

Sovereigns Climate Vulnerability Signals: Discussion Paper

Assessing Long-Term Risks to Sovereign Creditworthiness from Physical and Transition Risks

"The use of Climate Vulnerability Signals in the sovereign rating process would allow for a more consistent and robust consideration of climate-related risks to sovereign credit profiles."

Ed Parker, Global Head of Sovereign Research

Fitch invites feedback from market participants on this Discussion Paper. Comments should be sent by 28 February 2025. Please provide written feedback directly to sovclimate.vsfeedback@fitchratings.com. Please provide supporting comments.

This report is for discussion purposes only and is not a formal criteria proposal. Fitch follows a formal process for making criteria changes, which can include publication of an Exposure Draft and an associated feedback process. Any proposals published may differ from those set out in this Discussion Paper.



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Fitch Seeks Market Feedback on Enhancements to Climate Risk Assessment in its Sovereign Credit Rating Process

Fitch Ratings is contemplating introducing Climate Vulnerability Signals (Climate.VS) to enhance the agency's ability to identify and consider potentially credit-relevant climate risks in its credit rating process for sovereigns. This report sets out a potential approach for Climate.VS, to facilitate feedback from market participants.

Topics on which we are requesting feedback are:

- Do you believe climate-related risks are sufficiently material for sovereign credit profiles to warrant further focus in the rating process?
- Do you think Climate.VS would be a useful framework for identifying climate-related risks for sovereigns and considering them in the rating process? ([pages 2-3](#))
- Do you think a combined VS of 50 or more in 2035 would be an appropriate threshold for identifying higher-risk entities to receive further analytical scrutiny in the rating process? ([page 3](#))
- Do you think the proposed approach for producing sovereign Climate.VS is appropriate, including:
 - Do you agree with our proposal to focus mainly on the physical and transition risks listed on [page 2](#)?
 - Do you think our proposed Relative Climate Risk Model would be useful for assessing relative exposure to climate risk? ([pages 5-7](#)) Do you have any comments on the proposed data indicators ([Appendix 1](#)), the weighting system for physical risk types, the use of a size multiplier or the Qualitative Filter sub-factors?
 - Do you agree with the factors that we think are relevant to assessing the materiality of climate risk to sovereign credit profiles, and how the impact is expected to build up over time ([pages 7-8](#))?
 - Do you agree with the proposed approach of combining physical and transition risk to produce a combined VS ([page 8-9](#))?
- Do you think the hypothetical initial results ([Appendix 3](#)) look broadly correct in terms of their general ordinality and materiality?
- Do you have any other comments on the approach or believe there are additional issues that we should consider when further developing our proposal?

Climate Vulnerability Signal Definitions and Illustrative Rating Impact^a

	10	30	50	70	90
Definitions	Climate-risk factors neutral to the credit profile	Climate-risk factors not expected to affect the credit profile materially, but some adaptation may be needed	Climate-risk factors present challenges and may weaken the credit profile	Climate-risk factors present significant challenges and likely to lead to deterioration in the credit profile	Climate-risk factors pose existential or default-like threat to the credit profile
Illustrative Rating Impact ^b	No downward rating pressure	Ratings unchanged in vast majority of cases	Rating impact expected to be limited to one notch in most cases	High probability of multi-notch downgrade	Potential multi-category rating impact and high default risk.

^a This is aligned with Fitch's approach for Corporates for transition risk.

^b This illustrates the potential rating impact by the specified year for a representative issuer.

Source: Fitch Ratings

We would envisage to use Climate.VS as a screening tool to help identify entities potentially exposed to climate-related risks, and to subject those entities to additional analysis and consideration, when necessary, in our credit rating committees.

The Climate.VS level would be disclosed in our rating reports, as would any additional analysis conducted when the Climate.VS is considered high. When climate-related risks are key rating drivers of a credit rating these would continue to be disclosed in Rating Action Commentaries.

Under Fitch's *Sovereign Rating Criteria*, we already reflect climate risk in ratings when sufficiently relevant and material. Our proposals would represent a refinement of our current approach, with the aim of capturing climate-related risks more consistently and robustly.

The Climate.VS Framework

The physical impact of climate change and the impact of policies to transition away from the use of fossil fuels have the potential to exert pressure on sovereign credit profiles.

Fitch is contemplating introducing Climate.VS for sovereigns, to enhance its ability to identify and consider such potentially credit-relevant climate risks in its credit rating process for sovereigns. We already use Climate.VS for Corporates for transition risks, and we are proposing to use a similar and augmented approach for sovereigns.

Climate.VS would reflect Fitch's analytical opinion on the materiality of potential exposure of global sovereign credit profiles to climate-related risks from 2025 to 2050. Climate.VS would not reflect an issuer's impact on the environment.

In our proposal, Climate.VS would reflect physical risks and transition risks, as both are potentially relevant and material to sovereign credit profiles.

Physical risks: The main ones that we would assess are heatwaves and wildfires, droughts, storms, floods and landslides, and sea level rise, as we think they are the most material to credit profiles.

Transition risks: The ones that we would assess are exposure of major fossil fuel producers to a projected decline in global demand for fossil fuels ("fossil fuel dependence") and the cost of de-carbonising economies ("green energy costs").

Please let us know if you have comments on our proposal to focus our assessments on these climate-related risks.

The potential exposure of sovereigns to future changes to credit profiles due to climate-related risk would be assessed to produce a value on a scale of 0-100, based on the Climate.VS definitions and illustrative rating impact that are already used by Corporates.

As well as the (combined) Climate.VS, we propose to produce sub-series for each of physical risks (Climate.VS_p) and transition risks (Climate.VS_t). All three series would be made available to subscribers.

Fitch's Climate.VS would signal the expected build-up of climate-related risk over 2025-2050^a. We would aim to list Climate.VS at five-year intervals to generate a series of data points illustrating how climate risks could build up until 2050.

We would produce the combined Climate.VS by aggregating the physical risks (Climate.VS_p) and transition risks (Climate.VS_t) in terms of their illustrative rating impact in accordance with the table on [page 9](#). For example, a VS_p of 50 and a VS_t of 50 would result in a VS of 60.

Climate.VS would reflect our current analytical view of climate-related risks at the specified date. They would not incorporate sovereigns' policy targets or general mitigation and adaptation capacity, for example reflecting different levels of income and governance.

However, we are currently thinking that they would reflect specific existing mitigating factors to the extent that we assess them as sufficiently relevant and material. Risks would also be assessed based on the assumption of reasonable future responses made to those risks. For example, the materiality of the risk from a rise in sea levels could reflect some potential additional infrastructure, such as a sea wall (as well as the cost of it) rather than assuming no action at all is taken even to avert major economic loss. Or that economies and governments have some capacity to partially diversify away

^a Fitch recognises material uncertainties in the evolution of climate risk, including: the extent of future climate change, its impact on the frequency and severity of extreme weather events in different locations, the evolution of technology, the implementation of future policies that affect the

transition towards greener energy and the impact of all these developments on variables that have a direct impact on sovereign creditworthiness, such as GDP, the public and external finances and political risk.

from fossil fuels; or that the whole burden of the green energy transition does not fall on the public sector.

We would calibrate illustrative rating impacts for Climate.VS by the specified year for a representative issuer. We would not attempt, in the Climate.VS itself, to take into account the transition likelihood or likely drivers of any particular level of rating. Instead, such considerations would be assessed by rating committees. For example, for many 'CCC' range issuers there are likely to be more immediate, overriding concerns than climate that may be driving the rating, making a downgrade due to longer-term climate factors far less likely.

How Would Climate.VS Be Used in the Rating Process?

Use as a Screening Tool, Additional Disclosure

Under the approach that we are considering, we would use Climate.VS as a screener to identify credits with higher exposure to climate-related risks, based on our analysis. When an entity is identified as higher risk, it would receive further analytical scrutiny in our rating committees to consider whether any of the identified climate risks should lead to an immediate rating action, based on the *Sovereign Rating Criteria*. This would be aligned with Fitch's approach for Corporates.

We are considering using a threshold of 50 or more for the combined VS in 2035 as the threshold for higher-risk entities receiving further analytical scrutiny, as this indicates the potential for a one-notch or more downgrade based on the illustrative rating impact. Corporates currently use a threshold of 45 or more.

We propose using 2035 as a cutoff for the screening to align with our approach for Corporates, as about 10 years would provide time for there to be potentially material changes in climate risk, yet it is close enough that it could affect sovereign ratings, which tend to place more weight on nearer-term developments than on distant and uncertain factors.

In the future, we would expect to adjust the cutoff to maintain a roughly 10-year increment from the starting point, and to potentially push out the Climate.VS horizon beyond 2050.

Please let us know if you have a view on the most appropriate threshold to adopt for identifying higher-risk entities for further analytical scrutiny in our rating committees.

The Climate.VS should not be interpreted as a forecast of the actual expected rating impact by the time of the specified date, e.g. 2035. This may be more or less severe than indicated by the Climate.VS, depending on the general extent and impact of future climate change, the evolution of technology and specific measures the issuer may take to mitigate and adapt to climate risks.

We would disclose the Climate.VS in our rating reports. When the result is 50 or more in 2035, we would also disclose in these reports the rating committee assessment of the identified climate risks' impact on the current rating.

When climate-related risks are key rating drivers of a credit rating then these will continue to be disclosed in Rating Action Commentaries.

Additional analysis that the rating committee might undertake when an issuer's Climate.VS is 50 or more by 2035 to consider whether any identified climate risks should lead to an immediate rating action could include one or more of the following, if relevant:

- additional analysis and consideration of the relevant physical and transition risks;
- the sovereign's capacity to mitigate or adapt to these climate risks;
- the rating level and the relevance and materiality of climate-related risks relative to other key rating drivers;
- the level of uncertainty regarding the climate-related risks, the timeframe in which they might materialise relative to the rating horizon and when it would be warranted to reflect the risks in the current rating.

Augmenting Our Current Approach

The introduction of Climate.VS would be a refinement of our current approach. Fitch currently reflects climate risk in its sovereign ratings when we believe it is sufficiently relevant and material to sovereign creditworthiness.

Several variables in Fitch's Sovereign Rating Model (SRM) capture some of the effects of climate change – both ex-ante and ex-post (see [Impact of Climate Change on Sovereign Rating Model table](#)). However, the SRM will not necessarily fully capture climate risks because the full impact of physical or transition risks has not yet materialised. Moreover, the SRM coefficients are estimated on past data, when the impact of climate change was lower than we expect it to be in the future.

If the rating committee decides that climate-related factors and risks are sufficiently material and proximate to warrant a change in the current rating, and these are not sufficiently captured in the SRM, then the committee will make a notch adjustment using Fitch's Qualitative Overlay (QO) framework. This would be made in the Structural Features pillar under 'Other structural factors' if no more appropriate pillar is identified.

If we were to adopt Climate.VS, then this would provide the rating committee with a more comprehensive, consistent and transparent framework to identify elevated climate-related risks and to consider whether to make a QO adjustment.

Impact of Climate Change on Sovereign Rating Model

SRM variable ^a	Weight	Climate link
Ex-ante risk		
Share in world GDP	14.3%	Diversification and resilience to weather events and other shocks
Governance indicators	22.0%	Adaptation capacity, resilience to political strains
GDP per capita	11.8%	Adaptation and mitigation capacity
Commodity dependence	1.1%	Fossil fuel dependence/stranded asset risk
Ex-post impact		
GDP growth	1.8%	Physical and transition risks could reduce growth
GDP growth volatility	4.5%	More frequent and intense weather events
GDP per capita	11.8%	Ranking could fall for countries with outsized vulnerability to climate risks
Governance indicators	22.0%	Increased social and political instability
Consumer price inflation	3.6%	Supply side shocks could raise food prices, with the poor typically worst affected
Public finance variables ^b	15.8%	Green energy, diversification, adaptation and reconstruction costs, and lower GDP growth
External finance variables ^c	9.3%	Fossil fuel exporters and those suffering physical damage could see lower exports, FDI

^a See Sovereign Rating Criteria for full specification of variables

^b Government budget balance (% of GDP), debt (% of GDP) and interest (% of revenue)

^c Current account plus FDI, foreign-exchange reserves, sovereign net foreign assets and external interest service

Source: Fitch Ratings

What Would Be the Proposed Approach for Producing Climate.VS for Sovereigns?

Overview

The approach that we are considering would produce sovereign Climate.VS in a four-part process:

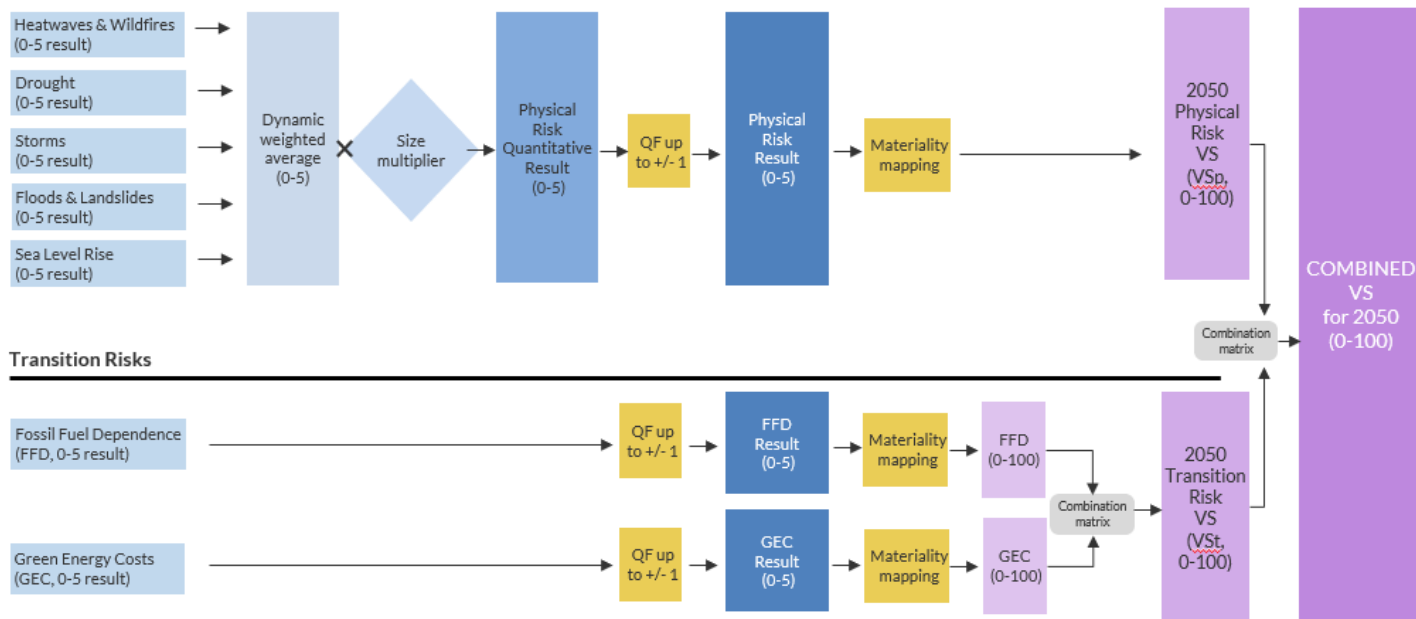
- i) **Relative or rank ordering of risk exposures by 2050:** First, we would determine the relative exposure or rank ordering across all sovereigns to climate-related risk by 2050, for each of physical risk and the two subcomponents of transition risk – fossil fuel dependence and green energy costs – using a proprietary Relative Climate Risk Model (RCRM) that we are considering developing.
- ii) **Materiality mapping for Climate.VS at 2050:** Second, we envisage to reflect the materiality of the potential exposure of the credit profile of the sovereign sector to each of physical risks, fossil fuel dependence and green energy costs by using materiality thresholds to map from the RCRM output to the VS definitions and 0-100 scale. This mapping would be the same for all sovereigns and reflect Fitch Sovereign team's collective analytical judgement.
- iii) **Constructing the 2025-2050 curve:** Third, we envisage determining paths to the 2050 output for each of physical risks, fossil fuel dependence and green energy costs to arrive at the VS output for other years, reflecting Fitch Sovereign team's collective analytical judgement about the phasing and build-up of the credit impact of these risks.
- iv) **Combining VS_p and VS_t for the combined Climate.VS:** Fourth, for each defined year, we would produce the overall Climate.VS by adding the fossil fuel dependence and green energy cost transition risk components to get VS_t , and then adding VS_p and VS_t in terms of their illustrative rating impact.

Sovereign Climate Vulnerability Signal Summary

Relative Climate Risk Model

Derivation of 2050 Vulnerability Signals (VS)

Physical Risks



QF = Qualitative Filter

Note: leftmost boxes represent the seven individual risk types. Each of these is comprised of four or five indicators (see Appendix 1). Data for each indicator is converted to the 0-5 scale as outlined in the text (see "Relative Risk Indicator Data Mapping Table").

Combination matrix based on adding numerical illustrative rating impact

Data sources are included in Appendix 1.

Source: Fitch Ratings

Relative Climate Risk Model (RCRM)

As part of the potential enhancements to our analysis of climate risk for Sovereigns, Fitch is considering introducing a Relative Climate Risk Model. If formally proposed, the model description would be part of a subsequent Exposure Draft, if any.

Under the approach that we are considering, the RCRM would produce a measure of the sovereign's relative exposure^b to each of physical, fossil fuel dependence, and green energy costs risks by 2050, on a scale of 0-5. It would cover seven climate-related risk types, (as in the [Sovereign Climate Vulnerability Signal Summary](#) above), and uses the same approach for all countries.

We would treat fossil fuel dependence and green energy costs separately in the RCRM so that we can also individually reflect their materiality and their phasing over the 2025-2050 curve before combining them at a later stage to derive VS_t . We believe this is a superior method as the two are largely independent (although correlated) risks and have different degrees of materiality to credit profiles and time curves.

We also think they are largely additive. A large fossil fuel exporter that relies on fossil fuels for its domestic energy supply will likely face not only a loss of fossil fuel export receipts but also a fairly high cost of decarbonising its domestic economy.

The RCRM would have two parts: the main quantitative section, which draws on a range of data and climate projections, and a Qualitative Filter (QF), through which there is potential to adjust the quantitative output to reflect relevant and material factors not fully captured in the data, based on sovereign-specific analyst judgment.

Indicator Data and Results

Each risk type result would be constructed from up to five data indicators, selected to be representative of and capture the risk type. These indicators include a blend of current and historical data, third-party risk measures, and climate model projections (see [Appendix 1](#)).

We would include current/historical data as, in general, countries already experiencing the greatest number and most severe weather events are likely to be the most susceptible to an increase in the frequency and severity of such events as the climate changes. While providing valuable insight, the output of climate change forecasts varies hugely across climate models, highlighting their uncertainty. When projections are used, we aim to use data representing SSP2-4.5 scenario from the Intergovernmental Panel on Climate Change (IPCC) and centred on 2050, or as close to these parameters as is available from a given source.

Please let us know if you think the data indicators in Appendix 1 would be useful, or if you have alternative suggestions.

For each indicator, we would derive a Z-score from the data across all sovereigns and then convert this to a 0-5 integer using the *Relative Risk Indicator Data Mapping* table. A result of 3 or above indicates that data for a given sovereign are above the global average. A result of 5 means data are more than 1 standard deviation above the global average.

^b Including sovereigns not rated by Fitch, for which there is sufficient data.

Relative Risk Indicator Data Mapping

Z-score	Relative Risk Result (higher is worse)
<-1	0
>=-1, <-0.5	1
>=-0.5, <0	2
>=0, <0.5	3
>=0.5, <1	4
>=1	5

Source: Fitch Ratings

Risk Type Subtotals

For an individual risk type, we would take the simple average of the 0-5 integer results across the up to five constituent indicators, as they are broadly intended to provide a proxy for different perspectives related to the risk. We think we should require at least two indicators to calculate a risk type subtotal. The risk type subtotal for sea level rise is set at the floor of 0 for landlocked countries.

Weighting of Physical Risk Types

We are considering calculating the overall physical risk result using a dynamic-weighted average of the constituent risk types. This would attach a greater weight to components with a higher result, as in the *Dynamic Weights for Physical Risk Result* table. The numerical percentage weights themselves are fixed, but the component that each weight is applied to varies 'dynamically'.

The overall physical risk result is simply the sum-product of weights and results across the five risk types. For instance, if the result for sea level rise is higher than the other four risk types for Sovereign A, then sea level rise will have a weight of 50% for Sovereign A.

Dynamic Weights for Physical Risk Result

Rank of risk type result ^a	Weight (%)	Weight (%) if only four risk types ^b
1	1	n/a
2	4	5
3	15	15
4	30	30
5	50	50
Sum	100	100

^a Higher rank is associated with a higher risk-type result.

^b Used when results are only available for four risk types (the minimum to calculate an overall physical risk result).

Source: Fitch Ratings

We think the use of weights with an exponential property captures a relevant "weakest link" property across the individual risk types. For example, sovereigns may face an increased threat from sea level rise or severe storms, which is not offset by low exposure to other risks.

Size multiplier: For physical risk only, we are considering applying a 'size multiplier' to the 'raw' intermediate result above to capture diversification benefits for larger countries and concentration risks for smaller ones. The size multiplier would reflect both the size of the country's economy and area.

We are considering the following specification, which we have used in the hypothetical initial results. For GDP: a component multiplier would be calculated as $\text{MIN}(0.8 * [\text{capped share of World GDP}]^{\wedge} - 0.1, 1.4)$. This formula gives a multiplier in the range 0.8 to 1.4.

For land area: an equivalent multiplier in the range 0.8 to 1.4 is calculated. The two multipliers are combined in a weighted average, with two-thirds weight for GDP and one-third weight for land area. The final model physical risk result equals the 'raw' result multiplied by this size multiplier.

Please let us know if you think the use of dynamic weights and a size multiplier would be a useful part of the approach, and if you think their calibration is broadly correct.

Qualitative Filter (QF)

Recognising that no parsimonious data set can fully capture all the relevant influences on climate-related risk, we envisage employing a QF to adjust for material factors not reflected or not fully reflected in the data component of the RCRM to get to the measure of each sovereign's relative risk for each of the physical and transition risks.

QFs could be applied to the overall physical risk result and to each of the risk types under transition risks. Each QF is comprised of three sub-factors (see Qualitative Filter below) that would set the analytical parameters for possible adjustments.

Qualitative Filter Relative to quantitative data

Risk Type	Physical Risks	Fossil Fuel Dependence	Green Energy Costs
Sub-factors	Unrepresentative indicators or data	Fossil fuel composition or unrepresentative indicators or data	Unrepresentative data and trends
	Vulnerable locations or economic sectors	Phasing of energy transition	Green energy endowments and opportunities
	Other factors	Sovereign wealth funds and other factors	External financing and other factors

Source: Fitch Ratings

The adjustment for each QF would be made in multiples of +0.25 / -0.25, with a maximum adjustment for each QF of +1/-1. Analytical judgment is applied in determining the size of QF adjustments.

QF adjustments would not reflect general adaptation capacity or potential mitigation measures that the sovereign might take in the

^c Neither do they (or any part of our analysis) reflect exposure to seismic risks such as earthquakes, volcanoes or tsunamis, which are generally not thought to be affected by climate change.

future, only existing country-specific mitigating or aggravating factors^c.

Please let us know if you have any comments on the proposed use of the QF, including the sub-factors and degrees of potential adjustment.

Materiality Mapping for Climate.VS at 2050

In the second stage of the approach that we are considering, the materiality mapping from the RCRM (0-5 scale) to the Climate.VS (0-100 scale) would reflect analytical judgment, drawing on general analysis on the materiality of climate risk to the sovereign sector. Thresholds would be set so that sovereigns at different points on the RCRM scale are placed onto the VS scale, consistent with its definitions.

The thresholds would be determined separately for each of physical risks, fossil fuel dependence, and green energy costs, as they have different degrees of materiality to credit profiles. But for each one they would apply to all sovereigns, so preserving the ordinality of the RCRM results.

Analytical judgment on the materiality of climate-related risk to the sovereign credit profile would be informed by external and Fitch research analysis (including [Climate Change 'Stranded Assets' Are a Long-Term Risk for Some Sovereigns](#), [Climate Change Physical Risks Are a Growing Threat to Sovereigns](#), and [Impact on CEE Sovereigns of Climate Change Decarbonisation Transition Risks](#)), including but not limited to:

- Projections of climate change and physical risks embodied in the SSP2-4.5 scenario from the [IPCC](#)
- Estimates of the impact of physical risks on GDP
- Past and projected damage from extreme weather events
- [UN Principles for Responsible Investment \(PRI\) Inevitable Policy Response \(IPR\) Forecast Policy Scenario \(FPS\) released in September 2023 and updated in July 2024^d](#) projections for the decline in the demand for fossil fuels
- SRM simulations of the impact of a decline in fossil fuel revenues
- Rating downgrades and defaults in past oil price shocks
- A range of estimates of green energy transition costs from international organisations.

Please let us know if you think these are relevant factors to inform our assessment of the materiality of climate risk to sovereign credit profiles, or if you have alternative suggestions.

Constructing the 2025-2050 Climate.VS Curve 2035

In the third stage of the approach that we are considering, Climate.VS at 2035 would be produced by taking the constituent VS (i.e. VS_p and the fossil fuel dependence and green energy cost components of VS_t) at 2050 as a starting point, then using analytical

^d Fitch uses the UN PRI FPS as our core scenario for the reduction of global demand for fossil fuels as this is consistent with our Corporate Climate.VS and we believe the focus on policy risk provides a realistic assessment of the core credit risk from climate-related changes on corporate issuers.

judgment to assess the proportion of the risk that is expected to materialise by 2035 (see [Appendix 2](#) for a graphic on constructing the 2025-2050 Climate.VS curve).

Unless in unusual circumstances, the judgement would be applied at the sovereign sector level (i.e. it does not vary by sovereign), meaning ordinal consistency of the constituents (physical risk, fossil fuel dependence, and green energy costs) with their respective 2050 VS counterparts is retained (but not necessarily the combine VS).

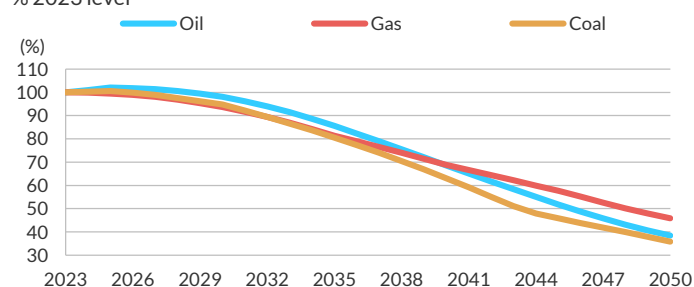
For each of physical and the transition risks, analytical judgments would draw on assessments of the build-up of the potential annual (flow) and cumulative (stock) effects, and the potential impact on the credit profile in line with the illustrative rating impact (e.g. a VS of 50 at 2035 implies a rating impact that is roughly one-third of the impact of a VS of 70 in 2050).

For physical risks, we currently assess the expected impact in 2035 at up to about one-third of the expected impact in 2050. This reflects: 2035 is less than midway from 2025 to 2050; the build-up in risks is non-linear as the impact of global warming is expected to be greater the higher the increase in temperature above pre-industrial levels; and the cumulative 'stock' effect also means a greater potential credit impact further into the future.

For fossil fuel dependence, we currently assess the expected impact in 2035 at about one-fifth of the expected impact in 2050. In the PRI Inevitable Policy Response scenario, global demand is projected to decline by only 14% by 2035 from 2023, less than a quarter of the total decline by 2050. Projected declines by 2035 are 19% for natural gas and 20% for coal. We are assuming broadly no change in the price of oil and gas in real terms, but there is a risk of a fall in prices if a decline in demand leaves excess global supply ("stranded assets").

Global Fossil Fuel Demand

% 2023 level



Source: Fitch Ratings, UN PRI Inevitable Policy Response Scenario

For green energy costs, we would expect the annual 'flow' costs (e.g. on the budget deficit) for 2035 to be broadly the same as for 2050, but the stock impact (e.g. on government debt) will be less, such that the total credit impact in 2035 might be about two-thirds of that in 2050. However, green energy costs are a less material driver of elevated VS_t in 2050 than fossil fuel dependence.

Therefore Climate.VS_t in 2035 relative to 2050 will vary depending on each sovereign's relative exposure to green energy costs and fossil fuel dependence, as indicated by the RCRM.

Climate.VS Output in 2025

The Climate.VS output at 2025 would provide an indication of the pressure on the current rating from constituent climate-related risks.

For all or virtually all sovereigns we would expect this to be between 10 ("Climate-risk factors neutral to the credit profile") and 30, which is consistent with some climate-related factors having some effect (for example starting to affect some SRM variables) with a low risk of a rating action in a minority of cases. In general, the Climate.VS in 2025 is likely to be towards the lower part of that range when the Climate.VS in 2035 is relatively low and towards the higher part of the range when the Climate.VS in 2035 is higher.

Climate.VS Output in 2030, 2040 and 2045

The constituent Climate.VS at 2030 would be the mid-point of the Climate.VS at 2025 and 2035 (rounded to nearest 5-point interval on the VS scale, and rounded down if exactly between).

The constituent Climate.VS at 2040 and 2045 would correspond to their point on a 'straight line' on the VS scale between the values for 2035 and 2050 (rounded to nearest 5-point interval on the VS scale, and rounded down if exactly between). We think this would provide a reasonable approximation as the illustrative rating impact increases exponentially along the VS scale as does the build-up of climate-related risks over the time horizon, in Fitch's view (particularly when taking account of the cumulative impact on balance sheets).

Do you agree with our proposed approach and our current broad assessment of the build-up of climate risk up to 2050, including for each of physical risks, fossil fuel dependence and green energy costs?

Combining VS_p and VS_t for the Combined Climate.VS

In the fourth stage of the approach that we are considering, the combined Climate.VS would be produced by combining Climate.VS_p and Climate.VS_t based on an addition of the illustrative numerical rating impact at the designated date (as in the Summary tables below), rounded to the nearest five-point interval on the VS scale. Prior to this, VS_t would be produced by combining the two transition risk components fossil fuel dependence and green energy costs, in exactly the same way.

For example, if sovereign X has a VS_p of 50 at 2050 (which implies an expected one-notch downgrade by 2050) and a VS_t of 60 at 2050 (which implies an expected two-notch downgrade by 2050), then it would have a combined VS of 70 (which implies an expected three-notch downgrade).

This proposed approach reflects our view that – at the entity level – physical and transition risks are largely independent. If both physical risk and transition risk are high, then the combined effect is greater than if only one of them is high (i.e. it is not simply the maximum of the two). The absence of physical risk does not mitigate high transition risk, or vice-versa (i.e. it is not an average of the two).

Numerical Illustrative Rating Impact Mapping

VS	10	20	30	40	50	60	70	80	90
Rating notches	0	0.1	0.25	0.5	1	2	3	4.5	6

Source: Fitch Ratings

Combination Matrix for Physical and Transition Risks^e

VS _p VS _t	10	30	50	70	90
10	10	30	50	70	90
30	30	40	52	71	90
50	50	52	60	76	91
70	70	71	76	90	95
90	90	90	91	95	100

Source: Fitch Ratings

Do you agree with the proposed approach of combining physical and transition risk to produce a combined VS?

What Do the Initial Results Indicate?

To facilitate understanding and the provision of feedback, we have produced some hypothetical initial results based on the proposed approach that we are considering. If we were to formally propose the adoption of Climate.VS then the subsequent results might well be different depending on any final format of the approach.

The hypothetical initial results indicate that all Fitch-rated sovereigns will face some adverse impact from climate-related risks, but results vary substantially across countries.

Virtually all are likely to face some additional cost from the transition to clean energy and some physical risks, such as more frequent and severe heatwaves, floods and storms. We believe this is consistent with the general scientific view that climate risk is an issue of significant global concern.

Nevertheless, 45% of Fitch-rated sovereigns (53 of the 117 sovereigns for which we have sufficient data to generate results) have a combined Climate.VS of 45 or below in 2050, signalling that we do not currently expect climate-related factors to be sufficiently material for them to lead to a negative rating action in most cases.

Some 14% of Fitch-rated sovereigns have a Climate.VS of 70 or more in 2050, indicating a potential downgrade of three notches or more in most cases. These are predominantly major fossil fuel exporters, who face a marked fall in output, exports and government revenues, other things equal. There are also some sovereigns with high exposure to physical risks, particularly some smaller economies in harm's way of potential extreme weather events and with limited capacity for diversification.

^e This table is an excerpt of the full combination matrix.

Summary Climate.VS Hypothetical Initial Results

% of Fitch-rated Sovereigns

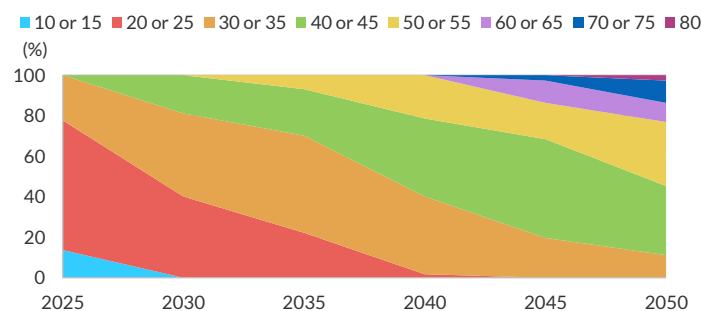
	Combined VS		Physical Risks (VS _p)		Transition Risks (VS _t)	
	2035	2050	2035	2050	2035	2050
VS10	0	0	0	0	0	0
VS15	0	0	17	0	0	0
VS20	0	0	15	0	48	0
VS25	22	0	33	2	16	48
VS30	18	0	25	15	15	10
VS35	30	11	0	15	5	14
VS40	10	10	7	33	6	6
VS45	13	24	2	8	8	4
VS50	7	22	0	17	1	2
VS55	0	9	0	7	0	3
VS60	0	8	0	1	0	3
VS65	0	3	0	2	0	0
VS70	0	2	0	0	0	8
VS75	0	9	0	0	0	3
VS80	0	3	0	0	0	0

Data availability means we have a combined VS for 117 out of 122 Fitch-rated sovereigns, VS_p for 121 and VS_t for 118.

Source: Fitch Ratings

Nevertheless, these are long-term risks. At 2035, the highest Climate.VS result is 50, indicating an expected downgrade of just one notch in the next 10 years, other things equal, and for just 7% of the portfolio. For major fossil fuel exporters, the impact starts to build more steeply between 2035 and 2050.

Initial Sovereign Climate Vulnerability Signals, 2050



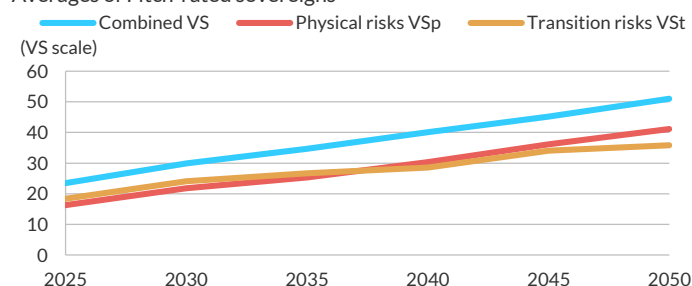
The average and median of VS_p are a little higher than for VS_t in the outer years of the curve. However, overall, transition risks (VS_t) are, in our view, more of a threat to sovereign credit profiles than physical risks (VS_p) by 2050 for Fitch-rated sovereigns, as they are more of a driver of higher VS levels.

Sixteen Fitch-rated sovereigns have a VS_t of 60 or more (indicating an expected downgrade of two notches or more, other things equal), compared with just four having a VS_p of 60 or more. However, some smaller unrated sovereigns could face material physical risks. There are also more Fitch-rated sovereigns with a VS_t

of 45 or more in 2035 than there are with a VS_p of 45 or more in 2035. See [Appendix 3](#) for the full hypothetical initial results.

Sovereign Climate Vulnerability Signal Curves

Averages of Fitch-rated sovereigns



Source: Fitch Ratings

Interpreting the Results

Fitch recognises that the impact of climate change on sovereign credit profiles is highly uncertain, which we believe is consistent with our proposal to use Climate.VS as a screener in the rating process rather than feeding into ratings directly.

VS are largely unmitigated exposures, so the actual impact on the rating might well be lower than suggested by the numerical illustrative rating impact. The Climate.VS should not be interpreted as a 'forecast' of the actual expected rating impact.

Some sovereigns have greater adaptation and mitigation capacity than others, such as those with strong standards of governance, high income levels, capacity for economic and revenue diversification, adequate and robust infrastructure and disaster reduction preparedness.

Consequently, as set out in the section *How Would Climate.VS Be Used in the Rating Process*, a raised Climate.VS does not necessarily mean it will result in a downgrade.

Conversely, a sovereign that is struck by a low probability, high-impact extreme weather event that causes severe damage to the economy and sovereign credit profile might experience a greater degree of negative rating action than signalled by the forward-looking Climate.VS.

Request for Feedback

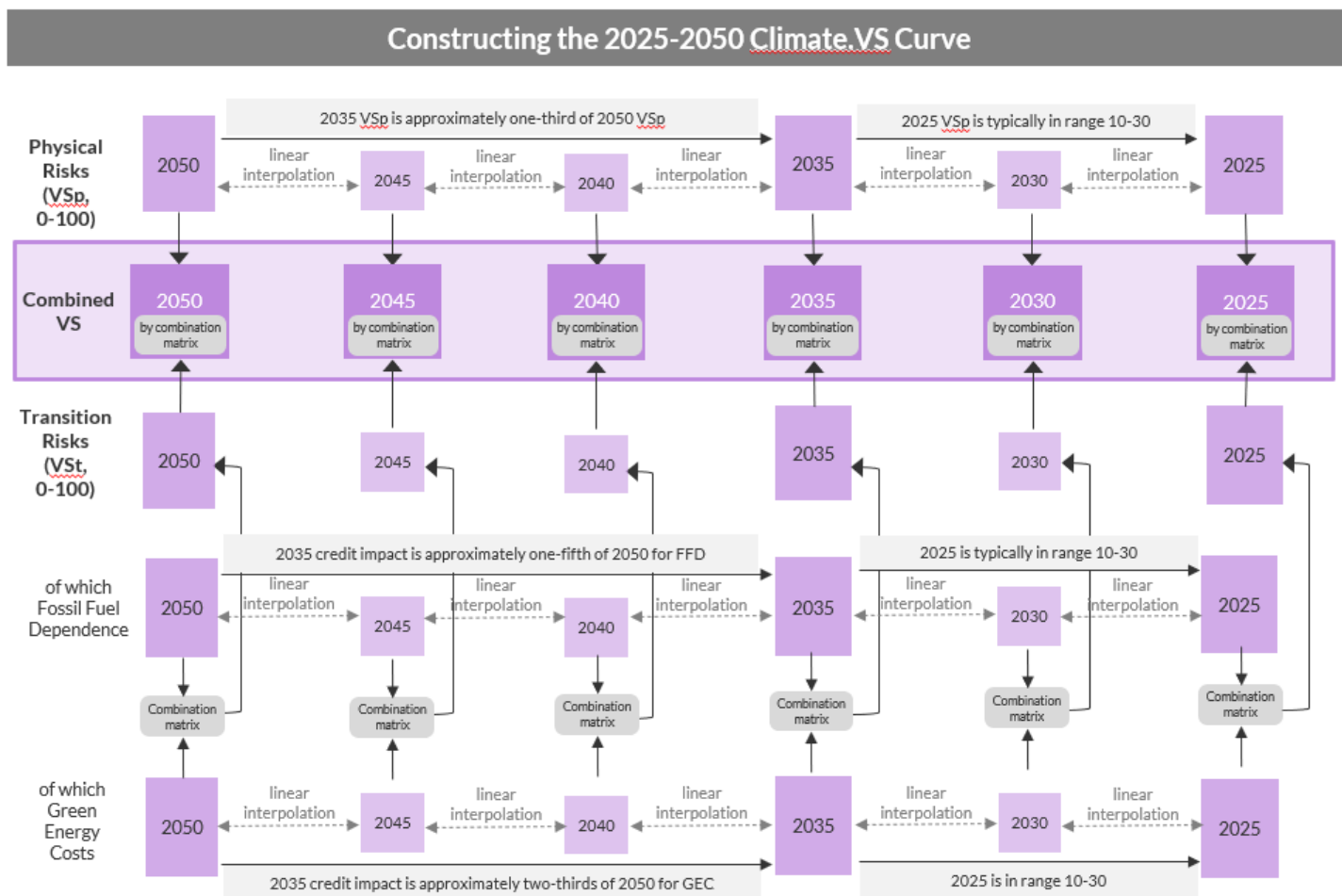
Fitch invites feedback from market participants on this Discussion Paper. Comments should be sent by 28 February 2025. This report is for discussion purposes only and is not a change to criteria or a formal proposal to change our criteria. Fitch follows a formal process for making changes to criteria, which can include an Exposure Draft and formal feedback process. This Discussion Paper is not an Exposure Draft. Should Fitch decide to proceed with the elements set out in this Discussion Paper, it would publish an Exposure Draft for formal comment, which would set out any rating implications.

Appendix 1: Relative Climate Risk Model Proposed Data Indicators and Sources

Short Name	Long Name	Source
Heatwaves and wildfires		
Heatwave & wildfire events	Heatwave & wildfire events (count & count per million, rolling 20 years)	EMDAT, Fitch
Peak temperature	Temperature in hottest month (°C, rolling 10 years)	WB CCKP, Haver
Peak temperature increase	Projected temperature increase in hottest month (RCP 4.5, SSP2, 2040-2059) (°C difference, versus historical)	WB CCKP
Very hot days increase	Projected increase in very hot days (RCP 4.5, SSP2, 2040-2059) (change in number of days >40°C, versus historical)	WB CCKP
Drought		
Drought events	Drought events (count & count per million, rolling 20 year)	EMDAT, Fitch
Drought, affected population	Population currently affected by drought (% total population)	INFORM
Drought, increase in affected population	Projected change in population affected by drought (RCP 4.5, SSP2, 2036-2065) (pp difference in % total population, versus historical)	INFORM
Average rainfall	Average monthly rainfall (millimeters, rolling 10 year)	WB CCKP, Haver
Average rainfall decline	Projected decline in average monthly rainfall (RCP 4.5, SSP2, 2040-2059) (% difference versus historical)	WB CCKP
Storms		
Storm events	Storm events (count & count per million, rolling 20 year)	EMDAT, Fitch
Storm damages	Storm damages (% GDP, rolling 20-year average)	EMDAT, Fitch
Cyclones, affected population	Population currently affected by cyclones (% total population)	INFORM Climate Change
Major cyclones, affected population	Population currently affected by major cyclones (% total pop.)	INFORM Climate Change
Flood and landslides		
River flood, flash flood & landslide events	River flood, flash flood & landslide events (count & count per million, rolling 20 year)	EMDAT, Fitch
River flood, affected population	Population currently affected by river flood (% total population)	INFORM Climate Change
River flood, increase in affected population	Projected change in population affected by river flood (RCP 4.5, SSP2, 2030-2069) (pp difference in % total population, vs historical)	INFORM Climate Change
Rainfall increase in wettest month	Projected rainfall increase in wettest month (RCP 4.5, SSP2, 2040-2059) (millimeter difference versus historical)	WB CCKP
Severe rainfall increase	Projected increase in average largest five-day cumulative precipitation episode (RCP 4.5, SSP2, 2040-2059) (millimeter difference versus historical)	WB CCKP
Sea level rise		
Coastal flood events	Coastal flood events (count & count per million, rolling 20 year)	EMDAT, Fitch
Coastal flood, affected population	Population currently affected by coastal flood (% total population)	INFORM Climate Change
Coastal flood, increase in affected population	Projected change in population affected by coastal flood (RCP 4.5, SSP2, 2040-2059) (pp difference in % total population, vs historical)	INFORM Climate Change
Population exposed to sea level rise	Population exposed to sea level rise (% total population)	WB WDI, Haver
Land exposed to sea level rise	Land exposed to sea level rise (% total area)	ND GAIN
Physical risk multipliers		
Share of world GDP	Share of world GDP (latest)	WB WDI, Haver, Fitch
Share of world land area	Share of world land area (latest)	WB WDI, Haver, Fitch
Fossil fuel dependence		
Net fossil fuel exports	Net fossil fuel exports (% GDP, five-year average)	UN COMTRADE, Haver, Fitch
Fossil fuel export dependency	Fossil fuel export dependency (% total exports, five-year average)	UN COMTRADE, Haver, Fitch
Fossil fuel rents	Fossil fuel rents (% GDP, three-year average)	WB WDI, Haver
Coal rents	Coal rents (% GDP, three-year average)	WB WDI, Haver
Green energy costs		
Coal use	Coal (% electricity generation, latest)	EMBER
Clean energy shortfall	Clean energy shortfall (% electricity generation, latest)	EMBER
Action to reduce GHG emissions	Action to reduce greenhouse gas emissions (inverse 0-100 score, latest)	YALE, Haver
GHG emissions per capita	Greenhouse gas emissions per capita (tonnes, latest)	UNFCCC, EDGAR, Haver, Fitch
GHG emissions per USD1,000 GDP	Greenhouse gas emissions per USD1,000 GDP (tonnes, latest)	UNFCCC, EDGAR, Haver, Fitch

Source: Fitch Ratings

Appendix 2: Constructing the 2025-2050 Climate.VS Curve



Note: 2050 boxes repeat the steps on the prior graphic "Sovereign 2050 Climate Vulnerability Signal Summary"

Combination matrix based on adding numerical illustrative rating impact.

Source: Fitch Ratings

Appendix 3: Climate Vulnerability Signals Hypothetical Initial Results

Sovereign Climate Vulnerability Signals: Hypothetical Initial Results

	Combined VS						Physical (VS _p)						Transition (VS _t)					
	2025	2030	2035	2040	2045	2050	2025	2030	2035	2040	2045	2050	2025	2030	2035	2040	2045	2050
Mongolia	30	40	50	55	70	80	15	20	25	30	35	40	30	40	50	55	65	75
Turkmenistan	30	40	50	55	70	80	20	25	30	35	45	50	25	35	45	50	65	70
Iraq	30	40	50	55	70	80	20	25	30	35	45	50	25	35	45	50	65	70
Kuwait	30	40	50	55	65	75	15	20	25	30	35	40	25	40	45	55	65	75
UAE	30	40	45	55	65	75	15	20	25	30	35	40	25	35	45	50	60	70
Kazakhstan	25	40	50	55	65	75	10	15	15	20	25	30	25	40	45	55	65	75
Oman	30	40	50	55	65	75	20	25	30	35	40	45	25	35	45	50	65	70
Gabon	30	40	45	55	65	75	20	25	30	35	45	50	25	35	40	50	60	70
Qatar	30	40	45	55	65	75	15	20	25	30	35	40	25	35	45	50	65	70
Congo, Republic of	30	40	45	55	65	75	15	20	25	30	35	40	25	35	45	50	65	70
Saudi Arabia	30	40	45	55	65	75	15	20	25	30	35	40	25	35	45	50	65	70
Azerbaijan	30	40	45	55	65	75	15	20	20	25	30	35	25	35	45	50	60	70
Angola	25	35	40	50	65	75	15	20	20	25	30	35	25	35	40	50	60	70
Seychelles	30	40	50	55	60	70	25	35	45	50	60	65	20	25	30	30	35	35
Mozambique	30	40	45	50	55	70	20	25	30	35	40	45	25	30	40	45	55	60
Chad	30	40	45	50	55	70	20	25	30	35	45	50	25	35	40	45	50	60
Maldives	30	40	50	55	60	65	25	35	45	50	60	65	20	25	25	25	30	30
Cabo Verde	30	40	45	55	60	65	25	35	45	50	60	65	15	20	20	20	25	25
Nigeria	25	35	40	45	55	60	15	20	25	30	35	40	25	30	35	40	50	55
Norway	25	35	40	45	55	60	10	15	15	20	20	25	25	30	40	45	55	60
Lesotho	30	35	40	50	55	60	25	35	40	45	55	60	15	20	20	20	25	25
Vietnam	30	40	45	50	55	60	25	35	40	45	50	55	20	25	30	35	35	40
Bahrain	25	35	45	50	55	60	15	20	25	30	35	40	25	30	40	45	50	55
Colombia	25	30	35	40	50	60	10	15	15	20	25	30	25	30	35	40	50	55
Philippines	30	40	45	50	55	60	25	35	40	45	50	55	20	25	30	30	35	35
Kosovo	30	40	45	50	55	60	20	25	30	35	45	50	25	35	40	45	45	50
Tunisia	30	40	45	50	50	55	25	35	40	45	50	55	20	25	25	25	30	30
Barbados	30	35	40	45	50	55	25	35	40	45	50	55	15	20	20	20	25	25
Jamaica	30	35	40	45	50	55	25	35	40	45	50	55	15	20	20	20	25	25
Jordan	30	35	40	45	50	55	25	35	40	45	50	55	15	20	20	20	25	25
Panama	30	35	40	45	50	55	25	35	40	45	50	55	15	20	20	20	25	25
Australia	25	35	40	45	50	55	15	20	25	30	35	40	25	30	35	40	45	45
Ghana	25	30	35	45	45	55	20	25	30	35	40	45	20	25	25	30	35	40
Pakistan	25	35	40	45	50	55	20	25	30	35	45	50	20	25	30	30	35	35
Dominican Republic	25	35	40	45	50	55	20	25	30	35	45	50	20	25	30	30	35	35
Egypt	25	30	35	40	50	55	20	25	30	35	45	50	15	20	25	30	30	35
Ecuador	25	30	35	45	50	55	15	20	25	30	35	40	20	25	30	40	45	50
Bangladesh	25	35	40	45	50	55	20	25	30	35	45	50	20	25	30	30	35	35
Cameroon	25	30	35	40	45	50	15	20	25	30	35	40	20	25	25	35	40	45
Indonesia	25	35	35	45	45	50	15	20	20	25	30	35	25	30	35	40	45	45
Bolivia	25	30	35	40	45	50	15	20	25	30	35	40	20	25	25	30	35	40
Sri Lanka	25	30	35	40	45	50	20	25	30	35	45	50	20	25	25	25	30	30
Thailand	25	30	35	40	45	50	20	25	30	35	45	50	20	25	25	25	30	30
Cyprus	25	30	35	40	45	50	20	25	30	35	45	50	15	20	20	20	25	25
Zambia	25	30	35	40	45	50	20	25	30	35	45	50	15	20	20	20	25	25
China	25	30	35	40	45	50	15	20	25	30	35	40	20	25	30	35	35	40
Serbia	25	30	35	40	45	50	15	20	25	30	35	40	20	25	30	35	35	40
El Salvador	25	30	35	40	45	50	20	25	30	35	45	50	15	20	20	20	25	25

Sovereign Climate Vulnerability Signals: Hypothetical Initial Results

	Combined VS						Physical (VS _p)						Transition (VS _t)					
	2025	2030	2035	2040	2045	2050	2025	2030	2035	2040	2045	2050	2025	2030	2035	2040	2045	2050
Paraguay	25	30	35	40	45	50	20	25	30	35	45	50	15	20	20	20	25	25
Namibia	25	30	35	40	45	50	20	25	30	35	45	50	15	20	20	20	25	25
Moldova	25	30	35	40	45	50	20	25	30	35	45	50	15	20	20	20	25	25
Macao	25	30	35	40	45	50	20	25	30	35	45	50	15	20	20	20	25	25
Greece	25	30	35	40	45	50	20	25	30	35	40	45	15	20	25	25	30	30
Benin	25	30	35	40	45	50	20	25	30	35	40	45	20	25	25	25	30	30
North Macedonia	25	30	35	40	45	50	20	25	30	35	45	50	20	25	25	25	30	30
South Africa	25	35	35	40	45	50	15	20	20	25	30	35	25	30	35	40	40	45
Taiwan	25	35	40	45	45	50	20	25	30	35	40	45	20	25	30	30	35	35
Malaysia	25	35	35	40	45	50	15	20	20	25	30	35	25	30	35	40	40	45
India	25	30	35	40	45	50	15	20	25	30	35	40	20	25	30	35	40	40
Uzbekistan	25	30	35	40	45	50	15	20	25	30	35	40	20	25	30	35	40	40
Kenya	25	30	35	40	40	50	20	25	30	35	40	45	15	20	20	20	25	25
Croatia	25	30	35	40	40	50	20	25	30	35	40	45	15	20	20	20	25	25
Armenia	25	30	35	40	40	50	20	25	30	35	40	45	15	20	20	20	25	25
Morocco	25	30	35	40	45	45	15	20	25	30	35	40	20	25	30	30	35	35
Korea	25	30	35	40	45	45	15	20	25	30	35	40	20	25	30	30	35	35
Hong Kong	25	30	35	40	45	45	15	20	25	30	35	40	20	25	30	30	35	35
Bulgaria	20	25	30	35	40	45	15	20	25	30	35	40	15	20	20	20	25	25
Ethiopia	20	25	30	35	40	45	15	20	25	30	35	40	15	20	20	20	25	25
Nicaragua	20	25	30	35	40	45	15	20	25	30	35	40	15	20	20	20	25	25
Luxembourg	20	25	30	35	40	45	15	20	25	30	35	40	15	20	20	20	25	25
Costa Rica	20	25	30	35	40	45	15	20	25	30	35	40	15	20	20	20	25	25
Georgia	20	25	30	35	40	45	15	20	25	30	35	40	15	20	20	20	25	25
Nepal	20	25	30	35	40	45	15	20	25	30	35	40	15	20	20	20	25	25
Rwanda	20	25	30	35	40	45	15	20	25	30	35	40	15	20	25	25	30	30
Israel	25	30	35	40	40	45	15	20	25	30	35	40	20	25	25	25	30	30
Guatemala	25	30	35	40	40	45	15	20	25	30	35	40	20	25	25	25	30	30
Singapore	25	30	35	40	40	45	15	20	20	25	30	35	20	25	30	30	35	35
Japan	20	25	30	35	40	45	15	20	25	30	35	40	15	20	20	20	25	25
Mexico	20	25	30	35	40	45	15	20	25	30	35	40	15	20	20	20	25	25
Argentina	20	25	30	35	40	45	15	20	25	30	35	40	15	20	20	20	25	25
Uganda	20	25	30	35	40	45	15	20	25	30	35	40	15	20	20	20	25	25
Slovenia	20	25	30	35	40	45	15	20	25	30	35	40	15	20	20	20	25	25
Netherlands	20	25	30	35	40	45	15	20	25	30	35	40	15	20	20	20	25	25
Malta	20	25	30	35	40	45	15	20	25	30	35	40	15	20	20	20	25	25
Slovakia	20	25	30	35	40	45	15	20	25	30	35	40	15	20	20	20	25	25
Hungary	20	25	30	35	40	45	15	20	25	30	35	40	15	20	20	20	25	25
Portugal	20	25	30	35	40	45	15	20	25	30	35	40	15	20	20	20	25	25
United States	20	25	30	35	40	45	15	20	20	25	30	35	15	20	25	25	30	30
Cote d'Ivoire	20	25	30	35	40	45	15	20	20	25	30	35	15	20	25	25	30	30
Canada	15	20	25	30	40	45	10	15	15	20	25	30	15	20	25	30	30	35
Estonia	15	20	25	30	40	45	10	15	15	20	25	30	15	20	25	30	30	35
Brazil	15	20	25	30	40	45	10	15	15	20	25	30	15	20	25	30	30	35
Turkiye	20	25	30	35	40	40	10	15	15	20	25	30	20	25	30	30	35	35
Tanzania	20	25	25	30	35	40	15	20	20	25	30	35	15	20	20	20	25	25
Romania	20	25	25	30	35	40	15	20	20	25	30	35	15	20	20	20	25	25
Italy	20	25	25	30	35	40	15	20	20	25	30	35	15	20	20	20	25	25
Iceland	20	25	25	30	35	40	15	20	20	25	30	35	15	20	20	20	25	25
Peru	20	25	25	30	35	40	15	20	20	25	30	35	15	20	20	20	25	25
Spain	20	25	25	30	35	40	15	20	20	25	30	35	15	20	20	20	25	25

Sovereign Climate Vulnerability Signals: Hypothetical Initial Results

	Combined VS						Physical (VS _p)						Transition (VS _t)					
	2025	2030	2035	2040	2045	2050	2025	2030	2035	2040	2045	2050	2025	2030	2035	2040	2045	2050
Austria	20	25	25	30	35	40	15	20	20	25	30	35	15	20	20	20	25	25
Lithuania	20	25	25	30	35	40	15	20	20	25	30	35	15	20	20	20	25	25
Poland	20	25	30	35	40	40	10	15	15	20	25	30	20	25	30	30	30	35
Latvia	20	25	25	30	35	40	15	20	20	25	30	35	15	20	20	20	25	25
Belgium	20	25	25	30	35	40	15	20	20	25	30	35	15	20	20	20	25	25
Czech Republic	15	20	25	30	30	35	10	15	15	20	25	30	15	20	20	20	25	25
Ukraine	15	20	25	30	30	35	10	15	15	20	25	30	15	20	20	20	25	25
New Zealand	15	20	25	30	30	35	10	15	15	20	25	30	15	20	20	20	25	25
Germany	15	20	25	30	30	35	10	15	15	20	25	30	15	20	20	20	25	25
Chile	15	20	25	30	30	35	10	15	15	20	25	30	15	20	20	20	25	25
Denmark	15	20	25	30	30	35	10	15	15	20	25	30	15	20	20	20	25	25
UK	15	20	25	30	30	35	10	15	15	20	25	30	15	20	20	20	25	25
Uruguay	15	20	25	30	30	35	10	15	15	20	25	30	15	20	20	20	25	25
Ireland	15	20	25	30	30	35	10	15	15	20	25	30	15	20	20	20	25	25
Finland	15	20	25	25	30	35	10	15	15	20	20	25	15	20	20	20	25	25
France	15	20	25	30	30	35	10	15	15	20	25	30	15	20	20	20	25	25
Switzerland	15	20	25	30	30	35	10	15	15	20	25	30	15	20	20	20	25	25
Sweden	15	20	25	25	30	35	10	15	15	20	20	25	15	20	20	20	25	25
Ras Al Khaimah	..	..	..	..	..	..	20	25	30	35	45	50	..	..	..	..	..	..
San Marino	..	..	..	..	..	..	20	25	30	35	45	50	..	..	..	..	..	..
Andorra	..	..	..	..	..	..	15	20	25	30	35	40	..	..	..	..	..	..
Abu Dhabi	..	..	..	..	..	..	15	20	25	30	35	40	..	..	..	..	..	..
Aruba	..	..	..	..	..	..	..	..	..	..	..	..	15	20	20	20	25	25

Source: Fitch Ratings

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