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BLUE CARBON

The planet's carbon sink

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1. Introduction to blue carbon

Climate change is challenging the planet but is being addressed, with natural ecosystems stabilising habitats in the deep seas and on large landmasses.

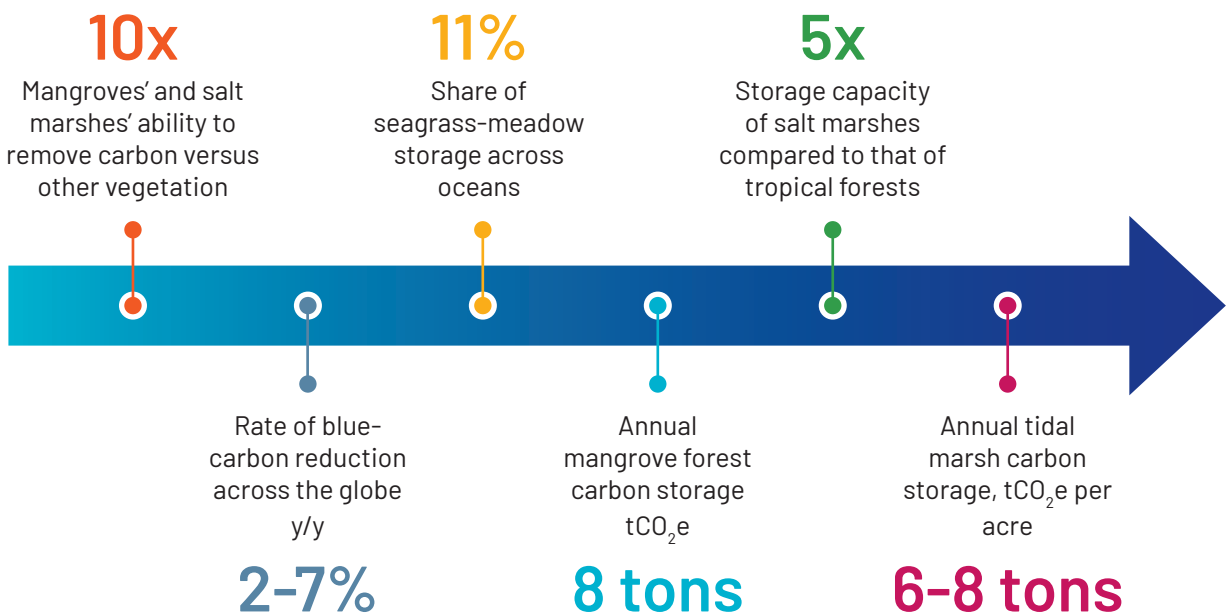
Flora and fauna help stabilise the deep seas by controlling facets of the ecosystem including marine life, the food chain and minerals and deposits on the ocean floor. Mangroves, tidal marshes and seagrass meadows, for example, help prevent the effects of climate change along coasts, including from downpours, rising sea levels and shoreline erosion, and control coastal water quality, protect the habitat of commercially valuable fishery resources and threatened marine species, and ensure nutrition security for coastal regions.

Seagrass meadows, mangroves and salt marshes capture and store carbon, functioning as a **carbon sink**.

Despite being considerably smaller than the planet's forests, these coastal ecosystems can trap far more carbon and keep doing so for thousands of years. This carbon stored/absorbed by other living organisms within such sinks is referred to as **blue carbon**; it is made up of organic carbon that is absorbed and retained either by ocean or shoreline environments.

These carbon sinks cover over **49m hectares** and can be found on all continents except Antarctica; these are some of the most endangered ecosystems on Earth, notwithstanding their significance. They are deteriorating four times faster than tropical forests, and climate change could accelerate this process. More than 50% of the world's pre-industrial age coastal wetlands have been lost since the 19th century.

Key facts about blue carbon



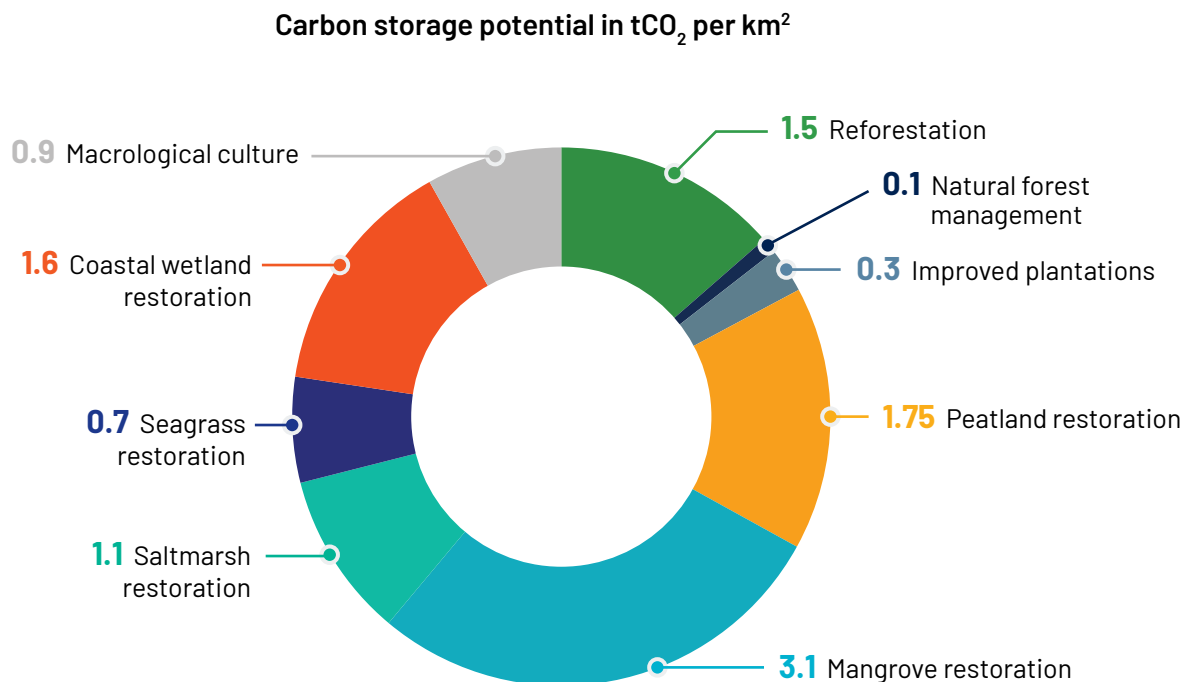
Source: NOAA

2. Evolution and significance of blue-carbon ecosystems

Climate change is endangering economies and accelerating the extinction of marine life and their ecosystems. Growing awareness of the serious effects of environmental harm on social and economic wellbeing, and human health and wellbeing, is creating a sense of urgency for change.

In the years before and after the two world wars, industrialisation gathered pace to meet significant demand for infrastructure and resources. This, combined with global population growth, resulted in a loss of habitat along shorelines and coastal areas.

This failed to be highlighted due to the low level of oversight and research from the early 1950s to the 1990s. With increasing awareness, however, a number of institutions have taken on the responsibility for restoration through private and public investments including grants; these enable the much-needed technological integration to track, assess and mobilise the changes needed to protect carbon sink ecosystems. Restoring the lost ecosystems of mangroves, salt marshes and seagrass meadows would unlock vast storage capacity, according to recent studies.



Source: NOAA

Scientists say that ocean-based climate-related efforts could account for one-fifth of the annual reduction in greenhouse gas emissions required by 2050 to limit the increase in global temperature to 1.5°C. Despite making up only about 1.5% of the Earth's forests, blue-carbon habitats release a billion tons of carbon annually, approximately one-fifth of the emissions generated due to tropical deforestation.

In line with growing emphasis on combatting climate change, governments that have adopted the United Nations Framework Convention on Climate Change have agreed to publicly release levels of carbon dioxide and other greenhouse gases they emit annually, in addition to the amount of carbon dioxide they believe they have eliminated from the atmosphere through action such as forest management or rehabilitation. Under the

terms of the treaty, a particular country's efforts to cut emissions or save natural carbon sinks are converted into cash that can be used to offset its own emissions or traded with other nations.

These mechanisms of control and commercialisation have significantly increased blue carbon-based investments across the globe. As part of these increased efforts, the NOAA Blue Carbon Inventory Project was started in 2021 under the aegis of national agencies of the US with the dual objectives of assisting partner nations in incorporating blue-carbon ecosystems into their inventories of greenhouse gas emission sources and sinks and reducing the ecological footprint to address climate change. This would support long-term sustainable management of coastal blue-carbon ecosystems.



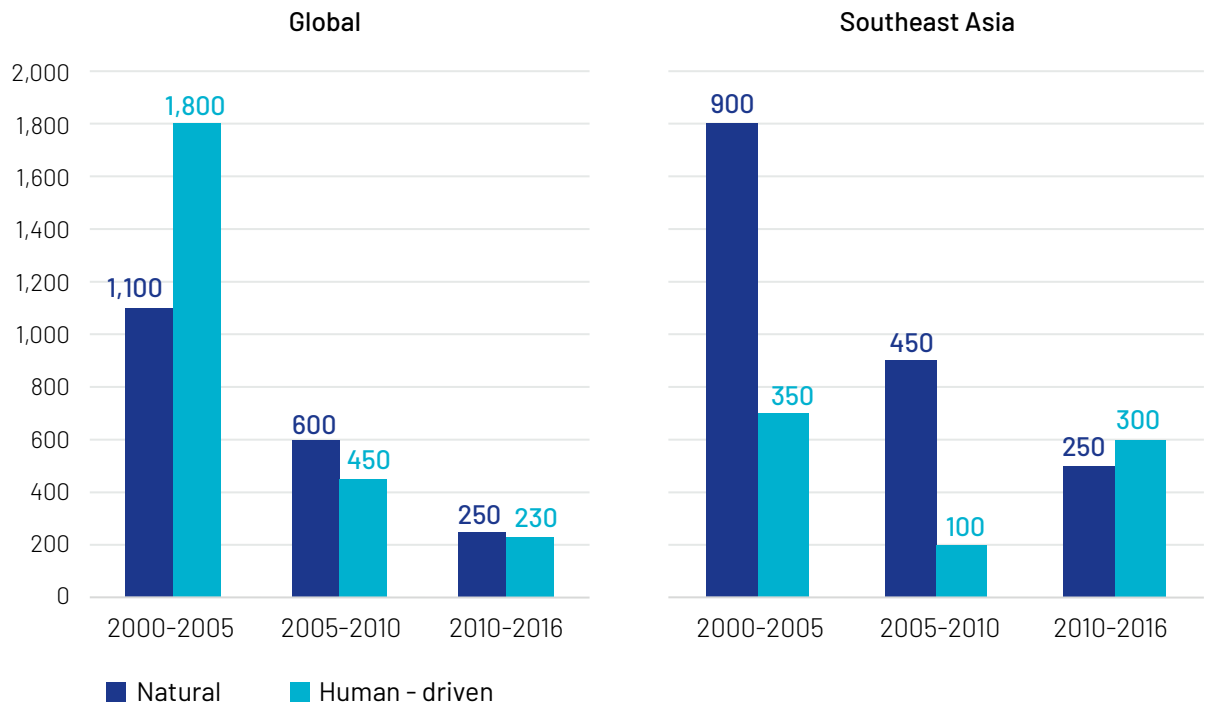
3. Key frameworks and initiatives supporting blue-carbon ecosystems

Forest preservation and restoration, and more recently, peatland restoration, have been acknowledged as crucial for mitigating climate change. Several countries are formulating laws and programmes to ensure ecological sustainability by reducing the carbon footprint that comes with economic expansion. These include measures to protect and promote sustainable natural systems essential to the United Nations Framework Convention on Climate Change (UNFCCC), for example, through the REDD+ framework and Nationally Determined Contributions (NDCs).

These policies and scientific analysis mechanisms have been integrated across multiple levels of implementation and are taken up through specific platforms and multi-level initiatives. The International Union for Conservation of Nature (IUCN), Conservation International (CI) and the International Olympic Committee (IOC) jointly formed one such platform, called the Blue Carbon Initiative (BCI). This aims to create management strategies, financial incentives and regulatory frameworks to ensure the preservation, rehabilitation and self-sustaining use of shoreline blue-carbon

ecosystems to provide an international forum for governmental organisations, non-governmental organisations, intergovernmental organisations and research organisations that aim to safeguard, sustainably manage and restore the world's coastal blue-carbon ecosystems.

In line with this, CI launched High-Quality Blue Carbon Principles and Guidance to give credit purchasers, financiers, vendors and project developers a uniform and recognised framework for planning and acquiring high-quality blue-carbon initiatives and credits. In addition, Australia's Department of Foreign Affairs and Trade, in multi-level collaboration with Google Australia, launched the Indo-Pacific Coastal Ecosystem Mapping Initiative, focused on employing machine learning to analyse seagrass and marine fauna pictures from different sources, to map and model data and insights in a more scalable and affordable manner. These studies would support further analysis being made by NASA and other administrations across the globe to assess loss structures of ecosystems. NASA classified multiple loss structures in mangrove ecological systems across the globe in a recent study .



Source: NASA

In response to such analysis and trend assessments, demand has been growing to manage, protect and restore these blue-carbon habitats to their full potential as part of regional and international climate change mitigation policies. This led to the IUCN releasing the Manual for the Creation of Blue Carbon Projects in Europe and the Mediterranean. This manual outlines all the necessary methodological stages – from project design on the ground to reporting in accordance with standards – to receive carbon credit offsets.



4. Trends in blue-carbon investment and financing

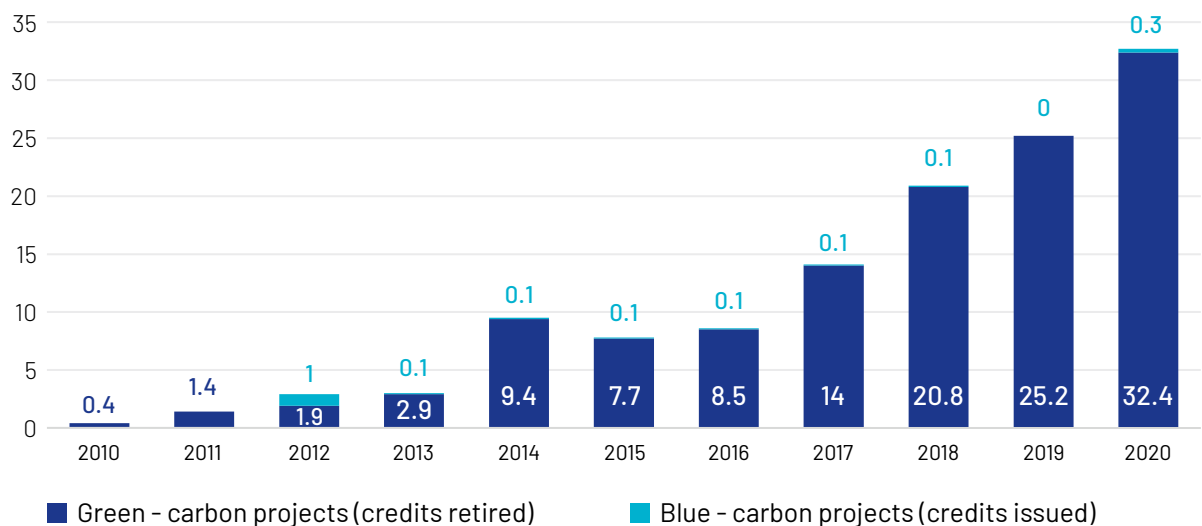
Seagrass meadows and mangroves are significant carbon sinks considered to be driving credit markets to start supplying carbon credits to international carbon markets. There is currently a gap in the scientific understanding of how different environmental factors affect the rate at which marine habitats absorb atmospheric carbon dioxide. According to scientific assessments, a credit equals one ton of emissions averted or eliminated from the atmosphere; this could lead to new investments as a collaborative effort towards saving these ecosystems from extinction or repairing damaged areas. Emitters in other nations can purchase credits from blue-carbon programmes or green-carbon projects such as projects to restore a forest to reduce carbon footprint.

Current investment by financial institutions in blue-carbon initiatives stems from a larger mismatch between operational capabilities and climate-related ambition.

Many banks and investors outside of the top tier lack the strategy and ability to invest in a relatively marginal asset class. Compared to the effort needed, ticket sizes are frequently modest, and there is often a pricing disparity with more established technology.

Financial institutions are racing to assess and include blue carbon into frameworks for portfolio allocation and to identify the knowledge resources that could help them navigate new markets to address these issues. The recently launched Blue Carbon Buyers Alliance seeks to unite and inform buyers behind a distinct demand signal, with members pledging to sponsor or purchase credits from high-quality blue-carbon projects, to address the difficulty of scaling both supply and demand. These aggregate early-mover signals may significantly affect supply, possibly resulting in a decline in prices .

10Y trend of carbon credits retired and issued in MtCO₂



Source: McKinsey

Much of the USD270bn annual carbon market comes from government-mandated programmes, such as the European Union's extensive Emissions Trading System, which caps emissions from high-emitting sectors and mandates businesses that exceed their limits to purchase carbon credits. In contrast, voluntary carbon markets (VCMs) are worth only USD1bn yearly and are still in the development stage due to ambiguous carbon credit accounting.

Since only a few projects, including five certified, have been launched so far, adding blue-carbon solutions to carbon emissions markets has limitations. The average project size now is 0.3m tCO₂e during a project's lifetime, compared to 2.4m tCO₂e for several other nature-based solutions in 2020 .

Blue-carbon projects in Asia and Central America are offering credit of USD13-35 per metric ton of carbon eliminated, with an offset purchased at USD7.53 per ton in 2022; this indicates significantly higher pricing, at a rate of two to four times the normal pricing. This price is based on the size and type of the project, considered together with the scarcity of projects and the high levels of first-mover interest. All this raises the value of blue-carbon credits, along with their availability in remote and difficult-to-reach locations, making it more difficult to complete projects, and quantify and recheck carbon stores.

Although emerging strategies such as the preservation and restoration of marine life may ultimately play a significant role in carbon sequestration, they are unlikely to receive VCM funding soon due to difficulties in integrating these strategies with several of the Core Carbon Principles that were created to make VCM funding possible. There are still certain unknowns in science, for example, about how carbon volume that is stored and recycled by marine life ends up in sediment.

Investors need to address bottlenecks among banking institutions, businesses, and governments to encourage more investment in blue-carbon technologies. In the most recent initiative, experts and volunteers took the better part of two decades to disperse more than 70m seeds across 3,600 hectares of a destroyed ecosystem in Virginia in the world's largest seagrass restoration effort. Such levels of investor participation can have a proportionate catalytic effect and may help investors develop the technical skills necessary as solutions scale up and delivery times get faster.

To regulate and introduce more standardised support for investors, several organisations have taken the initiative to formulate investor-focused carbon credit standards. The Taskforce on Scaling Voluntary Carbon Markets and Verra's REDD+ methodology aim to bring the entire value chain into close collaboration and offer solutions to the most urgent problems facing VCMs.



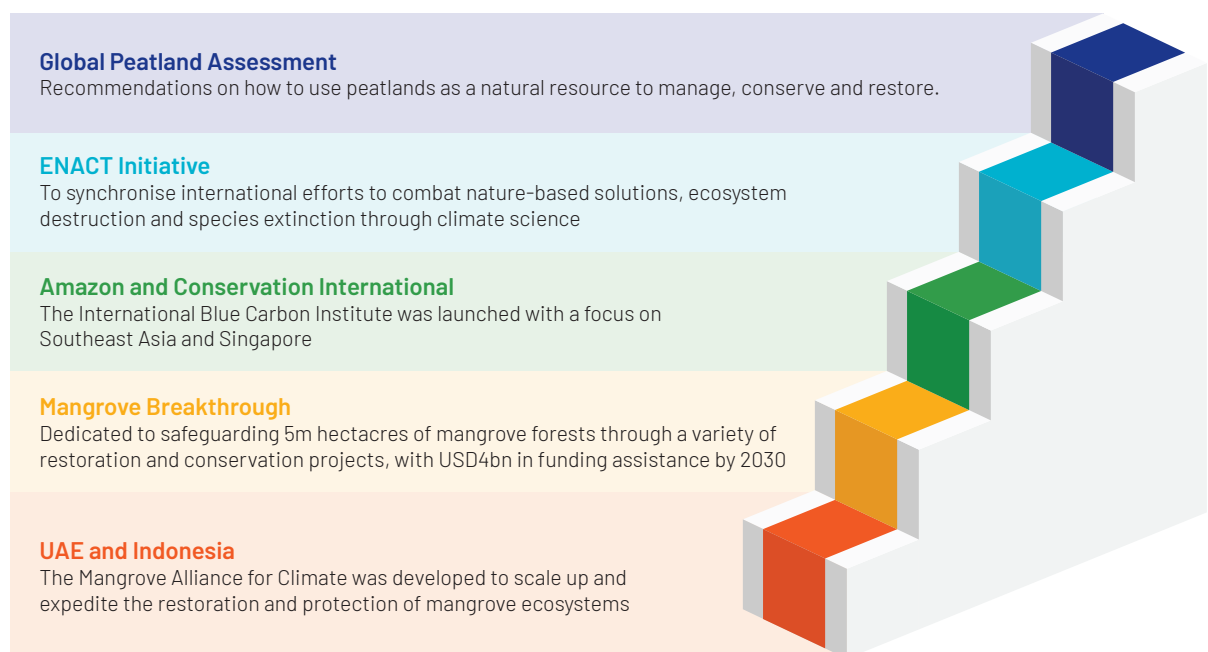
5. Representation of blue carbon at COP27

The inclusion of blue carbon and carbon sequestration in emission-reduction pathways has created a significant opportunity to strategically utilise these technologies as a long-term solution to rising CO₂ emissions. However, this calls for defining the precise capacity of blue carbon and its habitats. At the most recently held annual Climate Change Conference (COP27) in Egypt, the International Atomic Energy Agency (IAEA) disclosed its presence in more than 30 countries through blue-carbon projects. The IAEA is collaborating with 12 nations just on the African continent to increase the capacity for blue carbon. It is educating experts and assisting in the creation of labs with the capacity to precisely assess carbon sequestration rates through this regional technical cooperation project.

High-Quality Blue Carbon Market Principles and Guidance, the most recently launched joint collaboration-based framework

focusing on blue-carbon markets, was officially unveiled at the COP27 conference by Salesforce, The Nature Conservancy, Conservation International, Friends of Ocean Action and the Ocean Risk and Resilience Action Alliance.

Discussions along the themes of COP27 emphasised how crucial a role the blue-carbon ecosystem plays in sequestering and storing carbon dioxide. They also stressed the significance of cross-sector collaboration to accelerate progress on global objectives for the environment, the oceans and biodiversity. This involves bolstering assistance to nations so they may incorporate marine and coastal “nature-based solutions” into their Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs), together with compiling alliance-based investment models to be discussed and integrated into the ecosystem of financing solutions .



6. How Acuity Knowledge Partners can help

Our wide range of customised analysis and support covers the entire spectrum of financing products along the sustainable finance investment lifecycle and enables investment banks and advisory firms to establish and grow their sustainable finance practices:

Coverage and solutions		
ESG advisory	Green/social bonds	Nature-based solutions research
Sustainable bonds	Blended finance	ESG/sustainable transaction detailing
Green loans	Impact finance	ESG institutional/framework analysis
ESG strategy	ESG reports	Decarbonisation assessment

Our focused support	
Identifying sector-wise ESG taxonomy	Climate change framework analysis
Mapping climate targets	Analysis of sustainable initiatives
Climate bonds – opportunity analysis	Climate bonds – market updates
Benchmarking ESG standards and regulations	ESG newsletters
ESG scoring	Climate revenue share
SDG trackers	Building/analysing – portfolios or index
ESG thematic study	ESG indicators and controversies
SDG impact analysis	ESG rating

We have ESG domain expertise and help banks ramp up their onshore verticals, focusing on incorporating ESG in client analysis, saving a significant amount of senior bankers' time. We standardise templates and provide coverage across APAC, EMEA, the US and Sub-Saharan Africa.

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He has around 2.5 years of experience in working across the domains of ESG, Energy Security and Climate Change supporting clients and projects across sector wherein he holds strong accreditations focusing on Nuclear Power, Energy Security, Ballistics and National Security under the aegis of Ministry of Home Affairs, Govt. Of India, IAEA and World Institute of Nuclear Security, Vienna.

Sources:

- » [National Oceanic and Atmospheric Administration](#)
- » [The Blue Carbon Initiative](#)
- » [Intergovernmental Oceanographic – UNESCO](#)
- » [International Union for Conservation of Nature](#)
- » [Carbon Credits](#)
- » [McKinsey International](#)
- » [Salesforce](#)
- » [VERRA](#)

About Acuity Knowledge Partners

Acuity Knowledge Partners (Acuity), formerly part of Moody's Corporation, is a leading provider of bespoke research, analytics, staffing and technology solutions to the financial services sector. Headquartered in London, Acuity Knowledge Partners has nearly two decades of experience in servicing over 490+ clients by deploying its 4,800+ specialist workforce of analysts and delivery experts across its global delivery network.

We provide our clients with unique assistance to innovate, implement transformation programmes, increase operational efficiency, and manage costs and improve their top lines.

Our expertise includes the following:

- » Investment Banking: origination and trading support
- » Investment Research support: covering all asset classes in terms of ideation, data science, and research support across the buy side and sell side
- » Commercial Lending support: across origination, credit assessment, underwriting, and covenant and portfolio risk for all lending types
- » Private Equity: origination, valuation and portfolio monitoring support
- » Asset Management services support: across marketing, investment research, portfolio management/optimisation, risk and compliance
- » Corporate and Consulting services: market and strategic research; survey work; treasury and counterparty risk support; and CEO office support, including M&A, FP&A and investor relations support
- » Compliance support: AML analytics, KYC, counterparty credit risk modelling and servicing across banks, asset managers and corporates
- » Data Science: web scraping, data structuring, analytics and visualisation These services are supported by our proprietary suite of Business Excellence and Automation Tools (BEAT) that offer domain-specific contextual technology.

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