C2ES CENTER FOR CLIMATE AND ENERGY SOLUTIONS

COMMENTS OF THE CENTER FOR CLIMATE AND ENERGY SOLUTIONS

This document constitutes the comments of the Center for Climate and Energy Solutions (C2ES) on the request for input to guide the Securities and Exchange Commission (SEC) on climate-related financial disclosures.

C2ES is an independent, nonprofit, nonpartisan organization dedicated to advancing strong policy and action to reduce greenhouse gas emissions, promote clean energy, and strengthen resilience to climate impacts. We have extensive experience engaging stakeholders on climate-related financial disclosures and have released several publications and hosted public webinars on the subject.

- 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 Taskforce on Climate-related Financial Disclosure's (TCFD) recommendations.
- Based on the findings of that report, C2ES released a brief in August 2018, *Best Practices and Challenges: Using Scenarios to Assess and Report Climate-Related Financial Risk*.
- In April 2020, C2ES released a brief, *Implementing TCFD: Strategies for Enhancing Disclosure*, that describes the themes, lessons, and best practices from two workshops that we held in 2019 on TCFD implementation challenges.
- In April 2021, C2ES launched a new initiative examining how companies in high greenhouse gas emitting sectors can improve their disclosure of transition and physical risks and their strategies for strengthening resilience against these risks. C2ES will host two workshops this summer and release a report in early 2022.

The views expressed here are those of C2ES alone and do not necessarily reflect the views of members of the C2ES Business Environmental Leadership Council (BELC).

Summary

The risks of climate change to ecosystems and vulnerable communities are well-known. Companies are also increasingly recognizing and starting to analyze how climate change could affect their operations. Over the last few years, reporting the risks and opportunities of climate change through corporate climate disclosures has grown in relevance and importance.[1] C2ES has hosted workshops and released publications to further support corporate climate disclosure efforts. C2ES supports leading efforts such as the Task Force on Climate Related Financial Disclosure (TCFD) recommendations and seeks to enable better and more consistent climate-related financial reporting in the private sector. **We believe that the next decade is critical for decarbonizing our economy, achieving existing net-zero emissions targets, and building resilience to physical threats like wildfires and floods. To this end, market participants must have access to consistent, comparable, and reliable information on climate-related risks and mitigation and resilience opportunities to ensure that markets are fair, capital is efficiently allocated, and investors are protected. C2ES supports the development of mandatory climate related financial risk disclosure through the SEC**.

Well-regulated, consistent, meaningful, and comparable climate risk disclosures from companies is urgently needed to provide investors with information that enables them to assess their own material risks and opportunities related to climate change across their portfolios. Yet, critical questions remain on how best to accomplish such disclosures. As such, the SEC should require mandatory climate-related financial disclosure and take the steps needed to standardize a common reporting framework across sectors, develop additional industry-specific reporting standards, address liability questions, and provide companies with the resources and tools they need to disclose information well and in a way that is consistent, meaningful, and comparable.

In preparing its comments, C2ES gathered feedback from its Business Environmental Leadership Council—a group of leading companies across sectors committed to mandatory climate action and supportive of market-based solutions—to assess how to design the process of mandatory climate-related financial disclosures.[2] C2ES sought input on where gaps exist, where industry efforts can contribute to developing disclosure criteria, and where careful consideration is warranted, such as regarding questions of data quality, scenario analysis, and liability. We believe that a flexible and collaborative approach that recognizes the scope and urgency of need, while being informed and responsive to existing limitations, is needed in this process.

C2ES has developed responses to individual SEC questions in line with the following core recommendations. These recommendations are designed to respond to both the evolving context of climate science and policy, and the needs of businesses and investors.

1. **The SEC should immediately begin rulemaking on mandatory disclosure of companies' climate-related financial risks.** The SEC should require public companies' disclosure of financially material climate-related transition and physical risks and their strategies for managing those risks. This should be accomplished through clear disclosure rules for metrics and scenarios that have established use and methodologies, while also referencing both broadly accepted voluntary climate risk frameworks like the TCFD, and existing SEC disclosure rules and regulations that companies are accustomed to following. Through the rulemaking process, the SEC, with stakeholder input from both investors and companies, should develop disclosure requirements that will capture the most material risks and opportunities companies face due to climate change.

2. **The specifics of disclosure requirements should be phased in over time to reflect current availability of data and reporting standards and to allow for the development of new reporting standards or guidance; the SEC should lead a pre-determined stakeholder**

engagement process to regularly convene both investors and companies as best practice emerges. During the mandatory disclosure phase-in, all registrants should still disclose financially material climate-related risks (both physical and transition risks) under existing SEC materiality rules, and the SEC should immediately provide guidance, based on stakeholder feedback, on where and how these disclosures should best occur. C2ES recognizes that greenhouse gas emissions alone do not provide the full picture of risks, but they can nonetheless provide key insights on companies' overall risk and opportunity profiles, and importantly, much of that data is already available. **As such, C2ES recommends requiring greenhouse gas emissions disclosures because greenhouse gas inventories are the most well-developed climate risk-related metrics to date and are critical for investors in investment decision making.** C2ES recommends that the SEC requires registrants over a predetermined size threshold to disclose scopes 1 and 2, and, under certain contexts, scope 3 greenhouse gas emissions (see note on scope 3 emissions below), emissions reduction targets, strategy for managing targets, and interim goals. Mandating such disclosures provides companies and investors with critical data regarding their own climate risks, as well as a company's overall impact on climate change. Reflecting 20 years of industry experience developing corporate greenhouse gas inventories, more than 80 percent of S&P 500 companies currently disclose their scopes 1 and 2 emissions, and approximately 50 percent of companies across sectors disclose at least some categories of scope 3 emissions (however, it is still unclear if all companies' scope 3 disclosures represent the most financially material and/or greatest amount of greenhouse gas emissions in their value chains). Today, over 8,000 companies globally annually disclose their greenhouse gas emissions inventories to CDP, a public data platform, and several more companies disclose their greenhouse gas emissions in their public sustainability reports.[3]

After any greenhouse gas emissions disclosure rulemaking is complete and takes effect (e.g. two to five years after initial rulemaking is undertaken), C2ES recommends that the SEC consider further disclosure rules that reflect the state of market need, policy, and science. The SEC should seek to have ongoing disclosure targets and recommendations be informed by the industry working groups we recommend here, and emerging insights and research from both global regulators and other U.S. financial agencies, such as those convened by Financial Stability Oversight Council (FSOC) and Treasury's new Climate Hub. The SEC could also set consistent indicators intended for all organizations from both financial and non-financial sectors. Indicators should have quantitative and qualitative components and organizations should be asked to provide relevant climate-related metrics as well as disclosure around associated methodology, assumptions, limitations, processes, and controls in place (for further discussion of ensuring reliability and what metrics to include, see questions 11 and 13).

C2ES notes that as they currently exist, financial and non-financial (e.g., annual greenhouse gas inventories) reporting timelines do not align. In considering any reporting requirements, C2ES encourages the SEC to assess disparate reporting timelines while assessing how to develop requirements that reduce unnecessary reporting burdens on companies.

3. **Scope 3 emissions should be required in mandatory disclosures for certain sectors and/or under certain contexts; however, flexibility is needed**. C2ES recognizes that scope 3 emissions need to be assessed to best serve investors and financial institutions, and to provide a total picture of both a company's greenhouse gas emissions and their physical and transition risks related to climate change. For this reason, C2ES supports disclosure of scope 3 emissions, but with several caveats that reflect a range of concerns we heard from stakeholders consulted. We note that supply chain data, overall data quality, and data availability vary greatly depending on company or sector context. To that end, C2ES recommends that the SEC initially remove scope 3 emissions from any assurance

requirements (generally, we recommend phased in assurance requirements). We also recommend that the SEC provide flexibility around disclosure of scope 3 and work with industry and other stakeholders to provide clarity for how, and the extent to which, scope 3 emissions should be disclosed across sectors (see recommendation 4). Options for flexibility that the SEC could consider include:

a. For companies that track and report their scope 3 emissions: report the most material scope 3 greenhouse gas emissions, with noted data sources/estimates.
b. For companies that do not track and report their scope 3 emissions: describe how they estimate their overall scope 3 greenhouse gas emissions.
c. All: How much of a company's total estimated greenhouse gas footprint is from scope 3 emissions?
d. All: How much control does the reporting company have over the reduction of its scope 3 emissions?
e. All: How is the reporting company engaging suppliers/supply chains to reduce the most material scope 3 emissions?
f. All: How does a company's supply chain engagement strategy align with its climate risk and opportunity? This can be part of the strategy disclosure.

4. **The SEC should carefully consider how best to approach scenario analysis and provide guidance on use of scenario analysis.** Scenario analysis is a key tool in evaluating and disclosing climate risks to investors and registrants; further, it offers the ability to test business models and company resilience in a variety of different future policy, market, and temperature scenarios. Scenario analysis by its nature involves uncertainties and assumptions, many of which are dependent on the intersection of physical and transition risks. The SEC should distinguish between transition risk scenarios, which model the impact of policy, technology, and market risks, and can be highly sector specific, and physical risk scenarios, which reflect temperature pathways that often depend on policy and market action and are specific to companies and their supply chains. To that end, the SEC should immediately assess where and how to guide the use and disclosure of scenario analysis, and survey stakeholders about the utility of mandating specific scenarios by sector, including where flexibility is best provided, with input from registrants and investors.

5. **The SEC's disclosure requirements and subsequent stakeholder engagement process should be segmented by industry/sector and could initially focus on those industries/sectors deemed highest risk** (e.g., oil and gas and utilities, property and casualty insurance companies, or commercial real estate exposed to physical risk).[4] The SEC should immediately set up industry working groups where stakeholders can provide recommendations on industry- and sector-level considerations, such as which transition and physical risks should be included, any best practice for greenhouse gas calculation methods, and ongoing feedback on challenges and usefulness of disclosure recommendations. Previous C2ES research has found that industry-level working groups are currently assisting companies in undertaking key practices like scenario analysis.

6. **The SEC should consider safe harbor provisions or liability protections for forward-looking climate disclosures**, including the input assumptions and disclosed results of scenario analysis. Throughout this letter, where we discuss future facing estimations and projections such as opportunities or scenario analysis, we recommend the SEC ensure that these projections are subject to some form of relevant safe harbor or liability protection, to encourage, and not disincentivize, robust disclosure.

7. **The SEC should immediately undertake an internal research agenda focused on relevant topics** such as understanding transition and physical risk disclosures at an industry-level. The SEC could conduct such research from within its Division of Economic and Risk Analysis (DERA), and continue to hire staff with climate science and climate economics experience.

8. **The SEC should immediately engage other key financial system organizations, such as Financial Accounting Standards Board (FASB) and the Public Company Accounting Oversight Board (PCAOB) to assess how new climate change disclosure rules may affect their work in accounting standard setting and auditing oversight, and how these organizations can support mainstreaming non-financial disclosure**. For instance, the SEC should explore designating a climate disclosure standards board under, or horizontal to, FASB, and ensure the PCAOB can eventually monitor and oversee auditing and assurance. Auditing and assurance concerns requiring attention may include how best to guide a third-party verification of greenhouse gas emissions data (many companies already utilize third-party assurance services for their greenhouse gas inventories) and ensuring that climate-related risk information is correct and verifiable. As disclosure requirements are phased in, the PCAOB will need to develop additional standards and/or guidance for assurance or auditing of these new disclosure requirements.

9. **The SEC should convene an interagency working group to coordinate input from across the financial regulatory agencies and agencies with experience working with industry on climate change, on climate disclosure needs.** This working group could set a goal of determining standardized tools and recommendations for climate risk and financial materiality analysis, such as guidance on industry-specific scenarios to be used in energy transition scenario analysis, or physical risk modeling (as described above), and the definition of short-, medium- and long-term analysis. Throughout this process, research needs and an ongoing research agenda should be assessed. Developing publicly available data tools and technical support for registrants should be a key component of this process. This working group would operate independent of and in tandem with industry-level standard development groups, with the goal of soliciting feedback on the public tools and technical support it develops from those industry stakeholders.

10. **Where appropriate, the SEC should consider harmonizing with and/or building off existing multistakeholder, global, and comprehensive standard setting efforts for climate risk disclosure, including an effort currently underway at the International Financial Reporting Standard Foundation (IFRS).**[5] In general, the SEC should consider referencing existing standards and frameworks that are focused on financial materiality, are industry-specific, and are widely accepted and broadly in use already, such as the Sustainable Accounting Standards Board (SASB).[6] Drawing a distinction between frameworks and standards can be useful for assessing how the plethora of existing efforts fit together, and how best to focus on specific industries. According to SASB: "*Frameworks provide a set of (often) industry agnostic, principles-based guidance for how information is structured and prepared and which broad topics are covered. Standards offer industry-specific, replicable and detailed requirements for what should be reported for each topic."*[7] The SEC should require industry-specific reporting standards and subsequent disclosures to be in line with the TCFD framework, which is already the industry leader in this space. The SEC should retain oversight authority over an independent standard setter, and work to ensure that standard development is transparent, preferably with broad representation across key industry and other stakeholder groups. Multistakeholder processes such as those described above are crucial to ensure that rulemaking encompasses all market participant perspectives, many of whom already have deep expertise in this area.

SEC Questions for Consideration

1. How can the Commission best regulate, monitor, review, and guide climate change disclosures in order to provide more consistent, comparable, and reliable information for investors while also providing greater clarity to registrants as to what is expected of them?

A balance is needed between regulating disclosure so that investors have access to consistent, comparable, and useful information in investment decision making, while also allowing companies to build capacity to be able to accurately and reliably disclose as the scientific and policy context of climate change evolves. This balance can be accomplished through clear disclosure rules for standardized scenarios and metrics that have established use and methodologies, while referencing both broadly accepted voluntary climate risk frameworks like the TCFD, and existing SEC disclosure rules and regulations that companies are accustomed to following.

Given the evolving state of data limitations and best practices, developing an ongoing and targeted stakeholder feedback processes, such as through industry-level working groups, can help provide market participants with clear guidance to address current gaps. Additionally, developing an ongoing climate risk disclosure review and research process at the SEC itself (e.g., though DERA) can help ensure that disclosure guidance is responsive to the emerging science and policy landscape.

Building on what we have recommended in previous C2ES reports, the SEC should require public companies' disclosure of financially material climate-related risks and their strategies for managing those risks, including any use of scenario analysis.

Sub-question 1.1: Where and how should such disclosures be provided?

Disclosure of financially material climate-related risks should be provided in the annual mainstream financial filings, such as 10-k's and subsequent annual reports already required of public companies. Requiring disclosure in mainstream financial filings will help ensure comparability, consistency, and reliability for investors, as well as help ensure that companies are aligning their internal strategies to account for climate risk more so than they do now.

Sub-question 1.2: Should any such disclosures be included in annual reports, other periodic filings, or otherwise be furnished?

See question 1.1 and question 7.

2. What information related to climate risks can be quantified and measured?

Many transition risk metrics, such as scope 1 and 2 greenhouse gas emissions, have methodologies that are well established and have been widely in use for at least a decade, and can therefore be robustly quantified. These metrics can, in turn, inform traditional financial analysis, such as projected impacts on identified revenue streams or operating costs under anticipated policies like carbon pricing schemes. For physical risks, information is in its earlier stages of quantification, however, the ability of companies to measure their physical risk exposure is increasing, and many tools do currently exist (e.g., catastrophe models, public datasets, private consulting firms). Additionally, scenario analysis, which is recommended by leading voluntary frameworks such as the TCFD, can allow asset managers, investors, and companies to assess their risk under potential future temperature projections, regulatory environments, or market conditions that will be implied by the energy transition. C2ES recommends that the SEC, informed by relevant federal science agencies such as the Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA), work to provide publicly available guidance on scenario analysis tools and high-quality data for companies and investors. These efforts are necessary to fill a current knowledge gap and can help develop or validate existing tools and support best practices for calculating climate risks.

Sub-question 2.1: How are markets currently using quantified information?

There is rapidly growing investor demand for climate risk information, particularly greenhouse gas emissions data, as companies announce net-zero commitments and policymakers focus on accelerating the decarbonization of their economies. Retail and institutional investors seek to use this information in investment decisions, asset managers use this information in portfolio building and analysis, and companies use this information in capital budgeting and strategic decision making. Leading banks are rapidly committing to financing net-zero greenhouse gas emission projects and need consistent and reliable data to make financing decisions. Other market organizations like credit rating agencies are also beginning to use this information in their credit assessments of issuers. However, given the lack of standardization and lack of existing regulatory requirements, both the decision usefulness of quantified information and the availability of this information are inconsistent, inhibiting both accurate risk pricing and capital deployment currently needed to decarbonize. Further, inconsistent and non-standardized application of data and modeling inputs, such as those used in scenario analysis, makes it difficult for investors and regulators to understand climate risk across a broad portfolio that includes companies across multiple sectors.

Sub-question 2.2: Are there specific metrics on which all registrants should report (such as, for example, scopes 1, 2, and 3 greenhouse gas emissions, and greenhouse gas reduction goals)?

Yes, all companies should at minimum report scopes 1 and 2 greenhouse gas emissions, and, per our recommendations above, certain scope 3 emissions, their risk management strategy (including interim targets), and any reduction goals. In the absence of any goals, companies should explain why they cannot provide this information. As noted previously, mandating such disclosures provides companies and investors with critical data regarding their own climate risks, as well as a company's overall impact climate change. Reflecting 20 years of industry experience developing corporate greenhouse gas inventories, currently, over 80 percent of S&P 500 companies disclose their scopes 1 and 2 emissions, and approximately 50 percent of companies across sectors disclose some categories of scope 3 emissions (however, it is still unclear if all companies' scope 3 disclosures represent the most financially material and/or greatest amount of greenhouse gas emissions in their value chains). Today, over 8,000 companies globally annually disclose their greenhouse gas emissions to CDP, a public data platform, and several more companies disclose their greenhouse gas emissions in their public sustainability reports.[8]

We note that where industry-specific working groups exist to inform disclosure requirements, they can also illuminate where and when it is appropriate for certain industries to report on their greenhouse gas emissions intensity in addition to their total greenhouse gas emissions. In some cases, greenhouse gas intensity provides greater insights into the risks and opportunities facing specific industry sectors. However, again, here a set of agreed upon rules and metrics are needed to ensure all companies across a given sector are measuring their greenhouse gas intensities uniformly.

Sub-question 2.3: What quantified and measured information or metrics should be disclosed because it may be material to an investment or voting decision?

Both risks and opportunities should be examined together for investors and regulators to achieve a fuller understanding of the totality of a company's vulnerability to climate risk, and companies should disclose all financially material climate risks. Given the necessary scale and scope of economy wide decarbonization, a registrant's emissions inventory, emissions reductions goals, and interim targets are critical to disclose in the context of an investment or voting decision. While the inherent materiality of other climate risks could vary widely and is context specific, an example of potentially material information that is already in use is anticipated market changes due the energy transition, and the subsequent impact on longer lived assets, such as for power sector companies. Existing physical risk metrics that could be material depending on context include value at risk from sea level rise and identified supply chain vulnerabilities exposed to business

continuity disruption from severe storms or heat waves. It is important to note that in the case of the energy transition, opportunities exist for potential increased long-term value and returns, which is important to investor decision making as well (for instance, amount invested in zero-carbon R&D or resilience planning for assets). The SEC could consider commissioning ongoing research into industry-level materiality, such as in the future looking at filings such as 8-k's (to track material climate related events that may occur), and engaging with the activities of other organizations focused on this issue such as through Financial Stability Oversight Council (FSOC).

Sub-question 2.4: Should disclosures be tiered or scaled based on the size and/or type of registrant?

C2ES's previous research has found that small- and medium-sized companies face significant costs to assess and disclose climate-related information due to capacity constraints, and often require technical assistance. The SEC should consider tiering disclosures based on the size of registrants, and provide appropriate guidance, and technical support for companies where needed.

Sub-question 2.5: If so, how? Should disclosures be phased in over time? If so, how?

As noted in question 2.4, C2ES recognizes that many smaller companies may not have the resources or internal capacity to extensively disclose their greenhouse gas emissions and any climate-related financial risk information at the time disclosure requirements go into effect. Thus, the SEC should determine an initial disclosure threshold (by annual revenue, or other relevant metric), and target a longer ramp up period for smaller companies to disclose. The SEC should actively invest in providing companies of all sizes with tools and resources for disclosure, but within this effort the SEC should designate specific support, and potentially further streamlined reporting requirements, for smaller companies.

Sub-question 2.6: How are markets evaluating and pricing externalities of contributions to climate change?

Research has shown that generally markets do not price the physical impacts of climate change, except in certain cases such as sea level rise and real estate.[9] Even where evidence does exist, those price signals are small and still emerging.[10] For transition risk, there is growing evidence that currently markets are starting to reflect responses to emissions disclosures in ways that can negatively impact heavy emitting sectors, including in valuations and portfolio performance.[11] This may be especially true for companies without clear transition plans. At this time, however, reputational risks and investor needs remain key drivers of demand for disclosure. Consistent disclosures will allow investors to make more asset-specific and fully informed capital allocation decisions.

Sub-question 2.7: Do climate change related impacts affect the cost of capital, and if so, how and in what ways?

There is evidence that climate change impacts the cost of capital. For instance, higher emissions intensity has been correlated with higher costs of capital.[12] However, such evidence is mixed, as one very recent study found little impact on cost of capital for oil and natural gas firms, despite widespread acknowledgement of the transition risks and evidence of much higher capital costs for coal.[13] As noted above, the reputational risks facing companies today may indirectly affect cost of capital as well.

Sub-question 2.8: How have registrants or investors analyzed risks and costs associated with climate change?

In our publications, *Implementing TCFD: Strategies for Enhancing Disclosure* and *Best Practices and Challenges: Using Scenarios to Assess and Report Climate-Related Financial Risk*, C2ES found that more public companies are actively analyzing their climate-related risks and opportunities, and using the TCFD framework in order to accomplish this goal.[14] This research found that some companies have had success using scenario analysis to stress test their businesses across a range of possible future climate and climate policy scenarios, but that many challenges remain, including data availability, data communication, and limited use of actionable

physical risk modeling. Additionally, many companies do not issue standalone TCFD reports, but instead integrate the TCFD recommendations across their reporting, either in annual or sustainability reports.

Our research found that companies use publicly available scenarios but choose which scenarios and outcomes to test that are relevant to their individual business context. For instance, we found that scenario outputs ranged from potential changes in net present value, to impacts on specific business segments over different time horizons. Table 1, from our report on scenario analysis, shows how several large companies have used scenario analysis to inform their strategy and disclosure in public reports.[15]

Table 1: Different Approaches to Climate Disclosure Using Scenarios

COMPANY	REPORT TYPE	PUBLIC SCENARI-OS USED	TYPES OF RISKS DESCRIBED	OPPORTUNITIES DESCRIBED	SCENARIO OUT-PUTS
Chevron	Standalone *Climate Change Resilience: A Frame-work for Decision Making*	IEA: Current Policies, New Policies, and Sustainable Development scenarios	Operational, physical, geopolitical and legisla-tive, strategic	Production with flexibility, lower-cost production, gas, chemicals, energy efficiency, carbon capture and storage, renewable energy	Discussed impact on busi-ness segments (upstream & downstream/ chemicals) over short term and long term
Duke Energy	Standalone *2017 Climate Report to Shareholders*	Science Based Targets Initiative: Contraction of Absolute Emissions scenario	Physical, policy and economic	Increased demand for zero carbon sources, elec-trified transportation	Analyzed one possible pathway in line with 2 degrees and included description of their strategy to meet that future
Statoil	Chapter in existing report *2017 Sustainability Report*	IEA: Current Policies, New Policies, and Sustainable Development scenarios	Market and technol-ogy shifts, policy and legal, physical risks, reputation	Offshore wind, carbon capture use and storage, hydrogen	Described outcomes in terms of sensitivity to net present value

Sources: Chevron, Climate Change Resilience: A Framework for Decision Making, (Chevron, March 2018), https://www.chevron.com/-/media/shared-media/doc-uments/climate-change-resilience.pdf. Duke Energy, 2017 Climate Report to Shareholders, (Duke Energy Corporation, March 2018), https://www.duke-energy.com/_/media/pdfs/our-company/shareholder-climate-report.pdf. Statoil, 2017 Sustainability Report, (Statoil, March 2017), https://www.equinor.com/content/dam/statoil/documents/sustainability-reports/statoil-sustainability-report-2017-23march.pdf.

Sub-question 2.9: What are registrants doing internally to evaluate or project climate scenarios, and what information from or about such internal evaluations should be disclosed to investors to inform investment and voting decisions?

See question 2.8. Additionally, companies should leverage the TCFD framework and guidance for scenario analysis. Disclosing to investors specifically how companies have evaluated their climate risks (including, but

not limited to, scenario analysis), what impacts these evaluations found, and how these impacts inform company decisions and strategic planning is useful to gain a picture of how a company is managing and addressing its climate risks. Where disclosed, these discussions should include an upfront discussion of the specific assumptions made in each scenario (e.g., internal carbon price assumptions), and which scenarios were chosen and why. The SEC should ensure that these disclosures are responsive to different investor contexts, for instance, in direct finance through capital markets, or in indirect financing through intermediaries.

In its 2010 guidance on climate change, the SEC has already commented on how a discussion of strategy assessment tools like scenario analysis could be evaluated by management and explained to shareholders and investors in existing regulations like Form 10-k. As noted above, C2ES recommends that forward-looking analysis, including using scenarios, is subject to some sort of safe harbor to ensure robust disclosure. The SEC should consider how newer best practices such as the TCFD framework can integrate with its existing 2010 guidance and inform mainstream filings.

Sub-question 2.10: How does the absence or presence of robust carbon markets impact firms' analysis of the risks and costs associated with climate change?

While many firms are using shadow prices internally, the lack of carbon markets introduces a great deal of uncertainty around pricing and planning and may result in overstating or understating the impacts of transition risk in a company's analysis. C2ES supports both a price on carbon and a variety of market-based mechanisms to alleviate this uncertainty and help companies invest in reducing their greenhouse gas emissions and strengthening their climate resilience.

3. What are the advantages and disadvantages of permitting investors, registrants, and other industry participants to develop disclosure standards mutually agreed by them?

Permitting market participants to develop mutually agreed disclosure standards can foster a bottom-up approach that is sensitive to industry and sector specific constraints and data limitations. To ensure that standards adequately address the scope, scale, and inherent uncertainty of climate change, any standards development process should be overseen by regulators at the SEC and informed by scientific experts, such as those at the agencies previously identified here, including the EPA and NOAA. **The SEC should lead a process to establish disclosure requirements developed with input from multiple stakeholders, including investors and registrants (companies), in an open and transparent manner.** As much as possible and where appropriate, the SEC should validate existing disclosure frameworks and standards to inform disclosure requirements rather developing new ones, while retaining oversight and final approval. Where industry-specific information is relevant, as noted throughout, SEC should engage with industry stakeholders to develop additional standards and guidance.

Sub-question 3.1: Should those standards satisfy minimum disclosure requirements established by the Commission? How should such a system work?

Conversely, if disclosure requirements are to be led and developed mutually by market participants (e.g., industry groups), the Commission should set minimum disclosure requirements based on commonly accepted, currently in use metrics (such as greenhouse gas emissions), and then, as standards evolve, the SEC should be engaged in their development and oversee updates.

Sub-question 3.2: What minimum disclosure requirements should the Commission establish if it were to allow industry-led disclosure standards?

See above.

Sub-question 3.3: What level of granularity should be used to define industries (e.g., two-digit SIC, four-digit SIC, etc.)?

The SEC should be responsive to different industry contexts so that climate risks and opportunities are contained within an appropriate level of granularity. The SEC should develop recommendations for industry definitions and road test these recommendations in industry-level working groups so that these climate risks and opportunities are adequately captured.

4. What are the advantages and disadvantages of establishing different climate change reporting standards for different industries, such as the financial sector, oil and gas, transportation, etc.?

C2ES recommends applying a common framework (such as the TCFD) for assessing climate risk to all industries, coupled with additional industry-based standards and guidance to facilitate disclosure at an industry level. Such an approach addresses the real needs of different industries—many of which currently use different greenhouse gas calculation methodologies, and have different risks, materiality considerations, and context constraints—and supports an understanding of decision-useful information to investors in each specific industry in line with evolving best practice. Such an approach could initially favor different industries that are more readily able to disclose and impose nearer-term costs on those that cannot (for instance, research has shown that disclosures of climate risk are currently concentrated in a small handful of industries).[16]

Sub-question 4.1 How should any such industry-focused standards be developed and implemented?

Industry-focused standards should be developed through leveraging existing and widely used frameworks and standards such as Sustainability Accounting Standards Board (SASB) and the TCFD. C2ES recommends that the SEC convene industry working groups to assess the appropriateness of existing standards, and where gaps exist develop new ones, with SEC oversight and periodic assessments to determine when and how standards should be updated. Several sustainability reporting standards have been creating industry-specific standards and guidance over the past few years. Leveraging these existing efforts can provide a useful way to align with the approach that other disclosure entities and organizations are taking, and they can be helpful in peer benchmarking across industries.

5. What are the advantages and disadvantages of rules that incorporate or draw on existing frameworks, such as, for example, those developed by the Task Force on Climate-Related Financial Disclosures (TCFD), the Sustainability Accounting Standards Board (SASB), and the Climate Disclosure Standards Board (CDSB)?

Establishing rules that draw on existing frameworks is advantageous and C2ES recommends this approach. The TCFD, SASB, and CDSB all have varying degrees of broad industry buy in, and many organizations are already using these standards and frameworks. As such, utilizing them would require less effort than creating new ones, and can reduce time and effort in implementation.

However, it should be noted that these standards may prove incomplete to meet the evolving nature of climate risk, and the TCFD has not yet been widely implemented across industries, particularly around metrics and strategy disclosures. We note that TCFD itself is continuing to issue guidance and consultations as best practices emerge and that the voluntary nature of these frameworks are perhaps a contributor to their limitations at this time, further emphasizing the need for regulatory support and oversight.

Sub-question 5.1: Are there any specific frameworks that the Commission should consider? If so, which frameworks and why?

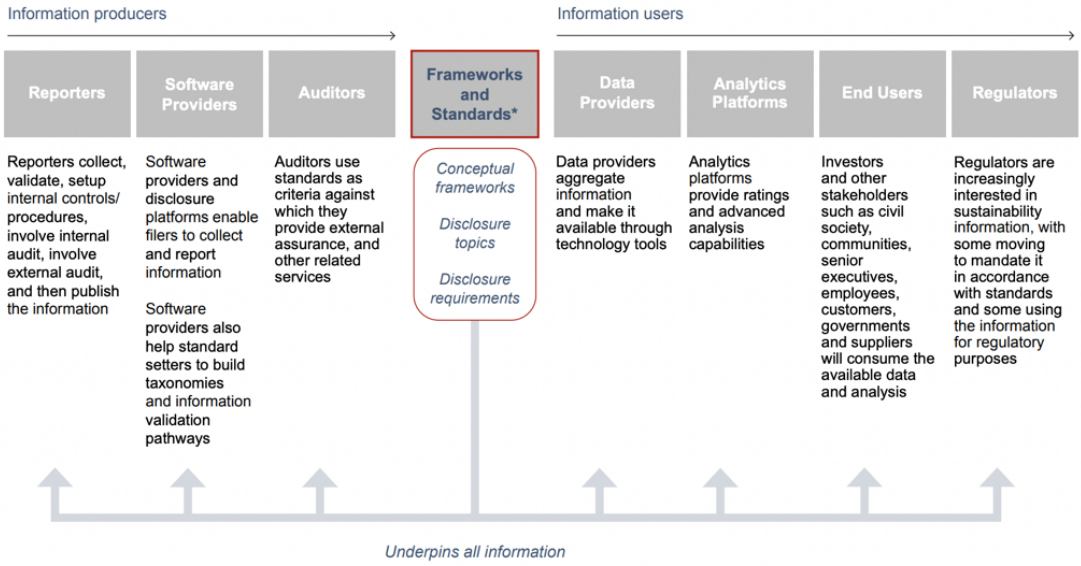
The TCFD is the current leading framework for assessing and reporting climate-related financial materiality and is also widely accepted among countries and global financial institutions around the world. C2ES

recommends that the SEC reference the TCFD in any rule setting it pursues, while acknowledging the limitations as noted above.

Drawing a distinction between frameworks and standards can be useful for assessing how the plethora of existing efforts fit together, and how best to focus on specific industries. According to SASB: "*Frameworks provide a set of (often) industry agnostic, principles-based guidance for how information is structured and prepared and which broad topics are covered. Standards offer industry-specific, replicable and detailed requirements for what should be reported for each topic.*"[17]

For this reason, C2ES recommends that the SEC utilize the TCFD as a reference framework, and assess the degree to which standards, including SASB itself, can fulfill the need to determine financially material disclosures by specific industry. Figure 1 provides further clarification on how frameworks and standards work together to provide information to the enterprise value creation ecosystem.

Figure 1: Frameworks and standards ensure high quality, accurate information, on which this eco-system depends



Sources: Impact Management Project, World Economic Forum and Deloitte, Reporting on enterprise value: Illustrated with a prototype climate-related financial disclosure standard, (London: Impact Management Project, 2020), https://29kjwb3armds2g3gi4lq2sx1-wpengine.netdna-ssl.com/wp-content/uploads/Reporting-on-enterprise-value_climate-prototype_Dec20.pdf

6. How should any disclosure requirements be updated, improved, augmented, or otherwise changed over time? See question 6.3. Disclosure requirements must be regularly reviewed, as best practice is evolving, and industry working groups should be set up initially and then convened as necessary to review needed updates and provide feedback on proposed changes. The SEC should engage closely with global market regulators such as those in the European Union that have already made strides in disclosure requirements, in order to share knowledge and identify any emerging best practices and areas of improvements. Once determined, disclosure requirements should be reviewed regularly to determine their decision usefulness (e.g., every three years) and updated as needed.

Sub-question 6.1: Should the Commission itself carry out these tasks, or should it adopt or identify criteria for identifying other organization(s) to do so?

See question 6.3.

Sub-question 6.2: If the latter, what organization(s) should be responsible for doing so, and what role should the Commission play in governance or funding?

See question 6.3.

Sub-question 6.3: Should the Commission designate a climate or ESG disclosure standard setter?

In tandem with setting disclosure requirements, the SEC should designate a regular sustainability standards board to oversee climate disclosure standards. This board should work closely with the SEC and be overseen the SEC to ensure that ongoing standards account for emerging best practices in science and policy that may affect ongoing disclosure needs.

In general, the SEC should designate a board to assess and oversee climate standard setting that is independent, leverages already broadly used standards, and is focused first on financial materiality. If the SEC seeks to integrate existing stakeholder efforts at setting climate disclosure standards (which is recommended), it should continue to assess the ongoing efforts underway at the International Financial Reporting Standards Foundation (IFRS). The IFRS is currently hosting a working group on developing a potential global sustainability standards board. This effort would leverage the TCFD, and may consider leveraging additional standards convergence efforts underway with SASB, CDP, Climate Disclosure Standards Board (CDSB), Global Reporting Initiative (GRI) and International Integrated Reporting Council (IIRC), which together have proposed a climate risk disclosure prototype.[18] The IFRS is considering this prototype as it assesses its sustainability specific standards board. The SEC should assess this new climate risk standard as well, especially since the inclusion of the GRI provides important considerations of civil society impact or "double materiality".[19]

Sub-question 6.4: If so, what should the characteristics of such a standard setter be?

See above.

Sub-question 6.5: Is there an existing climate disclosure standard setter that the Commission should consider? See above.

7. What is the best approach for requiring climate-related disclosures? For example, should any such disclosures be incorporated into existing rules such as Regulation S-K or Regulation S-X, or should a new regulation devoted entirely to climate risks, opportunities, and impacts be promulgated?

The SEC should survey stakeholders to assess the ease and usefulness of incorporating disclosures into existing regulation, or, instead, developing a new regulation. Incorporating climate risk disclosures into existing regulations (which have already been identified by the SEC in 2010) could be less burdensome for companies, but registrants may see utility in separating their disclosure depending on their internal reporting process. The SEC should consider evaluating the TCFD recommendations, and/or existing standalone TCFD reports to see how the framework may be best integrated into the 10-k or other existing regulations. For instance, disclosures could be provided in Section 101 of the 10-k.

The SEC should engage with investors and registrants to understand how best to require disclosures in mainstream filings, including where and how designated frameworks and standards can incorporate into existing SEC regulations. These requirements should be designed to be responsive to the existing capacities of companies as well as investor information needs. Companies have suggested utilizing existing TCFD or sustainability reports and having the option to link to those existing external disclosures to fulfill initial

disclosure requirements. This approach can provide flexibility during a ramp up period to full disclosure, though C2ES does support and recommend eventual disclosure in mainstream financial filings. As noted above, addressing legal liability concerns for forward looking statements and estimates should be a key component of rule setting in financial filings such as 10-k's.

Sub-question 7.1: Should any such disclosures be filed with or furnished to the Commission?

No answer (this is a legal consideration). C2ES notes a preference among business community stakeholders for furnishing disclosures.

8. How, if at all, should registrants disclose their internal governance and oversight of climate-related issues? For example, what are the advantages and disadvantages of requiring disclosure concerning the connection between executive or employee compensation and climate change risks and impacts?

The TCFD recommends and provides a framework for reporting internal governance of climate-related risks, and C2ES supports requiring the disclosure of climate-related governance and oversight in mainstream financial filings or proxy statements. While incorporating the entire TCFD framework into one location such as a 10-k may be beneficial, investors and registrants may prefer this left to proxy statements where governance and executive compensation is currently disclosed.

We note there are already efforts underway at leading firms to link executive compensation to sustainability goals and such efforts should be encouraged to assess the feasibility of greenhouse gas reduction targets and management's commitment to goals (and implicitly, commitment to, and/or existing implementation of transition risk management). Disclosure of such efforts can highlight firms that are already taking this step and provide investors with data on concrete steps towards greenhouse gas reduction goals, including targets to achieve net zero emissions by midcentury.

9. What are the advantages and disadvantages of developing a single set of global standards applicable to companies around the world, including registrants under the Commission's rules, versus multiple standard setters and standards?

Referencing a single set of global standards that can align with the United States context is preferable, given the global nature of both capital markets and climate impact. These standards should take a "building block approach" that can integrate with different jurisdictional contexts, and we note that such an approach is already being elevated in standard setting conversations internationally.[20] This would also simplify the existing standards landscape, encourage comparability, and reduce barriers to firms in deciding how to best disclose. However, such a single global standard does not currently exist, and those efforts that are underway are expected to materialize over the short to medium term. Additionally, as the United States uses a different accounting system than other countries, a global standard may take undue time and effort to align with existing SEC requirements and United States generally accepted accounting principles (GAAP), which are the existing accounting principles that govern financial accounting and are overseen by FASB. As noted in its own request for comment and in our comments above, the SEC should continue to monitor the important convergence happening between SASB and other leading standards, and prepare to designate a relevant independent standard setting US-based board (e.g., in the model of FASB) that can ensure standards are fit for purpose in the United States.

Sub-question 9.1: If there were to be a single standard setter and set of standards, which one should it be?

See question 6.3.

Sub-question 9.2: What are the advantages and disadvantages of establishing a minimum global set of standards as a baseline that individual jurisdictions could build on versus a comprehensive set of standards?

See question 6.3.

Sub-question 9.3: If there are multiple standard setters, how can standards be aligned to enhance comparability and reliability?

See question 6.3.

Sub-question 9.4: What should be the interaction between any global standard and Commission requirements?

See question 6.3.

Sub-question 9.5: If the Commission were to endorse or incorporate a global standard, what are the advantages and disadvantages of having mandatory compliance?

See question 6.3.

10. How should disclosures under any such standards be enforced or assessed? For example, what are the advantages and disadvantages of making disclosures subject to audit or another form of assurance?

Auditing and other forms of assurance are important to ensure that climate-related information is correct and to support the mainstreaming of decision-useful, standardized emissions data and information. Climate related disclosures should be subject to third-party verification to support those goals, and ultimately these should be in line with existing SEC assurance requirements for regular filings. However, there is a lack of existing climate related assurance standards at regulators like the PCAOB, and given the unique and emerging context of climate risk disclosures, the SEC should phase in any verification requirements while standards are developed and the stakeholder engagement process, such as the working groups we suggest above, are implemented. If firms are not currently disclosing or are at an earlier stage of disclosure, they may face substantial additional barriers to entry and costs from initial enforcement. A deeper and ongoing consideration of auditing needs is recommended, and the PCAOB should be looking at this issue in parallel to the disclosure standard process that is taking place at the SEC. As noted above, given the existing limitations in scope 3 reporting and data quality, the PCAOB should carefully consider how to best support scope 3 third party verification standards. Such standards should be developed in an open and transparent matter with opportunities for stakeholder input.

The SEC should distinguish between verification needs for historical greenhouse gas emissions or other historical data (we note that companies are in many cases currently utilizing assurance services and existing standards for greenhouse gas emissions verification), and forward-looking projections such as scenario analysis, which will require new frameworks and standard development.[21]

C2ES also recognizes that there are differences in levels of assurance, including limited versus reasonable assurance, and encourages the SEC, along with the PCAOB, to consider which levels could best support the ultimate goal of robust, verifiable, climate data disclosures.

Sub-question 10.1: If there is an audit or assurance process or requirement, what organization(s) should perform such tasks?

The PCAOB should eventually seek to provide oversight and enforcement in line with its existing authority and should begin to develop internal research and expertise in climate change and climate risk to guide auditors and providers of assurance services. As noted above, the SEC should consider assurance requirements that are phased in over time, and recognize the distinct context and challenges between verifying historical greenhouse gas emissions (for which assurance services and verification standards

currently exist) and other potential disclosures, such as scenario analysis, which would require more research and development to institute. The PCAOB could identify how its existing standards can be applied to emissions data and climate risk disclosures (or review and adopt existing verification standards), or begin to assess how it can develop new standards in critical areas such as scenario analysis (see above), and develop or leverage existing standards related to how companies address their climate impacts. The PCAOB itself has noted that it is beginning to develop capabilities in this area, through the use of "critical audit matters" (CAMs) which are a new and important tool for identifying challenging audit areas and can be used when assessing climate risk disclosure.[22] CAMs—which provide the ability for auditors to identify and direct a company's management towards audit areas that are material and involve challenging and complex judgement—can support accounting transparency in emerging areas like climate and Environmental, Social, and Governance (ESG) disclosures.

Sub-question 10.2: What relationship should the Commission or other existing bodies have to such tasks? What assurance framework should the Commission consider requiring or permitting?

The SEC should monitor the evolution of climate disclosure audits through its oversight of the PCAOB, such as tracking how CAMs are being utilized with respect to climate change, as this can help develop insights into difficulties with climate risk reporting as they emerge.

11. Should the Commission consider other measures to ensure the reliability of climate-related disclosures? Should the Commission, for example, consider whether management's annual report on internal control over financial reporting and related requirements should be updated to ensure sufficient analysis of controls around climate reporting?

Ensuring reliability should eventually be required in line with existing SEC rules, and, where appropriate, the SEC should also consider updating the rules on internal controls to specifically address climate reporting. Depending on whether and to what extent the SEC undertakes a rulemaking approach, appropriate control updates could be assessed in initial working groups.

C2ES notes that organizations who have senior management buy-in generally make the most progress on climate-related financial disclosures. Requiring management involvement has been shown to help drive climate action within the organization and better ensures organizational accountability for achieving the goals, targets, and commitments they have publicly disclosed. Certification of climate risk disclosure by company boards and officers should eventually align with that required for all material financial statements.

Sub-question 11.1: Should the Commission consider requiring a certification by the CEO, CFO, or other corporate officer relating to climate disclosures?

See question 11. C2ES notes that companies' current disclosures (in this case, CDP surveys), are signed off on by a variety of corporate positions, ranging from C-suite and Chief Sustainability Officers to operations management. As noted above, we also endorse sign off from senior officials on climate disclosures, however liability should be carefully considered and assessed depending on final disclosure rules.

12. What are the advantages and disadvantages of a "comply or explain" framework for climate change that would permit registrants to either comply with, or if they do not comply, explain why they have not complied with the disclosure rules?

A comply or explain framework allows companies flexibility during the ramp up to full disclosure ability. This will also allow for transparency around existing issues in disclosure and can help identify areas of support and improvement needs of tools and data availability. However, such a framework needs a phased approach over which companies would have to comply.

Sub-question 12.1: How should this work?

The SEC should allow registrants to comply or explain within a certain timeframe, with the requirement that if a company cannot disclose, they identify the barrier to disclosure and provide a plan for disclosure at a later date.

Sub-question 12.2: Should "comply or explain" apply to all climate change disclosures or just select ones, and why?

Comply or explain should not apply to scopes 1 and 2, and with context and options we have provided in our main summary above, at least some scope 3 greenhouse gas emissions data, because methodologies to develop them are established and broadly used across industry sectors and investors. Comply and explain should also not apply to any established or subsequent greenhouse gas reduction plans and interim and long-term climate goals. The shared goal of complete, decision-useful, and comparable climate risk disclosure should balance transparency and liability considerations, and seek to reward good disclosure, not penalize robust discussion of risk.

The SEC should also clarify that as disclosure requirements are assessed, all current existing materiality standards are still applicable and enforceable. As science and policy advances, and through input and insights from interagency organizations such as FSOC, the SEC should evaluate updating the comply or explain requirements to broaden the scope of compliance if necessary.

13. How should the Commission craft rules that elicit meaningful discussion of the registrant's views on its climate-related risks and opportunities?

If "meaningful discussion" is intended to foster reporting that goes beyond boilerplate statements or simply disclosing greenhouse gas data with no context, C2ES recommends that the SEC reference the TCFD framework, which provides guidance on disclosing governance, risk management, and strategy. Within this context, the SEC should require that companies disclose and describe any of their plans to reach any established greenhouse gas reduction goals (including net-zero emissions goals), including their strategies for meeting interim emissions reduction targets.

The Commission could also set consistent indicators intended for all organizations from both financial and non-financial sectors. Indicators should have quantitative and qualitative components and organizations should be asked to provide relevant climate-related metrics as well as disclosure around associated methodology, assumptions, limitations, processes, and controls in place (see question 11).

Advantages of requiring such disclosure can include obtaining information from organizations on: (1) metrics used to identify, assess, and manage climate-related risks and opportunities; (2) how these metrics are developed, tracked, and measured; (3) how climate-related metrics are linked to financial metrics (e.g., how climate-related risk and linked to an organizational value at risk and how climate-related opportunities are linked to revenues and costs to realize opportunities); (4) how climate-related metrics are considered in the context of broader risk management, business strategy, and financial planning and forecasting.

Sub-question 13.1: What are the advantages and disadvantages of requiring disclosed metrics to be accompanied with a sustainability disclosure and analysis section similar to the current Management's Discussion and Analysis of Financial Condition and Results of Operations?

As a general goal, the SEC should seek to identify a consistent, meaningful, and comparable disclosure format and disclosure location which investors and regulators can reference to understand a company's view of their climate risks. Wrapping any metrics and targets within the greater context of business planning and management insight is needed to make sense of any quantitative information disclosed and, in turn, a company's strategy for understanding and addressing the impacts of such information. An example is

potentially including opportunities in existing sections of the 10-k, where known trends and uncertainties are discussed.

14. What climate-related information is available with respect to private companies, and how should the Commission's rules address private companies' climate disclosures, such as through exempt offerings, or its oversight of certain investment advisers and funds?

C2ES's has previously noted that private companies do not face the same shareholder pressure for disclosure as public ones. While SEC disclosure rules are triggered by companies going public, there are a variety of carve outs and exemptions for, among other things, private securities offerings that are not subject to disclosure rules. As such, the SEC should consider developing rules for disclosures where appropriate, including in exempt offerings and funds that sell private securities. Developing rules for private companies where possible or adjusting requirements for SEC registration can potentially help discourage public companies from delisting and/or prepare privately held companies interested in going public with minimum disclosure standards.

15. Should climate-related requirements be one component of a broader ESG disclosure framework?

Climate-related risks should be independently reported and can serve as an input into a broader ESG disclosure framework. Industry-specific standards and disclosure requirements pertaining to climate-related risks are urgently needed and should be prioritized, given the systemic, evolving, and financially material nature of such risks. After the development of such standards, climate change risks can be reintegrated into an ESG disclosure framework as needed. Additionally, see question 15.2.

Sub-question 15.1: How should the Commission craft climate-related disclosure requirements that would complement a broader ESG disclosure standard?

See 15. In addition, by referencing existing standards like SASB, which are considered ESG but focused on sectors and materiality, the commission can leverage existing broadly supported work that cuts across both climate risk and ESG.

The SEC should also consider how ESG disclosures may overlap, such as how "S", or social disclosures can provide material context to climate-related disclosures (for example labor impacts and workforce planning due to the energy transition).

Sub-question 15.2: How do climate-related disclosure issues relate to the broader spectrum of ESG disclosure issues?

See 15. Given the systemic, evolving, and financial material nature of climate risks, climate-related financial risks should be considered as particularly relevant for companies in the broader spectrum of ESG disclosure issues, and should be prioritized in any rulemaking process. While, to date, climate risks have been mostly considered under the "E" in ESG, it is useful to view climate as a materially distinct and cross cutting issue that can impact all categories (E, S, and G) under ESG disclosure.

Endnotes

[1] "Climate-Related Financial Risk," last updated May 28, 2021, https://www.c2es.org/content/climate-related-financial-disclosures.

[2] "Business Environmental Leadership Council," last updated May 19, 2021, https://www.c2es.org/our-work/belc.

[3] Environmental Protection Agency Center for Corporate Climate Leadership, *Insights from Corporate Greenhouse Gas Management: Inventorying and Target Setting 2020,* (Washington, DC: U.S. Environmental Protection Agency, 2020), https://www.epa.gov/sites/production/files/2020-04/documents/insights-in-corporate-greenhouse-gas-management.pdf.

[4] An example of such an effort is the Edison Electric Institute sustainability reporting template, linked here: https://www.eei.org/issuesandpolicy/Pages/FinanceAndTax-ESG.aspx.

[5] The IFRS is already in the process of soliciting feedback and opinions from market participants as it moves forward on assessing a sustainability standards board. For the public responses so far see: https://www.ifrs.org/projects/work-plan/sustainability-reporting/consultation-paper-and-comment-letters.

[6] The ongoing international efforts at the IFRS includes consideration of other work being done to harmonize the primary sustainability standard organizations, including SASB and the Global Reporting Initiative, which importantly focuses on civil society impact.

[7] Amanda Medress, "Answering Your Questions about the Value Reporting Foundation," *SASB (blog),* December 21, 2020, https://www.sasb.org/blog/answering-your-questions-about-the-value-reporting-foundation.

[8] Environmental Protection Agency Center for Corporate Climate Leadership, *Insights from Corporate Greenhouse Gas Management: Inventorying and Target Setting 2020*.

[9] Bolstad et al., *Flying blind: What do investors really know about climate change risks in the U.S. equity and municipal debt markets?* (Washington, DC: The Brookings Institution, 2020), https://www.brookings.edu/research/flying-blind-what-do-investors-really-know-about-climate-change-risks-in-the-u-s-equity-and-municipal-debt-markets.

[10] Justin Murfin and Matthew Spiegel, "Is the Risk of Sea Level Rise Capitalized in Residential Real Estate?," *The Review of Financial Studies* 33, no. 3, (2020): 1217–1255, https://doi.org/10.1093/rfs/hhz134; Laura Kusisto and Arian Campo-Flores, "Rising Sea Levels Reshape Miami's Housing Market", *The Wall Street Journal*, April 20, 2018. https://www.wsj.com/articles/climate-fears-reshape-miamis-housing-market-1524225600.

[11] Christina Atanasova and Eduardo S. Schwartz, "Stranded Fossil Fuel Reserves and Firm Value," *NBER Working Paper Series*, (November 2019), https://www.nber.org/system/files/working_papers/w26497/w26497.pdf; Alessi Lucia, Elisa Ossola, and Roberto Panzica, "The Greenium matters: greenhouse gas emissions, environmental disclosures, and stock prices," *University of Milan Bicocca Department of Economics, Management and Statistics Working Paper* (July 2019), http://dx.doi.org/10.2139/ssrn.3452649.

[12] Arjan Trinks et al., *Greenhouse Gas Emissions Intensity and the Cost of Capital* (Groningen, Netherlands: University of Groningen, SOM Research School, 2017), https://research.rug.nl/nl/publications/greenhouse-gas-emissions-intensity-and-the-cost-of-capital.

[13] Alastair Marsh, "Loan Markets Are Pricing In Climate Transition, Penalizing Coal," *Bloomberg Green*, April 18, 2021, https://www.bloomberg.com/news/articles/2021-04-18/loan-markets-are-pricing-in-climate-transition-penalizing-coal.

[14] See Center for Climate and Energy Solutions, *Implementing TCFD: Strategies for Enhancing Disclosure* (Arlington, VA: Center for Climate and Energy Solutions, 2020), https://www.c2es.org/document/implementing-tcfd-strategies-for-enhancing-disclosure and Center for Climate and Energy Solutions, *Using Scenarios to Assess and Report Climate-Related*

Financial Risk (Arlington, VA: Center for Climate and Energy Solutions, 2018), https://www.c2es.org/document/using-scenarios-to-assess-and-report-climate-related-financial-risk.

[15] Nancy Meyer, *Best Practices and Challenges: Using Scenarios to Assess and Report Climate-related Financial Risks* (Arlington, VA: Center for Climate and Energy Solutions, 2018), https://www.c2es.org/site/assets/uploads/2018/08/using-scenarios-assess-climate-risk-08-18.pdf.

[16] Bolstad et al*., Flying blind: What do investors really know about climate change risks in the U.S. equity and municipal debt markets?*

[17] Amanda Medress, "Answering Your Questions about the Value Reporting Foundation."

[18] Impact Management Project, World Economic Forum, and Deloitte, *Reporting on enterprise value: Illustrated with a prototype climate-related financial disclosure standard* (London: Impact Management Project, 2020), https://29kjwb3armds2g3gi4lq2sx1-wpengine.netdna-ssl.com/wp-content/uploads/Reporting-on-enterprise-value_climate-prototype_Dec20.pdf.

[19] Double materiality is a concept that incorporates both the impact of a company on the planet (i.e. civil society impacts) and the impact of the planet on a company (i.e. financially material climate risks).

[20] "Building blocks are key: IOSCO and IFAC support for sustainability standards*," XBRL (blog*), May 14, 2021, https://www.xbrl.org/news/building-blocks-are-key-iosco-and-ifac-support-for-sustainability-standards.

[21] For existing verifications deemed acceptable by leading data provider CDP, see: https://www.cdp.net/en/guidance/verification.

[22] J. Robert Brown Jr. "It's Not What You Look at that Matters: It's What You See, Revealing ESG in Critical Audit Matters," (presentation, virtual, November 4, 2020).