



ERA·TOS·THENES

Climate Strategy & Disclosure: Plan Beyond the Horizon

2018



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CLIMATE STRATEGY & DISCLOSURE

**Climate strategy and disclosure
are about the same thing—
making better decisions
under conditions of extreme
uncertainty.**

If you only have one minute: Key conclusions

- 1** The Financial Stability Board Taskforce on Climate-related Financial Disclosures (TCFD) is driving the convergence of strategic planning and financial reporting. Climate strategy and disclosure are about the same thing—better decision-making under conditions of extreme uncertainty about the future.
- 2** The convergence of climate-related financial reporting and strategic planning calls for a new type of forward-looking accounting we call “future accounting”. When disclosed in financial filings, as recommended by the TCFD, future accounting raises important new policy considerations with regard to materiality assessment, assurance, and the use of independent specialists.
- 3** Large, global insurance companies, banks, insurers, investment managers, pensions and corporations use future accounting internally today—in the form of robust modeling and optimization systems—to reduce enterprise risks and increase profits. These systems can and should be extended to reflect climate-related variables.
- 4** The confluence of the issuance of the TCFD recommendations and the dominant market share of index funds is driving a transformation in investor fiduciary responsibilities and corporate governance. This is creating significant new demands for boards to become competent in climate strategy and disclosure.

SUMMARY

The Financial Stability Board Taskforce on Climate-related Financial Disclosures (TCFD) has accomplished much in its short history. However, its most significant accomplishment is its consensus recommendation for disclosures explaining the resilience of an organization's strategy under climate-related scenarios. This recommendation is groundbreaking because neither the use of scenario analysis to develop a climate-resilient organizational strategy nor the public disclosure of scenario-based financial information is common practice today.

The TCFD is driving the convergence of financial reporting and strategic planning. Building and maintaining a climate-resilient organizational strategy calls for a new type of forward-looking accounting we call "future accounting". Future accounting presents forecasted financial information as probability distributions rather than single point estimates in order to illustrate potential future financial performance under a range of different scenarios. Future accounting is essential to improving decision-making under conditions of extreme climate-related uncertainty on the part of firm managers, investors and financial markets. When disclosed outside the organization, it also raises important new policy considerations with regard to materiality assessment, assurance, and the use of independent specialists.

Future-proofing is the process of anticipating the future and developing strategies that minimize the adverse effects of shocks and stresses of future events. The use of scenario analysis to future-proof organizational strategy without regard to climate change is not new. Large, global insurance companies, banks, insurers, investment managers, pensions and corporations today use robust modeling and optimization systems to reduce enterprise risks and increase profits. These systems can and should be extended to reflect climate-related uncertainties. By integrating climate considerations into existing strategic analysis and planning systems and processes, firm managers can build and maintain more climate-resilient business models and build confidence among investors in their ability to do so.

The dominant market share of index funds is driving a transformation in investor fiduciary responsibilities and corporate governance. Index fund managers are long-term investors that cannot express disapproval of company's long-term strategy by selling the company's securities so long as that company remains in the relevant index. As a result, index fund managers have a greater responsibility to actively engage with firm management on long-term environmental, social and governance (ESG) issues. They are doing so not only through letters to management but through "active engagement" and support of initiatives such as the TCFD. They want firms to publicly articulate their strategic framework for long-term value creation and explicitly affirm that the board has reviewed it. The three largest index funds—BlackRock, Fidelity and Vanguard—control 23% of the voting stock of each company in the S&P 500. Each supports the TCFD recommendations. The message is clear: boards must become more engaged on climate strategy and disclosure.

SCENARIO ANALYSIS

In April 2015, after having identified climate change as a potential systemic risk to global financial stability, G20 Finance Ministers and Central Bank Governors asked the FSB to review how the financial sector could take account of climate-related issues.

This led to the formation of the TCFD, which was tasked with developing a framework of financial disclosures that “would enable stakeholders to understand better the concentrations of carbon-related assets in the financial sector and the financial system’s exposures to climate-related risks.”

Using these climate-related financial disclosures, the FSB envisioned that:

[F]inancial institutions and other relevant stakeholders could then assess the credibility of firms’ transition plans and their ability to execute them, and analyze the potential changes in value of their assets and liabilities that could result from a transition to a lower carbon economy or to other climate-related events (e.g. physical or legal risks). This would allow stakeholders not only to manage and price these risks accordingly but also, if they wish, to take lending or investment decisions based on their view of transition scenarios.

Stated differently, firms need to future-proof their organizational strategy against climate-related financial risks and publicly disclose information sufficient to allow others to independently assess their progress and capabilities.

The TCFD’s final report issued in June 2017 recommended a sweeping new climate disclosure framework covering governance, risk management, strategy and performance metrics and targets. Significantly, it recommended that preparers include this information in their annual financial reports instead of (or in addition to) other locations in order to improve credibility with investors and foster shareholder engagement.

Responding to the above-quoted FSB directive, the TCFD's recommendations call for companies to "describe the resilience of the organization's strategy, taking into consideration a wide range of different climate-related scenarios, including a 2°C or lower scenario." As a guide for those unfamiliar with the methodology, the TCFD included [a technical supplement on climate-related scenario analysis](#), which it describes as a means to better understand how a business might perform under different future states.

The range of plausible future climate states and pathways is extraordinarily broad. As described by the European Systemic Risk Board in a 2016 report titled *Too late, too sudden: Transition to a low-carbon economy and systemic risk*, in a benign scenario, the transition to a low-carbon economy occurs gradually: adjustment costs are manageable, and the repricing of carbon assets does not trigger financial instability. In an adverse scenario, the transition occurs late and abruptly. A similarly wide range of outcomes and pathways is plausible for direct and indirect damage to corporate assets and supply chains resulting from acute and chronic shifts in climate patterns.

Scenario analysis is a process specifically designed to identify and assess the potential impact of plausible future states and pathways in the event of highly uncertain long-term impacts (more than 3 to 5 years in the future). As such, it is an essential tool for assessing climate-related financial impacts, which are inherently both long-term and highly uncertain in nature, probability and magnitude.

Scenario analysis is not used to predict what will happen but to help plan for what could plausibly occur. A critical feature of scenario analysis is the selection or generation of a broad set of internally consistent scenarios (not just one) that cover a wide range of plausible future outcomes, both favorable and unfavorable. In this important respect, scenario analysis differs from techniques—such as sensitivity analysis, value at risk (VaR), and stress-testing, as developed by financial regulatory authorities—designed to assess financial outcomes based on a single variable, a single time period, or a single scenario.

When presented with a wide range of scenarios, managers often tend to choose one or two immediately to the right and left of what they believe to be the "most likely" base case. They regard the extreme scenarios as a waste because "they won't happen" or, if they do happen, "all bets are off." By ignoring the outer scenarios and focusing exclusively on moderate improvements or deteriorations from an assumed base case, management often leave themselves exposed to dramatic changes that occur in the "fat tails" of the distribution of potential results—particularly on the downside. Concern about fat tail risk is precisely what the FSB was concerned about and why it formed the TCFD.

AN EVOLUTION IN FINANCIAL REPORTING

The TCFD is driving the convergence of financial reporting and public relations, on one hand, and the convergence of financial reporting and strategic planning, on the other. The convergence of climate-related financial reporting and strategic planning calls for a new type of forward-looking accounting we call “future accounting”.

Convergence of Public Relations & Financial Reporting

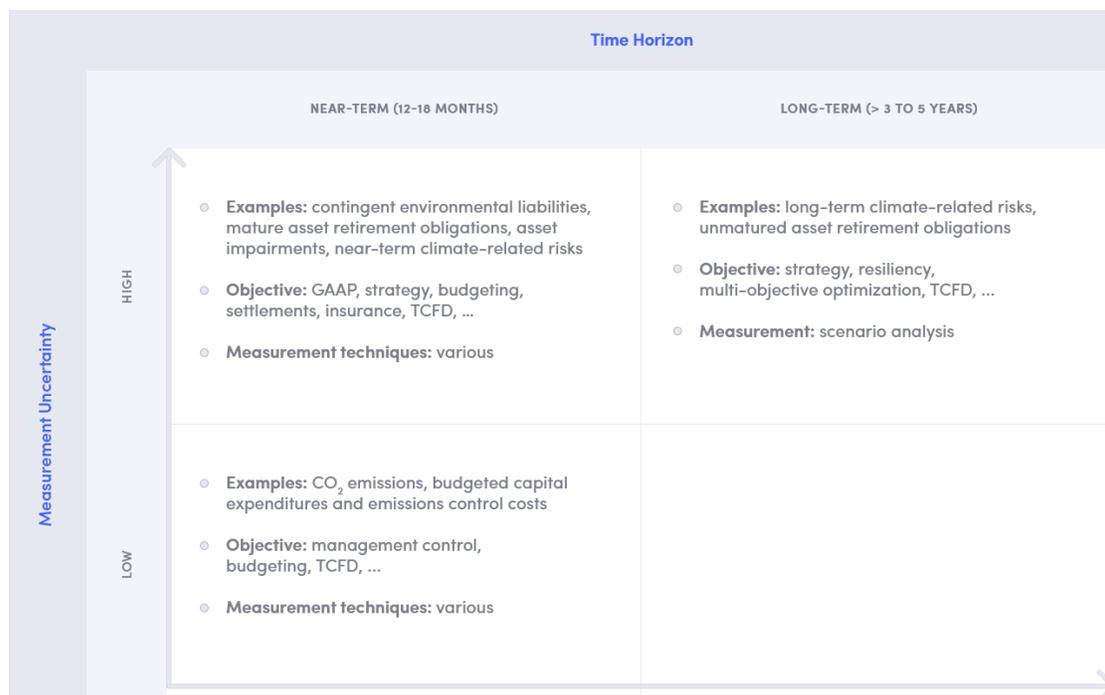
The TCFD’s recommendation to include “voluntary” climate disclosures in mainstream financial filings is converging financial reporting and public relations. Historically, corporations have provided voluntary ESG disclosures to achieve public relations objectives. Large corporations are accustomed to publishing voluntary reports touting their ESG bona fides. A typical ESG report costs less than \$25,000, making ESG reporting a cost-effective public relations opportunity to influence ESG ratings providers and asset managers offering ESG financial products. Unlike financial disclosure, ESG disclosure is most often voluntary and free from independent audit and internal control requirements. Management has complete discretion, and the motivation to selectively disclose is strong.

The term “climate-related financial disclosure” itself implies that henceforth climate-related disclosures will be seen as financial in nature, even though they may not be reflected as line items in the financial statements. The TCFD further emphasized this point by recommending that financial statement preparers include such disclosures in their annual financial reports. Going forward, managers will need to temper their PR-inspired motivation to selectively disclose against their legal duty to “fairly present”. Public relations and financial reporting objectives and responsibilities now overlap.

Convergence of Strategic Planning & Financial Reporting

The TCFD’s recommendation that companies disclose the results of scenario analysis is driving another convergence—this time of strategic planning and financial reporting. The need identified by the FSB for investors to “assess the credibility of firms’ transition plans and their ability to execute them” requires new forms of financial analysis and financial measures based on future expectations rather than historical experience.

The following diagram illustrates two key variables affecting the measurability of potential financial impacts of environmental and climate-related risks and opportunities—uncertainty and time. As the number of years into the future increases, so does uncertainty. Some past and near-term events, such as CO₂ emissions, budgeted capital expenditures and emissions control costs, are relatively easy to measure using a variety of techniques for purposes of management control, budgeting, insurance, or financial disclosure. Other near-term events, such as contingent environmental liabilities, mature asset retirement obligations, asset impairments, and near-term extreme weather risks, are more difficult to measure, but for reasons other than the intervening time until their occurrence. Events that are far distant into the future, such as long-term climate-related risks and opportunities, as well as energy-related asset retirement obligations that are not expected to mature for 30 years or more, are inherently uncertain and impossible to measure with a high degree of certainty or a single point estimate. When attempting to measure the potential financial impacts of such distant events, the objective is not to predict what will happen but to plan for what might plausibly occur.



The introduction of scenario analysis into climate-related financial disclosure means that strategic planning and financial reporting objectives and responsibilities now overlap.

Accounting for an Uncertain Future

Since the enactment of the U.S. Securities Exchange Act of 1934, financial reporting and securities analysis based upon such reporting have not fundamentally changed in the sense that the focus has largely remained on historical data compiled in accordance with generally accepted accounting principles, supplemented by management's near-term financial projections.

Until the early 1970s, the SEC banned disclosure of forward-looking information, based primarily on the perception that such information was inherently unreliable, and that unsophisticated investors would place undue emphasis on such information in making investment decisions. Firm managers also opposed forward-looking disclosures out of concern that predictions or statements of opinion could be considered to be "facts" which later could be said to be false or misleading for purposes of liability under the securities laws. Some preparers have raised similar concerns about the TCFD's recommendations. The SEC now allows properly caveated forward-looking disclosures, and analysts report that they view management's near-term performance projections to be critical to their own forecasts of a company's future performance.

Climate change has forced a reconsideration of whether backward-looking financial disclosures and near-term financial forecasts are sufficient to properly price stocks and bonds. Investment firms are now developing tools to estimate potential future climate-related impacts to company profitability, cash flows, and capital expenditures that can then be used to feed discounted cash flow and other equity valuation models. Credit ratings agencies such as S&P Global are gearing up to use the same information to determine whether climate risks have a material impact on credit risk.

The FSB's view that firms need to future-proof their organizational strategy against climate-related financial risks and publicly disclose information sufficient to allow others to independently assess their progress and capabilities calls for a new type of forward-looking accounting. There are two primary fields of accounting—financial accounting and managerial accounting (also called management accounting). Financial accounting is the field of accounting concerned with external reporting of an organization's financial

condition and results of operations in accordance with generally accepted principles and standards. Managerial accounting is the field of accounting concerned with managerial decision making within an organization.

While managerial accounting is primarily forward-looking, financial accounting mostly looks backward. Recently, however, financial accounting has been evolving away from a purely historical orientation, as evidenced by the ongoing shift from historical cost to fair value. With historical cost accounting, assets and liabilities are forever listed on a company's financial statements at the price at which they were purchased or assumed. Today, many assets and liabilities are instead listed at their current market price in what is called "fair value" or "mark to market" accounting. When there is no active market and thus no current market price, fair values are estimated using models, a practice known as "mark to model" accounting. Instead of locking in historical transaction values, fair value accounting reflects market participants' current expectations about the future.

What we call future accounting is the opposite of historical cost accounting and an evolution of mark to model accounting. Future accounting is an emerging subfield of both financial and managerial accounting. Its defining characteristic, and what differentiates it from other accounting practices, is the presentation of forecasted financial information as probability distributions rather than single point estimates in order to illustrate potential future financial performance under a range of different scenarios.

fu·ture ac·count·ing

/fyooCHər əkoun(t)ɪŋ/

noun

- 1 the action or process of forecasting potential future financial outcomes as probability distributions rather than single point estimates in order to illustrate performance under a range of different scenarios.
- 2 a subfield of managerial and financial accounting concerned with decision-making under conditions of uncertainty

Future accounting falls into the category of what the International Accounting Standards Board (IASB) calls “other” financial information, or “information intended to complement the financial statements by providing insight into the company’s strategy for creating shareholder value over time, its progress in implementing that strategy, and the potential impact on future financial performance not yet captured by the financial statements” (see [IASB Staff Paper on Wider Corporate Reporting](#)). Rather than estimating the value of existing assets and liabilities, future accounting uses techniques such as scenario analysis to measure possible future asset and liability values under a wide range of plausible future operational, market and regulatory conditions.

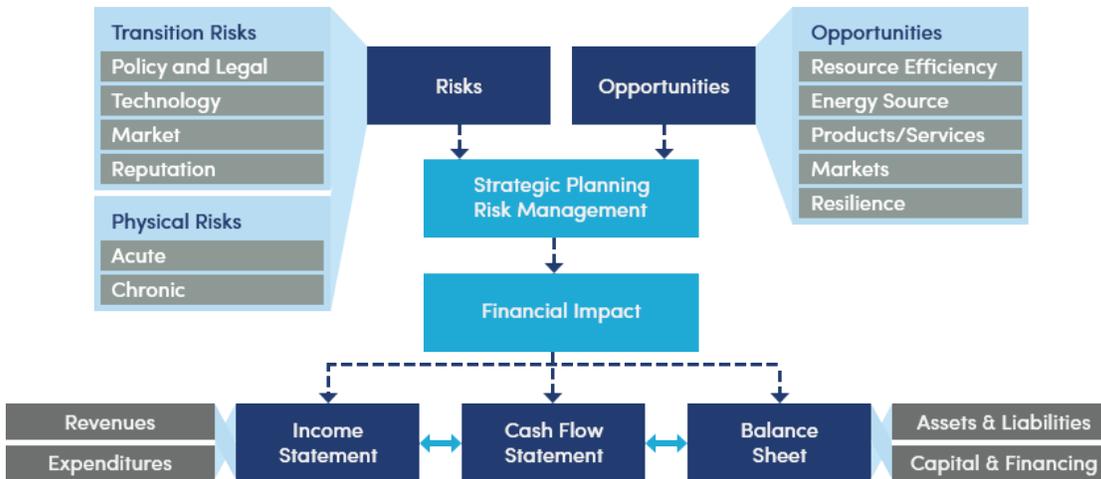
Future accounting and related financial disclosures are concerned with better decision-making under conditions of extreme uncertainty on the part of firm managers (preparers) and existing and potential investors, lenders, and other stakeholders (users). Firm managers can and should use future accounting as a type of managerial accounting to build and maintain a climate-resilient business model. To fulfill the objectives of the FSB, however, firms must also disclose information sufficient to enable financial institutions and other relevant stakeholders to assess the resiliency of a firm’s climate strategy and manage and price climate-related risks accordingly. When external disclosure is necessary or appropriate, for example as recommended by the TCFD, future accounting moves closer to financial accounting, but without a prescribed set of generally accepted principles and standards.

Creditors and investors bear climate-related risks that are derivative from the risks faced by their borrowers and portfolio firms. Accordingly, they must depend in part on financial disclosures of others to inform many of their climate-related financial decisions.

Forward-looking climate-related financial disclosures reflect the climate strategy of preparers and inform the financial decisions of users. This is why we say climate strategy and disclosure are about the same thing—making better decisions under conditions of extreme uncertainty.

In the climate context, future accounting is concerned with mapping climate risks and opportunities to potential future financial outcomes. Figure 3 from the TCFD implementation annex (reprinted below) illustrates how climate-related risks (transitional and physical) and opportunities map to an organization’s future balance sheet, income statement and statement of cash flows.

Climate-Related Risks, Opportunities, and Financial Impact



Future accounting includes but is not limited to scenario analysis. It’s a disciplined effort to measure potential future outcomes in terms that financial statement preparers and users can use to make financial decisions under conditions of extreme uncertainty. Future accounting is about accounting for the future. It may also be the future of accounting.

New Policy Considerations for Financial Reporting

Forward-looking climate-related financial disclosures present firm managers and board directors with several new important financial reporting policy considerations. The most important include how to assess the materiality of climate risks, the extent to which climate-related financial information must or should be independently audited, and whether to use independent specialists in the preparation of financial disclosures derived from actuarial models.

The first policy consideration is materiality and how to assess it. Most information included in the financial filings of listed companies is subject to a materiality assessment. Typically, this involves consideration of facts and their relevance to “reasonable investors”. Where, on the other hand, the matter is contingent or speculative in nature, as is the case with climate risk, the assessment of materiality is more difficult. Management must establish policies and procedures for determining if potential climate-related financial impacts are material, as defined under applicable financial reporting regulations. The outcome of this assessment will determine whether disclosure of potential financial impacts in the organization’s regulated financial filings is mandatory or optional.

We suggest a simple, objective criterion for assessing the materiality of climate risk to an organization: If firm managers use climate-related scenario analysis to optimize organizational strategy, they should consider climate risk *ipso facto* material to investors. Simply stated, if climate risk is significant enough to affect an organization’s strategy, it’s material. Conversely, if management determines that climate risk is not material to the organization, it should explicitly say so and why—comply or explain. From the organization’s silence, investors can reasonably infer that management is not using best practice to plan for potential climate-related financial impacts, which will tend to undermine management’s credibility, along with the company’s investor base and stock price.

The second policy consideration is assurance. Because it measures events and conditions that have not yet occurred and do not yet exist—and therefore cannot be independently verified—future accounting should be approached with skepticism by investors and firm managers alike. To be considered reliable, future accounting must be mathematically rigorous, objective, defensible, reproducible and auditable. If reported to investors, future accounting information can’t be selective disclosure in the guise of statistical analysis. It must instead reflect management’s best effort to plan for a highly uncertain future. Depending on the jurisdiction and the location of disclosure, this type of forward-looking financial information may be subject to mandatory audit requirements. Regardless, to be effective in meeting the FSB’s objectives, future accounting must be deemed reliable by investors and regulators, and to be considered reliable, it must be independently verified.

A third policy consideration concerns the use of specialists. Future accounting involves mathematical programming and actuarial modeling and should be prepared by persons having the requisite competence, capabilities and objectivity. When organizations lack

qualified internal resources, audit standards require that management retain a qualified expert. In the financial auditing vernacular, a “management’s expert” or “specialist” is an individual or organization possessing expertise in a field other than accounting or auditing, whose work in that field is used to assist the organization in preparing its financial statements and disclosures. Such experts include, but are not limited to, actuaries, appraisers, engineers, environmental consultants, and geologists. Matters relevant to evaluating the competence, capabilities and objectivity of a management’s expert include whether that expert’s work is subject to technical performance standards or other professional or industry requirements, for example, ethical standards and other membership requirements of a professional body or industry association, accreditation standards of a licensing body, or requirements imposed by law or regulation (e.g., actuary accreditation). When evaluating the objectivity of an expert engaged by the reporting entity, actual or perceived conflicts may create threats to the expert’s objectivity. See International Standard on Auditing (ISA) 500 and ISA 620 and PCAOB AU Section 336. As the TCFD recommendations become mainstream, we anticipate that independent, multi-disciplinary teams, including actuaries, statisticians, accountants, attorneys and environmental experts, will play an important role in the preparation and disclosure of forward-looking climate-related financial information.

EXISTING TOOLS

NEW APPLICATION

Making better decisions under conditions of uncertainty isn't just good climate strategy. It's good strategy. This explains why large, global insurance companies, banks, insurers, investment managers, pensions and corporations widely use scenario analysis in strategic planning and risk management today, and have for decades.

Scenario analysis is a component of what is now commonly known as “decision analysis,” which refers to a systematic, quantitative and interactive approach to decision-making under conditions of uncertainty. Given the long time horizons and the uncertain nature, probability and magnitude of climate risk, decision analysis is a particularly useful, and we would argue a necessary, tool for building a climate-resilient strategy.

The strategic planning and analysis departments of many large companies are accustomed to using decision analysis to inform strategy based on consideration of a broad range of uncertain future costs, prices, and growth, interest, and exchange rates. For example, to assess their risk exposure and to price insurance policies, insurers and reinsurers routinely use stochastic scenario generation systems as a component of multi-period, multi-objective asset and liability planning, analysis and modeling of alternative management strategies (see, e.g., [Financial planning via multi-stage stochastic optimization](#) and [Applying CVaR for Decentralized Risk Management of Financial Companies](#)).

Integrated optimization systems designed to reduce enterprise risks and increase total profits go by several names, depending upon the application area. In banks and pension plans, such systems are commonly called Asset and Liability Management, whereas they are often called Enterprise Risk Management (ERM) and Dynamic Financial Analysis (DFA) for non-financial and insurance companies, respectively. Other names include

Risk Based Capital Management (RBCM), and Total Integrated Risk Management (TIRM).

Although there are variations, most of these systems have three major components or modules: (1) a multi-period scenario generation module for estimating the uncertainties; (2) a simulation modeling the entity's position over time; and (3) a dynamic optimization module. These components are in wide use today, and each can be modified to integrate climate-related planning and analysis.

Einstein said that things should be as simple as possible, but no simpler. With multi-period, multi-objective asset and liability modeling under conditions of uncertainty simulated by stochastic scenario generation, it is possible to:

1. See the results of a single scenario (e.g., a single 2°C “what if” scenario analysis);
2. See the results of the large perturbation of a single variable (a “stress test”);
3. Calculate Value at Risk at any given time to a simulated perturbation or market change;
4. Determine the results of a series of alternative management strategies (analysis of strategies); and
5. Determine the optimal management strategy over time (i.e., determine “what’s best”); and
6. Provide robust statistical distributions to evaluate 1-5 and properly assess the probability and severity of almost any “event” for insurance or reinsurance purposes.

Simpler models (e.g., an asset only model, a single period model, a single scenario model, a single objective model, or a single strategy model), are designed to produce 1, 2 or 3 above, but no more. Yet, 5 and 6 are what every fund manager, insurance company executive and corporate CEO/CFO want to know.

This does not require reinventing the wheel. Actuaries have built economic scenario generation models that are used for financial and risk modeling and regulatory compliance by corporations, insurers and reinsurers. Willis Towers Watson's [STAR ESG](#) software is an example. Financial regulators and auditors already use and rely upon the results of such systems. These scenario generation systems can be modified to incorporate one or many climate change scenarios. Similarly, existing ERM frameworks can be informed and improved by incorporation of climate-based scenarios, simulations and management strategies.

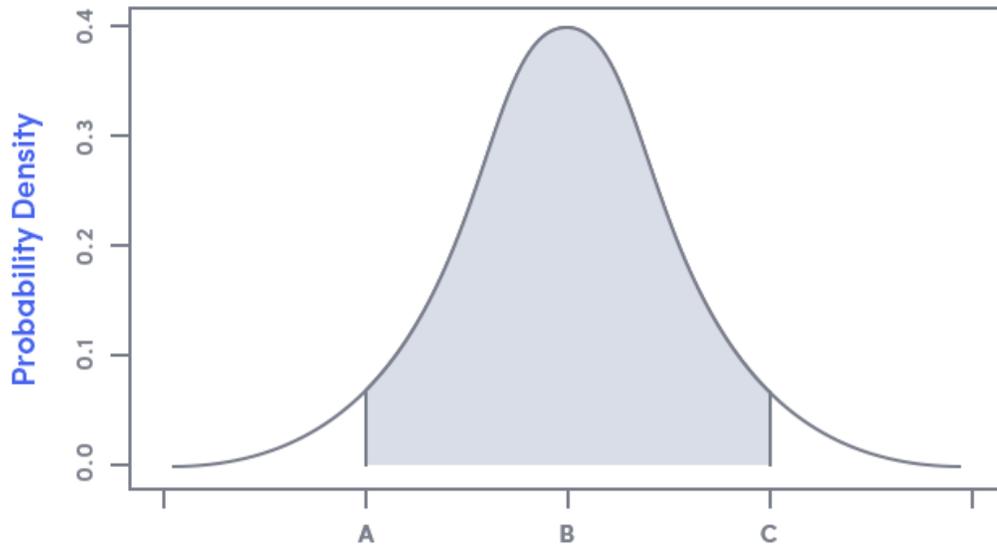
From Strategy to Disclosure

Corporations are exposed to some degree of climate risk whether they like it (or acknowledge it) or not. Management therefore has a responsibility to assess the organization's climate risk exposure and determine how to best manage it (mitigate it, transfer it, avoid it, accept it, or a combination of all or some of the four). This is nothing new. Climate risk is simply another aspect of enterprise risk management. What is new is the expectation that firm managers should disclose the results of the organization's climate-related analysis and planning, including management's plans for execution of its preferred strategy after consideration of the array of future uncertainties.

Having integrated climate-related criteria into its optimization systems for strategic planning and analysis, management will be well positioned to achieve three important objectives of climate-related financial disclosure: (1) demonstrating to investors that management is undertaking the appropriate steps to build and maintain a climate-resilient business model; (2) providing decision-useful analysis of potential future climate-related financial impacts; and (3) building confidence in the company's ability to mitigate climate-related risks and create sustainable, long-term shareholder value. See [Grading Exxon's First Climate Risk Assessment](#).

For example, instead of reducing uncertainty to a base case scenario that management believes is more likely than any other or a worst case scenario that it believes will never happen, management can speak to the central tendency of a wide distribution of potential scenarios, as well as fat tail risks and opportunities.

Management can disclose a probability distribution graph similar to the example shown below. In this way a company can say to its investors, as insurers often state following a loss resulting from an insured event, “Our best estimate of the result of event X is a loss of B with a 90% probability of the range of that loss being between A and C.”



PROBABILITY DENSITY GRAPH

Most importantly, management can provide an explanation of the optimal strategy selected to minimize the adverse impact of climate risk and maximize the company’s opportunity of economic success.

NEW GOVERNANCE RESPONSIBILITIES

As explained by BlackRock's Larry Fink, investors' increasing use of index funds is driving a transformation in fiduciary responsibility and the wider landscape of corporate governance. Active fund managers can choose to sell the securities of a company if they are doubtful about the company's strategic direction or long-term growth prospects. Index fund managers cannot express their disapproval by selling the company's securities as long as that company remains in the relevant index.

In this sense, index investors are the ultimate long-term investors—providing patient capital for companies to grow and prosper. As a result, the responsibility and motivation of index fund investors to engage on governance issues is more important than ever.

Enter the TCFD. Since releasing its recommendations in June 2017, the TCFD has received strong support around the world. Among those publicly endorsing the TCFD are many of the world's largest index fund managers, including BlackRock, Fidelity, Vanguard and State Street.

Public support for TCFD by institutional investors and index fund managers implies more than a call for nonfinancial firms to comply. The TCFD's recommendations explicitly apply to financial as well as nonfinancial firms, and include supplemental disclosures for banks, insurance companies, asset owners and asset managers, that will require them to collect and review TCFD disclosures from their borrowers, insureds and portfolio companies. By voluntarily committing to adopt the TCFD recommendations for their own reporting, large financial institutions are sending a strong market signal for

nonfinancial companies to follow suit.

Full engagement by the board and management in climate strategy, risk management and performance monitoring are indicators to fund managers of a company's ability to create sustainable long-term value. Accordingly, the TCFD recommends that firms disclose the organization's governance around climate-related risks and opportunities, including a description of the respective roles of the board and management in the oversight, assessment and management of climate-related risks and opportunities. In describing the board's oversight of climate-related issues, the TCFD recommends that firms disclose the following information:

- processes and frequency by which the board and/or board committees (e.g., audit, risk, or other committees) are informed about climate-related issues;
- whether the board and/or board committees consider climate-related issues when reviewing and guiding strategy, major plans of action, risk management policies, annual budgets, and business plans as well as setting the organization's performance objectives, monitoring implementation and performance, and overseeing major capital expenditures, acquisitions, and divestitures; and
- how the board monitors and oversees progress against goals and targets for addressing climate-related issues.

In describing management's role related to the assessment and management of climate-related issues, the TCFD recommends that firms disclose the following information:

- whether the organization has assigned climate-related responsibilities to management-level positions or committees; and, if so, whether such management positions or committees report to the board or a committee of the board and whether those responsibilities include assessing and/or managing climate-related issues:
- a description of the associated organizational structures;
- processes by which management is informed about climate-related issues; and
- how management (through specific positions and/or management committees) monitors climate-related issues.

The TCFD's final report gives examples of "climate-related issues" to be considered by the board and management. These include different types of climate-related risks and opportunities along with their potential financial impacts (See Tables 1 and 2 in the TCFD's final report). In addition to becoming familiar with the organization's specific

climate-related risks and opportunities, firm directors and managers should also stay abreast of emerging issues and best practices in climate strategy, disclosure and governance, as summarized in the following table.

EMERGING CLIMATE-RELATED GOVERNANCE ISSUES

Board Responsibilities	Climate-Related Issues
Approve the corporate strategy	Best practice for strategic planning and analysis under conditions of extreme uncertainty; integration of climate-related uncertainties into existing strategic planning systems and processes
Test business model and identify key performance measures	Resilience of the organization's business model to climate-related transition and physical risks; channels by which climate strategy, risk management, performance and governance impact equity valuation and credit risk models
Identify risk areas and oversee risk management	Climate-related risks and opportunities relevant to the organization; integration of climate-related risks into existing enterprise risk management and internal control processes; best practice for assessing the financial materiality of climate risk
Plan for and select new executives and board members	Climate-related competencies of board, relevant committees, and management; capability and willingness of senior executives to engage with fund managers on climate strategy and disclosure
Design executive compensation packages	Best practice for incorporating climate and ESG criteria into executive compensation
Ensure the integrity of published financial statements	Best practice for preparation, management certification, attestation, and disclosure of climate-related financial information
Approve major asset purchases	Best practice for measuring risk-adjusted returns on capital investments taking into account environmental and climate-related risks
Protect company assets and reputation	Exposure of corporate assets to acute and chronic changes in climate patterns; importance of the organization's ESG profile to its reputation with existing and prospective investors, employees, customers, suppliers and regulators
Represent the interest of shareholders	Evolving attitudes of institutional investors about ESG and climate-related criteria
Ensure the company complies with laws and codes	Best practice for enterprise risk management and internal control over financial reporting with regard to environmental and climate-related risks

CONCLUSION

Climate-related financial disclosure is moving to the forefront as an urgent business issue. The climate-related disclosures most important to the decision-making processes of financial statement users are those derived from an organization's strategic planning processes. In this sense, climate strategy and disclosure are about the same thing—making better decisions under conditions of extreme uncertainty.

The wide acceptance of the TCFD's recommendations by large index fund managers indicates that financial statement preparers are now expected to begin future-proofing their organizational strategies against climate-related financial risks and begin publicly disclosing information sufficient to allow financial statement users to independently assess their progress and capabilities. This will require new forms of financial information and analysis that we call future accounting. Many global firms use future accounting internally today to reduce enterprise risks and increase profits. These existing systems can and should be extended to consider climate-related uncertainties. The time to prepare for climate strategy and disclosure is now.