



UK
FINANCE

Integrating climate risk into the prudential capital framework

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1. Executive summary

UK Finance held a series of roundtables with the six UK banks¹ in scope of the Bank of England's Climate Biennial Exploratory Scenario (referred throughout as "the banks") to discuss industry views on the appropriateness of capital for climate-related financial risks as well as the feasibility, benefits and disadvantages of the options outlined in the Climate Change Adaptation Report 2021² for integrating climate-related risks into the prudential capital framework. Five roundtables were held covering: the potential options being discussed globally, capability gaps, microprudential regime gaps, macroprudential regime gaps and the trade-offs between the different options. The views expressed in those roundtables have been aggregated and summarised in this paper, and are not attributable to any single representative.

The banks agreed with the Bank of England's view that any proposed changes to the capital framework should be for the purpose of mitigating climate-related financial risks and not for the primary purpose of supporting green finance. Any adjustments to the capital rules that are not for the purpose of mitigating financial risk will likely either reduce financial resilience or create unintended consequences from over-capitalisation. However, it was also recognised that risk-based changes to the capital regime could potentially have a second order impact of supporting green financing if they recognised that there will be both winners and losers from the transition to net zero. For example, it is possible within a risk-based framework to recognise that certain assets may become less risky as a result of the transition to net zero, and this could indirectly support the financing of these 'green' and 'transitioning' assets. Equally, certain carbon-intensive assets may become riskier and so see an increase in their capital requirements, which could discourage the provision of credit to these assets. The rest of this paper therefore primarily focusses on the appropriateness of options for changing the capital framework from a financial risk perspective.

The banks agreed that until it is clear how climate risks will manifest differently from traditional financial risks it makes sense to focus on capturing climate through the application of existing regulatory tools, rather than fundamentally redesigning the framework in the short to medium-term. There are a number of channels through which climate risks are likely to already be captured to some extent by the existing regime, including through internal models, external credit ratings and the accounting regime. The extent to which climate risk is already captured by these elements will be unclear until we understand whether and how climate change has increased the aggregate level of uncertainty in the economy. Furthermore, the types of changes to the framework that may be necessary will depend on whether the primary aim is to avoid short-term risks such as the financial impacts of extreme weather or a climate-driven 'Minsky moment', or longer-term structural changes over a 30-40 year timeframe, or both. While these uncertainties persist, it may be better to try and capture climate within the current framework through the application of existing tools such as stress testing.

The stress testing component of the PRA Buffer is likely to be the most feasible and appropriate element of the capital framework to implement changes related to climate risk in the medium-term. The banks are supportive of focusing on improving scenario analysis capabilities, developing the climate stress

¹ Barclays, HSBC, Lloyds Banking Group, NatWest, Santander UK, and Standard Chartered Bank

² [PRA Climate Change Adaptation Report 2021 - Climate-related financial risk management and the role of capital requirements | Bank of England](#)

testing framework, and using stress tests to explore the financial magnitude of potential climate risks. The banks also agreed that, once methodologies have matured, it would make sense to consider climate stress impacts in the PRA Buffer, as this is the part of the capital regime which is already designed to account for uncertain, longer-horizon, forward-looking risks. The banks would find it helpful to receive further guidance from the Bank of England³ on scenario analysis to ensure the industry develops consistent and robust approaches.

Modelling and access to consistent data remains a challenge and therefore addressing ‘capability gaps’ is a key dependency for introducing any changes to the capital regime in the short-term. Increased guidance from the Bank of England would help to reduce variability in the identification and quantification of climate-related risks. Improving the understanding of how to identify and measure climate risks should continue to be the primary regulatory focus in the near-term. The banks viewed a continuous open dialogue with the regulator as vital and urged the Bank of England to go further with initiatives like the Climate Financial Risk Forum (CFRF) and to push for a ‘call to arms’ in improvements in data availability and modelling methodologies.

There was recognition that, in the longer-term, climate change should be reflected in Pillar 1 as a driver of Credit, Market and Operational Risks, but these rules should be agreed at the international level by the Basel Committee on Banking Supervision (BCBS). It is currently premature to explicitly integrate climate considerations into Pillar 1 methodologies as there is uncertainty around which methodological approaches would be most appropriate. Some banks suggested that extending risk horizons, or moving away from historic data towards forward-looking projections, would require a more fundamental rethink of the purposes and calibration on minimum capital requirements and therefore regulators and industry should work together to define the most appropriate methodological approaches. However, the advantage of adopting a Pillar 1 approach, once an appropriate methodology has been agreed, is that it is ‘bottom up’ and has the ability to recognise that certain assets could, in fact, become less risky as a result of the transition. As such, the banks support the ongoing research of the BCBS to develop international standards that support a level playing field and would encourage jurisdictional authorities not to pre-empt its recommendations. The capital regime is already complex and further international divergence would create additional complexity for banks with an international presence and could create competitiveness issues for UK regulated banks.

Limited changes are expected to be required to Pillar 2a in the near-term. Banks are already required to account for any risks in Pillar 2a that are not adequately captured by Pillar 1. However, as the banks support the continued back-testing of Pillar 1 and 2a methodologies on empirical data, the uncertain and forward-looking aspects of climate risk are likely to be better captured by PRA Buffer stress testing exercises in the near term. Similarly, a number of banks shared the view that, in the long-term, climate risk should be reflected in Pillar 1, rather than Pillar 2a, to the greatest extent possible. This is because Pillar 2a functions as an add-on and therefore, unlike Pillar 1, it is only able to reflect increases, and not decreases, in risk at an asset-level.

There were concerns around the potential use of Risk Management & Governance (RMG) scalars for climate risk purposes at this stage unless regulators first provide further clarity on what ‘good’ looks like for climate risk management capabilities. UK regulators already have the ability to utilise existing

³ Throughout this paper the Bank of England (BoE) is used to collectively refer to the publications and responsibilities of the BoE and the Prudential Regulation Authority (PRA).

Pillar 2 tools such as RMG scalars where they deem a bank’s risk management or governance capabilities to be weak. However, RMG scalar setting methodologies are relatively opaque and, given current uncertainties around best practice climate risk management, they are unlikely to lead to an improvement in outcomes when used in isolation. A number of areas were identified where the banks believed clearer regulatory expectations should be set before climate variables are explicitly considered in RMG scalars.

The banks did not identify a need to introduce a climate systemic risk buffer (SyRB) at this stage, as it is not yet clear whether aggregate capital requirements need to increase in response to climate change, or by how much. While the Climate Biennial Exploratory Scenario results identified that climate risk may make the distribution of future shocks worse, further research is required on the interaction between climate and systemic risk before setting out SyRB design principles. In February 2022, the Financial Stability Institute (FSI) noted that applying the macroprudential framework to systemic climate-related financial risks at this stage is likely to be ineffective and potentially counterproductive for financial stability⁴.

Table 1 below summarises the views expressed on the appropriateness, feasibility and pace of implementation of the options considered in the Climate Change Adaptation Report 2021. Each of the options is included for completeness, but not all of the options were seen as having a role to play. **In particular, the banks do not see a role for integrating climate considerations into the combined buffer.**

The Bank of England should publish a structured roadmap setting out the future regulatory direction of integrating climate into the capital framework. An implementation timeline would be beneficial to the industry, as it would support banks with planning and capability development.

Table 1: Summary review of the potential options for integrating climate into the capital framework

Option		Appropriateness	Feasibility	Pace of Implementation
More appropriate options ✓	PRA Buffer (Stress Testing)	High	Easier	Medium-term
	Pillar 1	High	Harder	Longer-term
	Pillar 2a	Medium	Moderate	Medium-term
Less appropriate options X	PRA Buffer (RMG Scalars)*	Low	Easier	Shorter-term
	Systemic Risk Buffer**	Low	Moderate	Longer-term
	Combined Buffer**	Low	Harder	Longer-term

Footnote: The systemic risk buffer is typically considered as part of the combined buffer but it has been split out here to reflect its closer relevance to the debate around climate risk and capital requirements.

⁴ [Brief No. 16 ‘The regulatory response to climate risks: some challenges’](#)

** Only considered here in relation to closing capability gaps (i.e. using RMG scalars explicitly as a tool for improving climate-related risk management).*

*** There was a divergence in views on these options and certain banks did not feel like they were viable at all.*

2. Introduction

Changes in global weather patterns associated with climate change have become increasingly economically and socially costly over recent decades and, unless global Greenhouse Gas (GHG) emissions are reduced sharply, the impacts are projected to get substantially more acute over coming years. However, reducing global GHG emissions in line with international climate goals will also significantly impact asset values across the economy, as the necessary changes in policies, technologies and consumer preferences will lead to a reassessment of a wide range of business models. It is therefore increasingly important for financial institutions and investors to factor the risks, and opportunities, associated with both physical climate change and the transition to a low carbon economy into their decision making and risk management processes.

Following the publication of Supervisory Statement 3/19 (SS3/19)⁵, the Bank of England (BoE)⁶ has expected banks in the United Kingdom (UK) to be monitoring the risks and opportunities arising from climate change and the transition to a low carbon economy. Banks are increasingly expected to have embedded climate risk within their Internal Capital Adequacy Assessment Process (ICAAP) submissions and following the BoE's Climate Biennial Exploratory Scenario (CBES) in May⁷, and other climate stress tests globally, prudential regulators are turning their focus towards the regulatory capital framework.

In the Climate Change Adaptation Report 2021⁸ the BoE outlined its initial thinking on the topic of integrating climate into the capital framework and committed to setting out further views on whether changes to the regime are required in H2 2022. Regulatory authorities from across the globe have since published a number of similar publications and the Basel Committee on Banking Supervision (BCBS) and Financial Stability Board (FSB) have been looking at this at an international level. As a result, banks have begun considering the implementation challenges and business implications of the various potential capital rule changes under consideration.

UK Finance held a series of roundtables with the six UK banks in scope of the BoE's CBES (referred throughout as "the banks") to discuss industry views on the feasibility, benefits and disadvantages of the various options for integrating climate into the prudential capital framework considered in the Climate Change Adaptation Report 2021. Five roundtables were held covering: the potential options being discussed globally, capability gaps, microprudential regime gaps, macroprudential regime gaps and the trade-offs between the different options. The views expressed in those roundtables have been summarised in this paper.

3. The role of regulatory capital and interactions with climate-related risks

⁵ [Enhancing banks' and insurers' approaches to managing the financial risks from climate change | Bank of England](#)

⁶ Throughout this paper the Bank of England (BoE) is used to collectively refer to the publications and responsibilities of the BoE and the Prudential Regulation Authority (PRA).

⁷ [Results of the 2021 Climate Biennial Exploratory Scenario \(CBES\) | Bank of England](#)

⁸ [PRA Climate Change Adaptation Report 2021 - Climate-related financial risk management and the role of capital requirements | Bank of England](#)

Key messages:

The banks agree with the BoE's view that any proposed changes to the capital framework should be for the purpose of mitigating climate-related financial risks and not for the primary purposes of supporting green finance. Any adjustments to capital rules that are not for the purpose of mitigating financial risk will likely either reduce financial resilience or lead to unintended consequences. There was recognition from the banks that while financial regulation can support the transition to net zero, government policy should be the driving force behind decarbonisation.

However, the banks also recognised that there will be both winners and losers from the transition to net zero and that an appropriately calibrated risk-based approach could have a second order impact of supporting green financing. For example, certain 'green' and 'transitioning' assets may receive a reduced capital charge if methodological changes account for the fact that certain assets may become less risky as a result of the transition. Equally, certain carbon-intensive assets may become riskier so see an increase in their cost of capital which could discourage the provision of credit to these assets.

Some of the banks supported further research into the introduction of environmental supporting and penalising factor adjustments to the capital regime. However, it was agreed that the underpinning design principles should focus on managing financial risks rather than incentivising behavioural change.

The rest of this paper therefore primarily focuses on the appropriateness of options for mitigating climate-related financial risks when discussing potential changes to the capital framework.

Regulatory capital is a source of funding that banks hold to absorb unexpected financial losses that would otherwise threaten their solvency. The minimum level of capital banks must hold is set by national supervisory authorities and international standards agreed by the Basel Committee on Banking Supervision (BCBS). Banks also hold additional 'capital buffers' to ensure they can absorb losses in times of stress without being in breach of their minimum requirements and in some cases to safeguard the stability of the financial system as a whole.

Regulators have recently begun investigating whether the existing capital rules remain appropriate in light of the emerging financial risks arising from climate change. The rationale for making changes to the capital framework that are being discussed broadly fall into one of two categories:

- 1) Changes that would ensure financial resilience against climate-related financial risks (risk-based changes).
- 2) Changes that would actively support the transition to net zero emissions (transition supporting changes).

The discussions around risk-based changes to the framework focus on whether or not the unique features of climate-related risks, such as the lengthened time horizons and the increased levels of uncertainty, render the existing rule calibrations inappropriate for maintaining current levels of financial resilience. The discussions around transition supporting changes suggest that the capital framework could be an

effective tool for mobilising the significant quantity of private sector financing that the shift towards a low carbon economy requires⁹.

There are a number of interconnections between the *risk and transition* focused approaches to adjusting capital rules. It could be argued that an active transition focused approach could simultaneously reduce aggregate systemic risk if it supported an early and orderly transition to net zero. Similarly, the introduction of an appropriately calibrated risk-based approach that recognised that certain assets will become less risky as a result of the transition could also have the second order impact of supporting green financing.

The BoE has been very clear in its communications that it views capital as only being an appropriate tool for dealing with the ‘consequences (not the causes) of climate change’¹⁰ and this view has been mirrored by other regulators such as the European Banking Authority (EBA) which has emphasised the ‘risk-based’ nature of the capital regime. This position is based on regulators’ interpretations of their respective mandates and on the empirical literature¹¹ which paints a mixed view of the effectiveness of using capital rules to influence bank lending patterns. While financial regulators can support the transition to net zero, governments and policy makers need to lead this change by providing clear climate policy pathways.

The banks’ agreed with the regulatory view that any changes to the capital framework should be for the primary purpose of mitigating climate-related financial risks and not supporting green finance. However, an appropriately calibrated risk-based approach could potentially have a second order impact of supporting green financing if it recognised that there will be both winners and losers from the transition to net zero. For example, it is possible within a risk-based framework to recognise that certain assets may become less risky as a result of the transition to net zero, and this could indirectly support the financing of these ‘green’ and ‘transitioning’ assets. Equally, certain carbon-intensive assets may become riskier so see an increase in their cost of capital, which would discourage the provision of credit to these assets.

Certain banks noted that they’re monitoring the exploration of environmental supporting and penalising factors in certain jurisdictions. The potential advantages of these approaches include the fact that such a change would be a relatively transparent and simple amendment to the framework. However, a lack of clear definitions around what is ‘green’ or environmentally harmful makes the implementation of such an approach challenging, as overly broad definitions may inadvertently restrict transition financing to the companies that need it most. Additionally, it was recognised that unless the design is explicitly risk-based there are likely to be negative implications associated with not directly tying capital requirements to credit quality. Further exploration on supporting factors was encouraged, subject to the underpinning design principles being based on managing risk rather than incentivising behaviour.

The rest of this paper therefore primarily focuses on the appropriateness of options for mitigating climate-related financial risks when discussing potential changes to the capital framework.

⁹ The International Energy Agency (IEA) estimated that at least \$3.5 trillion in energy-sector investments would be needed on average each year until 2050 [Deep energy transformation needed by 2050 to limit rise in global temperature - News - IEA](#)

¹⁰ [Macropru – fit for the future? – speech by Sarah Breeden | Bank of England](#)

¹¹ [Climate capital – speech by Sam Woods | Bank of England](#) and [Climate and capital: some outstanding issues – Bank Underground](#)

4. Does the current capital framework address climate related risks appropriately?

Key messages:

Climate risks are likely to already be captured to some extent by various elements of the existing framework such as internal model parameters, external credit ratings and the accounting regime. However, a number of potential ‘gaps’ in the regime were identified in the BoE’s Climate Change Adaptation Report 2021 that call into question whether design adjustments need to be introduced in order to better capture climate-related risks.

When considering whether or not to adjust the capital rules to account for climate-related risks it is important to consider the extent to which physical and transition risks will evolve differently from traditional financial risks. It will be difficult to adjust the design of the current framework until more research is performed on how climate risks could manifest differently from traditional financial risks. Also the types of adjustments that will be required will depend on whether the aim of changing the framework is to avoid short-term risks such as the financial impacts of extreme weather or a climate-driven ‘Minsky moment’, or longer-term structural changes over a 30-40 year timeframe, or both.

Therefore, while these uncertainties persist, and further research is carried out by banks and regulators, it may be better to try and capture climate within the existing design through the application of existing Pillar 2 tools (such as the stress testing component of the PRA Buffer) and providing further guidance on best practice approaches. Structural changes to the design of the Pillar 1 rules calibration should be assessed, and are likely to be required in the longer-term, but should not be implemented until further analysis has been undertaken on the nature of the underlying risks and until international agreement through BCBS is achieved.

4.1 Are climate-related risks captured by the existing framework?

Before considering any potential changes to the capital framework it is important to assess the extent to which emerging climate-related risks may already be captured by elements of the existing framework and therefore whether any changes are required.

The elements of the current Pillar 1 framework that rely on internal models could potentially already be sufficiently flexible to capture emerging climate risks. For climate-related risks that are already observable and financially material (such as an increased frequency of extreme heat events impacting crop yields and agricultural profitability in certain regions globally) these risks could already be captured by banks’ calculations of internal model parameters, such as Probability of Default (PD) or Loss Given Default (LGD) under the Internal Ratings Based (IRB) approach to calculating Credit Risk capital requirements.

However, due to current calibration approaches relying on historic data many climate risks may not be meaningfully captured by internal models at this stage as the risks emerging from climate change are not

fully reflected in historic data¹². Furthermore, the internal model approaches to other risk types may be comparatively more or less capable of capturing climate risk than the IRB approach for Credit Risk. For example, it may be comparatively even more challenging to capture climate within the Internal Models Approach (IMA) for Market Risk as it is calibrated for risks that materialize over a much shorter time horizon given the short-dated nature of trading book exposures i.e. 10-day VaR.

The standardised approach (SA) to calculating capital requirements by contrast is more rigid and is unlikely to directly capture climate risk as an emerging risk class. Elements of the SA that rely on external credit rating buckets for setting risk weights, such as ‘Exposures to rated institutions’, may indirectly account for climate-related risks if the external rating agencies factor climate risks in their credit opinions. This may become increasingly relevant due to the introduction of the ‘output floor’ under Basel 3.1. However, there are currently doubts about the extent to which climate-related risks are adequately reflected within existing credit rating methodologies¹³ and even if the gaps in these methodologies were addressed, some jurisdictions may elect not to allow the use external ratings under Pillar 1.

The existing Pillar 2 framework is potentially flexible enough to account for climate risks as it is already designed to be bank-specific, to cover risks which are underestimated or not covered by Pillar 1 and to account for the needs and circumstances of differing jurisdictions. In particular, the tools within Pillar 2b (the PRA Buffer) may be well-suited to dealing with the unique nature of climate risks. The PRA Buffer consists of a forward-looking stress testing component and RMG scalars that are used to account for failures in risk management processes, frameworks and governance. Climate could be factored into the application of either of these two tools with minimal fundamental changes to the design of the regime.

A final but more indirect channel through which climate risk may be captured by the existing rules is through the connections between the capital rules and the financial accounting framework. There is a close relationship between IFRS 9 accounting provisions for Expected Credit Losses (ECL) and the Expected Loss (EL) parameter required for Pillar 1 capital calculations¹⁴. As IFRS 9 ECLs are forward-looking, and the IFRS Foundation has outlined the relevance of climate-related risks to these provisions¹⁵, the potential impacts of climate risk on banks’ capital positions should be lower if these risks are accurately recognised in ECL projections. However, climate risk is not yet consistently factored into IFRS 9 ECLs and it is not explicitly accounted for at all in the unexpected loss calculations necessary for Pillar 1 capital requirements.

Further analysis is required to understand the extent to which climate risk drivers are already reflected in the current prudential framework through factors such as internal models, external credit ratings and the accounting regime. However, a number of potential ‘gaps’ in the regime were identified in the BoE’s Climate Change Adaptation Report 2021.

¹² [Capturing risk differentials from climate-related risks: A Progress Report | Banque de France \(ngfs.net\)](#)

¹³ [Credit Ratings and Climate Change - Challenges for Central Bank Operations | Banque de France \(ngfs.net\)](#)

¹⁴ For banks using the IRB approach to Credit Risk capital requirements the higher of EL or ECL is subtracted from a bank’s Common Equity Tier (CET) 1 position: 30.13 [CAP30 - Regulatory adjustments \(bis.org\)](#) and where ECL provisions are greater than EL a proportion of these provisions can count towards Tier 2 capital requirements 10.14 [CAP10 - Definition of eligible capital \(bis.org\)](#).

¹⁵ [IFRS - Educational material: the effects of climate-related matters on financial statements prepared applying IFRS Standards](#)

4.2 What are the potential gaps in the framework?

The BoE's Climate Change Adaptation Report 2021 identified a number of 'gaps' in the current regulatory capital framework where the consequences of climate change may be imperfectly captured by the existing regime.

- **Capability Gaps** – refer to the hurdles banks face when capturing risks fully within current frameworks. These exist mainly due to a lack of granular data or limitations in modelling techniques to reflect climate variables. These gaps are not unique to capital, and there are challenges related to climate-risk management and business planning more generally.
- **Regime Gaps** – refer to possible challenges in capturing climate-related financial risks due to the design or use of methodologies in the capital regime itself. These gaps apply to both the micro and macroprudential capital regimes independently.
 - **Microprudential Gaps** – the methodologies employed in the microprudential part of the capital regime are unlikely to currently capture climate-related risks as the key parameters are calibrated on historical data, calculations often rely on high-level bucketing of assets and are calculated to reflect unexpected losses over one year period.
 - **Macroprudential Gaps** – the macroprudential framework is more flexible with regard to time horizons and the ability to account for forward-looking risks, however its current application is more suited to cyclical risks rather than escalating systemic risks, the time horizons considered in current macro stress tests are still relatively short (3-5 years) compared to climate risk horizons and there are currently no tools specifically designed to look at climate risks.

The key question arising from the identification of these gaps is around their materiality and whether, and how, the existing framework would need to be adjusted in order to account for climate-related risks.

4.3 Does the existing framework need changing for climate risk?

Initial work from the BCBS¹⁶ concluded that climate risk drivers, including physical and transition risks, can be captured in traditional financial risk categories such as Credit, Market and Operational Risks.

These findings set the conceptual foundation for the analysis undertaken in reviewing the potential gaps in the prudential framework and the options for addressing them.

A key determinant of whether the existing capital regime should be adjusted to account for climate change depends on the extent to which climate risks will manifest differently from traditional financial risks. When viewing the problem through this lens it becomes clear that it can be valuable to distinguish between physical and transition risks. The key questions become:

- 1) Will the transition to net zero be materially different from previous structural changes to the economy?
- 2) To what extent will the increase in physical risks increase uncertainty around risk quantification?

¹⁶ [Climate-related risk drivers and their transmission channels \(bis.org\)](https://www.bis.org/cbsr/2021/04/climate-related-risk-drivers-and-their-transmission-channels)

Although there are identified gaps in the existing framework, it will be difficult to adjust its design until it is clear the extent to which climate change will increase the aggregate level of uncertainty in the economy. Furthermore, the types of adjustments that would be required will depend on whether the aim of changing the framework is to avoid short-term risks such as the financial impacts of extreme weather or a climate-driven ‘Minsky moment’, or longer-term structural changes over a 30-40 year timeframe, or both. Therefore, further research is required before making changes to the capital framework.

Before changing the underpinning methodological structure of the capital rules it will be necessary to review the theoretical and empirical evidence thoroughly. A number of the banks believed that the existing Pillar 1 framework is likely to already capture transition risks to some extent, as the economy has been continuously undergoing transitions throughout history (for example, the digital revolution in recent history) and the transition to net zero represents just another form of structural adjustment. The low carbon transition could be more disruptive than previous economic transitions, due to the required scale and pace of change, however it could be useful to undertake case study analyses of previous structural economic changes to better understand the potential financial magnitude of the risks, e.g. the 1973 oil shock or Germany’s current transition from Russian oil and gas. Conversely, physical risks may be less well captured by the existing framework, as an increase in extreme weather events represents a structural break from the recent past. However, this makes it difficult for banks to assess the materiality of these risks as there is little understanding of how they will impact financial conditions.

In the near-term, while these uncertainties persist, and research is carried out, it may be better to try to capture climate within the existing framework through the application of existing Pillar 2 tools and providing further guidance on best practice approaches. Structural changes to the design of the Pillar 1 rule calibrations should be assessed, and may be required in the longer-term, but should not be implemented until further analysis has been undertaken on the nature of the underlying risks.

Independent of this view, the banks’ views on the benefits, disadvantages and feasibility of each option considered by the BoE in the Climate Change Adaptation Report 2021 are set out over the rest of the paper.

5. Options for addressing the capability gaps within the current framework

Key messages:

Improving banks’ climate-related risk identification and quantification capabilities is a key priority that should be a prerequisite to considering how climate should be reflected within the capital framework. Given the multiple identified channels through which climate could be captured by the existing regime, the most effective course of action is likely to be ensuring that banks are able to better account for climate within their existing stress testing, credit monitoring and reporting capabilities. The banks viewed a continuous open dialogue with the regulator as vital and urged the BoE to go further with initiatives like the Climate Financial Risk Forum (CFRF) and to push for a ‘call to arms’ in improvements in data and modelling capabilities.

Risk Management and Governance (RMG) scalars were not viewed as a tool that would be particularly helpful for improving risk quantification capabilities. While recognising that RMG scalars have a role to play in dealing with significant weaknesses in risk and governance processes, they were not viewed as an appropriate tool for improving climate risk management capabilities in the absence of the BoE providing further guidance on best practice approaches.

Addressing capability gaps refers to directly improving banks' abilities to measure, manage and model climate risks. The Climate Change Adaptation Report 2021 identified two key ways in which the BoE could bridge capability gaps:

- 1) provide further guidance or supervisory expectations around the use of internal models; and
- 2) make greater use of the RMG scalars in PRA Buffer to counteract any perceived weaknesses in climate risk management or to incentivise improvements in climate risk management capabilities.

5.1 Regulator providing further guidance on risk quantification

Banks are already required to ensure they are appropriately capitalised for all material risks, including those related to climate. The challenge is that the difficulties in quantifying these risks could lead firms to conclude they are not material. Supervisory and regulatory interventions could arguably be targeted to ensure banks perform more work in this area, and that consistent outcomes are achieved.

Improving banks' climate-related risk identification and quantification capabilities is a key priority that should be a prerequisite to considering how climate should be reflected within the capital framework. Given the multiple identified channels through which climate can be captured by the existing regime, the most effective course of action is likely to be ensuring banks are able to better account for climate within their existing stress testing, credit monitoring and reporting capabilities.

The banks viewed a continuous open dialogue with the regulator as vital and urged the BoE to go further with initiatives like the Climate Financial Risk Forum (CFRF) and to push for a 'call to arms' in improvements in data and modelling capabilities. Additional guidance on the quantification of climate risks would address the most significant capability gaps. In particular, further guidance on climate stress testing would be beneficial, specifically regarding scenarios and the interaction of climate with other risk drivers – this is discussed further in section 6.2.2. The banks identified a need for the BoE to coordinate industry engagement and to provide further regulatory direction on its future approach to considering potential changes to the capital framework. A roadmap laying out any key dependencies and potential timelines would be beneficial to the industry as it would support them with planning and capability development.

Central to banks improving their risk quantification capabilities is receiving further guidance on the intersection between climate change, capital modelling and the IFRS 9 accounting framework. Quantitative solutions to climate risk modelling need to be holistic across expected and unexpected loss projections to ensure that consistent modelling approaches are adopted across both frameworks and to avoid double counting of risks. Unless there is consistency between these approaches it will be challenging for banks to establish how resilient they are to these risks.

The benefits of bridging capability gaps extend beyond the capital regime and should support the financing of green activities and the comprehensive management of financial risks. The BoE should continue to work closely with the UK government, and relevant standard setting bodies, to ensure that the data and disclosure standards being developed by groups such as the Transition Plan Taskforce (TPT) and the International Financial Reporting Standards (IFRS) Foundation's International Sustainability Standards Board (ISSB) are suitable for the requirements of the UK banking sector.

5.2 Use of RMG scalars

An option considered in relation to plugging capability gaps in the Climate Change Adaptation Report 2021 was the application of Risk Management Governance (RMG) scalars (in the PRA Buffer) to banks deemed to have significant weaknesses in their climate-related financial risk management and governance. In theory RMG scalars could be used to reinforce existing supervisory expectations by counteracting any perceived weaknesses in climate risk management and to incentivise improvements in capital modelling capabilities.

However, RMG scalars should only be considered in cases where banks are unable to demonstrate that they are adequately considering climate risk in their Pillar 2 ICAAP processes or meeting regulatory requirements or expectations, for example those set out in SS3/19 or in Dear CEO letters. Compliance against supervisory expectations should be sufficient to incentivise firms to focus resources on closing capability gaps; introducing additional capital requirements under RMG scalars will not directly support banks in building their analytical capacity. In order for RMG scalars to be used as a tool for bridging capability gaps, regulators first need to provide further clarity on what 'good' looks like. Specifically, three key areas of focus were identified where clear criteria should be set before capital add-ons are considered:

- 1) Climate risk management
- 2) Climate stress testing
- 3) Banks' transition plans

While recognising that UK regulators already have the ability to utilise RMG scalars with relative ease, and that they should play their usual role in dealing with significant weaknesses in risk and governance processes, this approach should not be prioritised as a primary tool for improving climate risk management or closing capability gaps. RMG scalar setting methodologies are relatively opaque and given current uncertainties around what best practice climate risk management looks like, RMG scalars are unlikely to lead to an improvement in outcomes when used in isolation. The key priority should be for industry, regulatory and other bodies to work together to address capability gaps rather than using RMG scalars to hold precautionary capital.

Table 2: Assessment of using RMG scalars to address climate-related risks

Appropriateness	Low
Feasibility	Easier
Pace of Implementation	Nearer-term
Dependencies	Further guidance is required on climate risk management, climate stress testing and transition plans

Recommendation	The BoE should focus on bridging capability gaps directly and only using RMG scalars in their traditional role rather than as a tool for addressing climate risk
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6. Options for addressing capital regime gaps

Key messages:

There was significant support for developing stress testing capabilities and, in the future, looking to consider climate stress impacts in the PRA Buffer. Climate risks are inherently uncertain and forward-looking and therefore it makes sense to focus on capturing climate risks under the stress testing component of the PRA Buffer which already accounts for longer-horizon scenario driven risks. However, further guidance is required on modelling approaches, climate scenario construction and how physical and transition risk shocks should interact.

In the long-term, a number of banks identified Pillar 1 as the most appropriate component of the capital regime to incorporate climate-related risk considerations, subject to international agreement of the rules by the BCBS. This was due to the transparency of the approach and the fact that the framework is sufficiently granular to capture decreases, as well as increases, in risk at an individual asset-level. However, it was also recognised that an appropriate methodology will likely take a long time to develop due to the existing capability gaps and the high bar for analytical robustness that applies to Pillar 1 rules.

The banks strongly support the pursuit of international agreement on changes to capital rules wherever possible – particularly with regard to the Pillar 1 framework. The capital regime is already complex and further international divergence would create additional complexity for banks with an international presence and could create competitiveness issues for UK regulated banks.

It was identified that extending the time horizons associated with Pillar 1 and 2a methodologies would require a more fundamental rethink of the purposes and calibration on minimum capital requirements for a broad range of issues beyond climate change. Similarly, it was agreed that Pillar 1 and 2a methodologies should continue to be calibrated and rigorously back-tested on empirical data in the near-term, rather than moving towards the use of forward-looking scenario analysis, to avoid the risk of introducing significant model variability and undoing the Basel 3.1 ‘output floor’ reforms. However, some of the banks supported further exploration into the use of more forward-looking approaches.

A number of banks were of the view that a systemic risk buffer should only be considered once it is clear that an increase in aggregate capital is required. Although it is likely that climate-related risks may increase the level of risk in the financial system, these channels are not yet well understood and the introduction of a systemic risk buffer without a clear risk justification could lead to an inefficient allocation of capital across the financial system. Similarly, there was agreement that climate risk doesn’t naturally fit into any of the other elements of the combined buffer at this stage.

6.1 Where in the capital regime should climate risk be considered?

Each option considered in the Climate Change Adaptation Report 2021 has been reviewed for its relative suitability for incorporating climate-related risks, with the results set out below. However, these discussions remain within the broader context of considering first whether the framework should be changed at all, and prioritising the closing of capability gaps.

The unintended consequences of over-capitalisation and inadvertently discouraging the financing of the low carbon transition should be key regulatory considerations across all of the options considered.

6.1.1 Microprudential

Microprudential regulations are concerned with the prudential risks to individual financial institutions.

Pillar 1

In the longer-term, a number of banks identified Pillar 1 as the most appropriate component of the capital regime to incorporate climate-related risk considerations. The potential advantages of introducing climate into the capital framework through Pillar 1 arise from the transparency of the models and approach. Some of the banks argued that focusing on designing an appropriate Pillar 1 approach could have the second-order impact of supporting green financing as it is ‘bottom-up’ and has the capability to recognise that certain ‘green’ and ‘transitioning’ assets could in fact become less risky as a result of the transition.

The banks strongly support the pursuit of international agreement on changes to capital rules wherever possible – particularly with regard to the Pillar 1 framework. The capital regime is already complex and there are already several differences in implementation across global jurisdictions. Further divergence would not be helpful as it would create additional complexity for banks with an international presence and could create international competitiveness issues for UK regulated banks. Given the significant complexity of the topic, and the timelines it will take to develop appropriate methodologies, it makes sense for the BoE to place focus on driving an optimal global solution through the BCBS rather than developing a UK specific process.

Despite the potential identified benefits of reviewing the Pillar 1 framework, changes in the near-term are unlikely to be feasible due to the existing capability gaps and the high bar for analytical robustness that applies to Pillar 1 rules. There is acknowledgement that agreeing capital regulations at an international level, and implementing them across jurisdictions, can be a slow and gradual process.

There were concerns about suggestions to extend the time horizons embedded within the Pillar 1 rules. Pillar 1 requirements are typically calibrated to account for risks over a one-year horizon and there have been suggestions that lengthening these horizons would enable banks to better account for climate-related risks. However, from a financial risk perspective, banks are typically capitalised over relatively short time horizons due to the nature of the contractual terms, refinancing considerations and management horizons. Therefore, in many cases it may not be appropriate to extend the time horizons embedded within capital rules. Relatedly, it is important to consider the capital and accounting regimes jointly – while regulatory capital only considers a one-year default horizon, lifetime PD impacts are considered under IFRS 9.

Introducing a longer-term perspective for climate risk would also bring into question whether other longer-term structural risks should also be considered. For example, there are a range of other structural longer-term issues – such as aging populations – that are not currently addressed by the Pillar 1 time horizons. If changes were made to Pillar 1 for climate reasons, an argument could be made that other longer-term issues should also be considered. Therefore, it does not seem appropriate to change the time horizons in the Pillar 1 rules unless there is a desire to redesign the framework independently of climate risk considerations.

Proposals relating to using forward-looking scenario analysis projections in Pillar 1 methodologies risk introducing significant model uncertainty and variability in modelling outcomes. The use of historic data in capital calculations has been identified as a potential gap in the capital regime when it comes to addressing climate risks – as past data is not expected to be reflective of the future. Some have suggested that forward-looking scenario analysis could be a tool for overcoming this issue. However, a key design feature of Basel 3.1 was to reduce model variability between firms in Pillar 1 through the introduction of the ‘output floor’ and this proposal would be contrary to those efforts. There is a key conceptual issue to agree around whether both minimum requirements and buffers should be calibrated on the basis of forward-looking projections. Further research is required to define appropriate methodologies to reconcile these different aspects, however, the banks agreed that currently it makes sense to focus on incorporating climate considerations into the stress testing component of the PRA Buffer which already incorporates forward-looking analysis.

A few preliminary methodological options were discussed. These included the possible integration of environmental metrics that are empirically associated with financial risk outcomes, such as Energy Performance Certificates (EPCs)¹⁷¹⁸, either into internal models or risk-based penalising and supporting factor adjustments. Alternatively, the integration of expert judgement on counterparty climate strategies into Credit Risk scorecards was considered as a potential option for dealing with the forward-looking uncertainty. However, the banks agreed that any proposed Pillar 1 approach should be designed to avoid variability in outcomes.

Table 3: Assessment of addressing climate-related risks in Pillar 1

Appropriateness	High
Feasibility	Harder
Pace of Implementation	Longer-term
Dependencies	Measurement methodologies, data, and international agreement.
Recommendation	The BoE should focus on building international agreement through the BCBS.

Pillar 2a

In the near-term, limited changes are expected to be required to Pillar 2a. Banks are already required to account for any risks in Pillar 2a that are not adequately captured by Pillar 1. However, as climate risks are

¹⁷ [Does energy efficiency predict mortgage performance? | Bank of England](#)

¹⁸ UK Finance is calling on the UK government to amend the UK’s EPC standard and certification process to ensure it more accurately reflects building energy performance. Our recommendation in this paper is without prejudice to that ask.

uncertain and forward-looking, they will more naturally be captured by PRA Buffer stress testing exercises in the near-term. For the same reasons as Pillar 1, the banks did not see clear arguments for redesigning Pillar 2a methodologies to be forward-looking – the methodologies should continue to be calibrated and rigorously back-tested on empirical data.

The banks did not identify a need to introduce a climate specific module under Pillar 2a as climate is viewed as a driver of existing financial risk types. Additionally, certain components of the existing Pillar 2a methodologies may be better suited to climate risk adjustments than others. For example, the climate risk impacts on operational risk could potentially be easier to introduce than other risk types due to the links between physical risks and traditional operational risk considerations such as damages to physical assets and business disruption. Concentration risk has also been identified by some as an area of the framework which could account for climate risks, but in reality it is likely that designing such an approach would be theoretically challenging. Finally, any kind of capital add-on based on sector or geography specific exposures was also viewed negatively due to dependencies on uncertain and overly broad definitions of ‘green’ and environmentally damaging activities, that may not be directly tied to financial risk.

One of the potential advantages of reviewing the Pillar 2a rules is that they are easier to change than Pillar 1 and therefore they could potentially be introduced in a shorter timescale. Some of the banks argued that a Pillar 2a climate risk approach could be used as a medium-term solution while Pillar 1 methodologies are being refined and agreed. This argument was based on the fact the BoE has more flexibility in implementing and adjusting Pillar 2 rules as they are set at a national level. However, other banks didn’t believe that Pillar 2a should be used to plug gaps in Pillar 1 and that any identified gaps should be rectified in Pillar 1 directly. In either case, the key dependency remains whether a suitably robust and transparent methodology can be designed.

Some of the banks shared the view that, over the long-term, climate risk should be reflected in Pillar 1 rather than Pillar 2a to the greatest extent possible. This is because Pillar 2a functions as an add-on to Pillar 1 and therefore it is not possible to reflect decreases, as well as increases, in risk at an asset-level.

Table 4: Assessment of addressing climate-related risks in Pillar 2a

Appropriateness	Medium
Feasibility	Moderate
Pace of Implementation	Medium-term
Dependencies	Measurement methodologies and data.
Recommendation	The BoE could consider using this tool in the medium-term if an appropriate methodology emerges during the interim period that it is being agreed at the international level for Pillar 1.

6.1.2 Macroprudential

Macroprudential regulations are concerned with ensuring the resilience and stability of the system as a whole.

The PRA Buffer – stress testing

The banks identified the PRA Buffer as the natural home for accounting for climate risk within the current framework in the medium-term. This is because it is already designed to account for forward-looking macroeconomic stress scenarios and therefore only minimal changes would be required to the framework to account for climate-related risks. The main dependency would be reducing the current variation in modelling approaches and the priority is therefore to address this gap from a capability perspective; either by providing more prescriptive scenarios that remove modelling variations or improving modelling guidance. However, it is recognised that even with additional guidance it will remain challenging to appropriately model certain risk drivers such as increased geopolitical risk and global supply chain disruption from major natural catastrophes.

There was no consensus between the banks around whether or not climate stress tests should be combined with, or separate from, traditional stress tests. One option discussed was to integrate climate into existing stress testing practices by specifying a transition climate scenario (such as orderly or disorderly transition) that underpins more traditional cyclical macroeconomic scenarios. Alternatively, banks could continue to run separate climate and macroeconomic stresses which would reduce the risk of attempting to achieve too much in a single scenario, but only provides a view on a climate stress in isolation and adds practical challenges to banks such as additional resource requirements. Further guidance on scenario construction and specifically on how to consider physical and transition risk shock interactions would be beneficial from an ICAAP perspective.

Capital setting stress test exercises are unlikely to require the extended 30-year time horizons associated with the CBES exercise. Longer time horizons are useful for risk identification and strategy setting but not necessarily optimal for capital setting purposes. Broadly, the typical three to five years stress testing horizon is likely to remain appropriate with the potential consideration of looking out to ten years in certain circumstances. This is because banks have the ability to introduce risk management and strategy decisions to avoid facing the financial consequences of long dated risks. There are stronger arguments for extending the time horizons associated with stress testing compared to Pillar 1 but any significant adjustments to the horizons would equally bring into question whether other long dated risks (e.g. ageing population) should also be explicitly considered by the regime.

A number of key decisions need to be agreed before stress testing can be used for capital setting purposes. If climate stress tests are to be used in a capital setting capacity, it would be important to remove the modelling variability seen in the CBES exercise. A key consideration will be whether capital setting climate stress tests should be modelled at a granular counterparty level or a sector-level. One option the banks discussed was the BoE adopting a more prescriptive approach to setting sector-level scenarios. This approach would reduce the modelling burden on banks and drive consistency, but it would not allow for distinction between counterparties within the same sector with different climate risk profiles.

From the perspective of internal stress testing exercises, further guidance on setting ‘severe but plausible’ climate scenarios and examples of what ‘good’ looks like would help to drive consistency in approaches. It would also be helpful to understand the extent to which forward-looking transition plans can be considered in capital stress tests. While these plans will be vital from a strategy perspective, it is currently unclear whether it will be possible to view them as a risk mitigant from a stress testing perspective. This is because it would not be appropriate to factor the impacts associated with counterparties’ plans to restructure their business models into a typical Credit Risk stress test.

Table 5: Assessment of addressing climate-related risks in the PRA Buffer – Stress testing

Appropriateness	High
Feasibility	Easier
Pace of Implementation	Medium-term
Dependencies	Developing a stress test methodology that delivers consistent impacts across firms
Recommendation	The BoE should focus on driving consistency with regard to climate risk stress testing.

Systemic Risk Buffers

A number of regulatory publications¹⁹ have identified the Systemic Risk Buffer (SyRB) as a potential macroprudential tool for capturing systemic climate risks. The SyRB is a flexible tool and several potential applications are possible:

- *System-wide Systemic Buffer:* An escalating buffer could be applied universally across banks in addition to the existing buffer stack – similar to the Countercyclical Capital Buffer (CCyB) but based on systemic climate risks rather than cyclical risks.
- *Climate Systemic Buffer:* A specific buffer could be introduced to individual firms based on their exposure to climate risk – similar to existing Global Systemically Important Bank (G-SIB) scoring.
- *Sectoral Systemic Risk Buffer:* A sector specific SyRB buffer requirement could be set to account for the additional risks associated with lending to particular geographies or activities.

A number of banks were of the view that a systemic risk buffer should only be considered once it is clear that an increase in aggregate capital is required. The analysis arising from the CBES exercise, and other climate stress tests globally, suggests that aggregate capital holdings may already be suitable for managing current best estimates of climate-related losses. Although it is likely that climate-related risks may increase the level of risk in the economy, these channels are not yet well understood and the introduction of an SyRB without a clear risk justification could lead to an inefficient over-capitalisation of the financial system. In February 2022, the Financial Stability Institute ('FSI') noted that applying the macroprudential framework to systemic climate-related financial risks at this stage is likely to be ineffective and potentially counterproductive for financial stability²⁰.

The systemic risk buffer is a flexible tool but there is uncertainty around how a climate SyRB would be used in reality. It is unclear whether the capital held in a climate SyRB would be released in a stress event, in a similar way to the CCyB, or whether this capital would be 'useable' for non-climate-related stress events such as Covid-19. If such a tool was to be introduced in the future the regulator would have to be very clear on how they expected this to work.

Further research is required on the interaction between climate and systemic risk before setting out SyRB design principles. A sectoral SyRB is likely to lead to unintended consequences by penalising all assets within a particular sector without accounting for individual counterparties that may already be transitioning towards a low carbon business model. Similarly, introducing a firm specific climate SyRB is likely to be less efficient than incorporating climate directly within Pillars 1 and 2 of the capital framework, as the size of the buffer will not be calibrated in line with the specific risks each individual institution faces.

¹⁹ [The macroprudential challenge of climate change \(europa.eu\)](#) and [EBA advice on the review of the macroprudential framework.pdf \(europa.eu\)](#)

²⁰ [Brief No. 16 'The regulatory response to climate risks: some challenges'](#)

Of the three potential implementation options of the SyRB outlined above, the system-wide approach is the least likely to lead to adverse outcomes. However, the current focus should be on better understanding the systemic risks arising from climate change before implementing a precautionary capital buffer.

Table 6: Assessment of addressing climate-related risks in the Systemic Risk Buffer

	<i>System-wide Systemic Buffer</i>	<i>Climate Systemic Buffer</i>	<i>Sectoral Systemic Risk Buffer</i>
Appropriateness	Low	Low	Low
Feasibility	Moderate	Harder	Harder
Pace of Implementation	Longer-term	Longer-term	Longer-term
Dependencies	Analysis of systemic climate risks and the results from further climate stress tests	N/A	N/A
Recommendation	Should not be implemented. The BoE should focus on initially understanding the systemic risk implications of climate change	Should not be implemented	Should not be implemented

Combined Buffer

For completeness the banks discussed the potential ways in which climate could interact with the elements of the combined buffer other than the SyRB. Other than the SyRB the Combined Buffer consists of:

- *Countercyclical Capital Buffer (CCyB)*: The CCyB could be raised during periods of excessive carbon-intensive credit growth.
- *Capital Conservation Buffer (CCoB)*: An add-on to the existing CCoB could be explored to build resilience against unexpected exogenous tail events related to climate risk.
- *Other Systemically Important Institutions (O-SII) / Global Systemically Important Institutions (G-SII) Buffers*: Could cover bank-specific risks, for systemic institutions.

There was strong agreement that climate doesn't naturally fit into any of these elements of the combined buffer. Redesigning these buffers to account for climate risk would compromise the original intended purposes of these tools and would create unnecessary complexity. Any consideration of changes to macroprudential framework should therefore focus on the suitability of the stress testing element of the PRA Buffer and potentially the SyRB if there was evidence of an increase in systemic risk.

Table 7: Assessment of addressing climate-related risks in the Combined Buffer

Appropriateness	Low
Feasibility	Harder
Pace of Implementation	Longer-term
Dependencies	Development of appropriate rationale and methodologies
Recommendation	Should not be implemented.

7. Conclusions and recommendations

This paper outlined the views expressed on integrating climate risk into the capital framework in a series of roundtable discussions held by UK Finance with the six UK banks in scope of the Bank of England's Climate Biennial Exploratory Scenario.

In the near-term, the banks identified improving climate risk identification and quantification capabilities as a key priority that should be a prerequisite to defining the necessary changes to the capital framework. Given the multiple identified channels through which climate could potentially be captured by the existing regime, and the uncertainty around how these risks will manifest differently from traditional financial risks, the most effective course of action is likely to be ensuring that banks are able to better account for climate within their existing stress testing, credit monitoring and reporting capabilities.

The banks identified the PRA buffer as the natural home for accounting for climate risk in the medium-term and identified improving scenario analysis capabilities as the key next step. It was agreed that Pillar 1 and 2a methodologies should continue to be back-tested on historical data and therefore that forward-looking climate risks should be accounted for in the PRA buffer over the medium-term, as this is the component of the existing regime that is already designed to account for forward-looking stress scenarios. The key next step in the near-term should be improving scenario analysis capabilities, developing the climate stress testing framework, and using stress tests to explore the financial magnitude of potential climate risks.

In the longer term, Pillar 1 was identified as potentially the most appropriate component of the capital regime to be adjusted to account for climate-related risk considerations, subject to international agreement of the rules by the BCBS. This was due to the transparency of the approach and the fact that the framework is sufficiently granular to capture decreases, as well as increases, in risk at an individual asset-level. The BoE should place focus on driving an optimal global solution through the BCBS and supporting research into better understanding climate risk drivers. However, further research is required to define appropriate methodologies and to understand the potential implications of moving away from historic data towards forward-looking projections.

The banks recognised a need for the BoE to coordinate industry engagement and to provide further regulatory direction on its future approach to considering potential changes to the capital framework. A roadmap laying out any key dependencies and potential timelines would be beneficial to the industry as it would support them with planning and capability development. The BoE should also go further with initiatives like the Climate Financial Risk Forum ('CFRF') and to push for further improvements in data and modelling capabilities. Additional guidance on climate stress testing would be particularly beneficial, specifically regarding scenarios and the interaction of climate with other risk drivers.

Table 8 below summarises the views on the appropriateness, feasibility and potential implementation timelines associated with each of the options outlined in the Climate Change Adaptation Report 2021 for integrating climate-related risks into the prudential capital framework.

Table 8: Summary review of the potential options for integrating climate into the capital framework

Option		Appropriateness	Feasibility	Pace of Implementation
More appropriate options ✓	PRA Buffer (Stress Testing)	High	Easier	Medium-term
	Pillar 1	High	Harder	Longer-term
	Pillar 2a	Medium	Moderate	Medium-term
Less appropriate options X	PRA Buffer (RMG Scalars)*	Low	Easier	Shorter-term
	Systemic Risk Buffer**	Low	Moderate	Longer-term
	Combined Buffer**	Low	Harder	Longer-term

Footnote: The systemic risk buffer is typically considered as part of the combined buffer but it has been split out here to reflect its closer relevance to the debate around climate risk and capital requirements.

* There was a divergence in views on these options and certain banks did not feel like these options were viable at all.

** Only considered here in relation to closing capability gaps (i.e. using RMG scalars explicitly as a tool for improving climate-related risk management).

8. Appendix: International regulatory publications on climate and capital

Regional considerations: How other jurisdictions are considering potential changes to respective capital regimes

Bank of England

23/06/21 PRA Climate Change Adaptation Report 2021

- The BoE set out how the capital framework can be effectively used to address the consequences of climate change but not the causes. The paper also discussed how climate-related financial risks are partially captured by the existing framework but there are regime gaps, relating to the current formulation of capital rules, and capability gaps, relating to data availability and modelling.

24/05/22 Climate Capital – speech Sam Woods

- Alongside the publication of the CBES climate stress test results, Sam Woods gave a speech that identified the following three questions as areas for future work with regard to the capital framework:
 - Are current capital levels sufficiently high to guard against unexpected shocks during the transition?
 - Does the framework of capital requirements capture climate risk at a sufficiently granular level?
 - Are regulated firms making sufficient progress in building the risk management capabilities they need – and if not, what regulatory incentives should be introduced?

08/06/22 Climate and capital: some outstanding issues – blog

- This BoE blog post explores the academic literature on climate change and the capital framework. Key gaps are identified in relation to appropriate time horizons, how to use forward-looking information and issues around how to validate climate models using available data when certain risks have never materialised in the past.

Dutch National Bank

11/05/22 On how climate-related and environmental risks affect banking and its prudential supervision – speech Steven Maijor

- This DNB speech outlines how the prudential framework should be fundamentally changed to account for climate-related and environmental risks. They explain how elements of the existing framework are flexible

enough to account for climate risks such as the internal model parameters, like Probability of Default or Loss Given Default, and other elements of the framework should arguably already capture these risks through the use of External Credit Rating Agency ratings. The speech states the DNB is considering the introduction of a new quantitative concentration limit, either set in absolute or relative terms.

**Hong Kong
Monetary
Authority**

04/07/22 Embedding climate risk in banking supervision – Dear CEO letter

- The HKMA wrote to all regulated institutions to let them know it is considering whether and how to incorporate climate risk into its Supervisory Review Process (i.e. Pillar 2), with a view to incentivising firms to enhance their risk management frameworks to address risks related to climate change and the transition to carbon neutrality. The HKMA also stated it would engage with international fora on refining the minimum capital requirements under Pillar 1 and the disclosure requirements under Pillar 3 to address climate risks.

European Union

27/11/2020 European Central Bank (ECB): Guide on climate-related and environmental risks

- The ECB's supervisory guidance on climate-related risks clarified that institutions are expected to identify and quantify these risks within their overall process of ensuring capital adequacy.

19/10/21 ECB: The challenge of capturing climate risks in the banking regulatory framework: is there a need for a macroprudential response?

- This article explores the challenges of incorporating climate risks into the existing prudential framework and concludes that complementary macroprudential policies may be required to manage climate risks in addition to banks' own risk management approaches and direct supervision.

31/03/22 European Systemic Risk Board (ESRB): Review of the EU macroprudential framework for the banking sector

- Discusses how complementary macroprudential policy options need to be considered to address the systemic aspects of climate risk. The ESRB suggest that this may require new tools such as a concentration limit but also that this will need to go hand in hand with the reduction of data gaps and global coordination.

29/04/22 European Banking Authority (EBA): Advice on the review of the macroprudential framework

- The EBA’s response to the European Commission’s Call for Advice on the review of the macroprudential framework included considerations relating to climate change and other environmental risks.

02/05/22 EBA: The Role of Environmental Risks in the Prudential Framework – Discussion Paper

- This discussion paper explores the potential options for capturing climate-related risks within the Pillar 1 regime including Credit Risk, Market Risk, Operational Risk and Concentration Risk. The EBA plans to publish a final report on this topic in 2023.

26/07/22 ESRB/ECB: The macroprudential challenge of climate change

- This report sets out to support reflection on the macroprudential tools available to policy makers by discussing the options for delivering a coordinated European macroprudential response, and considering the range of instruments that could be implemented.

BCBS

14/04/21 Climate-related financial risks – measurement methodologies & climate-related risk drivers and their transmission channels

- The BCBS published two papers outlining the theoretical underpinnings for considering and measuring climate-related risks. These publications aimed to open up a clearer path to the prudential management of climate risks by identifying areas for improving quantitative understanding and going forward they will look to identify gaps in the current framework.

15/06/22 Principles for the effective management and supervision of climate-related financial risks

- Introduced principle 5 to the ‘Principles for the effective management and supervision of climate-related financial risks’: “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.”

Network for Greening the Financial System

19/05/2022 Capturing risk differentials from climate-related risks

- This paper explored the supporting evidence for introducing adjustment factors into Pillar 1 capital requirements based on the climate risk differentials and found limited empirical evidence of ex-post risk differentials between ‘green’ and carbon-intensive assets.

- The paper concludes that introducing adjustment factors in the Pillar 1 capital framework remains a challenge and therefore there may be greater potential to consider Pillar 2 (and Pillar 3) requirements when addressing material idiosyncratic climate-related and environmental risks faced by individual financial institutions. However, the paper is clear that this does not exclude the potential supervisory use of Pillar 1 tools.