



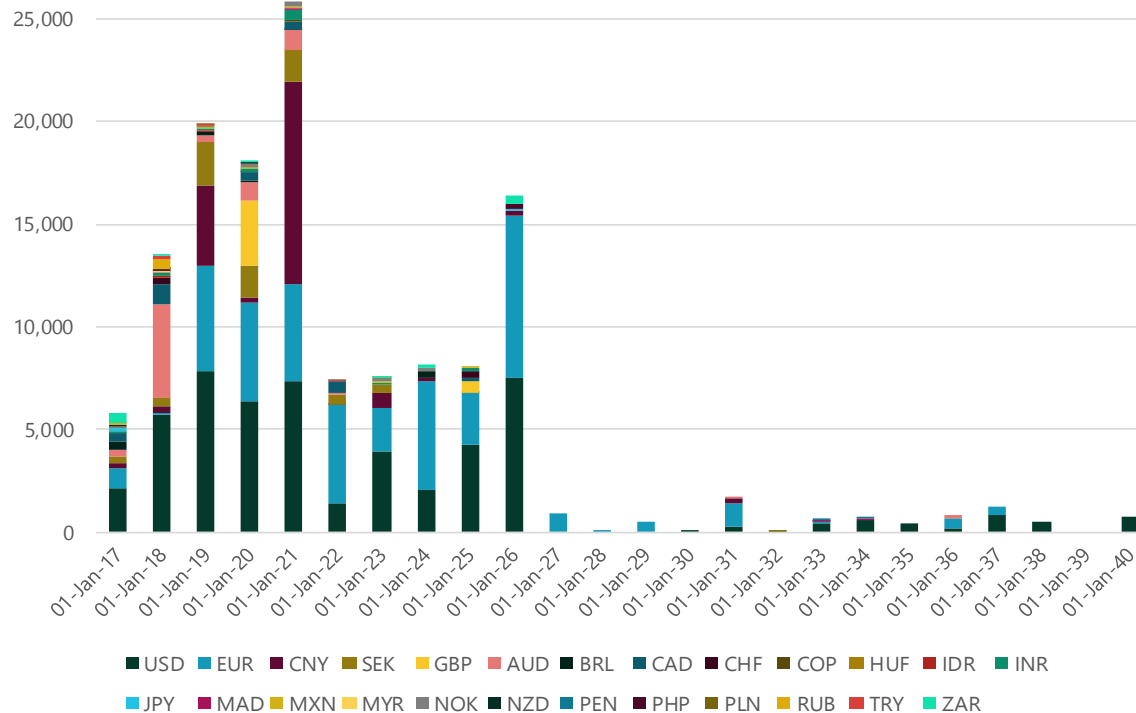
## ASSESSING THE CLIMATE CHANGE MITIGATION IMPACT OF GREEN BONDS



# 1 THE GREEN BOND MARKET

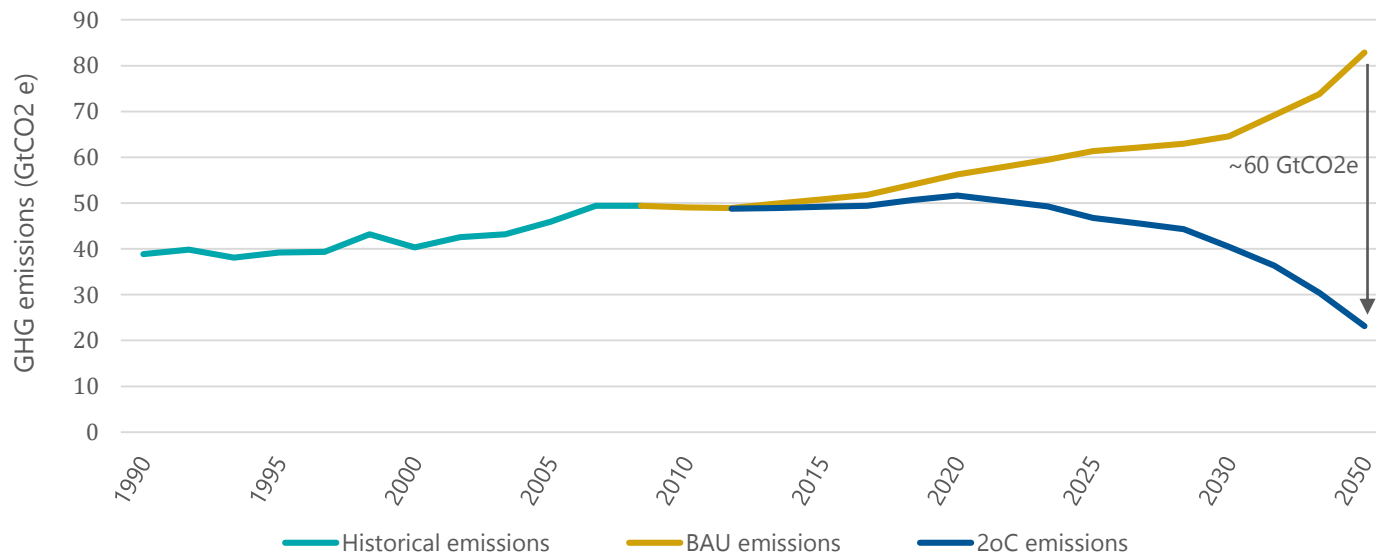
- Investors interested in ESG and non-financial returns;
- Demand for Green Bonds has boomed over the past 5 years;
- Green Bonds have mainstreamed environmentally aligned investment;
- US\$144 billion of Green Bonds outstanding denominated in 26 currencies

Green Bond Market Amortisation Profile



## 2 DEBT CAPITAL MARKETS AND CLIMATE CHANGE

- To keep global warming to below 2°C, GHG emission must reduce by ~60GtCO<sub>2</sub>e vs. BAU by 2050
- An estimated **\$93tn of investment is needed by 2030** globally to transition to a Low Carbon Economy;



Impact calculations are already in the guidance:



**“Transparency is of particular value in communicating the expected impact of projects...** The GBP recommend the use of qualitative performance indicators and, where feasible, **quantitative** performance measures”

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THE QUESTIONS EVERYONE IS ASKING

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- ... What impact are Green Bonds having on global emissions reductions?
- ... What is the prospective GHG impact of my Green Bond investment portfolio?
- ... How much potential Green is there in this Green Bond?


**You can't value what you don't measure**

- And some issuers and investors are already calculating GHG impact;

#### Green Bonds – Made by KfW

Impact of EUR 1 million investment:	<b>800</b> tons	of GHG emission reductions (CO <sub>2</sub> -equivalents) (per annum)
	<b>69,000</b> EUR	of savings for energy imports to Germany and in fossil fuel costs (per annum)
	<b>22</b> jobs	created and/or secured (person years)
	<b>94,000</b> EUR	of savings in external costs: e.g. by avoiding environmental and health damage (per annum)

Values are based on numbers evaluated by ZSW and internal calculations. Savings in GHG emissions are based on "Renewable Energies – Standard" programme impact 2010 - 2014 in Germany. Savings for energy imports to Germany and in fossil fuels, saved/created jobs and savings in external costs are based on "Renewable Energies" programme impact 2010 - 2014 in Germany. Current and future impact might be different, especially for projects outside Germany.

	Expected output (in TWh/year)		Expected avoided CO <sub>2</sub> emissions (in Mt/year)	
	Gross <sup>(1)</sup>	Net <sup>(2)</sup>	Gross <sup>(1)</sup>	Net <sup>(2)</sup>
Green Bond #1 November 2013	7.0	4.1	3.3	1.8
Green Bond #2 October 2015	4.3	3.1	3.0	2.1



We've worked with an external expert to develop a framework for measuring the environmental impact of the projects and deals. For the full year 2016, the renewable energy projects amounted to a total carbon emissions avoided of 744 kilotonnes, which is the equivalent of removing the annual emissions of 93,000 Dutch households.

- But currently calculation methodologies and results presentation vary across the market.

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## A UNIVERSAL APPROACH TO IMPACT ASSESMENT

**The Carbon Yield quantifies the environmental impact of a Green Bond in terms of GHG emissions avoided per annum through the financed activities.**

e.g. Company Corp. €500 million 02/2025 3.5% **0.735(C<sub>Y</sub>)**  
(C<sub>Y</sub>) = tCO<sub>2</sub>e/year/€1,000

**That is:** an investor holding €1,000 of this bond for a year, would have enabled 0.735 tCO<sub>2</sub>e of potential abatement.

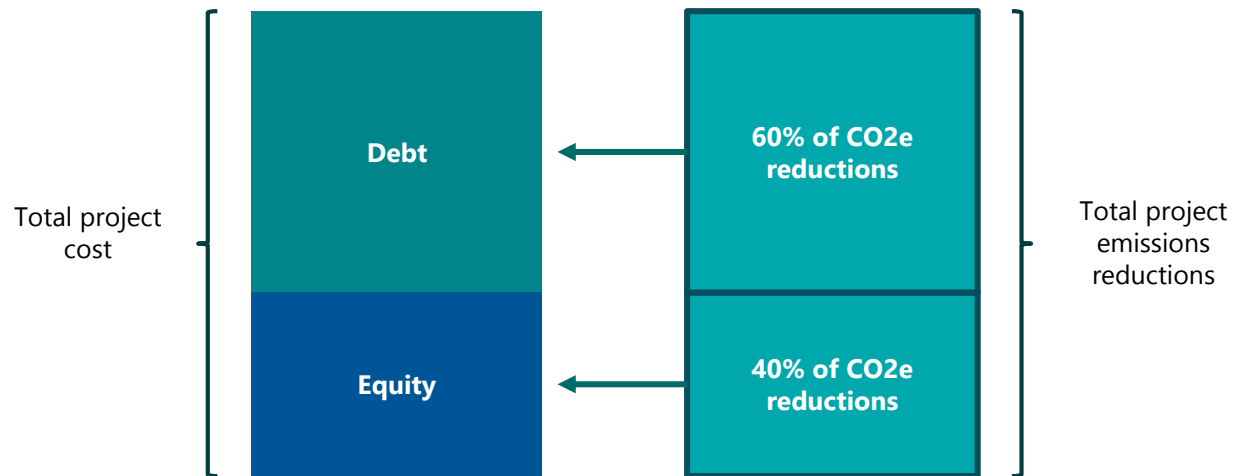


**The Carbon Yield methodology is publicly available** [www.carbonyield.org](http://www.carbonyield.org)

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## CALCULATING THE CARBON YIELD

- Emissions allocated evenly across **capital structure** of a project:



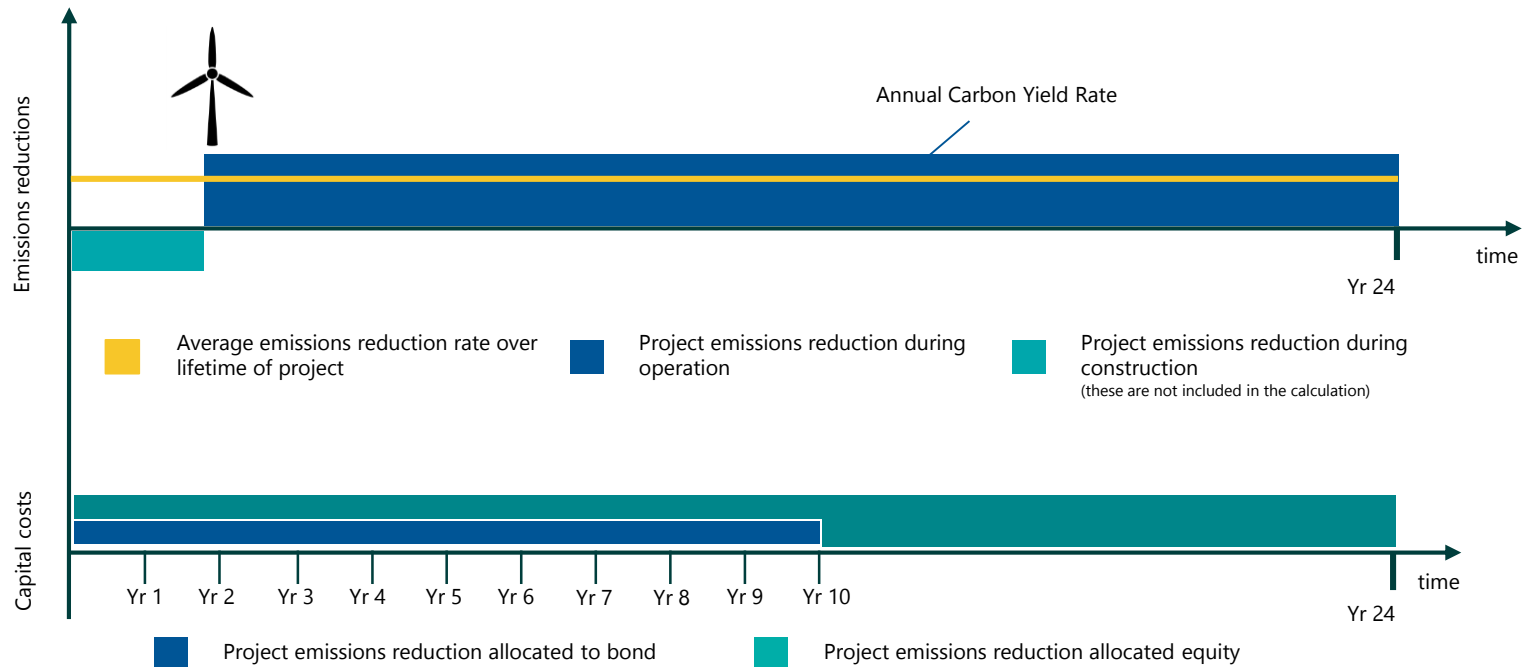
- Impact of project depends on: **size, technology** and **geography**



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## CALCULATING THE CARBON YIELD

- Impact averaged over **full lifetime** of project:



- Can be used to assess a portfolio of **existing Green Bonds**;
- Can be published by issuers of **new Green Bonds**;
- Is applied at **Framework level**: i.e. one Carbon Yield for one issuer
- Can be **used by anyone**;
- Is **publicly available**;
- Allows **upfront assessment** of impact of different Green Bond Frameworks;
- **Most of the data necessary to calculate it is already being collected by issuers.**

## 10 THE CARBON YIELD: USING IT

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- Is a straightforward **quantitative** metric;
- It introduces a **common language** around GHG impact across the market;
- Increases **transparency** in the Green Bond market;
- Is designed to **complement the existing Green Bond Ecosystem** of qualitative assessments;
- Allows **upfront assessment** of impact of different Green Bond Frameworks;
- Could lead to creation of **relative value** for Green Bonds;
- Increase flows of Green capital overall and to **Ems**;
- Provides investors with **additional information** on the issuances.

## 11 GHG EMISSIONS ARE NOT THE ONLY MEASURE OF GREEN

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### ... **But they're a good place to start**

- The Carbon and GHG accounting systems are the most advanced and familiar;
- We hope that in time the Carbon Yield will give rise to other “sister” metrics tackling for example water intensity;
- **The Carbon Yield methodology is publicly available** and looks to evolve and become more sophisticated with the market.