

TECHNICAL DOCUMENTATION

Climate Risk Rating

COVERING TRANSITION AND PHYSICAL RISKS OF INFRASTRUCTURE ASSETS
FORWARD-LOOKING TO THE HORIZONS 2035 AND 2050



Scientific Climate Ratings
An EDHEC Venture

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About Scientific Climate Ratings

Scientific Climate Ratings is an independent rating agency under EDHEC Ventures. Our ratings are built on rigorous scientific models, leveraging research from the EDHEC Climate Institute (ECI) and insights from other EDHEC Ventures (Scientific Beta, Scientific Portfolio, Scientific Infra & Private Assets). It delivers forward-looking ratings that quantify the financial materiality of climate risks for infrastructure companies and investors worldwide. Leveraging high-resolution geospatial data, proprietary climate risk models, and the world's largest financial dataset for infrastructure assets, SCR evaluates both transition risks (linked to the shift toward a low-carbon economy) and physical risks (arising from climate hazards such as floods, storms, heatwaves, and wildfires).

The ratings offer a dual perspective:

- The **Climate Exposure Rating (CER)** assesses current exposure to future climate risks under a “continuity” scenario, reflecting the most likely pathway based on today’s global policies and trends.
- The **Climate Risk Rating (CRR)** goes further by integrating climate risk data into financial valuation models across multiple scenarios – each weighted by its probability of occurrence – to estimate the financial effects of climate-related risks until 2035 and 2050.

While initially focused on infrastructure, Scientific Climate Ratings will soon extend its methodology to the listed equities segment, applying the same scientific rigor and forward-looking approach to a broader set of financial assets.

Scientific Climate Ratings aims to set a new standard in climate risk management – driving informed and responsible decision-making for a more resilient future.

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This document summarises the development of the *Climate Risk Rating (CRR)*. It explains the general approach, provides background on climate scenarios and our climate modelling approach, justifies the data requirements, and presents the results. For detailed information on the specific physical and transition risks, please see the respective technical documentations.



Scientific Climate Ratings developed a rating for infrastructure companies that reflects their sensitivity to present and future climate risks: the Climate Risk Rating (CRR). As an effective measure of future climate risks, we provide CRR for two time horizons – 2035 and 2050 – and include two categories:

- **Future physical risks** encompass all financial costs and losses that companies may experience due to the increased severity and frequency of climate-related hazards (e.g., floods, storms, wildfires, and heat stress) resulting from climate change.
- **Future transition risks** encompass all financial costs and losses that may arise from policies explicitly designed to mitigate climate change (e.g., carbon taxes), shifts in consumer preferences, and changes in societal values.

Our modelling approach includes estimating companies' carbon emissions and expected damages due to climate-related hazards. At this point, our estimations do not consider technologies that companies may deploy to reduce emissions or increase resilience to climate-related hazards in the future. Such strategies are idiosyncratic to each company and, in most cases, not publicly known. However, the CRR allows for asset-specific adjustments to the underlying transition and physical risk indices by integrating contributed data from the rated company, subject to verification and validation by our team.

1. General Approach

The methodology for calculating the CRR is similar to that of the Climate Exposure Rating (CER; for details, see its technical documentation) and follows a forward-looking approach, considering the risks posed by climate change until two future horizons: 2035 and 2050. Compared to the CER, it more precisely reflects the financial materiality of physical and transition risks on companies' cash flows and value. Accordingly, CRR represents a more effective "risk" rather than an "exposure" rating.

To assess this financial materiality, we use a company's Net Asset Value (NAV) as our base variable and define risk as a percentage difference in NAV between two conditions. To further estimate future climate risks, we calculate NAV for each climate scenario, as well as the "expected NAV," which is the average NAV across all scenarios weighted by their probabilities of occurrence (see Section 2). We also use the expected NAV as a reference to evaluate risks across all other scenarios and to allow comparisons between them (see details in Section 4.4). The calculation process of the CRR is summarised in Figure 1.

1. First, we calculate four company-level **risk metrics** that specify the impact of transition and physical risks on companies' NAV from today until 2035 and 2050, respectively.

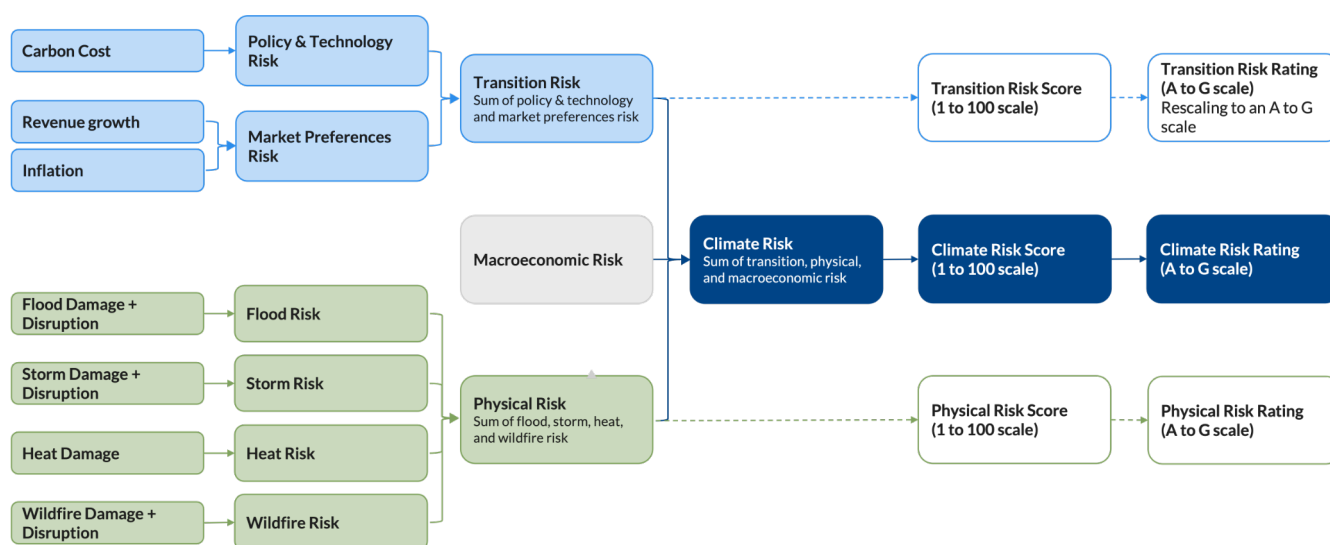


Figure 1: Illustration of the methodology for calculating the CRR

- i. **Transition Risk:** This metric is based on the sum of two types of transition risks:
 - **Policy and technology risk:** This metric measures the risks associated with the costs of carbon, calculated as the product of carbon tax and Scope 1 and 2 (S1+2) emissions.
 - **Market preferences risk:** This metric measures the risks associated with revenue growth relative to inflation. It aims to proxy situations in which market preferences impact revenues positively (revenue growth exceeds inflation) or negatively (inflation exceeds revenue growth).
- ii. **Physical Risk:** This metric is based on the sum of four types of physical risks caused by floods, storms, wildfires, and heat stress:
 - **Flood risk:** This metric measures the sum of risks associated with flood hazards. It includes damages to physical assets as well as disruptions to companies' activities that impact revenues.
 - **Storm risk:** This metric measures the sum of risks associated with storm hazards. It includes damages to physical assets as well as disruptions to companies' activities that impact revenues.
 - **Wildfire risk:** This metric measures the sum of risks associated with wildfire hazards. It includes damages to physical assets as well as disruptions to companies' activities that impact revenues.
 - **Heat risk:** This metric measures the risks associated with heat hazards. It includes damages to companies' revenues due to productivity losses.
- iii. **Macroeconomic Risk:** This metric measures the systematic risk stemming from macroeconomic conditions (i.e., GDP, inflation, and interest rate). We evaluate risk by comparing an asset's NAV under a specific climate scenario with the expected NAV, while excluding all company-specific idiosyncratic risk factors (e.g., carbon taxes, physical damages).
- iv. **Climate Risk:** This metric is the sum of the transition, physical, and macroeconomic risks.

2. Second, we calculate three company-level scores, ranging from 1 to 100, with 1 representing the best possible score and 100 representing the worst: the **Transition Risk Score**, the **Physical Risk Score**, and the **Climate Risk Score**. We calculate the scores based on the percentiles of their respective risk metric distributions.
3. Finally, the **CRR** is calculated by rescaling the Climate Risk Score to a 1 (A) to 7 (G) scale, where A represents the best possible rating and G the worst. Additionally, we rescale the transition and physical risk scores in the same way to retrieve a specific **Transition Risk Rating** and **Physical Risk Rating**.

The NAV is a central key figure when calculating the CRR and the final output of ECI's **climate risk model**¹. Since its publication in January 2024, the model has been enhanced with new features and improved calibration techniques, enabling more precise climate risk assessments. Before summarising the latest version of the climate risk model, which provides all the information needed to understand the NAV calculation (Section 4), we introduce the climate scenarios, their main characteristics, and assumptions (Section 2), and clarify the data requirements necessary for our climate risk model (Section 3).

Rating a company implies the (pre-)existence of a **reference scale**. In the CRR context, the reference scale is expressed in expected NAV loss. Therefore, the next step in the methodology involves defining these scales, which we describe in Section 5. Based on these reference scales, we can derive the various ratings, including the CRR, as described in Section 6. In some cases, we can adjust the ratings based on company-specific decarbonisation measures and resilience actions. For this, we utilise ECI's ClimaTech database, which provides decarbonisation and resilience strategies along with their respective effectiveness levels across various sectors. We explain the process in Section 7. Finally, Section 8 provides a specific example of the CRR calculation.

2. Climate Scenarios

At the heart of the CRR calculation, climate scenarios are projections of future macroeconomic conditions influenced by climate change based on various assumptions about greenhouse gas emissions, socioeconomic developments, and technological advancements. Overall, there are three main categories of scenarios:

- a. In **Orderly Transition scenarios**, immediate and coordinated climate policies are applied, enabling the containment of physical risks while avoiding significant transition risks.
 - i. **Net Zero** aims to reach net-zero emissions by 2050.
 - ii. **Net Zero Transformation** drives growth through beneficial innovations.

¹ The model, its assumptions, the associated results, and the underlying climate scenarios are described in detail in our methodological paper (Jayles & Shen, 2024).

b. In the **Disorderly Transition scenario**, carbon taxes are not applied immediately. To compensate for the delay while maintaining the goal of mitigating global warming, carbon taxes are introduced as a shock and increase sharply, entailing high transition risks.

iii. Delayed Transition delays the net-zero transition to 2030.

c. In the **No Transition scenarios**, climate policies remain unchanged from their current state. Transition risks are low but come at the cost of high physical risks.

iv. Climate Catastrophe is a worst-case scenario in which no transition efforts are made.

v. Climate Distress represents a subdued variation of the Climate Catastrophe scenario.

vi. Too Little Too Late showcases how climate change accelerates due to policymakers' inaction.

vii. Baseline includes only current pledges to counter climate change.

The following sections present the projections of key macroeconomic variables for each scenario employed in our climate risk model.

Additionally, ECI developed a methodology to calculate the probability of each climate scenario happening (Rebonato et al., 2025; as described in the respective technical documentation). Table 1 presents the probabilities associated with each scenario, listed in decreasing order. Our climate risk model uses these probabilities to calculate the expected NAV, which serves as a reference for evaluating different types of risk.

Table 1: Probabilities associated with each of the climate scenarios (Rebonato et al., 2025)

Scenario	Probability (%)
Climate Catastrophe	63.8
Climate Distress	23.2
Baseline	6.6
Too Little Too Late	6.0
Delayed Transition	0.2
Net Zero Transformation	0.1
Net Zero	0.1

2.1. GDP and Inflation

Figure 2 shows the projections of GDP (left) and inflation (right) in the United States (USA) in all scenarios until 2050. There are important differences between the scenarios. In particular, GDP in the Climate Catastrophe scenario (dark red) is dramatically affected, with negative growth starting around 2045. In contrast, GDP continues to grow in the Net Zero (bright green) and Delayed Transition (blue) scenarios after a short decline when carbon taxes are introduced (in 2025 in Net Zero and in 2030 in Delayed Transition). The inflationary effects of carbon taxes are also clearly visible: After a sharp increase when carbon taxes are introduced, inflation decreases and balances at around 2 percent after a few years. Climate Catastrophe (and to some extent Climate Distress)

represents an exception where inflation starts to rise significantly after 2030 from below 3 percent to 3 to 4 percent.

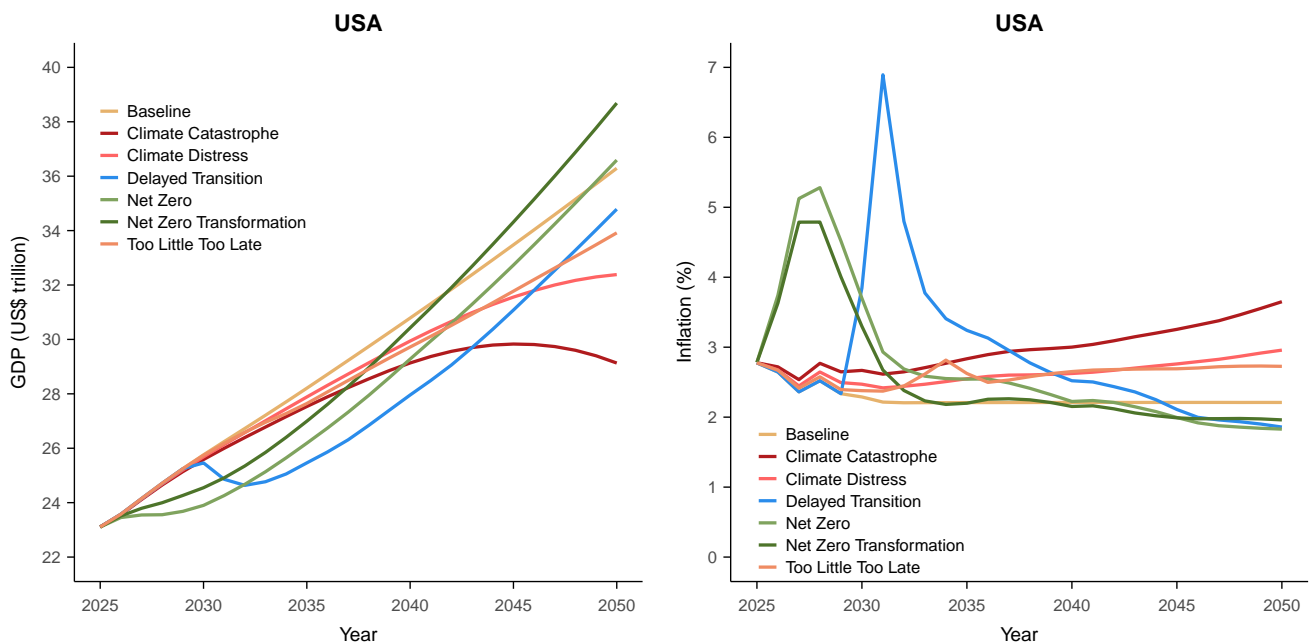


Figure 2: GDP (left) and inflation (right) in the USA in the Orderly (green), Disorderly (blue), and No Transition (red) scenarios.

2.2. Carbon Taxes and Emissions

Carbon taxes are meant to discourage carbon emissions by making carbon-based activities less economically viable. An increase in carbon tax is thus expected to lead to a decrease in carbon emissions. Figure 3 shows projections of carbon tax (left) and carbon emissions (right) in the USA in all scenarios until 2050. The pattern follows the scenarios as described: no carbon tax in most No Transition scenarios (red), a delayed and low carbon tax in the Too Little Too Late scenario (orange), a delayed but high carbon tax in the Disorderly Transition scenario (blue), and an immediate but milder carbon tax in the Orderly Transition scenarios (green). Correspondingly, emissions in Climate Catastrophe increase marginally until 2040, followed by a plateau of high emissions around 5 gigatons CO₂. If a low carbon tax is introduced, carbon emissions decrease steadily in the Baseline and Too Little Too Late scenarios. If policies are stricter (Disorderly Transition scenario; blue) or more immediate (Orderly Transition scenarios; green), carbon emissions drop more sharply to below 1 gigaton CO₂ by 2050.

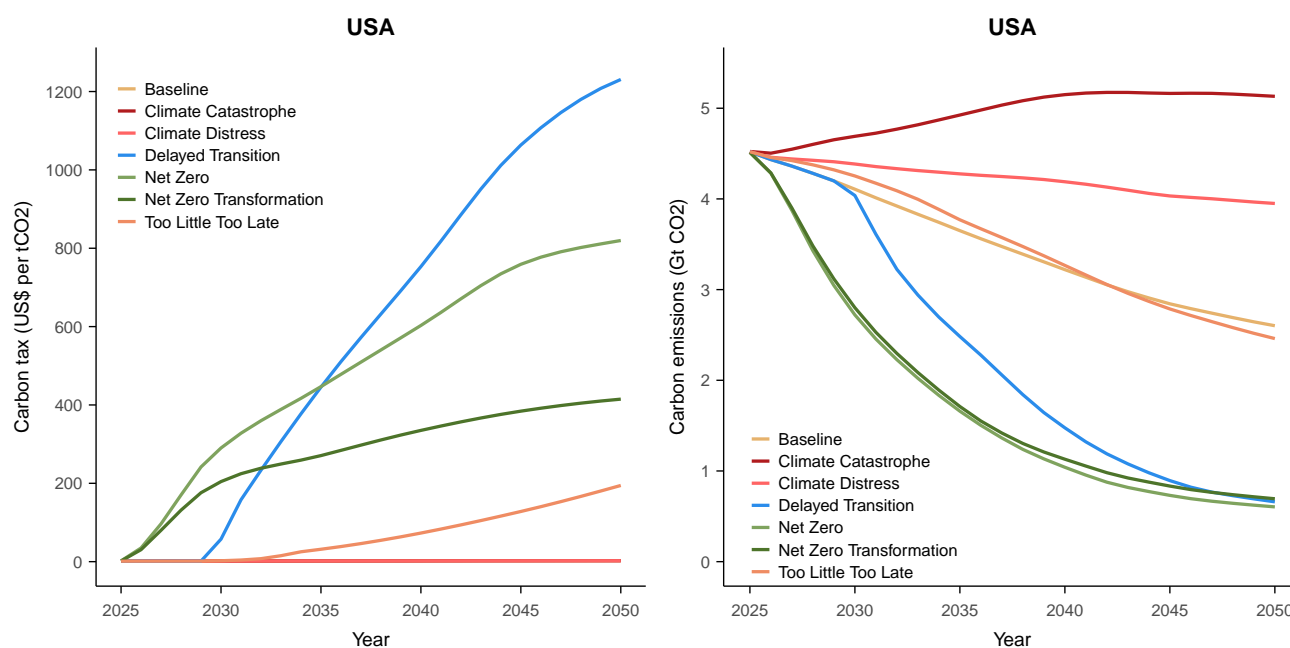


Figure 3: Carbon tax (left) and carbon emissions (right) in the USA in the Orderly (green), Disorderly (blue) and No Transition (red) scenarios.

3. Data Requirements

The CRR relies primarily on the calculation of NAV, which requires – besides the macroeconomic key variables provided in the climate scenarios – various inputs from each company included in the rating.² Specifically, our climate risk model uses the following information:

- **Financial information**, including revenue, size, equity premia, and age, among others
- **Carbon emissions**, *a minima* today (i.e., the year when the rating is calculated)
- **Physical risk exposure**, including companies' physical address and industrial activity
Based on this information, we assess the companies' risks from flood, storm, wildfire, and heat hazards (further detailed in the respective technical documentation).
- **Key variables from climate scenarios**, including GDP, inflation, carbon emissions, and carbon tax

We use the required data to build our climate risk model and develop CRR's three base variables: the transition, physical, and climate risk metrics.

4. Climate Risk Model

The CRR is forward-looking, and its calculation incorporates the evolution of transition and physical risks until two future horizons: 2035 and 2050. The calculation of NAV, a key variable in our climate risk model, relies significantly on the well-established infrastructure asset valuation approach

² For companies who wish to be included, we collect these inputs through online questionnaires. Please get in touch with our data team for further information: contact@scientificratings.com

developed by Scientific Infra & Private Assets (SIPA, 2024), which we introduce in Section 4.1. Subsequently, we outline the models that connect infrastructure financials to the macroeconomic variables of the climate scenarios (Section 4.2) and explain the impact of climate risks on companies' cash flows (Section 4.3). Finally, we present the metrics used to calculate companies' CRR (Section 4.4). Figure 5 illustrates the functioning of the climate risk model, highlighting the dependencies between the key variables introduced in the following sections.

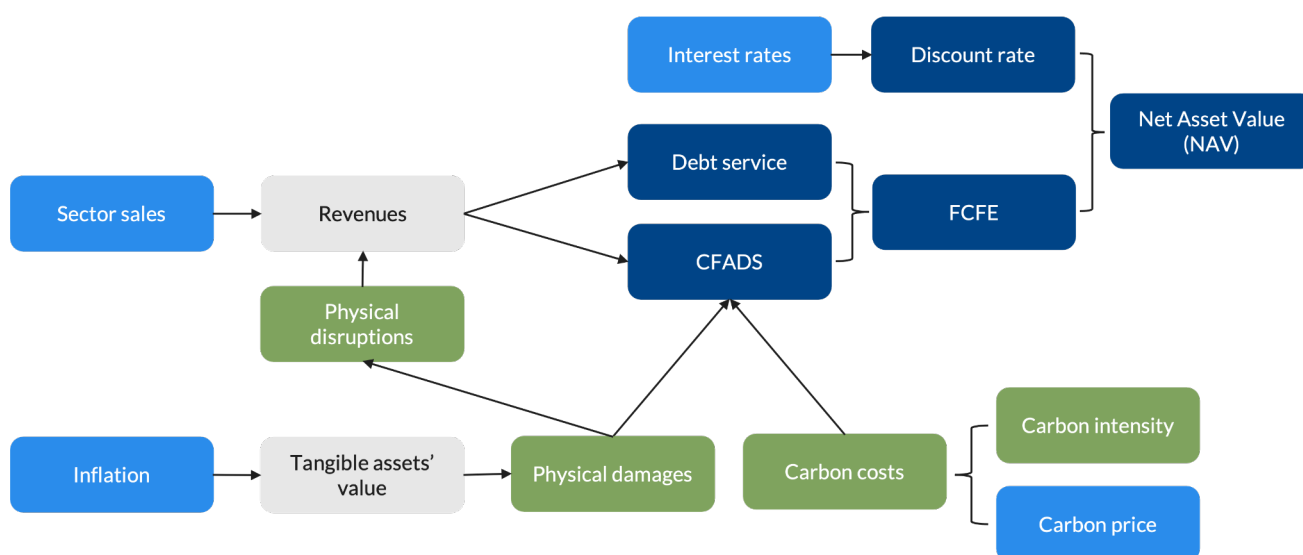


Figure 4: Schematic illustration of the climate risk model

The macroeconomic variables at the country level are provided for each climate scenario (light blue), while the forward-looking climate risk variables are available at the asset level (green). For the financial variables, we differentiate between the baseline financial inputs (grey) and the calculated output variables of the asset pricing model (dark blue).

4.1. Infrastructure Asset Valuation Approach

When dealing with privately held infrastructure assets in institutional portfolios, market prices are not readily available. Therefore, we adhere to the guiding principles of the International Financial Reporting Standards (IFRS) 13 – a framework for fair value measurements (IFRS, 2025) – and of modern asset pricing theory (SIPA, 2024) to value unlisted infrastructure equity investments.

One of the most commonly used methods for this purpose is the discounted cash flow (DCF) approach, which equates the value of an investment at any time t to the sum of all future cash flows generated from $t + 1$ until maturity (i.e., the end of the investment). Future cash flows are influenced by climate conditions, particularly climate hazards (physical risks), as well as measures implemented to mitigate the consequences of climate change (transition risks). In the context of the CRR, we focus on the mid-term impact most relevant to investors and asset managers. Therefore, we compute a partial version of the NAV that includes cash flows up to 2035 and 2050, rather than up to the maturity date. We still refer to this variable as NAV, although it is not the Net Asset Value *stricto sensu*.

To account for the difference in the value of money between today and tomorrow, future cash flows are discounted by a factor known as the discount rate, which is calculated as the sum of the risk-free rate and the equity risk premium.

The NAV for infrastructure assets is determined under each climate scenario based on two main components: 1) the country-specific risk-free rate, derived from each scenario's projected yield curves, and 2) company-level financial variables such as Cash Flow Available for Debt Service (CFADS), debt service, and equity risk premium. These variables are estimated using SIPA's factor-based asset pricing models, which capture the relationship between key financial drivers – especially revenue – and their impact on asset valuation. Finally, we calculate the **expected NAV** as the probability-weighted average across all climate scenarios.

4.2. Sector-Level Scenario Projections of Companies' Revenues

The infrastructure asset valuation approach emphasises the central role of revenues in the computation of cash flow. Accordingly, we need an approach that integrates climate-scenario considerations into revenue modelling.

We developed a model that projects sector-level revenue growth, assuming that a company's revenues (within a given sector and country) grow at the same rate as the global nominal sales in that sector and country. To ensure that these projections reflect both real activity and price movements, we distinguish between production changes and price effects. Since infrastructure companies typically operate at full capacity, we assume their current production levels are capped and cannot be exceeded (i.e., the cumulative growth rate of production is either zero or negative). Accordingly, production growth is limited or set to zero for regulated assets, while price movements are derived from the difference between nominal and real sector growth. By combining the effects of prices and production, we derive company-specific revenue trajectories for each year from today to 2050 and across all climate scenarios. These projected revenues feed directly into the cash flow estimations used in the asset valuation model.

It is important to note that the sales projections used in our calculations encompass all sectors, as classified by NACE, the statistical classification standard for economic activities in the European Community (Eurostat, 2023). Based on SIPA (2025b), which maps NACE activities to the Infrastructure Company Classification Standard (TICCS)³, we can obtain sector-specific sales for all TICCS classes and subclasses. Weighted averages ensure that major sector activities have a proportionally stronger influence than minor ones in determining growth rates.

³ The Infrastructure Company Classification Standard (TICCS) provides investors with a frame of reference for approaching the infrastructure asset class. It offers an alternative to investment categories inherited from the private equity and real estate universe, which are less informative when classifying infrastructure investments (SIPA, 2025b).

4.3. Direct Impact of Climate Risks on Companies' Cash Flows

In addition to the macroeconomic impact of climate risks (accounted for in the climate scenarios and represented in our model through revenues and the risk-free rate), infrastructure companies' cash flows can be affected by asset-specific exposure to physical and transition risks. When a hazard event occurs, physical damage affects an asset's production capacities (i.e., its capacity to generate revenue) and increases the repair and replacement costs. Additionally, companies' operating costs increase when carbon taxes are introduced, which can become a material risk factor for companies in high-emitting sectors. The following sections describe how we project physical damages and disruptions, as well as carbon emissions, and how these factors impact companies' revenues and cash flow.

4.3.1. Projections of physical damages and disruptions

The physical risks associated with any given hazard (as of June 2025: floods, storms, wildfires, and heat) are quantified by two key parameters: (1) The **severity** indicates the extent of the impact a hazard has on an infrastructure asset and can be proxied by a damage factor (for floods and storms), damage probability (for wildfires), or the level of operational disruption (for heat stress). (2) The **frequency** represents the likelihood of a hazard occurring in a given year and can be derived through the inverse of the return period, probabilistic models, or climate scenario projections. Based on these key parameters, ECI developed various methodologies to calculate expected damages from floods, storms, and wildfires, as well as "damages" to companies' revenues from a loss in productivity due to heat stress (more details can be found in the respective technical documentations).

While ECI's calculations centre on expected damages, we calculate damages to physical assets and further differentiate damages from disruptions that affect a company's activities. The focus on physical assets (as opposed to total assets) enables more precise financial risk projections. Additionally, the evaluation of business-day **disruption** allows us to consider further impacts on companies' revenues in the event that their activities are disrupted by hazards that damage their physical assets. Based on Mandel et al. (2025), this approach combines the physical damages related to each hazard with sector coefficients of the Federal Emergency Management Agency (FEMA), which indicate the number of interruption days following total destruction of a facility's capital stock. For partial damage, the interruption is assumed to scale proportionally with the share of capital lost, allowing the hazard magnitude to be directly translated into expected business-day interruptions for each asset.

As both severity and frequency of climate hazards evolve over time, we project these changes to calculate future damages and disruptions. For this, we rely on information from the Representative Concentration Pathways (RCP) scenarios.⁴ We use two of those RCP scenarios that represent a

⁴ On demand of the IPCC, the scientific community developed one of the first scenarios – the Representative Concentration Pathways – to explore the impacts of (future) greenhouse gas concentrations in the atmosphere on the climate (Van Vuuren et al., 2011). Future scenarios, like the ones developed by Oxford Economics or the Network for Greening the Financial System (NGFS), have been built based on those initial contributions.

moderate (RCP4.5) and a worst-case (RCP8.5) climate scenario for physical risks. We map the physical risk projections of these scenarios to our climate scenario data, as presented in Table 2.

Table 2: Correspondence between RCPs and climate scenarios used in our climate risk model

Climate Scenarios	RCP Scenarios
Climate Catastrophe	RCP8.5
Climate Distress	RCP8.5
Too Little Too Late	RCP8.5
Baseline	RCP8.5
Delayed Transition	RCP4.5
Net Zero Transformation	RCP4.5
Net Zero	RCP4.5

4.3.2. Projections of carbon emissions and carbon taxes

Most countries only tax companies for carbon emissions from operations (Scope 1 – S1) and purchased energy (Scope 2 – S2), leaving emissions from the broader value chain (Scope 3 – S3) untaxed. ECI's carbon intensity models estimate the S1+2 intensities per revenue for infrastructure companies in our universe of assets⁵ (details can be found in the respective technical documentation). We assume that S1+2 intensity per revenue grows similarly to the ratio of country-specific emissions to GDP in each climate scenario. To obtain projected carbon emissions, we multiply carbon intensity projections by revenue projections.

4.3.3. Impact of climate risks on CFADS and revenues

The additional costs associated with physical and transition risks are not included in our asset pricing model (presented in Section 4.1). However, these costs directly impact companies' cash flows in two ways: Firstly, the additional costs due to physical damages and carbon taxes must be accounted for in the CFADS. Accordingly, we deduct those costs from the CFADS. Secondly, physical disruptions due to floods, storms, and wildfires, as well as productivity losses resulting from heatwaves, impact the revenues used to calculate CFADS and debt service. Similarly, we deduct those impacts from the revenue projections.

4.4. Climate Risk Metrics

The climate risk model allows us to calculate an asset's NAV as of today, incorporating cash flows up to a specific time horizon (here, 2035 and 2050), while also considering transition and physical risks. The model further enables us to simulate various conditions, such as the inclusion or exclusion of carbon tax impacts or exposure to individual (or all) hazards. This conditional flexibility allows us to define risk as the relative difference in NAV between two conditions C and C_0 , where C_0 is the

⁵ The Unlisted Infrastructure Universe is a database of tracked assets that represent the fair value- and risk-adjusted performance of the unlisted infrastructure asset class. It includes 9,100 unique infrastructure companies in the 27 most active national markets for infrastructure investors to define an investible universe of private infrastructure companies. These companies have a minimum of USD 1 million in total asset book value, are privately owned, and can be categorised using TICCS (SIPA, 2025a).

reference condition.⁶

In the reference condition C_0 , we deactivate carbon taxes and exposure to climate hazards, while revenues grow in line with inflation. This risk-free condition is then compared to a risk condition C , in which we can activate risks in various combinations (e.g., exposure to a specific climate hazard or to all physical and transition risks). Furthermore, we consider a rescaling factor that enables us to compare the calculated risks across scenarios.

Based on these risk definitions, we specify the following risk conditions C to incorporate physical and transition risks in our climate risk model:

- Reference condition C for policy and technology risks:**
 NAV is calculated considering carbon costs (i.e., carbon tax is activated). The difference between C and C_0 calculates the relative difference in NAV due to carbon costs, which proxies policy and technology risks.
- Reference condition C for market preferences risks:**
 NAV is calculated based on a company's modelled revenue growth (see Section 4.2). The difference between C and C_0 calculates the relative difference in NAV due to revenue growth (compared to inflation), which proxies market preference risks.
- Reference condition C for flood, storm, and wildfire risks:**
 NAV is calculated considering damages and disruptions caused by physical hazards. The difference between C and C_0 calculates the relative difference in NAV due to both damages to physical assets and disruptions impacting revenues.
- Reference condition C for heat risks:**
 NAV is calculated considering productivity losses caused by heat stress. The difference between C and C_0 calculates the relative difference in NAV due to productivity losses impacting revenues.

Furthermore, we use these conditions to compute the following risks:

- Transition Risk:**
 We calculate the relative difference in NAV due to transition risks as the sum of the policy and technology risk, as well as market preferences risk.
- Physical Risk:**
 We calculate the relative difference in NAV due to physical risks as the sum of flood, storm, wildfire, and heat risks.
- Climate Risk:**
 We calculate the relative difference in NAV due to transition, physical, and macroeconomic risks as the sum of these three risk metrics.

⁶ Compared to transition and physical risks, we define macroeconomic risks slightly differently due to their systematic focus (excluding all asset-specific climate impacts).

5. Identification of Reference Scales

In order to translate these metrics into a score (and ultimately a rating), we need reference scales that rank companies according to their risks. To facilitate risk comparisons across climate scenarios, we construct reference scales based solely on the expected NAV. We conduct the following methodological steps to identify reference scales for the 2035- and 2050-time horizons for the Transition Risk Score, the Physical Risk Score, and the Climate Risk Score that can then be translated into ratings:

1. First, we **mitigate sectoral imbalances** in the transition risk metric to ensure that the various TICCS superclasses are evenly represented in the list of companies to be rated. For this, we employ a stratified bootstrap approach (Horowitz, 2019), which generates a larger population by sampling assets and including the same number of randomly selected companies from each TICCS superclass, thereby avoiding the amplification of sector biases. The resulting distribution of such a sample is more representative of the infrastructure asset class as a whole. However, as physical risks – and consequently, also climate risks – are location-dependent, we cannot apply this sector-based homogenisation procedure and therefore retain the original distribution.
2. Second, we **define a reference scale** by considering the distribution percentiles of the respective populations, based on the actual universe of assets for physical and climate risks or the stratified bootstrap output for transition risks. These percentiles constitute the reference scale against which we calculate the scores.

We perform the analysis on nearly 500 companies included in our infrastructure universe, for which we have all the financial information needed to calculate the NAV.⁷ The available data enable us to derive robust statistics and representative distributions of the three risk scores.

6. Rescaling Scores into Ratings

Based on the developed reference scales, we can now assign each company a transition, physical, and climate risk score. Companies with the lowest risks receive the lowest risk score. For example, if a company's transition risk falls below the 1st percentile, we assign a score of 1; if a company's transition risk falls between the 1st and the 2nd percentile, it receives a score of 2; and if the transition risk falls above the 99th percentile, the company's score is 100.

Finally, we transform the transition, physical, and climate risk scores, ranging from 1 to 100, into **ratings** on a scale from A to G. In line with standard practices in financial risk ratings, our final ratings

⁷ We review and update the data annually to account for new assets added to the tracking list.

aim to be symmetrically and close to normally distributed. Accordingly, we discretise the transition, physical, and climate risk scores to their respective ratings following an idealised repartition (as shown in Table 3). Figure 5 presents the final CRR in the expected climate scenario for 2035 and 2050.

Table 3: Idealised distribution of ratings

Rating	Score interval
A	[1, 5)
B	[5, 17.5)
C	[17.5, 37.5)
D	[37.5, 62.5)
E	[62.5, 82.5)
F	[82.5, 95)
G	[95, 100]

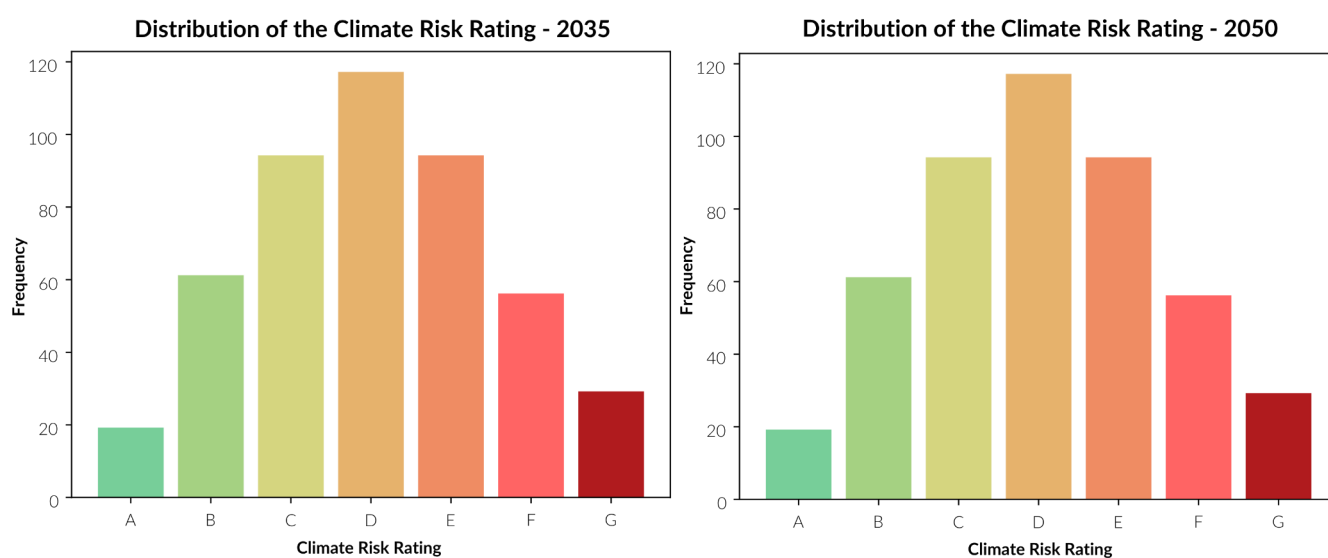


Figure 5: Final CRR ratings for all assets in our infrastructure universe for the 2035 and 2050 time horizons

7. Potential Adjustment Procedures of the CRR

Our models estimate the financial impact of transition and physical risks on companies' NAV, which is the basis for calculating the CRR. However, there may be characteristics unique to a company that our models, which focus on the systemic risk components, do not capture. For example, a company may implement technologies to reduce its emissions or exposure to specific hazards. In such cases, and at the request of the rated companies⁸, we can adjust the relevant metrics based on

⁸ Companies requesting the revision of their metrics need to provide information demonstrating the technologies implemented to reduce their emissions, increase their resilience to climate disasters, or both. This information allows us to capture the company's idiosyncratic risk components.

implemented technologies as well as future strategy plans (until 2050), as well as their respective effectiveness.

7.1. ClimaTech – Database of Decarbonisation and Resilience Strategies

In order to specifically evaluate companies' climate strategies and implemented measures, we utilise the ClimaTech database to adjust their CRR accordingly. **ClimaTech** is a comprehensive initiative designed to assess and evaluate infrastructure decarbonisation and resilience strategies in response to the increasing risks posed by climate change. The ClimaTech project distinguishes between decarbonisation and resilience strategies, both of which are crucial components in addressing climate risks for infrastructure assets (ECI, 2025).

- **Decarbonisation strategies** focus on reducing greenhouse gas emissions associated with infrastructure. These strategies aim to lower carbon footprints by employing technologies and practices that minimise the use of fossil fuels and enhance energy efficiency. For example, integrating renewable energy sources, like solar or wind power, and adopting low-carbon construction materials are key decarbonisation strategies.
- **Resilience strategies**, on the other hand, aim to mitigate the physical risks posed by climate change, such as floods and storms. These strategies ensure that infrastructure can withstand climate-related disruptions and continue functioning effectively in the face of extreme weather events. Resilience measures include building flood defences, improving structural integrity, and using fire-resistant building materials.

The ClimaTech database provides evidence-based assessments of these **strategies** and offers a detailed evaluation of their **effectiveness** across various infrastructure sectors. It serves as the largest global repository for decarbonisation and resilience measures, with a structured methodology based on scientific research and expert analysis. This enables stakeholders to make informed, data-driven decisions to future-proof their infrastructure investments against both transition and physical risks.

The ClimaTech database is pivotal to our adjustment procedure: If companies share their decarbonisation and resilience strategies, the database provides information on the extent to which our model-estimated emissions and expected damages can be reduced (effectiveness) for specific scopes, hazard types, and return periods.

7.2. Adjustments based on Decarbonisation Strategies

To update the carbon intensities per revenue, companies must provide information on their latest revenues, emissions, and implemented decarbonisation measures, as well as planned decarbonisation strategies and expected costs (OpEx, CapEx) up to 2050 (including supporting



materials). Several cases may arise for companies interested in a reviewed CRR (see also Figure 6):

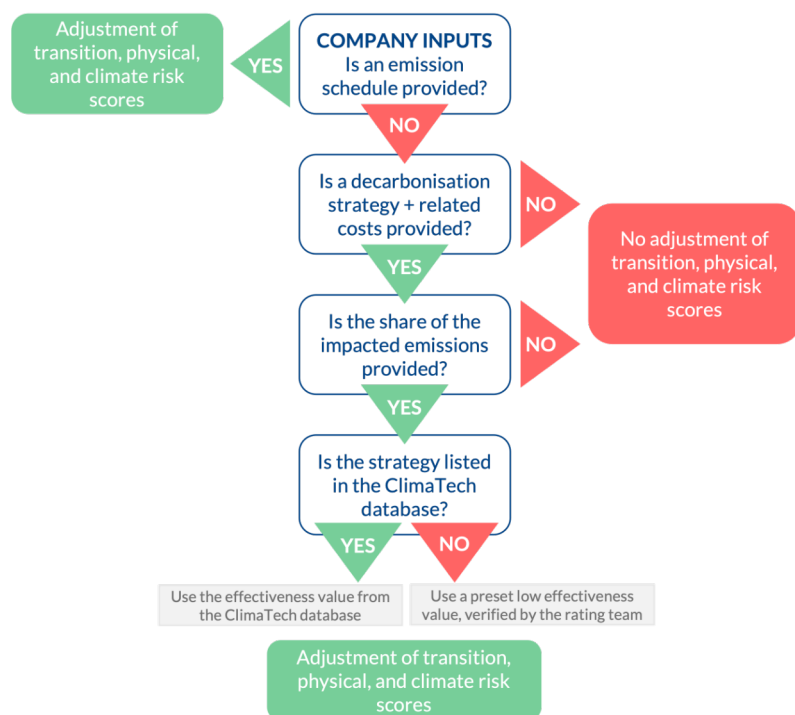


Figure 6: Illustration of the process to adjust carbon intensities per revenue based on current and future decarbonisation strategies

- **The company does not provide revenue information.**
In this case, it is not possible to update the CRR, as this information is required to adjust the carbon intensities.
- **S1, S2, or S1+2 emissions schedules are reported.**
If the ClimaTech team validates the credibility of the emissions schedules, we replace our model-based S1+2 intensity estimation with the provided values and update the CRR accordingly.
- **S1, S2, or S1+2 emissions are not reported, but decarbonisation measures and planned strategies are listed.**
In this case, we use the ClimaTech database to evaluate the effectiveness of implemented measures and future strategies and to adjust the CRR accordingly. Note that most decarbonisation technologies impact only parts of a company's total emissions. Accordingly, companies are required to specify the share of emissions that are impacted by the reported technology. Furthermore, we require the expected costs for future decarbonisation strategies.

7.3. Adjustments based on Resilience Strategies

For the adjustment process based on resilience strategies, we consider the three most material types of hazard events in infrastructure: floods, storms, and wildfires (UNDRR, 2020). These hazard

events can physically damage assets and are characterised by their return periods⁹, which serve as a proxy for their severity (more details on these physical risks can be found in their respective technical documentation).

We update the expected damages and disruptions from floods, storms, and wildfires for companies that have implemented technologies (or plan to do so in the future) to reduce the impact of such hazards. Again, in order to adjust the CRR, companies are required to provide information (along with supporting materials) on their current resilience measures and planned strategies. Additionally, we require the expected costs associated with the future implementation of these strategies. Similar to the adjustment of carbon intensities, we assess the effectiveness of resilience strategies and technologies for every relevant return period based on the ClimaTech database. After determining the effectiveness for all possible return periods, we can adjust the damages and disruptions of each hazard. Overall, we adopt a conservative approach and assume that if a resilience strategy is designed to protect against an extreme (less frequent) event, it also provides protection against more frequent, less severe events.

8. Example of the CRR and the Adjustment Process

To illustrate the rating process, including potential adjustments to the CRR, we use the example of an airport in Australia. We refer to resilience information from the company's latest sustainability report to demonstrate the adjustment process for physical risks.

8.1. Initial Calculation of the CRR (Before Adjustments)

Table 4 shows the airport's physical risks based on the expected NAV for each hazard and the resulting Physical Risk Rating under the "expected" scenario¹⁰ for a 2050 time horizon before adjustments.

Table 4: The airport's expected flood, storm, wildfire, heat, and its combined physical risk metrics (expressed in %) as well as its Physical Risk Rating (A-G)

Flood risk	Storm risk	Wildfire risk	Heat risk	Physical risk	Physical Risk Rating
23.4	5.3	0.008	0.24	29	E

⁹ The return period estimates the average time interval between occurrences of a hazard event of a defined size or intensity. To obtain return periods, statistical estimates are first calculated for a range of all possible hazard events based on historical observations. If a particular hazard event value has a 1% frequency of occurrence, it has a one in a hundred probability of occurrence at any given year and is hence known as the 100-year return period.

¹⁰ The "expected" scenario means that the respective metric outputs under each scenario have been weighted based on the scenario probabilities, as described in Section 2.

8.2. Adjustments for Resilience Strategies

In this case, we can adjust the physical risks from flood and storm hazards¹¹ if the said company has implemented technologies and plans future strategies that increase its resilience against such hazards. We relate each technology mentioned in the airport's sustainability report to the hazard and return period it is intended to protect against, as well as its corresponding level of effectiveness, based on the ClimaTech database (see Table 5). As the airport has already implemented these technologies, we do not need to consider additional costs in our cash flow estimations. The effectiveness of these technologies, and thus the risk reduction, applies today and in all future years.

Table 5: Implemented resilience technologies based on the airport's sustainability report

Resilience technology	Hazard	Type	Return period (years)	Effectiveness
Elevation	Flood	Inland + coastal	100 or less	80%
Flood barriers	Flood	Coastal	1,000 or less	80%
Flood barriers	Flood	Coastal	More than 1,000	2%
Natural infrastructure – habitat creation / restoration	Storm		50 or less	98%
Natural infrastructure – habitat creation / restoration	Storm		Between 50 and 1,000	Linear gradient
Natural infrastructure – habitat creation / restoration	Storm		1,000 or more	2%
Undergrounding	Storm		10,000 or less	20%
Undergrounding	Storm		More than 10,000	2%

Note: Based on ClimaTech's classification of resilience measures, we can link these technologies to specific hazards and protection levels (i.e., return periods for floods and storms), and associate an effectiveness level to each of them.

Each resilience technology mentioned in the table offers protection against different hazards. The level of protection depends on the magnitude of the hazard, which is determined by its return period. For instance, flood barriers offer a “step function” protection that only works below a certain threshold. Accordingly, such barriers are able to offer 80 percent protection against floods with a return period of 1,000 years or less. However, they are almost unable to protect (2% protection) against more severe floods with a return period of more than 1,000 years.

Furthermore, a technology can supersede another one in its protection at certain return periods. For instance, natural infrastructure in the form of habitat creation and restoration offers decreasing protection against storms, from 98 percent protection against mild storms with a return period of 50 years or less, to only 2 percent protection against severe storms with a return period of 1,000 years or more. Accordingly, there is a return period between 50 and 1,000 years where natural

¹¹ As of June 2025, we do not adjust for resilience strategies that protect against heat stress.

infrastructure can only offer a level of protection of less than 20 percent. In those cases, the protection level will still remain constant at 20 percent because the additional undergrounding technology provides a 20 percent protection for storms with a return period of 10,000 years or less.

8.3. Recalculation of the CRR

Following Table 5, we can update the physical risk metrics for each hazard separately, and hence the overall Physical Risk Rating. In summary, we calculate the following risk metrics (expressed in %) after the adjustment process:

- The resilience strategies reduced the flood risk by 94 percent between 2025 and 2050 from 23.4 to 1.37 percent.
- The resilience strategies reduced the storm risk by 65 percent between 2025 and 2050 from 5.3 to 1.85 percent.

Table 6 provides an overview of the initially estimated and adjusted values needed to calculate the CRR for the assessed airport. Using the adjusted values, we can re-run the procedures presented in this document to recalculate the airport's Physical Risk Rating and the underlying hazard-specific risk ratings. We observe a significant improvement in the Physical Risk Rating (from E to C) after adjusting for the implemented resilience technologies. This leads to an overall improvement of the Climate Risk Rating from D to A.

Table 6: The airport's estimated and adjusted values of flood, storm risk, and its combined physical risk metrics (expressed in %), as well as the respective risk ratings (A to G)

	Flood risk	Storm risk	Physical risk	Physical Risk Rating	Climate Risk Rating
Estimated	23.4	5.3	29	E	D
Adjusted	1.37	1.85	3.5	C	A

The CRR reflects the combined impact of physical, transition, and macroeconomic risks on an asset's value. It is derived by comparing an asset's combined risks against the risks of other assets within the rated infrastructure universe. Because each risk type affects assets differently, the overall rating does not move in a strictly linear way with changes in individual components. For example, an asset with severe physical risks but low transition risks may initially appear riskier overall than one with moderate exposure to both. Once resilience measures are introduced and the physical risk declines, the total risk can reduce significantly – enough to shift the overall rating drastically. This can make the improvement from the initial to the adjusted rating seem disproportionate. However, such outcomes are a natural result of integrating different types of risks that interact in complex, non-linear ways, reflecting the model's holistic view of how combined climate risks affect asset value.

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