

MANAGING THE RISK OF CLIMATE CHANGE WITHIN BANKS MAY REST ON INTERPRETING CARBON INTENSITY CORRECTLY

CARBON INTENSITY IS A MUCH-QUOTED, BUT DECEPTIVELY NUANCED METRIC. THE BANKING SECTOR NEEDS TO UNDERSTAND IT FULLY FOR CARBON DISCLOSURES AND RISK MANAGEMENT.

Climate Risk Perspectives

EMERALD PATHWAYS

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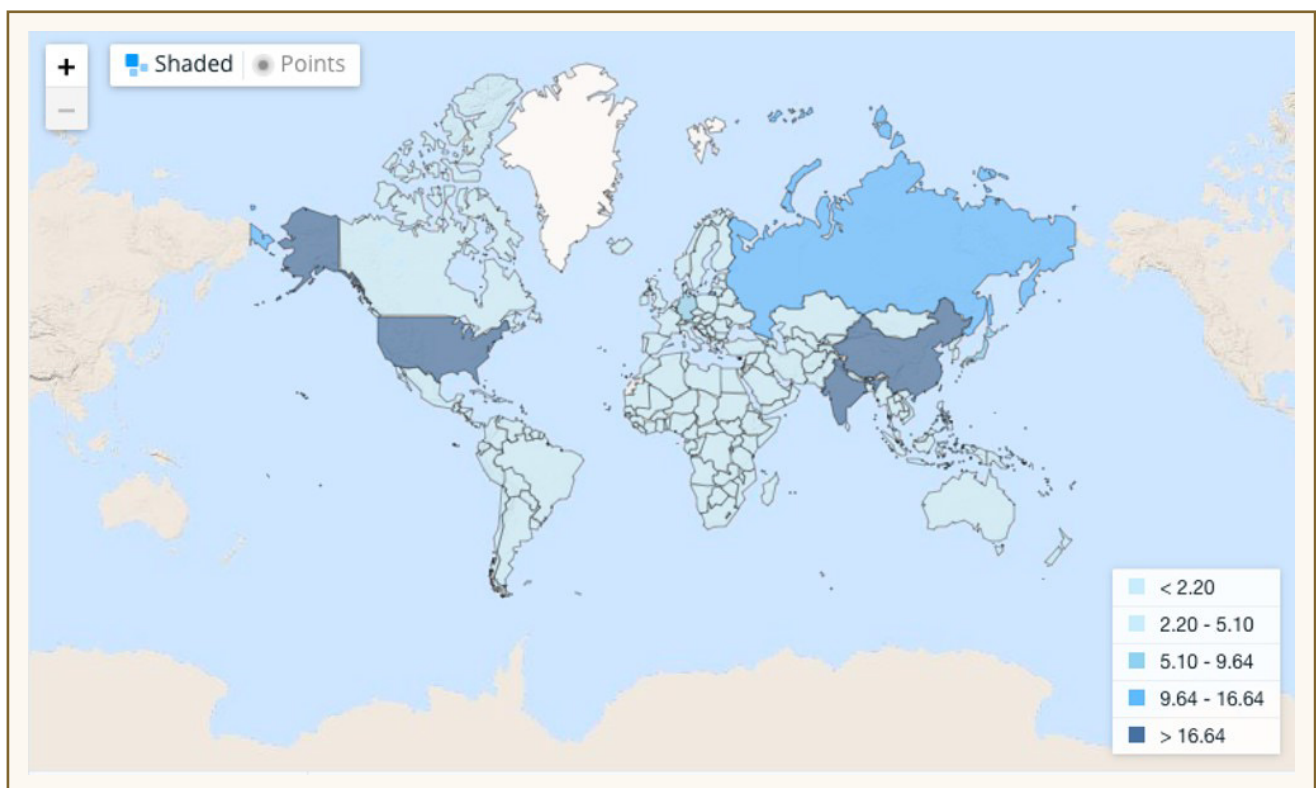
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Carbon Intensity is a common metric for comparative carbon auditing...

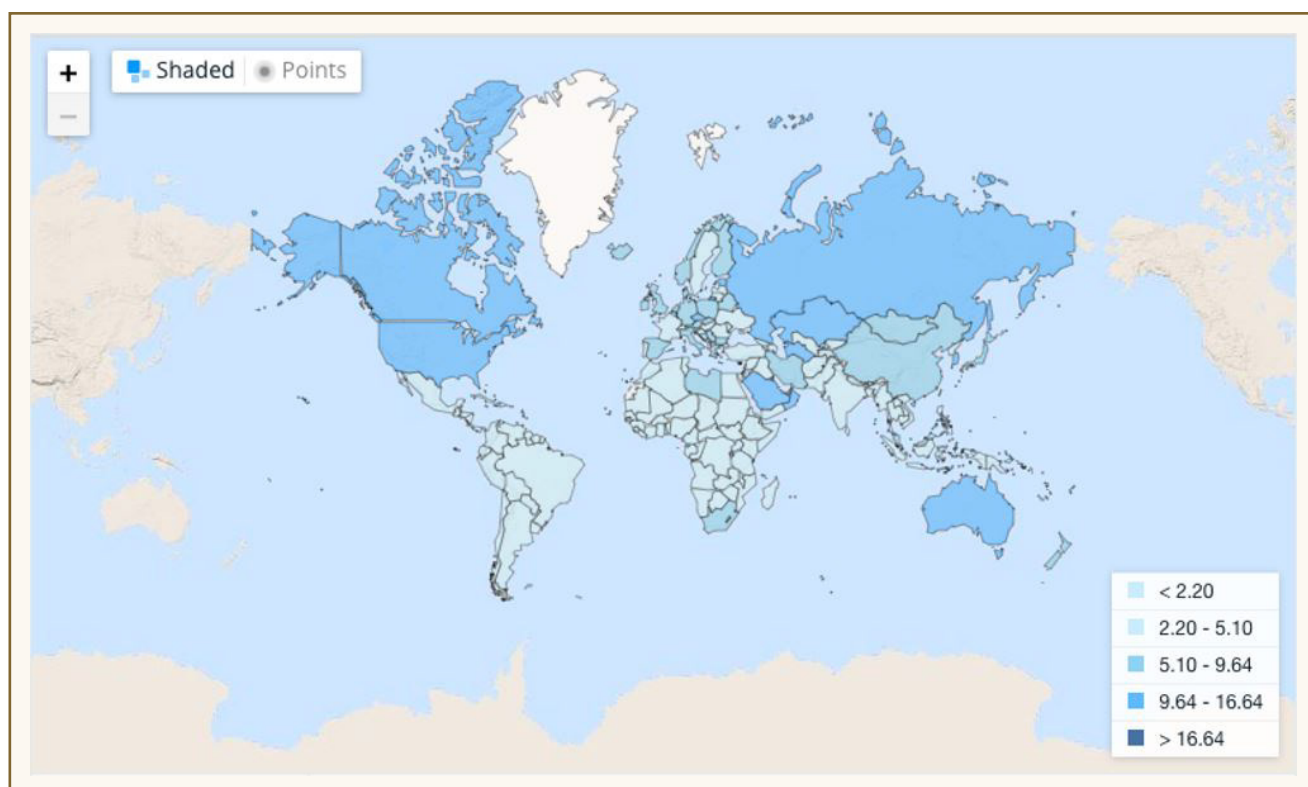
CI, as a metric, represents the amount of carbon emitted per unit of activity. This is typically expressed as 'KgCO₂ per unit', with the unit being representative of the activity. CI is useful for comparisons and emission targets such as - when the global distribution of CO₂ emission is considered.

2018 CO₂ emission by country ([from worldbank.org](https://data.worldbank.org/indicators/ny.gas.tz.cds)) shows the main industrial economies producing the most GHG in absolute terms.



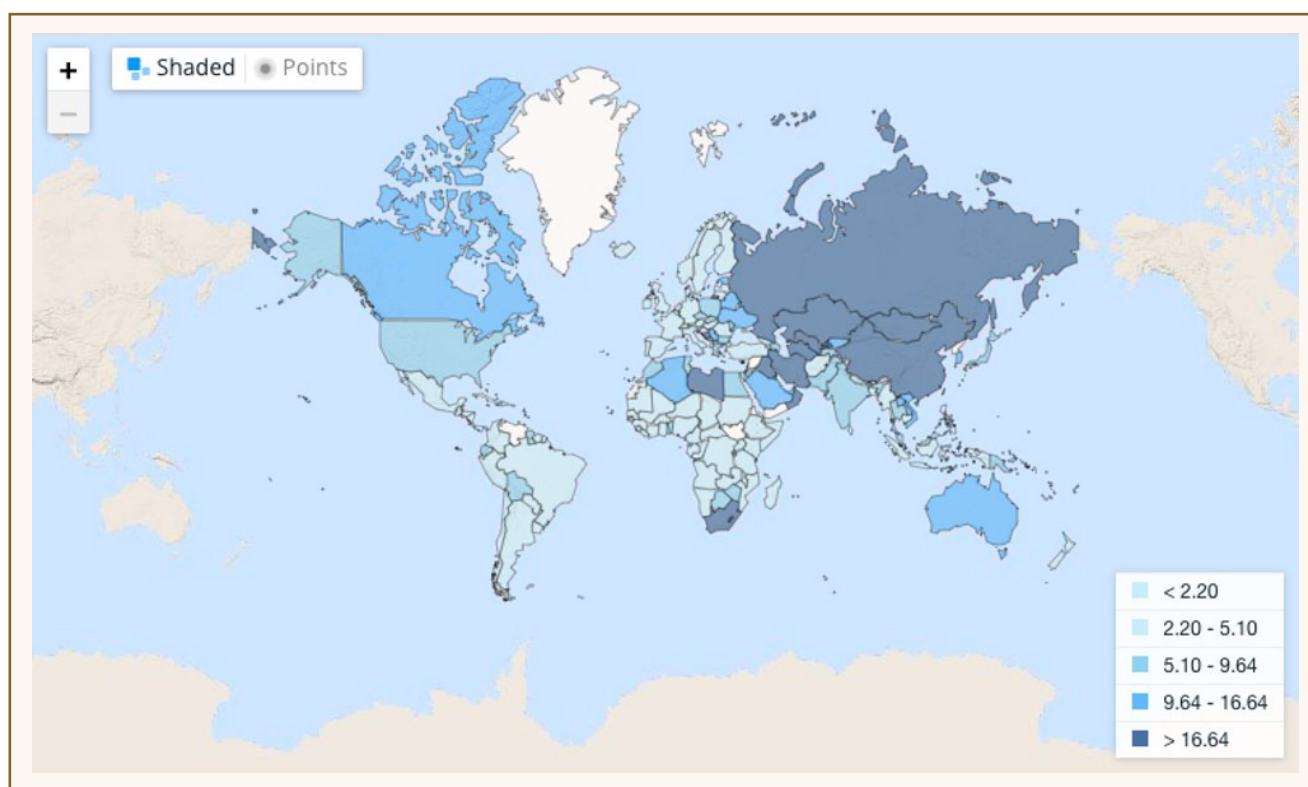
Source: worldbank.org

When this is converted to a 'per capita' basis, the chart changes considerably.



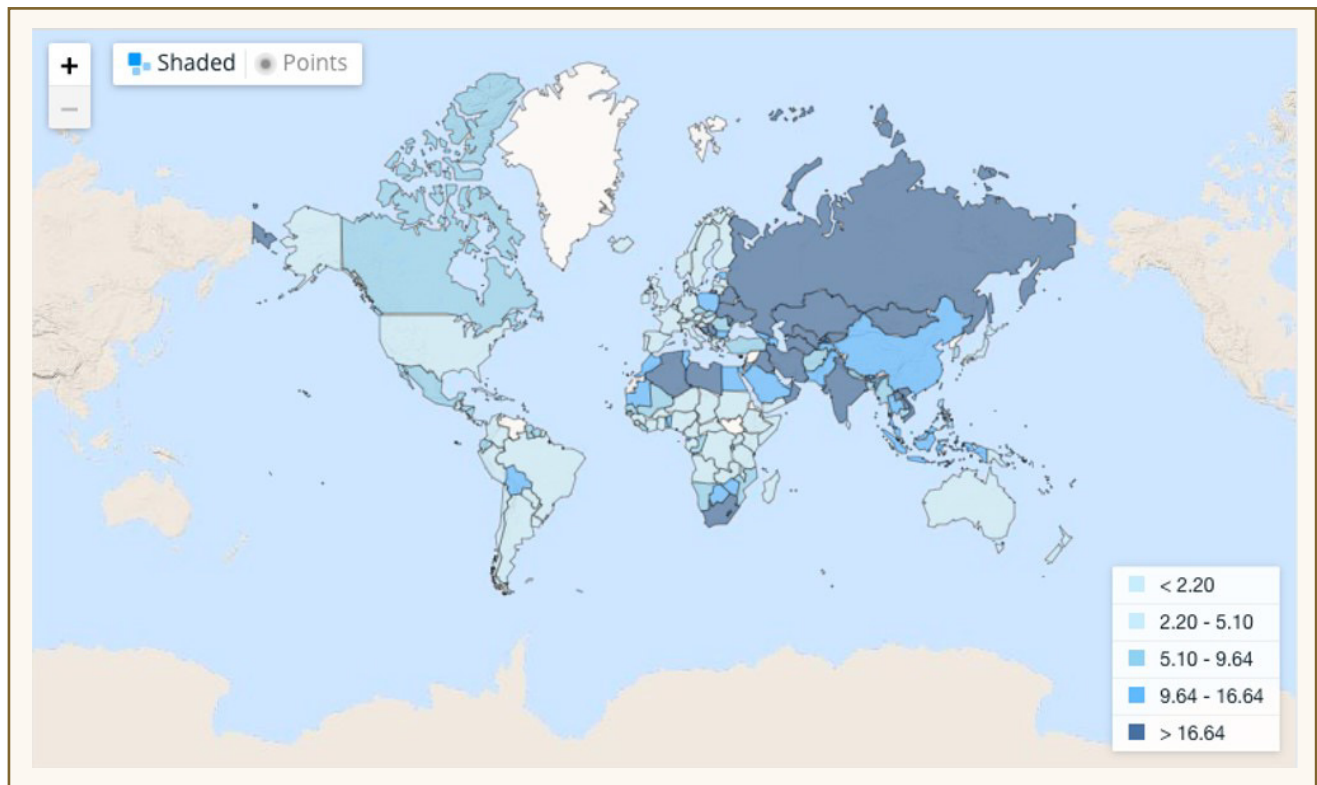
Source: worldbank.org

When converted again to CO2 per \$PPP GDP - GDP in dollar terms normalized to an international standard (Purchasing Power Parity) using the price of a wide basket of goods as the normalizing factor.



Source: worldbank.org

Finally, CO2 per \$GDP



Source: worldbank.org

Of particular interest is the role of the US in terms of CO2 intensity, and how it change with the metric selected as the unit of division. With each successive change, from 'pure emissions' to 'emissions per \$GDP', the country moves down an intensity grade.

This has clear ramifications as to the pathway to a greener economy that countries take, and their consequences on the wider global ambition of 'net zero' by 2050. Note that the US Department of Energy ([DoE](#)) uses the 'CO2 per \$GDP' formulation.

The unit used by banks for their 'Scope 3' disclosure, is 'CO2 per \$m revenue'.

Even the definition of CO2 emissions is variable...

Carbon emissions in a particular activity is not a simple calculation. There are four commonly used definitions for this, with each having its specific pros and cons:

- *Basic* - Carbon emissions are calculated for a specific process only without considering GHGs involved in material production or end-of-life processes for those materials. This method is the simplest as it is self-contained, and avoids double counting of total carbon emissions. However, it tends to obscure the total carbon footprint of a product, potentially leading to a greenwashing effect.

- *Well-To-Wheels (WTW)* - Carbon emissions for specific processes, and any upstream activities that extract, refine, and deliver materials needed for the process. Notably, end-of-life process emissions are not included, which excludes decommissioning of plants and machinery. This is attractive as a carbon audit standard as it allows an industry such as vehicle manufacture to be segmented into manufacture, recovery, and disposal. This avoids double-counting along the specific chain but also leaves room for greenwashing certain activities.
- *Life Cycle Assessment (LCA)* - Carbon emissions are counted over the entirety of the process, from raw material extraction to end-of-life treatment. This is the most complete carbon audit, as it captures all emissions involved. Banks that finance multiple parts of the same supply chain may double count some emissions but the main issue is the complexity of the audit itself. There are a number of variables needed, such as the length of life of a plant or machine, which impacts the unit numbers and therefore the final 'intensity' number. End-of-life emissions also require estimates about processes outside of the control of the firm under audit.
- *WTW-LCA Hybrids* - Between the two lifecycle methods, there are a number of systems. These are designed to provide a consistent measure. An example is the inclusion of end-of-life treatment for batteries for electric vehicles. These schemes retain the WTW ease while attempting to avoid carbon undercounting within specific industries.

One such hybrid scheme is the Greenhouse Gases, Regulated Emissions, and Energy use in Transportation (GREET) model, which is used by the US DoE's Office of Energy Efficiency and Renewable Energy. This allows a more comprehensive comparison of the relative environmental merits of different vehicle types.

More than just carbon is audited for CI computation...

CO₂ is the most commonly referenced Greenhouse Gas (GHG). This is because it is the longest-lasting in the atmosphere, effectively meaning that every kg released into the atmosphere has a warming effect for centuries. Other gases, such as methane or nitrogen, have greater potency, but often remain in the atmosphere for far less time - for decades rather than centuries.

The nature of climate pathways and potential environmental 'trigger points', where positive feedback loops are activated by temperatures being temporarily above the target range, means that these gases must be accounted for. To include other GHGs, a scientific formulation is used that compensates for both the potency and longevity, effectively amortizing the effect over a time range. This results in the terminology 'Carbon Dioxide or equivalent' (CO₂e).

Banks must use '**CO₂e tonnes per \$m revenue**' as their CI calculation base.

The Bank for International Settlements (BIS) issued [guidance](#) for syndicated loans on this topic in June 2021.

With the banking metric understood, data needs to be interpreted...

As mentioned in an earlier section, each industry uses a specified unit for its own reported CI. When calculating their own 'Scope 3' disclosures, banks must be able to disentangle the reported numbers they obtain from their customers. Below is a range of unit descriptions, as reported by the Bank of England (BoE) in their own disclosure documents.

	Intensity measurement
All	Tonnes of CO ₂ e per total £m sales revenue
	Tonnes of CO ₂ e per total £m Earnings Before Interest, Tax, Depreciation and Amortization (EBITDA)
	Tonnes of CO ₂ e per full time equivalents
Integrated oil and gas	Tonnes of CO ₂ e per tonne of output, broken down for: Exploration and production Refining Petrochemicals
Transport sectors	Tonnes of CO ₂ e per revenue tonne kilometer (RTK — revenue from transporting one tonne over a distance of one kilometer)
	Tonnes of CO ₂ e per pallet cases
Passenger carrying sector	Grammes of CO ₂ e per passenger kilometer
Beverages	Grammes of CO ₂ e per total liters of beverage e.g., beer, spirit
Retail	Tonnes of CO ₂ e per square meter of gross store area
Banking	Tonnes of CO ₂ e per £ million of income
Manufacturing	Tonnes of CO ₂ e per total million tonnes of production
Postal services	Grammes of CO ₂ e per 1000 items
Water utilities	Tonnes of CO ₂ e per megaliter broken down by clean and wastewater
Electricity utilities	Tonnes of CO ₂ e per megawatt hour

Telecommunications internet, software and services	Tonnes of CO ₂ e per gigabyte transmitted
Property sector	Tonnes of CO ₂ e per total square meter

In order to properly understand the levels of GHG being financed by the bank, they should break down the available data and report on the following:

- Sector level CI benchmarks and values for assets on the balance sheet
- Bank-level CI
- Explanatory notes on CI formulation
- Explanatory notes on sector level CI factors

In addition to carbon disclosures, the above information is used for:

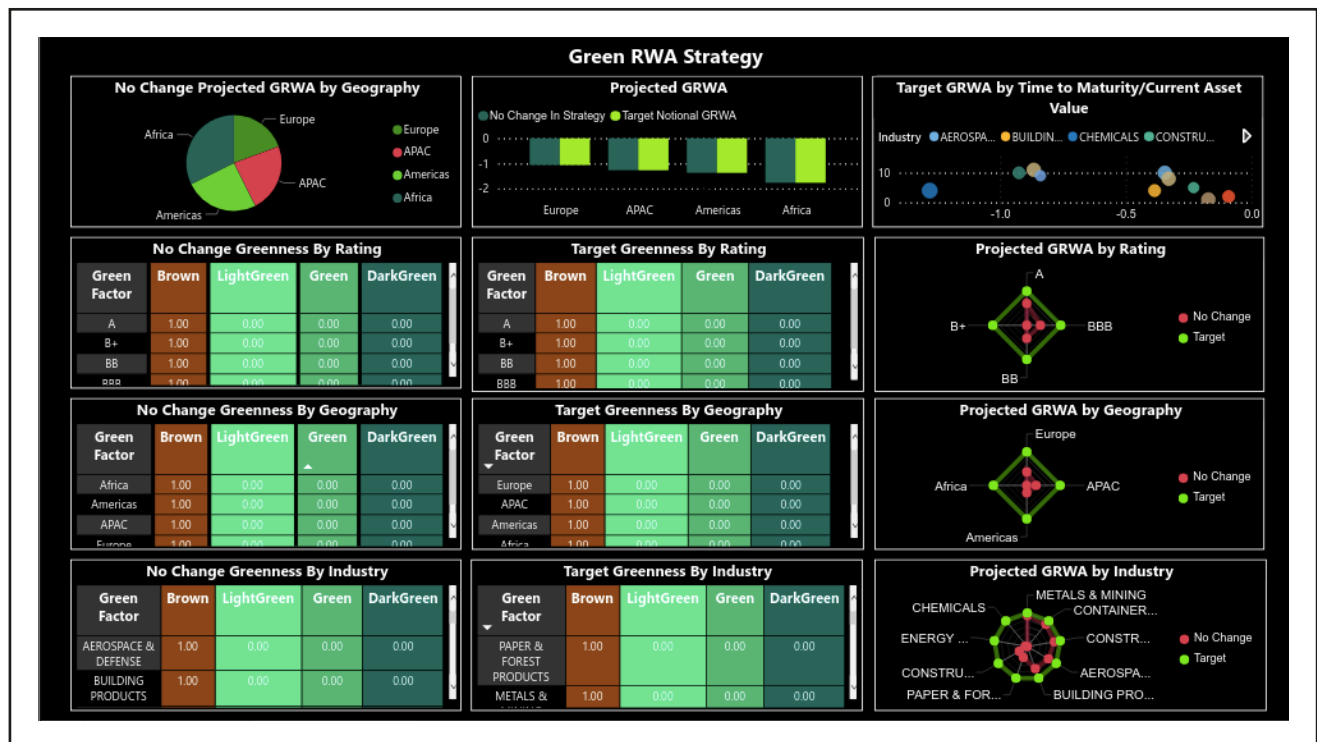
- Internal climate risk governance
- Inclusion of climate change in risk reporting
- Determination of likely climate strategy paths to be encoded into risk scenarios and stress testing

It is with regard to stress testing that the calculated outputs become most useful for financial risk management. Climate pathways are determined by the International Panel for Climate Change (IPCC) and are designed to represent valid routes to preset global warming targets. Individual governments commit to their own targets, based in part, on these pathways. The priority of climate action within each nation will differ according to their own emission profile and metrics. Understanding how a government views its national emissions is a useful indicator as to the speed of transition within each area and alters the likely impact on business models within specific sectors. These impacts will determine the likely credit profile of firms within these sectors and those that represent the banks' customers.

Strategies to deal with increased credit risks faced by the bank as a lender, and advisory services provided by the bank around climate adaptation, are determined by these pathways and resultant risk profile changes.

GreenCap can help...

GreenCap is a 'Risk as a Service' (RaaS) solution, designed to determine the risk-based capital increases a bank will face as the green economic transition progresses. The solution translates climate science into recognizable risk management outputs based on IPCC pathways and well-understood risk metrics.



With GreenCap, banks can expand their risk management frameworks to include climate change in their risk governance and reporting. They are also able to ensure that assets are priced in a way that reflects these increased risks, enabling climate advisory services to be provided, with the explicit aim of becoming a key part of the global warming solution.

Visit GreenCap.live for further insights, news, and resources, curated to provide banks with all the tools they need to create effective climate change risk management strategies.



ABOUT GREENCAP

- GREENCAP is a turnkey 'Risk as a Service' (RaaS) solution, designed for banks to include climate change as a category in their risk management frameworks.
- The solution allows banks to replicate climate pathways within their scenarios for economic impact and risk analysis.
- Using GreenCap, banks can modify pathways and scenarios to include the timing effects of delayed sustainability transition measures.
- Loans and credit facilities are measured and monitored against risks arising from both 'physical' and 'transition' impacts.
- GreenCap provides support for risk reporting and governance in the areas of 'Responsible Banking' and climate change.
- With GreenCap, banks can ensure that their climate strategies are financially grounded, and loan pricing is optimized throughout the transition to a green global economy.



ABOUT GREENPOINT FINANCIAL

- GreenPoint Financial is a division of GreenPoint Global, which provides software-enabled services, content, process and technology services, to financial institutions and related industry segments.
- GreenPoint is partnering with Finastra across multiple technology and services platforms.
- Founded in 2006, GreenPoint has grown to over 400 employees with a global footprint. Our production and management teams are in the U.S, India and Israel with access to subject matter experts.
- GreenPoint has a stable client base that ranges from small and medium-sized organizations to Fortune 1000 companies worldwide. We serve our clients through our deep resource pool of subject matter experts and process specialists across several domains.
- As an ISO certified by TÜV SÜD South Asia, GreenPoint rigorously complies with ISO 9001:2015 and ISO 27001:2013 standards.
- GreenPoint is owned by its founders and principals and is debt free.



Marcus Cree

MANAGING DIRECTOR AND
CO-HEAD OF FINANCIAL TECHNOLOGY AND SERVICES

Marcus has spent 25 years in financial risk management, working on both the buy and sell side of the industry. He has also worked on risk management projects in over 50 countries, gaining a unique perspective on the nuances and differences across regulatory regimes around the world.

As Managing Director, Marcus co-heads GreenPoint Financial Technology and Services and has been central in the initial design of GreenPoint products in the loan book risk area, including CECL and sustainability risk. This follows his extensive experience in the Finastra Risk Practice and as US Head of Risk Solutions for FIS. Marcus has also been a prolific conference speaker and writer on risk management, principally market, credit and liquidity risk. More recently, he has written and published papers on sustainability and green finance.

Marcus graduated from Leicester University in the UK, after studying Pure Mathematics, Psychology and Astronomy. Since graduation, Marcus has continually gained risk specific qualifications including the FRM (GARP's Financial Risk Manager) and the SCR(GARP's Sustainability and Climate Risk). Marcus's latest academic initiative is creating and teaching a course on Green Finance and Risk Management at NYU Tandon School of Engineering.



Sanjay Sharma, PhD

FOUNDER AND CHAIRMAN

Sanjay is the Founder and Chairman of GreenPoint Global - a risk advisory, education, and technology services firm headquartered in New York. Founded in 2006, GreenPoint has grown to over 380 employees with a global footprint and production and management teams located here in the U.S, India and Israel.

During 2007-16 Sanjay was the Chief Risk Officer of Global Arbitrage and Trading Group and Managing Director in Fixed Income and Currencies Risk Management at RBC Capital Markets in New York. His career in the financial services industry spans over two decades during which he has held investment banking and risk management positions at Goldman Sachs, Merrill Lynch, Citigroup, Moody's and Natixis. Sanjay is the author of "Risk Transparency" (Risk Books, 2013), Data Privacy and GDPR Handbook (Wiley, 2019) and co-author of "The Fundamental Review of Trading Book (or FRTB)- Impact and Implementation" (RiskBooks, 2018).

Sanjay was the Founding Director of the RBC/Hass Fellowship Program at the University of California at Berkeley and is an Adjunct Professor at EDHEC, Nice in France. Sanjay is also Adjunct Professor at Fordham University where he teaches a similar master's capstone course and at Columbia University. He has served as an advisor and a member of the Board of Directors of UPS Capital (a Division of UPS) and is a frequent speaker at industry conferences and at universities. He served on the Global Board of Directors for Professional Risk International Association (PRMIA).

He holds a PhD in Finance and International Business from New York University and an MBA from the Wharton School of Business and has undergraduate degrees in Physics and Marine Engineering. Sanjay acquired his appreciation for risk firsthand as a merchant marine officer at sea where he served for seven years and received the Chief Engineer's certificate of competency for ocean-going merchant ships. Sanjay lives in Rye, NY with his wife and two teenage sons.