

# EMERGENT BEST PRACTICES IN CLIMATE CHANGE RISK MANAGEMENT - BRINGING BANKS TO THE FORE

BANKING'S APPROACH TO CLIMATE CHANGE, FROM THE PHILOSOPHICAL DESIGN OF STRESS TESTS, THROUGH INCLUSION IN RISK MANAGEMENT FRAMEWORKS, TO STAKEHOLDER REPORTING, IS FIRING UP AGAINST A BACKDROP OF A TRULY INTERNATIONAL CONVERSATION ABOUT THE INDUSTRY'S ROLE IN THE FIGHT AGAINST THIS EXISTENTIAL CRISIS.

Climate Risk Perspectives

## JADED HORIZON

By **Marcus Cree**, FRM SCR



**GREENCAP**

[www.greencap.live](http://www.greencap.live)

**GreenPoint**  
Financial

[www.greenpoint.financial](http://www.greenpoint.financial)

[marcus.cree@greenpointglobal.com](mailto:marcus.cree@greenpointglobal.com) | [sanjay@greenpointglobal.com](mailto:sanjay@greenpointglobal.com)

International Corporate Center, 555 Theodore Fremd Avenue, Suite A102 Rye, NY 10580

## INTRODUCTION

Welcome to the third e-book, Jaded Horizon, a collection of the last series of articles, aimed at providing context and direction for banks looking at how to manage the financial risks posed by climate change.

2022 was a difficult year for those hoping to see firm action on the climate crisis, particularly after a promising COP in Glasgow in 2021. That said, there was significant movement in terms of exactly how banks should aim to measure and report potential impacts. From a certain perspective, the increasing focus on sustainability that had developed had outpaced the financial industry's efforts to create meaningful ways to include the emergent risks within existing frameworks. As policymakers around the world dealt with the immediate needs of rebuilding COVID-ravaged economies, a European ground war, and surging inflation, central banks and regulators carried on their work in the area and made up much of that ground. This e-book tracks this progress and puts these efforts into a meaningful context for risk managers working in the financial sector.

Scenario-based analysis and climate stress testing are discussed, along with the shifting parameters that become unavoidable in an area where deep interconnectedness and 'systems thinking' design is the norm. We explore the dynamics of tipping points and their impact on financial priorities, between adaptation and mitigation, as well as the way the early Basel Committee on Banking Supervision (BCBS) and European Central Bank (ECB) guidelines are gaining international acceptance.

Above all, the pieces inside this e-book are designed to spark conversation and meaningfully contribute to one of the most important developments in risk management the industry has ever considered. All original pieces are available, along with the first two series - 'Code Red' and 'Emerald Pathways', at [greencap.live](https://greencap.live).

We hope you find the articles as useful as we did when researching and writing them.

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- COP27, which concluded in Egypt recently, was held at a time of rampant international energy price inflation, a land war in Europe, and against a history of increasing intransigence in specific areas of funding. Even so, some achievements of the conference are well worth noting by banks.
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- 2021 ended with hope of a revitalized fightback against climate change. In the end, governments saw a year of inflation, European war, and struggles to regain pre-pandemic momentum. Central bankers, however, made significant climate progress. Banks need to follow these regulatory propositions carefully as they are likely to dominate the coming years.

## Chapter 1

# PHYSICAL AND REGULATORY TIPPING POINTS ARE BEING REACHED, AND BANKS NEED TO TAKE NOTICE

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THE 2022 IPCC FINDINGS, ALONG WITH THE REGULATORY POLICY IDEAS FROM THE SEC, ARE REQUIRED READING FOR BANKS BUILDING THEIR CLIMATE RISK PROGRAMS.

Originally published on March 31, 2021

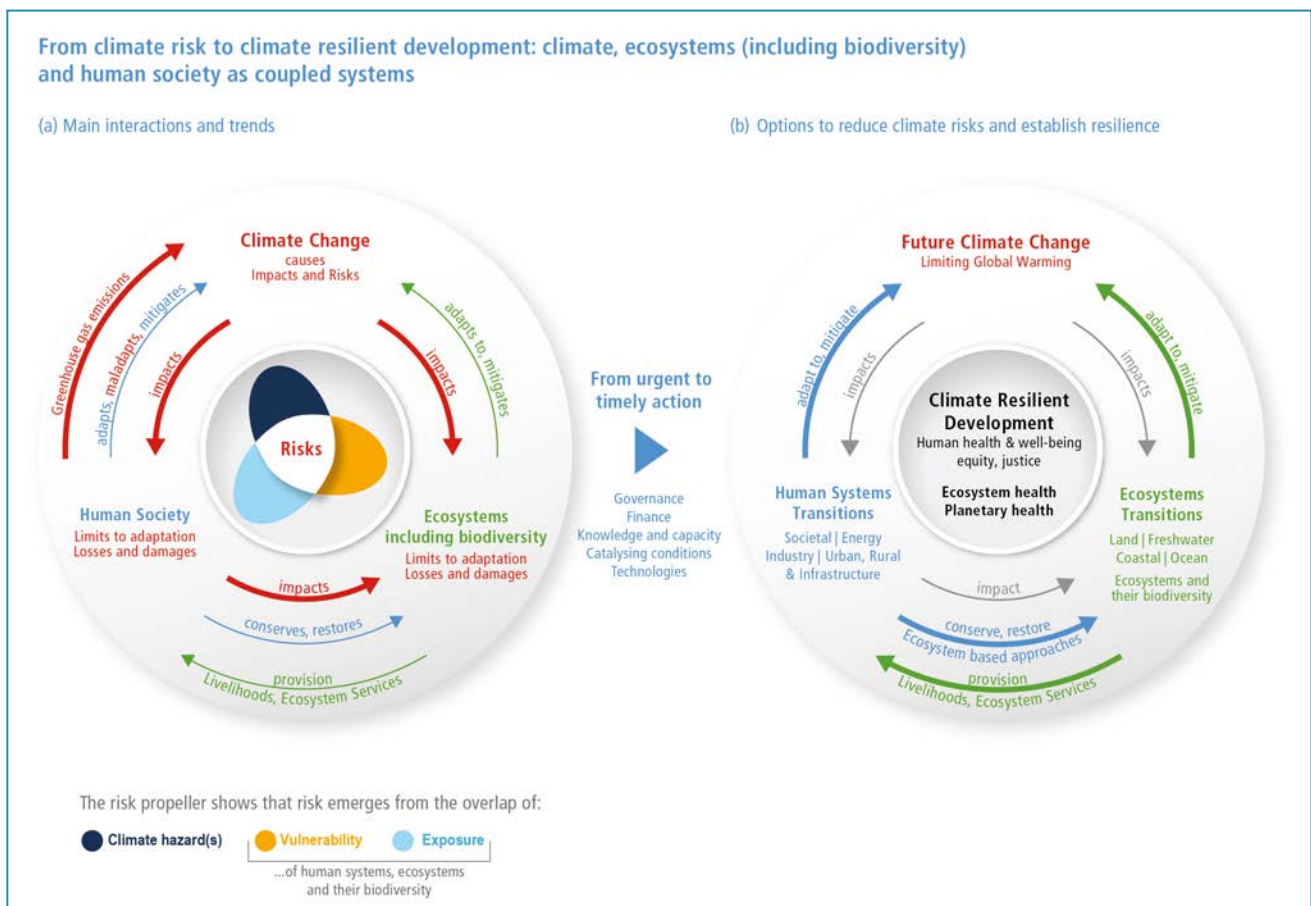
## The IPCC report, released on February 27 was alarming...

The long-term aim of the world's governments, as agreed at the various Conferences of the Parties (COPs), has been to limit global warming by 2100, to 2 degrees above pre-industrial levels, with an effort made to achieve an even more ambitious limit of 1.5 degrees.

The recent report produced by the Intergovernmental Panel for Climate Change (IPCC) - [Climate Change 2022: Impacts, Adaptation and Vulnerability](#) - was alarming, as it detailed how certain environmental tipping points had already been reached, and the need for adaptations to deal with consequences of 'overshooting' the 1.5-degree 'soft' target, may well dominate climate policy, with potentially dangerous implications.

Key points from the report include:

- Some previously possible pathways to avoid the worst consequences of climate change are already lost
- Global ecosystems are highly integrated with one another, meaning that acceptance of one tipping point significantly increases the probability of more following
- Any adaptation that is designed with short term goals to avoid specific risks, often leads to unintended consequences, giving rise to other risks becoming '**Maladaptation**'



Scientists contributing to the 2022 IPCC report have detailed specific risks that increase, by region, as temperatures rise above the 1.5-degree limit.

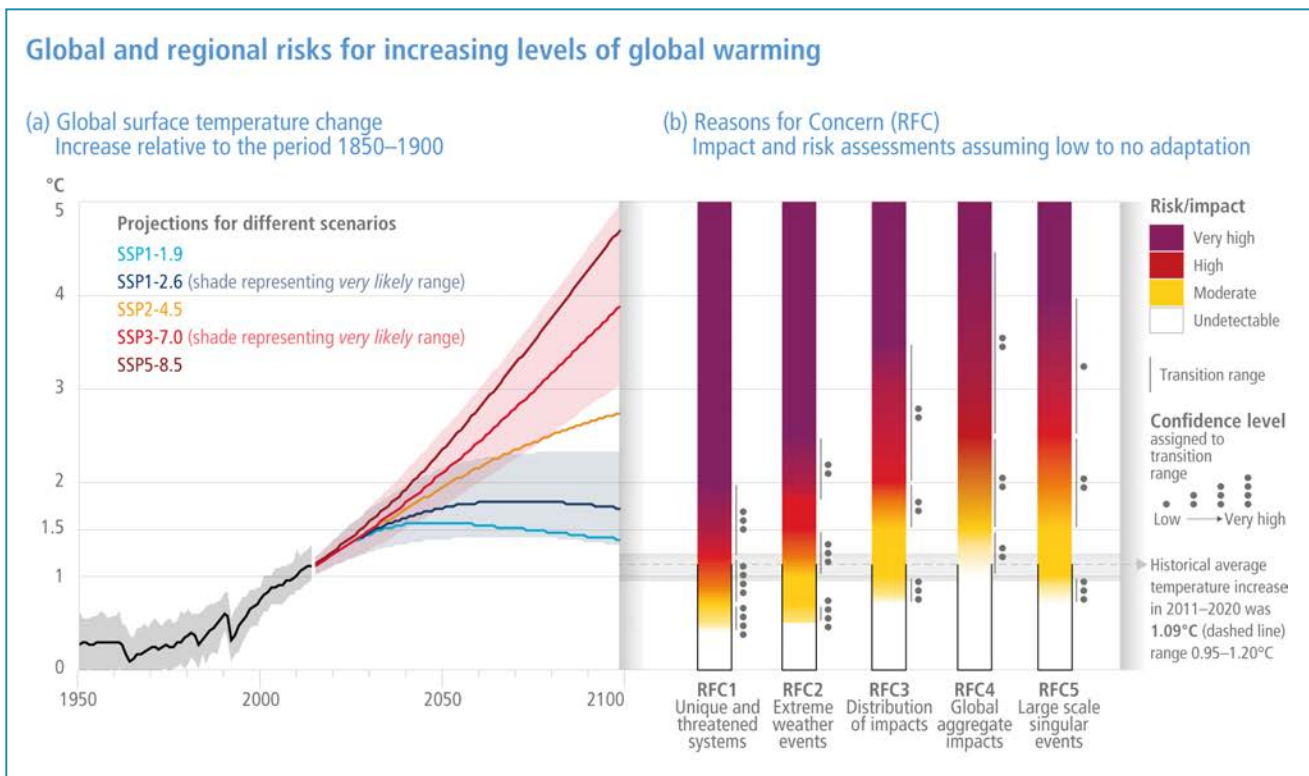
These risks include:

<b>Small Islands</b>	<ul style="list-style-type: none"> <li>• Loss of terrestrial, marine and coastal biodiversity and ecosystem services</li> <li>• Loss of lives and assets, risk to food security and economic disruption due to destruction of settlements and infrastructure</li> <li>• Economic decline and livelihood failure if fisheries, agriculture, tourism and from biodiversity loss from traditional agroecosystems</li> <li>• Reduced habitability of reef and non-reef islands leading to increased displacement</li> <li>• Risk to water security in almost every small island</li> </ul>
<b>North America</b>	<ul style="list-style-type: none"> <li>• Climate-sensitive mental health outcomes, human mortality and morbidity due to increasing average temperature, weather and climate extremes, and compound climate hazards</li> <li>• Risk of degradation of marine, coastal and terrestrial ecosystems, including loss of biodiversity, function, and protective services</li> <li>• Risk to freshwater resources with consequences for ecosystems, reduced surface water availability for irrigated agriculture, other human uses, and degraded water quality</li> <li>• Risk to food and nutritional security through changes in agriculture, livestock, hunting, fisheries, and aquaculture productivity and access</li> <li>• Risk to well-being, livelihoods and economic activities from cascading and compounding climate hazards, including risks to coastal cities, settlements and infrastructure from sea-level rise</li> </ul>
<b>Europe</b>	<ul style="list-style-type: none"> <li>• Risks to people, economies and infrastructures due to coastal and inland flooding</li> <li>• Stress and mortality to people due to increasing temperatures and heat extremes</li> <li>• Marine and terrestrial ecosystems disruptions</li> <li>• Water scarcity to multiple interconnected sectors</li> <li>• Losses in crop production, due to compound heat and dry conditions, and extreme weather</li> </ul>
<b>Central and South America</b>	<ul style="list-style-type: none"> <li>• Risk to water security</li> <li>• Severe health effects due to increasing epidemics, in particular vector-borne diseases</li> <li>• Coral reef ecosystems degradation due to coral bleaching</li> <li>• Risk to food security due to frequent/extreme droughts</li> <li>• Damages to life and infrastructure due to floods, landslides, sea level rise, storm surges and coastal erosion</li> </ul>

<b>Australasia</b>	<ul style="list-style-type: none"> <li>• Degradation of tropical shallow coral reefs and associated biodiversity and ecosystem service values</li> <li>• Loss of human and natural systems in low-lying coastal areas due to sea-level rise</li> <li>• Impact on livelihoods and incomes due to decline in agricultural production</li> <li>• Increase in heat-related mortality and morbidity for people and wildlife</li> <li>• Loss of alpine biodiversity in Australia due to less snow</li> </ul>
<b>Asia</b>	<ul style="list-style-type: none"> <li>• Urban infrastructure damage and impacts on human well-being and health due to flooding, especially in coastal cities and settlements</li> <li>• Biodiversity loss and habitat shifts as well as associated disruptions in dependent human systems across freshwater, land, and ocean ecosystems</li> <li>• More frequent, extensive coral bleaching and subsequent coral mortality induced by ocean warming and acidification, sea level rise, marine heat waves and resources extraction</li> <li>• Decline in coastal fishery resources due to sea level rise, decrease in precipitation in some parts and increase in temperature</li> <li>• Risk to food and water security due to increased temperature extremes, rainfall variability and drought</li> </ul>
<b>Africa</b>	<ul style="list-style-type: none"> <li>• Species extinction and reduction or irreversible loss of ecosystems and their services, including freshwater, land and ocean ecosystems</li> <li>• Risk to food security, risk of malnutrition (micronutrient deficiency), and loss of livelihood due to reduced food production from crops, livestock and fisheries</li> <li>• Risks to marine ecosystem health and to livelihoods in coastal communities</li> <li>• Increased human mortality and morbidity due to increased heat and infectious diseases (including vector-borne and diarrhoeal diseases)</li> <li>• Reduced economic output and growth, and increased inequality and poverty rates</li> <li>• Increased risk to water and energy security due to drought and heat</li> </ul>

The likelihood of these risks materializing varies considerably from region to region, but what is clear is that the overall risk rises substantially with higher endpoints in terms of global temperature rises.

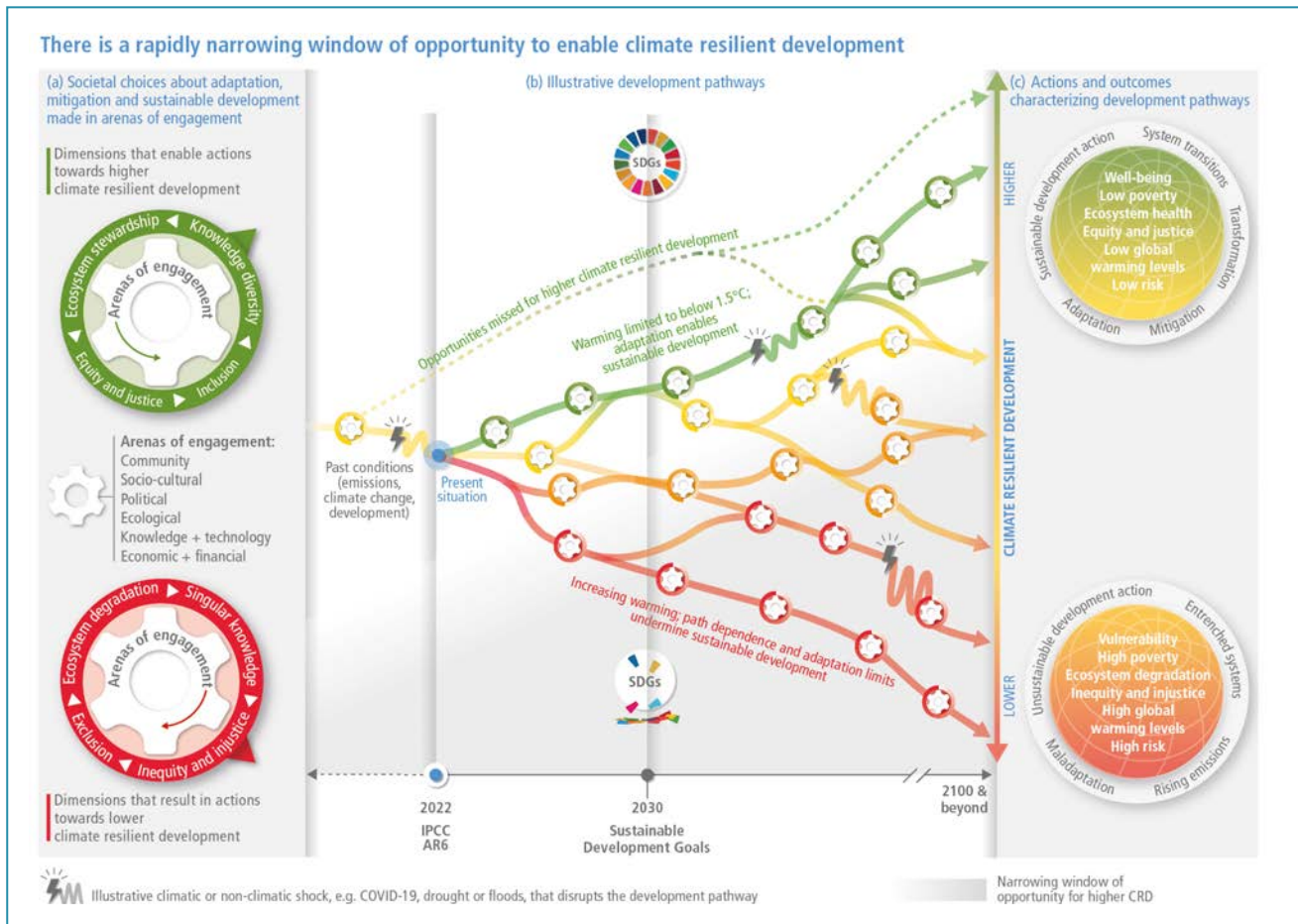




Source: ipcc.ch

The current trajectory puts the world on a path where adaptation will become increasingly necessary, drawing more spending away from mitigation, creating more positive feedback loops. It also increases the likelihood of adaptation being rapid and not planned in a global, integrated fashion, possibly leading to maladaptation.

Pathways are continually reassessed and re-mapped, to reflect the latest 'starting' point. It is disturbingly clear that the probability of an outcome of a 1.5-degree temperature rise is vanishingly small and would require a massive increase in targets around the world, including almost instant policy changes to reflect that increase in ambition.



Source: [ipcc.ch](http://ipcc.ch)

## This has significant ramifications for banks' climate stress scenarios...

Banks require stress tests to assess the resiliency of their own balance sheets. If they are to manage the vast financial flows required to mitigate and adapt, then they must be able to determine the resultant riskiness of current and future investments and credit facilities.

The rules around bank lending and credit risk, especially since the 2008 financial crisis, have been strengthened in ways, which mean that poor credit risk planning now could see far more risk capital being held, as their current obligors come to represent increased risks to the bank while effectively underpaying for that risk in terms of interest rates and credit spreads.

## Regulators, including the Securities and Exchange Commission (SEC), are creating policies that can assist climate risk managers...

The IPCC report was released three days after Russia invaded Ukraine, meaning that the full impact was less urgently reported than would normally have been the case. Even so, it is striking that the SEC released its climate change recommendations just three weeks later on March 21.

Interestingly, the SEC policies would fill an important data gap for banks building scenarios for stress-testing purposes.

Specifically, the paper calls for:

- Scope 1 and 2 disclosures from all filing companies
- Physical and transitional risk identification and quantification
- Upstream and downstream supply chain considerations
- Use and Impact of carbon pricing

Essentially, the recommendations, if bought into force, would move the US a lot closer to the EU in terms of climate change reporting.

Crucially, for banks looking to assess their balance sheet climate change risks, the new SEC policies would allow a process to be developed for the creation of likely scenarios built logically, including:

- Transitional plans based on the IPCC pathways and known government plans
- Costing of the known plans by the Network for Greening the Financial System (NGFS), at a global and regional level
- Adjustments to scenario costs based on revisions to the IPCC report as well as International Energy Agency (IEA) progress reports
- Adjustments to scenario impact according to developing/likely carbon pricing and supply chain effects

The base 'transitional' scenario could then be enhanced to include physical impacts as also identified within the SEC requirements.

Finally, banks could use filings to determine those borrowers who had already taken steps to mitigate physical risks from climate change and adjust their exposure and future credit profiles accordingly. This would allow the development of strategies to green the balance sheet and properly price future climate-related credit risks into credit facility pricing.

Given the financial system's central role in moving private money to projects and sectors where resilience is most needed, it is vital that banks perform this kind of scenario-based climate analysis both on their current book and future credit facilities.

## GreenCap can help...

GreenCap is a turnkey 'Risk as a Service' (RaaS) solution that provides banks with tools to create and populate climate-based scenarios. These scenarios will reflect the impacts and costs of the IPCC pathways and regional plans.

The system provides loan by loan climate risk analysis, including potential increases in risk capital that should be expected per scenario, and the credit spread differential, in basis points, that would be needed to justify that risk.



GreenCap takes hazard zones and transitional adaptations into account, resulting in a granular analysis that uses all available data to provide insights that can be put to immediate use within the bank.

Visit [greencap.live](https://greencap.live) for more insights and for resources, curated to assist bank risk departments in ensuring that their banks are truly resilient.

## Chapter 2

# FINANCE, AGRICULTURAL PRODUCTS, AND CLIMATE CHANGE

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**THE GLOBAL FOOD INDUSTRY AND CLIMATE CHANGE ARE HIGHLY INTERCONNECTED. BANKS FINANCING AGRICULTURE NEED TO UNDERSTAND THIS RELATIONSHIP AND THE RISKS IT CREATES.**

**Originally published on APRIL 28, 2022**

This paper highlights these two important aspects of modern life, with a focus on sustainability within agricultural products and production. It also delves into externalities of the food industry with regard to climate change and finally, considers the physical and regulatory risks to the industry along with potential adaptations.

## The global food industry is vast and not easy to define...

The global food industry is enormous and consists of multiple divisions. However, these can be grouped into:

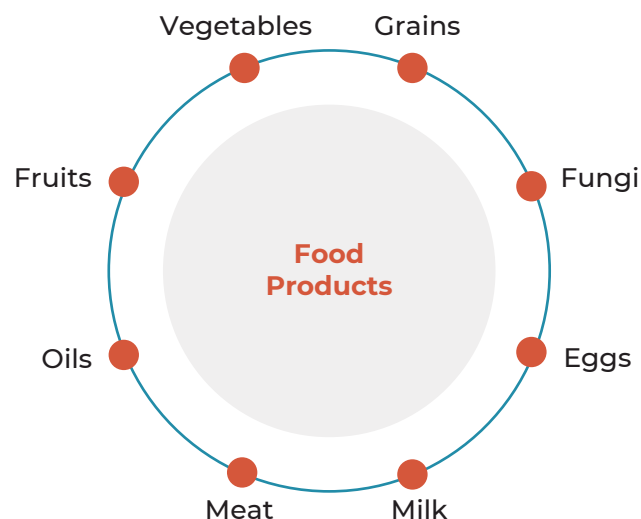


All these groups are connected by:

- > Transportation
- > Storage

Each segment has specific characteristics and is affected by climate change differently. This report focuses exclusively on the sub-segment of **Agricultural Production**, which is defined as the practice of cultivating plants and livestock, and thereby the use of several resources. These resources include land, soil, fertilizer, animal feed, seed, water, labor, and energy to produce food products, fiber, fuel, and raw materials.

Food products are divided into:



In simple terms, this report is hyper-focused on that part of the food sector, which directly produces food.

## Agriculture can be a major contributor to national wealth...

The importance of agriculture to a nation's economy varies substantially, with the agricultural sector contributing as much as 60% of the GDP in some developing countries, with the average contribution being 4% in developed nations. Considering the EU and US specifically, according to the World Factbook, the agricultural sector contributed 1.6% and 0.9% respectively to regional GDP in 2019.

## Agriculture is also a major contributor to climate change...

Climate change and agriculture are symbiotically related. On one hand, agriculture is very vulnerable to climate change because it transforms the manner in which agricultural production can operate. On the other hand, agricultural production is one of the key contributors to greenhouse gas emissions, thereby exacerbating climate change.

Climate factors that affect agriculture include:

- › Change in rising temperatures
- › Increase in extreme weather events
- › Changing precipitation patterns

However, how farmers and agricultural products, are affected varies substantially depending on:

- › Crops or farming products used
- › Geographic location
- › Regulatory environment

To generalize, crop yields in lower latitude regions are decreasing while those in higher latitudes are increasing because of climate change.

## Agricultural production creates externalities...

Modern industrialized agriculture, with its often-occurring monocultures, is the reason for many externalities arising from how agricultural products are produced. The resources used for production very often have negative externalities.

For example, the use of nitrogen fertilizer increased significantly in the latter half of the 20th century to increase crop yields. Simultaneously, this has led to the pollution of water and soil.

Other externalities produced by agricultural production include:

- › Environmental degradation such as biodiversity loss

- › Desertification and soil degradation
- › Water pollution
- › Greenhouse Gases (GHGs)

These factors contribute directly or indirectly to climate change. Most notably are GHGs emitted by this sector. According to the Food and Agriculture Organization (FAO) of the UN, the overall food supply chain accounts for more than a third of global GHG emissions.

The combined environmental cost of food production amounts to an estimated 12 trillion USD per year. The FAO argues that it is crucial to reduce emissions within the global food system to achieve the global (agreed in Paris, 2015) climate goal. The figures vary, depending on the specific study and underlying definition of the food sector. However, the overall trend is that the food sector is one of the most significant global contributors to climate change. Likewise, the Intergovernmental Panel on Climate Change (IPCC) concludes that it is inevitable that the food system adopts measures to fight climate change by reducing GHGs.

According to figures from the 2019 International Plant Protection Convention (IPPC) report, 19-38% of GHGs can be attributed to agriculture. The report further calculates that 9-14% comes from crop and livestock activities. Livestock is a significant contributor to emissions worldwide due to it being a substantial source of methane emissions and by being a key driver of deforestation. Furthermore, 5-14% of GHGs come from land use, which includes deforestation.

The rest (5-10%) can be limited to supply chain activities.

## These externalities circle back to create risks to agricultural production...

Potential risks to agricultural production can be divided into two types:

- › Physical Risk and
- › Regulatory Risk

While Physical Risk describes the ones posed by physical changes resulting from climate change that will threaten agricultural production, Regulatory Risk focuses on the dangers posed by potential future regulations that could significantly alter the production cost of agricultural goods.

Effective adaptation can mitigate vulnerabilities that the food system is exposed to due to climate change, both regulatory and physical.

## Adapting to physical risks is non-optional...

Physical Risks are those that result from climate change such as extreme weather events, including droughts, floods, extreme precipitation, and wildfires. However, it also includes



changing temperature and the way in which the physical environment is evolving. For example, the increasing average temperature may not allow the cultivation of certain crops in a region where they have been previously harvested.

Because agricultural production differs by crops and products, adaptation toward physical risk can be also very different. Considering New York State, suggested adaptations include:

- › Increasing soil organic matter and erosion control
- › Improved cropland grazing land management
- › Genetic improvements

Other adaptations include diversifying crop rotations to improve soil quality diversification through planting different plants, i.e., fewer monocultures. Furthermore, adaptation techniques may include integrated pest management systems, selective breeding to control and implement more efficient irrigation systems, and greater reliance on renewable energy.

## Regulatory risks loom equally large...

The food industry is already highly regulated, with the goal being the protection of consumers by regulating food safety, food security, and animal well-being. For the US and EU, the regulatory institutions are the Food and Drug Administration (FDA) and European Food Safety Authority (EFSA). Even if regulation is currently limited mainly to food safety, it is likely that regulations, which specifically address negative externalities within the food sector will be implemented in future.

For example, the transition towards a sustainable food system is a core part of the EU's Green Deal. Furthermore, the IPPC assumes that there will be adjustments in the regulation of the food system in future, to lower GHGs that the industry is producing, and thus be in line with the Paris Agreement. Several potential regulations could significantly impact the way the industry operates.

On the supply side, potential regulations include a reduction in methane emission and a ban on environmentally hazardous fertilizers. And on the demand side, there are regulations concerning reduction of food waste and taxes on meat consumption.

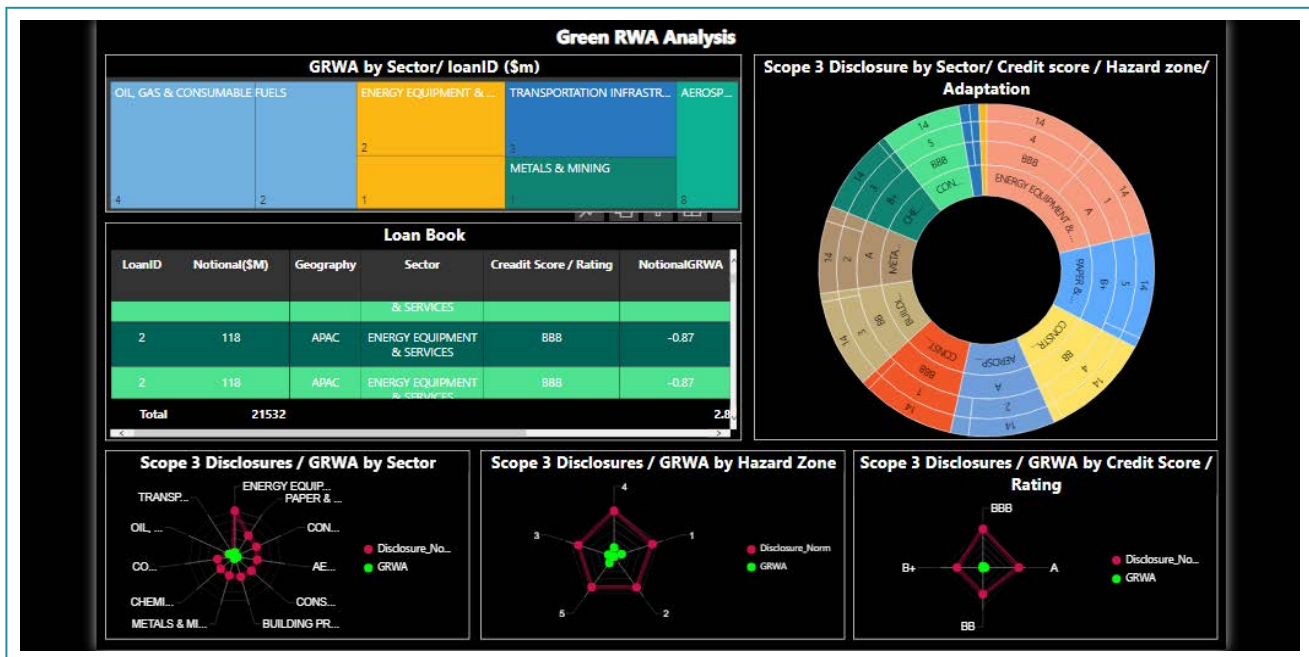
## Financing agriculture must take these risks into account...

When banks provide financing for agricultural production, the externalities and risks within the industry must be accounted for when assessing the credit risk. Loss of productivity from physical climate impacts and loss of profitability from increased regulatory costs across the whole supply chain can both dramatically increase the credit of the borrowing food producer. Banks that ignore this, or fail to fully build it into their calculations may well suffer unexpected credit losses as a result, and consequently, be under-capitalized from a risk perspective.

## GreenCap can help...

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Please visit [greencap.live](https://greencap.live) for more insights and resources, curated to assist banks in their sustainable journeys.

## Chapter 3

# CREATING MEANINGFUL CLIMATE CHANGE SCENARIOS IN A CHANGING WORLD

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**THE RECENT AUSTRALIAN ELECTION HIGHLIGHTS THE NEED FOR BANKS TO BE PREPARED FOR TRANSITION VOLATILITY, AND TO CONSTRUCT CLIMATE SCENARIOS ACCORDINGLY, OR RISK MISPRICING THEIR LOAN BOOK.**

**Originally published on JUNE 01, 2022**

## Climate scenarios differ markedly from traditional banks' stress testing...

Climate scenarios are essential for banks to properly stress test the 'riskiness' of their current balance sheets, but the creation of these scenarios is far from simple. From high-level climate 'Pathways' to policy-based regional ambitions, there is a great deal to take into account in the make-up, including:

- › Global climate ambitions agreed to by governments around the world
- › Regional targets set and monitored by the same governments
- › Differential pressures on food and energy security
- › Upstream and downstream supply chain effects
- › Worsening climate outcome predictions impacting the speed of transition
- › Split of the climate investments between adaptation and mitigation

All of these need to be reflected in a rigorously designed scenario.

## Global ambitions are the best starting point...

As part of its remit from the UN, The Intergovernmental Panel on Climate Change (IPCC) create a range of Representative Concentration Pathways (RCPs). These represent routes through the century towards outcomes, expressed in terms of the final increase in average global surface temperature, relative to pre-industrial measurements. The main pathways considered are:

- › 1.9 - Endpoint – a rise of 1.5 degrees or less
- › 2.6 - Endpoint – a rise of 2 degrees or less
- › 4.5 - Endpoint – a rise of 3 to 4 degrees
- › 8.5 - No action, commonly called 'Hot House World'

It is important to appreciate that these pathways are 'real world' based and presented to the regular UN 'Conference of the Parties' (COPs), at which the assembled governments agree on global ambitions to meet, or attempt to meet, specific outcomes. The key here is that this is a collective goal.

Various attempts have been made to deconstruct the collective goal into regional sub-goals, along with allocated targets, but these have failed. The current protocol is for individual countries to then publish their own individual aims, and be responsible for monitoring and reporting progress to the following COP. The net result is that there is no direct connection between the communal goal and the sum of the underlying individual goals.

As an example of this, an analysis of the last COP in Glasgow showed:

- › The communal aim was to hold global warming to 2 degrees
- › The stretch aim was to hold global warming to 1.5 degrees
- › The analyzed end-point of existing published policies would see a rise of 2.7 to 3 degrees

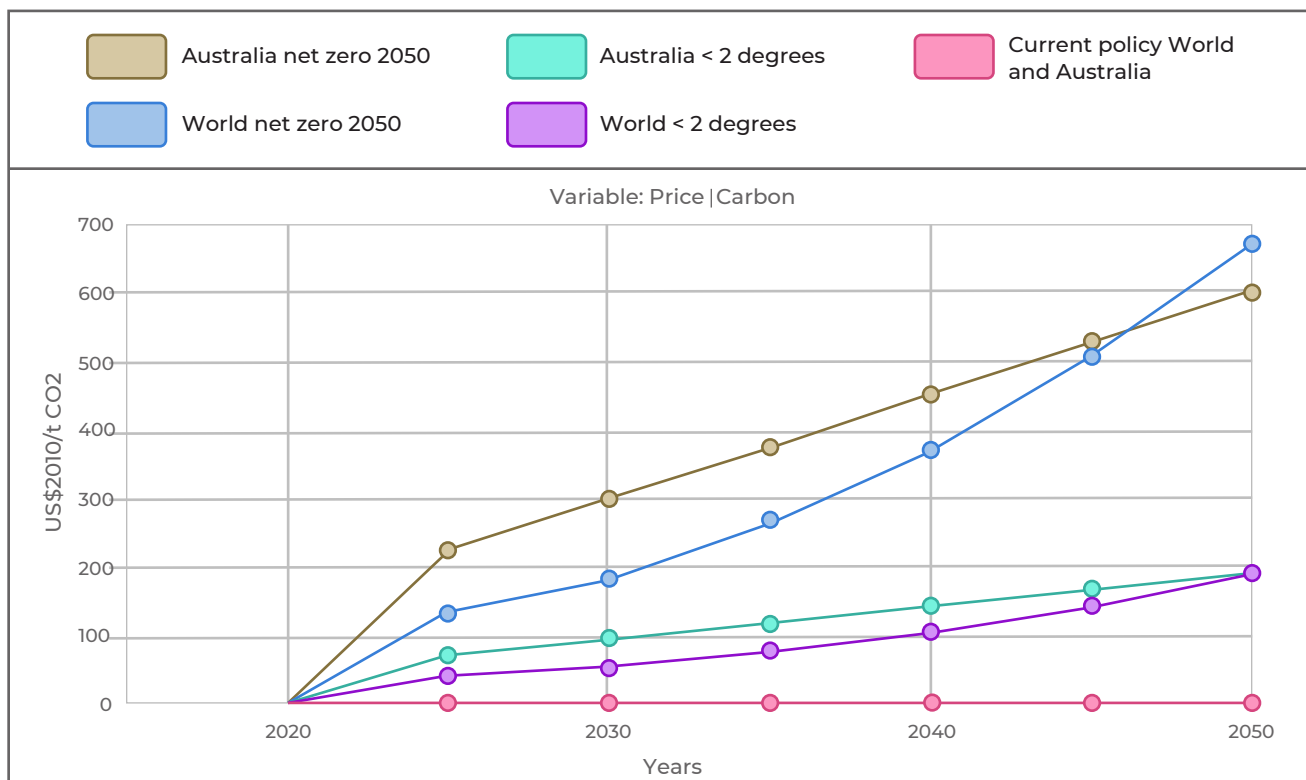
Three simultaneously held yet contradictory ambitions.

## More granular analysis allows for more detailed scenarios...

With all of that said, the start point of a global scenario still has to be the IPCC. It is the most widely recognized and researched, yet is just a starting point. Other bodies, most notably the International Energy Agency (IEA) and the Network for Greening the Financial System (NGFS) provide breakdowns that are more specific to industries and can be costed out more effectively. Importantly, the NGFS also breaks down climate pathways and policy initiatives by country, including metrics such as:

- › No action by the government
- › Current policy in place
- › Stated regional policy ambitions
- › GDP impact by year through the transition
- › Commodity prices
- › Energy pricing

One of the most important techniques that the NGFS adopts, is the use of a theoretical carbon price as a proxy for the cost of pathways and scenarios that are either based on regional plans or global outcomes. This allows for standardized comparison between regional transition journeys.

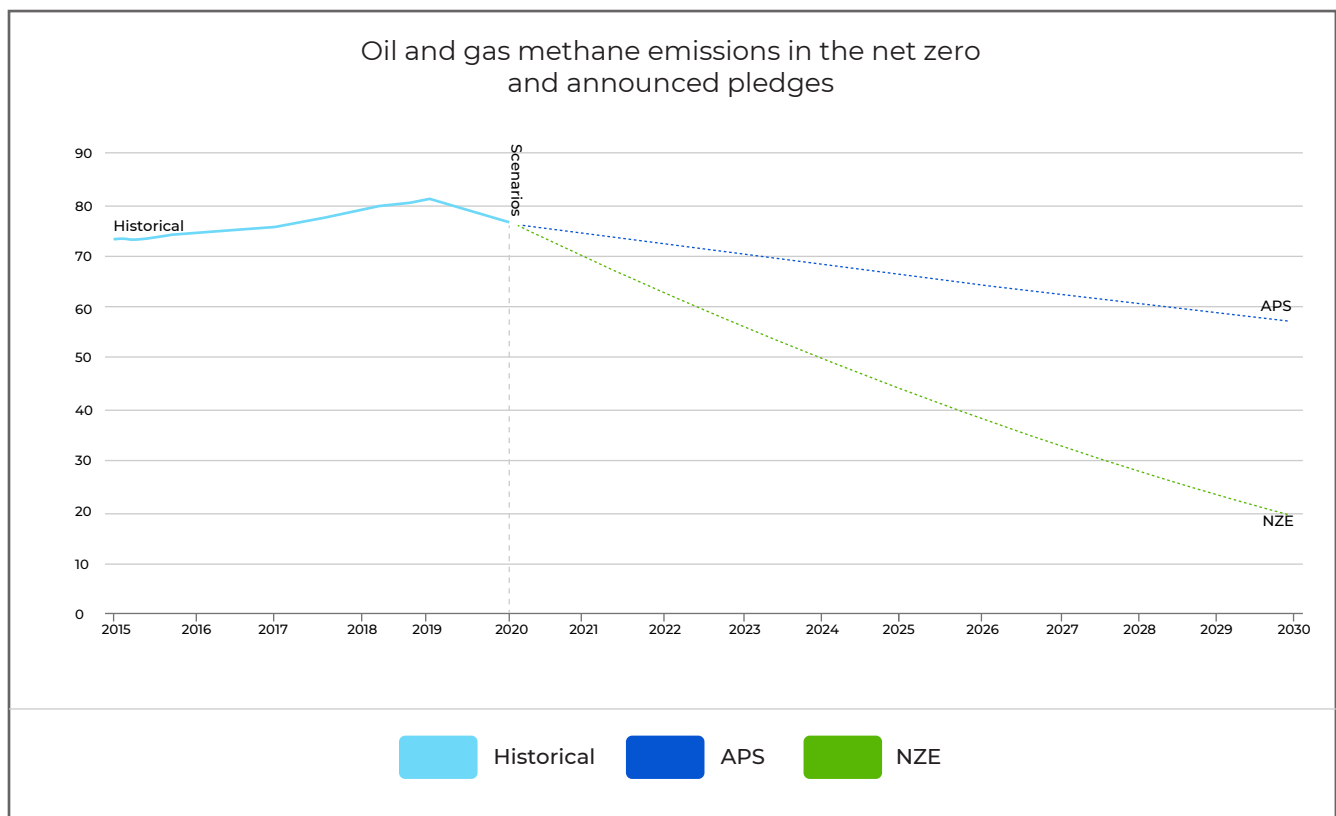


Source: NGFS

The IEA also analyzes the global economy from a 'brown to green' energy perspective. While not covering the agricultural sector, they do provide detailed progress reporting against their own 'Net Zero Emissions by 2050 Scenario' (NZE), which itself is in line with the various pathways as a necessary milestone. Sectors specifically covered by the analysis include:

- Power
- Fuel supply
- Industry
- Transport
- Buildings
- Energy Integration

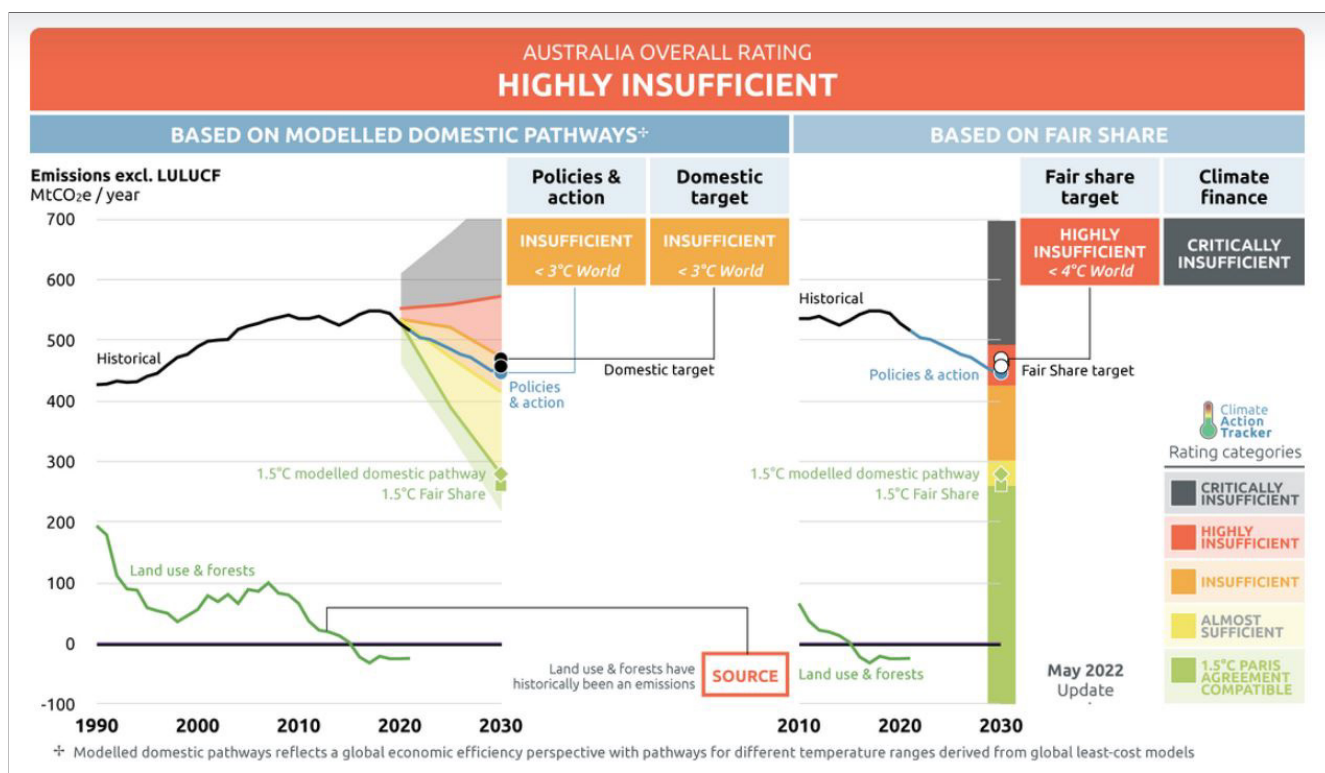
Each of these areas is further sub-divided into 46 specific analytic topics and tracked against that sector's progress towards net zero. This analysis is presented as adaptations needed, in each sector specifically, and whether or not those are being introduced at a pace that will meet the 2050 goal.



Source: IEA

The usefulness of this analysis is that it indicates not only how far the global economy is from being on track to a greener future, but how steep and disorderly the correction would need to be. This type of scenario adjustment is important for risk managers to build meaningful, defensible, economic scenarios.

Similar to the IEA, the 'Climate Action Tracker' (CAT) also breaks down current country-level pledges, measuring them against the UN agreed goals of a 2-degree limit with best efforts towards 1.5 degrees. The results are presented globally and locally by each country.



Source: Climate Action Tracker

As the IEA provides insights into the likely steepening of the transition curve, CAT allows scenario builders within banks to adjust local level speeds and urgencies.

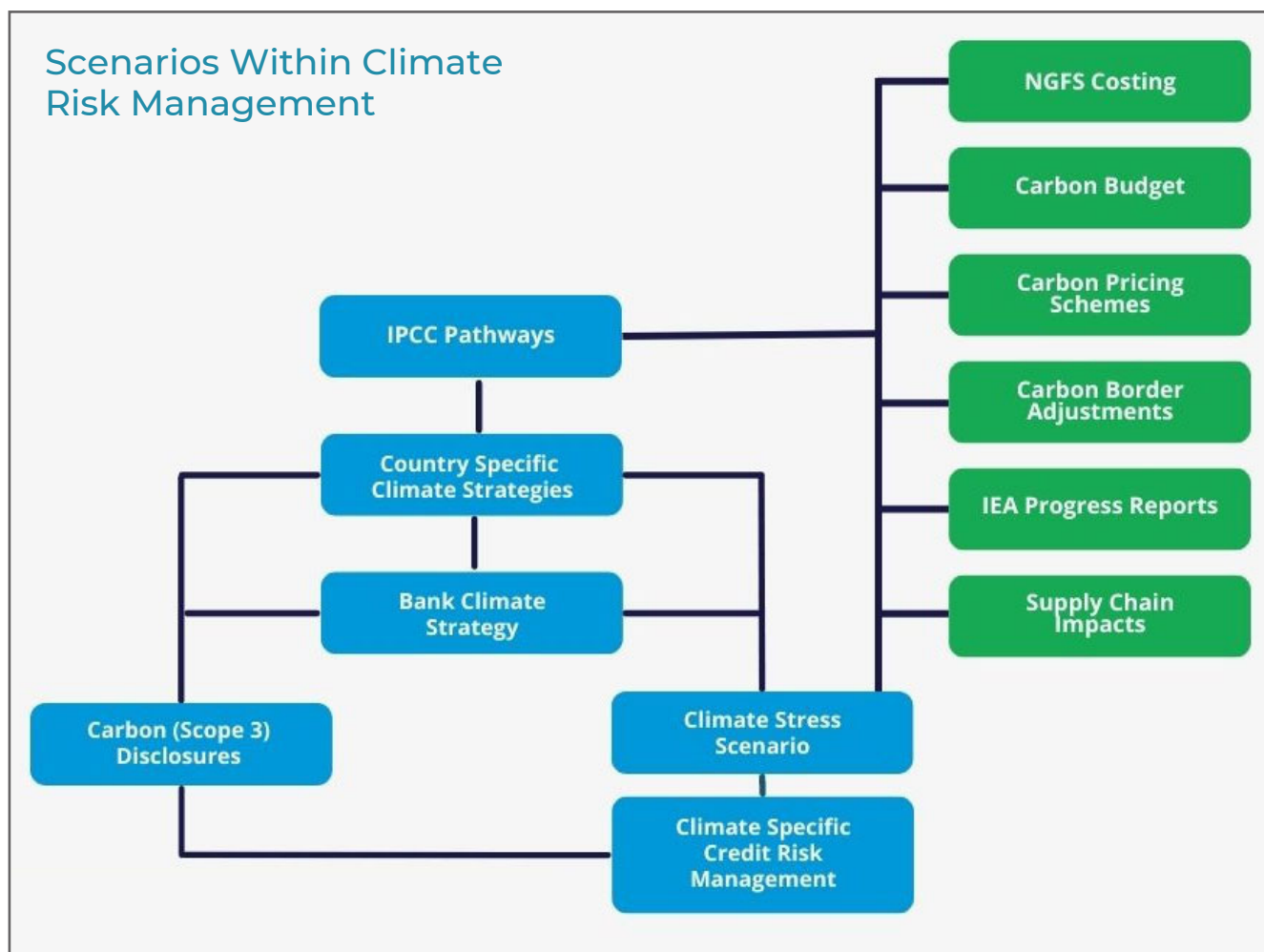
## Scenarios must be a mixture of art and science...

It is clear that there is a plethora of deeply-researched data that covers pathways to various climate outcomes, from a specific industry, progress through proxy carbon pricing to estimated annual GDP impacts.

For all of this data to become truly useful to banks, economic scenarios must combine the known elements of the analysis:

- High-level commitment - Indicating the pathway being tracked against
- Local commitments - Policies that have been put in place
- Stated ambitions - Policies that have been flagged but not put in place
- Climate indicators - Global measurements of climate change that increase the pressure to go further in policy
- Global supply chain indicators – How impacts on target industries are likely to affect their specific supply chains
- Costs – Researched estimates of the costs of each pathway
- Industry-specific indicators - Global progress within specific sectors

Within the above, there are such things as carbon taxing and carbon border adjustments, both of which carry policies from one region to another, impacting firms in both.



The final scenario(s) must be a blend of overall economic impact, typically expressed through GDP changes, and speed of transition adjustments.

It is also vitally important to keep in mind that some firms within economies will take adaptive steps to protect themselves against both transitional and physical climate change. Including the potential adaptations by industry, and factoring these into the analysis at an as granular level as possible, will create a set of scenarios that can inform a bank as to the likely impact of each pathway on its underlying book.

In the case of Australia, the shape of transition curves will change markedly as a government comes into power, with sustainability as a keystone policy initiative. The case for rapid change has been made and therefore it is likely that the country moves closer towards tracking the 2-degree target. With a robust scenario framework and system in place, the effect this will have on credit profile of the bank balance sheet could be reflected, informing lending strategy, putting the bank in a strong position to take advantage of opportunities it brings, as well as protecting itself from implied increased risks.



## GreenCap can help...

GreenCap is a Risk as a Service (RaaS) solution that enables banks to quantify the increased risks they will face as the global economy moves from a brown to a green basis.

Intuitive scenario building provides economic inputs to sit alongside obligor-specific adaptations, to make a rich, multi-dimensional approach to the task of building meaningful, tractable, scenarios.



GreenCap allows multiple scenarios to mirror the pathways and analysis from international bodies such as the IPCC, IEA, and NGFS. Adaptation options are built in at the loan level, to give the most accurate picture possible of the portfolio and its risk outlook.

Visit [greencap.live](https://greencap.live) for more insights and to discover resources that have been curated for banks to have access to the most important information they need during early days of the transition.

## Chapter 4

# **BANKS NEED CLIMATE RISK SCENARIOS TO WORK THROUGH THE UNCERTAINTY OF BONN**

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**THE RECENT UN CLIMATE MEETINGS  
IN BONN DID LITTLE TO REMOVE  
UNCERTAINTY FROM THE NEEDED  
GREEN TRANSITION, BUT THEY DID  
HIGHLIGHT THE NEED FOR BANKS TO  
PREPARE FOR A NUMBER OF  
POSSIBLE OUTCOMES.**

**Originally published on JUNE 30, 2022**

## Bonn, the bridge between Scotland and Egypt...

The June UN Framework Convention on Climate Change (UNFCCC) climate convention in Bonn was both the first major UN climate event since COP 26 in Scotland, and the staging event to set up COP 27, to be held in Egypt in November. The plan was to begin negotiations for the implementation stage, but that ambition was seriously dimmed by the shadow of six months of the war in Ukraine and its impact on food and energy supply chains.



Instead of seeing a post-pandemic 'build back better' commitment to strengthen national plans to meet the more aggressive targets on global warming (limiting that rise to 1.5 degrees above pre-industrial levels by 2100), there was a return to traditional areas of dispute between the developed and developing nations.

The status of national commitments is such that if all were met, as they stand, the 2100 average temperatures would be 2.4 degrees above pre-industrial levels, missing both the 1.5 and 2-degree targets. This climate route would inevitably see a switch of funding to be imperative from mitigation to adaptation.

While the details are complex, the unresolved points between the developed and developing countries include, at a high level:

- **Loss and Damage** - This is the cost of dealing with the effects that climate change has already caused in some poorer countries. The main contention is that this damage has been caused by

developed countries and their industrial revolution but borne by those states that did not contribute to or benefit from it.

- **Adaptation** - Assistance in funding the adaptations that will be needed to supply energy and infrastructure in the developing world has long been included in COPs, as these countries are effectively required to build their economies and transition to a greener future simultaneously.
- **Mitigation** – This is the extent to which the burden of CO2 reduction falls differentially on the two brackets (developed and developing). This is contentious and can lead to perceived anomalies such as China and India, both being prominent emitters and sitting in the group of countries being asked to further reduce those emissions.

The Bonn convention highlighted consistent areas of difference and did not act as the intended bridge between the Scottish and Egyptian COPs. At the same time, the climate policy ‘ratchets’, where each country strengthens its national targets by November 2022, are still in place, and these will become the real acid test as to how much damage has really been done to climate milestones for 2030, 2050 and 2100.

## Steepening the ramp...

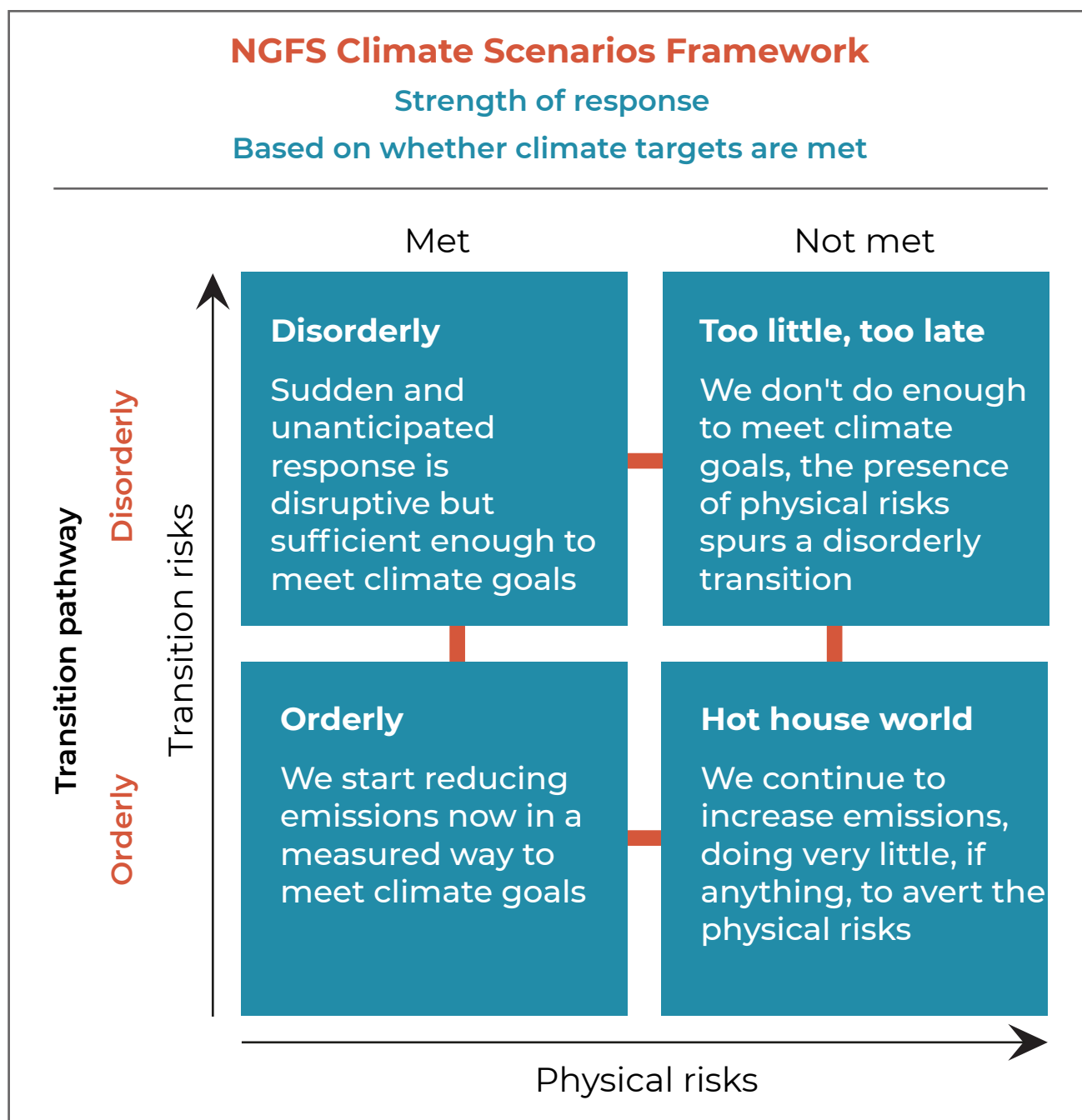
If the Bonn outcome is indicative of what can be expected at COP27, then it is likely that:

- National targets will be notionally strengthened, but not to the extent needed for the 1.5 or 2-degree targets
- The commitment to a 2-degree limit will be reaffirmed with promises to increase policy ambitions again in 2023

The effect of this from a banking risk management perspective is that we are moving into a higher probability of a ‘disorderly’ transition. Orderly and disorderly can be defined as:

- **Orderly** - The transition from a brown to a green economy is proactive, with clear, agreed targets at an international and national level, where governments, people, and companies have time to adapt to the transition in a way that avoids sudden draconian measures that derail corporate planning and business models.
- **Disorderly** - Climate planning is more ad-hoc and reactive, forcing firms to comply with sudden regulatory changes and severely impacting their ability to align their corporate strategy with a well-laid-out transition plan.

As unfortunate as the situation is, work has been done by the ‘Network for Greening the Financial System’ (NGFS) group and bodies such as the ‘International Energy Agency’ (IEA) to put dollar costs at the GDP level against current policies and various Intergovernmental Panel on Climate Change (IPCC) climate pathways. These include orderly and disorderly approaches.



Source: NGFS (2019a)

This data is available and can be used as the basis for a range of risk scenarios, providing banks with a number of outcomes that can be used to plan for credit and liquidity events that may occur as a result of the final policy pathways in each jurisdiction.

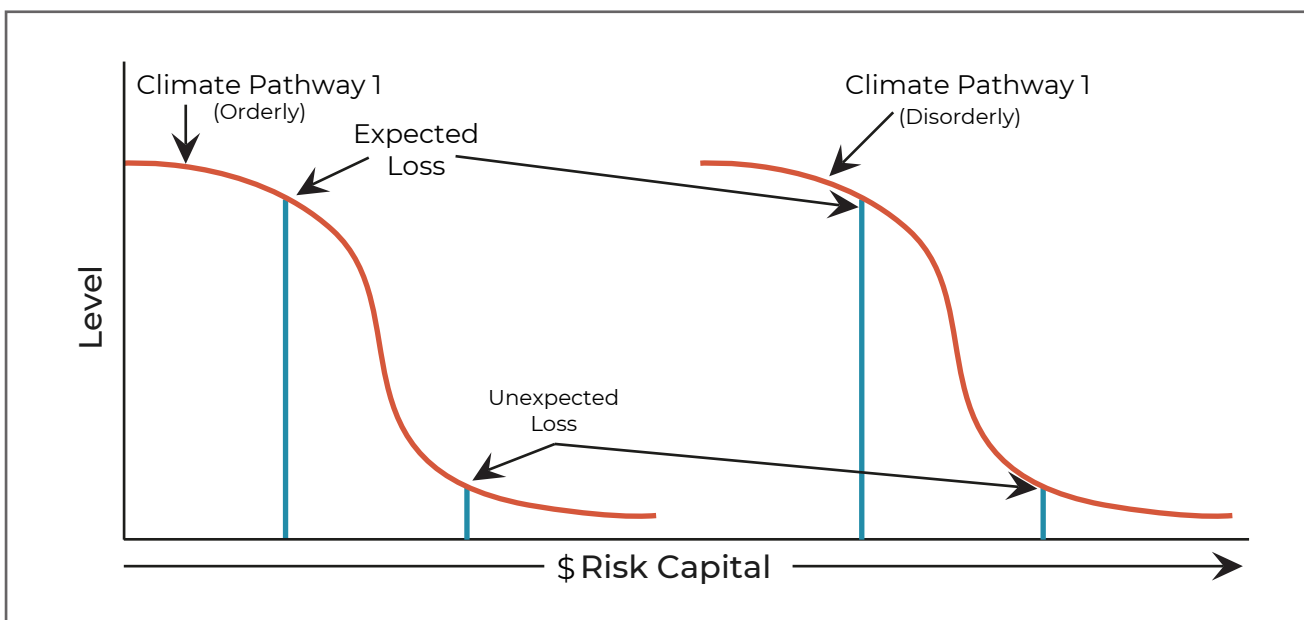
The key is the fact that while the high-level commitment stands at 2 degrees, with every delay in putting national policies in place that could make it a reality, the ramp is just getting steeper.

## Risk management is designed to quantify uncertainty...

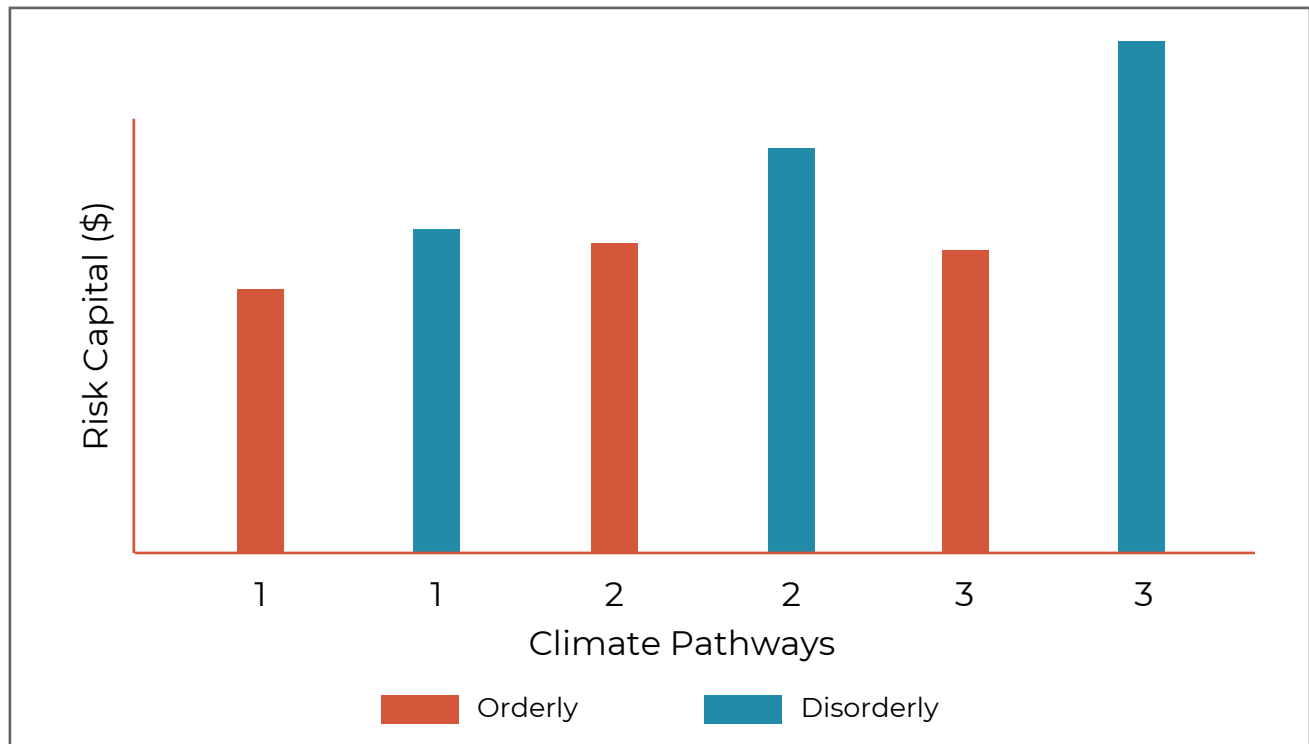
To build a set of climate scenarios that can be used for credit pricing and risk capital estimations, banks must think about:

- › Potential climate endpoints (expressed as degrees above pre-industrial levels by 2100)
- › Milestones for those targets (typically CO<sub>2</sub>e levels by 2030, 2050, and 2100)
- › Target economic sectors (energy, agriculture, infrastructure, etc.)
- › Supply chain impacts from sector targets
- › Adaptations already made by borrowers, in anticipation of regulation
- › Impacts on the bank (expected and unexpected losses)

These become the parameters that define what is reported and how that information can be used. When we think about estimating expected and unexpected losses, it is helpful to visualize these on a scale where each progression from a low target pathway to a higher one, or from an orderly to a disorderly approach to that pathway moves the loss distribution further up the cost line.



Ultimately, providing a range of losses by an approach that can then be used to price credit facilities according to expected changes in risk profiles, as well as form part of contingency liquidity planning within the bank, as per the BASEL liquidity guidelines.



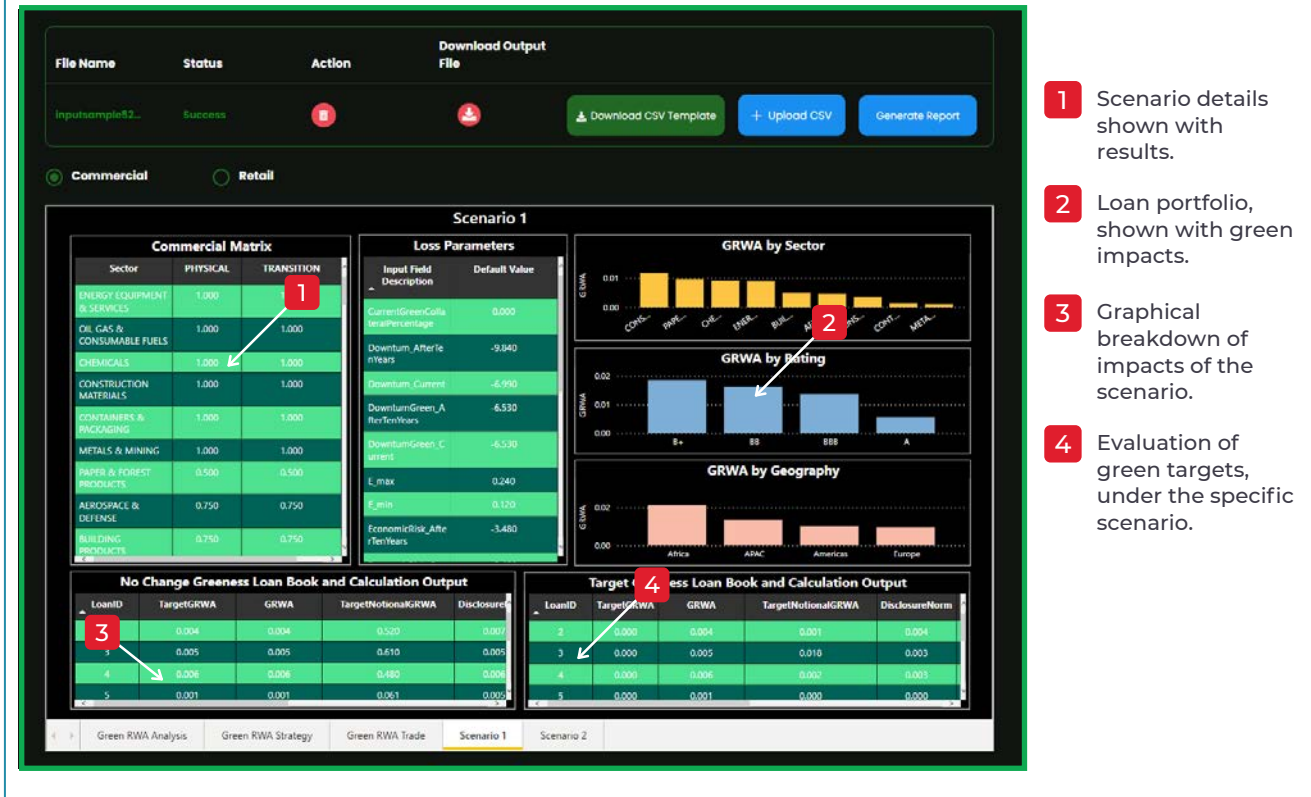
Once the range of outcomes is computed, it has to be kept up to date with policy announcements and the drift towards the ultimate pathway to be followed. The fact that this uncertainty will remain for some time means that banks will have to present a number of possible impacts and indicate where they believe the most likely route lies, both to senior management for liquidity strategy and external stakeholders as a core part of their sustainability planning. The fact that there is so much uncertainty also means that risk planning ought to focus on the period to 2030, and the first real CO<sub>2</sub> milestones to remain in line with the policy makers' agendas.

## GreenCap can help...

GreenCap is a 'Risk as a Service' (RaaS) solution that provides banks with the capacity to assess the impact on their balance sheets, of a range of climate pathways and scenarios. The solution:

- › Allow scenarios to be expressed in terms of cost and targeted sectors
- › Adaptations already in place to be reflected at loan level
- › Increases in risk capital to be estimated by loan and scenario, as well as aggregated across the balance sheet
- › Borrowers throughout the supply chain to be included in the analysis
- › Loans to be repriced to take account of the most likely impacts

## Scenario Report 1



GreenCap is designed for quick implementation and to provide an intuitive user experience that allows banks to include the credit risks inherent in climate change to be reflected appropriately at all levels of the bank, in order that they can become a major factor in strategic planning.

Visit [greencap.live](https://greencap.live) for more insights into the impact on banks, for physical and transitional climate change, as well as resources curated to assist banks in fully understanding how climate change will impact their business through its effects on their customers' risk profiles.



## Chapter 5

# INITIATING THE CLIMATE IMPERATIVE IN A TIME OF CHAOS

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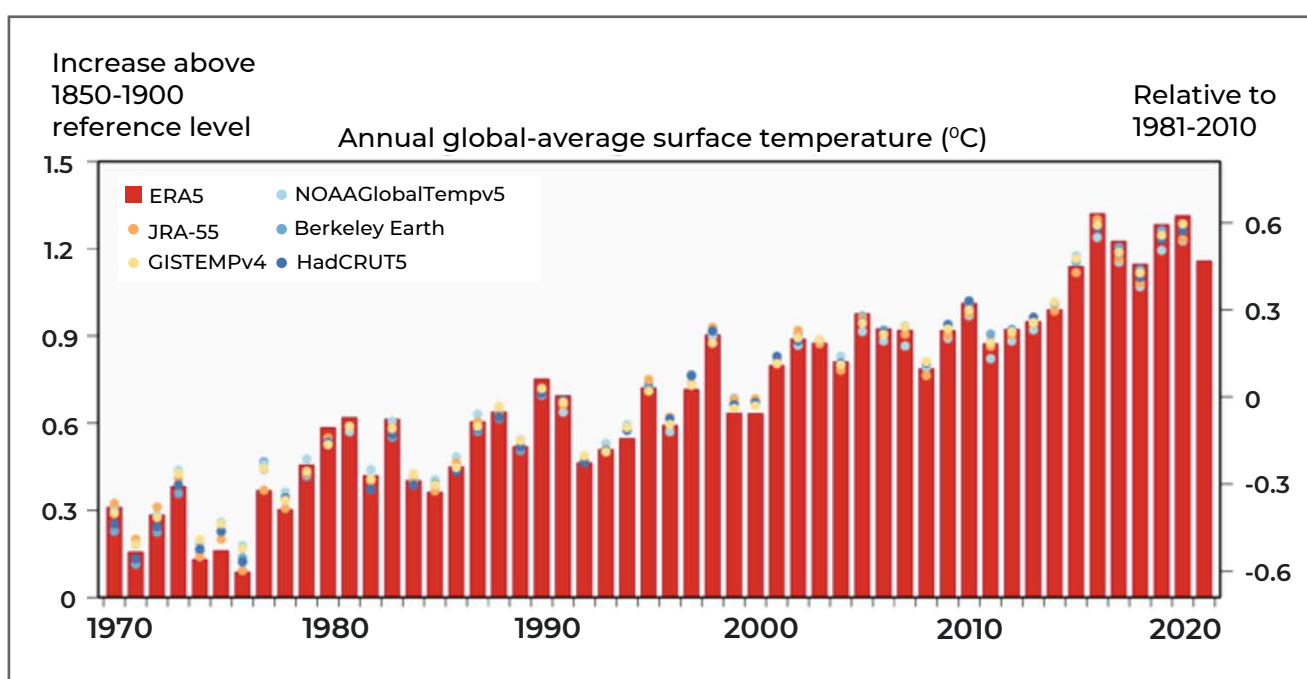
**HEAT WAVES IN EUROPE HAVE SEEN RECORD TEMPERATURES AND WILDFIRES. CONFLICT IN UKRAINE HAS CREATED HUGE ENERGY PRICE INCREASES. AFTER A TWO-YEAR PANDEMIC, LESSONS CAN BE LEARNED.**

**Originally published on July 28, 2022**

## Weather and climate are not the same...

Record hot days are not, in themselves, evidence of climate change. Climate is, by definition, a measure of long-term weather patterns. In this context, current records being broken are most notable for the fact that they are breaking records that were set in the last two or three years.

- The U.K. record set on July 19, 2022 (104.5 degrees) broke the previous high of July 25, 2019 (101.7 degrees)
- 2022 is on track to join the last seven years as the hottest on record



The important point is the dramatic cost of adaptation. Heat waves of the magnitude seen during 2022 demonstrate just how much infrastructure built for cooler climates needs massive upgrading simply to deal with rises already locked into the system.

- Building materials need to be designed to withstand higher temperatures
- Roads need to be upgraded to avoid cracking and potholes
- Rail systems (vital to the transition) need to be improved to avoid rails buckling in the heat

The demand for energy for cooling and water has also increased, putting pressure on these important systems.

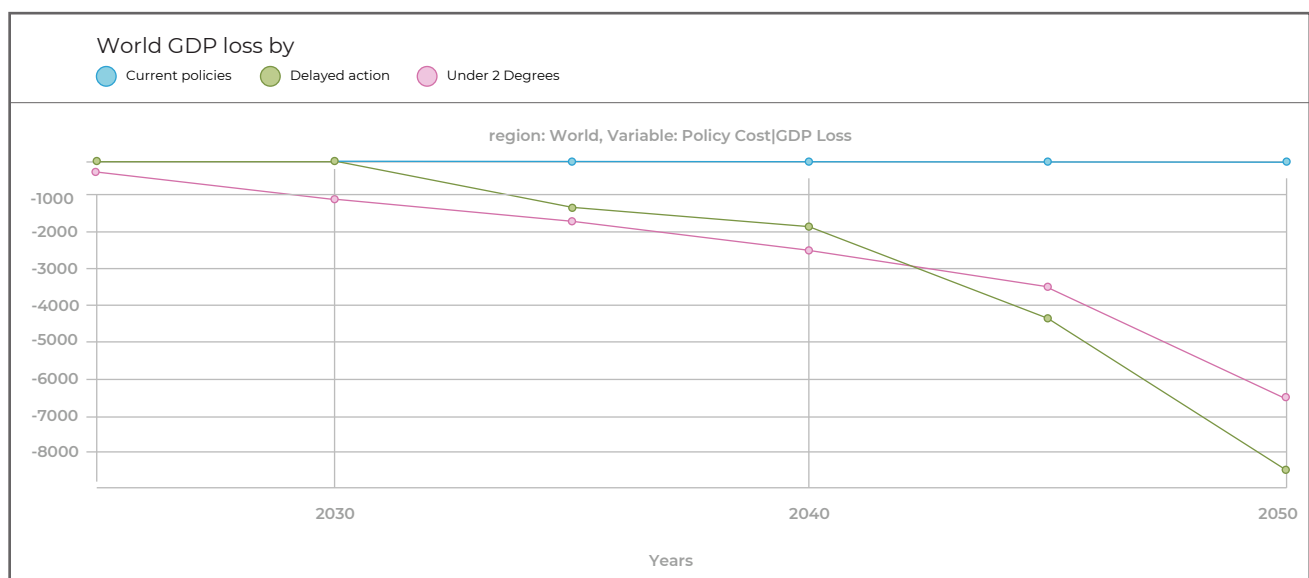
## Adaptation is the major barrier to orderly mitigation...

Adapting to current levels of climate change has been shown to be hugely costly. As investment is made in this area, mitigation of future heating inevitably takes a back seat. This creates a positive feedback loop, which will see more and more tipping points being reached, putting policymakers globally on a constant 'catch-up' footing in the matter of climate change.

The fact that priority is given to adaptation does not change what ultimately will need to be done. This rather delays it until its need is demonstrated in a way that mitigation becomes the priority of communities, voters, and governments, which it inevitably will.

The pointers are, therefore, to a disorderly or 'delayed action' response. These describe the ultimate adoption of a pathway that keeps the world in a manageable temperature range but is put into place in a less organized way, giving impacted industries less time to prepare and adjust their working business models. Such transitional strategies have been costed out by the Network for Greening the Financial System (NGFS) and are available in the same way that 'current policy' models are.

It seems that the prudent data pathway to use as the basis for climate scenarios within banks will be bounded by these options.



## Tragedy of the horizon...

Mark Carney, former Governor of the Bank of England, and now of the NGFS, coined the phrase 'tragedy of the horizon' to illustrate exactly the point about current needs superseding future ones in policymakers' thoughts.

The truth of this being a major barrier to climate mitigation action can be seen when the global warming issue is juxtaposed with recent events, where billions of dollars can be found and spent

in a very short amount of time, including COVID-19. The global pandemic enveloped the world in three months and saw governments globally shutting down large parts of their economies, putting supportive measures in place, including:

- › Furlow schemes
- › Risk-free business loans
- › Eviction moratoriums
- › Global transition to 'working from home' where possible

These measures were created and enacted within weeks of the pandemic starting. The acceptance by the electorates within countries, as well as the speed of the government response, is a testament to the fact that once it is clear that no action is worse, things can be done very quickly, regardless of cost.

The need for a transition to a greener global economy is not in scientific question and is accepted as an even greater threat than the COVID pandemic. The problem in implementing required measures, though, are:

- › Impacts increase relentlessly but gradually, removing both the shock factor and the driver that would ordinarily have electorates demanding immediate action.
- › The worst impacts are still framed as future possibilities, abstracted from day-to-day life that mitigation policies will disrupt.
- › A slow start to global acceptance of climate change has meant that far too little has been put in place to replace fossil fuels. This means that energy security is at risk in many countries.

The last point is illustrated well by the European response to the Russian invasion of Ukraine. Sanctions were put in place, but not on energy, and Germany is re-opening coal plants as the only way to maintain energy security should the Russian supply be cut off. There cannot be a clearer example of how under-prepared the world is to phase out fossil fuels and their attendant CO2 emissions.

## Light cutting through the gloom...

It is possible and logical to take a pessimistic view of the chances that the world will put itself on the green path, but there are also signs that it may.

The EU is actively bringing its 'Carbon Border Adjustment' plans into [legislation](#), an act that would effectively export a large part of its carbon pricing standards to its trading partners. This does show how a progressive approach from a major player can have real influence far beyond its own borders.

It is also notable that the greening of the steel industry is continuing apace, with the discussion over the U.K.'s largest plant in Port Talbot, being around whether it closes or the government subsidizes half of the 3-billion-pound cost.

These are all positive signs that even in the economic carnage of the Ukraine war and post-pandemic recovery, transitional moves are being made.

## Transitional assumptions can be drawn...

With so many competing economic priorities, we can conclude the following:

- Hard policies to put the world on a 2-degree warming path (or lower) will only be put in place when demanded through sufficient negative experience of climate change
- As negative experiences are felt and attributed to climate change, governments are likely to act quickly
- Negative climate and energy experiences are increasing, and the costs of doing too little in advance are being demonstrated in a variety of ways

The most likely outcome that is emerging from recent global experience is that a disorderly approach is quickly adopted in the latter half of this decade, which will be disruptive and expensive. However, this will also be seen as an immediate need as 'freak' heatwaves and wildfires become the new normal in previously temperate climates, as the tragic 'horizon' comes ever closer into view.

## Why banks should care about this...

Banks need to monitor the risks on their balance sheets. There are regulations and accounting standards that must be met that make this a priority for financial institutions. The economic shift that climate transition pathways represent forces banks to recreate these as specific risk scenarios to run against their loan books.

At a minimum, banks must run a range of scenarios, taking data from reputable sources such as the NGFS, against:

- Current policy pathways
- 2-degree pathways - orderly
- 2-degree pathways - disorderly/delayed action

It is likely, from stated COP26 ambitions, that this is where the transitional policy will be taken from. Of course, the more scenarios and pathways covered, the better, but economic impacts are still most likely to come from within these boundaries.

















## GreenCap can help...


GreenCap is a turnkey, Risk as a Service (RAAS) solution that enables banks to run their balance sheet against multiple climate scenarios and assess by loan and portfolio:


- › Expected loss
- › Unexpected loss
- › Climate spread required to cover risk funding
- › Expected fall in default probability (risk rating)


### Greencap Scenario

Scenario: Generate Report Add New Scenario

Scenario Name	Updated On	Action
Base	06/05/2022 09:03:25	   
no change	07/05/2022 09:58:56	   
all change	07/05/2022 09:53:45	   
only T and P	06/05/2022 23:55:08	   

**Parameters** 

**Commercial Matrix** 

**Retail Matrix** 

Visit [greencap.live](https://greencap.live) for more free insights and resources curated with the express ambition of assisting banks in managing and enabling the transition to a green global economy.

## Chapter 6

# US CLIMATE BILL RE-IGNITES BEACON OF HOPE AGAINST CLIMATE CHANGE. BANKS NEED TO TAKE NOTICE.

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THE US RECENTLY SIGNED INTO  
LAW, A LANDMARK CLIMATE BILL  
THAT HAS REVIVED THE FEASIBILITY  
OF THE 2-DEGREE/NET ZERO  
TARGETS OF THE PARIS 2016 COP

Originally published on August 31, 2022

## Its economic legislation...

Officially called the 'Inflation Reduction Act', the recent legislation effectively puts the US economy on a determinedly greener path, aiming at reducing US greenhouse gas (GHG) emissions to 42% of their 2005 levels. This is a reduction that would simultaneously represent a cut of 2.5% of total current global amount. This underlines just how important a significant move by the world's largest economy is to the overall climate program.

The US had made a 'Nationally Determined Contributions' (NDC) at the 'Conference of Parties' (COPs), in Paris, in 2015, under Obama. After the Trump administration left the Paris Agreement, President Biden rejoined, upon taking office, and strengthened the original commitment to:

- Achieving a minimum 50% cut in GHG emissions by 2030
- Net zero by 2050

The importance of the NDCs was, in part, the fact that they reflected a global ambition to hold global warming levels to 2 degrees above 'pre-industrial' levels. This limit is widely viewed as one that avoids the most extreme effects of climate change. This aim, though, was also looking increasingly fanciful with:

- 2017 seeing the average surface temperature already 1% above 'pre-industrial' levels
- Average temperatures rising at around 0.2 degrees per decade
- Agreement on 'carbon budget spend' between developed and developing economies stalling
- The US making no federal laws to support its own NDC

This began to change with the Biden administration joining the 'Global Methane Pledge' and unveiling the '[U.S. Methane Emissions Reduction Action Plan](#)' in November 2021. This was framed in terms of an economic boost, rather than simply a climate measure, and this is how the most recent bill has also been presented.





## But is it a climate bill?...

While not exclusively dealing with climate-related issues, the new Act does go some way to reorient the US economic direction towards sustainability and a net zero future. Climate-related pieces of the Act include:

- › Methane reduction, impacting
  - Agriculture
  - Industry
- › Electric vehicle subsidies and support, including
  - Direct support for the emergent industry
  - Support for US-based mining for battery materials
- › Clean energy, including
  - Solar energy subsidies
  - Increased support for wind farms
  - Investment in nuclear energy



There is little in the Act regarding the wider electrification of the energy grid, and there is explicit support for oil and gas exploration. These notwithstanding, the direction of travel for the economy is clearly towards sustainability, presented as increased energy security for the country and households.

## The Act will move the market...

Explicitly mentioned within the bill itself are tax support for heat pumps, water heaters, and home solar panels. The aim is obviously to push market forces towards a greener economy.

There are also provisions for increasing the value of new technologies around Carbon Capture and Sequester (CCS), with increased rates paid for carbon that is captured and re-used within industrial processes. It is worth noting that as global schemes come together, the arbitrage between regimes around carbon pricing will become a major indicator of progress towards the future that 196 governments have signed up to.

## What the act means for the rest of the world...

Outside of the US bill, the EU has been forging ahead with legal provisions for its 'Green Deal', including 'Border Carbon Adjustments' (BCAs) [discussed in a [previous piece](#)]. Even so, without explicit support of the largest economy in the world, these measures are unlikely to change the 'laissez faire' attitude towards climate change that characterizes non-COP government announcements globally.

The 'Inflation Reduction Act' changes the game in terms of where the world heads next, economically. By not only signaling intent, but encoding into law, an ambition to meet its Paris commitments, the US has effectively re-lit the beacon that 2 degrees is still possible. Economies around the globe are likely to significantly increase their ambition towards this same endpoint. Taken in the round, this means that businesses have to be prepared to invest in the technologies and changes required to meet net zero by 2050.

## Banks should take stock now...

Banks lend to economies based on certain expectations of how governments will support and finance those economies. When a shift in paradigm occurs, the credit pricing basis on which loans are made, from subsidies to consumer behavior change with them. The move from a predominantly 'brown' economy to a 'green' one is just such a shift.

It is now most likely that transitional measures, to move from where we are to a more sustainable future, will be mostly back in line with the 2-degree commitment made in Paris in 2015. This means that there are three main scenarios to run against balance sheets to assess the increasing credit risk from the changing environment, which are:

- Current Policies - The rules and regulations already in place in each country
- 2-degree limit - Current and future changes needed to limit global warming to 2 degrees above pre-industrial levels
- Delayed action 2-degree limit - Aiming for the same end result, but with policies put in place later than expected

These climate pathways are available from the International Energy Agency (IEA) and the Intergovernmental Panel on Climate Change (IPCC), with the estimated costs being available from the Network for Greening the Financial System (NGFS). Taken together, banks ought to be able to look at the total costs and disaggregate these into impacted industries and firms. Furthermore, given that the needs per industry are reasonably well understood, they should be capable of seeing those borrowers who have already taken steps to avoid heavy costs by investing early in green technology, and rewarding them with commensurately lower borrowing rates.

As the costs of the full transition are expected to be in tens of trillions, finding and rewarding companies that are on the right side of history needs to become an imperative for banks that want to be part of the funding of a future global economy.

## GreenCap can help...

GreenCap is a 'Risk as a Service' (RaaS) solution that allows banks to quantify the increased credit risks and costs associated with various climate pathways. Every loan can be assessed against each potential outcome, as it is built to take into account policies at local, regional, and global levels, provided there are:

- › Increases in unexpected losses
- › Increases in expected losses
- › Implied increases in default probabilities
- › Implied increases in basis point spreads per loan



Visit [greencap.live](https://greencap.live) for more insights, news and resources, curated with the explicit aim of assisting banks in their journey towards sustainable finance.

## Chapter 7

# CONSTRUCTING A FEASIBLE APPROACH TO ESTIMATING CLIMATE-RELATED CREDIT RISK

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**BY NOW, INCLUDING CLIMATE CHANGE WITHIN BANKS' RISK ANALYSIS IS ACKNOWLEDGED AS AN INDUSTRY NEED. FIRST, THOUGH, BANKS NEED TO DETERMINE EXACTLY WHAT IS BEING CALCULATED, AND SECOND, HOW TO INTEGRATE THE RESULTS.**

**Originally published on OCTOBER 6, 2022**

## Climate change creates risks across multiple dimensions...

Climate change will cost businesses, and therefore corporate borrowers, within the real economy, significant amounts of their free cash flow. This cost will arise from:

**Transition Risk** - This is the risk of costs of compliance with local policy that impacts the borrowing firm. This comes from:

- › Direct costs of compliance for target industries and firms
- › Indirect costs within their up and downstream supply chains

**Physical Risk** - This is the risk of costly damage due to physical climate change. This comes from:

- › Adaptations to avoid physical impacts
- › Insurance costs against physical impacts

The net effect is that the financial profile changes, and therefore the credit profile changes. This implies that there is a potential risk in loans that is not being paid for via a basis point spread or that capitalizing the risk in the form of economic capital is more costly as it is insufficiently funded.

## Building a project to estimate risk-based costs...

Any framework that aims to put 'hard' numbers against climate change risk must be multi-dimensional in its ambition. This can only be achieved by running climate pathways in the form of economic scenarios against the loan book, including:

Scenarios covering at least

- › Current policy pathways - assumes full implementation of current policies on statute books
- › NDCs or Nationally Determined Contributions - assumes full implementation of policies to meet 'soft' commitments to the UN's COP under the Paris accord
- › 2 degrees - assumes implementation of pathway policies that would be required to hold global warming to 2 degrees above pre-industrial levels
- › 2 degrees delayed - the same as above but with a delayed start

Per scenario, loan and, aggregation to balance sheet level

- › Unexpected risk capital level
- › Expected risk capital level
- › Implied change in default probability
- › Implied basis point spread per loan

These outputs provide the risk committee with the means to determine the overall climate-specific credit risk that needs to be included as every country across the world is impacted by the transition to, and the physical consequences of, a greener economic paradigm.

## Specific data is needed to run climate scenarios...

The required outputs for any climate-based risk assessment must include:

### Loan details, including

- › Geography
- › Industry
- › Current rating
- › Adaptations already in place

### Scenario data

- › Target industries for transition
- › Industry-level adaptations/regulations
- › Supply chain impacts from transition
- › Costs associated with transition and physical climate change

## Loan Details

Core loan systems should hold basic details of the loans themselves. Specific data on business model adaptations must also be kept in order to assess how far along the sustainable journey each obligor has gone. This information has a material impact on the extent to which new regulations will impact the profitability and resultant credit profile.

The geographic location and jurisdiction of a corporate borrower is of paramount importance in assessing both its exposure to climate policy (transition risk) and climate events (physical risk). Without a policy in place to actively force a change to the business model/costs, there is little incentive for a firm to invest in adaptations to reduce its impact on the environment. Similarly, each industry has either its own set of climate adaptations or is associated with one that does, via its place in the overall supply chain. Examples of adaptations by industry can be found in reports such as the World Economic Forum's 'Net-Zero Tracker' [report](#).



Source: [www3.weforum.org](http://www3.weforum.org)

The current rating of the obligor is also required data. Ratings are, at least in part, reflections of the free cash flow that covers the expense of covering current debts and outgoings. Expenses related to transitional adaptations must be seen as additional costs to continue in business and, therefore, directly reduce such coverage. Before and after applying climate pathway scenarios, the overall credit profile must take all of the above into consideration.

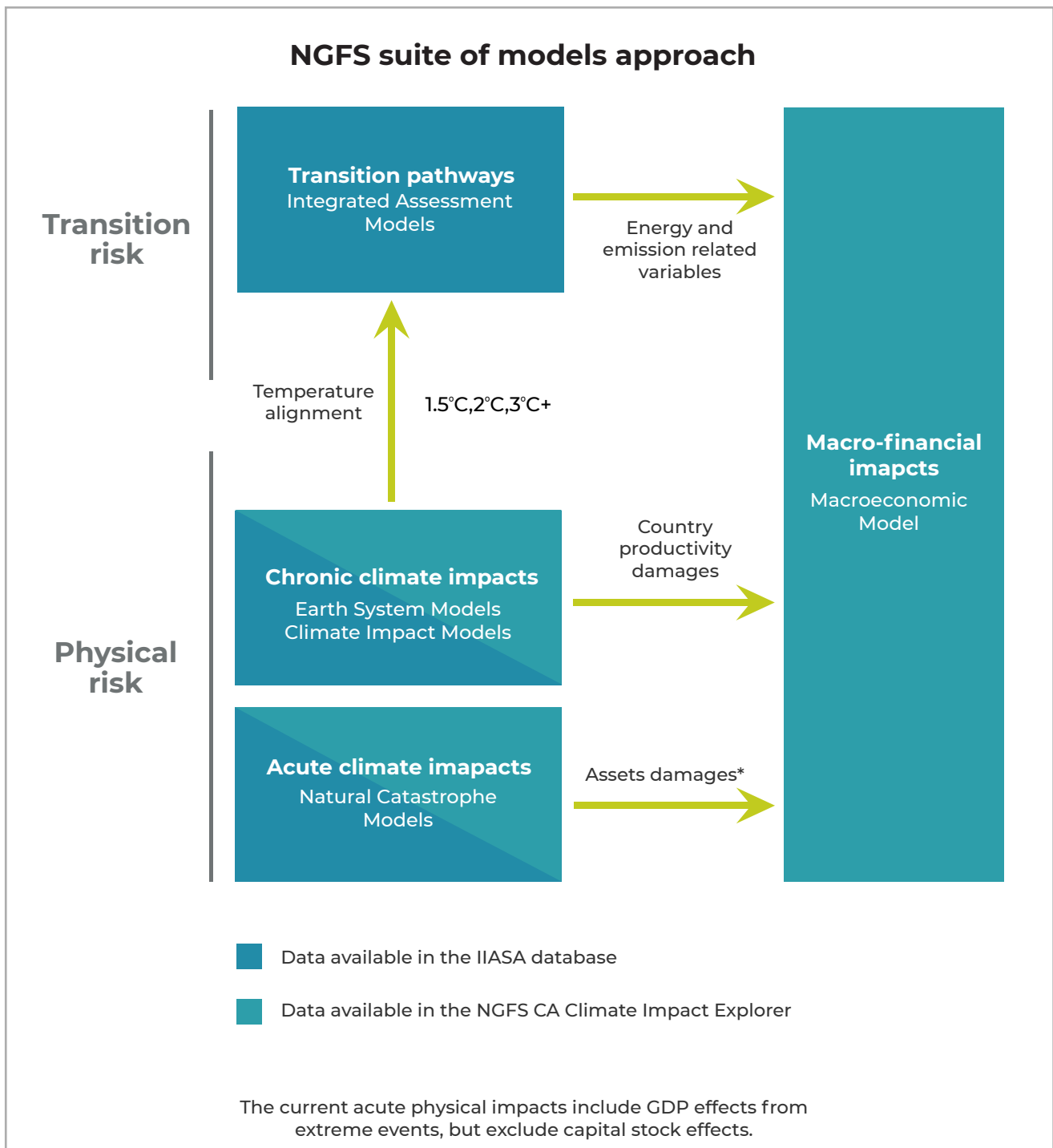
## Scenario data

Climate pathways are complex and written as 'real world' adaptations that must be made across areas such as:

- › Buildings
- › Industry
- › Agriculture
- › Infrastructure
- › Transportation
- › Tourism

While the Intergovernmental Panel on Climate Change (IPCC) has produced high-level pathways that would result in average global warming increases (relative to pre-industrial levels) of various levels, the majority of countries have also submitted at least an initial NDC. These need to be scrutinized and used as the basis for aspirational targets for each, juxtaposed with policies currently in place in each region.

- › NDCs are constantly updated by the UN and can be accessed [here](#)
- › Current policies are generally detailed on each government website
- › Costs associated with the transition and implied physical damage are broken down by country and region on the [NGFS site](#)



Once this data is sourced, bank analysts must look beyond specifically targeted industries into their supply chains in order to create a more complete picture. There are a number of options available to climate teams in this area, including looking at idiosyncratic stock market returns by sector and correlating these to the core target sectors. This provides reasonable insight into the overall supply chain impacts.



## Bringing the data together...

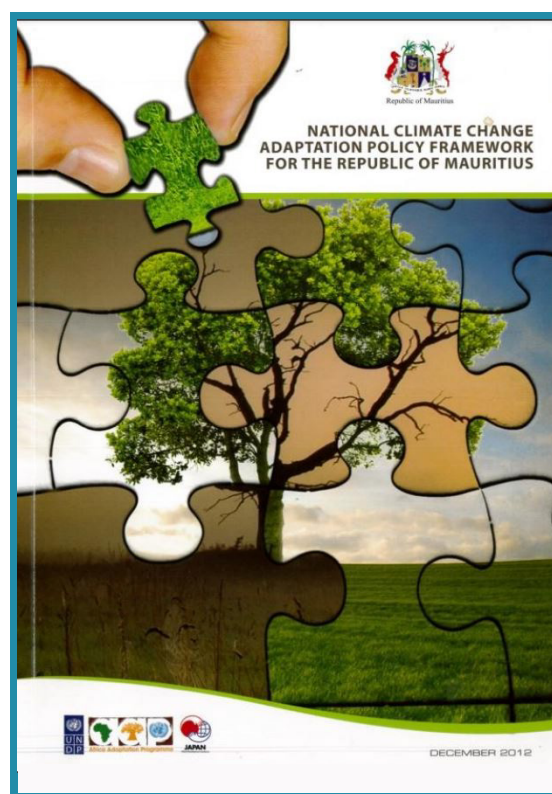
Banks are ultimately concerned with credit, market and liquidity risks arising from climate change. The most pressing category, though, is credit risk. Trillions of dollars are needed per annum to meet the wider investment goals of the 2-degree targets, and banks must ensure that they are in a position to act as the funding conduit for that monetary flow. The most significant threat to that positioning is a sudden increase in default likelihood, coming from borrowers using more of their revenue in meeting new regulations, leaving themselves less able to service their debts properly.

With this in mind, the following calculations are required per scenario, loan and aggregation to balance sheet level:

- › Unexpected risk capital level
- › Expected risk capital level
- › Implied change in default probability
- › Implied basis point spread per loan

This is explicitly recognized by the Basel Committee on Banking Supervision (BCBS), as is illustrated in its 2021 review of considerations and methodologies for measuring [climate-related financial risks](#).

## From best practice to policy...



This analysis is being picked up by central bankers in countries such as Mauritius, where, guidance to its banks was issued in April of 2022, and action plans for bringing climate change into their core risk analysis are now a requirement.

An important aspect of the Mauritius guidance is that it expects climate change to sit within but be clearly differentiated from banks' standard risk management. Three lines of defense are explicitly mentioned, and analysis must include:

*“Financial institutions shall have a framework for measuring and monitoring material, climate-related and environmental financial risks, which as a minimum, will:*

- i. include the development of relevant risk indicators to categorize counterparties, sectors, and geographical locations based on the extent of climate-related and environmental financial risks;*
- ii. comprise an adequate risk monitoring process, which includes usage of qualitative and quantitative analytic tools and metrics to monitor relevant risk indicators and climate-related and environmental financial risk exposures against the overall strategy and risk appetite for climate-related and environmental financial risks and to support decision making;*
- iii. ensure that the risk appetite framework incorporates relevant risk exposure limits and thresholds for the risks and;*
- iv. encompass measures to encourage counterparties to provide relevant disclosures on climate-related and environmental financial risks.”*

## A win-win situation...

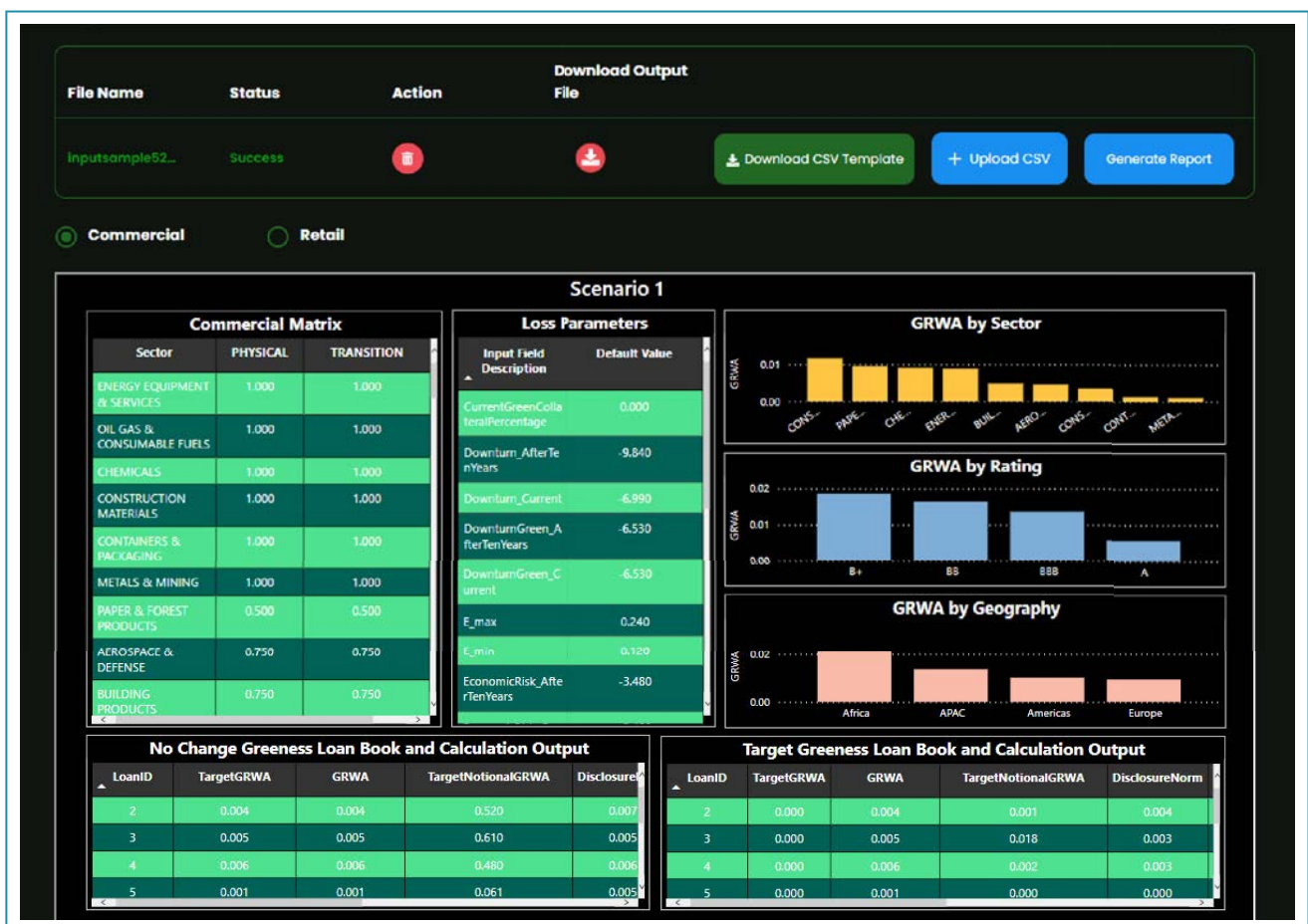
Banks that implement a system of risk management that clearly identify climate risks, quantifying the extent to which financial resiliency is at risk, will not only put themselves in a position to benefit from the transition to a greener economy, but also place themselves ahead of the regulatory wave that will, in short order, require them to do so.

## GreenCap can help...

GreenCap is a Risk as a Service (RaaS) solution that enables banks to:

- Identify financial risks arising from climate change

- Measure
  - › Increases in default probability per loan per scenario
  - › Changes in economic capital that can be expected at loan and balance sheet level, per scenario
  - › Re-price loans in basis point terms to ensure that green businesses are incentivized while non-green credits are charged appropriately
- Report risks by stress test and climate pathway to
  - › Management
  - › Stakeholders
  - › Regulators



Visit [greencap.live](https://greencap.live) for further news, insights, and resources curated for banks to bring climate change into their risk management, as well as details about the GreenCap climate risk system.

## Chapter 8

# COP27 HAS A CHALLENGING AGENDA THAT BANKS MUST FOLLOW CAREFULLY

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**NOVEMBER SEES THE 27TH  
'CONFERENCE OF THE PARTIES' (COP27)  
CONVENED IN SHARM EL-SHEIKH,  
EGYPT. ONE YEAR AFTER GLASGOW  
HOSTED THE 26TH EDITION, IT IS VITAL  
THAT BANKS NOTE ANY  
(RE)PRIORITIZATION AND THE  
DIRECTION OF TRAVEL REGARDING  
GLOBAL CLIMATE AMBITION.**

**Originally published on NOVEMBER 3, 2022**

## Each COP has a specific vision...

COP27 has laid out its vision of success, which is to substantiate progress made at Glasgow, by moving from stronger commitments to 'specific, measurable, impactful initiatives'. The five main pillars of this vision are:

- › Equitable balance between developed and developing countries in funding the global challenge of loss from mitigation and adaptation to climate change
- › Basing all planned work on the Intergovernmental Panel on Climate Change (IPCC), or equally credible groups, scientific analysis of the problem
- › Creating a 'no country left behind' mentality for all collaborative action
- › Commitment to common rules and principles in tackling climate change
- › Determined movement from negotiation to action

In keeping with this vision statement, specific targets of the Summit are centered heavily on the transition to action.

- › Agreed work streams to implement pledges on time and at scale
- › A new, science-based, adaptation agenda to protect basic and sustainable needs of vulnerable countries
- › Action to support vulnerable countries where loss and damage have already occurred
- › Mobilize financial flows based on needs and existing Nationally Determined Contributions (NDCs)
- › Create a framework for a just transition, avoiding backsliding on commitments and pledges

This COP is clearly focused on one of the major gaps in the [achievements of COP26](#), which was to make substantive progress in climate responsibilities between developed and developing countries.



## The current position is largely tracked from the Paris Accord of COP 21...

The Paris-based COP was a milestone in climate politics. At that Summit, the global community agreed on key objectives, including:

- › Hold global warming to 2 degrees above pre-industrial levels
- › Make 'best efforts' to hold global warming to 1.5 degrees above pre-industrial levels
- › Create NDCs, which act as pledges from specific countries, with targets to be set and increased regularly

This established twin ambitions - with the NDCs being local and independent, there is no strict obligation for those commitments to combine to reach the wider group ambition. It was conceived as a solution to the political impasse that had developed between the richer and weaker economies.

As a result of this agreement, progress to a sustainable global economy was regionalized, with an overriding ambition loosely guiding that progress. Such tracking is, therefore, performed against multiple targets.

- › Current policies vs NDCs measuring the implementation of specific pledges by each country
- › NDCs vs. 2-degree limit measuring the gap between pledges and what is generally seen as that countries' 'fair share' of global ambition

Tracking the first of these is most important for those creating financial scenarios, because NDCs are benchmarks against which governments have agreed to be measured.

## Direction of travel is determined by more than NDCs, though...

In addition to NDCs, there are two more elements to consider.

- › Long-term low greenhouse gas emissions development strategies (LTS) - Plans, typically out to 2050, to convert regional power generation to being sustainable (preferably net zero).
- › Sustainable Development Goals (SDGs) - 17 high-level goals covering ambitions of the UN for a more sustainable world. While a number of these are linked to climate change, the full set is wider in scope. The relationship between climate and SDGs is covered [here](#).



The interconnected web of complementary, and occasionally conflicting pledges and plans must be viewed in the context of building an overall pathway. NDCs may not be dependent upon LTSs and SDGs, but harmonization may delay NDC implementation. The closer aligned these plans are, when they exist at all, the more likely the NDCs are to become a reality in a timely manner.

## Data is available to track progress and linkages...

Navigating these relationships can be daunting, but organizations such as [Climate Watch](#) provide details as to who has provided NDCs, updated NDCs and LTSs and how these relate to the UN's SDGs. These datasets and analyses can then be used to modify NDCs' costings in order to build scenarios in a more 'real world' context.

Analysis of the most recent submissions and data indicate to scenario builders, within bank risk management departments, the manner in which each country treats the transition. As an example, we can look at the highest emitters in terms of NDC and LTS submission.

Country ↕	Share global	NDC ↕	Updated First NDC ↕	2nd NDC ↕	LTS ↕	Climate Framework ... ↕	Sectoral Laws or Policies ↕
<a href="#">China</a>	24.23%	✓	✓	✗	✓	✓	✓
<a href="#">United States</a>	11.60%	✓	✓	✗	✓	✓	✓
<a href="#">India</a>	6.76%	✓	✓	✗	✗	✗	✓
<a href="#">European Union (27)</a>	6.33%	✓	✓	✗	✓	✗	✗
<a href="#">Indonesia</a>	3.94%	✓	✓	✗	✓	✗	✓
<a href="#">Russia</a>	3.87%	✓	✗	✗	✗	✗	✓
<a href="#">Brazil</a>	2.92%	✓	✓	✗	✗	✓	✓
<a href="#">Japan</a>	2.28%	✓	✓	✗	✓	✓	✓

Above are the countries whose contribution to global emissions is greater than 2% of the total, and their status in terms of submission of NDCs and LTSs.



Source: Explore NDC-SDG Linkages | Climate Watch ([climatewatchdata.org](https://climatewatchdata.org))

Above is a heatmap indicating the level of linkage between regional climate NDCs and the specific UN SDG exclusively covering climate change (number 13/17).

Data such as this shows that there is work to be done to meet various promises and commitments from the preceding decade. Most notably:

- › Key emitters need to update their NDCs
- › NDCs need to be harmonized with LTSS
- › NDCs need to be harmonized with SDGs

One way of looking at these problems is that the 'cone of uncertainty', which spans the different outcomes from 'current policies' to the '2-degree limit' has to be reduced by adjusting and implementing more ambitious NDCs. Not only will this put much-needed energy into the fight against climate change, but it will also be the natural next phase of this journey that started in Paris at COP15.

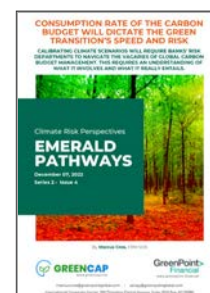
## Egypt's COP can be viewed as the most political since Paris...

The 27th COP takes place against a dramatic global backdrop. The war in Ukraine has put a strain on worldwide food and energy security. The interconnectedness of the global [supply chain](#) highlights not just the need for a unified approach, but also the growing disparity between rich and developing economies in terms of how they deal with these core security issues.



Coupled with the fact that developing nations are also on the front line of physical climate change, COP27 is aiming to finally achieve agreement on the long-discussed 'fair transition'. In broad terms, this means directly supporting countries facing direct climate damage in terms of adaptation, and wealthier countries providing more funding to countries as they 'catch up' in the most sustainable way.

If Paris provided a neat route past a unified approach, and Glasgow acted as the five-year checkpoint, Egypt must see political convergence. The ever-shrinking [carbon budget](#) is the ticking stop clock that looms large over negotiations, and it is imperative that discussion becomes action before 2025 if 2030 goals are to have any chance of being met.





## Banks' risk departments must take careful note of the details...

Transitional policy changes on the scale that are being discussed will have massive impacts on economies across the world. These impacts will fundamentally change the credit risk landscape within those countries. And if banks are unprepared, then they will find themselves on the wrong side of the transitional balance sheet, with rising economic risk costs tying up capital in brown assets rather than funding the journey to a greener future.

## GreenCap can help...

GreenCap is a turnkey 'Risk as a Service' solution that allows banks to model economic climate pathways, including current policies, NDCs, and 2-degree limits. With the financial risks of each being calculated from the banks' perspective, climate change risks can be included within the wider scope of risk management. CROs and lending officers will then be in a position to manage balance sheet strategy in a way that is entirely in keeping with its sustainability ambitions.



Visit [greencap.live](https://greencap.live) for further news, insights, and resources curated for banks to bring climate change into their risk management, as well as details about the GreenCap climate risk system.

## Chapter 9

# COP27 - WHAT MUST FINANCIAL FIRMS TAKE AWAY?

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**COP27, WHICH CONCLUDED IN EGYPT RECENTLY, WAS HELD AT A TIME OF RAMPANT INTERNATIONAL ENERGY PRICE INFLATION, A LAND WAR IN EUROPE, AND AGAINST A HISTORY OF INCREASING INTRANSIGENCE IN SPECIFIC AREAS OF FUNDING. EVEN SO, SOME ACHIEVEMENTS OF THE CONFERENCE ARE WELL WORTH NOTING BY BANKS.**

**Originally published on DECEMBER 1, 2022**

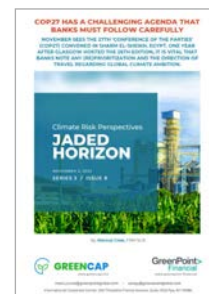
## History dealt COP27 a difficult hand to play...

Developing countries have called for two specific things for a long time.

The first is 'Loss and Damage' payments from developed nations. Essentially, some countries find themselves at the forefront of physical climate change impacts, which are primarily caused by developed countries. The situation is exacerbated by the fact that even now, richer countries emit many multiples of the greenhouse gasses coming from the worst-affected nations in the world. Historically, wealthier countries have fought against this, as it could conceivably lead to legal claims in the future.

The second, linked, issue is that smaller coastal and island nations desperately need the wider global community to reinforce a commitment to holding global warming this century to 1.5 degrees above pre-industrial levels. If higher targets are allowed to become a replacement for 1.5 as the target, then the damages they would sustain could threaten any viability they have as independent countries, if not wipe them out entirely.

With the [COP](#) coming as the Russian invasion of Ukraine has seen energy prices skyrocket, which itself has led inflation upwards, western spending conversations have been more towards military and energy security than climate change.



## Since Glasgow, the scientific warnings have only become louder...

At the [26th edition of the COP](#) in 2021, scientific evaluations of the combined Nationally Determined Contributions (NDCs), put forward by countries as a requirement from the Paris accord, reached in 2015, alarmingly predicted that even full rollouts of the plans would see a century end increase of 2.7 degrees. This would be a disaster for the smaller developing nations. Delegates agreed to revisit and strengthen their NDCs in time for the 2022 COP.



As the conference started, very few had done so, and revised analysis showed that the reduction in emissions by 2030 would be around 1% only, a long way from the 43% total reduction needed for 1.5 degrees to be even remotely possible.

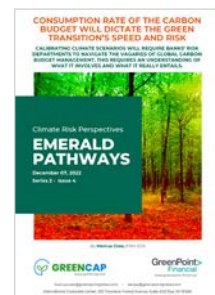
## There were some green shoots of hope...

Surprisingly, there was more progress on the 'Loss and Damage' issue than had been seen at any prior COP. The group agreed that a fund ought to be set up, and a transitional committee was created to determine how such a fund would be filled and subsequently run. The key part of this section of the agreement is that outside of some 'pledges', the funding was not determined, and will likely be a mix of public and private initiatives. These, along with the organizational recommendations, are due to be presented to COP28 in the UAE next year.

There was also increased pressure on banks and development banks to ease the flow of money for transitional projects, with a new vision being asked for, in order that such institutions are 'fit for purpose' over the next decade.

## As well as continued black holes...

Curtailling carbon emissions depends to a large degree on reaching peak use for fossil fuels sooner rather than later. One proposal mooted was for the summit to agree to a commitment to phase out all fossil fuels, which would have significantly strengthened the Glasgow position. This was not adopted, and it was noted by the Glasgow COP President, Alok Sharma, that to reach the ambitious goal of 1.5, [carbon emissions](#) need to peak by 2025, and that this not being committed to represented a significant failure of the conference.

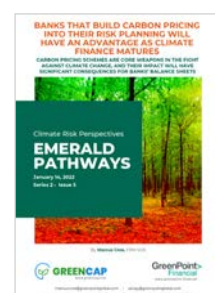


## All in all, a disappointing but mixed bag of results...

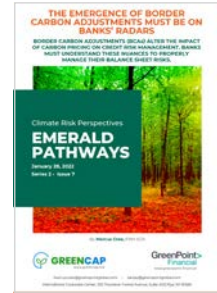
The easy conclusion is that this COP failed to achieve progress substantively, and that this was a sadly predictable outcome, given the geopolitical situation framing it. This misses some important nuances though that banks, in particular, would do well to take note of.

The fact is that a fund has been agreed to, whereby emitters will effectively pay in, while those suffering climate hardship will take out. Even without details, this should put banks on alert that money will need to be raised from the private sector, with the higher emitting industries most likely to be targeted for whatever proposals ultimately come forward. Conceivably, funds could be raised from:

- Wider adoption of Carbon '[cap and trade](#)' schemes, which have the advantage of locking in a base level of energy security as well as charging for emissions or the introduction of carbon tax schemes.



- › Creation of [carbon border adjustments](#) to prevent such schemes from simply incentivizing offshoring of CO2 emissions.



Any or all of the above would act as a profit drag to 'brown' industries and firms, as well as an additional bonus for those companies already investing in 'greening' their operations. The implications for future costs and credit profiles are significant, as it threatens to turn the economic order on its head, with fossil fuel utilities becoming a greater risk to bank balance sheets than sustainable start-ups.

Another potential impact of a 'Loss and Damage' fund is that governments may escape historic 'reparation' payments, but subsidizing future emission growth could carry high financial penalties once the president for the fund is in place.

These should be considered by banks, as they choose lending strategies going forward, or else they may find that their credit risk costs outweigh any short-term gains to be had from a 'business as usual' approach. [Climate scenario analysis](#), centering on transitional costs and how they may be borne, needs to become a staple reporting requirement in every bank's risk department.



## GreenCap can help...

GreenCap is a turnkey, 'Risk as a Service' (RaaS) solution that gives banks the capacity to run multiple climate scenarios and pathways and view the impact they have on:

- › Loan pricing
- › Balance sheet profitability
- › Expected and unexpected losses (credit risk capital)
- › Borrowers' probability of default



GreenCap is built on the philosophy that banks need a solution that allows them to view climate change in banking terms. Without such a solution, they are caught between current banking rules around credit risk and the urgent need to finance the transition to a sustainable economic future.

Visit [greencap.live](https://greencap.live) for more insights and resources written and curated to enable financial institutions to make informed choices and keep themselves on the right side of history.

## Chapter 10

# 2022 - A YEAR OF CHANGE IN CLIMATE CHANGE RISK - A BANKING VIEW

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2021 ENDED WITH HOPE OF A REVITALIZED FIGHTBACK AGAINST CLIMATE CHANGE. IN THE END, GOVERNMENTS SAW A YEAR OF INFLATION, EUROPEAN WAR, AND STRUGGLES TO REGAIN PRE-PANDEMIC MOMENTUM. CENTRAL BANKERS, HOWEVER, MADE SIGNIFICANT CLIMATE PROGRESS. BANKS NEED TO FOLLOW THESE REGULATORY PROPOSITIONS CAREFULLY AS THEY ARE LIKELY TO DOMINATE THE COMING YEARS.

Originally published on **DECEMBER 29, 2022**

## The Basel Committee on Banking Supervision (BCBS) has climate change on the top of its agenda...

The BCBS has wrestled with encoding climate change into risk management for a while, and has released a series of consultative papers including:

### April 2021 - '[Climate-related risk drivers and their transmission channels](#)'

This report looks at, and defines, financial risks to banks that need to be considered in the context of climate change. While the report covers all aspects of risk management, positioning these within the overall Basel framework, it specifically considers how microeconomic, macroeconomic, governmental, and supply chain impacts need to be built into climate considerations.

Risk	Potential effects of climate risk drivers (physical and transition risks)
Credit risk	<ul style="list-style-type: none"> <li>• Credit risk increases if climate risk drivers reduce borrowers' ability to repay and service debt (income effect) or banks' ability to fully recover the value of a loan in the event of default (wealth effect).</li> </ul>
Market risk	<ul style="list-style-type: none"> <li>• Reduction in financial asset values, including the potential to trigger large, sudden and negative price adjustments where climate risk is not yet incorporated into prices. Climate risk could also lead to a breakdown in correlations between assets or a change in market liquidity for particular assets, undermining risk management assumptions.</li> </ul>
Liquidity risk	<ul style="list-style-type: none"> <li>• Banks' access to stable sources of funding could be reduced as market conditions change. Climate risk drivers may cause banks' counterparties to draw down deposits and credit lines.</li> </ul>
Operational risk	<ul style="list-style-type: none"> <li>• Increasing legal and regulatory compliance risk associated with climate-sensitive investments and businesses.</li> </ul>
Reputational risk	<ul style="list-style-type: none"> <li>• Increasing reputational risk to banks based on changing market or consumer sentiment.</li> </ul>

Credit risk and its oversized contribution to potential climate-related losses are highlighted, as is the fact that it is the risk area that has seen the most work in terms of solution development.

In the accompanying publication, '[Climate-related financial risks – measurement methodologies](#)', solution methodologies were also discussed, to the extent they were available in April 2021.

### June 2022 - '[Principles for the effective management and supervision of climate-related financial risks](#)'



This publication details 18 principles that the committee sees as key for banks, and supervisors, to properly account for climate change within banks' risk management divisions. Each of these principles is expanded upon, and directly linked to an existing standard principle.

**Principle 1 :** *Banks should develop and implement a sound process for understanding and assessing the potential impacts of climate-related risk drivers on their businesses and on the environments in which they operate. Banks should consider material climate-related financial risks that could materialize over various time horizons and incorporate these risks into their overall business strategies and risk management frameworks. [Reference principles: BCP 14, SRP 30, Corporate governance principles for banks]*

**Principle 2 :** *The board and senior management should clearly assign climate-related responsibilities to members and/or committees and exercise effective oversight of climate-related financial risks. Further, the board and senior management should identify responsibilities for climate-related risk management throughout the organizational structure. [Reference principles: BCP 14, SRP 30, Corporate governance principles for banks]*

**Principle 3 :** *Banks should adopt appropriate policies, procedures, and controls that are implemented across the entire organization to ensure effective management of climate-related financial risks. [Reference principles: BCP 14, SRP 30, Corporate governance principles for banks]*

**Principle 4 :** *Banks should incorporate climate-related financial risks into their internal control frameworks across the three lines of defense to ensure sound, comprehensive and effective identification, measurement and mitigation of material climate-related financial risks. [Reference principles: BCP 26, SRP 20, SRP 30, Corporate governance principles for banks]*

**Principle 5 :** *Banks should identify and quantify climate-related financial risks and incorporate those assessed as material over relevant time horizons into their internal capital and liquidity adequacy assessment processes, including their stress testing programmes where appropriate. [Reference principles: BCP 15, BCP 24, SRP 20, SRP 30]*

**Principle 6 :** *Banks should identify, monitor, and manage all climate-related financial risks that could materially impair their financial condition, including their capital resources and liquidity positions. Banks should ensure that their risk appetite and risk management frameworks consider all material climate-related financial risks to which they are exposed and establish a reliable approach to identifying, measuring, monitoring, and managing these risks. [Reference principles: BCP 15, SRP 30]*

**Principle 7 :** *Risk data aggregation capabilities and internal risk reporting practices should account for climate-related financial risks. Banks should seek to ensure that their internal reporting systems are capable of monitoring material climate-related financial risks and producing timely information to ensure effective board and senior management decision-making. [Reference principles: BCP 15, SRP 30, Principles for effective risk data aggregation and risk reporting]*

**Principle 8 :** Banks should understand the impact of climate-related risk drivers on their credit risk profiles and ensure that credit risk management systems and processes consider material climate-related financial risks. [Reference principles: BCP 17, BCP 19, SRP 20, Principles for the management of credit risk]

**Principle 9 :** Banks should understand the impact of climate-related risk drivers on their market risk positions and ensure that market risk management systems and processes consider material climate-related financial risks. [Reference principles: BCP 22]

**Principle 10 :** Banks should understand the impact of climate-related risk drivers on their liquidity risk profiles and ensure that liquidity risk management systems and processes consider material climate-related financial risks. [Reference principles: BCP 24, Principles for sound liquidity risk management and supervision]

**Principle 11 :** Banks should understand the impact of climate-related risk drivers on their operational risk and ensure that risk management systems and processes consider material climate-related risks. Banks should also understand the impact of climate-related risk drivers on other risks and put in place adequate measures to account for these risks where material. This includes climate-related risk drivers that might lead to increasing strategic, reputational, and regulatory compliance risk, as well as liability costs associated with climate-sensitive investments and businesses. [Reference principles: BCP 25, Principles for the sound management of operational risk, Principles for operational resilience, SRP 20, SRP 30]

**Principle 12 :** Where appropriate, banks should make use of scenario analysis to assess the resilience of their business models and strategies to a range of plausible climate-related pathways and determine the impact of climate-related risk drivers on their overall risk profile. These analyses should consider physical and transition risks as drivers of credit, market, operational, and liquidity risks over a range of relevant time horizons. [Reference principles: BCP 15, Stress testing principles]

**Principle 13 :** Supervisors should determine that banks' incorporation of material climate-related financial risks into their business strategies, corporate governance, and internal control frameworks is sound and comprehensive. [Reference principles: BCP 9, BCP 14, BCP 26, SRP 20]

**Principle 14 :** Supervisors should determine that banks can adequately identify, monitor, and manage all material climate-related financial risks as part of their assessments of banks' risk appetite and risk management frameworks. [Reference principles: BCP 15, SRP 20, SRP 30]

**Principle 15 :** Supervisors should determine the extent to which banks regularly identify and assess the impact of climate-related risk drivers on their risk profile and ensure that material climate-related financial risks are adequately considered in their management of credit, market, liquidity, operational, and other types of risk. Supervisors should determine that, where appropriate, banks apply climate scenario analysis. [Reference principles: BCP 17–25, Principles for sound liquidity risk management and supervision, Principles for the sound management of operational risk, Principles for operational resilience]

**Principle 16** : *In conducting supervisory assessments of banks' management of climate-related financial risks, supervisors should utilize an appropriate range of techniques and tools and adopt adequate follow-up measures in case of material misalignment with supervisory expectations. [Reference principles: BCP 8, BCP 9, SRP 10, SRP 20]*

**Principle 17** : *Supervisors should ensure that they have adequate resources and capacity to effectively assess banks' management of climate-related financial risks. [Reference principles: BCP 9]*

**Principle 18** : *Supervisors should consider using climate-related risk scenario analysis to identify relevant risk factors, size portfolio exposures, identify data gaps, and inform the adequacy of risk management approaches. Supervisors may also consider the use of climate-related stress testing to evaluate a firm's financial position under severe but plausible scenarios. Where appropriate, supervisors should consider disclosing the findings of these exercises. [Reference principles: Stress testing principles]*

The overriding message is that the existing framework of risk management principles is sufficient to include climate change, as long as climate-specific scenarios and factors are included in the overall risk package. Principle 12 (scenario analysis) explicitly makes this point. It is an important point to emphasize, as it effectively means that the responsibility for including climate risk lies with the banks themselves and supervisors to judge.

#### **December 2022 - 'Frequently asked questions on climate-related financial risks'**

In this document, which builds on the 18 principles of the previous one, it is emphasized that climate change impacts on counterparties' capacity to cover their obligations, can, and should be, reflected in the Risk-Weighted Asset (RWA) calculations - *'Climate-related financial risks can impact banks' credit risk exposure through their counterparties. To the extent that the risk profile of a counterparty is affected by climate-related financial risks, banks should give proper consideration to the climate-related financial risks as part of the counterparty due diligence. To that end, banks should integrate climate-related financial risks either in their own credit risk assessment or when performing due diligence on external ratings.'*

There is an unmistakable growth in strength in the messaging that banks and their supervisors need to:

- › Work climate risk into their existing risk management frameworks
- › Transparently show exactly how climate risk is being captured and transformed into financial risk
- › Be flexible in the way that climate scenarios are parameterized
- › Ensure that climate change specificities are included at all levels and 'lines of defense'
- › Pay particular attention to how climate risks are manifested in impacted credit profiles and resultant economic capital charges

## US regulatory bodies are creating frameworks based around the Basel concepts...

While the Basel Committee creates guidance, regulators within the US are building up their own sets of risk management requirements that either draw from or mirror the BCBS thinking.

The US has several bodies responsible for various parts of the financial system, and 2022 has seen progress from each of them.

### **October 2021 - Financial Stability Oversight Council (FSOC) releases its '[Report on Climate-Related Financial Risk](#)'.**

This report assessed the entire landscape of the US financial market, with the aim of deepening the understanding of potential impacts and creating mitigation processes to protect the system from them. Sections included:

- › *Regulatory and Supervisory Engagement with Climate-related Financial Risk* - Reviews the work underway across FSOC members on climate-related financial risks and financial stability.
- › *Climate-related Financial Risk - Data and Methods* highlight the data and methodological challenges associated with the measurement of climate-related financial risks and potential approaches to meeting these challenges.
- › *Climate-related Disclosures* - Discusses the critical role of consistent, comparable, and decision-useful climate-related disclosures for investors, financial institutions, regulators, and the public in the measurement of climate-related financial risks.
- › *Implications for Financial Stability Assessments* - Presents key issues for assessments of the effect of climate-related financial risks on financial markets and institutions, emphasizing the need for measurement tools to assess such risks and the important role that scenario analysis can play in the development and deployment of these critical assessments.
- › *Council Recommendations* - Synthesizes the analysis of the report through a set of recommendations that begin to address the challenges and needs identified throughout the reports.

### **December 2021 - The Office of the Comptroller of the Currency (OCC) launched its '[Draft Principles](#)', and sought comments from its members.**

This document recognized the unique impact that climate change would have on financial institutions. The general principles dealt with physical and transitional risk, specifically in the areas of:

- › Governance
- › Policies, procedures, and limits
- › Strategic planning
- › Risk management
- › Data, risk measurement, and reporting
- › Scenario analysis

Importantly, these principles drew a clear distinction between how risks are typically managed, using historic data as the basis for forecasting, and climate risk's dependence upon forward pathways. To this point, scenario-based analysis was specifically mentioned as the core tool for analysis. It is also notable that credit and liquidity risk were highlighted as key areas of concern when assessing climate change risk.

### **March 2022 - The SEC Proposes Rules to [Enhance and Standardize Climate-Related Disclosures for Investors](#)**

These extensive and detailed rules are designed to be in line with the Task Force on Climate-Related Financial Disclosures (TCFD) and GHG protocol rules. They would effectively require US Securities and Exchange Commission (SEC) listing firms to disclose a range of climate-related information, including:

- › Material impacts
- › Carbon offsets or renewable credits as applicable
- › Maintained internal carbon pricing
- › Details of any scenario analysis
- › Strategies for risk identification and mitigation

It is interesting for banks to note the kind of disclosures being mooted as these would go a long way to fill in the gaps left by top-down scenario analysis. Mitigation of impacts that would otherwise impact credit profiling and pricing are vital ingredients for a meaningful analysis to be performed.

### **December 2022 - Federal reserve releases in consultation document '[Principles for Climate-Related Financial Risk Management for Large Financial Institutions](#)'**

This publication is the same as the OCC version above, but aimed at banks with \$100b or more in assets.

The US systemic preparation for managing climate change is running behind its EU counterpart, but the direction of travel is clear. Banks will be increasingly expected to:

- › Incorporate climate risks into their existing risk frameworks
- › Isolate climate-specific impacts, including physical and transitional, on counterparty credit
- › Use forward-looking climate scenarios based on evolving science

- › Create strategies to mitigate long-term, specified, climate risks
- › Set limits specific to climate risks
- › Create climate risk reporting and governance throughout the organization

## Europe has also increased the cadence on climate resiliency within banks...

The European Central Bank (ECB) has been publishing active guidance for a number of years,

**November 2020 - ‘[Guide on climate-related and environmental risks](#)’**, which detailed the supervisory expectations relating to risk management and disclosure. This had the same expectations as the BCBS guidance, specifically asking for - *‘Institutions are thus expected to comprehensively analyse the ways in which climate-related and environmental risks drive the different risk areas, including liquidity, credit, operational, market, and any other material risk to capital or any of its sub-categories that it is or might become exposed to.’*

The 13 specific expectations of financial institutions are:

1. Institutions are expected to understand the impact of climate-related and environmental risks on the business environment in which they operate, in the short-, medium- and long-term, in order to be able to make informed strategic and business decisions.
2. When determining and implementing their business strategy, institutions are expected to integrate climate-related and environmental risks that impact their business environment in the short-, medium-, or long-term.
3. The management body is expected to consider climate-related and environmental risks when developing the institution’s overall business strategy, business objectives, and risk management framework, and to exercise effective oversight of climate-related and environmental risks.
4. Institutions are expected to explicitly include climate-related and environmental risks in their risk appetite framework.
5. Institutions are expected to assign responsibility for the management of climate-related and environmental risks within the organizational structure in accordance with the three lines of defense model.
6. For the purposes of internal reporting, institutions are expected to report aggregated risk data that reflect their exposures to climate-related and environmental risks with a view to enabling the management body and relevant sub-committees to make informed decisions.
7. Institutions are expected to incorporate climate-related and environmental risks as drivers of existing risk categories into their existing risk management framework, with a view to managing, monitoring, and mitigating these over a sufficiently long-term horizon, and to review their arrangements on a regular basis. Institutions are expected to identify and quantify these risks within their overall process of ensuring capital adequacy.

8. In their credit risk management, institutions are expected to consider climate-related and environmental risks at all relevant stages of the credit-granting process and to monitor the risks in their portfolios.
9. Institutions are expected to consider how climate-related and environmental events could have an adverse impact on business continuity and the extent to which the nature of their activities could increase reputational and/or liability risks.
10. Institutions are expected to monitor, on an ongoing basis, the effect of climate-related and environmental factors on their current market risk positions and future investments, and to develop stress tests that incorporate climate-related and environmental risks.
11. Institutions with material climate-related and environmental risks are expected to evaluate the appropriateness of their stress testing with a view to incorporating them into their baseline and adverse scenarios.
12. Institutions are expected to assess whether material climate-related and environmental risks could cause net cash outflows or depletion of liquidity buffers and, if so, incorporate these factors into their liquidity risk management and liquidity buffer calibration.
13. For the purposes of their regulatory disclosures, institutions are expected to publish meaningful information and key metrics on climate-related and environmental risks that they deem to be material, with due regard to the European Commission's Guidelines on non-financial reporting - Supplement on reporting climate-related information.

In keeping with the BCBS and US guidance that followed, the ECB does make specific points about longer-term horizons, the need for climate pathway-based scenarios, and the need to monitor credit impacts from transitional and physical factors in particular.

**November 2022 - [‘Results of the 2022 thematic review on climate-related and environmental risks’](#)** - The ECB published findings of its 2022 climate risk assessment involving 186 large banks. These findings included:

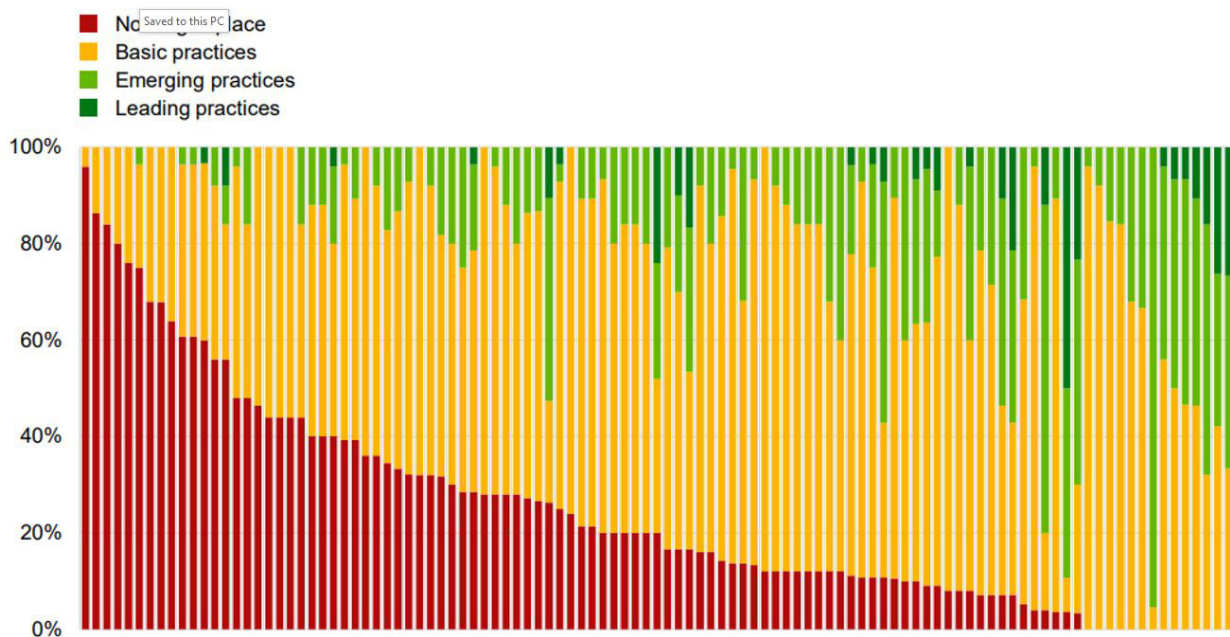
- › The European Central Bank (ECB) has concluded its thematic review on climate-related and environmental risks of 186 banks with total combined assets of €25 trillion, which is aimed at fostering the alignment of the banking sector with its supervisory expectations.
- › There is broad acknowledgment within the banking sector of the materiality of physical and transition risks within the current business planning horizon.
- › Most institutions have now devised an institutional architecture to address climate-related risks, having clearly built up their capabilities compared with 2021.
- › Some institutions have started to use transition planning tools, along with targeted client engagement, to enhance the resilience of their business model over longer time horizons, but a wait-and-see approach is still prevalent.
- › Virtually all the institutions need to make far-reaching and enduring efforts to develop consequential, granular and forward-looking approaches to manage climate-related and environmental financial (C&E) risks.

- Institutions need to make further efforts to attain an acceptable degree of coverage of key portfolios, geographies, and risk drivers.
- Notwithstanding the progress made by many institutions on their implementation plans, the ECB expresses significant supervisory concern regarding the execution capabilities of around half of the institutions.
- The ECB's remediation timelines require the institutions to ensure full alignment with all expectations by the end of 2024 and include the deployment of further supervisory instruments to instigate decisive actions where needed.
- On a more positive note, the good practices observed in numerous institutions demonstrate how the sector can harness innovation to address the prevailing challenges.
- The ECB also observed good practices being deployed in relation to broader environmental risks, with institutions leveraging existing climate-related risk approaches.

While progress is clearly being made, the central bank is still concerned that the banking sector may be left struggling with unmanaged risks as a transition to a greener economy progress.

### The level of maturity of practices across areas of supervisory expectations (bank-by-bank)

(percentages of areas of supervisory expectations by institution)



Source: Supervisory assessment of 107 significant institutions' responses to the 2022 thematic review on climate-related and environmental risks.

**November 2022 - 'Good practices for climate-related and environmental risk management'** was published as a guide to banks, built on the findings of the stress tests earlier that year.



These best practices are centered on materiality, business strategy, governance and risk appetite, and risk management. Once again, the drive is for banks to identify material risks and encode these into their existing frameworks and lines of defense. Notably, an example of best practice includes -

*“In order to reflect the forward-looking nature of risks, one institution leverages scientific climate pathway scenarios (e.g., Network for Greening the Financial System (NGFS) and Intergovernmental Panel on Climate Change (IPCC)) to assess physical risks and transition risks. These scenarios are then used to simulate the stress impact on the institution’s portfolios. For this, the institution employs a simulation tool that uses external data (e.g., asset-level data, price data) and client data to estimate the impact of the scenarios. Using this tool to model expected change to earnings before interest, taxes, depreciation, and amortization (EBITDA), the institution can estimate the PDs at the client-level under the various scenarios by 2030 (taking into account the longer time horizon associated with C&E risks). These stressed client-level probability of default (PDs) are then aggregated to the sector portfolio level, which allows the institution to generate sector-level heatmaps to identify which sectors are most impacted by C&E risks.*

*As the next step, the institution calculates the difference between stressed portfolio PD and baseline portfolio PD, which is the exposure at risk due to C&E risk. As the calculated difference surpassed the materiality threshold, the institution decided to allocate a dedicated economic capital buffer for that amount of exposure at risk, addressing both transition and physical risks.”*

## Other regions are developing supervisory approaches to climate risks...

In addition to the US and EU, central banks around the world are creating expectations for their regulated institutions to analyze, manage and report climate specific risks. The vast majority of these can be linked to the BCBS guidance in direct ways.

One such example of this is Mauritius, where the stress test-based guidance is detailed in - [‘Constructing a feasible approach to estimating climate-related credit risk’](#).



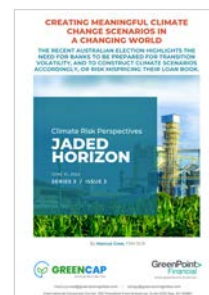
It should be also noted that the UK, Brazil and China have all made progress on climate risk from within their financial regulation during 2022.

## Financial risks depend, in large part, on government policy on climate change...

Perhaps the most difficult aspect of stress testing the financial impact of climate change is the interrelatedness of credit risk, transitional speed, and physical climate change. In short:

- A faster transition to a greener economy creates additional compliance costs for firms all along supply chains, increasing the short-term credit risk of 'brown' companies and their suppliers
- A slower transition increases the likelihood of worse physical impacts in the mid- to long-term, impacting collateral values and business models
- Increased physical climate change impacts increase the need for adaptation spend, which diverts money from mitigation investment, potentially creating a vicious cycle of ever-worsening physical conditions to contend with

For these reasons, and to properly capture the co-dependency of risk factors, banks must model specific, researched climate pathways into their stress testing, taking care to include existing mitigations already in place at the borrowers' business. This was covered in - ['Creating Meaningful Climate Change Scenarios in a Changing World'](#)



The recent COP, held in Egypt, had grand ambitions to build on the 2021 Glasgow edition, covered in - ['COP27 has a challenging agenda that banks must follow carefully'](#). In many ways, the aims were unfulfilled, but some progress was made regarding the long-running funding disagreement between developed and developing countries, covered in ['COP27 – What must financial firms take away?'](#).



## 2022 in summary...

2022 was a challenging year for policymakers. The aftermath of the pandemic, along with the Russian invasion of Ukraine, meant that, in many ways, fighting climate change took a back seat. That did allow, however, central banks to make up some ground in terms of guidance and regulation.

While climate scenarios themselves evolve at the pace of policy inaction, the need to run and include them in risk appetites, strategy and management are more pressing than ever. Central

banks are increasingly asking for this within standard risk reporting, and there is pressure for risk frameworks to have clearly set out climate limits and monitoring.

2023 will only see this trend accelerate.

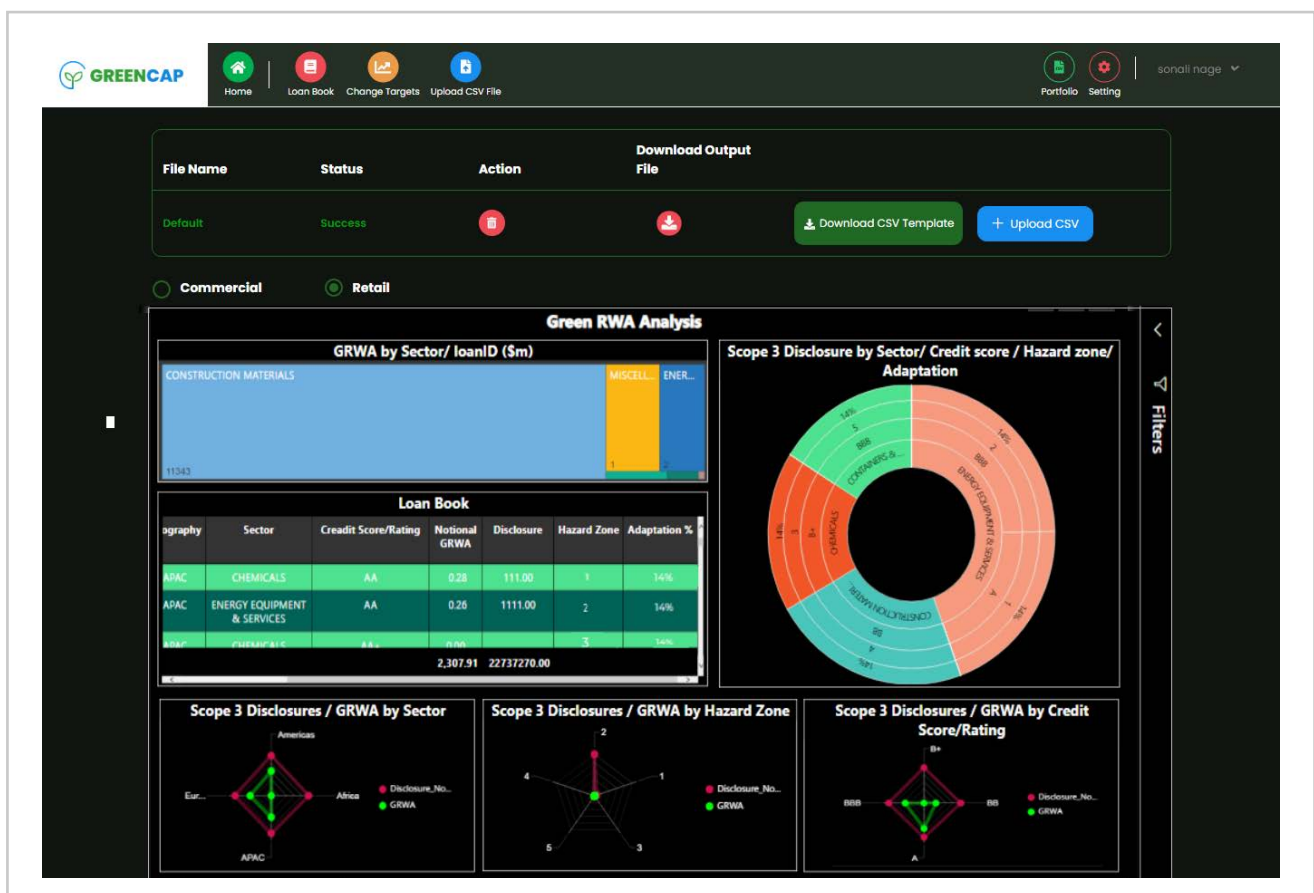
## GreenCap can help...

GreenCap is a turnkey Risk as a Service (RaaS) solution that allows banks to model multi-jurisdiction, multi-sector climate pathways as stress tests. This enables analysis at the loan level with results including:

- › Changes in unexpected losses
- › Changes in PD
- › Changes in expected losses

The system is granular enough to give banks the capacity to include borrower-level mitigations and adaptations, providing a uniquely top to bottom analysis that can be used to:

- › Report financial risk implications of climate change
- › Create climate-based limits that can be used by the 'second line of defense'
- › Evolve strategies to meet high-level environmental commitments over longer timeframes



Visit [greencap.live](https://greencap.live) for more insights, news and resources curated for use by banks to build effective climate risk management into their existing frameworks.



## 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 500 employees with a global footprint. Our production and management teams are in the US, 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 Nord, GreenPoint rigorously complies with ISO 9001:2015, ISO 27001:2013, and ISO 27701:2019 standards.



## Marcus Cree

MANAGING DIRECTOR AND  
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 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 provides strategic and tactical guidance to GreenPoint senior management and serves as client ombudsman. His career in the financial services industry spans three decades during which he has held investment banking and C-level risk management positions at Royal Bank of Canada (RBC) 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" (Risk Books, 2018).

Sanjay was the Founding Director of the RBC/Hass Fellowship Program at the University of California at Berkeley and has served as an advisor and a member of the Board of Directors of UPS Capital (a Division of UPS). He has also served on the Global Board of Directors for Professional Risk International Association (PRMIA).

Sanjay 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. As well as being a regular speaker at conferences, Sanjay actively teaches postgraduate level courses in business and quantitative finance at EDHEC (NICE, France), Fordham, and Columbia Universities.