

Barclays Green Bond Investor Report

February 2019

Introduction

Climate change represents one of the greatest challenges faced by the world today. Banks have an important role to play in ensuring the world's energy needs are met while helping to limit the threat that climate change poses to people and to the natural environment. Banks have a direct environmental and social impact through their operational footprint, as well as indirectly in the way that they mobilise capital, advise clients and develop products. At Barclays, our aim is to facilitate the transition to less carbon intensive sources of energy, while supporting economic development and growth in society by helping to ensure the world's energy needs are met responsibly.

Barclays was the first bank to issue a Green Bond backed solely by UK assets back in 2017. This was followed by the launch of an innovative suite of Corporate Green Finance products, including the first-to-market Green Deposit, Green Loan, Green Asset Finance and Green Innovation Finance, all developed using 'Barclays Green Product Framework' in collaboration with global green research and ratings leader, Sustainalytics.

Last year we were the first major UK high street lender to launch a Green Mortgage. Under the leadership of the Barclays Green Banking Council, we continue to develop market-leading, innovative Green Finance products and services to support our customers and clients.

"The urgency of climate change requires new, creative solutions across the entire economy. At Barclays, we have a well-established reputation for financial innovation and a key role to play in applying our expertise to develop creative, green financial solutions to support our customers and clients, as we all transition to a lower carbon future."

Rhian-Mari Thomas, Chair, Barclays Green Banking Council.

Within our Green Bond Framework, we have committed to publish an investor report on an annual basis. This Green Bond investor report contains details of the allocated portfolio of Eligible Mortgage Assets (EMAs), as well as a quantitative environmental impact assessment for our inaugural issuance.

Green Bond Framework Summary

Section	Summary
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Use of Proceeds

- Allocate an equivalent amount of funding which represents the proceeds from Barclays Green Bonds to finance and refinance mortgages on energy efficient residential mortgages that are in the top 15% of lowest carbon intensive properties based on Energy Performance Certificate (EPC) data
- A formula was derived taking into account the current performance of households, the UK government’s linear target of ‘close to zero’ emissions by 2050 and the mid-point of a potential green bond maturity needing to coincide with the top 15% of lowest carbon intensive properties, resulting in the following formula for the maximum carbon intensity output:

$$y = -0.8235x + 1688.24$$

Where x = year of mid-point bond maturity and y = carbon intensity, measured in $\text{kgCO}_2/\text{m}^2/\text{year}$



Process Evaluation and Selection

- The residential mortgage portfolio will be mapped against the latest EPC data and filtered, removing any encumbered mortgages that are already used in other transactions and ensuring they are in the top 15% of the lowest carbon intensive properties



Management of Proceeds

- The size of the allocated portfolio of EMAs will be monitored on a monthly basis
- Any redeemed or ineligible assets will be replaced by EMAs



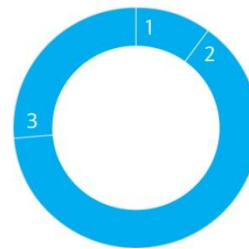
Reporting

- Barclays will publish an annual investor report
- A suitably qualified provider will provide an assurance report each year

Green Bond Details

Issuer	Barclays PLC
Settlement Date	14/11/2017
Currency	Euro
Notional	500,000,000
Tenor	6-year noncall 5 year
ISIN	XS1716820029
Call Date	14/11/2022
Maturity Date	14/11/2023

Carbon Intensity of Eligible Mortgage Asset Portfolio (kgCO₂/m²/year)



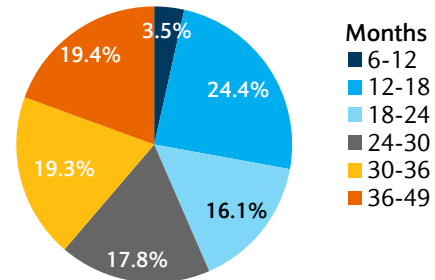
	%
1 0-9.99	(10.15%)
2 10-19.99	(63.47%)
3 20-24.8	(26.38%)

All EMA properties in the allocated portfolio have an estimated 24.8 kgCO₂/m²/year or less.

Use of Proceeds

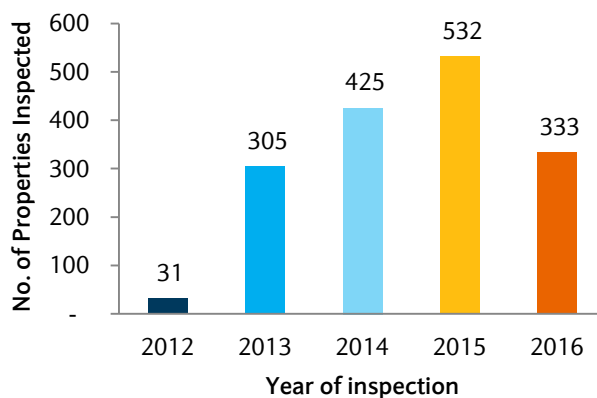
Reporting Date	31/12/2018
GBP equivalent of Issuance Proceeds	£440,772,785
FX rate as at pricing date (6/11/2017)	1.1345 EUR/GBP
Size of Allocated Eligible Mortgage Assets	£442,200,093
Bond Proceeds allocated	100%
Carbon Intensity max threshold	24.8 kgCO ₂ /m ² /year ¹
Finance/Refinance	100% Refinance

Seasoning of Loans



All loans in the portfolio have been originated within 3 years of the settlement date

Year of EPC Inspection



Geographical Distribution of EMAs



East Anglia	9.10%
East Midlands	4.92%
Greater London	25.28%
North	1.97%
North West	4.61%
South East	36.41%
South West	7.13%
Wales	1.72%
West Midlands	5.11%
Yorkshire and Humberside	3.75%

Over 50% of all EMA properties have had their most recent EPC inspection from 2015 onwards.

¹This has been calculated in accordance with formula $y = -0.8235x + 1688.24$ where $x = 2020$

Barclays Green Bond Quantitative Environmental Impact Assessment

Carbon Reporting as at 31st December 2018: Results and Methodology

As at 31st December 2018, Barclays' allocated EMA portfolio contained 1,626 mortgage loans for residential properties with a nominal value of £442,200,092.52². This report shows our results and methodology for estimating potential avoided carbon emissions (versus national EPC average) for these properties.

	Nominal Value (£m)	Number of Properties
Proceeds allocated to Buy-to-Let mortgages	£160,511,537	659
Proceeds allocated to Residential mortgages	£281,688,555	967
EMA portfolio Assets as at 31st December 2018	£442,200,093	1,626

The calculations have been checked and verified by Carbon Trust as part of their CBI Post Issuance Verification Report dated 19th February 2019³. All calculations are based on loan data as of 31st December 2018 and on the most recent EPC dataset release for England and Wales (March 2017).

1. Comparison of average estimated carbon intensity against a domestic baseline

This first calculation compares the average estimated carbon intensity of the allocated portfolio of EMAs against a comparable domestic baseline. The comparable baseline used in this report is the average estimated carbon intensity of all properties in the most recent EPC dataset⁴ as at March 2017, which has been used as a projection for the national average of carbon intensity for properties in England and Wales.

The EPC dataset contains duplicate addresses, due to single properties having multiple EPC certificates recorded over time. These duplicate entries were not considered in order to mitigate ambiguity regarding the appropriate EPC record to associate with the properties. EPC information marked as 'Invalid' on the dataset has also been removed from our internal database, as these

² Equivalent to €501,676,004.96 using FX rate at pricing date

³ Carbon Trust Assurance Report has been published on the 'Green Bonds' section of Barclays Investor Relations website (<https://home.barclays/investor-relations/fixed-income-investors/funding-and-liquidity/green-bonds/>)

⁴ The appropriate field within the EPC dataset that contains estimated carbon intensity figures for each property is: CO₂ EMISS CURR PER FLOOR AREA (CO₂ emissions per square metre floor area per year in kg/m²)

contain potentially erroneous values for carbon intensity. Finally, the estimated avoided carbon emissions (versus national EPC average) are sensitive to the choice of baseline dataset. For example, the avoided carbon emissions versus the national EPC average may decrease over time as UK housing energy efficiency improves. The DCLG⁵ EPC data release contains EPC records for c.16 million properties in England and Wales as at March 2017, whilst the total number of domestic properties in England and Wales is much higher (25.6m domestic properties with a Council Tax band as at 31 March 2018). As a result, this report only considers the national average carbon intensity based on EPC data, and subsequent calculations are benchmarked against this average.

Allocated Portfolio of EMAs

Total KgCO₂/m² of all EMAs = 25,834.6

Total number of properties = 1,626

$$\text{Average} = \frac{25,834.6}{1,626} = 15.89 \text{ KgCO}_2/\text{m}^2$$

EPC Dataset (March 2017)

Total KgCO₂/m² of all properties = 623,075,041.3

Total number of properties = 15,423,226

$$\text{Average} = \frac{623,075,041.3}{15,423,226} = 40.40 \text{ KgCO}_2/\text{m}^2$$

The average carbon intensity for Barclays allocated EMA portfolio of 15.89 KgCO₂/m² is c.60% lower than the EPC dataset average of 40.40 KgCO₂/m², and c.36% lower than the top 15% of lowest carbon intensive properties at 24.8 KgCO₂/m².

⁵ Department for Communities and Local Government

2. Annual estimated KgCO₂ avoidance of Allocated EMA portfolio

The second calculation estimates the annual carbon emission avoidance of the overall portfolio of EMAs. This calculation includes the following inputs:

- (a) Average estimated carbon intensity of allocated EMA portfolio (in KgCO₂/m²)
- (b) Average estimated carbon intensity of EPC dataset (in KgCO₂/m²)
- (c) Total floor area of EMA portfolio properties (in m²)

The formula for calculating the estimated carbon avoidance using these inputs is shown below: -

$$\text{Annual KgCO}_2 = (a - b) * (c)$$

Where:

$$a = 15.89$$

$$b = 40.40$$

$$c = 191,411$$

Estimated Annual Avoidance versus national EPC average = 4,691,484 KgCO₂ or 5,171.42 US tCO₂⁶

3. Estimated carbon emissions avoided per every €1m of proceeds allocated

The third calculation is an estimation of how many tons of CO₂ have been avoided per €1m of Barclays Green Bond proceeds allocated. The formula for this calculation is shown below:

$$\text{CO}_2 \text{ Avoidance per €1m invested} = \frac{(a*b)}{c}$$

Where:

$$a = \text{€}1,000,000$$

$$b = 5,171.42 \text{ US tCO}_2$$

$$c = \text{€}500,000,000$$

Annual CO₂ Avoidance per €1m invested versus national EPC average = 10.34 US tCO₂

⁶ Conversion: $Kg = \frac{US\ t}{0.0011023}$

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