9 million households for a year.

1,570 MW of renewable energy in construction

The portfolio is forecast to avoid greenhouse gas emissions of 3,462 kt CO₂e per year equivalent to taking over 1.1 million cars off the road.

645 MW of renewable energy in operation

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6 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/)

9 Year on year increase in ‘cars off the road’ is not due to change in portfolio but rather due to the updated conversion factor calculated using a petrol car based on data from UK Government Greenhouse gas reporting conversion factors. See www.gov.uk/government/collections/government-conversion-factors-for-company-reporting for further detail.
Macquarie’s green financing transactions

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 £2,100 million GBP loan facility of which £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 transactions to fund projects that will deliver environmental benefits to support Macquarie’s business strategy.

In March 2020, Macquarie issued its second green financing facility, a US$300 million facility into the Japanese market. Of this, US$150 million (Tranche A) constitutes as green financing and was issued in accordance with Macquarie’s GFF. For the purposes of this report, the green impact of this facility is not discussed as the facility was drawn down after the 31 March 2020 reporting period end.

The details of Macquarie’s green tranches are as below:

<table>
<thead>
<tr>
<th>Tranche</th>
<th>Macquarie GBP Facility</th>
<th>Macquarie Samurai USD Facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issuer</td>
<td>Macquarie Group Limited</td>
<td>Macquarie Group Limited</td>
</tr>
<tr>
<td>Issue Date</td>
<td>13 June 2018</td>
<td>13 June 2018</td>
</tr>
<tr>
<td>Maturity Date</td>
<td>13 June 2021</td>
<td>13 June 2023</td>
</tr>
<tr>
<td>Original Tenor</td>
<td>3 years</td>
<td>5 years</td>
</tr>
<tr>
<td>Total Volume</td>
<td>£250m</td>
<td>£250m</td>
</tr>
<tr>
<td>Structure</td>
<td>Revolver</td>
<td>Term</td>
</tr>
<tr>
<td>Initial Drawdown Date</td>
<td>31 July 2019</td>
<td>26 July 2018</td>
</tr>
<tr>
<td>Drawn Volume as at 31 March 2020</td>
<td>£250m</td>
<td>£250m</td>
</tr>
<tr>
<td>Use of Proceeds</td>
<td>In accordance with Macquarie’s Green Finance Framework</td>
<td>In accordance with Macquarie’s Green Finance Framework</td>
</tr>
</tbody>
</table>

See glossary for definition of green financing transactions.
For the reporting period April 2019 to March 2020:

- MGL GBP Facility Tranche A1 was drawn down on 31 July 2019 and allocated to from this date until the end of the reporting period.
- MGL GBP Facility Tranche B1 was drawn down and allocated to throughout the entire reporting period.
- MGL Samurai USD Facility Tranche A was undrawn and not allocated to during the reporting period.

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

<table>
<thead>
<tr>
<th>Eligible Projects</th>
<th>Location</th>
<th>Technology</th>
<th>Stage</th>
<th>Percentage of Macquarie Funding(^{11})</th>
<th>Total Capacity (MW)</th>
<th>Total GHG emissions avoided (kt CO(_2)e/yr)(^{14})</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLE Malaysia</td>
<td>Malaysia</td>
<td>Solar</td>
<td>Construction</td>
<td>100%</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Överturingen Wind Park</td>
<td>Sweden</td>
<td>Onshore Wind</td>
<td>Construction</td>
<td>100%</td>
<td>235</td>
<td>41</td>
</tr>
<tr>
<td>East Anglia One</td>
<td>UK</td>
<td>Offshore Wind</td>
<td>Construction</td>
<td>16% (^{12,13})</td>
<td>714</td>
<td>980</td>
</tr>
<tr>
<td>Energy Pratham Godo Kaisya</td>
<td>Japan</td>
<td>Solar</td>
<td>Operation</td>
<td>100%</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>Eolica Kiselice</td>
<td>Poland</td>
<td>Onshore Wind</td>
<td>Operation</td>
<td>100%</td>
<td>42</td>
<td>73</td>
</tr>
<tr>
<td>Formosa 1</td>
<td>Taiwan</td>
<td>Offshore Wind</td>
<td>Operation</td>
<td>50% (^{12})</td>
<td>128</td>
<td>207</td>
</tr>
<tr>
<td>Formosa 2</td>
<td>Taiwan</td>
<td>Offshore Wind</td>
<td>Construction</td>
<td>75% (^{12})</td>
<td>376</td>
<td>625</td>
</tr>
<tr>
<td>Rampion Offshore Wind Farm</td>
<td>UK</td>
<td>Offshore Wind</td>
<td>Operation</td>
<td>25% (^{12})</td>
<td>400</td>
<td>578</td>
</tr>
<tr>
<td>Lal Lal Wind Farm</td>
<td>Australia</td>
<td>Onshore Wind</td>
<td>Construction</td>
<td>20%</td>
<td>228</td>
<td>401</td>
</tr>
<tr>
<td>Lohas Ece Brown K.K (Tochigi)</td>
<td>Japan</td>
<td>Solar</td>
<td>Construction</td>
<td>100%</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>Lohas Ece Brown K.K (Nagano)</td>
<td>Japan</td>
<td>Solar</td>
<td>Operation</td>
<td>100%</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Zajaczkowo Windfarm</td>
<td>Poland</td>
<td>Onshore Wind</td>
<td>Operation</td>
<td>100%</td>
<td>48</td>
<td>62</td>
</tr>
<tr>
<td>Murra Warra Wind Farm 2</td>
<td>Australia</td>
<td>Onshore Wind</td>
<td>Pre-Construction</td>
<td>50%</td>
<td>209</td>
<td>468</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>2,424</strong></td>
<td><strong>3,462</strong></td>
</tr>
</tbody>
</table>

\(^{11}\) Reflects the share of the projects funded by Macquarie green financing at the time of allocation.

\(^{12}\) The funding percentage was subject to variation during the reporting period. As at March 2020, funding to Överturingen Wind Park, East Anglia One, Formosa 1, Formosa 2 and Rampion Offshore Wind Farm was 50%, 13%, 25%, 26% and 0%, respectively.

\(^{13}\) As at March 2020, Macquarie’s interest in East Anglia One was 40%.

\(^{14}\) In an update to the 2019 Macquarie Green Finance Impact Report, projects that commence operations after July 2019 adopt an updated (v2.0) marginal grid electricity emission factor to calculate avoided GHG emissions, in line with International Financial Institutions (IFI) approach to GHG accounting for renewable energy projects. In most cases, this has the effect of reducing the estimate of avoided GHG emissions for projects previously evaluated with the v1.0 marginal grid electricity factors.
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 environmental expertise, as well as representatives from Risk Management Group - Credit, Financial Management Group - 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 Opinion 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 Purposes.

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 have implemented a monitoring and reporting process to ensure that:

¬ the total funding required for eligible projects is greater than the outstanding principal amounts due on green financing transactions
¬ eligible projects are owned within the consolidated entity which raises the green financing transaction that is notionally allocated against the eligible projects
¬ eligible projects do not have other financing (a) secured 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.

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15 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.


17 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.

18 Macquarie Group Limited and its subsidiaries.

19 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

As a specialist in green infrastructure, with expertise in green finance, investment and measurement, GIG has led the way in developing practical solutions to meet the growing demand for transparency and sustainability reporting from investors, shareholders, regulators, and communities.

GIG offers specialist Green Impact Advisory services on green finance investment instruments and green impact reporting for public disclosure to empower us and our partners to make more informed, sustainable choices whilst showcasing the green credentials of investments.

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 1 April 2019 to 31 March 2020. 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

<table>
<thead>
<tr>
<th>GHG emissions avoided (carbon dioxide equivalent)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average annual</td>
<td>3,462 kt CO₂e / yr</td>
</tr>
<tr>
<td>Remaining lifetime</td>
<td>90,728 kt CO₂e</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other emissions to air avoided (oxides of nitrogen)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average annual</td>
<td>5,138 t NOₓ / yr</td>
</tr>
<tr>
<td>Remaining lifetime</td>
<td>137,691 t NOₓ</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fossil fuels consumption avoided (oil equivalent)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average annual</td>
<td>1,543 kt oe / yr</td>
</tr>
<tr>
<td>Remaining lifetime</td>
<td>40,460 kt oe</td>
</tr>
</tbody>
</table>

20 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 Appendix 1.

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 will 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 accounting\(^1\)

- 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

- 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

- 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.

\(^1\) The GHG Protocol for Project Accounting - [www.ghgprotocol.org/standards/project-protocol](http://www.ghgprotocol.org/standards/project-protocol)
Macquarie and green investment

Macquarie is a global financial services group operating in 31 markets in asset management, retail and business banking, wealth management, leasing and asset financing, market access, commodity trading, renewables development, investment banking and principal investment.

We have 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:

Backing new technologies:
- EV infra
- Hydrogen
- Floating offshore wind
- Battery storage
- Energy and infra tech
- Geothermal
- Anaerobic digestion
- Offshore Wind
- Solar PV
- Waste to energy
- Biomass
- Landfill/Biogas
- Hydro
- Onshore Wind
- Energy Infrastructure
- Meters
Macquarie continues to support our clients seeking to manage and respond to sustainability challenges and capitalise on emerging opportunities. 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.

**Our capabilities**

**Finance and Develop**
- 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

**Advise**
- financial advisory
- debt and equity arrangement
- green financial institution advisory
- green impact assessment, reporting and ratings

**Manage**
- real asset management, including green infrastructure, equity and debt, asset finance and real estate
- securities investment management and structured access to funds
- equity-based products and alternative assets

**Trade**
- 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

The financial sector has a critical role to play, alongside government, businesses, investors and the community, to support the transition to a low-carbon and climate resilient economy. As a global financial services provider, we are committed to using our expertise in renewable energy and clean technology to connect global capital to opportunities that support this transition.

In 2019, GIG acquired the 42 MW Kisielice and the 48 MW Zajęczkowo onshore wind farms in its first two investments in Poland. Generating enough renewable electricity to power the equivalent of over 80,000 homes per year, the wind farms have a positive impact on the energy mix in a country that is still largely reliant on coal. Poland is the largest electricity market in Central Eastern Europe, but has one of the lowest shares of renewables in electricity generation in that part of Europe. Electricity demand is predominantly met from an ageing fleet of coal and lignite power plants, and in time these plants will need to be replaced with new generating capacity – making renewables deployment increasingly important.
Offshore wind

GIG is a leading non-utility investor in offshore wind. In the UK – the world’s leading offshore wind market – Macquarie and GIG have supported almost 50% of the country's total offshore wind capacity in operation or construction including the 714 MW East Anglia ONE development.\textsuperscript{22}

From the established offshore wind markets of Western Europe, the sector has now been growing into new and emerging markets across Asia where the growing need for power is creating real opportunity for low carbon investment.

Through its Formosa projects, GIG is at the forefront of Taiwan’s burgeoning offshore wind market. Together with its joint venture partners Ørsted, JERA and Swancor, GIG successfully delivered Taiwan’s first commercial scale offshore wind farm, Formosa I in late 2019. Along with joint venture partners JERA and Swancor Renewable, GIG has now also commenced construction on Formosa II. Together Formosa I and Formosa II are important milestones in the realisation of Taiwan’s commitment to deliver 5.7 GW of offshore wind capacity by 2025, and will generate 504 MW of clean electricity, enough to power ~508,000 households. Formosa 3 is currently under development by GIG, and partners EnBW and JERA. The project intends to pursue capacity in Taiwan’s next round of grid allocations later this year. Formosa 3 could deliver up to 2 GW of electricity, further advancing Taiwan’s green energy ambitions. Formosa 3 was not allocated any green tranche financing in 2020 but may be considered for future allocations.

\textsuperscript{22} Including investments made by Macquarie Group (including managed funds) and Green Investment Bank.
<table>
<thead>
<tr>
<th><strong>Glossary</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CO₂e</strong></td>
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<tr>
<td><strong>counterfactual</strong></td>
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<tr>
<td><strong>eligible projects</strong></td>
</tr>
<tr>
<td>‒ renewable energy</td>
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<tr>
<td>‒ energy efficiency</td>
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<tr>
<td>‒ waste management</td>
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<tr>
<td><strong>ESR</strong></td>
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<tr>
<td><strong>GFF</strong></td>
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<td><strong>GFWG</strong></td>
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<td><strong>GHG</strong></td>
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<td><strong>GIG</strong></td>
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<tr>
<td><strong>green finance transactions</strong></td>
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<tr>
<td><strong>green impact</strong></td>
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<tr>
<td><strong>green opinion</strong></td>
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<tr>
<td><strong>green tranches</strong></td>
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<td><strong>kt</strong></td>
</tr>
<tr>
<td><strong>legal commitment</strong></td>
</tr>
<tr>
<td><strong>MW</strong></td>
</tr>
<tr>
<td><strong>notional allocation</strong></td>
</tr>
<tr>
<td><strong>PPAs</strong></td>
</tr>
<tr>
<td><strong>SDGs</strong></td>
</tr>
<tr>
<td><strong>reporting period</strong></td>
</tr>
</tbody>
</table>
Appendix 1
1. Introduction

The Green Impact Advisory (‘GIA’) 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 green financing (‘green tranches’). This Report covers those projects (the ‘Projects’) that were supported by the green tranches between 1 April 2019 and 31 March 2020 (together, the ‘Portfolio’). The GIA team has forecast the Portfolio’s avoided: greenhouse gas (‘GHG’) emissions; emissions to air; and fossil fuels consumption (together, the ‘Green Impact’), as summarised below. The forecasts are based on the total Green Impact derived from 100% of the 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 3,462 AA. We have assessed the weighted average Green Impact Forecast Accuracy for the Portfolio at Level 3 (Good). Please refer to Appendix 3 for further information on how this is calculated.

The Report is aligned with the reporting recommendations in Section 4 of the Green Loan Principles, May 2020.

### Portfolio information

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational projects</td>
<td>6</td>
</tr>
<tr>
<td>Construction projects</td>
<td>6</td>
</tr>
<tr>
<td>Consented projects in development</td>
<td>1</td>
</tr>
<tr>
<td>Solar capacity (MW)</td>
<td>44</td>
</tr>
<tr>
<td>Offshore wind capacity (MW)</td>
<td>1,610</td>
</tr>
<tr>
<td>Onshore wind capacity (MW)</td>
<td>762</td>
</tr>
</tbody>
</table>

### Green Impact: Forecast

**GHG emissions avoided (carbon dioxide equivalent)**

- Average annual: 3,462 kt CO₂ e / yr
- Remaining lifetime: 90,728 kt CO₂ e

**Other emissions to air avoided (oxides of nitrogen)**

- Average annual: 5,138 t NOₓ / yr
- Remaining lifetime: 137,691 t NOₓ

**Fossil fuels consumption avoided (oil equivalent)**

- Average annual: 1,543 kt oe / yr
- Remaining lifetime: 40,460 kt oe

---

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 GIA 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 the Appendices.

**Greenhouse gas emissions avoided**

The Portfolio is forecast to avoid emissions of over 3,400 kt CO$_2$e / yr

- **Remaining lifetime**: 90,728 kt CO$_2$e

**Other emissions to air avoided**

The Portfolio is forecast to avoid emissions of over 5,000 t NO$_x$ / yr

- **Average annual nitrogen oxides**: 5,138 t NO$_x$ / yr
- **Average annual sulphur oxides**: 11,657 t SO$_x$ / yr
- **Average annual 10µm particulate matter**: 111 t PM$_{10}$ / yr
- **Average annual 2.5µm particulate matter**: 511 t PM$_{2.5}$ / yr
Fossil fuels consumption avoided

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 metric kilotonnes of oil equivalent (kt oe).

The Portfolio is forecast to avoid an average of over 1,500 kt oe per year. When the underlying projects are aggregated based on technology, they are anticipated to avoid an average of 12 kt oe per year for solar projects, 1,117 kt oe per year for offshore wind and 414 kt oe per year for onshore wind.

The Portfolio is forecast to avoid over 1,500 kt oil equivalent annually

<table>
<thead>
<tr>
<th>Fossil fuels consumption avoided</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average annual</td>
<td>1,543 kt oe / yr</td>
</tr>
<tr>
<td>Remaining lifetime</td>
<td>40,460 kt oe</td>
</tr>
</tbody>
</table>

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 GIA 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 will improve as more projects become operational.
## 4. Contribution to the Sustainable Development Goals

The United Nations Sustainable Development Goals (SDGs) are a set of 17 goals for sustainable development, defined by 169 SDG Targets to be achieved by 2030. The GIA 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 contribute indirectly (inverted coloured SDG icons below).

### Direct contribution

<table>
<thead>
<tr>
<th>Goal</th>
<th>SDG Target</th>
<th>Portfolio Contribution</th>
</tr>
</thead>
</table>
| **Goal 3.9** | Reduce deaths and illnesses from air pollution | **Target 3.9**  
According to the World Health Organization, air pollutants such as nitrogen oxides (NO\textsubscript{x}), sulphur oxides (SO\textsubscript{x}) and particulate matter (PM) can lead to premature death and illnesses such as stroke, heart disease, lung cancer and chronic respiratory diseases. Avoidance of fossil fuel electricity generation due to renewable generation of the Portfolio is forecast to avoid emissions of harmful air pollutants:  
- 5,138 tonnes of NO\textsubscript{x} / yr  
- 11,657 tonnes of SO\textsubscript{x} / yr  
- 622 tonnes of particulate matter / yr |

| Goal 7.2 | Increase substantially the share of renewable energy in the global energy mix | **Target 7.2**  
2.4 GW of renewable energy generation capacity is supported by the Portfolio. Of this approximately 1.8 GW is in development or construction. |

| Goal 9.1 | Develop quality, reliable, sustainable and resilient infrastructure | **Target 9.1** |

---

2. World Health Organization, Ambient air pollution - a major threat to health and climate: [https://www.who.int/airpollution/ambient/en/](https://www.who.int/airpollution/ambient/en/)
### Indirect contribution

<table>
<thead>
<tr>
<th>Goal</th>
<th>SDG Target</th>
<th>Portfolio Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Target 12.2</strong></td>
<td>Achieve the sustainable management and efficient use of natural resources</td>
<td>Avoidance of fossil fuel electricity generation due to renewable generation is forecast to avoid the consumption of 1,543 kilotonnes of oil equivalent annually.</td>
</tr>
<tr>
<td><strong>Target 13.3</strong></td>
<td>Improve human and institutional capacity on climate change mitigation.</td>
<td>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 3,462 kilotonnes CO₂e of greenhouse gas emissions annually</td>
</tr>
</tbody>
</table>
## Appendix 1

### Portfolio: Key Project Data

<table>
<thead>
<tr>
<th>Project name</th>
<th>Technology</th>
<th>Location</th>
<th>Capacity (MW)</th>
<th>Stage</th>
<th>Commencement of operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Anglia One Limited</td>
<td>Offshore Wind</td>
<td>United Kingdom</td>
<td>714</td>
<td>Construction</td>
<td>2020</td>
</tr>
<tr>
<td>Formosa 1</td>
<td>Offshore Wind</td>
<td>Taiwan</td>
<td>128</td>
<td>Operation</td>
<td>2020</td>
</tr>
<tr>
<td>Formosa 2</td>
<td>Offshore Wind</td>
<td>Taiwan</td>
<td>376</td>
<td>Construction</td>
<td>2021</td>
</tr>
<tr>
<td>Green Investment Rampion Ltd</td>
<td>Offshore Wind</td>
<td>United Kingdom</td>
<td>400</td>
<td>Operation</td>
<td>2018</td>
</tr>
<tr>
<td>Överturingen Wind Park</td>
<td>Onshore Wind</td>
<td>Sweden</td>
<td>235</td>
<td>Construction</td>
<td>2020</td>
</tr>
<tr>
<td>Eolica Kiselice</td>
<td>Onshore Wind</td>
<td>Poland</td>
<td>42</td>
<td>Operation</td>
<td>2008</td>
</tr>
<tr>
<td>Lal Lal Wind Farm</td>
<td>Onshore Wind</td>
<td>Australia</td>
<td>228</td>
<td>Construction</td>
<td>2020</td>
</tr>
<tr>
<td>Murra Warra Wind Farm 2</td>
<td>Onshore Wind</td>
<td>Australia</td>
<td>209</td>
<td>Pre-Construction</td>
<td>2021</td>
</tr>
<tr>
<td>Zajączkowo Windfarm</td>
<td>Onshore Wind</td>
<td>Poland</td>
<td>48</td>
<td>Operation</td>
<td>2008</td>
</tr>
<tr>
<td>BLE Malaysia 101</td>
<td>Solar</td>
<td>Malaysia</td>
<td>3</td>
<td>Construction</td>
<td>2020</td>
</tr>
<tr>
<td>Energy Pratham Godo Kaisya</td>
<td>Solar</td>
<td>Japan</td>
<td>12</td>
<td>Operation</td>
<td>2019</td>
</tr>
<tr>
<td>Lohas Ece Brown (Nagano)</td>
<td>Solar</td>
<td>Japan</td>
<td>15</td>
<td>Operation</td>
<td>2019</td>
</tr>
<tr>
<td>Lohas Ece Brown (Tochigi)</td>
<td>Solar</td>
<td>Japan</td>
<td>14</td>
<td>Construction</td>
<td>2020</td>
</tr>
</tbody>
</table>
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 v 1.1

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 Handbook. 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 projects and the IFI approach to GHG accounting for energy efficiency projects.

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 lifecycle emissions similar to the counterfactual would score the highest ratings from AAA to B. Projects with lifecycle emissions relative 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.

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 governance. 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.

References:

1. www.greeninvestmentbank.com/green-impact
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
Appendix 3

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GIG calculates Green Impact using reference data obtained from, among others, 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 12 months ended 31 March 2020

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 2020 (GFF), for the 12 months ended 31 March 2020 (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) Ensuring that the GFF, as well as all eligible projects which have been notionally allocated green tranche financing, are aligned with the APLMA Green Loan Principles;
(c) The compliance activity undertaken to meet the obligations contained within the GFF; and
(d) 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 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**
This report has been prepared for use by the Directors of MGL for the purpose of providing reasonable assurance over compliance with the obligations contained within the GFF. We disclaim any assumption of responsibility for any reliance on this report to any person other than the Directors of MGL, or for any other purpose than that for which it was prepared.

This report relates to *Macquarie Green Finance Framework - June 2020* located at [www.macquarie.com/au/about/investors/debt-investors](http://www.macquarie.com/au/about/investors/debt-investors). The Management of MGL are responsible for the integrity of MGL’s website and we do not accept responsibility for any changes that may have occurred to this version of the GFF since it was initially presented on the website.

PricewaterhouseCoopers

John Tomac
Partner

Sydney
13 July 2020
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