BUSINESS

IMPLEMENTING TCFD: STRATEGIES FOR ENHANCING DISCLOSURE

C2ES CENTER FOR CLIMATE AND ENERGY SOLUTIONS

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Since the Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD) put forward a voluntary reporting framework in 2017, a growing number of companies have been working to improve and align public reporting on climate-related risks and opportunities with the taskforce's recommendations. The Center for Climate and Energy Solutions (C2ES) supports the TCFD's recommendations and seeks to enable better and more consistent climate-related financial reporting in the private sector.

C2ES hosted two workshops in early 2019 to further support corporate disclosure efforts, building on three years of work that C2ES has conducted in this space. With these workshops, C2ES sought to help companies translate information gleaned from climate scenario analysis into information that can be used for corporate decision-making. This includes translating information from global climate and energy transition scenario analyses into company-level financial insights. It also includes helping companies assess and disclose the risks and opportunities related to the physical impacts of climate change, including how to demonstrate the financial value of resilience to stakeholders.

This brief identifies best practices, challenges, and lessons learned gathered during these workshops that were held with corporate, government, and other non-profit stakeholders.

KEY INSIGHTS

- **Successful TCFD implementation requires coordination across multiple corporate functions.** With its focus on financial outcomes, the TCFD framework has helped broaden climate change discussions beyond corporate sustainability teams to also include legal, finance, risk management, and systems planning units.
- **Companies can build executive buy-in by broadening the analysis to reveal business opportunities.** Turning TCFD analysis into a business strategy discussion that includes exploration of growth opportunities—not just

a defensive examination of possible risks—helps engage senior leadership teams. With the right support, the TCFD process is an opportunity to develop a comprehensive corporation-wide climate risk initiative.

- **Managing for climate change means translating risks and opportunities into the right business lexicons.** Once climate-related risks and opportunities are translated into business financial terms, management teams can better justify new investments or strategies compatible with various climate futures.
- **To help scope TCFD-related scenarios analyses, companies should conduct broad screenings for physical and transition risk.** Cursory reviews of publicly available data can be used to as a starting point and can guide more in-depth TCFD analysis down the road.
- **Accurate and organized data is the cornerstone of any good TCFD analysis.** Data might include geographic locations of assets and details about investment portfolios, but for many companies this data takes time to compile, refine, and verify.
- **Stress testing modeling outcomes allows companies to better anticipate potential rough points in a transition.** Modelling disruptive transitions using scenario analysis is challenging because most scenarios assume gradual transitions. However, financial impacts are most likely to occur during times of disruption, such as if game-changing technologies emerge or major climate policy is enacted.
- **Stand-alone TCFD reports are not expected by external stakeholders, but may showcase corporate dedication to addressing climate change and help strengthen internal engagement on related issues.** The TCFD recommendations do not suggest companies develop new reports to relay TCFD-related information externally, but some corporate representatives have noted that the process may help engage internal stakeholders and achieve greater buy-in.

CONTINUED CHALLENGES

- **TCFD guidance does not address the overlap and differing needs between the analyses needed to identify and manage transition and physical risk, despite the necessity for companies to consider both.** Additionally, TCFD guidance surrounding physical risk is less robust than for transition risk. As more experts conduct analysis across both types of risk, new tools are needed. Continued information sharing among stakeholders working on these issues is also vital.
- **More work is needed to relay the financial benefit of climate resilience investments.** Resilience can have soft benefits that are realized over a long period of time or prevent damages from climate events, making those benefits difficult to define, measure, and report. Standardization of key resilience indicators across economic sectors is needed, including other qualitative methods of disclosing the value of such investments.
- **Companies need more clarity regarding what constitutes "material" climate risk.** Given the long timeframes associated with climate change, stakeholders still have conflicting ideas regarding the definition of materiality. The task force, regulators and others need to clarify the issue of materiality for companies as it relates to climate change.
- **Companies are struggling to balance shareholder demands for more quantitative disclosures with the range of outcomes and uncertainty that scenario analyses yield.** Thus far, rather than report specific numbers, many companies are opting to report on strategies that are robust under a range of possible scenarios. Going forward, companies and shareholders must develop a shared understanding and tolerance for the uncertainty surrounding any risk quantification.
- **The flexibility of the TCFD recommendations, particularly on scenarios, has resulted in corporate climate disclosures that vary significantly.** Since one of the key goals of the TCFD framework is to enable more comparable and consistent disclosures, greater guidance and standardization is needed on a sector-by-sector basis on how such exercises are conducted and reported upon.

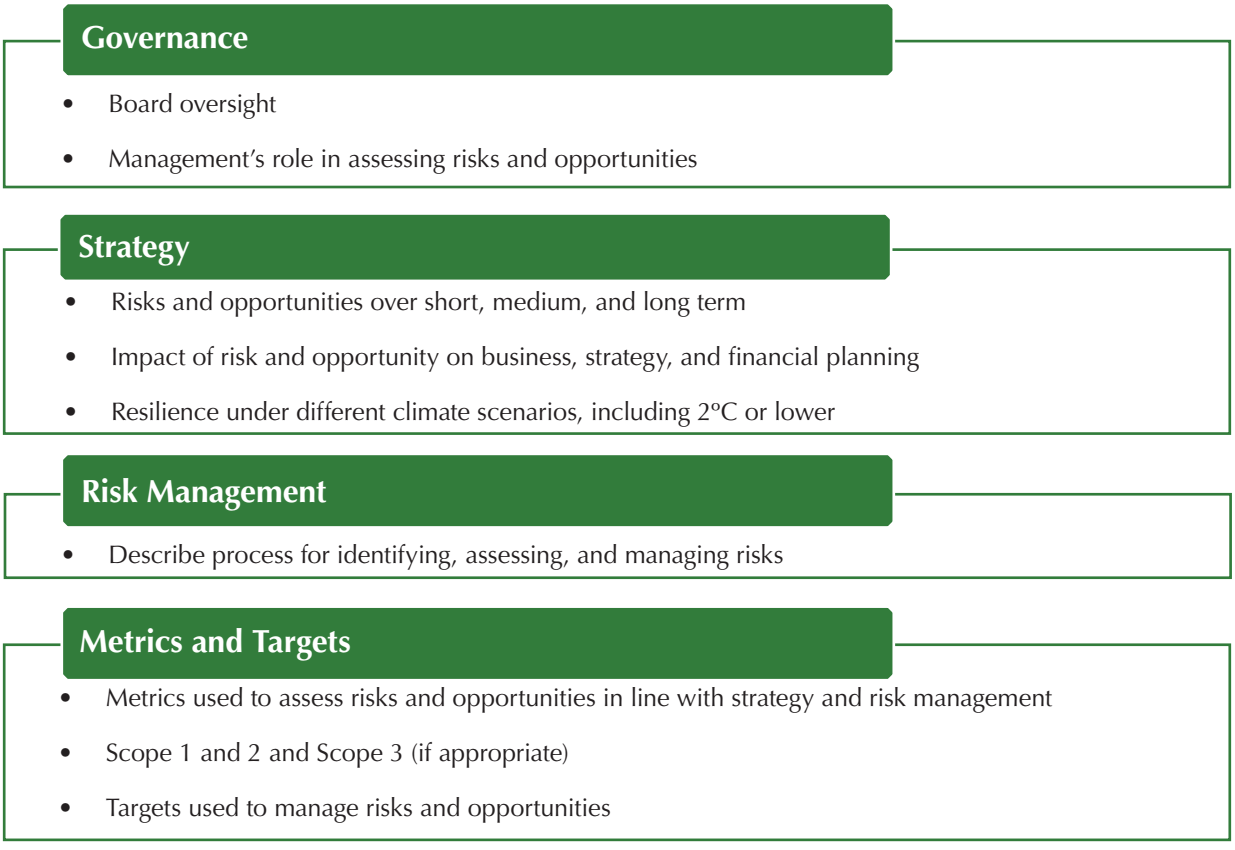
- **Policymakers should also recognize the significant economic risk that small- to medium-size businesses face.** Smaller businesses are often not focused on climate-related risk issues given capacity constraints, and privately held companies do not face the same shareholder pressures that are driving action among publicly traded companies. As such, more technical assistance will be required to engage smaller businesses on this issue.

BACKGROUND

The TCFD was formed in 2015 to develop a voluntary and consistent framework for publicly traded companies to improve the information they provide on their climate-related risks and opportunities to investors, lenders, insurers, and other stakeholders. In 2017, the TCFD issued its recommendations, which focus on corporate governance, strategy, risk management, and reporting of metrics and targets (**Figure 1**).[1] As of September 2019, more than 890 companies and other organizations had expressed their support for the TCFD framework.[2]

C2ES convened several workshops and webinars with companies leading up to the TCFD's recommendations. In September 2017 we issued a report, *Beyond the Horizon: Corporate Reporting on Climate Change*, in which we identified areas where additional support was needed for companies implementing the TCFD's recommendations. One such area included helping companies use scenario analysis to assess climate-related risks and opportunities. Based on these issues, C2ES released a brief in August 2018, *Best Practices and Challenges: Using Scenarios to Assess and Report Climate-Related Financial Risk*.

FIGURE 1: TCFD Disclosure Framework



Source: Task Force on Climate-related Disclosures.

INTRODUCTION

The TCFD recommendations catalyzed the conversation around more sophisticated disclosure of climate-related financial risk. The recommendations also came at a time when a greater number of companies were seeking to better understand their potential climate-related risks and opportunities as some risks have started to emerge and materialize.

WHAT IS CLIMATE RISK?

Climate-related risk encompasses several different types of risk. Transition risk is related to society's responses to climate change and a transition to a low-carbon economy. Those risks include regulatory risk, such as climate laws and policies that can affect how companies do business. Transitioning to a low-carbon economy also creates technology or market risk, related to meeting new demand for climate-friendly technology and services. Companies could also face liability risk if they are seen as contributing to the climate crisis, for example, through litigation that could affect bottom lines and corporate reputation. The chronic and acute impacts of climate change, such as disruptions from powerful storms, wildfires, heatwaves, floods, and droughts, are physical climate risks that companies must address. For example, climate change can affect facilities and operations, supply and distribution chains, employees and customers, while also potentially causing cascading risks through water and energy systems.

The risks faced by different types of companies are unique, thus requiring them to strategically identify their own risk factors or opportunities that could influence their financial well-being. In the United States, only "material" risks are required to be included in financial filings with the U.S. Securities and Exchange Commission (SEC). Materiality is typically defined as information that could affect the decision making of an informed investor. However, many stakeholders are challenging the traditional definition of materiality in the climate context, since most investors take a relatively short-term view of the market. More stakeholders are now considering the long-term financial viability of companies through the multi-decadal lens of climate change. However, as stakeholders press companies for longer-term outlooks, the uncertainty of that information increases. Currently, there is very little guidance available for companies to define materiality under longer timeframes and relay the relative uncertainty of those projections to their stakeholders. The Task Force, regulators, and others need to clarify the issue of materiality for companies.

INVESTORS NEED MORE INFORMATION

The financial community is engaging more proactively to better understand how climate change might affect the value of their investments. From 2012–2018, the number of environmental social and governance (ESG)-focused shareholder resolutions being filed and voted on grew by nearly 50 percent, with climate change being the most common issue among the resolutions being filed.[3] In addition, asset owners are beginning to include climate in their investment screens not only to lower risk, but to enhance returns.[4] This trend is not limited to ESG-investors; mainstream investors and private equity are considering these factors as well. They recognize that smart environmental management can be used as an indicator of strong, long-term strategic management, resulting in greater profitability. As a result, financial institutions such as BlackRock are incorporating climate screens as part of their due diligence process.

Investors often do not have adequate information to separate marketing from actual strategic management action, but disclosures that align with the TCFD framework help to close that gap. That being said, investors are still figuring out how to incorporate climate-related information into their decision making. The investment community still needs to work on articulating how it plans to use this information and what data points are most useful to their analysis. As this is clarified, companies will be better equipped to provide more quantitative data points.

RISING FOCUS ON PHYSICAL CLIMATE IMPACTS

Global experts, including those at think tanks, in academia, and among policymakers, are often more advanced in analyzing scenarios related to transition risk than those related to physical risk. For example, the signing of the Paris Agreement in 2015 signaled a greater likelihood of a large-scale shift toward more stringent climate policy, resulting in a surge of new analysis regarding how different economies might achieve their goals and what impact that might have on corporate investments and individual firms. But as the physical impacts of climate change have materialized in financially significant ways, companies and other stakeholders are

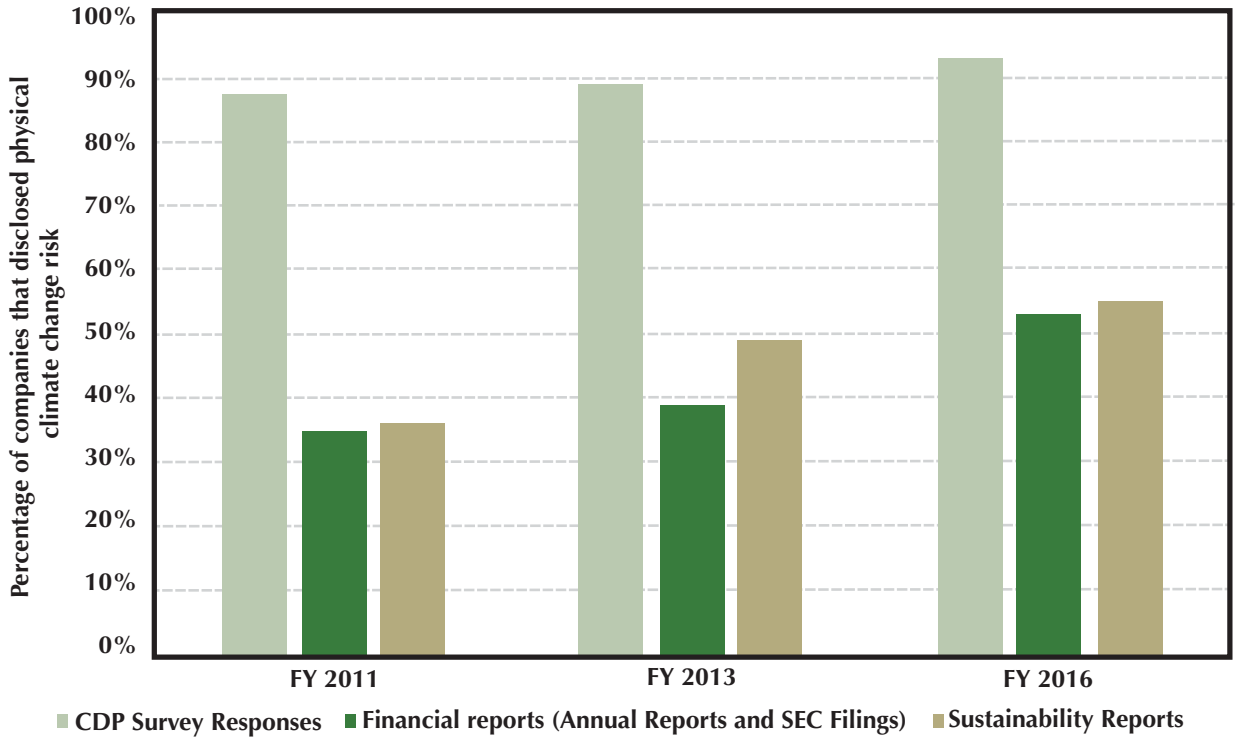
facing new urgency to better analyze, understand, and mitigate against physical risks as well. In a brief including 2018 analysis, *Business Risks, Opportunities, and Leadership*, C2ES reviewed the financial disclosure documents of 98 companies first analyzed for our 2013 *Weathering the Storm* report (companies in the S&P 100 in 2012), and again for the 2015 *Weathering the Next Storm: A Closer Look at Business Resilience* report.[5] Looking across five years of disclosures reveals that the corporations featured in the research are increasingly discussing physical climate risk in their reporting (See **Figure 2**).

Furthermore, rising temperatures are contributing to climate impacts in the form of extreme weather events and disasters that present significant costs to the economy. In the United States in 2017, disaster losses exceeded $300 billion, making it the most expensive year on record. In 2019, the country had 14 billion-dollar weather disasters, which exceeded the previous 3 three-year average of 12 events. These 14 events were more than double the long-term average since 1980. Last year was also the fifth year in a row to have 10 or more separate billion-dollar events per year. Already in 2020, we have had two of these events with losses exceeding a billion-dollars Disaster costs to the federal government make headlines, but we know those costs are also passed to the private sector. Extreme weather events, the failure of climate change mitigation and adaptation, and natural disasters were ranked by the World Economic Forum as the top three risks in terms of likelihood and among the top seven risks in terms of impact for businesses in its 2020 *Global Risks Report*.[6]

GROWTH IN CORPORATE DISCLOSURE

Due to pressure from both external and internal stakeholders, more companies are embarking on climate analysis using the TCFD framework to analyze how climate change may present strategic risks or opportunities that could affect their bottom lines. This type of analysis can help companies mitigate potential risk, but also find new ways to drive value for shareholders and develop new sources of competitive advantage.

FIGURE 2: Share of "Weathering the Storm" Companies that Disclose Physical Climate Risk



A 2018 analysis of 2016 financial disclosure documents revealed that among the 100 companies researched in the original *Weathering the Storm* report, the proportion of companies mentioning physical climate risk in their disclosure documents has risen. The overall acknowledgement of climate risks in at least one disclosure document rose from 90 percent of companies in 2011, to 91 percent in 2013 and to 98 percent of the companies (96 out of 98) in 2016.

WORKSHOP FINDINGS

C2ES hosted two workshops in 2019 to further support corporate disclosure efforts as demand for more nuanced climate-related financial information from investors, lenders, insurers and other stakeholders continues to rise. The focus of this body of work includes helping companies translate information from climate scenario analysis into information that can be used for corporate decision-making and more nuanced financial disclosures. It also covers the challenges of assessing and disclosing risks and opportunities related to the physical impacts of climate change, including how to demonstrate the financial value of resilience to stakeholders. Our findings are organized around broad themes that came up during both workshops: assembling the right team to get started on the TCFD process, screening and assessing risks, conducting scenarios, and relaying results effectively to stakeholders.

GETTING THE TEAM AND TOOLS IN PLACE

The first element of the TCFD framework addresses governance issues—both related to board oversight and management's role in assessing climate-related risks and opportunities. In the 2013 report, *Weathering the Storm*, C2ES identified a four-step process that many companies use to assess and manage climate risks (**Figure 3**).[7] This process continues to apply as companies implement the TCFD recommendations.

Although both C2ES workshops sought to address fairly technical issues related to scenario analysis and assessing physical climate risks, participants noted the importance of embarking on such analysis by building awareness and gaining support from the top levels of an organization. This ensures that climate-related analysis is not just being used to "check a box," but becomes part of a more comprehensive conversation around corporate decision making. In addition, emphasizing potential market opportunities related to climate change and energy transitions can better engage senior staff and leadership rather than approaching the exercise with only risk mitigation in mind (See **Box 1**).

BUILDING A CROSS-FUNCTIONAL TCFD TEAM

With TCFD's focus on financial outcomes, climate change discussions have broadened beyond corporate sustainability teams. Implementing the TCFD recommendations requires coordination among several corporate functions and involves breaking down internal silos in the company by engaging a diverse set of internal stakeholders including the legal, sustainability, risk management, systems planning, and finance, among others. In addition, legal teams must also be engaged, particularly when it comes to reporting. Determining which key stakeholders to engage is one of the first steps of the process.

Developing a firmwide team is one way to coordinate the disclosure process across business units. Members of different business units can bring a better understanding of the importance of specific climate-related issues and how they might affect the company's financial performance—whether it's related to transition risk or physical impacts.

During conversations on translating outcomes from scenario analysis into financial impacts, participants noted that a firmwide team can help bridge the gap between functional priorities on climate change, such as risk management and business strategy. The impacts of climate change are far reaching and long-term, but to plan and develop comprehensive strategies requires communication of those risk and opportunities in business language that can drive action in the near-term. A diverse team can translate climate risks and opportunities into the right business lexicons, allowing corporate leaders to better see the bigger picture and make possible adjustments in shorter term investments or strategies due to longer term climate-related risks and opportunities.

In addition, a firmwide focus can be useful in managing potential risks once they are identified. In conversations we had with stakeholders on physical climate risk, insurance currently is considered a solution to protect assets from the physical impacts of climate change, but a different strategy might be needed over the long term if climate change continues to go unmitigated. Mounting physical risks under a scenario in which global average temperature rises 4 degrees C might lead strategic teams to think about alternatives beyond insurance because such risks might be "uninsurable." This is another reason why creating a cross-functional team across an organization is critical to enabling a thorough TCFD assessment.

SCREENING FOR RISKS

One of the biggest hurdles to corporate management of climate risk is to undertake a systematic assessment of

FIGURE 3: Four Steps for Managing Climate Risk

1 BUILD AWARENESS

A critical foundation for companies taking concrete steps to enhance their resilience is building a clear understanding of the risks associated with extreme weather and climate change.

This effort should reach out broadly across the company to include all people who must be part of an effective response, including senior managers at headquarters, facility managers in the field, enterprise risk managers, and supply chain planners. It should engage all employees and communities that play an important part of planning and response strategies. This outreach effort should address the common misperception that future conditions will be similar to those experienced in the past, and should make clear that climate change is increasing the risks of certain types of extreme weather events and these risks may have significant impacts on the company's bottom line.

2 ASSESS VULNERABILITIES

Companies can build on existing business risks assessment activities to identify the impacts that future changes in the likelihood or magnitude of extreme weather events could have on their operations and facilities.

There is no one single best approach for undertaking such a vulnerability assessment; the research identified a variety of ways of analyzing these changing risks based on the degree of internal expertise and the magnitude of risks. Whatever the particular approach selected, a vulnerability assessment would benefit from including the following considerations:

- A high-level initial screening of potential climate risks across the company, with more in-depth vulnerability assessments of high-risk facilities and operations;
- Forward-looking assumptions about changes in the risk profile of extreme weather and climate change; and
- Information about changes in related factors (e.g., land use, population growth, competition for scarce resources) that could also amplify or alter risks.

3 MANAGE RISKS AND PURSUE OPPORTUNITIES

Once potential impacts are identified, companies must develop plans to prioritize actions to manage these risks and maximize opportunities.

It is critical that companies work across their value chain, and with local governments and stakeholders, to ensure that actions taken will build in an appropriate level of resilience. Specific risk mitigation actions could include:

- Modifying planning and operations;
- Fortifying or relocating infrastructure and facilities;
- Addressing volatility or changes in the supply of key commodities such as water;
- Managing risks within supply chains; and
- Expanding or adjusting insurance coverage.

In better managing the risks of future extreme weather, leading companies have also identified a range opportunities to offer new services or products better suited to a world experiencing more frequent or intense extreme weather.

3 ASSESSMENT AND REVIEW

Leading companies, recognizing that the risks of extreme weather and climate change will evolve over time, are beginning today to develop adaptive risk management planning.

They periodically update their understanding of risks and their responses as new information becomes available and they are fine tuning their resilience strategies and capacities over time.

BOX 1: Reframing from Risk to Opportunity

Reframing TCFD as a business strategy discussion that extends beyond a risk assessment exercise to explore growth opportunities can result in better C-suite engagement. Climate change can provide new market opportunities for many companies, and TCFD can help companies identify new market needs. There are a number of business opportunities related to the changing climate:

- Policy and regulation can catalyze investments in new technologies or climate solutions.
- Strengthening of corporate supply chains can provide competitive market advantages.
- Climate migration to less vulnerable places can create new investment opportunities in those receiving communities.
- For each climate challenge identified, there are opportunities for tech solutions to address them.
- Policies such as carbon pricing may change market dynamics to provide a competitive opening for certain products and services.

vulnerabilities to extreme weather and climate change (See **Figure 3**). In considering potential vulnerabilities, companies should examine their core operations (their own facilities and assets) but also a broader range of potential impacts that, while not directly within their control, could affect their bottom line.[8]

Different types of companies may choose different approaches to conducting a vulnerability assessment, but it should include a process that identifies the facilities and operations at greatest risk; considers scientifically-based, forward-looking assumptions related to the risk profile of extreme weather events and climate change; and incorporates other related factors into the analysis, such as land use, population growth, or competition for scarce resources that could also amplify or alter risks.

Across sectors, most large companies have geographically diverse holdings that are susceptible to different physical and transition risks. Therefore, a high-level screening analysis conducted across the company should consider both types of risks. This step can be done with publicly available data and can help to identify hot spots—either geographically or within an investment portfolio.

FURTHER ASSESSMENT OF PHYSICAL CLIMATE RISKS

Companies should be aware that a hot-spot analysis is only the first step in understanding risk. Even if only low or immaterial risks are found in that screening, more detailed analyses may be needed to better understand how this risk might change over time, including how specific facilities, supply chains and market demand may be affected.

While it is possible to screen risks and obtain high-level insights with little data, a thorough risk assessment requires more data and expertise. For example, publicly available data can be useful to identify hot spots, but uncertainty or gaps in the data need to be explored. For example, much of the physical risk data available from federal and international sources may not have enough granularity or be appropriate for use in corporate risk analysis at the asset-level. Additionally, some data used at the federal level is completely inadequate for informing a corporate risk assessment or risk management decisions. For instance, flood insurance rate maps used by the National Flood Insurance Program identify only flood risk based on historic data. While FEMA is updating its flood risk maps with new data and risk assessment methods, those products currently are not reliable for understanding current and future flood risk for corporate purposes. Specialized climate experts or consultants may be able to provide more detailed analysis of at-risk facilities or business units (See **Box 2**).

When considering physical climate risks, once they have been identified, the next step is to quantify the value of the assets or business at risk. This assessment contains a thorough analysis of several elements. To get started, some companies first consider the risks posed to a single facility or one element of the portfolio as a

pilot and then use lessons from that assessment for other business areas. However, a comprehensive analysis of corporate climate risks and opportunities might involve assessing business continuity plans, supply chain issues, and other complex elements including the resilience of specific assets under different climate conditions (See **Box 3**).

A comprehensive physical risk analysis not only looks at how energy systems might evolve, but also how result-

ing emissions might affect the climate. Beyond macro climate trends, analysts must also determine how such changes might threaten existing facilities or supply chains. Therefore, the data requirements to conduct such analysis is much greater than for transition risk analysis. This includes knowing asset locations, collecting climate data for those locations, overlaying potential risk factors, and considering future climate outcomes.

PREPARING FOR SCENARIO ANALYSIS

Once the scope of the assessment is determined, organizations will often launch into a scenarios exercise as recommended by the TCFD to better assess how potential risks and opportunities related to climate change might materialize under different circumstances. By looking at the long-term future through several different lenses, a scenarios exercise can test a company's performance under a variety of futures to help the management team develop a robust long-term strategy. For more information regarding scenario analysis, see the 2018 C2ES brief, *Best Practices and Challenges: Using Scenarios to Assess and Report Climate-Related Financial Risk*.

ENSURING DATA QUALITY

As organizations prepare for a scenarios exercise, it is important to ensure the data used in the analysis are accurate. The results of a scenario analysis are only as good as the input data, and bad data, bias, and incorrect assumptions could lead to unclear or incorrect conclusions resulting in stakeholder confusion.

SCOPING A SCENARIOS EXERCISE

A variety of approaches are used by businesses to scope their assessments of risks and opportunities as it relates to scenario analysis. For example, in its pilot TCFD analysis, Citi used both a top-down approach, considering sector-level portfolio impacts, and a bottom-up approach to consider borrower-level risks associated with transition risk.[9] Specifically, the company analyzed how transition risk and the physical impacts of climate change would affect its investments in the utility sector, while focusing on only transition risk to its oil and gas portfolio. By comparison, BHP conducted a comprehensive portfolio analysis in 2016 after the Paris Agreement. That assessment considered transition risks that affected all commodities in their portfolio, including coal, iron ore, oil, gas, and uranium assets among others. Although this report focused on the impacts on the company's portfolio under a central scenario, it reviewed its asset performance under a range of scenarios and also stress tested certain elements to shock events.[10] Another company, Entergy, a utility headquartered in New Orleans, reported on the risk and opportunities for both physical and transition climate-related risks in its 2019 *Climate Scenario Analysis* report.[11]

SETTING AN ANALYTICAL GOAL

Prior to launching into a scenarios exercise, it is useful for the firmwide team to agree upon the purpose of the analysis, such as what questions need to be answered, the scope of the assessment as well as how any outcomes may be used. This will help the analytical team develop

BOX 2: Engaging External Experts

Companies expressed that especially in earlier rounds of implementing the TCFD recommendations, they relied on external firms to do both the high-level risk screening and the more detailed analysis needed to quantify those risks most likely to be material. These experts often include legal firms, consultants who use econometric models to assess complex issues, experts who can help translate climate models into risk models, and scientific research firms for climate data analytics.

Climate modeling is one area where external expertise is often needed, since it requires expertise in translating climate information into risk models. As such, many companies rely on external climate analysis firms that can employ modeling techniques to consider risks and local exposure of risk for physical assets and properties, then scale up that analysis to look across portfolios of investments or real estate and supply chains. The past few years have seen a proliferation of private consulting firms with climate modeling expertise ready to help companies conduct more granular scenario exercises to analyze physical impacts.

BOX 3: Measuring the Benefits of Climate Resilience

Companies have decades of experience measuring and pricing risk. Physical climate risks are measured by the value of assets that are exposed to different climate events and the likelihood of those events happening. But resilience is difficult to define, measure, and report. As companies reduce risk and build resilience, those decisions will yield soft or long-term benefits, which are challenging to demonstrate to shareholders and others.

There are a growing number of examples of how companies, utilities and cities have measured resilience benefits. Utilities have used "power outages avoided" and the associated savings as a measure of resilience. These benefits can then demonstrate positive return on investment. As companies get better at quantifying their climate risk, they should also develop methods to disclose the value of their resilience investments. The co-benefits of actions taken to manage physical risk can also be described, at least qualitatively, to shareholders. For instance, green infrastructure often has higher upfront costs, but as it relies on vegetation that grows over time, it can maintain its value and function for longer than traditional infrastructure options.

Local and federal government examples of resilience metrics can inform further progress on developing resilience metrics for the private sector. Companies should define a set of characteristics that embody resilience and develop indicators or metrics to show they are meaningfully pursuing resilience in line with those characteristics. Examples of these indicators could include percentage of real estate holdings in flood zones for banks or asset managers and deployment of wildfire or flood-ready building codes in new construction. Industry-wide resilience indicators can help shareholders, regulators, and others evaluate how prepared a company is for the climate risks they face.

A related theme emerged at the workshops—in addition to disclosure and transparency, there should be more rewards for private-sector resilience action. These incentives can be offered by local or state governments, for instance through tax incentives to build resiliently. Incentives can also be offered by the finance and insurance sectors through lower premiums or rates on loans if a structure or program follows resilient guidelines. An existing example of an insurance incentive is a USAA discount offered to homeowners living in communities that participate in Firewise, a program that requires risk assessments, an action plan to reduce wildfire risk, and demonstrated risk reduction actions.[12]

Resilience metrics are needed for companies to evaluate their own resilience, prioritize the strategies that reduce risk effectively, and inform policymaker and shareholder decisions.

appropriate parameters for the analysis and determine if outside experts are needed.

CHOOSING SCENARIOS

A robust TCFD analysis will employ a number of scenarios, even if the results of only a couple are disclosed. No single scenario is expected to prove correct when considering outcomes associated with timeframes that go out decades. Therefore, exploring a range of scenarios, including various scenarios that meet a 2-degree target, as well as those that do not, will give companies a better sense of potential risks and opportunities. Companies may also start their process by analyzing two extreme scenarios as "bookends" to better understand the range of conditions that might affect company operations and the organization's financial health.

A number of companies we spoke with mentioned that investors are requesting use of common or widely available reference scenarios, such as those developed by the International Energy Agency (IEA) to assess transition risk. While companies should be responsive to investor requests, those scenarios may not always be the most informative as the basis of a company's scenarios exercise. They may consider adapting publicly available reference scenarios to more closely align with their particular circumstances. Companies should consider the merits and trade-offs associated with the scenarios they choose to use in their analysis and be prepared to defend those choices to their stakeholders.

When choosing scenarios, it is just as important to understand the assumptions of those scenarios as well as the areas of greatest risk exposure (See **Box 4**). Together, those elements can guide companies toward suitable scenarios that test the strength of their businesses against different climate risks and opportunities.

CHALLENGES WITH TRANSITION RISK ANALYSIS

The outcomes from transition risk analysis are greatly influenced by the assumptions embedded in the scenarios used to conduct it. Those assumptions could be related to policy expectations or technology advances in certain sectors. These factors can be challenging to analyze given the uncertainty around how they might develop over coming decades. As a result, it is often difficult for companies to translate outcomes into concrete financial terms.

In addition, climate-related financial risk is most likely to materialize during times of disruption. However, most models assume smooth transitions in policy and technology transfer. Therefore, companies should explore ways to stress test the outcomes of their models to better anticipate potential rough points in a transition.

TCFD REPORTING

Climate disclosures allow companies to tell their stakeholders how they are working to manage climate-related risks and capitalize on the opportunities that arise. This includes demonstrating how their strategies perform under various scenarios.

WHERE AND HOW TO REPORT OUTCOMES

Although communication is the last step, companies should consider how they might communicate outcomes with their stakeholders prior to embarking on the analysis. While material risks are expected to be disclosed in financial filings, most companies will still want to relay even non-financially material outcomes to 1) internal stakeholders to inform strategic thinking and 2) external stakeholders to relay how the analysis is guiding their risk management strategies. External communication is particularly important for companies operating in sectors most vulnerable to climate or transition risk. Public disclosure of scenarios outcomes is typically expected; therefore, companies should involve their legal teams early in the process to help guide scoping and reporting parameters.

Determining the breadth of disclosure is a key challenge area for companies implementing the TCFD recommendations. Some companies have concerns about opening potential legal liability once a risk has been disclosed or relaying strategic information that may be considered confidential. However, not all information obtained through the TCFD process is expected to be fully disclosed. In order to ensure the integrity of the messaging associated with public TCFD disclosures, many companies we spoke with mentioned relying on trusted partners to echo and relay their messaging to other external stakeholders.

There are multiple ways in which companies might choose to share the results of their analysis. In some cases, a standalone TCFD report that fully lays out how a company has followed the framework might be the most appropriate means of delivering this information. Several companies noted that preparing an external report helped demonstrate to external stakeholders their dedication to addressing climate change, but it also helped to build internal buy-in, strengthening the exercise. In addition, some corporate representatives noted that upon seeing the final delivered product, more internal stakeholders were interested in becoming involved in the process, which will likely enhance the next analysis.

However, for many companies, current reporting structures offer ample opportunity to describe outcomes from a TCFD process. This could include disclosing any material risks in financial filings, discussing the use of scenarios to stress test strategies in a corporate sustainability report, and reporting relevant metrics and targets through another third party. It is up to each organization to determine the information needs of stakeholders and choose the appropriate vehicle for delivering the outcomes of their TCFD analysis.

FRAMING UNCERTAINTY

As we identified in the 2018 scenario analysis report, the TCFD framework provides flexibility around how companies report outcomes from scenario exercises. Many companies are still challenged to translate climate risks or opportunities into future financial outcomes. As such, most companies describe what variables they stress-tested through the scenario exercise, identify the range of uncertainty considered, and report how they use those outcomes to inform their strategic management process.

However, as stakeholders ask for more quantitative outputs of scenario analyses, such as estimates of property of risk, companies must consider how to communicate the outcomes of different scenarios, including the uncertainty surrounding specific numbers. In addition, they should take into account that typically, a more granular analysis yields a greater margin of error, which should be shared with stakeholders. Companies, shareholders, and policy makers will benefit from establishing a shared understanding and tolerance for the uncertainty surrounding risk quantification and a standardized process to guide companies.

In the meantime, companies should look for ways to relay strategic options that are robust within a range of uncertainty, rather than focusing on the outcomes generated through one particular scenario. Companies can also enhance their reporting by sharing information such as conducting a what-if analysis on certain elements of the exercise to support findings. By focusing on a range of outcomes, stakeholders will gain a stronger understanding of a corporation's financial resilience under different policy and climate science factors. Likewise, by developing robust strategies that allow for flexibility within a certain frame of uncertainty, businesses will be prepared regardless of how the climate crisis or energy transition unfolds.

CONCLUSIONS

Much progress has been made by corporate entities over the past couple of years to enhance climate disclosures using the TCFD recommendations, but there is still more work to be done. Analyzing and understanding climate impacts requires iterative work and coordination among industry players to support greater consistency with how related risks and opportunities are being disclosed.

One of the greatest issues that emerged in our workshops was related to companies seeking to assess both physical and transition risks but lacking a holistic framework to analyze them together. TCFD guidance does not address the overlapping and differing needs between the two types of analyses, despite the necessity for companies to consider both. Additionally, TCFD guidance surrounding physical risk is less robust than for transition risk. As more experts conduct analysis across both types of risk, new tools are needed.

Likewise, more work is needed to relay the financial benefit of climate resilience investments. Resilience can have soft benefits that are realized over time or prevent damages from climate events, making those benefits difficult to define, measure, and report. Standardization of key resilience indicators across economic sectors is needed, including other qualitative methods of disclosing the value of such investments.

As a broader concern, companies noted a lack of clarity around how various stakeholders define material risk, particularly over long timeframes such as those associated with climate change. Material financial risks are often viewed through a relatively short-term lens; therefore, regulators, such as the Securities and Exchange Commission, should more closely consider potential systemic impacts and design frameworks that help to clarify these issues for data preparers.

With growing demands for climate disclosures, companies will have to determine how to best respond to increasing requests for quantitative outputs of scenario analyses. This is challenging given that any measurement of risk, especially based on future scenarios, has uncertainty. Longer term, greater standardization in the approach to scenario analyses is needed and should be considered on a sector-by-sector basis. Industry groups are best positioned to lead these discussions and could play a helpful role in aligning the structure of scenario exercises and related disclosures.

The flexibility of the TCFD recommendations has resulted in corporate disclosures that vary significantly. Since one of the key goals of the TCFD framework is to enable more comparable and consistent disclosures, greater guidance and standardization is needed on a sector-by-sector basis on how such exercises are conducted and reported upon. Continued information sharing among stakeholders to better identify and report on climate-related risks and opportunities is vital to achieving this goal.

Lastly, policymakers should also recognize that significant economic risk may be associated with small- to medium-sized businesses. Given that many of these businesses are critical to larger, corporate supply chains, the participants at our workshops noted this as an important segment of the economy to engage on climate risk and resilience. Smaller businesses are often not focused on climate-risk issues given capacity constraints and lack of shareholder pressure. As such, more technical assistance will be required to engage smaller businesses on this issue.

BOX 4: Physical Climate Scenarios vs. Energy Transition Scenarios

Consideration of both transition and physical impact scenarios are relevant for companies when assessing climate-related risks and opportunities.

Scenarios that are focused on meeting a specific warming target tend to be referred to as "transition scenarios." As such, those scenarios tend to focus more on policy ambition required to meet that target. Several organizations, including the IEA, publish a range of scenarios, including ones that meet and do not meet a target of 2 degrees C. Different analytical lenses may be used to explore potential impacts under transition scenarios, including carbon price, energy demand, commodity prices, efficiency technology, policy, macroeconomic, or demographic variables, among others.

Companies should also consider how the physical impacts of climate change might affect their business resilience. "Physical" climate scenarios are based on the outcomes of global climate models, such as those put forward by the Intergovernmental Panel on Climate Change (IPCC). Physical climate scenarios can help companies consider the risk of severe climate change impacts and where and when those impacts might materialize. The IPCC publishes scenarios that focus on the physical impacts, using representative concentration pathways (RCPs), which model different trajectories of carbon dioxide concentrations in the atmosphere. However, one challenge companies have when using these models is obtaining down-scaled data that can be used to accurately assess asset-level impacts.

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ENDNOTES

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2 "TCFD Supporters," Task Force on Climate-related Disclosures, last modified September 2019, https://www.fsb-tcfd.org/tcfd-supporters.

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4 Ibid.

5 Previous *Weathering the Storm* C2ES reports provided a snapshot of the state of resilience planning in multinational companies as of 2011 and 2013. This research relied upon public documents prepared by companies, case studies with companies representing different economic sectors, interviews, and workshops. In 2018, we re-examined public documents from companies to assess how this field of practice has evolved over the last two years. The sample set is the S&P Global 100 companies, as of 2012, with a reduced sample of 98 because of mergers.

We reviewed 4 types of public documents: Responses to CDP questionnaires (climate change, water, and supply chain), SEC Filings (10-K for U.S.-based companies, 20-F for international companies listed in the U.S.), annual reports published by company and sustainability or corporate responsibility reports published by company. We noted mentions of physical climate change risk and climate-related risks. If the report only contains boilerplate language, or did not connect natural disasters with climate change, the mention was not scored for our analysis.

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Other Climate Risk Disclosure publications from C2ES:

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https://www.c2es.org/document/beyond-the-horizon-corporate-reporting-on-climate-change/
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https://www.c2es.org/document/using-scenarios-to-assess-and-report-climate-related-financial-risk/

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