CDSB Climate Disclosure Standards Board

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Climate resilient stock markets

Climate change reporting proposals for adoption or support by stock exchanges

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About this report

This report has been prepared by the Climate Disclosure Standards Board (CDSB) with funding from the Foreign and Commonwealth (FCO) Prosperity Fund, which promotes sustainable global growth. CDSB seeks to develop research and tools that elicit disclosure by corporations of environmental information that can be used by market actors for the allocation of capital to activity that supports sustainable development. This report is released to coincide with and support CDSB's activities at the UNFCCC Climate Change Conference (COP20) in December 2014 in Lima.

The primary purpose of this report is to propose climate change reporting requirements for adoption or support by stock exchanges (depending on the applicable regulatory environment). By way of background to the proposed requirements, the report briefly considers why stock exchanges should act to address climate change, the current state of stock exchange activity on climate change-related reporting and the challenges and opportunities for stock exchanges wishing to introduce or develop climate change reporting approaches. The introductory parts of the report draw extensively on the experience and research of organizations that have already considered the role of stock exchanges in addressing climate change (and other aspects of sustainability), including ACCA, Aviva, Calvert Investments, Carbon Tracker, CDP, Ceres, Corporate Knights, EIRIS and UNCTAD.

Contents

Introduction

Changing climate – changing risks

Warming of the climate system is unequivocal[1]. The scope and scale of the risks presented by climate change are well documented. Those risks have profound implications for economic growth and financial stability as well as for society and the natural world. The challenges of addressing climate change must be addressed across interdependent ecological, economic, social and political landscapes.

Climate resilience depends on making the right decisions right now

Climate resilience – the capacity to survive disturbances brought about by climate change – depends on social, political and financial infrastructures being in place to identify and mitigate risk. Decisions made now will affect the scope and scale of future climate impacts and their effect on the stability of economic, ecological, societal and other systems. Climate-literate decisions that consider how to achieve optimal outcomes for the environment as well as financial returns and societal benefits must therefore be made now to minimize future climate impacts. New risk management techniques are needed to manage *"future risks that are directly tied to present decisions[2]"*, including assessment of the future climate risks associated with investment and strategic decisions made now. Any delay will result in greater impacts from climate change and higher implementation costs of remedial action[3].

Climate-literate decisions depend on the availability of reliable information

The urgency for climate-literate decisions to be made now brings with it the imperative for new types of information about climate change-related risk – information that works at a systems level, that can be integrated into economic decision-making and that guides the allocation of capital to climate-resilient activity. Research by Ceres[4] found significant investor agreement that climate change warrants particular attention in corporate disclosure because of the widespread physical and systemic risks it presents and also the innovation opportunities that it offers. This is corroborated by evidence of the significant portfolio risk[5] that climate change presents to investors.

Climate change mitigation and adaptation depends on private investor capital

Reliable information about climate change is also crucial for unlocking the private investor capital that is critical to addressing climate-financing needs[6]. The World Economic Forum estimates that between US$700 billion and US$1 trillion per annum is required for investment in climate change-related mitigation and adaptation activities including efficient infrastructure and resilient agriculture and water resources[7].

Inaction threatens to destroy value and trust

The risks associated with climate change share many characteristics with the risks that emerged from the financial crisis[8]. In both cases, the risks are slow, imperceptible, creeping risks that are systemic in nature and lead to widespread destruction of value, loss of trust, and harm to the public interest[9]. Some commentators regard companies' failure to address climate change as tantamount to dereliction of fiduciary duty[10], exposing the directors to litigation[11] and jeopardizing corporate performance as well as the public interest.

Stock exchanges have the infrastructure, networks and experience to contribute to addressing climate change

As one of the repositories for the rights, rules, mechanisms and systems that shape economic relationships, stock exchanges have a powerful role to play in protecting stock market actors, creating the conditions for low-carbon investment and promoting incentives for the development of practices that protect natural resources and strengthen climate resilience. As providers of long-term market infrastructure with extensive networks, experience and influence, stock exchanges are in a unique and influential position to initiate or develop their contributions to the protection of financial markets through direct and indirect support for the reporting and management of climate risks and opportunities to which businesses are exposed. The value of stock exchange intervention is already evident from the action they have taken with regulators to contribute to the financial stability agenda and to encourage transparency and governance practices that build public trust, enhance accountability and provide confidence to market actors[12]. In the process stock exchanges themselves have accumulated reputational capital[12].

Some stock exchanges are already addressing climate change

Some stock exchanges are already engaging with sustainability and environmental matters as the effects of unsustainable practices and environmental degradation on value creation, the resilience of markets and opportunities for innovation become increasingly evident. The development by some stock exchanges of environmental, social and governance reporting and behavioral guidance and requirements and the creation of various types of specialist indices, demonstrates how sustainability is becoming a mainstream consideration which needs to be communicated to stakeholders, in the same way that any material risks to corporate performance and prospects must be reported.

A call to action

However, not all stock exchanges or financial market actors are involved, action is fragmented and there is little evidence that financial markets are yet taking account of climate-related risks and opportunities relevant to future shareholder value.

There are various reasons for this lack of coordinated activity, including the fragmentation of reporting on climate change and the lack of consistent and comparable information available to the investment community about the risks that climate change presents to the corporations in which they invest. Although the provision of corporate information on climate change is improving, a further stage of development is required so that climate change-related information is equated with financial information in terms of standardization, reliability and capacity to inform decisions and action. For as long as climate change-related information lacks the characteristics of reliability, consistency and comparability, the efficiency with which markets are able to allocate capital to its most productive uses over the medium to long term – a crucial enabler of strong and sustainable economic growth – is undermined.

Stock exchanges and other financial market actors must act through direct and indirect support for the reporting and management of climate risks and opportunities to which businesses are exposed. In order to assist and accelerate action, Part 4 of the report proposes climate change reporting requirements for support or adoption by stock exchanges.

Report overview

This report focuses on climate change as a specific and distinct aspect of sustainability for various reasons, including Ceres' evidence of significant investor agreement that climate change warrants particular attention in corporate disclosure because of the widespread physical and systemic risks it presents and also the innovation opportunities that it offers[4]. As climate change reporting requirements often form a subset of environmental or sustainability reporting schemes, this report does also refer to wider requirements.

The report focuses on the actions that stock exchanges can take because, while their powers vary according to the regulatory environment in which they operate, they play a crucial role in building transparent, regulated markets and promoting best practice in financial and corporate governance. They have the infrastructure, networks and experience to contribute to sustainable development and tackling climate change through listing requirements, voluntary initiatives, guidance and training for companies and investors, development of specialist indices and communication channels with regulators.

The document focuses primarily on the reporting and disclosure mechanisms that stock exchanges can introduce or support to elicit information necessary for decision-making about climate change. It builds on and references relevant work already undertaken by organizations such as ACCA[13], Aviva[14], Calvert Investments[15], Carbon Tracker[16], CDP[17], Ceres[4], Corporate Knights[18], EIRIS[19], UNCTAD[20] and others. The document forms part of CDSB's work to complement existing mainstream disclosure requirements with guidance on climate change-related reporting that supports existing regulatory frameworks and responds to growing calls for the financial community to recognize and manage its exposure to climate risk.

This report starts by summarizing evidence that climate change has immediate and future consequences for financial markets and the conditions on which they depend for success. The evidence makes the case for stock exchanges to act at speed and scale, proactively to assess and manage adverse impacts from climate change, to minimize risks and grasp new opportunities arising from changing conditions. Secondly, this paper considers the types, strengths and weaknesses of current stock exchange activity on climate change and thirdly, the opportunities and challenges associated with the development of that activity.

Part 4 sets out the proposed requirements that stock exchanges may contemplate introducing or adding to their disclosure guidance or rules for addressing climate change. The requirements reflect work undertaken by Aviva, CDP, CDSB, Ceres, Corporate Knights, UNCTAD, international regulators and many others. The proposals are designed to collate shared thinking on and characteristics of climate change-related disclosure requirements and thereby act as a convenient guide for stock exchanges.

Report structure

This report seeks to answer the following questions:

+ Why should stock exchanges act to address climate change?
+ What is the current state of stock exchange activity on climate change?
+ What are the challenges and opportunities for stock exchanges introducing or developing climate change reporting requirements?
+ What climate change reporting requirements could be adopted or supported by stock exchanges?

Part 1

Why should stock exchanges act to address climate change?

The role of stock exchanges has been of increasing interest to a growing body of observers since the privatization and demutualization trends began in the 1990s[21]. As evidenced by Aviva's "roadmap", stock exchanges now occupy a position at the heart of markets (Figure 1)[14]. Depending on the regulatory arrangements in place in particular jurisdictions, stock exchanges may implement or influence the reporting and behavioral requirements of their registrants alone or with other agencies. Just as stock exchanges have intervened to influence the corporate governance and financial stability agenda, they can and should make similar or more stringent interventions to address the threats posed by climate change.

Climate change will have impacts on the economy, companies, consumers, investors and security, all of which affect stock exchanges and financial markets and the underlying systems and confidence on which their success depends. The World Economic Forum's Global Risks 2013 Report examines 50 global risks across five categories and is based on a survey of over 1,000 experts[22]. The report identifies rising GHG emissions and failure to adapt to climate change as the two global environmental risks most likely to materialize with high impacts.

The following is a brief summary of research that has been conducted on the impacts of climate change. It shows that climate change has the potential to affect the economic, social and ecological systems on which resilient financial markets – and so much more – depends. In so doing, it makes the case for stock exchanges to act to address climate change.

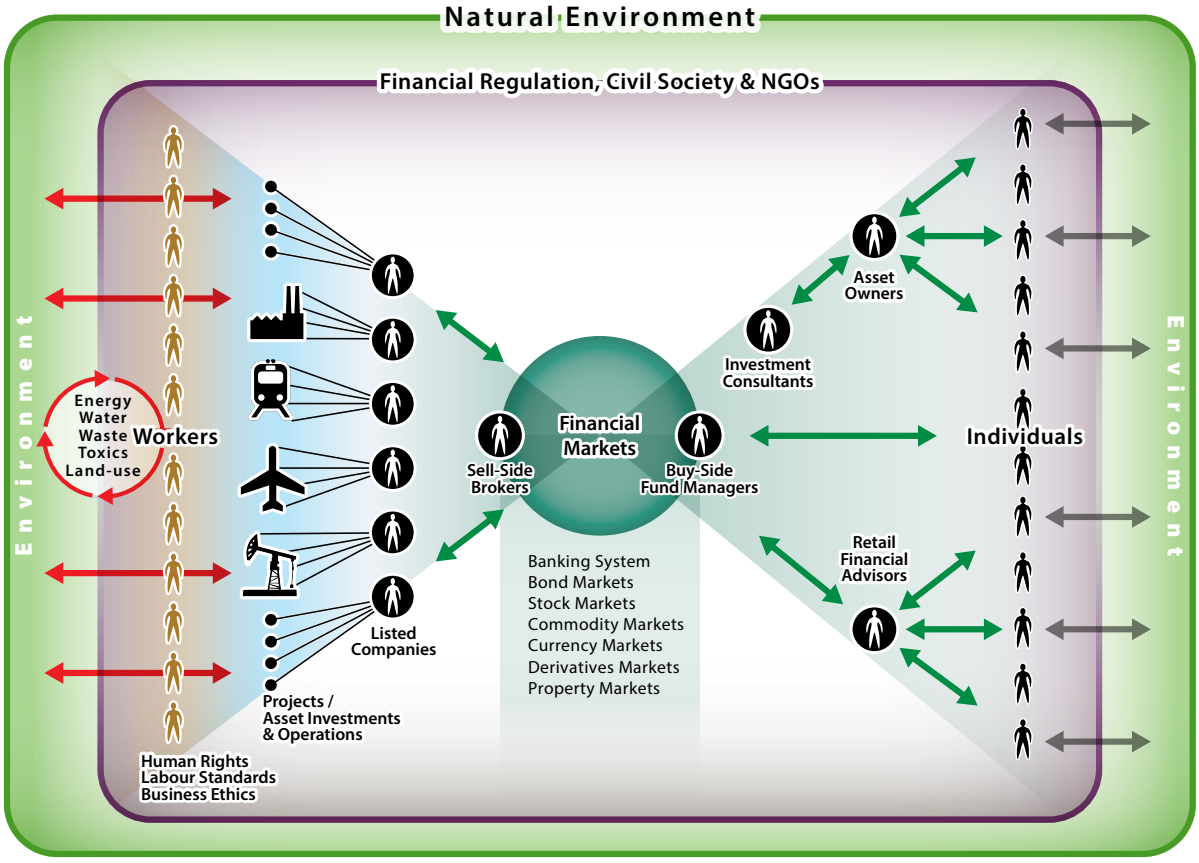

Figure 1 The equity markets[14]

1.1 Impacts on the economy

The New Climate Economy Report "Better Growth, Better Climate" draws comparisons between the financial crisis and climate change[8]. It notes that both involve the steady accumulation of risk over time and that the risks are systemic in both cases. The report compares the steady spread of high-risk financial instruments throughout global financial systems with the steady accumulation of greenhouse gas emissions in the atmosphere. The steady accumulation at which both types of risk accumulate makes it difficult to identify the point at which the threat of risk tips over into actual damage. As the International Finance Corporation (IFC) says in its 2009 report on climate risk and financial institutions, *"creeping changes in average conditions are already causing material changes in risk[9]"*. Whereas the economic scale of the global financial crisis has been estimated at about 1.5% per annum of global GDP per annum[23], the Intergovernmental Panel on Climate Change (IPCC)'s estimate of the economic consequences of climate change are in the order of 0.5–2.0% of global GDP by 2050, but that is based on the likely costs of a temperature increase of just 2°C above pre-industrial levels with strong adaptation measures being taken. Should the increase be greater, the costs will rise further[8].

As well as predictions about future costs, the costs of climate change may also be inferred from past extreme weather events. For example, between the 1950s and 1990s, the annual economic losses from large extreme weather events, including floods and droughts, increased ten-fold. In the period from 1990 to 1996 alone, there were 22 floods with losses exceeding $1 billion each[24].

1.2. Impacts on specific sectors

Climate change will affect all sectors of the economy but impacts for some sectors may be more apparent and pervasive. For example, climate change will have significant effects on crop yields, livestock health, productivity, soils, irrigation and fisheries due to higher temperatures, heat waves, flooding, shifting precipitation patterns, ocean acidification and warming and changing distributions of pests and diseases[25]. Climate change will affect food access, utilization and price stability. As evidenced by the examples in Box 1, production shocks are already evident around the world. Many other sectors will be affected including extractive industries, transport and utilities.

Box 1 – Climate change impacts on agriculture and food production

+ In March 2014, General Mills told investors that extreme weather had disrupted production and operations and dampened sales, undermining their quarterly earnings. "We lost 62 days of production, which would be 3 or 4%" said Ken Powell, CEO of General Mills, explaining that "this year's severe winter weather dampened sales performance across the food industry"[26].
+ In 2011, the worst recorded drought in Texan history cost the agriculture sector $7.6 billion[27].
+ In 2010, heavy rain and flooding in Guatemala caused a $4 million loss for Fresh Del Monte Produce's banana operations resulting in $9 million loss in profits[28].
+ In 2009, droughts in India caused a share reduction (44%) in Indian sugar output projections for the end of the year. As a result, sugar prices hit a three-year high in early August 2009 on the New York Stock Exchange, while also reaching their highest levels in 28 years on the London Stock Exchange. Overall sugar prices rose by 64% in 2009 on the expectation that India would become a net importer for two years in a row[9].
+ Without adaptation to the changing climate, in the United States some Midwestern and Southern counties could see a decline in yields of more than 10% over the 5–25 years should they continue to sow corn, wheat, soy and cotton[8].

1.3 Geographical impacts

Climate impacts will be experienced at different times and different degrees of severity around the world. The Low Elevation Coastal Zone is particularly exposed to the effects of climate change for example. This zone constitutes 2% of the world's land area but contains 10% of its population. The number of people exposed to the 1-in-100 year extreme sea-level event, (i.e. the sea level that has a 1% chance of being exceeded every year), increased by 95% between 1970 and 2010. By 2010, about 270 million people and $13 trillion worth of assets were exposed to the 1-in-100 year extreme sea-level event[29].

The USA is already feeling the effects of climate change. Within the next 15 years, higher sea levels combined with storm surge will increase the average annual cost of coastal storms along the Eastern Seaboard and the Gulf of Mexico by $2 billion to $3.5 billion. The annual cost of hurricanes and other storms will reach $35 billion[2].

The 2007-8 droughts in Australia contributed to increased global wheat prices up to 85%. By 2030, up to 20% more drought months are projected over most of Australia. Floods and droughts in Kenya cost the country 16% of GDP in 1998–2000. In 2001, drought-induced electricity rationing in Brazil led to economic losses of approximately $20 billion, equivalent to 2% of GDP[9].

1.4 Impacts on security

Human security will be progressively threatened as the climate changes, by undermining livelihoods, increasing migration and challenging the ability of states to provide the conditions necessary for human security[30]. Major extreme weather events have led to significant population displacement and changes in the incidence of extreme events will amplify the challenges and risks of such displacement.

Researchers have identified a relationship between past internal conflict in sub-Saharan Africa and variations in temperature estimating that a 1% increase in temperature leads to a 4.5% increase in civil war in the same year and a 0.9% increase in the following year. By the year 2030, based on averaged data from the 18 climate models used, this will translate approximately to a 54% increase in armed conflict incidence in the region[31]. The US CNA Military Advisory Board identifies the catalytic effect of climate change affecting instability and conflict as well as military, infrastructure, economic and social support systems[32].

1.5 Impacts on companies and financial markets

The impacts listed above and others that are beyond the scope of this study will inevitably affect financial markets and the conditions on which they depend for success. As noted by IFC in a 2009 report on climate risks and financial institutions, *"not all investments will be affected by climate impacts, nor will they all be affected in the same ways. The severity of the impacts will depend on several factors including climatic sensitivity, location, management practices, market conditions, existing policies and regulations*[9]*"*. This study contends that stock exchanges and market actors are therefore critically dependent on good quality information to maximize their chances of determining where and when those factors are most likely to converge to create risks or opportunities. IFC's report summarizes the climate change-related factors most likely to weaken financial performance[9], which include:

1. The effect of climate change on market conditions, particularly supply and demand, as a key determinant of prices, which may in turn affect the competitiveness of investments;
2. Efficiency, output and performance of assets may change due to changing climate conditions with consequences for revenue;
3. Increased operating and maintenance costs due to changes in the price, availability and quality of inputs;
4. Increased insurance costs or withdrawal of insurance in some regions;
5. Additional capital expenditure to cater for environmental requirements relating to assets, equipment and corporate practices; and
6. Increased reserves and provisions as the risks of climate change become better understood and easier to quantify.

As well as recognizing the negative effects that climate change may have on corporate performance, there is emerging evidence of the positive correlation between good environmental performance and long-term value creation[33,34,35].

1.6 Conclusions

Climate change has important implications for economic activity and corporate performance. The effects of climate change are beginning to play out within and among sectors and regions. They are likely to grow in significance in the years to come, becoming an increasingly important factor in the relative performance of firms, sectors and investment portfolios. The above evidence shows that climate change has immediate and future consequences for stock markets and the conditions and factors on which they depend for success. Markets providing the right environment for businesses that are aware of and addressing climate risk will be first to grasp new opportunities arising from changing conditions and be well positioned to gain competitive advantage. As providers of long-term market infrastructure, stock exchanges must therefore introduce or support measures to identify the physical and economic risks and opportunities of climate change and act by working with regulators and others to strengthen economic, social and ecological resilience and security. The following section examines the actions that stock exchanges are already taking.

Part 2

What is the current state of stock exchange activity on climate change?

2.1 Background context to stock exchange activity

Companies listed on stock exchanges are coming under increasing pressure to provide information about and take action to address climate change.

+ Regulators are increasingly introducing policy measures to mitigate climate change, for example, through the introduction of greenhouse gas emissions reporting requirements, energy standards, levies (such as the UK Climate Change Levy[36]) and carbon trading schemes, such as the EU Emissions Trading Scheme[37].
+ NGOs, academics and others warn of the risks of assets such as fossil fuel reserves becoming "stranded" as they are rendered obsolete by measures to mitigate climate change[38].
+ Shareholders, including large pension funds, foundations and socially responsible investors, are filing resolutions to encourage companies to address environmental, social and governance issues. For example, shareholders Arjuna Capital/ Baldwin Brothers Inc. and As You Sow have filed a 2015 shareholder resolution asking Exxon Mobil to return capital to shareholders in the light of climate change-related risks[39]. The resolution refers to investor concern that Exxon Mobil is not preparing for a low oil demand scenario and that potential and planned capital expenditure on high cost, high carbon projects is at risk of eroding shareholder value.
+ Strong coalitions signal support for carbon pricing to place a direct value on GHG emissions so that they move from indicative measures of performance to indicators that could directly affect financial performance and shareholder value[40].

The background context against which stock exchanges operate reflects trends that also increase expectations for companies to provide and decision-makers to use information about climate change. For example:

+ Share prices that increasingly value brand, reputation and other intangibles;
+ Focus on governance and stewardship;
+ Growth in initiatives on the role of the financial sector in managing social and environmental issues;
+ Concern over short termism in markets;
+ Growth in responsible and impact investment;
+ Pension funds taking account of and disclosing decisions/policies on environmental and social issues;
+ Rise of integrated reporting led by the International Integrated Reporting Council.

2.2 Stock exchange reporting activity

In response to these pressure points and trends, a number of stock exchanges require or encourage their registrants to disclose material sustainability and environmental information. These include Toronto, BM&FBOVESPA, Malaysia, Johannesburg, Korea and Bombay exchanges[4]. Regulatory agencies are also promoting sustainability reporting requirements. Of the International Organization of Securities Commissions' (IOSCO) 32 participating bodies, around a third have introduced a sustainability reporting initiative[41]. Various reports and studies analyze the degree and type of activity being taken or supported by stock exchanges. Examples of four such studies are referenced below.

The 2014 Report on Progress prepared by the **United Nations Sustainable Stock Exchanges (SSE) initiative** examined activity across 55 exchanges[41]. It found that over 40% of the exchanges offer at least one index integrating social and/or environmental issues. One-third of the exchanges provide either sustainability reporting guidance or training to the companies listed on their exchange. Twelve of the 55 exchanges require aspects of environmental and social reporting for at least some of their companies, with only seven of those exchanges requiring such reporting for all listed companies.

A 2011 study by **CDP** examined the extent of climate change disclosure using market capitalization as a more investor-relevant denominator than the number of companies that report on climate change[17]. The research showed that a significant tipping point had already been passed and that, when measured as a percentage of market capitalization, investors already have information about climate change from 54% of the companies listed on the exchanges analyzed by CDP. Five exchanges were found to have disclosure rates of over 80%, a further three over 70% and a further four over 60%. Of those 12, five were in the top 10 largest exchanges – LSE, Euronext, NYSE, TSX and Tokyo. Despite this welcome progress, CDP's research showed that certain exchanges are carrying high levels of risk from unknown implications of climate change.

Calvert Investments, together with partners, have analyzed the natural capital policy reporting trends of 4,712 companies[15]. The companies concerned are members of 53 financial indices used by global asset managers for benchmarking performance. The source information for the research was drawn from Bloomberg environmental, social and governance data and was used for the purposes of determining whether and to what extent companies on the indices concerned report information about air, water, land and biodiversity policies and whether they are signatories to the UN Global Compact. The table of results, which ranks reporting against those data points, found that companies in most parts of Europe were above average in terms of their reporting on greenhouse gas emissions, with almost 93% of FTSE 100 companies reporting their total greenhouse gas emissions.

A 2014 study by **Corporate Knights Capital**[18] shows clear differences in the number of listed companies disclosing energy consumption and greenhouse gas emissions as primary indicators of climate change (Table 1).

Corporate Knights' research also shows limited use of "*first-generation*" climate-related sustainability indicators[18]. Only 39% of the world's large listed companies (defined as companies with a market capitalization in excess of US$2 billion – a total of 4,609 companies) currently disclose their GHG emissions, and only 17% of the world's large listed companies (801/4,609) currently disclose Scope 3 emissions. The number of large companies disclosing GHGs has grown from 1,238 to 1,818, an increase of 47%, between 2008 and 2012. Scope 3 emissions disclosure also increased from 283 in 2008 to 801 in 2012, an increase of 183%. Over half (52%) of the world's large listed materials companies now disclose their GHGs. The energy and financials sectors, each with a disclosure rate of 32%, have the lowest intra-sector disclosure rate on GHGs. The research shows that GHG disclosure varies substantially within the Global Industry Classification Standard (GICS) energy sector. For instance, 76% (28/37) of energy companies classified in the GICS integrated oil & gas sub-industry disclosed their GHGs in 2012. This compares to 11% of energy companies classified in the GICS oil & gas drilling sub-industry.

Exchange Name	Country	Number of large listed Companies as of July 1, 2014	Energy Disclosure (%)	GHGs Disclosure (%)
Johannesburg Stock Exchange	South Africa	54	89	91
Helsinki Stock Exchange	Finland	23	83	87
Copenhagen Stock Exchange	Denmark	22	73	82
London Stock Exchange	United Kingdom	223	75	82
Euronext Amsterdam	Netherlands	35	71	77
Stockholm Stock Exchange	Sweden	57	77	77
BME Spanish Exchanges	Spain	47	74	74
Euronext Lisbon	Portugal	11	73	73
Euronext Paris	France	122	70	67
Athens Stock Exchange	Greece	11	64	64

Table 1 Corporate Knights Capital (2014) Top 10 Exchanges Disclosure Score (proportion of an exchanges' large listings that disclosed) ranked by GHG (%)[18]

The research by the UN SSE Initiative, CDP, Calvert Investments and Corporate Knights provides encouraging evidence of progress in corporate sustainability reporting. However, generally, reporting is sporadic across countries, exchanges and indices in terms of the quality, quantity and type of information reported. The research generally concludes that more attention needs to be focused on improving the quality, consistency and quantity of sustainability reporting, including climate change-related indicators.

2.3 Regional trends

Corporate Knights' study also highlights regional trends in stock exchange activity (Table 2).

Research by the ACCA shows that stock exchanges in countries such as Botswana, Ghana, Kenya and Nigeria are engaged in activities looking to promote sustainable business practice[13]. The Ghana Stock Exchange (GSE), for example, has initiated plans to develop a sustainability reporting framework for listed companies. The GSE and ACCA will together be running a series of training programs for CFOs of listed companies on how to adopt sustainability reporting. Ghana is one of the top-performing economies in West Africa, with large listed companies from a diverse range of sectors, including energy, mining, telecommunications, pharmaceuticals and professional services. The GSE sees sustainability reporting as a means of ensuring that Ghana remains a leading economy and competitive on the global stage[13].

2.4 Development of indices

Stock exchanges alone, or in partnership with others, also develop indices to identify companies that meet certain sustainability standards or subsets thereof. For example:

+ **FTSE4Good IBEX index** comprises companies in the BME's IBEX 35 Index and the FTSE Spain All Cap Index that meet good standards of practice in corporate social responsibility, including environmental sustainability.
+ **BM&FBOVESPA Corporate Sustainability Index (ISE)** is a Brazilian index which measures the total return on a theoretical portfolio composed by stocks issued by companies on the São Paulo stock exchange that are highly committed to corporate sustainability and social responsibility (maximum of 40 companies).
+ **The DAX Global Sarasin Sustainability Germany Index** is composed of the 100 biggest and most liquid German companies based on specified selection criteria. The index tracks compliance with the Sarasin Sustainability Matrix.

Exchange Name	Country	Number of large listed Companies as of July 1, 2014	Energy Disclosure Growth (%)	GHGs Disclosure Growth (%)
Borsa Istanbul	Turkey	28	86	82
Philippine Stock Exchange	Philippines	35	57	57
Bolsa Colombia	Colombia	21	46	46
Bangkok Stock Exchange	Thailand	42	46	37
Singapore Stock Exchange	Singapore	53	34	34
Shanghai Stock Exchange	China	171	10	32
Tel Aviv Stock Exchange	Israel	23	50	26
Taiwan Stock Exchange	China	72	47	22
Mexico Stock Exchange	Mexico	46	33	17
Bursa Malaysia	Malaysia	50	41	15

Table 2 Corporate Knights Capital (2014) Top 10 Market Disclosure Growth Score (the growth rate in the proportion of an exchange's large listings) ranked by GHG (%)[18]

+ **The FTSE4Good Environmental Leaders Europe 40 Index** is designed to identify European companies that are doing more to manage their environmental risks and impacts while reducing their environmental footprint. The index is constructed by taking all European companies in the FTSE4Good Index Series that have obtained the "best practice" environmental rating of 5, ranking them by full market capitalization, and then selecting the top 40 to be included in the index.
+ **FTSE Environmental Opportunities Index Series** measures the performance of global companies that have significant involvement in environmental business activities, including renewable & alternative energy, energy efficiency, water technology and waste & pollution control. Developed in partnership with Impax Asset Management, the FTSE Environmental Opportunities Index Series requires companies to have at least 20% of their business derived from environmental markets and technologies.
+ **The SRI-KEHATI Index** partnership between Indonesia Stock Exchange and KEHATI, the Indonesian Biodiversity Foundation. Eligible companies are judged in six areas: the environment, community involvement, good corporate governance, respect for human rights, business behavior and labor practices.
+ **The Dow Jones Sustainability Indices** are offered cooperatively by RobecoSAM and S&P Dow Jones Indices. They track the stock performance of the world's leading companies in terms of economic, environmental and social criteria. The indices serve as benchmarks for investors who integrate sustainability considerations into their portfolios and provide an effective engagement platform for companies who want to adopt sustainable best practices.

Specialist climate indices are also being developed such as:

+ **BSE CarbonEx** tracks the performance of the companies within BSE 100 index based on their commitment to mitigating risks arising from climate change. The index was created to address market demand for a sophisticated approach to portfolio management incorporating climate change risk and opportunity.
+ **Low Carbon 100 Europe Index** is an index designed to measure the performance of the 100 largest European companies with the lowest carbon (CO_2) intensity in their respective sectors or sub-sectors.
+ **FTSE KLD Global Climate 100 Index** is designed to provide investors with access to investment in the top 100 globally listed companies, whose activities demonstrate the greatest potential for mitigating the immediate and long-term causes of climate change.
+ **The MSCI Global Low Carbon Target Indexes** aim to reflect a lower carbon exposure than that of the broad market by overweighting companies with low carbon emissions (relative to sales) and those with low potential carbon emissions (per dollar of market capitalization).
+ **The MSCI Global Low Carbon Leaders** Indexes aim to achieve at least 50% reduction in the carbon footprint by excluding companies with the highest carbon emissions intensity and the largest owners of carbon reserves (per dollar of market capitalization).
+ **The S&P BSE CARBONEX** aims to provide investors with an index that is indicative of companies' commitment to mitigating the effects of climate change and moving to tackle environmental challenges. It uses comprehensive data acquired from independent providers of sustainability data and companies' public disclosures and tracks the underlying benchmark index "S&P BSE 100 Index" closely.

2.5 Combined activity by stock exchanges

As well as taking action as individual organizations, stock exchanges are participating in coalitions and specialist working groups to address climate change and other sustainability-related issues. For example:

+ The **United Nations Sustainable Stock Exchanges (SSE)** initiative is co-organized by the United Nations-supported Principles for Responsible Investment, the United Nations Conference on Trade and Development (UNCTAD), the United Nations Environment Program Finance Initiative (UNEP-FI) and the United Nations Global Compact Office (UNGC). The SSE's flagship consensus building event is its biennial Global Dialogue. This event brings together investors, exchanges and regulators in order for them to share best practices on ESG disclosure. It also provides a platform for stock exchanges to make public commitments to promote improved sustainability performance and disclosure among their listed companies.
+ The **WFE Sustainability Working Group (SWG)** which includes representatives from 19 WFE member exchanges from around the world, convenes regularly to discuss material concerns and share best practices related to sustainability. The SWG investigates the need for exchanges to seek, standardize, and/or publish environmental, social, and corporate governance data. Through analysis of existing data forms and reporting frameworks, group members seek to understand the real impacts, both positive and negative, on their businesses. The SWG works to reflect the role of exchanges in the formation of a fair, open, and transparent economy-promoting sustainable business models.
+ The **Ceres Investor Network on Climate Risk (INCR)** an established network of institutional investors committed to addressing climate change and sustainability challenges, formed its own Working Group to support the UN SSE initiative and engage with global exchanges. INCR believes that company-issued sustainability data is essential to the investment process and should be integrated into exchange listing rules.

2.6 Conclusions

The degree of activity by stock exchanges to develop or support reporting and behavioral guidance, requirements and indices on sustainability legitimizes reporting and demonstrates how sustainability is becoming a mainstream consideration. Further progress on refining, standardizing and mandating sustainability reporting is to be expected and is indicated by the precedent set for governance and financial reporting. At this stage in the development of sustainability reporting, there is an opportunity for all interested parties to guide its direction. The opportunities – but also challenges – for stock exchanges are considered in the next section.

Part 3

What are the challenges and opportunities for stock exchanges introducing or developing climate change reporting requirements?

Although some stock exchanges are engaging in and leading environmental, climate change and sustainability reporting, there are various challenges to be addressed before those actions result in optimal outcomes for financial market actors. The infrastructure, networks and experience available to stock exchanges offer them the chance to turn those challenges into opportunities through influence and further action.

3.1 The challenges

A full analysis of the challenges associated with the development of climate change reporting requirements is beyond the scope of this document. However, the following paragraphs briefly describe some of the issues that limit the quality, quantity and effectiveness of climate change information reaching financial markets.

+ **Variable compliance with current requirements to disclose climate risk** – The SEC issued Interpretive Guidance[42] on climate disclosure in 2010 outlining expectations that companies should report "material" regulatory, physical, and indirect risks and opportunities related to climate change as part of their risk reporting. Research by Ceres[43] has however identified that climate disclosures by S&P 500 companies in their annual 10-K reports are very brief, provide little discussion of material issues, and do not quantify impacts or risks. The research also finds that a large number of companies fail to say anything about climate change in their annual filings to the SEC. Research into disclosure patterns outlined at paragraph 2.2 above also illustrates the variability in reporting climate change indicators.
+ **Fragmented approach to sustainability and climate reporting requirements** – A recent report by UNCTAD[20] corroborates research by CDSB[44] and the OECD[45] in finding a lack of consistency between sustainability reporting initiatives, including variation in the type of companies within the scope of the initiative, in the nature of the reporting schemes, (for example, whether voluntary or mandatory) and in the definition of terminology, such as whether/how materiality is defined. Furthermore, there is no single standardized set of metrics and indicators for the disclosure of climate change-related information despite calls from investors for comparable and consistent information[46].
+ **Scope of application varies** – Some reporting initiatives are geared toward all listed companies, while others are more targeted to specific industries (for example, companies in heavy polluting industries under Green Securities Law China, energy utility companies under ANEEL Requirements for Annual Sustainability Report Brazil), or a certain type/size of company (for example, the top 100 listed on BSE & NSE in terms of annual business responsibility reporting in India and 500 firms through the Green Posting system Korea)[20].
+ **Imposition of burdens** – The introduction or development of climate change reporting requirements could give rise to claims that disproportionate burdens are being placed on listed companies. The prospect of reporting burdens may influence a company's decision to list and create competitive pressures for stock exchanges. Many organizations, however, recognize that bold climate action presents economic opportunities and makes good business sense[47]. Therefore, stock exchanges introducing, supporting or developing reporting requirements could be said to be implementing the minimum expected market conditions. Arguably, the involvement of stock exchanges at this stage in the development of climate change reporting requirements, particularly through engagement and testing with all relevant parties, could limit the burdens placed on reporting companies.
+ **Sustainability and the mainstream** – Research by EIRIS notes the relatively small percentage of global assets invested in sustainability and responsible practice[19]. The World Bank estimates that of the US$75 trillion of assets managed by institutional investors, less than 1% of those assets are allocated to green investments[6]. EIRIS' interview with one exchange suggests that investors do not expect commercial opportunities from responsible investment[19]. There is evidence that things are changing, with the Financial Times reporting commitments from various organizations to invest up to US$200 billion to finance low-carbon and climate resilient development[48] and estimates of an increase in the climate bonds market from $10 billion in 2013 to $40 billion in 2014[49]. However, the business case for supporting climate change initiatives and investments will only be strengthened when investment linked to climate objectives becomes mainstream.

+ **Time horizons** – Tensions between the short-termism of certain financial market actors and the long-term systemic risk of climate change can undermine the attention given to climate change risks.
+ **Policy background** – Aviva's Roadmap for Sustainable Capital Markets[14] states that *"the capital markets do not incorporate companies' full social and environmental costs. Indeed until these market failures are corrected through government intervention of some kind, it would be irrational for investors to incorporate such costs, since they do not affect financial figures and appear on the balance sheet or – therefore – affect companies' profitability. This means that the corporate cost of capital does not reflect the sustainability of the firm."*
+ **Mixed evidence about the use by investors of climate change-related information** – There is mixed evidence of the way in which investors respond to and use reporting information about climate change-related risks. A report by CDP and Sustainable Insight Capital Management[50] found that industry leadership on climate engagement was linked to higher performance on three financial metrics – return on equity, cash flow stability and dividend growth – but that no discernible value premium was awarded to such leaders. A report by KPMG[51] finds that, by contrast, a large carbon footprint has a negative impact on firm value.

3.2 From challenges to opportunities

Variability in the quality, quantity, type and location of reported climate change-related information leads to a lack of consistency and comparability. Limited, fragmented, un-enforced, un-assured, inconsistent information is difficult for readers to use in decision-making and the evidence of its use is inconclusive. Unless macroeconomic factors associated with climate change are taken into account in the investment chain and by financial markets, interests are threatened by *"contagion risk [52]"*. This is caused by an initially idiosyncratic problem that is ignored at first, arguably because it is too remote, but then becomes more apparent and pervasive. As non-financial information is increasingly incorporated by investors into decision-making[53,54], a stock exchange that plans or has requirements to disclose environmental information ensures that companies produce the necessary information to meet investor's needs. By acting on climate change and communicating risks, analyses can be made to start to understand impacts and dependencies and avoid or minimize the impact of the type of *"creeping changes in average conditions[9]"* that have been implicated in the sudden emergence of the global financial crisis.

There are various opportunities and reasons for stock exchange to take action to future proof themselves against the risks of climate change and to do so without delay to limit the cost of mitigation and adaptation. The opportunities include:

3.2.1 Leadership and influence

Although the responsibility for initial and continuous disclosure requirements may reside or be shared with regulators, stock exchanges have a vital role in driving and leading change to a sustainable and low carbon economy through a number of channels, mechanisms and focus areas as follows.

Focus on disclosure activity – Information related to climate change including greenhouse gas reduction initiatives, adaptation plans, physical risks and opportunities, energy policy, energy innovation is explicitly considered in corporate research profiles. Investors have expressed a need for this specific information to be reported separately from or as a distinct component of wider environmental information, as it is more focused on systems risk, widespread physical risk, and innovation[4]. This specific information therefore has the potential to play an important part in investment and divestment decision-making. It can bring access to socially responsible investment capital, private equity, fixed income investments and exchange-traded funds, as investors manage climate change risks in their investment portfolios and help generate solutions[55]. Stock exchanges that support disclosure activity, including in jurisdictions where public authorities may not yet have acted to require climate change-related disclosure, are therefore ensuring that necessary information reaches financial market actors.

Focus on emerging markets – As the economic output from emerging markets and developing countries grows, it is becoming increasingly critical for action to be taken to tackle failures that limit economic performance and increase climate risk in those markets. Such matters are particularly pertinent to developing countries where socio-ecological relationships are closer, the capacity for climate adaption and resilience may be limited when compared to developed countries and where greater transparency can attract investment.

Focus on high-risk sectors – Stock exchanges can influence action in carbon intensive sectors such as electricity, extractives, construction and transportation, to improve efficiency and innovation. Key renewable energy sources have moved from being prohibitively expensive to realistic options for future energy supply, particularly electricity generation. The cost of wind power is one-third or one-quarter of what it was 25 years ago; solar power costs have fallen by half since 2010. The cost gap between renewables and fossil fuels is narrowing, and in some markets, renewables are already cost-competitive – even more so if their multiple benefits are considered[8]. Renewable energy must be considered and included in diverse, expanding energy production.

Coal accounts for over 40% of global electricity production, but 73% of power sector GHG emissions[56]. Major reductions in coal use are vital for climate mitigation scenarios. About US$750 billion was invested in new coal power plants in 2000–2010 alone, and those plants will emit around 100 gigatonnes of carbon dioxide ($GtCO_2$) if operated for 40 years[56]. Those built in 2010–2020 will add a similar cumulative amount. In scenarios to limit warming to 2°C, the IEA for example sees coal-fired power generation falling to 60% of 2011 levels by 2030, even with the development of Carbon Capture and Storage, and total reductions in coal emissions of 11 Gt[57]. Research suggests that half of this reduction could be achieved at zero or very low net cost, once the changing cost of alternatives, reduced health damages and other co-benefits are taken into account[58]. Particular disclosure activity can be introduced or encouraged by stock exchanges to elicit information about the risks of fossil fuel assets becoming obsolete as proposed in CDSB's discussion paper on stranded carbon assets[59] and a joint report by the Carbon Tracker Initiative and ACCA on accounting for the emissions hidden in reserves[60].

3.2.2 Convene the relevant parties

Exchanges are well positioned to develop dialogue between companies, investors and regulators[61]. The relationships between exchanges through initiatives such as the United Nations Sustainable Stock Exchanges initiative and the Ceres Investor Initiative for Sustainable Exchanges, can help to ensure that the right parties are convened in order to agree standardized disclosure requirements internationally. Dialogue between investors, listed companies and exchanges can also help identify particular challenges and opportunities related to climate reporting and drive development and adoption of recognized international reporting standards and certifications.

3.2.3 Oversee, enforce, recommend

Stock exchanges have a role to play in assessing or appointing other organizations to assess the overall quality and quantity of climate change (and other forms of) reporting. Improvements and best practices can then be recommended based on analyses of the current state of reporting. For example, the Australian Council of Superannuation Investors' (ACSI) measures the progress of ASX 200 listed companies with respect to disclosure of ESG risks, providing investors with insight on whether ESG risks are being adequately disclosed by index constituents. The 2014 ACSI study also illustrates the changes in disclosure levels of companies in relation to sustainability[62]. Entry and listing requirements allow exchanges to monitor market developments and bring cases to the attention of securities or regulators to inform future policy and strengthen the integrity of markets, thereby also accumulating "reputational" capital[12].

3.2.4 Guide, train, inform

Guidance, training, and tools can be developed individually or in collaboration with others for example, Ceres, the UN Conference on Trade and Development[20], the World Federation of Exchanges[63] and Corporate Knights Capital[18,64,65]. Guidance on how to comply with reporting requirements can provide impetus to improve the quality of disclosure and increase the number of companies disclosing performance, risks and opportunities related to climate change. Development of guidance also provides investors with greater confidence in the quality and depth of reported climate-related information as well as increasing transparency, consistency and comparability.

Through the relationships with listed companies and investors, stock exchanges can improve the integrated financial literacy of the consumers and producers of climate change (and other) information. They can also encourage asset owners to communicate to beneficial owners and society how they have integrated sustainability considerations into investment management agreements. Integrated investment consulting and asset management, similarly, can be developed to explain how fund managers are including sustainability in their decision-making.

3.3 Conclusions

Demand from a variety of stakeholders and the introduction of regulatory requirements for the provision of information has resulted in organizations making climate change-related disclosures and in the development of standards for certain types of information, particularly greenhouse gas emissions. However, this has not yet resulted in the degree of consistency and comparability that is essential for decision-making[20]. Challenges remain in organizing disclosure practices to achieve the type of consistency and efficiency that has been achieved with financial reporting standards. Variations in the quality and quantity of reported environmental and climate information, leads to a lack of consistency and comparability. This hinders the effectiveness with which investors and others are able to factor climate change-related information into their decision-making. Also, the variable quality of reporting and different rates at which reporting progress is being made leaves some exchanges more vulnerable to the effects of undisclosed risks than others.

However, there are also opportunities. In particular, although they have developed against different policy backgrounds, the various mandatory and voluntary schemes involving climate change-related disclosure around the world share some fundamental characteristics which, if consolidated, could form the basis for more standardization and reliability. The proposals in Part 4 seek to consolidate and complement existing practice by recording and encouraging coalescence around shared characteristics in order to help standardize climate change-related disclosure. Mindful of the challenges and burdens of disclosure requirements, the proposals in Part 4 aim to provide a practical approach to introducing or supporting climate change reporting requirements, recognizing the time needed to adapt and further obligations for companies.

Part 4

Proposed climate change reporting requirements

Stock exchanges have various opportunities to lead, introduce, participate in or support activities designed to improve climate change-related reporting. However, recognizing that engaging with sustainability and climate change is not a core competency of stock exchanges, CDSB offers in this section a set of proposed reporting requirements on climate change for consideration, support or adoption by stock exchanges.

4.1 Characteristics of the proposed requirements on climate change reporting

The proposed requirements in this section are based on reporting requirements developed for the CDSB Framework[i]. Those requirements in turn recognize and adopt relevant principles from existing reporting practice and shared characteristics emerging from new reporting practices. In particular, the requirements have been developed to incorporate and exhibit the following characteristics:

1. Compatibility with relevant features of the existing mainstream corporate reporting model

Although features vary around the world, mainstream reports to regulators and shareholders generally incorporate financial statements, governance disclosures and management's commentary on the business. Increasingly, other types of information are being incorporated into mainstream reports, including about climate change, environmental and social matters.

The proposed requirements below have been developed on the premise that the addition of new types of information is most useful, efficient and understandable where the basis of preparation and presentation is compatible with existing mainstream reporting practice or where any departure is explained. Therefore, to the extent that the mainstream reporting model already requires disclosures about risks and opportunities to which the business is exposed, the proposals below simply extend the mainstream requirements to apply to climate change-related risks and opportunities. Similarly, governance disclosures and performance results should be extended to include information about how climate change effects on the business are governed and how business activities contribute to climate impacts, for example through emission of greenhouse gases.

Developing requirements that are compatible with the existing mainstream reporting model is designed to:

+ Minimize reporting burdens for organizations by adopting and extending relevant structures, principles and language with which business is already familiar;
+ Make it easy for stock exchanges and others to add climate change-related reporting requirements to their existing suite of requirements;
+ Encourage consistency of approach to mainstream reporting of climate change information;
+ Promote integrated disclosure of financial and non-financial information.

2. Recognition and formalization of emerging shared trends in reporting

While the existing mainstream reporting model offers a stable basis for the inclusion of new types of information, the proposed requirements below also reflect shared characteristics from *emerging* voluntary and mandatory reporting practice around the world. CDSB has researched the way in which the requirements it proposes link with those of existing reporting initiatives[ii]. Therefore, where there is evidence of widespread adoption of or support for a particular practice, it is reflected in the proposed requirements below. For example, there is evidence of a widespread trend for reporting initiatives to request information that may collectively be described as *"sources of impact"*, that is, activities that give rise to impacts on the environment or society. In the case of climate change, those sources include greenhouse gas emissions and land use change. Information about those sources helps readers to understand the extent to which a business is dependent on activities that give rise to environmental and social impacts and therefore to assess the degree of risk associated with those activities (for example, where environmental taxes or other regulatory changes are anticipated).

[i] Available at http://cdsb.net/framework (under consultation at time of writing)
[ii] Available at http://cdsb.net/consultationtable1

3. Encouragement of contextual and explanatory narrative

While climate change reporting is evolving, the role of narrative to explain performance results is essential. According to research by ACCA and Eurosif[46] investors regard quantitative key performance indicators as essential. However, while those indicators are evolving and remain non-standardized, the narrative supplied by reporting organizations to explain quantitative results is important for an understanding of how they have been prepared and what they represent.

Similarly, where the basis for preparing climate change (and other environmental) information departs from the basis used for preparing other information reported alongside or in the same report, narrative to explain those departures is important for a full understanding of the report. For example, whereas the scope of mainstream reporting has typically focused on past, known events affecting resources, assets and relationships over which the reporting organization has control or ownership, social and environmental reporting tends to extend the boundary of the reporting organization to include outcomes and impacts of activity for which it is responsible or accountable. The proposed requirements seek to ensure transparency about the scope of reported information.

4. Support for assurance activity

Information that has been assured by a third party provides the user or reader with confidence that the information is reliable. In order to conduct assurance activities, assurors generally require information to have been prepared according to suitable criteria and to contain suitable subject matter. The proposed requirements have been drafted to represent suitable criteria and subject matter for the purposes of supporting assurance activity.

4.2 The proposed climate change reporting requirements

The proposed requirements are set below. A detailed explanation of the rationale for each proposed requirement and guidance to support it is beyond the scope of this document. However, guidance and further information about each requirement may be found in the CDSB Framework[iii], which in turn references other reporting approaches on which it relies and adopts relevant principles.

1. Organizational boundary

Requirement – Climate change-related information shall be prepared for the entities within the boundary of the organization or group for which the report is prepared and, where appropriate, shall distinguish information reported for entities and activities outside that boundary.

Purpose – to ensure that climate change-related information is prepared on the same basis and for the same entities and activities as those for which other information is reported in the same or related documents.

2. Reporting policies

Requirement – Disclosures shall cite the reporting frameworks, standards, guidelines, protocols, methodologies, laws and policies used for preparing climate change-related information and shall (except in the first year of reporting) confirm that they have been used consistently from one reporting period to the next.

Purpose – to inform readers about which reporting policies have been used to prepare disclosures.

3. Reporting period

Requirement – Disclosures shall be provided on an annual basis.

Purpose – to ensure that climate change-related information is made available to readers on a timely basis, at least annually.

4. Restatements

Requirement – Disclosures shall report and explain any restatements.

Purpose – to report amendments made to previously reported climate change-related information due to errors, changes to policies, methodologies or organizational structure.

[iii] Available at http://cdsb.net/framework (under consultation at time of writing)

5. Assurance

Requirement – Disclosures shall report whether and to what extent climate change-related information has been assured and, if so, which assurance standard has been applied.

Purpose – to inform the reader about whether, to what extent and how climate change information has been assured by a third party.

6. Material climate change-related information

Requirement – Disclosures shall report the outcome of the process applied by management for identifying material climate change–related information.

Purpose – to keep the reported information focused on material climate change-related matters.

7. Governance

Requirement – Disclosures shall describe the governance of climate change risks, opportunities and strategies and of reported climate change-related information.

Purpose – to provide transparency about accountability for the organization's oversight of climate change and information reported about climate strategies, risks and opportunities.

8. Policy, strategy and targets

Requirement – Disclosures shall report management's policies, strategies, targets and expenditure plans for addressing climate change including the indicators, plans and timelines to assess performance.

Purpose – to enable readers to assess the rationale, quality and efficacy of the environmental policies, strategies, targets and expenditure plans developed by the organization to address climate change.

9. Risks and opportunities

Requirement – Disclosures shall report and disclose the principal current and anticipated climate change-related risks and opportunities affecting the organization.

Purpose – to inform readers of the organization's principal climate change-related risks and opportunities.

10. Sources of climate change impacts and comparative analysis

Requirement – Disclosures shall report quantitative and qualitative results to reflect material sources of climate change impact and shall cite the approaches used to prepare those results and shall analyse the results compared with performance targets set and results reported in previous periods.

Purpose – to inform readers, using quantitative and qualitative results, of the degree to which material sources of climate change impact have arisen over the reporting period and how the results compare with those for previous periods and against performance targets.

11. Strategic analysis including future outlook

Requirement – Disclosures shall include a statement about the long-term and short-term impact climate change actually and potentially has on the organization's strategic objectives and ability to create value.

Purpose – to inform readers of management's view on how climate change actually or potentially affects the organization's strategy and ability to create value.

12. Application of reporting principles

Requirement – Disclosures shall be relevant, material, faithfully represented, connected with other relevant information, consistent and comparable, understandable, straightforward, assurable and forward-looking.

Purpose – to elicit climate change-related information that is useful to readers in their decision-making.

4.3 Supplementing the proposed requirements to meet particular reporting objectives

The requirements have been designed to apply to all sectors and industries. However, they also lend themselves to being supplemented with guidance or further requirements designed to achieve specific reporting objectives or to elicit information about particular risks, sectors or impacts. For example, research by Carbon Tracker[16], CDP, Ceres, CDSB and others highlights the particular climate risks associated with fossil fuel companies. As an example of stock exchange activity relevant to the determination of those risks, a CDSB report on "Proposals for reporting on Carbon Asset Stranding Risks[59]" cites the London Stock Exchange's AIM 16 (March 2006) note, which sets out guidance for mining, oil and gas companies, including the requirement for all assets owned or proposed for exploitation by the application of the AIM company to be disclosed together with the status of those assets.

Based on CDP's Oil and Gas module, the proposed reporting requirements may be supplemented to determine particular information from oil and gas companies as follows:

+ Under core requirement 8 on policy, strategy and targets, companies should disclose whether carbon is to be transferred or sequestered and whether there are plans for investment in or development of renewable energy or other energy efficient initiatives.
+ Under core requirement 9 on risks and opportunities, companies should include analysis on whether and to what extent their business model and strategy is at risk from the so-called "*carbon budget*" identified by the IPCC and others[iv];
+ In response to core requirement 10 on sources of climate change impacts, companies should disclose the quantity of their fossil fuel energy resources in units of barrels of oil equivalent and the greenhouse gas emissions embedded in those reserves;
+ Responses from companies to requirement 11 on strategic analysis and future outlook should include disclosure of planned capital expenditure on research, development, exploration and extraction, revenues predicted from reserves and prospective subsidies.

In addition to meeting reporting objectives in relation to particular industries, the proposed requirements may be adapted to elicit information about trends in climate strategy and performance. For example:

+ Requirement 8 may be adapted to elicit information on whether companies are using internal carbon pricing[66] as a strategic planning tool;
+ Requirement 7 may be adapted to determine whether and to what extent remuneration practices are used to reward achievement of climate change-related objectives.

4.4 Conclusion

The business and investment case for financial market actors to address climate change is made. In the same way that they have responded decisively to corporate governance irregularities and to the financial stability agenda, stock exchanges are starting to respond to the new risk landscape presented by climate change. The infrastructure and leadership is in place for stock exchanges to build on the progress they have already to support and introduce climate change reporting requirements. The reporting requirements proposed above are designed to assist in that process, to inform discussions, to prompt action to incorporate climate change-related information into financial decision-making and to build climate resilient stock markets.

[iv] WRI (2014) Infographic: The Global Carbon Budget [Online] Available at [http://www.wri.org/resources/data-visualizations/infographic-global-carbon-budget]

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