Corporate Knights
The Company for Clean Capitalism

Measuring Sustainability Disclosure

Ranking the World's Stock Exchanges

Sponsored by

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About This Report

This report is the sixth instalment of an annual series that tracks the extent to which the world's publicly traded companies are disclosing the seven sustainability indicators; namely, employee turnover, energy, greenhouse gas emissions (GHGs), injury rate, personnel costs, waste and water. The analysis is conducted at the level of individual stock exchanges – 55 in total – and is based on disclosure rates according to Bloomberg and Thomson Reuters data for the year 2015 (the most recent time period for which the majority of data has been disclosed), growth in disclosure rates on a trailing five-year basis (2011–15) and disclosure timeliness.

Corporate Knights
The Company for Clean Capitalism

Corporate Knights Inc. (CK) has a media division, which includes the award-winning business and society magazine Corporate Knights, and a research division, which produces corporate rankings, research reports and financial product ratings based on corporate sustainability performance. Its best-known rankings include the Best 50 Corporate Citizens in Canada and the Global 100 Most Sustainable Corporations. In June 2013, Corporate Knights was named Magazine of the Year by Canada's National Magazine Awards Foundation. For more information about CK, please visit www.corporateknights.com.

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Notes

The opinions expressed in this report are those of Corporate Knights and do not necessarily reflect the views of Aviva Investors.

Comments on this paper are invited and may be addressed to the authors at capital@corporateknights.com.

FOREWORD

Business must play its part in our sustainable future

At Aviva, we're in business for the long term. We can trace our history as an insurer back to 1696, many of our customers stay with us over the course of their lives and we want to leave a positive legacy for those who come after us – to be "good ancestors."

The path towards a more sustainable global future is clear. The Paris Climate Change Agreement and Sustainable Development Goals (SDGs) show us the way. But we won't reach the destination without the businesses that drive the global economy playing their part to the full. So investors and the public need clearer, better information about how businesses contribute – or don't– to the wellbeing of our planet and our people.

That is why Aviva's partnership with Corporate Knights to publish a ranking of how the world's stock exchanges disclose sustainability data is so important. Global stock exchanges are central to encouraging the disclosure of accurate information from the companies that list with them. Since 2012, this study has been holding those exchanges and the companies they list to account for their sustainability performance.

This sixth annual report shows signs of progress: the key sustainability disclosure indicators have all improved since our measurements began in 2011, albeit slowly. It's also encouraging to see two emerging economy exchanges in the top ten this year, including the Bangkok Stock Exchange which has risen steadily through the ranks from 40th place in 2013. But there's still a great deal of improvement needed. It's disappointing, for example, that half of listed large energy companies did not disclose information on their Greenhouse Gas Emissions in 2015.

More needs to be done. Exchanges and regulators should set a mandatory requirement for the disclosure of sustainability information, introduced on a "comply or explain" basis, which can help maintain clear expectations while allowing companies the flexibility they need. The recent report of the Taskforce on Climate-related Financial Disclosures (TCFD) has given clear, concrete recommendations about how climate disclosure should be done – this needs to be reflected in global listing regimes. I call again for IOSCO (the International Organization of Securities Commissions), the global setter of standards for the securities sector as a whole, to develop and set globally consistent listing rules. Only then will investors have access to the consistent high-quality information they need.

I would like to thank everyone who has contributed to this important report. It is another example of how simple, public league tables work to encourage a race to the top. At Aviva we're working with others to extend this concept across the whole range of SDGs and create a World Benchmarking Alliance. It is only by better understanding what is happening today that we can start to build the world we want to live in tomorrow.

Mark Wilson
Group Chief Executive Officer
Aviva

FOREWORD

It is crucial that the march towards global corporate transparency on issues as important as sustainable development continues to advance. Corporate Knights has once again shone an important light on the disclosure of sustainability information and whilst I am heartened that the focus on sustainability remains strong internationally, I am well aware that there is still work to be done.

As I write in early September 2017, the world is experiencing unprecedented storms from Bangladesh, to the Caribbean, to the USA. Extreme weather events are becoming a fact of life, a new risk to be factored into economic and business models. Businesses around the world will have to ensure their business models and strategy take into account these increasingly frequent events. This year has seen the recommendations from the FSB's Climate-related Financial Disclosure Taskforce and further work from the UN in ensuring there is a strong focus on achieving the Sustainable Development Goals across the private and public sector. These are vital next steps on the journey towards sustainable development internationally. Over the last year the IIRC has been working with our partners to support these endeavours, and provide insight on how businesses can align their thinking to the SDGs.

Sustainability information should not just be provided in a timely, coherent and understandable manner. The information should be used, acted upon and actually change the behaviour of businesses and investors around the world. As the TCFD pointed out, this requires the integration of climate risk management within the mainstream strategic and risk management processes of the company. Transparency must have a purpose and in this instance, we must ensure that as companies are encouraged to be more transparent they take time to reflect on how the data they produce might inform their strategy and business model. Integrated Reporting offers key opportunities in this regard, as businesses make direct linkages between the data they produce and how it affects their ability to create value now and in the future.

Year on year I see more and more investors taking an active interest in these issues, as they adapt their decision-making processes based on the broadening story of value creation that they receive from businesses. Pension funds and active investors are increasingly seeing the benefit in investing with companies that focus and communicate on more than the pure financials, looking to the future and the stakeholders that they need to get there.

It is welcome to see in Corporate Knight's findings that a number of stock exchanges in developing markets are steadily climbing the rankings each year. For companies in these markets, advancing their reporting practices offers a means of attracting direct foreign investment. It would be remiss of me not to give recognition to the Johannesburg Stock Exchange which continues to lead the way in this regard – the King IV Corporate Governance Code that they adopted this year has put value creation at the heart of business thinking in South Africa.

Good corporate reporting can help advance financial stability and sustainable development internationally. Stock exchanges play a vital role in this work. I urge them to continue to use their influence to catalyse such changes. Whilst it is relatively simple to demand companies to produce information, it is more challenging to bring about the behavioural changes so clearly needed. I commit to working with standard setters, businesses, investors and stock exchanges so that we ensure the reporting landscape is cohesive, to help change behaviours and drive sustainable development.

Richard Howitt,
CEO, International Integrated Reporting Council

FOREWORD

2017 marks GRI's 20th anniversary.

Twenty years ago, few corporations disclosed information on sustainability impacts. Today, companies compete to bolster their reputations as good corporate citizens.

This did not happen by accident. In 1997 a small but determined team of people formed the Global Reporting Initiative from within the US nonprofit organization Ceres. The transparency that resulted has changed the world for the better. The act of gathering, checking and publicly reporting information naturally leads to improvement because "you manage what you measure." Today, more than two thirds of the largest 250 companies in the world report their sustainability results using the GRI framework, and the numbers continue to grow.

Early in my career, I had the privilege to work with the late Andy Grove (former Intel CEO). He famously said, "Success breeds complacency. Complacency breeds failure. Only the paranoid survive." This sentiment can be applied to the success of sustainability reporting. With so many companies now reporting on their sustainability impacts, we must ask ourselves if practice is achieving the desired results. Are companies and their stakeholders getting enough value out of the act of reporting and is this helping us create the conditions for sustainable development?

We know that transparency works. It shines a light on the critical sustainability issues and, as a result, companies improve their performances over time. But, if we are going to solve the world's most challenging problems, we must be more efficient. It's time to step up our game and to get more out of reporting. Many ideas have been floated, including the conclusions of this report, about how we can improve. But, before we chart a course, we must know where we are going. To achieve our sustainability goals, we must align capital with sustainable business practices and decouple economic growth from environmental degradation and human rights abuses.

Transparency has a vital role to play in achieving these goals, but the current practice must evolve. Investors are unlikely to read 100+ page reports with sustainability information that may be more than a year old. To align capital to sustainability practices, investors need concise, current, comparable and consistent information (the "four C's" of effective reporting). And, investors also want a forecast of company performance into the future.

Company boards and managers also must do better. Too many companies view their annual sustainability report as a feel-good, marketing exercise. Corporate leaders must adopt a longer-term view, to see that sustainability information is material to their business. The corporate leaders of tomorrow will integrate this information into their products and services to help them win in a resource-constrained world.

At GRI, we are committed to evolving the practice of reporting so that it can achieve the promise of sustainable development. I welcome the conclusions in this report as an important step in that direction.

Tim Mohin
Chief Executive, Global Reporting Initiative

Executive Summary

More than 20 years into the sustainability reporting experiment, three things are clear.

Number one: Vast progress has been made to the point where 43% of large corporations around the world now report on their greenhouse gas emissions, arguably the most important metric in relation to the monumental climate challenge of our time.

Number two: The essential driver of this progress is regulations, illustrated by a clear common denominator shared by each of the top-10-ranked stock exchanges: 10 out of 10 are in jurisdictions where there are regulations mandating sustainability disclosure.

Number three: The progress on improved reporting rates across the board is overshadowed by the wide gulf that exists between the concise, current, comparable and consistent sustainability information that investors demand and the paltry disclosure that companies offer.

A critical mass of investors now recognize their central role from a fiduciary perspective in accelerating the twin imperatives of the Sustainable Development Goals (SDGs) and a transition toward a low-carbon economy.

While it never made sense that investors could succeed in a society or planet that fails, emerging policy and technological drivers have advanced market fundamentals such that investing in a better world now makes sense and makes dollars. Unfortunately, the reporting gap is hobbling market feedback loops and gumming up the efficient allocation of capital. This constitutes a glaring governance failure that requires urgent redress.

Delivering on the SDGs by 2030 and a low-carbon transition is a tall order. Fortunately, with the awesome $300 trillion in savings our society has built up, we have the means. But information is the lifeblood of markets, and right now investors are in the dark due to woefully insufficient disclosure by companies on how they are advancing these twin titanic challenges of the 21st century. As a point of reference, a February 2017 Harvard Business School and Oxford University's Saïd School of Business paper reported that 45% of 368 institutional investors globally found that a lack of data comparability across firms was limiting their firms' ability to use sustainability information in their investment decisions.

We know the what, where and when required to fill this information gap, and we can take a page from the evolution of financial reporting to pinpoint who must lead and how it can best be done.

What is required is a set of globally accepted sustainability accounting standards to mandate disclosure by companies in tandem with and at the same time as their financial filings. Addressing this global governance failure requires the leadership of the G20 to task the International Accounting Standards Board to leverage the pioneering work by the Global Reporting Initiative, International Integrated Reporting Council and Sustainability Accounting Standards Board to issue IFRS-like sustainability disclosure standards (just like those we have for financial matters) for immediate adoption by nation states and their securities regulators for all significant companies (those with over US$1 billion in annual turnover).

Armed with this information and $300 trillion in firepower, there is no reason why investors cannot meet their essential function of efficiently allocating the estimated $5–7 trillion annually required to deliver on the SDGs and climate challenge.

Anything less would be uncivilized.

Toby A. A. Heaps
Chief Executive Officer
Corporate Knights

TOP 10

Figure 1: Top 10 exchanges by Overall Score

Rank 2017	Rank 2016	Rank 2015	Rank 2014	Rank 2013	Stock exchange	Number of large companies	Final score
1	7	1	1	2	Helsinki Stock Exchange	41	84.9%
2	4	11	14	12	Stockholm Stock Exchange	89	77.5%
3	2	6	4	6	Euronext Paris	154	77.0%
4	8	5	9	11	London Stock Exchange	247	73.9%
5	14	9	7	4	Oslo Stock Exchange	36	73.7%
6	1	2	2	10	Euronext Amsterdam	46	73.1%
7	3	4	10	17	Australian Securities Exchange	180	73.0%
8	5	3	5	7	Copenhagen Stock Exchange	33	72.8%
9	6	8	3	5	Johannesburg Stock Exchange	69	70.9%
10	13	17	27	40	Stock Exchange of Thailand	92	70.1%

Key Findings

The Helsinki Stock Exchange claims the top spot for the third time: In the six-year history of the ranking, the Helsinki Stock Exchange was placed first in 2014, 2015 and 2017. It continues to excel in terms of overall disclosure, obtaining the top score on that metric out of 55 stock exchanges studied. It was also found to be the home of the fastest disclosers of sustainability information, with 90% (36 out of 40) of the qualifying companies having already published their corporate sustainability performance data at the time of writing.

Sustained progression: The Stock Exchange of Thailand continues its progression in the ranking from the 40th spot in 2013 to the 10th place in this year's ranking, marking the fifth year of uninterrupted progression. Thai-listed large companies were noted for strong all-round performance in terms of disclosure rates, disclosure growth and timeliness. The combination of voluntary reporting guidelines issued by the stock exchange in 2012 followed by mandatory disclosure requirements by the securities regulator in 2014 appears to have contributed to the continuous rise of the Stock Exchange of Thailand in the ranking.

The Taiwan Stock Exchange experiences a notable jump: China's Taiwan Stock Exchange progressed in the ranking by 18 spots to land in the 12th place in this year's ranking, primarily due to relatively high disclosure rates by its 127 large listed companies. With the exception of employee turnover, all the other six indicators are all reported by over half of the 127 surveyed organizations, with GHGs being reported by an impressive 79% of those 127 organizations, the sixth highest among all surveyed stock exchanges. A number of voluntary and mandatory policy instruments have been promulgated by both the Taiwan Stock Exchange and the Taiwan Financial Supervisory Commission since 2010; it appears that the overall exercise has been met with resounding success.

Environmental indicators disclosed by a minority of large companies: GHGs were disclosed by only 43% of the 6,441 large companies included in this research, followed by energy (40%) and water (38%); a majority of large companies are still not disclosing any of the four environmental indicators (energy, GHGs, water and waste) tracked in this research.

Slow uptake in disclosure: The disclosure of GHGs, arguably the most widely tracked environmental indicator, increased at an annualized rate of 5.1% over the five-year period 2011 to 2015. Water was the environmental indicator whose disclosure improved the most over the period 2011 to 2015, with an annualized rate of 10.2%. In the case of energy and waste, their annualized rates of increase were 2.2% and 4.2%, respectively.

The London Stock Exchange continues to lead in terms of GHG disclosure: Two hundred and twenty-five of the London Stock Exchange's 247 large listings (91%) disclosed their GHGs for 2015, making it the exchange with the highest percentage of GHG disclosure among all stock exchanges surveyed. The 2013 update to the UK Companies Act of 2006, which requires U.K.-incorporated companies listed on the London Stock Exchange main market, Nasdaq or NYSE to report their GHGs, remains one of the most successful instruments in spurring environmental and social performance disclosures.

Shanghai- and Shenzhen-listed large corporations trail in terms of disclosure performance: Among exchanges with at least 100 large companies, China's Shanghai Stock Exchange and Shenzhen Stock Exchange were found to have the lowest disclosure rates of the seven indicators tracked in this research; with the exception of personnel costs, all six remaining indicators were disclosed by less than 10% of the large listings on each respective stock exchange. While both stock exchanges have a number of voluntary and mandatory policy instruments in place to promote sustainability reporting, the lacklustre results illustrate that the existence of policy instruments which are not well defined and lacking in enforcement may not be sufficient to promote reporting.

Developed economies lead on disclosure: Companies based in developed economies generally had a higher disclosure rate across the seven indicators than their counterparts from emerging countries. On average, developed-country corporations disclosed three of the seven indicators as opposed to two for emerging-country corporations. With the exception of personnel costs and, to a small extent, employee turnover, a higher proportion of developed-country corporations reported energy, GHGs, injury rates waste and water in comparison with the ones based in emerging countries; for instance, while 51% of the 4,131 large companies based in developed economies disclosed GHGs for 2015, only 27% of the 2,293 emerging-country large companies reported GHGs for the same year. Interestingly, GHGs was the metric that had the biggest gap in reporting between developed- and developing-country corporations. It is also interesting to note that water was the most highly reported environmental metric among emerging-country corporations.

Mandatory disclosure as a driver for sustainability reporting: All top-10-ranked exchanges in this year's ranking have at least one mandatory, prescriptive and broad policy instrument designed to regulate sustainability disclosure that is in force in the jurisdiction where they operate; this is similar to the finding made with last year's top 10.

3

The number of times the Helsinki Stock Exchange placed first in the ranking

Continued dominance of stock exchanges from developed economies in the top quarter of the ranking: Stock exchanges based in developed countries continue to occupy a majority of the spots in the top portion of the ranking. Among the top 10, eight stock exchanges are from developed economies. However, it is interesting to note that there are now two exchanges from emerging economies: the Johannesburg Stock Exchange (JSE) placed in the ninth position (the JSE has been in the top 10 in every single edition of this ranking since inception in 2012), and the Stock Exchange of Thailand, which as noted earlier progressed uninterruptedly over the past five years, placed 10th.

Small exchanges make sizable gains: The Wiener Börse (up 14 places to the 17th spot), Borsa Istanbul (up 15 places to the 20th spot) and Warsaw Stock Exchange (up 16 places to the 22nd spot), each with around 50 large listings, experienced significant gains in the ranking. Large listings on the Wiener Börse were noted for high disclosure rates, with over half of its 24 large companies having disclosed energy, GHGs and water for the year 2015, while waste and injury rates were disclosed by 46% of these same 24 large companies. Similarly, the Borsa Istanbul stands out for above-average disclosure rates for energy, GHGs and water and for double-digit annualized disclosure growth rates for a majority of the seven indicators. In the case of the Warsaw Stock Exchange, virtually all of its 38 large listings disclosed personnel costs for 2015 while experiencing double-digit annual growth rates in the disclosure of most of the remaining indicators. It is interesting to note that, like Switzerland's SIX Swiss Exchange, the Wiener Börse and the Warsaw Stock Exchange have neither adopted nor appear to be under the regulation of any national policy instrument meant to encourage corporate environmental and social disclosures.[1] However, since these countries form part of the European Union (EU), there may be some positive spillover effects from transparency practices of corporations in other EU countries that have been adopted by Austrian and Polish companies. The Borsa Istanbul, however, is regulated by no fewer than 12 different voluntary and mandatory policy instruments promulgated by the exchange, the regulator and national government, the large majority of which came into being since 2010.

Disclosure timeliness a detriment to stock exchange performance: Several stock exchanges, including Brazil's BM&FBOVESPA and India's Bombay Stock Exchange/National Stock Exchange lost over 10 places compared to last year, primarily due to slow turnaround times for the disclosure of sustainability information to the market after year-end. Indeed, the actions of large companies listed on the BM&FBOVESPA and the Bombay Stock Exchange/National Stock Exchange put those exchanges among the five slowest disclosers of all stock exchanges surveyed; only about 10% of their respective large listings had disclosed their sustainability data to the market within seven months of their fiscal year-end. The Mexican Stock Exchange, the Tokyo Stock Exchange and the Santiago Exchange, which dropped several places in the ranking, also experienced weaknesses in disclosure timeliness although to a lesser extent.

1. Based on the Carrots & Sticks database, accessed on August 11, 2017. www.carrotsandsticks.net

The Copenhagen Stock Exchange was found to be the exchange with the highest proportion of revenue from environmentally sustainable sources, at 4.4%.

Corporations based in Nordic countries are the fastest disclosers: The Nordic countries of Finland, Sweden and Norway are home to the fastest disclosers of sustainability information to the market. Ninety per cent of the large listings on Finland's Helsinki Stock Exchange had disclosed their sustainability data to the market within seven months of their fiscal year-end. The corresponding figures for the Stockholm Stock Exchange and the Oslo Stock Exchange are 88% and 87%, respectively.

Slow turnaround time for sustainability reporting: On average, only half of all qualifying large companies in this year's study had disclosed their sustainability performance data within seven months of their fiscal year-end (December 31, 2016, or later), which is roughly similar to the findings made in previous years. In comparison, a vast majority of the same large companies (98%) have already disclosed their financial information for the same fiscal year-end period. This is an especially crucial issue for investors who rely on the timely availability of sustainability information to be integrated with financial data for investment decision-making.

Coal power weighs in the Warsaw Stock Exchange: The Warsaw Stock Exchange is the most carbon-intensive stock exchange of the 55 exchanges studied, with 1,674 metric tons of GHGs per million of revenue in U.S. dollars in 2015. This may in part be due to the heavy reliance of the domestic economy on coal-powered energy. On the other hand, technology companies-heavy Nasdaq was found to be the one with the lowest carbon intensity at 76 metric tons of GHGs per million of revenue in U.S. dollars in 2015.

Danish companies lead on green revenue: The Copenhagen Stock Exchange was found to be the exchange with the highest proportion of revenue from environmentally sustainable sources, at 4.4%. Wind turbine equipment manufacturer and installer Vestas Wind Systems, renewable energy company Dong Energy and insulation products Rockwool International are examples of some of the top Copenhagen-listed large companies with a significant proportion of green revenues. In total monetary terms, the New York Stock Exchange (NYSE) was the exchange with the highest amount of green revenues (US$123 billion), but this represented only about 1.1% of total revenues of 1,009 NYSE-listed companies. On average, however, the BME Spanish Exchanges had the highest amount of green revenues per large listed company, at US$312,700,000. Median percentage green revenue was 1.1%, while the average was 1.2%.

Norway's oil industry weighs on Oslo Stock Exchange's brown revenues: Oil-rich Norway's Oslo Stock Exchange was found to be the exchange with the highest percentage of corporate revenue from brown sources – oil & gas, thermal coal and electric utilities that use coal for electricity generation (44.5%) – followed closely by the Moscow Exchange at 43.9%. Completing the top three is Vietnam's Hochiminh Stock Exchange, where about 40% of the total revenues of its 14 large listings come from two oil & gas companies. It is also noted that a majority (seven) of the exchanges in the top 10 by brown revenues have a lower-than-median percentage (1.1%) from green revenues.

Recommendations

- The G20 Finance Ministers are encouraged to task securities regulators to collaborate to initiate a process to bring about a set of generally- accepted sustainability accounting and reporting principles to be used internationally by publicly- listed corporations in the same way that IFRS (International Financial Reporting Standards) are the generally- accepted accounting and reporting principles in a majority of jurisdictions around the world. Securities regulators are further encouraged to integrate such generally- accepted sustainability accounting and reporting principles into mandatory listing requirements to be enforced in the same way that financial reporting is being currently being monitored and enforced. This may help address the growing lack of comparable, consistent, specific and timely sustainability information offered by corporate reporters that many investors are expecting to receive. "It is important that such an initiative secures the participation and commitment of a critical mass of all the major markets so as to avoid the relocation of corporate listings towards stock exchanges with lesser requirements; it is therefore recommended that the International Organization of Securities Commission (IOSCO) takes a leadership role in this regard.

- Existing sustainability reporting standard-makers such as the Global Reporting Initiative (GRI) and the Sustainability Accounting Standards Board (SASB) are encouraged to work together to develop one single set of generally accepted sustainability accounting and reporting principles with the collaboration of securities regulators and other actors in the sustainability field. This set of generally accepted sustainability accounting and reporting principles may serve as a global reporting standard that allows comparable assessments of performance among companies across different jurisdictions. The Corporate Reporting Dialogue,[2] an existing platform designed to respond to market calls for greater coherence, consistency and comparability between corporate reporting frameworks, standards and related requirements, may be used as the forum to bring about such internationally accepted sustainability accounting and reporting standards.

- In order to encourage companies that are yet to engage in sustainability reporting for the first time, it is recommended that policy-makers redouble their efforts by either implementing a mandatory, prescriptive and broad policy instrument designed to regulate sustainability disclosure for large listed and non-listed entities (or converting existing voluntary ones into mandatory) with the addition of adding monitoring and enforcing compliance requirements with such disclosure rules. Furthermore, stock exchanges are encouraged to keep track of and publish a list of their respective listed entities that are engaging in sustainability disclosure and those that are not so as to create competitive pressure on those that are still lagging behind. Such an initiative would have greater impact if done globally through an association of stock exchanges such as the World Federation of Exchanges (WFE).

- Where mandatory requirements exist, the securities regulators and other legislators are encouraged to require the reporting of sustainability performance data as part of regulated annual financial disclosures. An example includes France's Grenelle II law where affected publicly- traded companies are required to publish sustainability-related information in the annual report (registration document) within the regulatory time frame. This will ensure that financial and non-financial information are available simultaneously which can be integrated into investment decision-making.

2. http://corporatereportingdialogue.com/

Introduction

This is the sixth annual issue of Corporate Knights' "Measuring Sustainability Disclosure: Ranking the World's Stock Exchanges." Since its first instalment in 2012, this research report has sought to track the level of disclosure of quantitative sustainability-related information by the world's large publicly traded corporations; this 2017 edition continues to fulfill this mission and ranks the world's stock exchanges based on the extent to which their respective listed companies disclose seven of the most widely tracked quantitative sustainability performance indicators; namely, energy use, carbon emissions, water use, waste generation, rate of employee injury, rate of employee turnover and personnel costs (hereinafter collectively referred to as "the seven indicators"). The methodology for this report remains unchanged since it was first presented in 2012, making it possible to compare how the disclosure of quantitative sustainability performance indicators has evolved over time.

In its 2016 review, the Global Sustainable Investment Alliance measured a total of US$22.9 trillion of assets being professionally managed under responsible investment strategies.[3] This, according to the same report, represents an increase of 25% since 2014. While the definition of "responsible" investment strategies may vary widely, what is clear is that more and more assets are being subjected to some sort of sustainability criteria in the investment decision-making process. This would not have been possible without the uptake in sustainability reporting that the corporate world has experienced over the past decade. For instance, 43% of large companies today disclose their carbon emissions. We take advantage of the sufficiently available sustainability data to carry out some performance analysis in the second part of this report, as we did in last year's report.

The need for sustainability performance information has never been as strong as it is today, especially with the worldwide adoption of the ambitious 17 Sustainable Development Goals.[4] While implementing those 17 goals is already a demanding task, measuring progress toward the achievement of these goals requires disciplined data disclosures, in particular from corporate actors that arguably represent the bulk of economic activity in most countries around the world.

While stakeholder pressure, especially from investors, is the main driver behind the increased availability of sustainability performance information, legislators and regulators have also played a large positive role in promoting corporate sustainability performance disclosures. Carrots & Sticks,[5] which provides an inventory of all existing policies and instruments around the world that are aimed at promoting sustainability disclosure, lists a total of 371 such instruments in 64 countries.[6] Of these, 239 are described as mandatory policies.

We should, however, not be too quick to pat ourselves on the back; while 43% of large companies today disclose their carbon emissions, it means a considerable 57% are still not disclosing this metric that many sustainability specialists now consider a staple disclosure. So, there is still a lot to do to close the gap in disclosure quantity.

Perhaps more important is the need to address disclosure quality. In February 2017, researchers at Harvard Business School and the Saïd School of Business at Oxford University reported that 45% of 368 institutional investors globally found that a lack of data comparability across firms was limiting their firms' ability to use sustainability information in their investment decisions. Forty-three per cent of the same investors deplored the lack of standards in reporting sustainability information. A further 40% found sustainability information to be too general to be useful.[7]

3. http://www.gsi-alliance.org/wp-content/uploads/2017/03/GSIR_Review2016.F.pdf
4. http://www.undp.org/content/undp/en/home/sustainable-development-goals.html
5. https://www.carrotsandsticks.net/
6. As of July 11, 2017.
7. Amel-Zadeh, A. and Serafeim, G. (2017). Why and How Investors Use ESG Information: Evidence from a Global Survey. Working Paper 17-079. Harvard Business School.

It is therefore imperative that regulators, legislators and all other actors involved so far in bringing about this inventory of sustainability information start focusing on the quality of the information while maintaining the growth in quantity. As noted earlier, many of the investors surveyed by the researchers reported a lack of comparability, consistency and specificity in the sustainability information offered by corporate reporters; this does not come as a surprise when 139 of the 371 (37.5%) inventoried policy instruments require only "general sustainability, ESG or non-financial" information according to Carrots & Sticks.[8] The rest cover either the environmental, social or governance area or a combination of these. The 43% of the respondents who complained of a lack of standards in reporting sustainability information echoes what many sustainability specialists have been calling for for many years – generally accepted sustainability reporting standards or an equivalent of generally accepted accounting standards but for sustainability information that is adopted by regulators and legislators for mandatory use by reporting entities with standardized "sustainability statements." Using an analogy from the financial reporting realm, the sustainability reporting realm is looking at what the IFRS offers in the financial reporting realm as the standard required to be used in accordance with national securities regulations in most countries in the world.

Organizations such as the Global Reporting Initiative (GRI) and the Sustainability Accounting Standards Board (SASB) offer what could be the foundation for globally accepted sustainability reporting standards. However, the lack of consistency in application is already apparent; of the 71 instruments that mention the GRI standards in some way or another, only six mandate the use of the GRI standards as the reporting framework.[9]

The other area that still needs to be addressed is the extent to which policy instruments are binding on the organizations whose behaviour they seek to regulate. Out of the 371 policy instruments inventoried by Carrots & Sticks, 239 or 65% appear to be mandatory (of these, 146 require only general sustainability, ESG or non-financial information or a description of sustainability governance practices). In many cases where the corporation does not see an economic incentive (including aversion to sanctions), it will not engage in any activity that accounts for its environmental and social performance. Therefore, the existence of voluntary corporate sustainability disclosure policies reinforces the possibility that a portion of the world's economic activity will never be measured for its environmental and social impact. To compound the problem, whether or not the GRI standards are a requirement for sustainability reporting purposes, the question of enforcement remains widely unanswered, not only within the provisions of the policy piece itself but also as a matter of practice by the appointed regulator.

It is therefore an understatement to say that there is still a long way to go before bringing sustainability reporting to the same level as financial reporting. Without a globally applied sustainability reporting standard that is binding on all applicable organizations and systematically enforced in the same way that financial reporting is for publicly listed organizations, there is a risk that corporate reporters and stakeholders may settle for the status quo. This paper therefore serves as a contribution to the current state of sustainability reporting by illustrating where progress has been made but especially how large the gap is between that current state of things and where it ought to be.

The Future for the "Measuring Sustainability Disclosure: Ranking the World's Stock Exchanges" Annual Report

As mentioned earlier, this sixth edition of "Measuring Sustainability Disclosure: Ranking the World's Stock Exchanges" leaves the ranking methodology unchanged from its preceding issues. However, it is intended to revamp the ranking methodology in the next edition to address investors' demands for globally standardized sector-specific disclosures that are pertinent in investment decision-making. The future "Measuring Sustainability Disclosure: Ranking the World's Stock Exchanges" report will rank stock exchanges in that way.

8. https://www.carrotsandsticks.net/
9. https://www.globalreporting.org/resourcelibrary/GRI%20references%20for%20the%20website.pdf

Methodology

Our ranking model has remained largely unchanged since our inaugural report in 2012. As such, it is possible to track the changes in a given stock exchange's sustainability disclosure performance over time. The methodology is presented below:

Please refer to Appendix A for a more detailed review of the methodology.

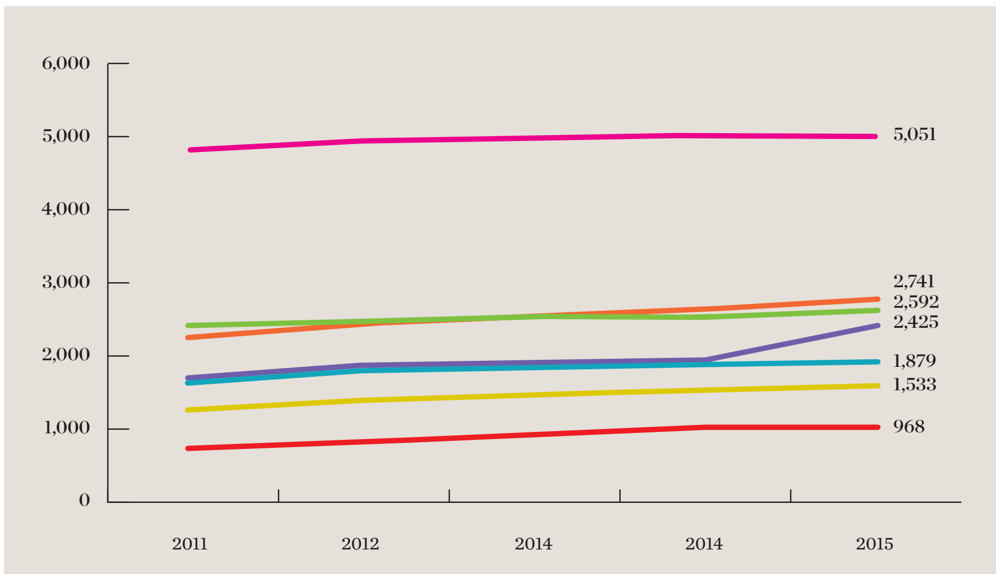
Aspect	Explanation
Unit of analysis	Large publicly traded companies, defined as companies with revenue of at least US$1 billion in their fiscal year ended 2016–17. The total was 6,633 companies.
Level of aggregation	The 6,633 large companies were aggregated according to the stock exchange on which their shares are primarily traded.[10] Stock exchanges with fewer than 10 large companies were removed from this study in order to maintain statistical significance. A total of 55 stock exchanges remained after applying the above filter, with 6,441 large companies.
Data source	The data used in the analysis was obtained from Bloomberg's and Thomson Reuters ESG database on August 1, 2017. The seven indicators consist of: (i) Energy use (energy) (ii) Carbon emissions (GHGs) (iii) Water use (water) (iv) Waste generation (waste) (v) Rate of employee injury (injury) (vi) Rate of employee turnover (employee turnover) (vii) Personnel costs (personnel costs)
Key performance indicators	The 55 stock exchanges included in this study were assessed using three measures of performance: (i) The Disclosure Score (50% weight). The Disclosure Score measures the proportion of an exchange's large listings that disclosed the seven indicators in 2015. The indicators are equally weighted in terms of their contribution to the Disclosure Score. (ii) The Disclosure Growth Score (20% weight). The Disclosure Growth Score measures the growth rate in the proportion of an exchange's large listings that disclosed the seven indicators over the 2011–15 period. (iii) The Disclosure Timeliness Score (30% weight). The Disclosure Timeliness Score measures how quickly an exchange's large listings report sustainability data to the market after the end of their fiscal year, December 31, 2016, and after.
Historical data	The Disclosure Score is based on data for the year 2015. The reason for this gap is data completeness. Companies' fiscal year-ends vary, and many companies still take over 12 months after their fiscal year-end to disclose their sustainability data. As of August 1, 2017, 2015 is the most recent time period for which the majority of companies engaged in sustainability reporting have disclosed.

10. Companies were aggregated on the basis of their "primary listing." For example, Rio Tinto plc trades on the London Stock Exchange (primary exchange) and on the New York Stock Exchange as an ADR. In our study, Rio Tinto plc is grouped under the London Stock Exchange only.

Sustainability Disclosure Trends

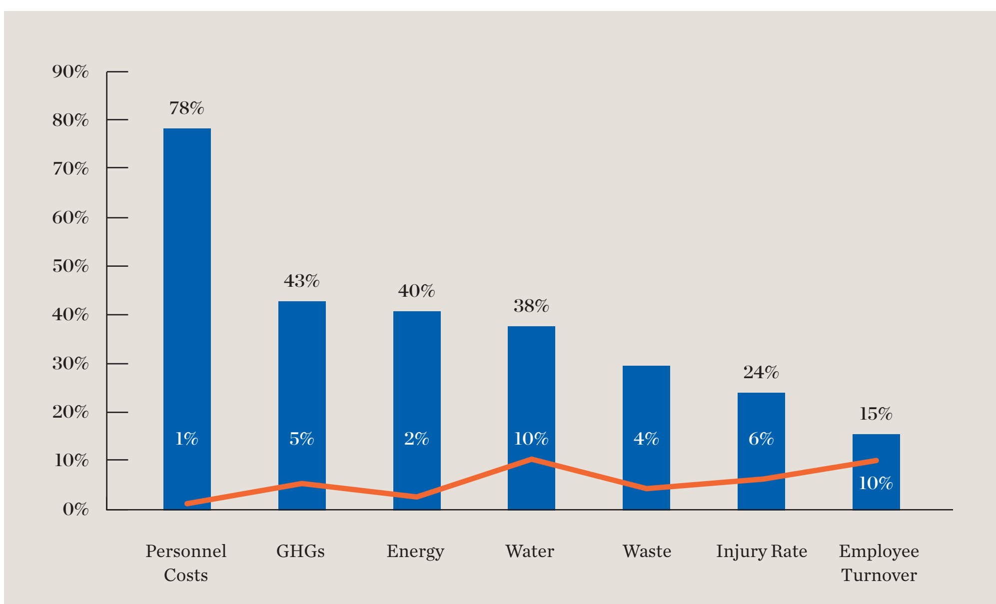
Of the seven indicators tracked in this report, personnel costs remains the most highly reported indicator for 2015; this was reported by 78% of the 6,441 large companies included in this research. This may, in part, be due to the existence of requirements under certain financial reporting standards to disclose personnel costs.[11] Of the remaining six indicators, which are largely disclosed on a voluntary basis, GHGs was the most highly disclosed (by 43% of the 6,441 companies included in this research), followed by energy (40%) and water (38%).

Figure 2: Number of large companies that disclose the seven indicators, 2011–15



- Personnel costs
- GHGs
- Energy
- Water
- Waste
- Injury rate
- Employee turnover

Figure 3: 2015 disclosure rate of the seven indicators and annualized growth rates, 2011–15



- Disclosure Rate, 2015
- Annualized Growth Rate, 2011–2015

11. The International Financial Reporting Standards (IFRS) are the financial reporting standard that, under IAS 19, "Employee Benefits," mandates the disclosure of personnel costs.

Leaving aside the disclosure of personnel costs, all remaining six indicators experienced growth over the five-year period 2011–15 albeit at a low pace. For instance, the reporting of GHGs increased at an annualized rate of only 5.1%; from 2011 to 2015, the disclosure of GHGs increased by only 22%. It is, however, encouraging to note the rise in the disclosure of water at the double-digit rate of 10.2% annualized and that the disclosure of water by large companies almost doubled between 2011 and 2015. Similarly, the disclosure of employee turnover – historically the most poorly reported of the seven indicators – increased at an annualized rate of 9.6% or by 44% between 2011 and 2015.

Despite the progress made over the past 20 years in sustainability reporting, 57% of the world's large publicly traded companies still did not disclose their GHGs for 2015. It is noted that the majority of the non-disclosers are large companies based in emerging economies; while less than half of the developed-economy-based large companies have not disclosed their GHGs for 2015, the corresponding figure for their emerging-country counterparts is 73%. Further analysis by sector reveals more disconcerting facts. Fifty-two per cent of the developed-country GICS energy sector large companies did not disclose their GHGs for 2015; the energy sector is usually considered one of the highest emitters of GHGs globally. The picture among emerging economies looks even more dismal: non-disclosure rates of GHGs among the GICS Energy, Industrials, Materials and Utilities sectors – the top four high-impact sectors in terms of GHGs – are 62%, 80%, 71% and 68%, respectively.

Figure 4: 2015 disclosure rate of GHGs by type of economy and GICS sector

	Developed countries		Emerging countries	
GICS Sector	Number of large companies	Percent which did not disclose GHGs, 2015	Number of large companies	Percent which did not disclose GHGs, 2015
Consumer Discretionary	821	58%	307	78%
Consumer Staples	370	49%	188	72%
Energy	232	52%	138	62%
Financials	486	52%	365	73%
Health Care	246	52%	63	87%
Industrials	941	49%	392	80%
Information Technology	364	48%	145	59%
Materials	398	31%	337	71%
Real Estate	40	43%	125	82%
Telecommunication Services	68	26%	67	49%
Utilities	157	31%	145	68%

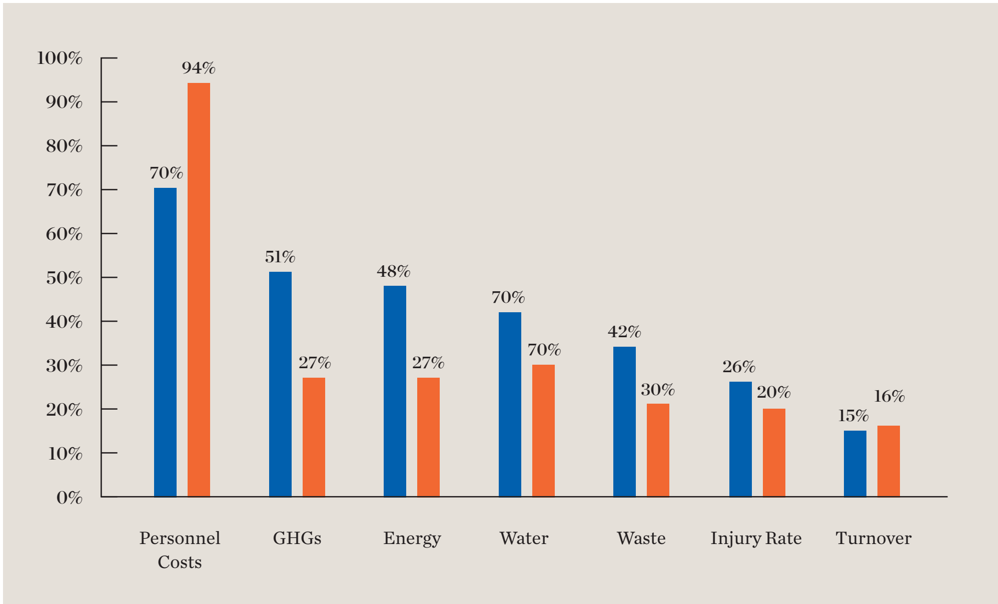
Overall and consistent with the findings in the prior years, with the exception of personnel costs[12] and to a small extent employee turnover, the disclosure of the seven indicators is still significantly lower among companies trading on stock exchanges based in emerging countries.

12. The International Financial Reporting Standards (IFRS) are the financial reporting standard that, under IAS 19, "Employee Benefits," mandates the disclosure of personnel costs.

Findings

For instance, while 51% of the 4,131 large companies based in developed economies disclosed GHGs for 2015, only 27% of their 2,293 counterparts from emerging countries reported GHGs for the same year. The same pattern is observed for the remaining five indicators as shown in Figure 5 below.

Figure 5: Reporting rates – developed versus emerging economies



Developed
Emerging

Close to 20 years after the introduction of sustainability reporting as a desirable outcome by corporations around the world, bolder efforts to boost the disclosure of the sustainability performance indicators among large companies listed in developed countries and especially in emerging economies are crucially needed. Mandatory and clear requirement through the issue of regulations has proven to be one generally successful instrument to spur sustainability performance reporting in several jurisdictions as illustrated further in the next section.

91%

The percentage of the London Stock Exchange's large companies that disclosed their GHGs for 2015.

18

The number of spots gained by the Taiwan Stock Exchange in the ranking

90%

The percentage of the Helsinki Stock Exchange's large companies which have published their sustainability performance information within seven month of their fiscal year end.

Ranking

In this sixth edition of this annual ranking, we applied our ranking model to the 55 stock exchanges included in our study. The results are show in Figure 6 below. The Helsinki Stock Exchange claims the top spot for the third time. In the six-year history of this ranking, the Helsinki Stock Exchange previously placed first in 2014 and 2015. It continues to excel in terms of overall disclosure, obtaining the top score on that metric out of 55 stock exchanges studied.

It was also found to be the home of the fastest disclosers of sustainability information, with 90% (36 out of 40) of the qualifying companies having already published their corporate sustainability performance data at the time of writing. The top five in this year's ranking also include the Stockholm Stock Exchange, Euronext Paris, London Stock Exchange and the Oslo Stock Exchange. It is interesting to note that all top-10-ranked exchanges in this year's ranking have at least one mandatory, prescriptive and broad policy instrument designed to regulate sustainability disclosure that is in force in the jurisdiction where they operate; this is similar to the finding made with last year's top 10.

The London Stock Exchange stands as a prime example of how mandatory disclosure requirements through regulations can be a successful instrument to promote sustainability reporting, in this case GHG reporting. Two hundred and twenty-five of the London Stock Exchange's 247 large listings (91%) disclosed their GHGs for 2015, making it the exchange with the highest percentage of GHG disclosure among all stock exchanges surveyed. The 2013 update to the UK Companies Act of 2006, which requires U.K.-incorporated companies listed on the London Stock Exchange main market, Nasdaq or NYSE to report their GHGs,[13] remains one of the most successful instruments in spurring environmental and social performance disclosures.

The Stock Exchange of Thailand continued its progression in the ranking from the 40th spot in 2013 to the tenth place in this year's ranking marking the fifth year of uninterrupted progression. Thai-listed large companies were noted for strong all-round performance in terms of disclosure rates, disclosure growth and timeliness. The combination

13. https://www.carrotsandsticks.net/regulation/companies-act-2006-strategic-report-directors-report-regulations-2013-quoted-companies-ghg-reporting-2013/

of voluntary reporting guidelines issued by the stock exchange in 2012 followed by mandatory disclosure requirements by the securities regulator in 2014[14] appear to have contributed to the continuous rise of the Stock Exchange of Thailand in the ranking.

Taiwan – China's Taiwan Stock Exchange progressed in the ranking by 18 spots to land in the 12th place in this year's ranking, primarily due to relatively high disclosure rates by its 127 large listed companies. With the exception of employee turnover, all the other six indicators are all reported by over half of the 127 surveyed organizations, with GHGs being reported by an impressive 79% of those 127 organizations, the sixth highest among all surveyed stock exchanges. A number of voluntary and mandatory policy instruments have been promulgated by both the Taiwan Stock Exchange and the Taiwan Financial Supervisory Commission since 2010;[15] it appears that the overall exercise has been met with resounding success. The Taiwan Stock Exchange was also found to be the exchange that experienced the highest growth rate in the disclosure of the seven indicators over the five years 2011 to 2015. The disclosure of GHGs, water, waste, employee turnover and injury rates grew at double-digit rates on an annualized basis over those five years. This phenomenon was already noted in last year's study.

The Shanghai- and Shenzhen-listed large corporations trail in terms of disclosure performance. Among exchanges with at least 100 large companies, China's Shanghai Stock Exchange and Shenzhen Stock Exchange were found to have the lowest disclosure rates of the seven indicators tracked in this research; with the exception of personnel costs, all six remaining indicators were disclosed by less than 10% of the large listings on each respective stock exchange. While both stock exchanges have a number of voluntary and mandatory policy instruments in place to promote sustainability reporting, the lacklustre results illustrate that the existence of policy instruments alone may not be sufficient to promote reporting.

Once again, stock exchanges based in developed countries continue to occupy a majority of the spots in the top portion of the ranking. Among the top 10, eight stock exchanges are from developed economies. However, it is interesting to note that there are now two exchanges from emerging economies: the Johannesburg Stock Exchange (JSE) placed in the ninth position (the JSE has been in the top 10 in every single edition of this ranking since inception in 2012), and the Stock Exchange of Thailand, which as noted earlier progressed uninterruptedly over the past five years, placed 10th.

The Wiener Börse (up 14 places to the 17th spot), Borsa Istanbul (up 15 places to the 20th spot) and Warsaw Stock Exchange (up 16 places to the 22nd spot), each with around 50 large listings, experienced significant gains in the ranking. Large listings on the Wiener Börse were noted for high disclosure rates, with over half of its 24 large companies having disclosed energy, GHGs and water for the year 2015, while waste and injury rates were disclosed by 46% of these same 24 large companies. Similarly, the Borsa Istanbul stands out for above-average disclosure rates for energy, GHGs and water and for double-digit annualized disclosure growth rates for a majority of the seven indicators. In the case of the Warsaw Stock Exchange, virtually all of its 38 large listings disclosed personnel costs for 2015 while experiencing double-digit annual growth rates in

14. https://www.carrotsandsticks.net/regulations/?fwp_regions=tha
15. https://www.carrotsandsticks.net/regulations/?fwp_regions=twn

the disclosure of most of the remaining indicators. It is interesting to note that, similar to the case of Switzerland's SIX Swiss Exchange, the Wiener Börse and the Warsaw Stock Exchange have neither adopted nor appear to be under the regulation of any national policy instrument meant to encourage corporate environmental and social disclosures.[16] However, since these countries form part of the European Union (EU), there may be some positive spillover effects from transparency practices of corporations in other EU countries that have been adopted by Austrian and Polish companies. The Borsa Istanbul, however, is regulated by no fewer than 12 different voluntary and mandatory policy instruments promulgated by the exchange, the regulator and national government, the large majority of which came into being since 2010.

Disclosure growth:
While it was noted earlier that the Taiwan Stock Exchange had the highest overall growth rate in the disclosure of the seven indicators over the period 2011–15, it is interesting to again note the presence of the Euronext Paris and Euronext Amsterdam among the top 10 exchanges in terms of growth rate. Both mature exchanges are noted for healthy growth rates in the disclosure of water, employee turnover and injury rate (and in the case of Euronext Paris, GHGs as well); this is quite remarkable for exchanges where disclosure rates are already relatively high. Other notable fast-growing exchanges among the top 10 include Bolsa Colombia, Bursa Malaysia, the Stock Exchange of Thailand, the Borsa Istanbul and the Johannesburg Stock Exchange – all being based in emerging economies. The top 10 in terms of disclosure growth is completed by the Warsaw Stock Exchange and the Singapore Exchange.

Disclosure timeliness:
The Nordic countries of Finland, Sweden and Norway are home to the fastest disclosers of sustainability information to the market. Ninety per cent of the large listings on Finland's Helsinki Stock Exchange had disclosed their sustainability data to the market within seven months of their fiscal year-end. The corresponding figures for the Stockholm Stock Exchange and the Oslo Stock Exchange are 88% and 87%, respectively. The other two top five exchanges by disclosure timeliness are the Australian Securities Exchange (86%) and the London Stock Exchange (84%).

Several stock exchanges, including Brazil's BM&FBOVESPA and India's Bombay Stock Exchange/National Stock Exchange, lost over 10 places compared to last year, primarily due to slow turnaround times for the disclosure of sustainability information to the market after year-end. Indeed large companies listed on the BM&FBOVESPA and the Bombay Stock Exchange/National Stock Exchange are among the five slowest disclosers of all stock exchanges surveyed; only about 10% of their respective large listings had disclosed their sustainability data to the market within seven months of their fiscal year-end. The Mexican Stock Exchange, the Tokyo Stock Exchange and the Santiago Exchange, which dropped several places in the ranking, also experienced weaknesses in disclosure timeliness although to a lesser extent.

16. Based on the Carrots & Sticks database, accessed on August 11, 2017. www.carrotsandsticks.net

Ranking

Figure 6: Overall results

First quartile · Second quartile · Third quartile · Fourth quartile

Rank 2017	Rank 2016	Rank 2015	Rank 2014	Rank 2013	Exchange name	Number of large companies	Disclosure score	Disclosure growth	Timeliness score	Overall score
1	7	1	1	2	Helsinki Stock Exchange	41	95.4%	36.2%	100.0%	84.9%
2	4	11	14	12	Stockholm Stock Exchange	89	78.4%	45.2%	97.6%	77.5%
3	2	6	4	6	Euronext Paris	154	85.4%	64.5%	71.4%	77.0%
4	8	5	9	11	London Stock Exchange	247	77.8%	39.1%	90.4%	73.9%
5	14	9	7	4	Oslo Stock Exchange	36	70.8%	48.8%	95.2%	73.7%
6	1	2	2	10	Euronext Amsterdam	46	76.5%	60.3%	76.1%	73.1%
7	3	4	10	17	Australian Securities Exchange	180	73.3%	42.4%	92.8%	73.0%
8	5	3	5	7	Copenhagen Stock Exchange	33	77.9%	37.2%	88.0%	72.8%
9	6	8	3	5	Johannesburg Stock Exchange	69	89.5%	48.9%	54.7%	70.9%
10	13	17	27	40	Stock Exchange of Thailand	92	73.8%	62.5%	69.0%	70.1%
11	30	27	21	25	Taiwan Stock Exchange	127	83.8%	78.5%	23.8%	64.7%
12	10	12	15	8	SIX Swiss Exchange	91	76.0%	35.7%	64.2%	64.4%
13	9	7	20	15	Deutsche Börse	128	74.6%	42.0%	61.9%	64.3%
14	11	10	8	1	BME Spanish Exchanges	50	88.9%	43.1%	35.7%	63.8%
15	17	19	23	24	Bursa Malaysia	54	51.1%	62.6%	80.9%	62.4%
16	18	15	22	18	Singapore Exchange	48	53.1%	53.9%	78.5%	60.9%
17	31	22	28	27	Wiener Börse	24	68.7%	34.1%	59.5%	59.0%
18	–	13	37	–	Irish Stock Exchange	10	60.1%	33.9%	–	52.2%
19	16	18	13	31	Bolsa Colombia	25	67.9%	66.2%	11.9%	50.8%
20	35	34	11	32	Borsa Istanbul	57	60.1%	55.9%	28.5%	49.8%
21	19	30	19	13	Borsa Italiana	80	61.9%	32.5%	38.0%	48.9%
22	38	33	43	35	Warsaw Stock Exchange	38	53.6%	60.3%	33.3%	48.8%
23	12	26	24	21	BM&FBOVESPA	133	79.2%	29.0%	9.5%	48.3%
24	24	23	17	23	Stock Exchange of Hong Kong	403	34.7%	41.9%	73.8%	47.9%
25	34	31	38	37	Indonesia Stock Exchange	61	39.3%	34.4%	66.6%	46.5%
26	21	24	32	30	Toronto Stock Exchange	162	52.2%	40.2%	40.4%	46.3%
27	15	14	18	26	Shanghai Stock Exchange	407	25.8%	35.3%	85.7%	45.7%
28	–	–	16	9	Athens Stock Exchange	20	67.1%	28.0%	21.4%	45.5%
29	32	28	33	39	Philippine Stock Exchange	34	43.9%	33.9%	42.8%	41.6%

Rank 2017	Rank 2016	Rank 2015	Rank 2014	Rank 2013	Exchange name	Number of large companies	Disclosure score	Disclosure growth	Timeliness score	Overall score
30	23	25	29	22	Euronext Brussels	33	46.3%	15.9%	50.0%	41.3%
31	22	36	25	28	Mexican Stock Exchange	62	49.6%	40.3%	26.1%	40.7%
32	–	35	31	16	Korea Exchange	211	42.8%	27.9%	45.2%	40.5%
33	27	37	30	19	Moscow Exchange	89	48.5%	33.7%	30.9%	40.2%
34	–	–	6	14	Euronext Lisbon	15	71.6%	13.9%	4.7%	40.0%
35	26	29	34	33	New York Stock Exchange	1009	34.7%	24.1%	57.1%	39.3%
36	28	21	12	3	Tokyo Stock Exchange	838	53.6%	33.3%	19.0%	39.2%
37	43	20	26	38	Shenzhen Stock Exchange	261	20.2%	15.5%	83.3%	38.2%
38	41	42	40	–	New Zealand Exchange	13	43.9%	16.8%	–	35.8%
39	25	32	39	36	Nasdaq	416	24.7%	13.8%	52.3%	30.8%
40	33	39	36	20	Santiago Exchange	45	44.2%	18.0%	16.6%	30.7%
41	–	–	–	–	Buenos Aires Stock Exchange	28	39.6%	27.0%	11.9%	28.8%
42	37	40	–	–	Dubai Financial Market	10	32.6%	19.6%	–	28.7%
43	29	16	35	34	Bombay Stock Exchange/ National Stock Exchange	193	44.4%	25.8%	2.3%	28.1%
44	–	–	–	–	Nigerian Stock Exchange	13	30.1%	3.4%	–	22.1%
45	36	38	41	45	Tel Aviv Stock Exchange	42	27.2%	27.1%	7.1%	21.1%
46	42	41	44	44	Qatar Stock Exchange	12	23.9%	5.3%	–	18.3%
47	40	44	42	42	Saudi Stock Exchange	30	21.8%	9.2%	–	18.0%
48	–	–	–	–	Frankfurt Stock Exchange	14	19.9%	8.2%	–	16.4%
49	45	45	46	43	Lima Stock Exchange	26	22.9%	11.9%	0.0%	13.8%
50	–	–	–	–	OTC Markets	44	14.5%	7.5%	–	12.4%
51	–	–	–	–	Pakistan Stock Exchange	24	13.2%	5.7%	–	11.0%
52	–	–	–	–	KOSDAQ	19	12.4%	3.2%	–	9.6%
53	–	–	–	–	Hochiminh Stock Exchange	14	12.1%	3.6%	–	9.6%
54	–	–	–	–	Egyptian Exchange	12	2.4%	3.8%	–	2.8%
55	44	–	–	–	Caracas Stock Exchange	12	2.4%	0.7%	–	1.9%

Beyond Disclosure: Powering Decision-Making With Sustainability Performance Data

While the previous section examined sustainability disclosure rates, for the second year, this report includes a section on sustainability performance analysis as an illustration of how quantitative data may be used in a meaningful way to inform investment decision-making in the wake of the global economic shift toward more sustainable business activities.
The following three aspects are explored:

- Carbon intensity;
- Revenue exposure to green energy and related activities (renewable energy, energy-smart technologies, carbon capture and storage, environmental services and carbon markets); and
- Revenue exposure to brown activities (fossil-fuel-related activities).

Carbon intensity

Carbon intensity is calculated by dividing the sum of scope 1 and 2 GHG emissions (GHGs) of the companies in a given stock exchange for 2015 by the sum of revenue (in U.S. dollars) for the same set of companies for 2015. To maintain statistical significance, only exchanges with at least 10 pairs of GHGs and revenue are included.

As shown in Figure 7 below, the Warsaw Stock Exchange is the most carbon-intensive stock exchange of the 55 exchanges studied, with 1,674 metric tons of GHGs per million of revenue in U.S. dollars in 2015. This may in part be due to the heavy reliance of the domestic economy on coal-powered energy.

The top three most carbon-intensive exchanges is completed by the Moscow Exchange (1,390 metric tonnestons of GHGs per million of revenue in U.S. dollars in 2015) and Bursa Malaysia (1,065 metric tons of GHGs per million of revenue in U.S. dollars in 2015).

At the other end of the table, technology-companies-heavy Nasdaq was found to be the one with the lowest carbon intensity at 76 metric tons of GHGs per million of revenue in U.S. dollars in 2015.

Figure 7: Top 10 stock exchanges with the highest carbon intensity, 2015

Stock exchange	Number of large companies	Carbon intensity (tCO2e scope 1 & 2) per US$1 million of sales, 2015
Warsaw Stock Exchange	14	1,674
Moscow Exchange	21	1,390
Bursa Malaysia	21	1,065
Johannesburg Stock Exchange	56	953
Stock Exchange of Thailand	46	674
Bombay Stock Exchange/National Stock Exchange	38	639
Bolsa Colombia	13	565
Euronext Amsterdam	28	485
Borsa Italiana	34	469
Australian Securities Exchange	57	453

Investing in the new economy

The Copenhagen Stock Exchange was found to be the exchange with the highest proportion of revenue from environmentally sustainable sources at 4.4%. This is arrived at by dividing the sum of green revenues of companies on a given exchange divided by total revenues of those same companies. Based on Bloomberg's BNEF data, green revenues include those derived from renewable energy, energy-smart technologies, carbon capture and storage, environmental services and carbon markets.[17] Wind turbine equipment manufacturer and installer Vestas Wind Systems, renewable energy company Dong Energy and insulation products Rockwool International are examples of some of the top Copenhagen-listed large companies with a significant proportion of green revenues. The next two exchanges are the Irish Stock Exchange (3.1%) and the BME Spanish Exchanges (3.0%). Figure 8 below shows the top 10 stock exchanges by percentage of green revenues. Median percentage green revenue was 1.1%, while the average was 1.2%; this illustrates how there are still significant opportunities in investing in the new green economy.

In total monetary terms, the New York Stock Exchange (NYSE) was the exchange with the highest amount of green revenues (US$123 billion), but this represented only about 1.1% of total revenues of 1,009 NYSE-listed companies. On average, the BME Spanish Exchanges had the highest amount of green revenues per large listed company at US$312,700,000.

Figure 8: Top 10 stock exchanges by green revenues, number of large companies and as a percentage of total revenue

Stock exchange	Number of large companies	Number of companies deriving green revenues as a percentage of total, 2015				Green revenue as a percentage of total revenue, 2015	Average green revenue (US$), 2015
		More than 0% and less than 10%	10–24%	25–49%	50% and above		
Copenhagen Stock Exchange	33	12	4	1	1	4.4%	278,983,946
Irish Stock Exchange	10	5	–	–	1	3.1%	197,822,259
BME Spanish Exchanges	50	30	3	1	2	3.0%	312,694,837
New Zealand Exchange	13	5	1	2	–	2.5%	80,843,045
Wiener Börse	24	13	2	1	–	2.5%	129,334,119
Euronext Amsterdam	46	19	3	–	1	2.4%	276,667,527
Helsinki Stock Exchange	41	18	3	1	–	2.1%	85,097,188
Euronext Brussels	33	18	–	1	–	2.1%	105,659,709
Borsa Italiana	80	44	4	–	–	2.0%	195,627,134
Singapore Exchange	48	18	3	–	–	1.9%	149,262,112

17. http://about.bnef.com/

Overlapping brown companies

43%

The proportion of the world's large companies which reported their GHGs for 2015.

In this section, stock exchanges are assessed based on the proportion of the total revenue of their listed entities that comes from "brown" sources – oil & gas, thermal coal mining and electric utilities that use coal for electricity generation. As the world economy is slowly transitioning toward a low-carbon one, companies with significant involvement in the production and use of high-carbon-emitting sources of energy may be exposed to considerable downside financial risk over the long term.

Figure 9 below shows the top 10 exchanges by percentage of brown revenue.

Oil-rich Norway's Oslo Stock Exchange was found to be the exchange with the highest percentage of corporate revenue from brown sources (44.5%), followed closely by the Moscow Exchange at 43.9%. Also in the top three is Vietnam's Hochiminh Stock Exchange, where about 40% of the total revenues of its 14 large listings come from two oil & gas companies. It is also noted that a majority of the exchanges in the top 10 by brown revenues have a lower-than-median (1.1%) percentage from green revenues. This illustrates the need for economic risk reduction through diversification in several economies.

Figure 9: Top 10 stock exchanges by brown revenues, 2015

Stock exchange	Number of large companies	Brown revenue as a percentage of total revenue, 2015	Green revenue as a percentage of total revenue, 2015
Oslo Stock Exchange	36	44.5%	0.8%
Moscow Exchange	72	43.9%	0.8%
Hochiminh Stock Exchange	14	37.8%	0.2%
Athens Stock Exchange	20	37.5%	1.1%
London Stock Exchange	247	36.1%	1.1%
Stock Exchange of Thailand	92	32.7%	0.7%
Bolsa Colombia	25	29.7%	0.6%
Warsaw Stock Exchange	38	27.6%	0.9%
Bombay Stock Exchange/National Stock Exchange	193	26.6%	1.2%
Philippine Stock Exchange	34	23.9%	0.7%

Conclusion

More than 20 years into a global push to promote corporate transparency in environmental and social matters, it is found that only 43% of the world's 6,441 large companies reported their GHGs for the year 2015; effectively, a majority of the world's large companies – 57% – still have not disclosed any information on their GHGs, arguably the most heavily tracked corporate environmental performance indicator. Other important environmental metrics such as water and waste are reported at even lower rates.

Even though over 2,700 large publicly traded companies have disclosed GHGs (and other environmental and social indicators), it was found that a significant number of institutional investors find corporate sustainability data to lack sufficient comparability and specificity, thus limiting their ability to effectively use the information.

Policy-makers, regulators, investors and sustainability experts are urged to develop a radically different strategy to address both the "quantity" and "quality" issues that limit the widespread use of corporate sustainability reporting today. Mandatory requirements, a set of globally accepted standards, clearly specified reporting vehicle and time frame, and enforcement are some of the key ingredients needed to bring corporate sustainability reporting to the same level and usefulness for investors as financial information currently is for investors. Ensuring that sustainability information is disclosed at the same time as financial information can in the meantime already be a big step forward. The International Organization of Securities Commissions (IOSCO), the World Federation of Exchanges (WFE) and members of the members of the Corporate Reporting Dialogue are some of the global organizations that may have a crucially impactful role in redefining the corporate sustainability reporting landscape, ideally with some impetus from the G20.

A concerted effort by all relevant parties can therefore bring about the much-needed transparency to measure and steer the world's transition to a low-carbon one and the achievement of the Sustainable Development Goals by 2030.[18]

18. http://www.undp.org/content/undp/en/home/sustainable-development-goals.html

Appendix A. Detailed Methodology

Ranking model: Stock exchanges were ranked on three measures:

(i) The Disclosure Score (50% weight). The Disclosure Score measures the proportion of large listings that disclosed the seven indicators in 2015. First, the percentage of large companies trading on a given stock exchange that disclosed a given indicator in 2015 is determined. This is done for all 55 exchanges analyzed. Second, the 55 resulting percentages are percentage-rank-scored, with the highest percentage receiving the highest score. This is repeated for each of the remaining six indicators. Finally, an exchange's Disclosure Score is a simple average of the seven percentage-rank scores. The indicators are equally weighted in terms of their contribution to the Disclosure Score.

(ii) The Disclosure Growth Score (20% weight). The Disclosure Growth Score measures the growth rate in the proportion of large listings that disclosed the seven indicators over the 2011–15 period (20% weight). First, the annualized compound growth rate in the disclosure of a given indicator is calculated for the period 2011–15. This is done for all 55 exchanges analyzed. Second, the resulting 55 annualized compound growth rates are percentage-rank-scored, with the highest percentage receiving the highest score. This is repeated for each of the remaining six indicators. Finally, an exchange's Disclosure Growth Score is a simple average of the seven percentage-rank scores.

(iii) The Disclosure Timeliness Score (30% weight). The Disclosure Timeliness Score measures how quickly companies report sustainability data to the market after the end of their fiscal year. First, from our universe of 6,441 companies, we removed all the ones that had not disclosed any sustainability data in 2015. From the remaining companies, we considered the ones that had a fiscal year-end from December 31, 2016, to date. If a given stock exchange had fewer than 10 companies remaining after applying the above screens, it was discarded from the analysis. Second, for each of the remaining exchanges, we looked at the existence of publicly disclosed sustainability data as at August 1, 2017 (seven months after year-end) on a per-exchange basis. Third, the percentage of companies that disclosed sustainability data was calculated. This is done for all eligible exchanges. Finally, the percentage values are percentage-rank-scored; these are the Disclosure Scores. The Timeliness Score is arrived at by considering all large companies on a given exchange with a fiscal year-end of December 31, 2016, and after ("the qualifying companies"), then calculating the proportion that had disclosed at least one of the seven indicators (excluding personnel costs) by August 1, 2017. This process is repeated for all 45 stock exchanges included in the research universe. To maintain statistical significance, any stock exchange with fewer than 10 qualifying companies is not assessed on the timeliness indicator.

In the event the Disclosure Timeliness Score cannot be calculated for a given stock exchange, that stock exchange will be scored on the Disclosure Score (70%) and Disclosure Growth Score (30%).

Let's consider an illustrative example:
Assume that stock exchange ABC is one of the 55 exchanges included in our analysis. Stock exchange ABC had 100 large listings as of August 1, 2017. Sixteen of these listings disclosed their 2015 employee turnover rate, 61 disclosed their energy, 58 disclosed their GHG emissions, 11 disclosed their injury rate, 89 disclosed their personnel costs, 17 disclosed their waste and none disclosed their water. The exchange's disclosure rates are:

Indicator	Disclosure rate
Employee turnover	16%
Energy	61%
GHGs	58%
Injury rate	11%
Personnel costs	89%
Waste	17%
Water	0%

Assume that ABC was best among all 55 exchanges in terms of the disclosure of energy, GHG, personnel costs and waste and the worst in terms of employee turnover, injury rate and water.

The resulting percentage-rank scores are:

Indicator	Percentage-rank scores
Employee turnover	0%
Energy	100%
GHGs	100%
Injury rate	0%
Personnel costs	100%
Waste	100%
Water	0%

ABC's Disclosure Score is therefore the simple average of the above percentage-rank scores times a weight of 50%; i.e., the Disclosure Score is 29%.

In terms of disclosure growth, assume that over the period 2011–15, the disclosure of each one of the seven indicators grew at an annualized compound rate as per the table below:

Indicator	Annualized compound growth rate
Employee turnover	12%
Energy	48%
GHGs	50%
Injury rate	-10%
Personnel costs	0%
Waste	5%
Water	0%

Assume further that ABC had the best growth rate among all 55 exchanges for energy and GHGs, the median growth rate for employee turnover and the worst growth rate for injury rate, personnel costs, waste and water. The resulting percentage-rank scores for disclosure growth are as follows:

Indicator	Percentage-rank scores
Employee turnover	50%
Energy	100%
GHGs	100%
Injury rate	0%
Personnel costs	0%
Waste	0%
Water	0%

The Disclosure Growth Score for ABC is the simple average of the above scores times a weight of 20%; i.e., the Disclosure Growth Score is 7%.

Finally, in terms of disclosure timeliness, assume that out of the 100 large companies that traded on ABC exchange on August 1, 2017, 70 had a December 31, 2016, and after inclusive year-end. Furthermore, as at August 1, 2017, five of these 70 companies (7%) had already disclosed their sustainability performance data.

Compared to the remaining 54 exchanges, ABC had the second-lowest percentage of its large companies with a qualifying year-end that had disclosed sustainability data by August 1, 2017. This results in a percentage-rank score of 2%.

ABC's Disclosure Timeliness Score is therefore the above 2% times a weight of 30%; i.e., the Disclosure Timeliness Score is 1%.

The sum of ABC's Disclosure Score (29%), Disclosure Growth Score (7%) and Disclosure Timeliness Score (1%) is 37%, the Overall Score.

If 37% is the third-lowest Overall Score among all 55 exchanges, ABC places 53rd out of 55 in the ranking.

Exchange size. While exchanges with fewer than 10 large company listings were eliminated from the ranking, exchanges that met this cut-off were treated equally.

Exchange characteristics. Exchange characteristics such as ownership structure or the degree of autonomy that exchanges have to implement listing requirements were not analyzed.

Sector composition. The sector composition of each exchange's large listings was not taken into account. Exchanges that are home to a disproportionately large share of companies in industries known to have strong disclosure practices, such as the mining industry, may have been advantaged in our ranking.

Data conventions. All data is subject to the data collection methodologies employed by Bloomberg and Thomson Reuters. For instance, Bloomberg discards a small but unspecified number of data points in its ESG database that do not meet quality control thresholds. While the merits of Bloomberg's quality control process are obvious, it means that Bloomberg's ESG database is not a complete representation of global reporting trends on the seven indicators.

Data fields

Seven sustainability indicators	Reporting rationale
Employee turnover	Low employee turnover is often correlated with effective human capital management and talent retention, which are well-established returns drivers in many sectors.
Energy	Energy use can be an important proxy for firm-wide resource use efficiency and an increasingly important cost centre for companies in many industries.
GHGs	The prospect of carbon regulation is leading to a growing monetization of GHG externalities, with the concept of carbon shadow pricing an increasingly utilized accounting tool.
Injury rate	Workplace health and safety can be a useful proxy for management quality.
Personnel costs	Pay equity is an increasingly visible sustainability theme, with tightening rules around workforce and CEO pay disclosure and greater vigilance about excessive CEO compensation. Personnel costs also provide insight to how well a company is positioned to retain and attract the best talent.
Waste	Waste generated per unit of revenue can be an insightful measure of operational efficiency.
Water	Water is an increasingly scarce global resource, and a firm's water use practices can reflect management foresight.

Disclosure timeliness. Exchanges that could not be assigned a Disclosure Timeliness Score were scored only on the Disclosure Score and Disclosure Growth Score with revised weights of 70% and 30%, respectively.

Notwithstanding these limitations, this year's ranking is based on a clear and objective set of criteria and allows for transparent benchmarking of sustainability disclosure across the world's stock exchanges.

Appendix B. Disclosure Rates (2011–15) by Stock Exchange and Indicator

Employee turnover

Stock exchange	Number of large companies, August 1, 2017	2011	2012	2013	2014	2015	CAGR
Athens Stock Exchange	20	6	7	8	8	8	7%
Australian Securities Exchange	180	34	40	39	49	44	7%
BM&FBOVESPA	133	76	72	71	80	53	-9%
BME Spanish Exchanges	50	17	18	23	24	23	8%
Bolsa Colombia	25	2	4	8	7	6	32%
Bombay Stock Exchange/ National Stock Exchange	193	14	13	23	23	21	11%
Borsa Istanbul	57	6	5	7	10	10	14%
Borsa Italiana	80	22	19	22	25	28	6%
Buenos Aires Stock Exchange	28	4	3	6	6	6	11%
Bursa Malaysia	54	7	9	12	15	15	21%
Caracas Stock Exchange	12	0	0	0	0	0	–
Copenhagen Stock Exchange	33	10	11	12	12	12	5%
Deutsche Börse	128	36	40	43	50	54	11%
Dubai Financial Market	10	0	0	1	1	1	–
Egyptian Exchange	12	0	0	0	0	0	–
Euronext Amsterdam	46	9	12	13	19	17	17%
Euronext Brussels	33	5	5	6	5	4	-5%
Euronext Lisbon	15	4	4	5	4	4	0%
Euronext Paris	154	47	54	71	81	81	15%
Frankfurt Stock Exchange	14	0	0	0	0	0	–
Helsinki Stock Exchange	41	16	21	20	24	26	13%
Hochiminh Stock Exchange	14	0	1	1	1	1	–
Indonesia Stock Exchange	61	7	9	11	9	9	6%
Irish Stock Exchange	10	2	2	2	2	2	0%
Johannesburg Stock Exchange	69	31	36	35	34	35	3%
Korea Exchange	211	10	11	14	14	23	23%
KOSDAQ	19	0	0	0	0	0	–
Lima Stock Exchange	26	1	1	2	2	3	32%
London Stock Exchange	247	46	52	56	57	55	5%
Mexican Stock Exchange	62	7	10	8	7	11	12%
Moscow Exchange	89	12	13	15	15	18	11%

Appendix B. Disclosure Rates (2011–15) by Stock Exchange and Indicator

Employee turnover

Stock exchange	Number of large companies, August 1, 2017	2011	2012	2013	2014	2015	CAGR
New York Stock Exchange	1009	44	56	53	59	60	8%
New Zealand Exchange	13	1	1	1	0	0	-100%
Nigerian Stock Exchange	13	0	0	0	0	1	–
Oslo Stock Exchange	36	5	6	8	10	10	19%
OTC Markets	44	1	1	3	1	1	0%
Pakistan Stock Exchange	24	1	2	2	2	0	-100%
Philippine Stock Exchange	34	4	4	4	4	5	6%
Qatar Stock Exchange	12	1	1	1	1	2	19%
Santiago Exchange	45	7	7	10	11	8	3%
Saudi Stock Exchange	30	1	1	0	0	0	-100%
Shanghai Stock Exchange	407	17	14	19	24	26	11%
Shenzhen Stock Exchange	261	3	2	3	2	3	0%
Singapore Exchange	48	5	5	5	9	10	19%
SIX Swiss Exchange	91	32	34	36	39	40	6%
Stock Exchange of Hong Kong	403	15	22	31	37	43	30%
Stock Exchange of Thailand	92	10	20	22	22	30	32%
Stockholm Stock Exchange	89	31	31	29	30	34	2%
Taiwan Stock Exchange	127	22	35	44	60	60	29%
Tel Aviv Stock Exchange	42	0	3	4	5	3	–
Tokyo Stock Exchange	838	3	4	5	8	8	28%
Toronto Stock Exchange	162	18	22	25	26	25	9%
Warsaw Stock Exchange	38	1	0	3	4	7	63%
Wiener Börse	24	6	6	6	6	7	4%

Energy

Stock exchange	Number of large companies, August 1, 2017	2011	2012	2013	2014	2015	CAGR
Athens Stock Exchange	20	11	10	12	12	12	2%
Australian Securities Exchange	180	121	124	126	126	122	0%
BM&FBOVESPA	133	87	88	91	86	83	-1%
BME Spanish Exchanges	50	38	40	40	41	41	2%
Bolsa Colombia	25	4	6	9	15	16	41%
Bombay Stock Exchange/ National Stock Exchange	193	61	60	68	62	56	-2%
Borsa Istanbul	57	26	26	27	29	29	3%
Borsa Italiana	80	42	42	44	44	44	1%
Buenos Aires Stock Exchange	28	2	5	5	2	2	0%
Bursa Malaysia	54	13	16	16	16	18	8%
Caracas Stock Exchange	12	0	0	0	0	0	–
Copenhagen Stock Exchange	33	24	23	21	22	22	-2%
Deutsche Börse	128	77	78	76	77	81	1%
Dubai Financial Market	10	0	0	1	1	0	–
Egyptian Exchange	12	0	0	0	0	0	–
Euronext Amsterdam	46	25	26	27	27	28	3%
Euronext Brussels	33	13	14	14	15	14	2%
Euronext Lisbon	15	9	7	6	6	6	-10%
Euronext Paris	154	93	98	100	103	105	3%
Frankfurt Stock Exchange	14	4	3	2	2	2	-16%
Helsinki Stock Exchange	41	35	35	35	34	35	0%
Hochiminh Stock Exchange	14	0	0	0	0	0	–
Indonesia Stock Exchange	61	10	11	15	12	12	5%
Irish Stock Exchange	10	6	5	5	5	5	-4%
Johannesburg Stock Exchange	69	54	59	58	59	59	2%
Korea Exchange	211	84	84	85	86	86	1%
KOSDAQ	19	0	0	0	0	0	–
Lima Stock Exchange	26	2	0	0	0	1	-16%
London Stock Exchange	247	179	175	175	179	180	0%
Mexican Stock Exchange	62	17	18	25	26	26	11%

Appendix B. Disclosure Rates (2011–15) by Stock Exchange and Indicator

Energy

Stock exchange	Number of large companies, August 1, 2017	2011	2012	2013	2014	2015	CAGR
Nasdaq	416	75	84	88	95	101	8%
New York Stock Exchange	1009	297	311	329	328	353	4%
New Zealand Exchange	13	4	4	4	3	5	6%
Nigerian Stock Exchange	13	1	1	1	1	1	0%
Oslo Stock Exchange	36	23	25	27	26	29	6%
OTC Markets	44	6	7	5	4	3	-16%
Pakistan Stock Exchange	24	0	0	0	0	0	-
Philippine Stock Exchange	34	7	7	9	10	10	9%
Qatar Stock Exchange	12	1	1	1	1	1	0%
Santiago Exchange	45	8	7	8	8	8	0%
Saudi Stock Exchange	30	1	1	1	1	1	0%
Shanghai Stock Exchange	407	42	44	44	42	40	-1%
Shenzhen Stock Exchange	261	15	14	13	13	15	0%
Singapore Exchange	48	17	17	17	15	20	4%
SIX Swiss Exchange	91	60	59	59	58	57	-1%
Stock Exchange of Hong Kong	403	87	88	92	91	97	3%
Stock Exchange of Thailand	92	38	44	46	48	48	6%
Stockholm Stock Exchange	89	65	65	64	66	65	0%
Taiwan Stock Exchange	127	44	48	50	55	62	9%
Tel Aviv Stock Exchange	42	9	9	8	8	9	0%
Tokyo Stock Exchange	838	402	412	415	422	426	1%
Toronto Stock Exchange	162	81	86	89	87	91	3%
Warsaw Stock Exchange	38	9	11	12	12	16	15%
Wiener Börse	24	13	14	14	14	15	4%

GHGs

Stock exchange	Number of large companies, August 1, 2017	2011	2012	2013	2014	2015	CAGR
Athens Stock Exchange	20	11	11	11	12	11	0%
Australian Securities Exchange	180	114	120	125	127	130	3%
BM&FBOVESPA	133	93	96	96	92	97	1%
BME Spanish Exchanges	50	34	37	38	42	42	5%
Bolsa Colombia	25	6	12	15	17	17	30%
Bombay Stock Exchange/ National Stock Exchange	193	49	48	56	56	55	3%
Borsa Istanbul	57	19	26	25	29	29	11%
Borsa Italiana	80	34	35	38	42	44	7%
Buenos Aires Stock Exchange	28	4	4	5	4	4	0%
Bursa Malaysia	54	10	13	12	18	22	22%
Caracas Stock Exchange	12	0	0	0	0	0	–
Copenhagen Stock Exchange	33	23	25	24	23	24	1%
Deutsche Börse	128	64	71	65	75	80	6%
Dubai Financial Market	10	1	2	2	2	2	19%
Egyptian Exchange	12	0	0	0	0	0	–
Euronext Amsterdam	46	25	28	28	28	28	3%
Euronext Brussels	33	14	13	12	14	14	0%
Euronext Lisbon	15	10	9	8	8	8	-5%
Euronext Paris	154	79	91	95	104	108	8%
Frankfurt Stock Exchange	14	2	1	1	1	1	-16%
Helsinki Stock Exchange	41	32	34	35	35	35	2%
Hochiminh Stock Exchange	14	0	0	0	0	0	–
Indonesia Stock Exchange	61	4	7	6	6	8	19%
Irish Stock Exchange	10	5	5	5	6	6	5%
Johannesburg Stock Exchange	69	55	61	61	60	62	3%
Korea Exchange	211	82	82	81	80	88	2%
KOSDAQ	19	0	0	0	0	0	–
Lima Stock Exchange	26	1	0	1	2	1	0%
London Stock Exchange	247	178	196	205	221	225	6%

Appendix B. Disclosure Rates (2011–15) by Stock Exchange and Indicator

GHGs

Stock exchange	Number of large companies, August 1, 2017	2011	2012	2013	2014	2015	CAGR
Moscow Exchange	89	18	22	12	20	25	9%
Nasdaq	416	76	84	91	102	103	8%
New York Stock Exchange	1009	326	362	355	367	388	4%
New Zealand Exchange	13	6	5	6	6	8	7%
Nigerian Stock Exchange	13	0	0	0	0	0	–
Oslo Stock Exchange	36	21	23	25	30	30	9%
OTC Markets	44	6	7	6	4	3	-16%
Pakistan Stock Exchange	24	1	1	2	2	0	-100%
Philippine Stock Exchange	34	8	10	10	10	9	3%
Qatar Stock Exchange	12	0	1	1	1	1	–
Santiago Exchange	45	11	14	8	10	8	-8%
Saudi Stock Exchange	30	2	2	1	1	1	-16%
Shanghai Stock Exchange	407	6	8	15	18	23	40%
Shenzhen Stock Exchange	261	4	5	5	4	7	15%
Singapore Exchange	48	11	15	14	17	20	16%
SIX Swiss Exchange	91	57	61	60	60	57	0%
Stock Exchange of Hong Kong	403	30	36	45	62	76	26%
Stock Exchange of Thailand	92	24	40	40	42	46	18%
Stockholm Stock Exchange	89	62	63	62	63	66	2%
Taiwan Stock Exchange	127	51	74	84	97	100	18%
Tel Aviv Stock Exchange	42	8	9	8	8	10	6%
Tokyo Stock Exchange	838	439	445	452	467	459	1%
Toronto Stock Exchange	162	87	91	92	95	97	3%
Warsaw Stock Exchange	38	8	11	10	11	16	19%
Wiener Börse	24	13	13	12	13	14	2%

Injury rate

Stock exchange	Number of large companies, August 1, 2017	2011	2012	2013	2014	2015	CAGR
Athens Stock Exchange	20	8	9	8	9	7	-3%
Australian Securities Exchange	180	98	108	113	121	125	6%
BM&FBOVESPA	133	72	69	67	75	64	-3%
BME Spanish Exchanges	50	26	26	26	25	28	2%
Bolsa Colombia	25	5	7	6	6	7	9%
Bombay Stock Exchange/ National Stock Exchange	193	27	27	31	29	32	4%
Borsa Istanbul	57	5	10	12	14	17	36%
Borsa Italiana	80	15	18	17	16	18	5%
Buenos Aires Stock Exchange	28	2	2	3	3	5	26%
Bursa Malaysia	54	13	11	12	15	17	7%
Caracas Stock Exchange	12	0	0	0	0	0	–
Copenhagen Stock Exchange	33	16	19	19	19	20	6%
Deutsche Börse	128	35	38	39	42	44	6%
Dubai Financial Market	10	1	1	1	1	1	0%
Egyptian Exchange	12	1	0	0	0	0	-100%
Euronext Amsterdam	46	17	22	23	22	23	8%
Euronext Brussels	33	7	8	8	9	9	6%
Euronext Lisbon	15	6	7	8	5	6	0%
Euronext Paris	154	58	72	78	78	86	10%
Frankfurt Stock Exchange	14	0	0	0	0	0	–
Helsinki Stock Exchange	41	21	24	25	23	23	2%
Hochiminh Stock Exchange	14	0	0	0	0	0	–
Indonesia Stock Exchange	61	7	12	12	13	15	21%
Irish Stock Exchange	10	3	3	3	4	4	7%
Johannesburg Stock Exchange	69	35	37	40	41	41	4%
Korea Exchange	211	11	17	17	17	16	10%
KOSDAQ	19	0	0	0	0	0	–
Lima Stock Exchange	26	2	2	3	3	4	19%
London Stock Exchange	247	117	118	122	126	124	1%

Appendix B. Disclosure Rates (2011–15) by Stock Exchange and Indicator

Injury rate

Stock exchange	Number of large companies, August 1, 2017	2011	2012	2013	2014	2015	CAGR
Moscow Exchange	89	16	19	21	19	20	6%
Nasdaq	416	24	27	29	27	30	6%
New York Stock Exchange	1009	200	207	214	207	200	0%
New Zealand Exchange	13	5	2	4	3	6	5%
Nigerian Stock Exchange	13	0	0	0	0	2	–
Oslo Stock Exchange	36	15	16	19	19	21	9%
OTC Markets	44	1	3	3	2	2	19%
Pakistan Stock Exchange	24	0	1	1	0	0	–
Philippine Stock Exchange	34	3	4	4	4	6	19%
Qatar Stock Exchange	12	0	0	0	1	1	–
Santiago Exchange	45	12	14	11	11	13	2%
Saudi Stock Exchange	30	1	1	1	2	2	19%
Shanghai Stock Exchange	407	7	9	11	16	14	19%
Shenzhen Stock Exchange	261	5	5	4	6	8	12%
Singapore Exchange	48	3	7	10	11	16	52%
SIX Swiss Exchange	91	22	23	25	33	31	9%
Stock Exchange of Hong Kong	403	21	26	33	44	52	25%
Stock Exchange of Thailand	92	18	32	34	42	44	25%
Stockholm Stock Exchange	89	30	33	35	35	39	7%
Taiwan Stock Exchange	127	27	40	56	63	66	25%
Tel Aviv Stock Exchange	42	2	3	3	3	3	11%
Tokyo Stock Exchange	838	117	121	119	130	126	2%
Toronto Stock Exchange	162	51	52	50	53	52	0%
Warsaw Stock Exchange	38	3	7	9	9	9	32%
Wiener Börse	24	8	7	9	10	11	8%

Personnel costs

Stock exchange	Number of large companies, August 1, 2017	2011	2012	2013	2014	2015	CAGR
Athens Stock Exchange	20	16	16	17	18	17	2%
Australian Securities Exchange	180	153	149	155	157	159	1%
BM&FBOVESPA	133	116	117	116	120	121	1%
BME Spanish Exchanges	50	47	45	45	47	47	0%
Bolsa Colombia	25	13	22	22	18	21	13%
Bombay Stock Exchange/ National Stock Exchange	193	184	184	184	185	189	1%
Borsa Istanbul	57	54	55	55	55	55	0%
Borsa Italiana	80	72	72	72	73	71	0%
Buenos Aires Stock Exchange	28	26	27	27	27	27	1%
Bursa Malaysia	54	46	50	50	50	49	2%
Caracas Stock Exchange	12	9	10	10	10	9	0%
Copenhagen Stock Exchange	33	27	28	29	30	30	3%
Deutsche Börse	128	117	117	120	120	122	1%
Dubai Financial Market	10	9	7	7	9	10	3%
Egyptian Exchange	12	6	7	7	7	8	7%
Euronext Amsterdam	46	38	39	40	44	44	4%
Euronext Brussels	33	29	29	30	30	28	-1%
Euronext Lisbon	15	15	15	15	15	15	0%
Euronext Paris	154	144	144	144	147	147	1%
Frankfurt Stock Exchange	14	10	11	11	11	10	0%
Helsinki Stock Exchange	41	41	41	41	41	41	0%
Hochiminh Stock Exchange	14	5	8	9	11	12	24%
Indonesia Stock Exchange	61	59	61	61	61	60	0%
Irish Stock Exchange	10	9	10	10	10	10	3%
Johannesburg Stock Exchange	69	63	63	64	64	65	1%
Korea Exchange	211	183	191	194	197	204	3%
KOSDAQ	19	16	18	19	19	19	4%
Lima Stock Exchange	26	15	16	17	15	15	0%
London Stock Exchange	247	234	236	238	238	240	1%

Appendix B. Disclosure Rates (2011–15) by Stock Exchange and Indicator

Personnel costs

Stock exchange	Number of large companies, August 1, 2017	2011	2012	2013	2014	2015	CAGR
Moscow Exchange	89	63	70	79	79	81	6%
Nasdaq	416	184	184	184	184	177	-1%
New York Stock Exchange	1009	306	308	308	308	273	-3%
New Zealand Exchange	13	13	13	13	13	13	0%
Nigerian Stock Exchange	13	13	13	13	13	13	0%
Oslo Stock Exchange	36	33	33	33	31	31	-2%
OTC Markets	44	14	14	15	14	10	-8%
Pakistan Stock Exchange	24	24	24	22	23	23	-1%
Philippine Stock Exchange	34	31	31	32	32	33	2%
Qatar Stock Exchange	12	10	10	10	9	10	0%
Santiago Exchange	45	38	38	38	38	41	2%
Saudi Stock Exchange	30	30	29	24	28	30	0%
Shanghai Stock Exchange	407	358	380	387	394	396	3%
Shenzhen Stock Exchange	261	217	244	248	253	253	4%
Singapore Exchange	48	43	42	42	40	41	-1%
SIX Swiss Exchange	91	84	84	84	85	83	0%
Stock Exchange of Hong Kong	403	373	381	389	393	392	1%
Stock Exchange of Thailand	92	88	88	88	88	90	1%
Stockholm Stock Exchange	89	77	82	84	87	83	2%
Taiwan Stock Exchange	127	121	123	123	123	123	0%
Tel Aviv Stock Exchange	42	27	28	28	28	30	3%
Tokyo Stock Exchange	838	766	778	782	786	793	1%
Toronto Stock Exchange	162	83	83	84	87	87	1%
Warsaw Stock Exchange	38	36	36	37	37	37	1%
Wiener Börse	24	22	22	21	21	21	-1%

Waste

Stock exchange	Number of large companies, August 1, 2017	2011	2012	2013	2014	2015	CAGR
Athens Stock Exchange	20	8	8	8	8	8	0%
Australian Securities Exchange	180	50	60	64	65	71	9%
BM&FBOVESPA	133	77	86	85	84	77	0%
BME Spanish Exchanges	50	31	34	35	37	36	4%
Bolsa Colombia	25	7	12	12	10	11	12%
Bombay Stock Exchange/ National Stock Exchange	193	26	30	33	34	33	6%
Borsa Istanbul	57	11	12	11	14	18	13%
Borsa Italiana	80	30	31	30	37	34	3%
Buenos Aires Stock Exchange	28	1	1	2	1	1	0%
Bursa Malaysia	54	6	9	8	10	13	21%
Caracas Stock Exchange	12	0	0	0	0	0	–
Copenhagen Stock Exchange	33	16	17	17	16	15	-2%
Deutsche Börse	128	46	52	52	58	58	6%
Dubai Financial Market	10	1	1	2	2	2	19%
Egyptian Exchange	12	0	0	0	0	0	–
Euronext Amsterdam	46	20	18	18	20	21	1%
Euronext Brussels	33	11	11	11	10	11	0%
Euronext Lisbon	15	10	8	8	7	8	-5%
Euronext Paris	154	66	71	77	84	88	7%
Frankfurt Stock Exchange	14	1	1	1	2	2	19%
Helsinki Stock Exchange	41	29	31	31	30	29	0%
Hochiminh Stock Exchange	14	0	0	0	0	0	–
Indonesia Stock Exchange	61	3	5	5	3	4	7%
Irish Stock Exchange	10	2	3	3	3	2	0%
Johannesburg Stock Exchange	69	28	35	38	37	34	5%
Korea Exchange	211	51	62	62	60	55	2%
KOSDAQ	19	0	0	0	0	0	–
Lima Stock Exchange	26	3	1	1	0	2	-10%
London Stock Exchange	247	108	110	105	98	104	-1%
Mexican Stock Exchange	62	13	19	19	23	22	14%
Moscow Exchange	89	22	27	28	28	27	5%

Appendix B. Disclosure Rates (2011–15) by Stock Exchange and Indicator

Waste

Stock exchange	Number of large companies, August 1, 2017	2011	2012	2013	2014	2015	CAGR
New York Stock Exchange	1009	192	220	220	219	227	4%
New Zealand Exchange	13	2	2	1	1	0	-100%
Nigerian Stock Exchange	13	0	0	1	1	1	–
Oslo Stock Exchange	36	11	11	12	13	14	6%
OTC Markets	44	5	5	4	2	3	-12%
Pakistan Stock Exchange	24	1	1	2	2	1	0%
Philippine Stock Exchange	34	5	8	7	5	7	9%
Qatar Stock Exchange	12	0	0	0	1	1	–
Santiago Exchange	45	12	13	15	14	11	-2%
Saudi Stock Exchange	30	2	1	1	1	1	-16%
Shanghai Stock Exchange	407	8	9	10	14	19	24%
Shenzhen Stock Exchange	261	5	4	5	8	12	24%
Singapore Exchange	48	8	11	12	11	13	13%
SIX Swiss Exchange	91	40	43	42	45	43	2%
Stock Exchange of Hong Kong	403	18	26	32	48	55	32%
Stock Exchange of Thailand	92	16	28	28	38	36	22%
Stockholm Stock Exchange	89	38	42	42	41	42	3%
Taiwan Stock Exchange	127	48	62	65	77	85	15%
Tel Aviv Stock Exchange	42	3	5	5	5	4	7%
Tokyo Stock Exchange	838	404	404	411	414	397	0%
Toronto Stock Exchange	162	44	51	49	53	52	4%
Warsaw Stock Exchange	38	8	10	12	12	11	8%
Wiener Börse	24	9	11	12	12	11	5%

Water

Stock exchange	Number of large companies, August 1, 2017	2011	2012	2013	2014	2015	Water 2011–2015
Athens Stock Exchange	20	12	13	12	12	11	-2%
Australian Securities Exchange	180	57	64	63	65	93	13%
BM&FBOVESPA	133	85	86	83	85	83	-1%
BME Spanish Exchanges	50	34	37	38	38	38	3%
Bolsa Colombia	25	8	13	15	15	19	24%
Bombay Stock Exchange/ National Stock Exchange	193	31	40	44	42	68	22%
Borsa Istanbul	57	12	15	15	21	28	24%
Borsa Italiana	80	32	33	33	35	38	4%
Buenos Aires Stock Exchange	28	5	5	6	5	12	24%
Bursa Malaysia	54	6	9	10	13	23	40%
Caracas Stock Exchange	12	0	0	0	0	0	–
Copenhagen Stock Exchange	33	17	18	18	17	18	1%
Deutsche Börse	128	47	52	52	58	66	9%
Dubai Financial Market	10	0	0	1	0	2	–
Egyptian Exchange	12	0	0	0	0	1	–
Euronext Amsterdam	46	19	19	19	20	26	8%
Euronext Brussels	33	10	10	10	10	11	2%
Euronext Lisbon	15	9	7	8	7	8	-3%
Euronext Paris	154	74	81	88	91	106	9%
Frankfurt Stock Exchange	14	1	1	1	3	5	50%
Helsinki Stock Exchange	41	28	29	29	29	31	3%
Hochiminh Stock Exchange	14	0	1	1	1	4	–
Indonesia Stock Exchange	61	8	12	11	12	15	17%
Irish Stock Exchange	10	2	3	3	3	3	11%
Johannesburg Stock Exchange	69	35	43	43	41	50	9%
Korea Exchange	211	57	64	64	59	53	-2%
KOSDAQ	19	0	0	0	0	0	–
Lima Stock Exchange	26	2	1	1	1	7	37%
London Stock Exchange	247	102	102	98	99	111	2%
Mexican Stock Exchange	62	16	22	25	26	28	15%

Appendix B. Disclosure Rates (2011–15) by Stock Exchange and Indicator

Water

Stock exchange	Number of large companies, August 1, 2017	2011	2012	2013	2014	2015	Water 2011–2015
Nasdaq	416	39	40	40	38	105	28%
New York Stock Exchange	1009	188	213	211	217	376	19%
New Zealand Exchange	13	0	0	0	1	3	–
Nigerian Stock Exchange	13	0	0	1	1	3	–
Oslo Stock Exchange	36	6	6	7	8	14	24%
OTC Markets	44	4	5	4	2	8	19%
Pakistan Stock Exchange	24	1	1	2	2	5	50%
Philippine Stock Exchange	34	6	10	9	9	11	16%
Qatar Stock Exchange	12	1	1	1	1	1	0%
Santiago Exchange	45	15	17	15	15	19	6%
Saudi Stock Exchange	30	2	2	1	1	6	32%
Shanghai Stock Exchange	407	26	29	32	35	38	10%
Shenzhen Stock Exchange	261	5	6	7	8	6	5%
Singapore Exchange	48	11	14	14	18	24	22%
SIX Swiss Exchange	91	46	51	50	50	54	4%
Stock Exchange of Hong Kong	403	35	52	57	64	72	20%
Stock Exchange of Thailand	92	22	40	42	48	59	28%
Stockholm Stock Exchange	89	35	38	38	36	48	8%
Taiwan Stock Exchange	127	45	60	72	82	84	17%
Tel Aviv Stock Exchange	42	7	8	7	4	14	19%
Tokyo Stock Exchange	838	358	371	375	388	381	2%
Toronto Stock Exchange	162	39	48	47	53	67	14%
Warsaw Stock Exchange	38	7	7	8	9	11	12%
Wiener Börse	24	10	10	10	9	12	5%

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