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Standard Guide for Environmental, Social, and Governance (ESG) Disclosure Related to Climate and Community[1]

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1. Scope

1.1 This guide provides an overview of frameworks used for environmental, social, and governance (ESG) disclosures applicable to a variety of organizations.

1.2 This guide discusses the history and purpose of ESG disclosure frameworks, as well as the challenges associated with the greater interest in and broader requirements for transparency and accountability in the information used in disclosures.

1.3 The focus of this guide is the array of ESG disclosure frameworks and the regulatory context for organizations making ESG disclosures including climate and community concerns.

1.4 The goal of this guide is to improve the users' understanding of ESG disclosure frameworks and to outline but not to supersede federal, state, tribal, and local regulatory requirements, and guidelines for disclosures. This guide can be used in situations where there may not be a regulatory requirement or framework for disclosure, or where the user wishes to conduct voluntary disclosure initiatives. In addition, it can also be used to standardize efforts when several different disclosure requirements apply to an organization.

1.5 This guide is organized as follows:

1.6 Before beginning the ESG disclosures process, organizations should document the information and data identified and evaluated, clarify the professional judgement factors considered during decision making and state how those factors influenced decisions or actions, and document the relevant technical policy decisions. The organization should verify that the data and information which are to be used in the ESG disclosures process, including historical data and current data, will be relevant to and of sufficient quantity and quality to answer the questions posed and the decisions made in the ESG disclosures process.

1.7 The ESG disclosures should be appropriate, relevant, and decision-useful disclosures suited to a particular request, purpose, or target audience.

1.8 The ESG disclosure frameworks discussed in this guide vary widely in ESG elements. For example, some ESG frameworks focus only on disclosure of a select set of environmental factors such as regulated emissions. The wider range of ESG elements that may be disclosed are summarized below.

1.8.1 The environmental component of the disclosures might focus on an organization's impact on the environment—for example, its energy and water inputs and pollution outputs. It also might focus on the risks and opportunities associated with the impacts of climate change on or by the company, its supply chains and value chains, its industry, and the communities in which its facilities and operations reside. Key elements of the environmental component may include carbon footprint; resource consumption; resource depletion; energy efficiency; renewable energy; greenhouse gas emissions; waste reduction, recycle, reuse, and waste management; pollution prevention; and issues related to environmental justice.

1.8.2 The social component of the disclosures might focus on the organization's relationship with people and society—for example, opportunities and risks for diversity and inclusion; human rights; the rights of Indigenous People; specific faith-based issues; health and safety of employees, customers, consumers, and communities, both locally and/or globally;

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company investment in its local community; and how such issues are addressed by the organization in its facilities and its value and supply chains. Key elements of the social component of disclosures may include employee relations; customers and consumer relations; supply and value chain management; workplace health and safety; human rights; and community relations.

1.8.3 The governance component of the disclosures might focus on as how the organization is run—for example, transparency and reporting; ethics; compliance; shareholder rights; and the composition and role of the board of directors and/or senior management team. Key elements of the governance component of disclosures may include organizational structure; diversity; compensation; business ethics; reporting; transparency; oversight; communications; regulatory compliance; tax strategy; political actions (such as lobbying and campaign contributions); investor relations; shareholder and stakeholder rights; and decision-making regarding opportunity and risk management strategy for the organization, and its value and supply chains.

1.9 This guide assists users in navigating the array of various ESG disclosure frameworks. It is not the intent of this guide to define the technical decisions or professional judgements appropriate for each user, but rather to provide information on the existing decision frameworks.

1.10 This guide recognizes the complexity and diversity of topics related to ESG disclosures and provides technical support for a range of ESG disclosure applications. ESG factors are an increasing focus of regulatory guidance, consumer demand, investor goals, academic research, and industry efforts to manage risk and maximize return.

1.11 This guide provides an overview of ESG disclosure requirements and frameworks and provides resources for organizations in making their disclosures. It is beyond the scope of this guide to evaluate potential impacts of climate change, or to review the outcomes of decisions taken by organizations, or to analyze the cost/benefit determinations made by organizations on the negative vs. positive impacts of technological advances that may or may not contribute to climate change.

1.12 The guide user's legal counsel should be consulted regarding information and data designated for the disclosure process, which should be evaluated for compliance implications potentially associated with its public release (such as compliance with environmental laws; regulations; and terms or conditions of permits and consent agreements). Review of alignment of ESC policy with fiduciary duty should be included in this consultation.

1.13 This guide is intended to complement, not replace, existing regulatory requirements or guidance. ASTM International (ASTM) guides are not regulations; they are consensus-based standards that may be followed as deemed appropriate by guide users.

1.14 *Units*—The values stated in International System of Units (SI) units are to be regarded as the standard. Refer to: IEEE/ASTM SI 10 American National Standard for Use of the International System of Units (SI): The Modern Metric System.

1.15 *This standard does not purport to address safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.16 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

E1369 Guide for Selecting Techniques for Treating Uncertainty and Risk in the Economic Evaluation of Buildings and Building Systems

E2013 Practice for Developing Functions, Constructing FAST Diagrams, and Performing Function Analysis During Value Engineering (VE)/Value Analysis (VA) Study

E2081 Guide for Risk-Based Corrective Action

E2091 Guide for Use of Activity and Use Limitations, Including Institutional and Engineering Controls

E2114 Terminology for Sustainability

E2129 Practice for Data Collection for Sustainability Assessment of Building Products

E2137 Guide for Estimating Monetary Costs and Liabilities for Environmental Matters

E2173 Guide for Disclosure of Environmental Liabilities

E2205 Guide for Risk-Based Corrective Action for Protection of Ecological Resources

E2348 Guide for Framework for a Consensus-based Environmental Decision-making Process

E2432 Guide for General Principles of Sustainability Relative to the Built Environment

E2541 Guide for Stakeholder-Focused, Consensus-Based Disaster Restoration Process for Contaminated Assets (Withdrawn 2019)[3]

E2718 Guide for Financial Disclosures Attributed to Climate Change

E2725 Guide for Basic Assessment and Management of Greenhouse Gases

E2986 Guide for Evaluation of Environmental Aspects of Sustainability of Manufacturing Processes

E2893 Guide for Greener Cleanups

E3012 Guide for Characterizing Environmental Aspects of Manufacturing Processes

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] The last approved version of this historical standard is referenced on www.astm.org.

E3027 Guide for Making Sustainability-Related Chemical Selection Decisions in the Life-Cycle of Products
E3032 Guide for Climate Resiliency Planning and Strategy
E3096 Guide for Definition, Selection, and Organization of Key Performance Indicators for Environmental Aspects of Manufacturing Processes
E3123 Guide for Recognition and Derecognition of Environmental Liabilities
E3130 Guide for Developing Cost-Effective Community Resilience Strategies
E3136 Guide for Climate Resiliency in Water Resources
E3181 Practice for Determination of the Converted Fraction of Starch and Cellulosic Content From a Fuel Ethanol Production Facility
E3183 Guide for Harvesting Coal Combustion Products Stored in Active and Inactive Storage Areas for Beneficial Use
E3210 Practice for Infrastructure Management
E3228 Guide for Environmental Knowledge Management
E3240 Guide for Risk-Based Corrective Action for Contaminated Sediment Sites
E3249 Guide for Remedial Action Resiliency to Climate Impacts
E3256 Practice for Reference Scenarios When Evaluating the Relative Sustainability of Bioproducts
E3302 Guide for PFAS Analytical Methods Selection
E3341 Guide for General Principles of Resilience
E3350 Guide for Community Resilience Planning for Buildings and Infrastructure
E3356 Guide for Stakeholder Engagement on Environmental Risk Management and Climate
D7612 Practice for Categorizing Wood and Wood-Based Products According to Their Fiber Sources

2.2 *ISO Standards:*[4]
ISO 14000 Environmental management
ISO 14001 Registrar - Environmental Mgmt System
ISO 14026 Environmental labels and declarations
ISO 14024 Environmental labels and declarations
ISO 14025 Environmental labels and declarations
ISO 14040 Environmental management
ISO 14046 Environmental management
ISO 14064 Greenhouse Gases Package
ISO 14065 General principles and requirements for bodies validating and verifying environmental information
ISO 14066 Environmental information
ISO 26000 Social responsibility
ISO 27000 Information security management

2.3 *Other Referenced Documents:*
United States Code of Federal Regulations (CFR), Title 40, Chapter I, Subchapter C, Part 98 Mandatory Greenhouse Gas (GHG) Reporting Requirements (40 CFR Part 98)
IEEE/ASTM SI 10 American National Standard for Use of the International System of Units (SI): The Modern Metric System
NIST Guide for Environmentally Sustainable Investment Analysis Based on ASTM E3302, March 2021, https://nvlpubs.nist.gov/nistpubs/ams/NIST.AMS.200-11.pdf

[4] Available from International Organization for Standardization (ISO), ISO Central Secretariat, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, https://www.iso.org.

3. Terminology

3.1 *Definitions:*

3.1.1 The terms used in this guide have been defined previously in other documents and in ASTM standards. ASTM standards are referenced where applicable

3.1.2 *climate change, n*—a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. **E3032**

3.1.2.1 *Discussion*—The United Nations Framework Convention on Climate Change, in Article 1, defines "climate change" as: "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods." The UNFCCC thus makes a distinction between "climate change" attributable to human activities altering the atmospheric composition, and "climate variability" attributable to natural causes. The exclusion of climate change not attributed to human activity within the definition of climate change is a point of difference between different organizations and conventions. The guide user should consider whether to include factors not attributed to human activity in their definition of climate change specific to the disclosures they are pursuing.

3.1.3 *climate change adaptation, n*—the adjustments that communities or ecosystems make to limit the negative effects of climate change or to take advantage of opportunities provided by a changing climate.

3.1.3.1 *Discussion*—ASTM E3032 Standard Guide for Climate Planning and Strategy defines adaptation as actions to reduce the adverse consequences of extreme weather and harness opportunities; it is not explicit about climate changes that may be more gradual than extreme weather. See Section 5 for discussion of regulatory developments and Section 6 for discussion of disclosure frameworks and standards that address climate change adaptation and the management of climate-related risks.

3.1.4 *climate risk, n*—social, cultural, economic, health, and environmental impacts associated with more severe or frequent extreme weather events, or long term chronic changes in conditions such as sea level rise, saltwater intrusion, or droughts, associated with climate change.

3.1.5 *financial impacts attributed to climate change, n*—the material financial impacts on a company's performance, operations, assets, and liabilities attributed to climate change effects, including but not limited to real or expected risks of physical damage to facilities, regulatory costs and incentives, and shifts in the market for products and services (including stranded assets). **E2718-21**

3.1.5.1 *Discussion*—Trends in climate and weather over the long term have the potential to result in substantial impacts to the local built and natural environment including financial impacts. (See E3136.) See Sections 5, 6, 7, 8, 9, and 10 for further discussion on this topic.

3.1.6 *greenhouse gas (GHG), n*—Greenhouse gases (GHGs) are gases that absorb infrared radiation, such as water vapor, thereby trapping heat in the atmosphere and making the planet warmer; and the most important greenhouse gases directly emitted by human activities, that may be reportable, include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and several fluorine-containing halogenated substances (HFCs, PFCs, SF6 and NF3).

3.1.6.1 *Discussion*—The disclosures applicable to this guide focus on GHGs found in the USEPA Annual Inventory of GHG Emissions and Sinks, pursuant to the UN Framework Convention on Climate Change (UNFCCC). The seven categories of anthropogenic GHGs tracked in the national GHG inventories, pursuant to the UNFCC, include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF6), and nitrogen trifluoride (NF3). (See E2725, E2893, E3181). Refer to: 40 U.S. CFR Part 98, and the American Innovation and Manufacturing Act (AIM Act) (Pub. L. 116-260; dated 12/27/2020; effective 11/04/2021). The GHG Protocol, developed in a multi-stakeholder process undertaken in the late1990s, included a standardized measurement of GHG emissions. The first edition of the GHG Protocol was published in 2001 and has since been updated. The USEPA Annual GHG Inventory and international greenhouse gas inventories do not include requirements to measure and report on water vapor or ozone. Refer to: USEPA 2023 Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021. U.S. Environmental Protection Agency, EPA 430-R-23-002, available at: https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-andsinks-1990-2021.

3.1.7 *resilience, n*—the capacity of social, economic, and environmental systems to withstand and rapidly recover from a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning and transformation. **E3032, E3341**

3.1.8 *stakeholders, n*—individuals, organizations, communities, or other entities that affect or are affected by an organization, an event, an action, a regulation, or a policy.

3.1.8.1 *Discussion*—Stakeholders may include, but are not limited to, owners, buyers, developers, lenders, insurers, investors, employees, customers, consumers, suppliers, government agencies, nongovernment organizations, tribal organizations, and community members, groups, and advocates. (See E2013, E2081, E2091, E2205, E2541, E3183, E3240, E3350, E3356.)

3.1.9 *value chain, n*—the upstream and downstream activities related to an organization's operations.

3.1.9.1 *Discussion*—Upstream activities in connection with a value chain may include activities by a party other than the organization that relate to the initial stages of an organization's production of a good or service (such as materials sourcing, materials processing, and supplier activities). Downstream activities in connection with a value chain may include activities by a party other than the organization that relate to processing materials into a finished product and delivering it or providing a service to the end user (such as transportation and distribution, processing of sold products, use of sold products, end of life treatment of sold products, and disposal of production wastes).

3.2 *Acronyms:*

3.2.1 *CDP*—Carbon Disclosure Project

3.2.2 *CDSB*—Climate Disclosure Standards Board

3.2.3 *CSR*—corporate sustainability reporting

3.2.4 *DOE*—U.S. Department of Energy

3.2.5 *EPA*—U.S. Environmental Protection Agency

3.2.6 *FSOC*—Financial Stability Oversight Council

3.2.7 *FTC*—U.S. Federal Trade Commission

3.2.8 *GHG*—greenhouse gas

3.2.9 *GRI*—Global Reporting Initiative

3.2.10 *IFRS*—International Financial Reporting Standards Foundation

3.2.11 *IPCC*—Intergovernmental Panel on Climate Change

3.2.12 *ISO*—International Organization for Standardization

3.2.13 *ISSB*—International Sustainability Standards Board

3.2.14 *LCA*—life cycle assessment

3.2.15 *NGO*—non-government organization

3.2.16 *NIST*—National Institute for Standards and Technology, U.S. Department of Commerce

3.2.17 *NOAA*—National Oceanic and Atmospheric Administration, in U.S. Department of Commerce

3.2.18 *PRI*—UN Principles for Responsible Investment

3.2.19 *SASB*—Sustainability Accounting Standards Board

3.2.20 *SBTi*—Science Based Targets initiative

3.2.21 *SEC*—U.S. Securities and Exchange Commission

3.2.22 *SDG*—United Nations Sustainable Development Goals

3.2.23 *TAS*—tribal treatment in the same manner as a state

3.2.24 *TCFD*—Task Force on Climate-Related Financial Disclosures

3.2.25 *UN*—United Nations

3.2.26 *UNDRIP*—UN Declaration on the Rights of Indigenous Peoples

3.2.27 *WEF*—World Economic Forum

3.2.28 *WRI*—World Resources Institute

4. Significance and Use

4.1 *Purpose*—This guide provides an overview of frameworks used for environmental, social, and governance (ESG) disclosures applicable to a variety of organizations. This guide provides users with information on the history of ESG disclosure frameworks, the components that comprise ESG disclosures, the target audience of these disclosures, and the challenges associated with this topic.

4.2 *How to Use Information*—This guide is intended to provide a brief overview of ESG disclosure frameworks and considerations. The users of this guide are encouraged to

review the sections of this guide and the supplemental information provided in the Appendices to this guide which include example templates and further discussion on key topics relevant to ESG disclosures.

4.3 *Who Should Use Information*—The intended users of this guide may include a diverse range of stakeholders such as industries and companies that use, make, or sell products; regulators at federal, state and local levels; consultants and vendors; consumers; investors; academic researchers and students; non-governmental organizations (NGOs); and community constituents. Over the past 35 years, this topic has been the subject of increasing corporate, regulatory, consumer, ratings agencies, and stakeholder interest.

4.4 *Regulatory Context*—This guide reviews regulatory developments regarding ESG disclosures in the U.S. and internationally. This guide provides a brief overview of regulatory developments and trends regarding ESG disclosures. Users of this guide should stay current on the regulatory requirements applicable to their operations, products, services, and supply and value chains.

4.5 *Frameworks*—This guide provides an overview of ESG disclosure frameworks in the U.S. and internationally. There are several voluntary frameworks that provide guidance for ESG disclosures, such as GRI, TCFD, the Value Reporting Foundation, and the Stakeholder Capital Metrics framework (developed by the World Economic Forum and the major accounting firms). In the U.S., the practice of voluntary, market-led disclosures using multiple guidelines is developing into a more standardized but flexible approach. This stands in contrast to the European Union where specific standardized directives have been adopted.

4.6 *Professional Judgement*—An organization's ESG disclosures require professional judgement regarding approaches to the selected ESG elements, and their alignment with the organization's actual practices, as considered alongside many other factors. Explanations should be clear, concise, and well documented regarding how ESG disclosures were made and evaluated using goals established under selected ESG frameworks. Policies and procedures that address ESG disclosures should be documented and part of the organization's relevant practices. Compliance personnel should be knowledgeable about the organization's specific ESG-related practices. Factors requiring professional judgement should include a clear, well documented rationale.

4.7 This guide is not intended to replace or supersede federal, state, local, or international regulatory requirements. Users of this guide should confirm the regulatory guidance and requirements for the jurisdiction in which they are working. This guide may be used to complement and support such requirements. This guide does not replace the need for engaging competent persons in ESG disclosure.

5. Regulatory Requirements, Guidelines, Directives, Initiatives

5.1 In the U.S. and internationally, governments and regulatory agencies enact rules, issue guidance, and implement initiatives and directives to require and encourage ESG disclosures. A brief overview follows with weblinks for specific tools and resources found in Appendix X1.

5.2 In addition to summaries of final regulations, this section also includes brief summaries of a few significant proposed rules to alert users of this guide to potential regulatory changes that are under consideration at the time of writing, so that they may watch for coming final rules that may affect their climate and ESG disclosures. Users of this guide should confirm the status of agency regulations and requirements. The rule proposals discussed in this guide are for information purposes only and are subject to change if/when the rules are finalized. This section of the guide describes relevant proposed regulations to make the reader aware of changes in the law that are under consideration, some of which may or may not be adopted in an upcoming final rule. Proposed regulations are not final or binding. The description provided in this guide is not intended as either legal advice or as an endorsement of any such proposal. The user should consult with legal counsel for legal advice based on the user's specific facts, fiduciary duties, and applicable law.

5.3 *United States Federal:*

5.3.1 *The U.S. Securities and Exchange Commission (SEC):*

5.3.1.1 SEC Division of Enforcement developed a Task Force on Climate and ESG in 2020. The SEC Divisions of Corporation Finance provided Guidance Regarding Disclosure Related to Climate Change (2010, currently under revision). The SEC Division of Investment Management, Division of Examinations, Investor Advisory Committee has provided communications related to climate change. Refer to: https://www.sec.gov/

5.3.1.2 In August 2020, the SEC adopted amendments to modernize the description of business (Item 101), legal proceedings (Item 103), and risk factor disclosures (Item 105) that organizations are required to make pursuant to SEC Regulation S-K. These disclosure requirements had not undergone significant revisions in over 30 years.

5.3.1.3 In spring 2021, the SEC issued a request for public comment on ESG disclosure related to climate and community, with responses compiled for review in fall 2021, leading to a March 2022 rule proposal.

5.3.1.4 In Sept. 2021, the SEC's Division of Corporation Finance released a sample letter it sent to companies regarding climate change-related risks and opportunities that may be required in their disclosures.

5.3.1.5 In March 2022, the SEC proposed rules to enhance and standardize climate-related disclosures for investors. The SEC may revise the disclosure requirements before finalizing the rule in Fall 2023, based on public comments filed in June 2022. Refer to: https://www.sec.gov/news/press-release/2022-46. The user should be aware of this development and review the final SEC rules when published. Refer to SEC rules index at: https://www.sec.gov/rules/rulemaking-index.shtml

5.3.1.6 In May 2022, the SEC proposed rules to enhance disclosures by certain investment advisers and investment companies about environmental, social, and governance (ESG) investment practices. The notice of proposed rulemaking is available at: https://www.sec.gov/rules/proposed/2022/33-11061.pdf. A fact sheet summary is available at: https://

www.sec.gov/files/ia-6034-fact-sheet.pdf Guide users should be aware of this development and review the final rule when published.

5.3.2 *The U.S. Department of Treasury:*

5.3.2.1 The U.S. Department of the Treasury's Climate Action Plan (July 2021) focuses on Executive Order 14008 Section 211 (Climate Action Plans and Data and Information Products to Improve Adaptation and Increase Resilience) and Treasury's efforts with regards to its facilities and operations to improve adaptation and increase resilience to the impacts of climate change. The U.S. Treasury is also supporting the development of a governmentwide Climate-Related Financial Risk Strategy, pursuant to Executive Order 14030 (Climate-Related Financial Risk).

5.3.2.2 The U.S. Department of Treasury's Office of the Comptroller of the Currency, with the U.S. Federal Deposit Insurance Corporation, proposed risk management principles in 2021 and 2022 to provide guidance to banking organizations they supervise with over $100 billion in total assets as they develop capabilities and deploy resources to manage climate-related financial risks. The principles cover six areas: governance; policies, procedures, and limits; strategic planning; risk management; data, risk measurement and reporting; and scenario analysis. Refer to: Fed Notes on Climate Change and Financial Stability (March 19, 2021).

5.3.2.3 The U.S. Department of the Treasury's Financial Stability Oversight Council (FSOC) released in October 2021 a new report on climate-related financial risk. The U.S. Treasury Department Climate Hub, Climate Counselor, and Financial Stability Oversight Council indicated they are in the process of evaluating climate change.

5.3.2.4 The U.S. Treasury Department's Federal Insurance Office released a report entitled, Insurance Supervision and Regulation of Climate-Related Risks (June 2023). The report, issued in response to the White House Executive Order 14030 on Climate-Related Financial Risk (May 2021), is part of broader efforts the Federal Insurance Office is undertaking to assess climate-related risks to the insurance industry. See: https://home.treasury.gov/news/press-releases/jy1579

5.3.3 The U.S. Federal Trade Commission published a request for information (December 20, 2022) to assist in the FTC's decision whether to revise its environmental marketing guidelines known as 'Green Guides' (16 CFR Part 260) to address statements or disclosures regarding climate change or greenhouse gas reduction goals. The current 'Green Guides' contain guidelines for marketing claims regarding certifications and seals of approval; carbon off sets; free-of claims; non-toxic claims; made with renewable energy claims; and made with renewable materials claims. Comments were filed in May 2023. If the FTC proceeds, a notice of proposed rule-making could be published in 2023 and a final rule could be published in 2024.

5.3.4 The U.S. Commodity Futures Trading Commission published a request for information to inform its understanding and oversight of climate related financial risk in the derivatives markets and commodities markets (Federal Register, June 8, 2022). Responses will be used to inform the Commission's approach to the recommendations of the Financial Stability Oversight Council's Report on Climate-Related Financial Risk (Oct. 2021) and inform the ongoing work of the Commission's Climate Risk Unit. The 2021 report recommendations include enhanced public climate-related disclosures.

5.3.5 *The U.S. Federal Reserve Board:*

5.3.5.1 The US Federal Reserve Board is conducting a 2023 pilot Climate Scenario Analysis (CSA) exercise to learn about large banking organizations' climate risk-management practices and challenges and to enhance the ability of both large banking organizations and supervisors to identify, measure, monitor, and manage climate-related financial risks. This pilot exercise will support the Board's responsibilities to ensure that supervised institutions are appropriately managing all material risks, including financial risks related to climate change. Refer to: https://www.federalreserve.gov/publications/climate-scenarioanalysis-exercise-instructions.htm

5.3.5.2 The U.S. Federal Reserve Board invited public comment on proposed principles providing a high-level framework for the safe and sound management of exposures to climate-related financial risks for large banking organizations (Dec. 2, 2022, Docket No. OP- 1793). See: https://www.federalreserve.gov/ and https://www.federalreserve.gov/newsevents/pressreleases/other20221202b.htm

5.3.5.3 The U.S. Federal Reserve Board issued a bulletin (Fed Notes, March 19, 2021) on Climate Change and Financial Stability which describes an approach to understanding how risks arising from climate change may affect financial stability and connects this discussion to the financial stability monitoring framework described in the Federal Reserve's Financial Stability Reports. The U.S. Federal Reserve is evaluating climate risk and vulnerabilities in the U.S. economy and in sectors such as insurance, banking, real estate, and global supply chains.

5.3.6 *The U.S. Department of Energy (US DOE):*

5.3.6.1 The US DOE released in March 2022 new building energy code final rules (10 CFR Part 430) for federal buildings and in April and May 2023 issued new rules (10 CFR Part 429 and 430) containing standards for consumer appliances, including room air conditioners, air cleaners, and pool heaters. All new buildings and major retrofits constructed by the Federal government must comply with the 2021 International Energy Conservation Code (IECC) and the 2019 American Society of Heating, Refrigerating, and Air Conditioning Engineers Standard 90.1 building energy codes. In February 2020, the US DOE issued in a final rule the Energy Conservation Program for Appliance Standards: Procedures for Use in New or Revised Energy Conservation Standards and Test Procedures for Consumer Products and Commercial/Industrial Equipment. The Federal government plans to finalize more than 100 proposed and final actions for appliance and equipment standards. See: https://www.regulations.gov/document/EERE2017-BT-STD-0062-0163. See: https://www.energy.gov/eere/buildings/appliance-and-equipmentstandards-program

5.3.6.2 The US DOE established the Better Climate Challenge in February 2022, to challenge organizations to set ambitious, portfolio wide GHG emission reduction goals. This new effort provides additional opportunities for peer exchange and technical assistance to mitigate the impacts of climate

change. Through the Better Climate Challenge, organizations can partner with US DOE to reduce portfolio wide GHG emissions. US DOE provides technical assistance and opportunities to learn and share actionable best practices for carbon reduction. US DOE program overview and resources are available at: www.energy.gov Resources and tools developed by the US DOE include the 50001 Ready Navigator, an online application that provides step-by-step guidance for implementing and maintaining an energy management system in conformance with the ISO 50001 Energy Management System Standard. Refer to: https://navigator.lbl.gov/

5.3.7 *The U.S. Environmental Protection Agency (US EPA):*

5.3.7.1 The US EPA implemented the Greenhouse Gas Reporting Program (GHGRP) in 2009 (refer to 40 CFR Part 98) with revised rules in subsequent years. The GHGRP requires annual reporting by March 31 each year of greenhouse gas (GHG) data for the preceding year from large GHG emission sources, fuel and industrial gas suppliers, and CO_2 injection sites in the United States. Annual emissions reporting is required by approximately 8,000 facilities, and the data reported in March are made available to the public in October of each year. The GHG Reporting Program provides information on how the source category is defined, the greenhouse gases required to be reported, how emissions must be calculated, what information must be reported, when and how reports are submitted, and under what circumstances a facility may stop reporting. The complete list of data elements that must be reported and records that must be retained under 40 CFR Part 98 (Mandatory Greenhouse Gas Reporting) are available online in the e-CFR. See: https://www.epa.gov/ghgreporting

5.3.7.2 The US EPA proposed amendments to the GHGRP rules in 2022 (FR Vol. 87, No. 118, dated June 21, 2022). The US EPA published a supplemental notice of additional proposed rule revisions on May 22, 2023. The agency plans to issue additional supplemental notices of proposed rulemaking in 2023 to propose revisions in Subpart W to implement provisions of the Inflation Reduction Act directing US EPA to collect a methane fee based on "empirical evidence" for certain sources of methane that exceed specified methane intensity thresholds. The May 2023 Federal Register notice (88 FR 32852) is available at: https://www.govinfo.gov/content/pkg/FR-2023-05-22/pdf/2023-10047.pdf. The June 2022 rule proposal is available at: https://www.govinfo.gov/content/pkg/FR-2022-06-21/pdf/2022-09660.pdf. See: https://www.epa.gov/ghgreporting and https://www.epa.gov/ghgreporting/rulemaking-noticesghg-reporting

5.3.7.3 The US EPA issued a supplemental proposal (on December 6, 2022) to update, strengthen, and expand the proposed standards (of November 15, 2021), which are intended to significantly reduce emissions of greenhouse gases (GHGs) and other harmful air pollutants from the Crude Oil and Natural Gas source category. The Federal Register notices are available at: https://www.govinfo.gov/content/pkg/FR-2022-12-06/pdf/2022-24675.pdf and https://www.govinfo.gov/content/pkg/FR-2021-11-15/pdf/2021-24202.pdf. Also see: https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry

5.3.7.4 The US EPA proposed rules (in May 2023) which include five separate actions under section 111 of the Clean Air Act (40 CFR Part 60) addressing greenhouse gas (GHG) emissions from fossil fuel-fired electric generating units (EGUs). The public comment period was extended (to August 8, 2023). The final rule may be issued in 2024 and may include some GHG reporting requirements or may affect reporting under the GHGRP. Refer to: https://www.epa.gov/stationary-sources-air-pollution/greenhouse-gasstandards-and-guidelines-fossil-fuel-fired-power

5.3.7.5 The US EPA regulations at 40 C.F.R. Part 60, Subpart OOOOa require certain major sources of GHGs in certain segments of the Crude Oil and Natural Gas source category to deploy leak detection and repair or other actions to reduce methane emissions. US EPA published a notice of proposed rule-making (November 15, 2021) and a supplemental notice (December 6, 2022) seeking public comment on US EPA proposals to revise and to update, strengthen, and expand the standards proposed on November 15, 2021. The proposed rules are intended to significantly reduce emissions of greenhouse gases (GHGs) and other harmful air pollutants from the GHG reduction actions to be mandated under US EPA's new source performance standards (NSPS) for new sources and Guidelines to States for existing sources in segments of the Crude Oil and Natural Gas source category. The final Clean Air Act NSPS will affect reporting under Subpart W of the GHGRP, because the U.S. Congress required US EPA under the Inflation Reduction Act of 2022 to impose a methane fee on emissions exceeding certain thresholds of methane emissions reported under Subpart W, but it allowed an exemption for entities subject to and in compliance with the methane NSPS regulations. After reviewing comments filed on the rule proposal notices, US EPA is expected to issue a new final rule in 2023.

5.3.7.6 The US EPA is directed under the American Innovation and Manufacturing (AIM) Act of 2020 to develop a U.S. production baseline and a U.S. consumption baseline and to phase down the production and consumption of climate-damaging hydrofluorocarbons (HFCs) in production and consumption relative to those baselines. Data reported to the GHGRP under 40 CFR Part 98.360 Subpart OO, Suppliers of Industrial Greenhouse Gases, are relevant to the production and consumption baselines. Companies that produce, import, export, destroy, use as a feedstock, reclaim, package, or otherwise distribute HFCs may be affected by the final rule. Companies may also be affected if they use HFCs to manufacture refrigeration and air-conditioning equipment, foams, aerosols, and fire suppressants, or use HFCs in one of the six applications specified in the AIM Act. Refer to: https://www.epa.gov/climate-hfcsreduction/aim-act

5.3.7.7 The US EPA administers the ENERGY STAR program, a voluntary labeling program for which the US EPA sets energy efficiency specifications and those that meet them can choose to display the ENERGY STAR logo. The program, launched in 1992, has been expanded and updated over the past 30 years. See: https://www.energystar.gov/about/how_energy_star_works/ENERGY_STAR_certification

5.3.8 *The U.S. Federal Acquisition Regulations (FAR):*

5.3.8.1 The FAR are the primary regulations for use by all Federal Executive agencies in their acquisition of supplies and services with appropriated funds. The FAR became effective on April 1, 1984, and are issued pursuant to applicable statutes under the joint authorities of the U.S. Administrator of General Services (GSA), the U.S. Secretary of Defense (DOD), and the U.S. Administrator for the National Aeronautics and Space Administration (NASA), under the broad policy guidelines of the Administrator, U.S. Office of Federal Procurement Policy, U.S. Office of Management and Budget (OMB) (collectively "FAR Council"). Refer to: 48 CFR Parts 1, 4, 9, 23 and 52.

5.3.8.2 On November 14, 2022, the FAR Council published a proposed rule regarding the Disclosure of Greenhouse Gas Emissions and Climate-Related Financial Risk Rule by certain federal contractors. The Federal Register Notice (dated Nov. 14, 2022) with comment extension notice (dated Dec. 23, 2022) is available at: https://www.govinfo.gov/content/pkg/FR-2022-11-14/pdf/2022-24569.pdf. Public comments are on the proposed rule are available at: https://www.regulations.gov/docket/FAR-2021-0015/comments.

5.3.9 The U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) published a proposed rule-making (Federal Register, dated May 5, 2023) for regulatory amendments that implement congressional mandates in the Protecting our Infrastructure of Pipelines and Enhancing Safety Act of 2020 to reduce methane emissions from new and existing gas transmission pipelines, distribution pipelines, regulated (Types A, B, C and offshore) gas gathering pipelines, underground natural gas storage facilities, and liquefied natural gas facilities by updating federal leak detection and repair standards. Refer to: https://www.phmsa.dot.gov/regulations/gas-pipeline-leakdetection-and-repair-nprm

5.4 *U.S. States, Tribes, and Municipalities:*

5.4.1 Some states, federally recognized tribal governments, and municipalities, including townships, counties, and parishes, have enacted rules to require the reporting of climate related emissions data. Emissions and climate-related examples are discussed below. Additional examples are discussed in Appendix X2.

5.4.2 New Jersey enacted the Global Warming Response Act (GWRA) (P.L. 2007 c.112; P.L. 2018 c.197) which includes an annual statewide greenhouse gas emissions inventory as a tool for tracking progress in reducing GHGs emissions. The inventory includes estimates for carbon dioxide (CO_2), methane (CH4), nitrous oxide (N_2O), and fluorinated gases with high global warming potentials, along with estimates for carbon sequestration. There are additional climate pollutants that are tracked separately outside of the GHG inventory, specifically, black carbon. Refer to: https://dep.nj.gov/ghg/nj-ghg-inventory/ and https://www.nj.gov/dep/climatechange/

5.4.3 The City of Boston MA enacted the Building Energy Reporting and Disclosure Ordinance (BERDO) which requires building owners, tenants, and other stakeholders to track and report their energy usage and greenhouse gas emissions and to reduce both. This ordinance requires the City of Boston to make these data available to the public.

5.4.4 The City of Philadelphia PA enacted the 2019 Building Energy Performance Program (BEPP). This program is commonly referred to as Building Tune-ups. The City of Philadelphia Office of Sustainability (OOS) passed regulations that provide more detail to the policy in Fall 2020. The City of Philadelphia amended Chapter 9-3400 of The Philadelphia Code, entitled "Energy Conservation", to add a new Section 9-3403, entitled "Building Energy Performance Policy," to require owners of certain large buildings to conduct tune-ups of the energy and water systems in such buildings, under certain terms and conditions. The City of Philadelphia's Office of Sustainability established a comprehensive Green Works Plan. The City of Philadelphia tracks and reports on key sustainability metrics relevant to that plan. These include energy and water usage in large commercial buildings as tracked and reported against benchmarks.

5.4.5 The Montgomery County Council of Maryland enacted Building Energy Performance Standards (BEPS) legislation (Bill 16-21) in April 2022. The BEPS Law of 2021 builds on the County's existing Building Energy Benchmarking Law of 2014, which requires owners of certain buildings to report annual energy use to Montgomery County Department of Environmental Protection (DEP) each year. The BEPS Law (1) expands the number of buildings covered by benchmarking requirements; (2) amends certain definitions; (3) established energy performance standards for covered buildings with certain gross floor area; (4) created a Building Performance Improvement Board; and (5) revised County law regarding environmental sustainability. Resources related to the process of energy benchmarking are available at: https://www.montgomerycountymd.gov/green/energy/benchmarking.html

5.4.6 New Jersey enacted the Clean Energy Act of 2018 that requires owners or operators of commercial buildings over 25,000 square feet to benchmark their buildings' energy and water usage within five years. The New Jersey Board of Public Utilities notified these building owners and operators of the October 2023 deadline to input 2022 usage data into the ENERGY STAR Portfolio Manager system. Refer to: https://njcleanenergy.com/commercial-industrial/programs/cea-benchmarking

5.4.7 Cities, counties, and states around the U.S. have passed benchmarking and disclosure laws to improve the energy performance of large buildings. As of spring 2022, annual benchmarking is required by over 40 U.S. municipalities covering more than eleven billion square feet nationally by mandatory programs. Metrics indicate that 40 to 70 percent of emissions in a municipality result from buildings. Significant opportunities exist going for energy efficiency among the largest buildings in a municipality, as benchmarking measures actual performance rather than design performance. Benchmarking refers to the process of measuring and comparing performance metrics. By entering data in the free web-based ENERGY STAR Portfolio Manager program provided by the US EPA, a building owner can receive standardized metrics to measure and compare energy efficiency between its buildings and similar facilities. Refer to the ENERGY STAR Portfolio

Manager Quick Start Guide (May 2022). Also see Section 5.3.7.7. Refer to: https://www.energystar.gov/buildings/benchmark

5.4.8 Benchmarking and disclosure laws to improve the energy performance of large buildings often require the reporting and disclosure of total GHG emissions intensity for buildings. This requirement currently exists in many municipal codes and laws. The relevant greenhouse gas emissions from a building come not just from those on site but also the emissions from the source of the energy used in the building. Emissions intensities for other types of operations compare emissions to other metrics such as throughput. The total Greenhouse Gas emissions from the building and from energy delivered to the building divided by the floor area of the building, reported in kilograms of carbon dioxide equivalent (CO_2e) per square foot ($kgCO_2e/ft^2$), represents the total GHG emissions intensity of the building. Refer to: https://www.energystar.gov/buildings/benchmark/understand_metrics/what_eui

5.4.9 The National Building Performance Standards Coalition, launched in January 2022 with 33 initial participants, is comprised of a nation-wide group of state and local governments committed to inclusively design and implement equitable building performance standards and complementary programs and policies. Resources and technical assistance are provided by federal agencies including USEPA and USDOE, as well as labor and NGOs. The Coalition is working to advance legislation and/or regulation, with a goal of adoption by April 2024. Refer to: https://nationalbpscoalition.org/#about

5.4.10 The Arlington County Virginia Board launched the 2007 Arlington Initiative to Reduce Emissions (AIRE) as the county's climate action program. In 2013, AIRE updated its name to the Arlington Initiative to Rethink Energy. The County set goals or targets, established a dedicated funding source for projects, dedicated staff with requisite expertise, integrated energy efficiency into the project review process, benchmarked and disclosed public building energy performance on Building Energy Report Cards, and conducts staff educational programs. Arlington County is a Compact of Mayors signatory and a Carbon Disclosure Project (CDP) participant, so its greenhouse inventory updates meet international standards and can be compared with other communities around the world. The County tracks multiple energy metrics and performance indicators by using advanced energy management information systems and data analytics tools for decision making. This is an example of significant actions taken by local governments to reduce GHG emissions and implement climate adaptation measures. Refer to: https://www.arlingtonva.us/Government/Programs/Sustainability-and-Environment/Energy. Also see: https://dx.doi.org/10.2139/ssrn.3952722

5.4.11 *Tribal Governments*—Several federal environmental laws authorize USEPA to treat eligible federally recognized Indian tribes in a similar manner as a state (TAS) for implementing and managing certain environmental programs. The Clean Air Act, Clean Water Act, and Safe Drinking Water Act expressly provide the authority for Indian tribes to play essentially the same role in Indian country that states do within state lands. Refer to: https://www.epa.gov/tribal/tribes-approved-treatment-state-tas. Also refer to the UN Declaration on the Rights of Indigenous Peoples (UNDRIP).

5.5 *International:*

5.5.1 The European Union (EU) Financial Stability, Financial Services and Capital Markets Union published a regulation on Sustainability-Related Disclosures in the Financial Services Sector (Dec. 2020). The EU released its updated Sustainable Finance Strategy and Implementation of the Action Plan on Financing Sustainable Growth (August 2020). The European Union enacted Sustainable Finance Disclosure Regulations (SFDR) (in 2019, effective March 2021). Under the SFDR, firms must make both firm-level and product-level disclosures about the integration of sustainability risks, the consideration of adverse sustainability impacts, the promotion of environmental or social factors, and sustainable investment objectives. Refer to: https://www.eurosif.org/

5.5.2 The European Commission adopted (April 2022, effective January 2023) a set of technical standards used by financial market participants when disclosing sustainability-related information under the Sustainable Finance Disclosures Regulation (SFDR) which specifies the exact content, methodology and presentation of the information to be disclosed, thereby improving its quality and comparability. The EU released Regulatory Technical Standards and Benchmarking Methodology (effective in 2020). Refer to: https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainablefinance_en. The Joint Research Centre (JRC) of the European Commission works closely with research and policy organizations in the Member States, with the European institutions and agencies, and with scientific partners in Europe and internationally, including within the United Nations system, to provide science and knowledge services such as their joint evaluation of the well-to-wheels energy use and GHG emissions for a wide range of potential future fuel and powertrain options analysis.

5.5.3 The European Commission adopted (on July 31, 2023) the European Sustainability Reporting Standards (ESRS) for use by all companies subject to the Corporate Sustainability Reporting Directive (CSRD) which became effective in January 2023. The standards cover the full range of environmental, social, and governance (ESG) issues, including climate change, biodiversity and human rights.

5.5.4 The European Commission adopted the Taxonomy Regulation for Climate Change Mitigation (June 2020). Refer to: https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainablefinance/eu-taxonomy-sustainable-activities_en

5.5.5 The European Union has developed Sustainability Benchmarks, an EU Green Bond Standard, and measures to strengthen how ESG factors are being considered including Guidelines on Disclosure Requirements for Credit Ratings. The European Commission issued a proposal (in May 2018) for a regulation creating two types of low carbon benchmarks and requiring environmental, social and governance (ESG) disclosure requirements for benchmarks. The 2019 EU Regulation on EU climate transition benchmarks, EU Paris-aligned benchmarks, and sustainability-related disclosures for benchmarks was published in the Official Journal (December 2019)

and entered into application (April 2020). The European Commission adopted new rules (July 2020) setting out minimum technical requirements for the methodology of EU climate benchmarks. The delegated acts were published and entered into application (in December 2020).

5.5.6 The EU Emissions Trading System (EU ETS), set up in 2005, is the world's first international emissions trading system. Refer to: https://www.eea.europa.eu/data-and-maps/dashboards/emissionstrading-viewer-1 and https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets_en. As of April 2020, there were 61 carbon pricing initiatives around the world already implemented or planned for implementation, including 31 emissions trading schemes and 30 carbon tax initiatives. For more information, refer to the International Energy Agency (IEA) report issued in July 2020, available at: https://iea.blob.core.windows.net/assets/2551e81a-a401-43a4-bebda52e5a8fc853/Implementing_Effective_Emissions_Trading_Systems.pdf

5.5.7 The Basel Committee on Banking Supervision published in 2021 a public consultation on principles for the effective management and supervision of climate-related financial risks. The document forms part of the Committee's holistic approach to address climate-related financial risks to the global banking system and aims to promote a principles-based approach to improving both banks' risk management and supervisors' practices in this area. The Basel Committee's Task Force on Climate-related Financial Risks (TFCR) is charged with undertaking the Committee's work on climate-related financial risks. This work includes review of existing initiatives, analytical reports, and effective supervisory practices to mitigate climate-related financial risks. Refer to: https://www.bis.org/press/p210414.htm

5.5.8 The Singapore Exchange (SGX) began a phased approach to requiring companies to provide climate-related reporting as well as disclosures on board diversity starting in financial year 2022. All issuers must provide climate reporting on a "comply or explain" basis in their sustainability reports from the financial year starting 2022. Climate reporting became mandatory for issuers in the financial, agriculture, food, and forest products, as well as energy industries from the financial year 2023. Those in materials and buildings, and transportation industries will have to comply from 2024. The SGX also mandated disclosures on specific disclosures around board diversity. Refer to: https://www.sgx.com/sustainable-finance/sustainability-reporting and https://corp.sgx.com/mediacentre/20211215-sgx-mandates-climate-and-board-diversity-disclosures

5.5.9 The Monetary Authority of Singapore (MAS) (Singapore's Central Bank) and the Carbon Disclosure Project signed a Memorandum of Understanding to promote sustainability disclosures and enable financial institutions and corporates to better measure and monitor their ESG performance and impact. Refer to: https://www.mas.gov.sg/news/media-releases/2022/mas-and-cdp-to-jointly-promote-accessto-quality-esg-data

5.5.10 The Bank of England issued its 2021 Biennial Exploratory Scenario on the financial risks attendant to climate change. Refer to: https://www.bankofengland.co.uk/news/2022/may/boe-publishes-resultsof-the-2021-biennial-exploratory-scenario-financial-risks-from-climate-change

5.5.11 The Government of Canada enacted the Canadian Net-Zero Emissions Accountability Act in 2021. This Act enshrines in legislation the Government of Canada's commitment to achieve net-zero greenhouse gas emissions by 2050 and provides a framework of accountability and transparency to deliver on it. The Act establishes a legally binding process to set five-year national emissions-reduction targets as well as develop credible, science-based emissions-reduction plans to achieve each target. In accordance with the requirements of the Act, the federal government is required to provide updated emissions reductions plans in the milestone years of 2030, 2035, 2040, and 2045, the ultimate goal being to cut Canadian emissions to 40 percent below 2005 levels by 2050.

5.5.11.1 In March 2022, the Government of Canada released the 2030 Emissions Reduction Plan. In June 2022, the Environment and Climate Change Canada (ECCC) published the Greenhouse Gas Offset Credit System Regulations, the legally binding framework of Canada's first national carbon offset system and a step towards addressing the federal government's emission reduction goals, outlined in the 2030 Emissions Reduction Plan. In June 2022, the Government of Canada released the Compendium of Federal Offset Protocols (version 1.0) to implement Canada's greenhouse gas offset credit system. Additional protocols are in development. Additional information is available at: https://www.canada.ca/en/services/environment/weather/climatechange.html

5.5.12 The Intergovernmental Panel on Climate Change (IPCC), at its 14th session in October 1998, was tasked to oversee the IPCC National Greenhouse Gas Inventories Programme, in close collaboration with the Organization for Economic Cooperation and Development and the International Energy Agency (IEA). The Task Force on National Greenhouse Gas Inventories (TFI) was developed to work on greenhouse gas inventory related methodologies and practices. The TFI is responsible for assessing and developing inventory methods and practices that are scientifically sound and relevant to all countries to encourage the widespread use of these methodologies by countries participating in the IPCC and by Parties to the United Nations Framework Convention on Climate Change (UNFCCC). It's 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories was developed and presented for adoption and acceptance during the 49th Session of IPCC in May 2019. This internationally recognized methodology is available at: https://www.ipcc.ch/library/

5.5.13 In fall 2022, the World Resources Institute (WRI) issued a series of stakeholder surveys to commence a multi-year process to consider whether or how to revise its Protocols for disclosing Scope 1, 2 and 3 GHG Emissions, including provisions for market-based accounting for example for trading wind, solar or other renewable energy credits or the GHG emission reduction attributes of renewable natural gas. The surveys, survey responses and more information are available on the WRI GHG Protocol online at https://www.wri.org

6. Overview of ESG Disclosure Frameworks, Standards, Guidelines

6.1 This section of the guide provides an overview of ESG disclosure frameworks, standards, and guidelines. Short descriptions are provided with a quick reference summary as Table 1.

6.2 Currently, multiple ESG disclosure and reporting frameworks exist globally. These frameworks have been developed with different underlying objectives. In 2020, four of the major global frameworks (including CDP, CDSB, GRI, IIRC, and SASB) announced their commitment to align their reporting frameworks and develop a comprehensive ESG reporting framework. The frameworks and standards are designed for unique sets of stakeholders and are based on unique definitions of materiality. A brief summary of frameworks follows, below beginning with the international frameworks.

6.3 The United Nations (UN) Sustainable Development Goals (SDGs) include 17 goals and 169 targets that are integrated and balance the three dimensions of sustainable development – economic, social, and environmental. UN Sustainable Development Goal 13 aims to "take urgent action to combat climate change and its impact". Refer to: https://sdgs.un.org/goals

6.4 UN Environment Program (UNEP) Finance Initiative Principles for Responsible Investing (PRI) is a non-profit organization, developed in 2005 and supported by the UN to support sustainable finance. It seeks to incorporate ESG issues into investment analysis and decision-making processes, and it provides technical training and guidance to its signatories. In spring 2020, it released its updated Principles for Responsible Investing (PRI) which provide guidance for industry, academia, regulators, investors, consumers, and communities. The UNEP PRI guidance has been adopted by over 3,000 signatories representing 60 countries worldwide. Refer to: https://www.unpri.org/

6.5 *Sustainability Accounting Standards Board (SASB) Standards*—are designed for communication by companies to investors about how sustainability issues impact long-term enterprise value. SASB Standards can be used by companies as a practical tool for implementing the principles-based framework recommended by the Task Force for Climate-related Financial Disclosures (TCFD).

6.6 *Task Force on Climate-related Financial Disclosures (TCFD)*—provides guidance on metrics, targets, and transition plans to reduce greenhouse gas emissions and climate related risks across all areas of a company's business operations. TCFD reporting includes sections on governance, strategy, risk management, investments, and metrics, allowing companies to measure their progress and commit to reducing climate risks across all areas of their business. Refer to the TCFD Guidance on Metrics, Targets, and Transition Plans (Oct. 2021). Refer to: www.fsb-tcfd.org/

6.7 *The International Integrated Reporting Council (IIRC)*—developed the Integrated Reporting Framework, a principles-based, multi-capital, framework that is used to accelerate the adoption of integrated reporting across the world. Integrated reporting brings together material information about an organization's strategy, governance, performance, and prospects in a way that reflects the commercial, social, and environmental context within which the organization operates. This framework provides a representation of how the organization creates value now and in the future. It is informed by comprehensive metrics and disclosure topics via use of the SASB Standards. Refer to: https://www.integratedreporting.org/resource/international-ir-framework/

6.8 *Climate Disclosures Standards Board (CDSB)*—was setup in 2007 at the World Economic Forum in the absence of climate related disclosure standard setters. The CDSB Framework provides an approach for reporting environmental and social information in mainstream reports, such as annual reports, 10-K filing, or integrated report. The first CDSB, the Climate Change Reporting Framework, was released in 2010. The scope of the CDSB Framework was expanded to include social as well as environmental, including climate change, information, with the revised framework released in 2022. The CDSB provides technical guidance on climate, water, biodiversity, and social disclosures. The CDSB Framework and guidance aligns with Task Force on Climate-related Financial Disclosures and builds on widely used reporting approaches (such as CDP, GRI, SASB, IFRS). Refer to: https://www.cdsb.net/

6.9 *Global Reporting Initiative (GRI)*—founded in 1997, is an international independent standards organization that helps businesses, governments and other organizations understand and communicate their impacts on issues such as climate change. GRI's goal is to provide standards that can be used to achieve accurate, high-quality sustainability reporting. In April 2022, GRI released its revised Universal Standards 2021, and the first in a set of 40 Sector Standards. The first GRI Sector Standard is focused on the oil and gas, coal, agriculture, aquaculture, and fishing sector. Refer to: https://www.globalreporting.org/ and https://www.globalreporting.org/media/zauil2g3/public-faqsuniversal-standards.pdf

6.10 *International Sustainability Standards Board (ISSB)*—was formed in 2021. This organization has developed technical guidance and standardized prototypes for climate-related reporting. In June 2023, the ISSB issued new standards, IFRS S1 and IFRS S2, for sustainability-related disclosures in capital markets to inform investment decisions. IFRS S1 provides a set of disclosure requirements designed to enable companies to communicate to investors about the sustainability-related risks and opportunities they face over the short, medium, and long term. IFRS S2 sets out specific climate-related disclosures and is designed to be used with IFRS S1. Refer to: https://www.ifrs.org/groups/technical-readinessworking-group/#resources and https://www.ifrs.org/groups/international-sustainability-standardsboard/

6.11 *The Carbon Disclosure Project (CDP)*—, is a not-for-profit international organization that runs the global disclosure system for investors, companies, cities, states, and regions to manage their environmental impacts. The CDP provides a