



# THE PM'S GUIDE TO THE ESG REVOLUTION

From article of faith to mainstream investment tool

PMs today are confronted with growing client demand for ESG integration, a tidal wave of disorderly data, and uncertainty about the extent to which ESG analysis can improve investment decisions. Our analysis suggests that with the right focus, ESG integration offers a differentiated and alpha-additive complement of risk analysis for mainstream investors, while tapping into a growing asset pool. We offer a how-to guide for implementation, focusing on the metrics that matter most for investors.

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# Overview: The PM's Guide to the ESG Revolution

## From article of faith to mainstream investment tool

**PMs today are confronted with: (1) growing client demand for Environmental, Social and Governance (ESG) integration** (actively managed ESG assets have grown at a 29% CAGR since 2010 according to US SIF vs. 7% for actively managed US mutual funds); **(2) a deluge of data** (one widely used ESG database has expanded its number of available data points by nearly 5X since 2010 to over 6,000,000 today); and **(3) persistent uncertainty about the extent to which ESG data can improve investment decisions.**

We believe that the most advanced ESG indicators present a valuable and underutilized opportunity for portfolio managers. **Our analysis shows that by focusing on a selective suite of key ESG metrics, mainstream investors can add a differentiated and alpha-additive complement of risk analysis to their toolkit, while tapping into a growing ESG asset pool.**

## Narrowing the focus to what matters most for investors

Given broader investor comfort with governance topics and greater comparability of governance features, this report focuses specifically on the 'E&S' of ESG. **We bring order to the chaos by narrowing the list of ESG data points to the short list of those that we believe matter most for investors in each sector.** Here are our key takeaways:

- **Where robust data is available, E&S metrics make a tangible difference to performance.** Our latest analysis is consistent with our past work in suggesting that ESG is currently best used by investors as a risk tool – specifically, in identifying and avoiding companies with *lagging* ESG performance. Companies falling in the bottom quartile of our E&S framework have underperformed sector peers by 135 bps per annum on average since 2011. Results are less robust for *positive* alpha linkages with strong ESG performers, but there are signs this relationship is strengthening over time alongside improving disclosure rates, suggesting that more of a positive, *screen-in* approach to ESG also holds promise (see p. 18).
- **Talk is cheap – focus on hard metrics.** 84% of the E&S data we surveyed focuses on whether companies have **policies** in place to address ESG issues (e.g., policies related to diversity, emissions, energy efficiency, ethics, etc.). However, we find little evidence that companies disclosing non-quantifiable policies outperform peers – in fact, in our backtest they tend to do worse. In contrast, performance on **quantifiable ESG metrics** is what matters most for stocks. Companies with above average performance on such metrics outperformed regional sector peers by 247 bps over rolling 3-year time periods, on average, since 2010. We accordingly favor (and overweight) numeric performance metrics in our framework (see p. 14).
- **Disclosure does not equal performance.** We believe many ESG scoring frameworks give credit simply for greater transparency. Our work finds that disclosure alone is linked to stock *under*performance (an average of 376 bps annually relative to non-disclosing sector peers). Rather it is *performance* on ESG factors that matters most. We therefore score instances of non-disclosure neutrally in our framework, as disclosure does not indicate exposure or positive performance per se (see p. 14).
- **Despite the proliferation of data, there's still a long way to go.** Among nearly 300 total E&S metrics that we examined, 62% have disclosure rates below 20%, including 71% of numeric metrics. Best-in-class numeric metrics have ~50% disclosure, but the median is just 9% (see p. 9).

## E&S metrics: What correlates most strongly with stock performance?

We view ESG as a rich and underappreciated source of information regarding company culture and risks, including accountability and controls, regulatory and reputational risk, customer and employee relationships, and more. These corporate characteristics can manifest themselves through high-profile incidents or controversies, but we believe they more commonly influence company and stock performance over longer periods of time. We therefore analyze alpha linkages (regional sector-relative) over longer holding periods (3-5 years). Below we summarize the E&S metrics that have shown the strongest and most consistent alpha relationships in our backtests (see p. 10 for more detail):

### What has worked best:

- **Diversity.** Companies with higher levels of female employees have seen average annual alpha of 3.3% across all sub-sectors within our framework.
- **Resource intensity.** Low relative levels of energy and water intensity have performed well, especially for Basic Resource sectors – some of the largest users of energy and water – delivering 2.6% (energy) and 1.8% (water) alpha annually.
- **Employee turnover.** Companies with low employee turnover generated 0.8% annual alpha (on our 3-year test), and higher on our 5-year test (3.0%).
- **Emissions.** Low emitters based on total greenhouse gas (GHG) and scope 1 emissions generally outperformed across our framework, logging 3.1% alpha in relevant sectors, though results were mixed for Manufacturing sectors.
- **Target metrics:** “Target” metrics as a category (stated goals on E&S performance) were consistently linked to positive alpha over time – specifically those related to emissions (1.2% pa), energy (1.6% pa) and water efficiency (0.8% pa).
- **‘Business ethics improvement tools’** (including whistle blower, ombudsman, suggestion box, hotline, etc.) was the only pure policy (non-quantifiable metric) that performed consistently well in our study (+0.9% pa on average).

## Introducing our enhanced GS SUSTAIN ESG screen

Based on our survey and backtesting of available E&S indicators, we have developed a screening framework that we believe offers a simpler, more transparent, and more ‘materiality-focused’ alternative to commonly used 3<sup>rd</sup> party ESG ratings solutions (see p. 20).

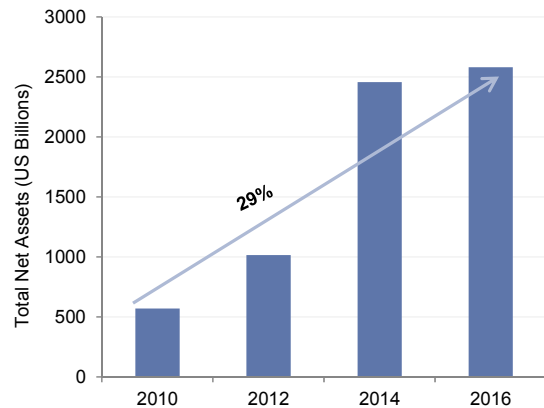
**We use our framework principally to identify companies carrying elevated operational risk linked to lagging ESG performance.** This test represents a key component of our Governance & Risk Management framework, one of three pillars in our GS SUSTAIN assessment of long-term industry leaders (see p. 21). We generally do not consider bottom-quartile E&S performers as candidates for our GS SUSTAIN Focus List, and companies falling below that threshold become candidates for removal. Four of our Focus List companies fall into the 4<sup>th</sup> quartile in our E&S framework. **We remove Safran and Halliburton** from the GS SUSTAIN Focus List based on persistently lagging E&S performance, and **replace the latter with top-quartile E&S peer Schlumberger.** We retain **Bank Rakyat** given better scores relative to EM peers, and we place **BHP Billiton** under watch on a one-year scoring dip in the context of historically stronger scores (see p. 21 for detail).

**We offer our scoring framework as a resource for investors.** In Exhibit 40, we list the top and bottom 10 scoring companies by GICS 1 industry in our sector-tailored E&S frameworks. Our scoring is available for most publicly traded issuers of significant size (including the GS global coverage footprint, MSCI ACWI, S&P 500, etc.). Additional detail is available upon request.

# Our message in 6 charts

## Exhibit 1: ESG represents a rare source of secular growth in active management

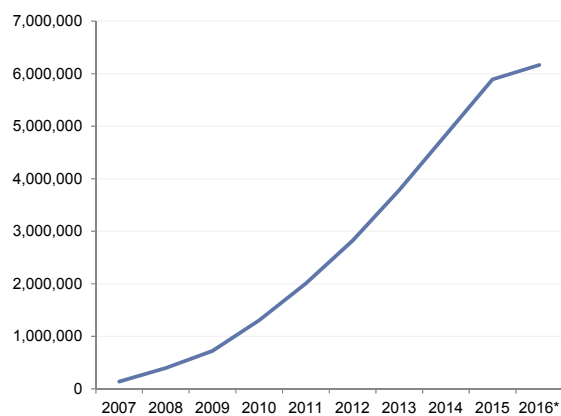
AuM of pooled investment products incorporating ESG in the US (2010-2016)



Source: US SIF Foundation

## Exhibit 2: Although the volume of ESG data available to investors has grown exponentially...

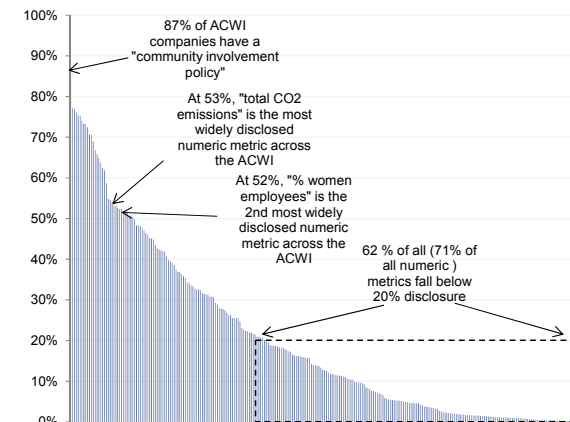
Cumulative ESG data points for 453 select metrics



Source: Bloomberg

## Exhibit 3: ...the chaotic nature of the data makes investor implementation extremely challenging

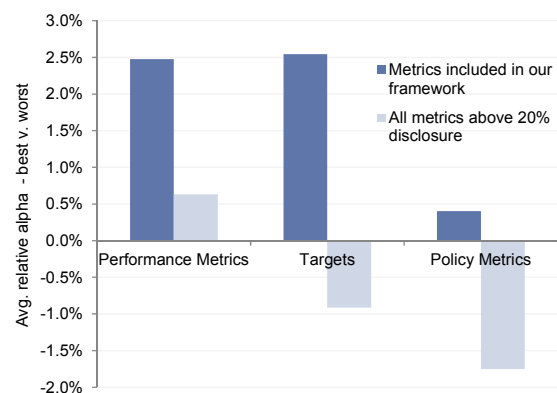
Disclosure for available E&S metrics, MSCI ACWI



Source: Thomson Reuters

## Exhibit 4: We sift through and test the data to identify the metrics that matter most...

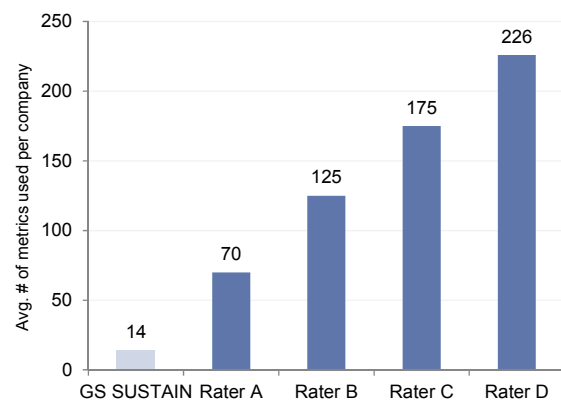
Avg. sector-relative TSR relationship by metric type, 2010-2014



Source: Thomson Reuters, Bloomberg, FactSet, Goldman Sachs Global Investment Research

## Exhibit 5: ...and offer a transparent and useable framework for mainstream investors...

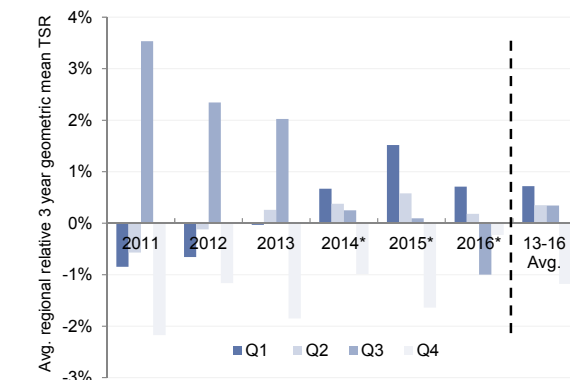
Avg. number of metrics in widely used 3<sup>rd</sup>-party ESG scoring frameworks



Source: Goldman Sachs Global Investment Research

## Exhibit 6: ...which we believe can help mitigate risk and enhance alpha over the long term

3yr holding period TSR performance (2011-2016) based on our E&S scoring framework (2010-2015)



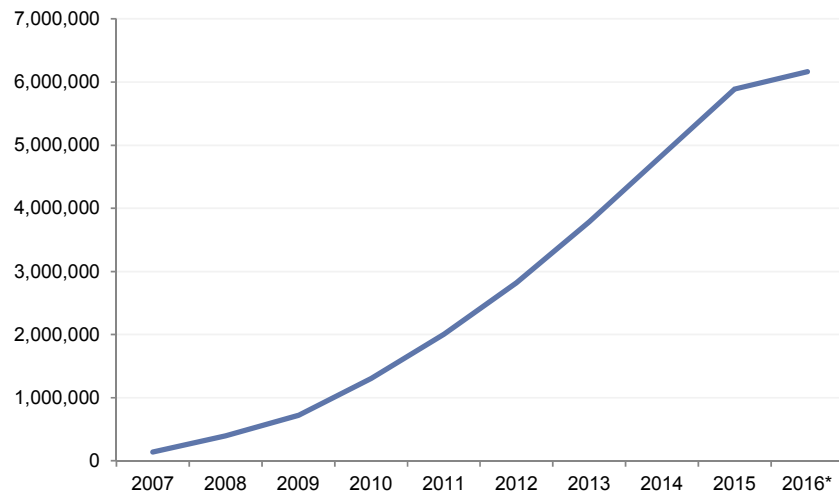
Source: FactSet, Goldman Sachs Global Investment Research

# The promise and challenge of ESG data

**Recent years have witnessed a dramatic expansion in ESG data and ratings available to investors**, growing to millions of ESG data points (Exhibit 7) and a proliferation of ESG research organizations and ratings services. According to the Governance and Accountability Institute, 81% of S&P 500 companies issued some form of social responsibility or sustainability report by the end of 2015, up from just 20% in 2011. Additionally, according to the Global Initiative for Sustainability Ratings there are over 100+ organizations dedicated to analyzing and rating company ESG performance. So what's the problem?

**The challenge lies in the extreme diversity of disclosures, leading to hundreds of often industry- or company-specific reporting conventions, with selective and uneven subject matter emphasis that makes knowing what to focus on extremely difficult.** Despite the rapid growth in data there remains a dearth of comparable performance metrics for many materially important topics such as supply chain stewardship. Disclosures also tend to be biased toward larger companies and can vary widely by region (see Exhibits 25-26). For example, energy usage is disclosed by 74% of European companies in the MSCI ACWI, but only 36% of N. American companies. Uniform data on lost time incident rates are available from 62% of ANZ-based companies but only 23% of emerging market competitors (Exhibit 12).

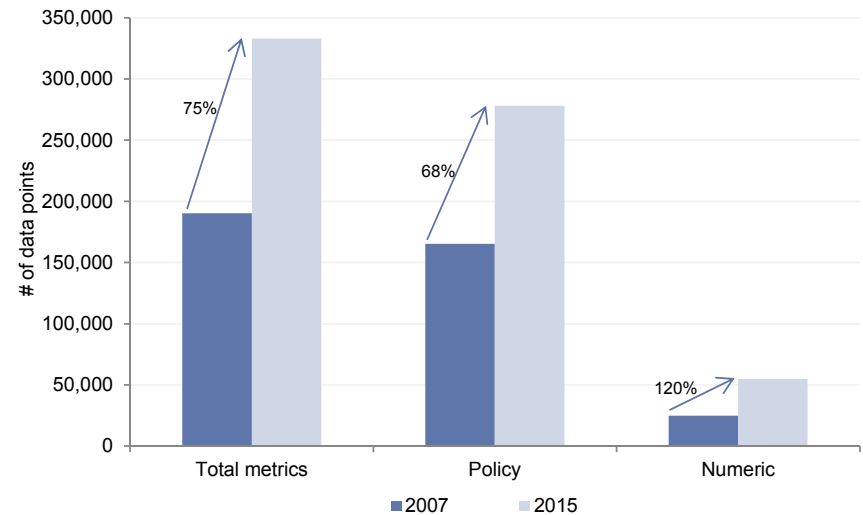
**Exhibit 7: ESG data available to investors has grown exponentially**  
Cumulative ESG data points available from Bloomberg for 453 select metrics



\*2016 represents a partial year of disclosure since reporting cycle is not complete

Source: Bloomberg

**Exhibit 8: Quantifiable ESG metrics are growing rapidly but much of E&S data is still unquantified and relatively vague**  
E&S data availability by metric type, MSCI ACWI constituents



Source: Thomson Reuters

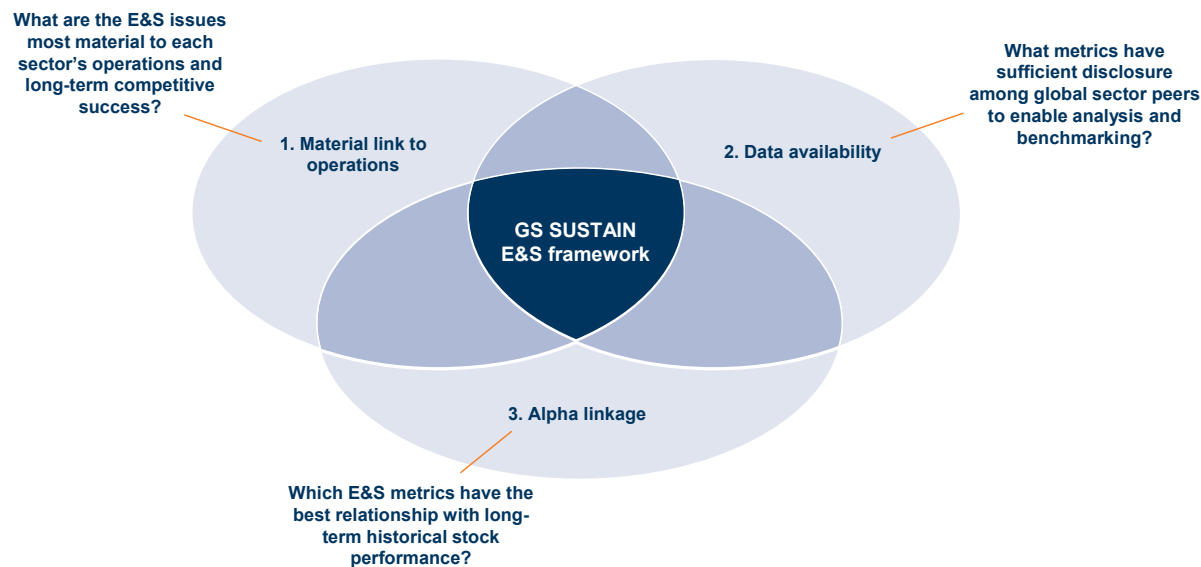
# Quality over quantity: Narrowing the focus to what matters most for investors

**Our framework seeks to focus on material issues likely to have the most robust link with company and stock performance. Our selected metrics lie at the intersection of:**

- (1) Material links to operations and franchise value** – We begin by identifying the E&S issues most directly linked to key business drivers – e.g., resource efficiency in heavy industry, working conditions in labor-intensive sectors, talent attraction and retention in IP-based industries, etc. (see Exhibit 10).
- (2) Critical mass of disclosure** – We sift through the data to get to the material metrics with broad enough disclosure to offer a meaningful benchmark of performance vs. a regional sector peer group.
- (3) Best relationship with historical stock performance** – We backtest links between E&S data and peer-relative stock performance, emphasizing longer periods of time (3- and 5-year periods) over which these cultural and risk indicators might manifest themselves in a company’s financial performance. See p. 16 for more detail.

**Using these three lenses, we sort through the noise and narrow the aperture from hundreds of data points to about a dozen for each sector** (ranging from 7 to 22 depending on the sector), which are used to score companies against global sector peers in the MSCI ACWI. The bulk of these data points are quantitative metrics that PMs can observe individually and transparently. The following pages walk through each of these steps in greater detail.

**Exhibit 9: Materiality, data availability and alpha drive our metric selection process**



Source: Goldman Sachs Global Investment Research.

## Step 1: Materiality – Honing in on clear linkages to operations

Our first step is focusing on ESG issues that have the most direct link to operations for each industry. Below is an illustrative representation of how we think about this question. We recognize that there are material ESG issues that fall beyond the scope of the simplified exercise below, and we customize our metric selection across 35 global sectors. But the exercise shows how we **force ourselves to think about what matters most – or the key operational and strategic issues that drive long-run franchise value in the context of each business model.** For example:

- **Resource Intensity** – The ability of heavy industrials or manufacturers to make efficient use of resources has both regulatory implications and a direct impact on margins and returns.
- **Human Capital** – Companies in IP- or design-centric industries must compete for and retain top global talent. Companies in labor-intensive industries must consider employee motivation, turnover and their reputation as employers.
- **Environment & Employee Safety** – Companies in heavy industries face regulatory requirements and reputational pressures they must perform against to avoid costly incidents and retain their license to operate.
- **Community Relations** – Companies in highly regulated industries or business activities that have a major impact on local populations – whether financial, environmental, health or otherwise – must be conscious of serving and protecting the best interests of their communities to remain a going concern.

These are all issues that one would not be surprised to hear discussed on a corporate earnings call or in an analyst meeting. E&S metrics offer measurable data related to performance on these vectors that we think is commonly overlooked by investors.

**Exhibit 10: A simplified, illustrative view of key E&S exposures by business model**

Business models by major ESG exposures	Sample sectors	Environment		Human Capital		External Stakeholders	
		Resource Intensity & Efficiency	Waste & Emissions	Employee Development & Retention	Worker Safety	Supply Chain Management	Customer & Community Relations
Basic Resources	Mining, Oil, Paper, Chemicals, Steel						
Utilities	Utilities						
Manufacturing	Autos, A&D, Cap Goods, Consumer Goods, Staples						
Industrial Services	Airlines, Shipping, Construction, Oil Services, Telecom						
IP & Design	Consumer Brands, Tech Hardware, Biopharma, MedTech, Semis						
Real Estate-Centric	REITs, Retail, Hospitality, Gaming						
Business Services	Business & IT Services, Software, Internet, Media						
Financials	Banking, Insurance, Asset Mgmt						

Source: Goldman Sachs Global Investment Research

We have also compared our determinations of material business issues against work done in the US by the Sustainability Accounting Standards Board (SASB), which has completed an extensive body of research in order to narrow investor focus to the most material ESG issues, based on studies of company, media and regulatory emphasis as well as evidence of historical financial impact. (See Exhibit 38-39 for a complete summary of the metrics included in our framework.)



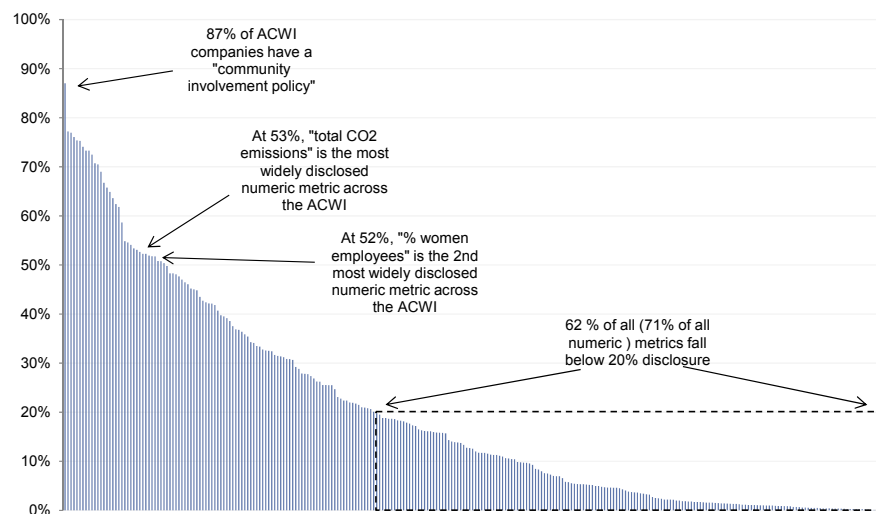
## Step 2: Data availability – You can't always get what you want

**Exposure to a particular ESG issue does not mean there are applicable or measurable disclosures with which to measure it.** Metrics we include in our framework must have a critical mass of disclosure (we generally require a minimum of 20% of global sector peers, though the average is substantially higher) in order to enable meaningful backtesting and contributions to current scoring. Over time as certain types of disclosures and specific metrics attain greater critical mass, we think this helps to catalyze incremental adoption from peers using disclosure leaders as models. (Exhibits 41-42 in the appendix detail disclosure rates for all metrics in our framework.)

**Furthermore, the majority of available E&S data points are binary in nature (Yes/No) related to policies in place – rather than quantifiable metrics – offering limited information and comparability.** Looking across our third-party data providers' entire lists of E&S metrics we found that of the top 25 disclosed metrics only one was numeric (Total GHG emissions) and was the 25<sup>th</sup> most disclosed metric with 53% disclosure across the MSCI ACWI. Among the top 50 metrics disclosed, 76% were policy/binary, with only 12 of 50 being numeric. Of all numeric metrics available, 71% had less than 20% disclosure, although we recognize that some numeric metrics are industry specific and not universally relevant. What's encouraging is the rapid rise of numeric based metrics, which grew 120% from 2007 to 2015 (albeit off a low base) compared to 68% growth for binary (Exhibit 8). We expect these positive data trends to continue as investors and regulators increasingly demand better data to assess ESG performance.

**Exhibit 11: Low disclosure rates for most ESG metrics make selectivity key**

Disclosure rates for available E&S metrics, MSCI ACWI universe



Source: Thomson Reuters

**Exhibit 12: W. Europe leads, N. America lags on numeric metric disclosure**

Latest available disclosure for select metrics by region, MSCI ACWI

	W. Europe	N. America	Japan	ANZ	EM
<b>Resource Intensity</b>					
Energy Usage	74%	36%	69%	61%	46%
Water Usage	65%	31%	58%	52%	36%
<b>Emissions</b>					
Total GHG Emissions	83%	43%	64%	81%	43%
<b>Human Capital</b>					
Women Employees	86%	34%	38%	94%	59%
<b>Safety</b>					
Lost Time Incident Rates	52%	25%	28%	62%	23%
<b>Supply Chain</b>					
# of Supplier Audits	11%	3%	0%	1%	1%

Source: Thomson Reuters, Bloomberg

### Step 3: Seeking links to stock performance

Our final step is to backtest specific E&S metrics for alpha linkages. **In our backtesting we concentrate on longer time periods (3-5 years) vs. shorter periods as we believe cultural and risk assessments are a mosaic by definition and will be more commonly manifest over time.** We recognize that there are other ways of testing direct linkages to firm performance than stock prices (e.g., level and durability of profitability, cost of capital, volatility, etc.), but we choose to start with what is the most direct and salient to investors. (See page 16 for a detailed explanation of our backtest methodology.)

Our backtesting focuses on data since 2010 due to more significant disclosure limitations prior to this date. Given this relatively short performance period in our testing, it's important to recognize that as disclosure rates continue to evolve over time, so too will alpha relationships. In Exhibit 13, we summarize the strongest (positive) alpha linkages by sub-sector for E&S metrics with sufficient disclosure (see Exhibits 34-36 in the appendix for complete detail). We group our backtest results by business model type to highlight where metrics worked well across similar sectors.

**Exhibit 13: Best performing E&S metrics by business type / key E&S exposures**

Business Types / E&S Exposures	Sub-sectors	Environment		Human Capital		External Stakeholders		
		Resource Intensity & Efficiency	Waste & Emissions	Employee Development & Retention	Worker Safety	Supply Chain Management	Customer & Community Relations	Operational Controls
Basic Resources	Mining, Oil, Paper, Chemicals, Steel	Energy Usage Water Withdrawal	Hazardous Waste Waste Recycling CO2 Emissions		Total Injury Rate Fatality Rate			
Utilities	Utilities		Waste Recycling CO2 Emissions					
Manufacturing	Industrials, Autos, A&D, Staples, Consumer Durables	Energy Usage Water Withdrawal		Employee Turnover Employee Diversity Employee Training			Customer Health & Safety Policy	Business Ethics Improvement Bribery and Corruption Policy
Industrial Services	Airlines, Multi-Indus. Svcs, Shipping, Construction, Oil Services, Telecom	Energy Usage	Total Waste NOX & SOX Emissions Hazardous Waste	Employee Turnover Employee Diversity Employee Training	Employee H&S Policies Fatality Rate			
IP & Design	Consumer Brands, Biopharma, MedTech, Hardware, Semis			Employee Diversity Employee Turnover		Supply Chain H&S Policy Environmental Supply Chain Policy Child and Forced Labor Policy	Data Privacy Policy	
Real Estate-Centric	Retail, Hospitality, Gaming, REITs			Employee Diversity Employee Turnover Training and Development Policies				
Business Services	Biz Svcs, Consulting, IT Services, Software, Internet, Media			Employee Turnover Women in Management Women Employees				Business Ethics Improvement
Financials	Banks, Insurance, Asset Management			Employee Diversity Training and Development Policies				Business Ethics Improvement Bribery and Corruption Policy

Source: Goldman Sachs Global Investment Research.

### What has worked best? Summary findings of our E&S metric backtests

- Diversity shines.** Firms with higher relative levels of female employees have seen average annual alpha of 3.3% across all sub-sectors within our framework (rolling 3-year test). The alpha relationship has been apparent in industries where uniquely skilled talent is at a premium such as Aerospace & Defense, IT Services and Pharmaceuticals, but also for select heavier industries including Oil Refiners, Mining & Materials and Paper & Packaging where a competition for talent may not seem as apparent. The proportion of female *managers* also tested positively, but more modestly. Data on minority employees is much

more sparse, and therefore more difficult to see alpha relationships. Companies with high levels of diversity include Northrop Grumman, Alliance Data Systems, Cielo SA, CSL Ltd and Bristol-Myers Squibb.

- **Keep an eye on resource intensity.** Low relative levels of energy and water intensity have performed well for basic resource sectors including Oil Producers, Oil Refiners, Steel, Paper & Packaging and Chemicals – some of the largest users of energy and water. Strong performers in these sectors outperformed regional sector peers by 2.6% (energy) and 1.8% (water) annually, on average. Mining & Materials was an exception, where low resource intensive companies generally underperformed, though we note that miners with higher relative water *recycling* as a percentage of water withdrawn outperformed by 9.7%, suggesting that relative stewardship may matter more in this instance than water intensity given varying intensities for different mining activities. Examples of low-resource intensity companies are Conoco Phillips, Royal Dutch Shell, and Vale. Among miners, Freeport-McMoRan and Gold Corp rank as good water recyclers.
- **Solid signals on emissions.** Low emitters based on total GHG and scope 1 emissions generally outperformed across our framework delivering 3.1% alpha where applicable. Low scope 1 emitters performed particularly well among Oil Producers, Oil Refiners, Chemicals, Infrastructure, and Utilities at 4.4%, 8.4%, 5.3%, 13.0% and 2.3% alpha respectively. For sectors that utilize more electricity, total GHG emissions also outperformed in sectors with large building footprints such as Hospitality (lodging and restaurants) and Gaming. We noticed mixed results for Manufacturing sub-sectors with no significant outperformance across A&D, Autos, Durables, Staples and Multi-industry. Low relative emitters across various industries include CAE, Boeing, Chr Hansen, Range Resources, Korea Electric Power Corp and PG&E Corp.
- **Employee turnover.** Companies with low employee turnover have generated 0.8% annual alpha (on our 3-year test), and higher on our 5-year test (3.0%), underscoring the universal importance of good human capital management.
- **Supply chain performance links for Consumer Brands.** Despite unflattering performance for E&S policies broadly in our backtesting, we identified some pockets of success. Within Consumer Brands (which includes apparel, footwear and accessories), we found that companies disclosing robust environmental, health & safety, child and forced labor supply chain policies performed markedly better than those without, generating an average 5.6% annual alpha. A dearth of numeric metrics available to gauge supply chain performance requires heavy leaning on policy measures for now.
- **'Business ethics improvement tools'** (including whistleblower, ombudsman, suggestion box, hotline, etc. to improve general business ethics) was the only pure policy (non-metric) that performed well over time across sectors in our study (+0.9% pa).
- **Target metrics:** "Target" metrics as a category (stated goals for E&S performance) were consistently linked to positive alpha over time – specifically related to emissions (1.2% pa), energy (1.6% pa) and water efficiency (0.8% pa). While target metrics are technically binary/policy metrics, the implied focus on improvement and accountability carry more weight, in our view, and the positive backtesting outcomes are supportive of this.
- **Strong metric results but with smaller sample sizes include** water recycling rates and SOx and NOx emissions.

#### What has shown limited or mixed alpha linkages?

- **Wasteful measurement?** Leaders on (low) waste intensity generally performed poorly in Manufacturing sub-sectors despite the relevant profit link. On average, low-waste manufacturers underperformed by 2.1% in our backtesting. While this outcome may result from differences in inputs between various manufacturers, we noticed that companies with higher percentages of waste recycling also underperformed by 2.3%. The lack of a more positive link could be influenced by waste already being well managed by manufacturing companies, offering limited differentiation. For example, in Autos, where disclosure is available, the

average waste recycling ratio is already at 88% of total waste produced, suggesting this issue is already broadly well managed and thus only marginal improvements are left to be made.

- **Mixed safety record.** Companies with low injury rates underperformed modestly on average in our backtests – for example in Manufacturing and Services sectors. However, stronger links to positive alpha were apparent in Basic Resources sectors, including Miners and Oil Producers. This could be because the lack of a safety culture in these sectors could potentially carry more significant consequences for firm value – e.g., an environmental disaster. Leaders on (low) total injury rates in heavy industries include ConocoPhillips, Chevron and Sealed Air Corp. Leaders on lost-time injury rates include Phillips 66, Newmont Mining and Posco Steel.
- Other metrics that showed moderately negative average outcomes, though based on smaller sample sizes by sector, were **renewable energy usage** and **VOC emissions intensity**.

# Decoding the data deluge: Policies, targets and metrics

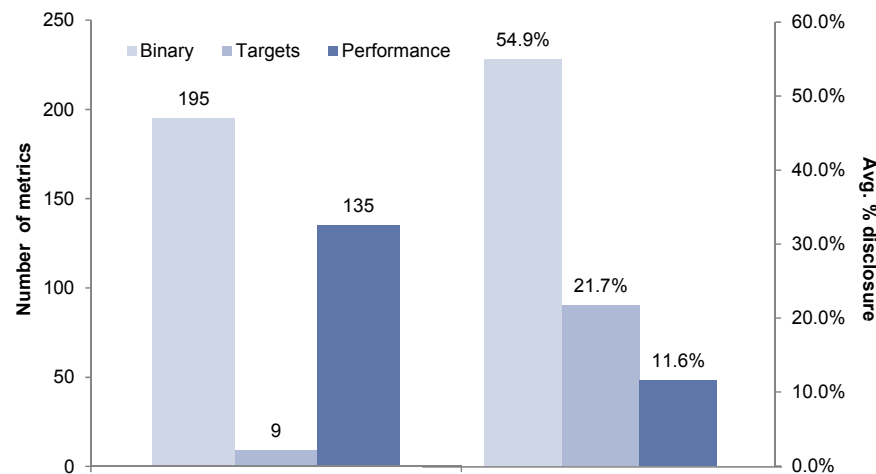
Using data from leading third-party ESG data providers that collectively gather over 800+ E&S metrics and cover over 10,000 companies, we narrow the metric universe to 47 unique metrics within our framework across all sectors, looking at 21 numeric, 8 targets, and 18 policy/binary metrics (Exhibit 18). On average we score each of 35 unique sectors on 14 metrics, though disclosure limitations result in an average of around 10 metrics actually scored per company.

### We categorize E&S data into three major types:

- 1) **Policies:** The majority of CSR disclosures are qualitative in nature and thus binary (yes/no) – i.e., denoting the disclosure of a particular policy or business practice, such as employee health & safety, data privacy or supply chain safety policies.
- 2) **Targets:** Like policies, targets are also binary in nature (yes/no), but indicate that beyond the implementation of a policy there is also measurement and enumerated improvement goals. This data type is relatively rare (Exhibit 14). Examples of E&S targets include energy use reduction targets and diversity goals.
- 3) **Metrics:** These are quantitative data points related to E&S performance. Some best disclosed metrics include total GHG emissions, total energy usage and percentage of female employees. Heavier industries tend to have more hard metrics because of more common quantifiable measures related to resource intensity (e.g., energy and water), environmental performance (e.g., waste and emissions) and employee safety (e.g., injury rates and fatalities).

**Exhibit 14: Policy metrics outnumber performance data points and have much higher disclosure rates**

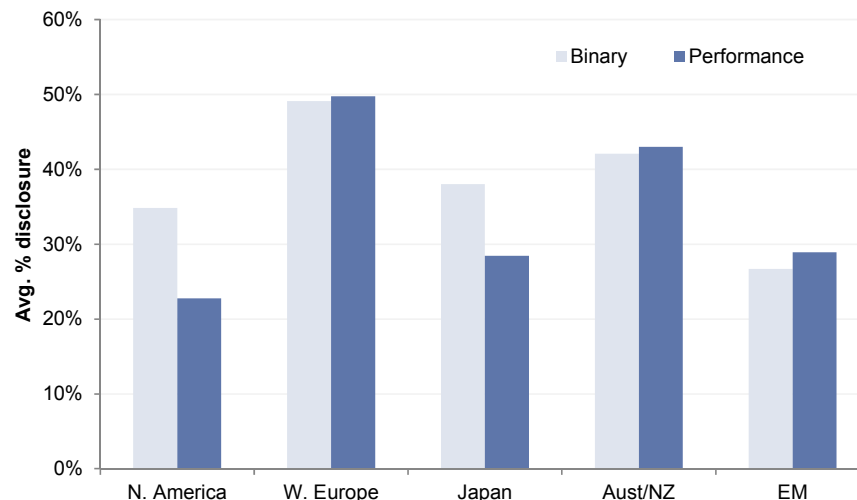
E&S metric type availability and average disclosure rates, latest, MSCI ACWI



Source: Thomson Reuters

**Exhibit 15: N. America and Japan overindex on vague policy disclosures**

Metric disclosure rates for policy ("yes") and performance metrics within our framework, MSCI ACWI

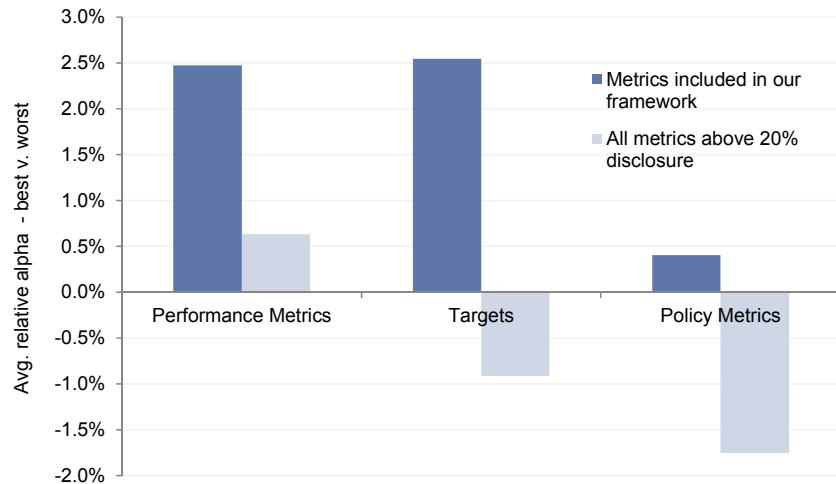


Source: Thomson Reuters, Goldman Sachs Global Investment Research

**Our backtesting work affirms our preference for metrics and targets over policies.** Performance metrics show the best relationship with stock performance, while top performers on binary metrics (those articulating a policy) actually *underperformed* on average compared to those without the policy (Exhibit 16). For the selective set of metrics included in our framework, top scorers on performance metrics saw an average 247 bps of alpha per annum in our backtests, while companies with select policies in our framework saw much more modest outperformance of 40 bps. Target metrics also performed well, though based on a much smaller sample set.

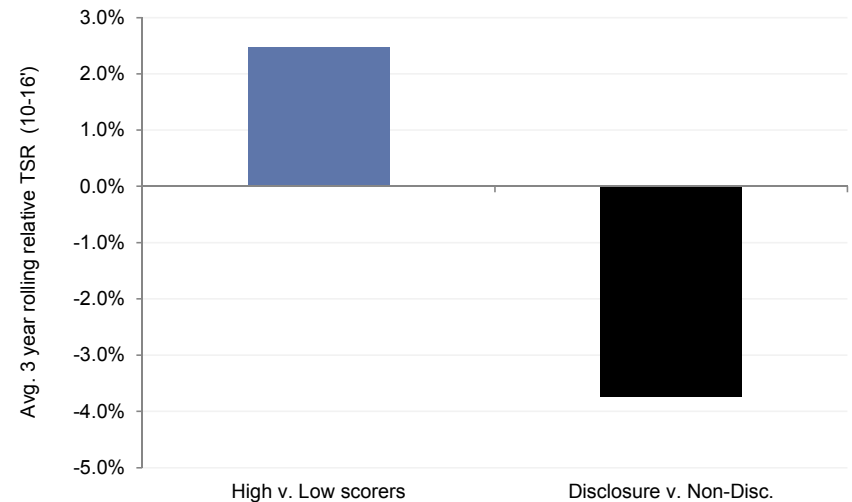
Our work has also found that companies *without* disclosure have historically tended to outperform those *with* disclosure over our testing period, contributing to our decision to give neutral (rather than low) scores to non-disclosers in our scoring methodology (Exhibit 17). This appears to be principally a result of higher-growth companies under-disclosing but outperforming over our backtest period. We believe that giving no credit for disclosure helps avoid a bias toward the best disclosers (typically larger companies in developed markets) and avoids potentially giving undue credit for robust public relations efforts or ‘greenwashing’. We recognize some companies (especially younger companies or companies in domiciles with less regulatory-mandated requirements) may under-disclose and yet be strong performers on E&S vectors. We take the view that if no data is disclosed, we aren’t able to judge, recognizing that disclosure alone does not necessarily equate with exposure to material issues, nor strong performance relative to peers.

**Exhibit 16: Performance and target metrics significantly outperform policies**  
Avg. sector-relative TSR relationship by metric type, 2010-2014



Source: Thomson Reuters, Bloomberg, FactSet, Goldman Sachs Global Investment Research

**Exhibit 17: Strong disclosure alone actually correlates with stock underperformance. It is measurable performance that matters**  
Avg. sector-relative TSR relationship for high vs. low E&S performance (numeric metrics) and disclosure vs. non-disclosure, MSCI ACWI, 2010-2016



Source: Thomson Reuters, Bloomberg, FactSet, Goldman Sachs Global Investment Research

**We rationalize, normalize available data and overindex on quantifiable ESG metrics**

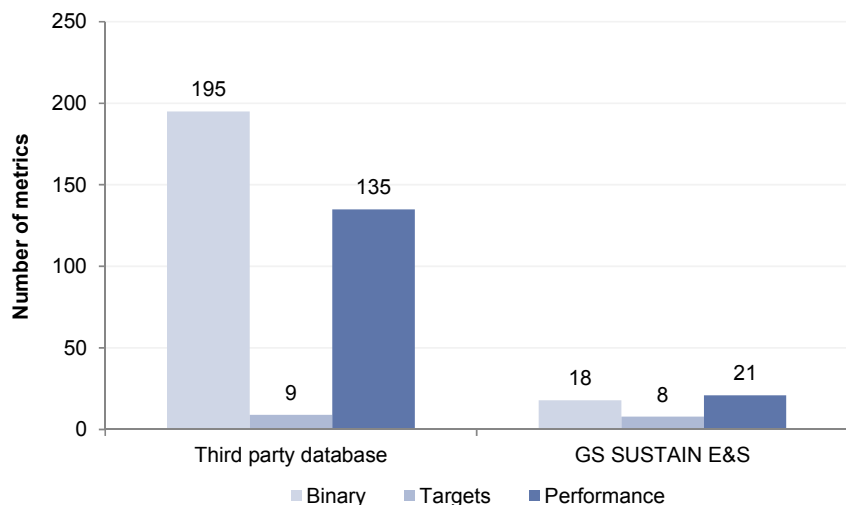
From our available E&S data universe, we consolidate and rationalize overlapping and duplicative E&S numeric metrics to combine company coverage and get the widest range of disclosure available for the same metrics. The exhibits below show how available corporate E&S disclosures lean heavily toward policies. However, we emphasize performance metrics with the highest disclosure over binary metrics as binary policies can remain quite subjective and don't speak to actual underlying performance. We use binary metrics sparingly, and only as a proxy for performance in cases where there is limited disclosure for numeric metrics – e.g., ethics and supply chain – or where targets strengthen the case of a company's engagement – e.g., reduction targets for waste, emissions, water, etc. Over time as quantifiable disclosure standards improve, we expect to gradually migrate away from binary measures and towards better numeric performance metrics.

Once we have our data consolidated we normalize company E&S data where necessary – e.g., total GHG emissions per \$m in revenue or fatalities per 1,000 employees. With consistent and comparable metrics we then percentile rank companies' performance for each metric relative to sub-sector peers in each year. With these percentile rankings we perform two alpha tests (as described further on page 16) looking at the relationship of stronger vs. weaker performers on TSR over long time periods.

In addition to over-indexing on performance metrics, we also overweight them by allowing for a greater points opportunity for positive performance on numeric metrics compared to binary metrics (see page 16). Numeric metrics currently make up ~81% of a company's total score on average and ~19% for binary metrics. Our aggregated scores determine an overall E&S score for each company relative to MSCI ACWI sub-sector peers. The Appendix lists the top-10 and bottom-10 scoring companies in each GICS 1 industry (Exhibits 40). More detail for additional companies is available upon request.

**Exhibit 18: Our framework overindexes on metrics and targets vs. available data**

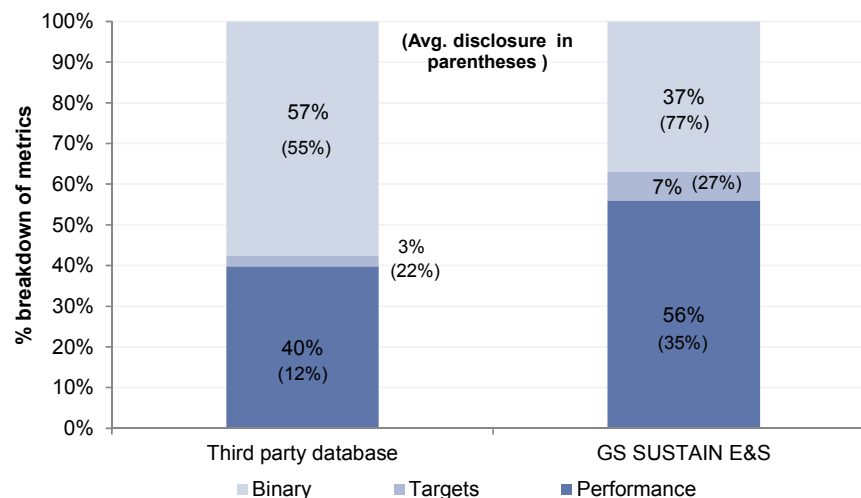
Number of E&S metrics



Source: Thomson Reuters, Goldman Sachs Global Investment Research

**Exhibit 19: The metrics selected in our framework also have significantly higher-than-average disclosure rates**

Proportion of metrics by data type



Source: Thomson Reuters, Goldman Sachs Global Investment Research

### More detail on our E&S metric backtests and scoring methodology

We performed two alpha tests on our available universe of E&S metrics to compare results across different time frames and methodologies. Based on constituents of the MSCI ACWI, total shareholder return (TSR) was calculated both regional- and sector-relative in an effort to control for skews. MSCI ACWI membership ensures a certain minimum level of market cap, though roughly a quarter of this universe has a market cap smaller than \$5 billion. Larger companies do tend to score better on E&S metrics; however, when we adjusted for both region and size biases in our backtests we did not find meaningful differences in our results compared to regional adjustments alone.

While the data can be cut in multiple ways, to enable larger sample sizes and simplify the analysis, our tests only measured performance of 'high' (above average) vs. 'low' (below average) scorers in each global sector on each numeric E&S metric, or 'yes' vs. 'no' in the case of policy metrics.

**Rolling 3-year test** – For each year between 2010-2014 we measured regional, sector-relative 3-year TSR beginning the year of reported E&S performance. For example, companies ranked on CO2 intensity in 2012 were separated into top performers (below average intensity) and bottom performers (above average intensity) and then tracked on TSR performance from 2012-2014. (For the full list of metric results see Exhibits 34 and 36.) While not using perfect foresight, we allow for some overlap in the performance and TSR periods given our view of limited volatility in E&S metric performance from one year to the next and E&S factors' concurrent impact on business performance over time.

**Consistent 5-year discloser test** – For companies with five years of contiguous disclosure between 2010-2014 (pending completion of the 2015 reporting cycle), we averaged annual percentile rankings for each numeric metric to identify companies scoring in the top half vs. bottom half *over the entirety* of those five years on each metric and then tracked TSR performance over the same period. This gave us an even longer-term view of the influence consistent performance on a particular E&S measure may have had on company and stock performance. (For complete results of our 5-year test by metric, see Exhibit 36.)

**How we turn metrics into scores.** We recognize there are many ways to combine metrics to construct scores and rankings. Our intent was to create something simple and transparent that assigns points based on high or low performance on each metric, consistent with our backtesting approach. In light of our findings that numeric metrics hold substantially more information, accountability and potential alpha (see Exhibit 16), we significantly overweight metric performance vs. policies. For each numeric metric we award 2 points for high performers (top 40<sup>th</sup> percentile to mitigate large point swings for companies ranking near the sector average) and subtract 2 points for low performers (bottom 40<sup>th</sup> percentile). We award just a half point for non-quantified policies (0.5 points). Because policies effectively have 100% disclosure rates, well in excess of average disclosure rates for numeric metrics, each policy metric tends to drive a full 1-point swing in scoring since each company either has the policy (+0.5) or does not (- 0.5). Finally, we award bonus points (+1) for both ESG-linked management incentives and audited sustainability reporting.

**A worked example – global Steel.** In Exhibit 20 we summarize our scoring for the global Steel industry (MSCI ACWI constituents) on the 12 select E&S metrics in our Steel sector framework. As an example, Nucor scores in the 65<sup>th</sup> percentile of the 21 Steel companies in the MSCI ACWI based on the following metric scores: Positive performance on energy intensity (88<sup>th</sup> percentile) and NOx and SOx emissions (93<sup>rd</sup> percentile) contribute 4 total points to their overall score. On these metrics, Nucor receives 0 total points as disclosed policies related to business ethics and bribery are negated by the absence of toxic chemical reduction and biodiversity impact policies. ArcelorMittal's disclosure rate (data availability) on the material issues in our framework is considerably better than Nucor, but its lagging performance on many of these quantifiable measures results in a bottom-quartile aggregate score.



**Exhibit 20: Example E&S scoring for the global Steel sector (MSCI ACWI constituents)**

Company Name	E&S Total Points	Final E&S Score	E&S Performance Metrics																Total E&S Performance Score	Total E&S Performance %ile Rank
			Water Withdrawal Rank	Water Withdrawal Score	Energy Usage Rank	Energy Usage Score	Total Waste Intensity Rank	Total Waste Intensity Score	CO2 Equivalents Emission Total Rank	CO2 Equivalents Emission Total Score	Total SOx and NOx Emissions Rank	Total SOx and NOx Emissions Score	Turnover of Employees Rank	Turnover of Employees Score	Lost Time Injury Rates Rank	Lost Time Injury Rates Score	Fatalities Rate Rank	Fatalities Rate Score		
Hitachi Metals Ltd	16	100%	0%	2	94%	2	64%	2	93%	2	100%	2	-	0	17%	2	60%	2	14	100%
Tata Steel Ltd	13	95%	20%	2	63%	2	43%	0	60%	2	72%	2	17%	2	33%	2	50%	0	12	95%
Kobe Steel Ltd	9	90%	7%	2	50%	0	50%	0	53%	0	50%	0	33%	2	-	0	100%	2	6	90%
Posco	7	85%	13%	2	38%	-2	36%	-2	40%	-2	64%	2	17%	2	0%	2	100%	2	4	75%
Fortescue Metals Group Ltd	6	80%	67%	-2	100%	2	100%	2	100%	2	-	0	92%	-2	-	0	100%	2	4	75%
Nucor Corp	4	75%	-	0	88%	2	-	0	-	0	93%	2	-	0	-	0	-	0	4	75%
China Steel Corp	3	60%	33%	2	13%	-2	29%	-2	20%	-2	86%	2	42%	0	25%	2	100%	2	2	70%
Vale SA	3	60%	53%	0	81%	2	86%	2	87%	2	36%	-2	75%	-2	50%	0	40%	-2	0	35%
Erdemir	1	50%	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	0	35%
voestalpine AG	1	50%	93%	-2	56%	0	57%	0	67%	2	79%	2	-	0	100%	-2	-	0	0	35%
Hyundai Steel Co	0	40%	27%	2	-	0	14%	-2	47%	0	-	0	-	0	-	0	-	0	0	35%
ThyssenKrupp AG	0	40%	73%	-2	69%	2	72%	2	73%	2	57%	0	50%	0	92%	-2	20%	-2	0	35%
JFE Holdings Inc	-1	35%	47%	0	25%	-2	93%	2	27%	-2	0%	-2	0%	2	-	0	-	0	-2	30%
Maruichi Steel Tube Ltd	-2	30%	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	0	35%
Gerdau SA	-3	25%	-	0	-	0	-	0	-	0	-	0	67%	-2	83%	-2	-	0	-4	25%
Nippon Steel & Sumitomo Metal	-4	20%	100%	-2	19%	-2	22%	-2	33%	-2	43%	0	-	0	8%	2	-	0	-6	15%
ArcelorMittal SA	-6	10%	87%	-2	6%	-2	-	0	7%	-2	22%	-2	8%	2	67%	-2	10%	-2	-10	0%
Companhia Siderurgica Nacional	-6	10%	-	0	31%	-2	-	0	13%	-2	-	0	100%	-2	-	0	-	0	-6	15%
JSW Steel Ltd	-7	0%	40%	2	0%	-2	7%	-2	0%	-2	7%	-2	-	0	42%	0	0%	-2	-8	5%
Severstal' PAO	-7	0%	80%	-2	44%	0	0%	-2	-	0	14%	-2	50%	0	75%	-2	-	0	-8	5%

Combined overall E&S score for Steel industry

Numeric E&S metric performance for 8 quantitative metrics

Binary E&S performance for 6 policy metrics

Company Name	E&S Targets & Policies														Targets and Policies Total Score	Targets and Policies %ile Rank
	Toxic Chemicals Reduction	Toxic Chemicals Reduction Score	Biodiversity Impact Reduction	Biodiversity Impact Reduction Score	Improvement Tools Business Ethics	Improvement Tools Business Ethics Score	Policy Bribery and Corruption	Policy Bribery and Corruption Score	ESG Linked Compensation	ESG Linked Compensation Score	Audited CSR Report	Audited CSR Reporting Score				
Hitachi Metals Ltd	Y	0.5	N	-0.5	Y	0.5	Y	0.5	N		Y	1	2	65%		
Tata Steel Ltd	N	-0.5	N	-0.5	Y	0.5	Y	0.5	N		Y	1	1	25%		
Kobe Steel Ltd	Y	0.5	Y	0.5	Y	0.5	Y	0.5	N		Y	1	3	80%		
Posco	Y	0.5	Y	0.5	Y	0.5	Y	0.5	N		Y	1	3	80%		
Fortescue Metals Group	N	-0.5	Y	-0.5	Y	0.5	Y	0.5	N		Y	1	2	65%		
Nucor Corp	N	-0.5	N	-0.5	Y	0.5	Y	0.5	N		-	0	0	5%		
China Steel Corp	Y	0.5	N	-0.5	N	-0.5	N	-0.5	Y	1	Y	1	1	25%		
Vale SA	N	-0.5	Y	0.5	Y	0.5	Y	0.5	Y	1	Y	1	3	80%		
Erdemir	N	-0.5	Y	0.5	Y	0.5	Y	0.5	N		N	1	1	25%		
voestalpine AG	N	-0.5	N	-0.5	Y	0.5	Y	0.5	N		Y	1	1	25%		
Hyundai Steel Co	N	-0.5	N	-0.5	Y	0.5	Y	0.5	N		-	0	0	5%		
ThyssenKrupp AG	N	-0.5	N	-0.5	N	-0.5	Y	0.5	N		Y	1	0	5%		
JFE Holdings Inc	Y	0.5	N	-0.5	Y	0.5	N	-0.5	N		Y	1	1	25%		
Maruichi Steel Tube Ltd	N	-0.5	N	-0.5	N	-0.5	N	-0.5	N		-	-2	0	0%		
Gerdau SA	N	-0.5	Y	0.5	Y	0.5	Y	0.5	N		-	1	1	25%		
Nippon Steel & Sumitomo Metal	Y	0.5	Y	0.5	N	-0.5	Y	0.5	N		Y	1	2	65%		
ArcelorMittal SA	Y	0.5	Y	0.5	Y	0.5	Y	0.5	Y	1	Y	1	4	100%		
Companhia Siderurgica Nacional	N	-0.5	N	-0.5	Y	0.5	Y	0.5	N		-	0	0	5%		
JSW Steel Ltd	N	-0.5	Y	0.5	Y	0.5	Y	0.5	-		-	1	1	25%		
Severstal' PAO	N	-0.5	Y	0.5	N	-0.5	Y	0.5	N		Y	1	1	25%		

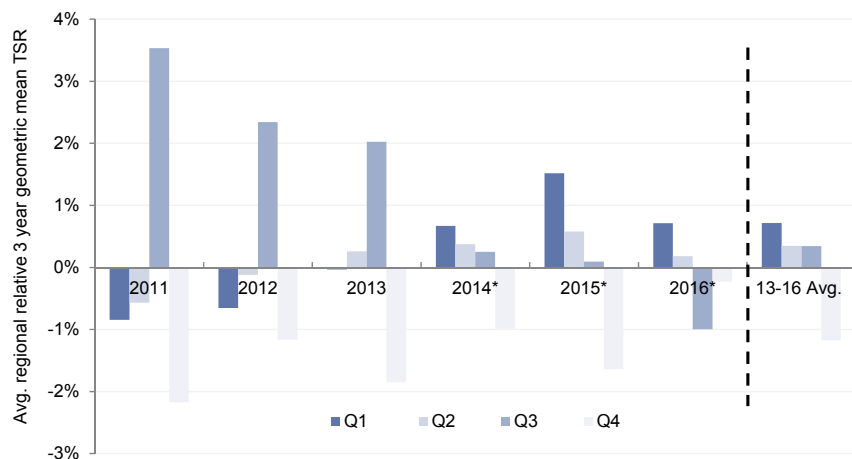
Source: Thomson Reuters, Bloomberg, Goldman Sachs Global Investment Research

## Alpha in aggregate E&S scores

In addition to backtesting metrics, we also backtested our scoring framework (see note below on approach). Our takeaways follow:

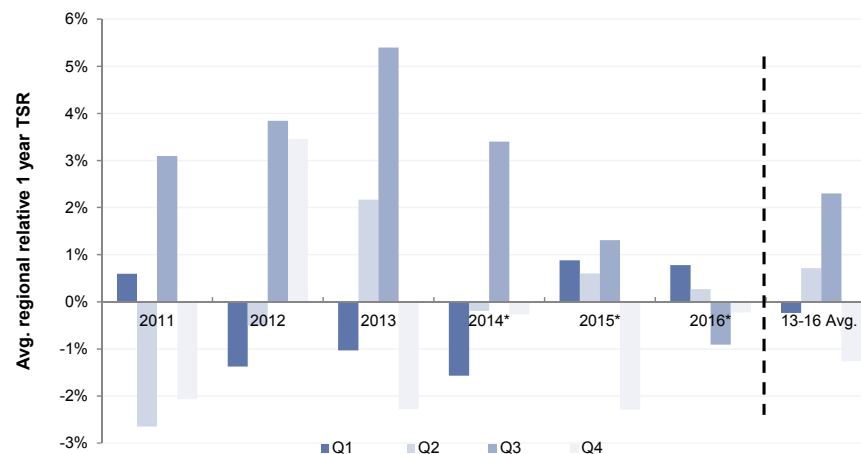
- **Bottom quartile companies consistently underperform**, suggesting the framework works best as a risk assessment tool to help avoid E&S laggards in each industry. On average Q4 companies underperformed peers by 118bps (between 2013 and 2016). Although results were similar prior to 2011 and 2012, we emphasize the time after these years in our results owing to lower disclosure rates prior to 2013. Top quartile companies have outperformed in recent years (by 72bps), though not to the extent that laggards have underperformed, and not as consistently over time.
- **However, a positive alpha relationship of strong vs. weak E&S companies (top half vs. bottom half, regional sector-relative) has been emerging in recent years** as data disclosure has improved, suggesting emerging usefulness as a positive (screen-in vs. screen-out) tool (see Exhibit 24).
- **E&S metrics work better as a signal for long-term (rather than shorter-term) stock price performance.** Holding Q1 E&S companies on a longer time horizon produced an average 72bps of alpha between 2013 and 2016 compared to -23bps underperformance using just a 1-year holding period (Exhibits 21-22). This finding is directionally consistent with work done by Harvard Business School finding an alpha relationship for ESG only over extended, multi-year time periods.<sup>1</sup>

**Exhibit 21: E&S scores show orderly TSR over a LT investment horizon...**  
3-year holding period (2011-2016) based on previous year's E&S data (2010-2015)



Source: FactSet, Goldman Sachs Global Investment Research

**Exhibit 22: ...but less so over shorter holding periods**  
1-year holding period (2011-2016) based on previous year's E&S data (2010-2016)



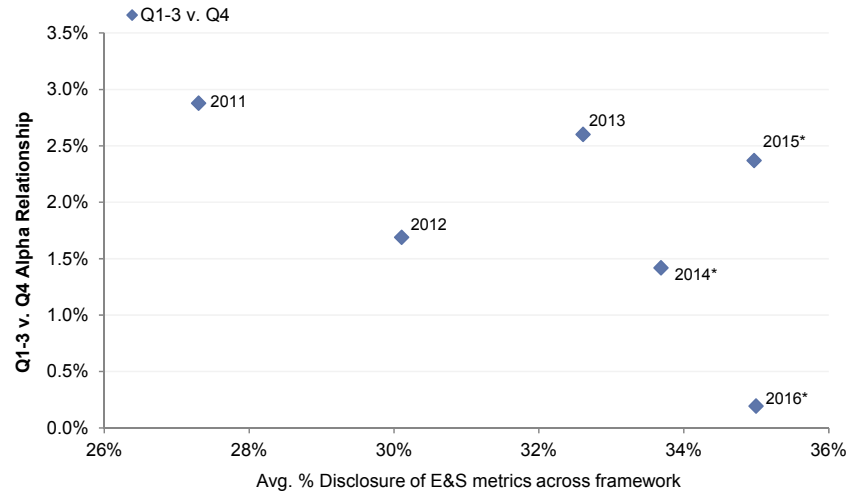
Source: FactSet, Goldman Sachs Global Investment

*Note: TSR performance periods results are based on the previous year's ESG scores. E.g. 2011 three year period results are based on 2010 ESG scores. 3-year TSR performance periods for backtesting begin on May 1 of the next year assuming a lag in ESG disclosures and ends after 3 years on April 30. Years 2014, 2015 and 2016 represent partial three year rolling periods. E.g. 2015 period incorporates 05/01/2015 to 03/22/2017.*

<sup>1</sup> "The Impact of Corporate Sustainability on Organizational Processes and Performance", Robert G. Eccles, Ioannis Ioannou, and George Serafeim, 2014

**Exhibit 23: E&S metrics have worked best as a risk avoidance strategy...**

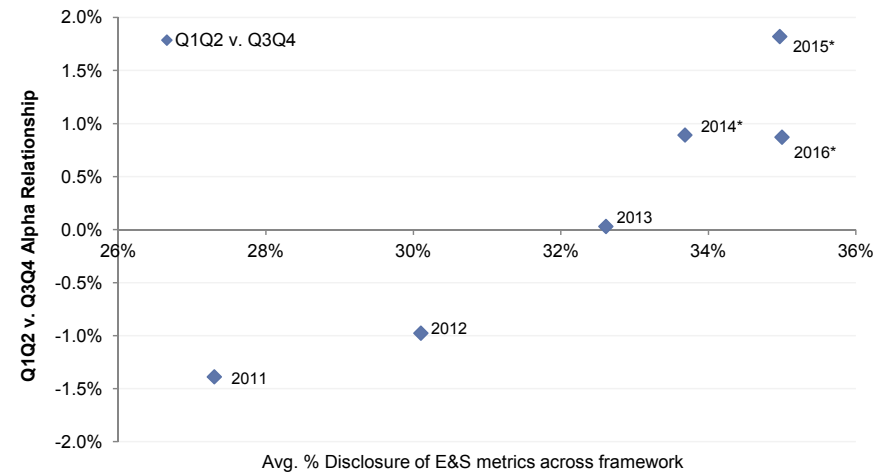
Average annual alpha of quartiles 1-3 vs. Q4 in our E&S framework, 2011-16



Source: Thomson Reuters, Bloomberg, FactSet, Goldman Sachs Global Investment Research

**Exhibit 24: ...but may also be starting to work as a best-in-class strategy**

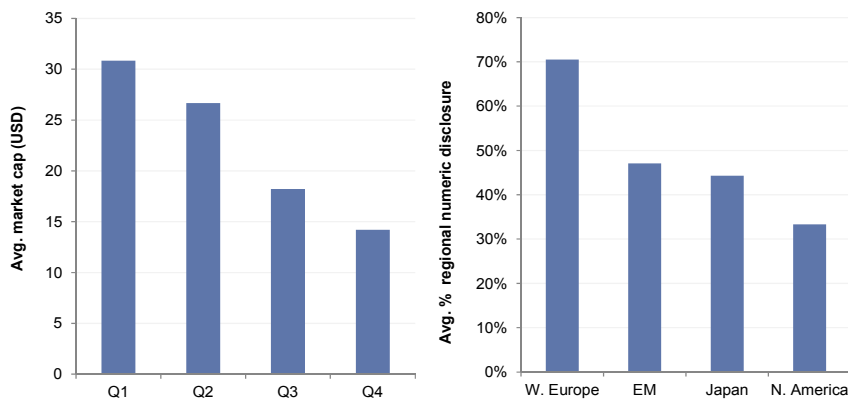
Average annual alpha of quartiles 1&2 (above average E&S scores) vs. Q3 & Q4



Source: Thomson Reuters, Bloomberg, FactSet, Goldman Sachs Global Investment Research

**Exhibit 25: Large and European companies disclose more**

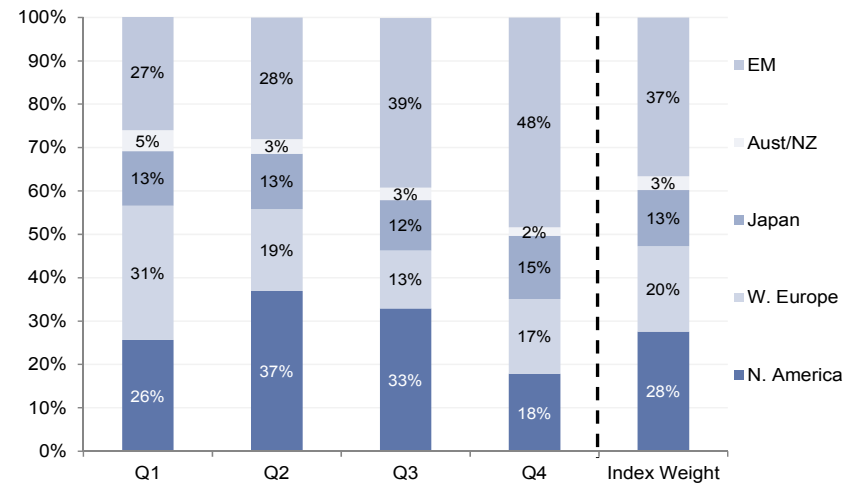
Avg. mkt cap by quartile of regional relative disclosure and regional % numeric disclosure rates for metrics included by sub-sector within our framework



Source: Thomson Reuters, Bloomberg, FactSet, Goldman Sachs Global Investment Research

**Exhibit 26: W. Europe overindexes on top-scoring E&S companies, while EMs tend to score lower**

Regional % breakdown of Q1 to Q4 E&S scores based on latest available data



Source: Thomson Reuters, Bloomberg, FactSet, Goldman Sachs Global Investment Research

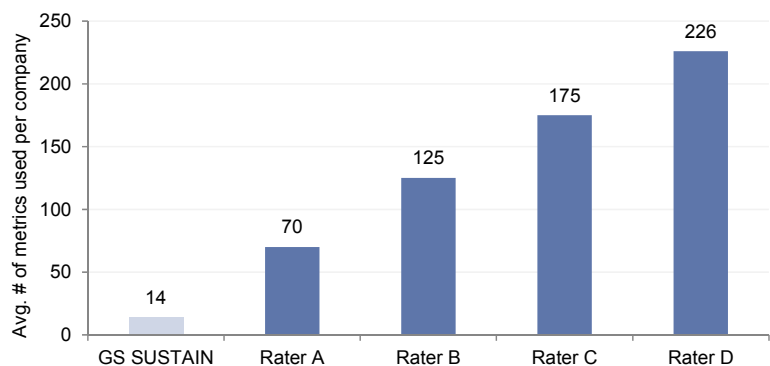
## How we differ from other scoring frameworks

Our approach aims to solve many of the challenges that investors have faced in integrating ESG data into stock selection. We emphasize the following:

- **Designed for the mainstream investor** – Our solution is specifically tailored for mainstream investors – rather than ESG specialists or values-based screeners – by identifying the issues most closely linked to material business value. We view this as differentiated vs. more complex or ‘kitchen sink’ approaches that risk being dilutive in their comprehensiveness in an effort to satisfy specialized audiences rather than prioritizing franchise and investment value creation.
- **Simplicity and transparency** – We believe our focus on a limited set of clearly delineated metrics (an average of 14 per sector, with only 10 metrics driving each company score on average due to disclosure limitations) provides greater transparency than most scoring or ratings solutions we are aware of that place a high value on creating the most expansive view possible of a company’s E&S profile, and with limited consideration to selectivity at the metric level specifically pertaining to investor outcomes. Limited transparency can also be associated with subjectivity in E&S ratings, underscored by instances where different ratings services come to divergent conclusions based on the same publicly disclosed data<sup>2</sup>.

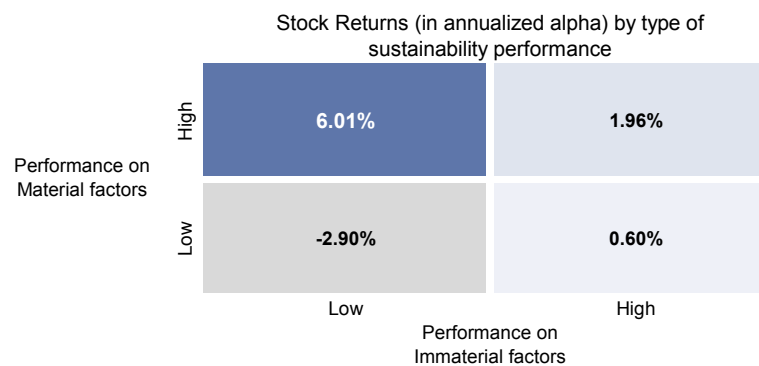
**Focus matters.** A 2015 Harvard Business School study found that ranking companies based solely on SASB’s framework of material E&S metrics resulted in meaningful stock outperformance, while companies that performed well on *immaterial* issues underperformed<sup>3</sup>. The study also concluded that 80% of corporate sustainability disclosures are immaterial and have shown no connection to financial performance or alpha, underscoring the need for investors to focus on the issues and metrics that matter most. Currently SASB recommends an average of only 13 metrics across standards for its 79 industries.

**Exhibit 27: We recommend a focus on materiality because...**  
Avg. number of metrics in widely used 3rd-party ESG scoring frameworks



Source: Goldman Sachs Global Investment Research

**Exhibit 28: ...less is more when it comes to ESG delivering alpha**  
Findings of HBS ESG materiality study



Source: Harvard Business School

<sup>2</sup> See “Do Ratings Firms Converge? Implications for Strategy Research”, IRL, 2014

<sup>3</sup> “Corporate Sustainability: First Evidence of Materiality”, HBS, 2015, Mozaffar Khan, George Serafeim & Aaron Yoon

## ESG a key element of our GS SUSTAIN framework for identifying long-term leaders

**We believe a key point of differentiation in our approach to ESG is that we are not silo'd or dogmatic in our efforts, but rather incorporate ESG as part of a holistic approach to long-term alpha generation** (Exhibit 29). Our analysis of governance and stakeholder engagement emphasizes institutional factors related to management quality, company culture and other risks, particularly important in the new era of investor activism, heightened social scrutiny and expanding regulatory oversight (Exhibit 30).

**In the context of our framework, we generally do not consider bottom-quartile ESG performers as candidates for our GS SUSTAIN Focus List, and Focus List companies falling below that threshold become candidates for removal.**

However, we believe that ESG screening is best used to flag areas for concern or further inquiry, rather than being rigidly prescriptive or definitive given the mosaic nature of the data and the disclosure limitations discussed in this report. We also recognize that some of the performance on these metrics may largely be a function of a company's business model. We supplement the scoring with additional context based on available data, a company's disclosure and performance track record and other fundamental considerations in making our Focus List determinations.

**Exhibit 29: The GS SUSTAIN analytical framework**



Source: Goldman Sachs Global Investment Research

**Exhibit 30: The key components of the Governance & Risk Management pillar of our GS SUSTAIN framework**

(1) Prior capital allocation	Does management have a track record of allocating capital effectively?
(2) Management incentives	Are management incentives designed to align interests with shareholders in long-term value creation?
(3) Organizational checks & balances	Are sufficient checks and balances on leadership embedded in the governance infrastructure?
(4) Shareholder rights & control	Do external shareholders have sufficient influence over board appointments and potential corporate actions?
(5) Key stakeholder management	Does management show appropriate engagement with risk associated with critical stakeholders?

Source: Goldman Sachs Global Investment Research

## Addressing select names from our Focus List with lagging E&S performance

Four names from our GS SUSTAIN Focus List fall into the bottom quartile of our E&S scoring vs. global peers based on latest available data. We address each below:

**Removing Safran.** We remove Safran from the GS SUSTAIN Focus List. The company has been a consistent laggard in the context of our new E&S framework relative to its Aerospace & Defense peers in the MSCI ACWI, averaging in the 18<sup>th</sup> percentile since 2011. The lower scores are due primarily to the raised bar of our revised framework, giving lower credit for disclosures alone and placing a higher weight on the most material quantitative metrics. Safran has the highest level of hazardous waste intensity in the sector while scoring poorly on employee turnover (80<sup>th</sup> percentile) and lost-time injury rates (80<sup>th</sup> percentile). On the positive side, Safran scores favorably on female diversity for both managers and employees. Notable policies lacking among the company's disclosures

include flexible working hours and an employee health & safety system. We also note that Safran ranks poorly on a number of Governance factors we track including independent board leadership (ex-CEO is chairman), low board independence (40%) and unequal voting rights.

**Replacing Halliburton with Schlumberger.** We remove Halliburton from the GS SUSTAIN Focus List. The company has performed poorly in our E&S framework over the past two years, falling in the 7<sup>th</sup> percentile on 2014 data and 10<sup>th</sup> percentile currently, based on high disclosure (around 70% of all metrics in our Oil Services framework). Halliburton's lower performance in recent years includes higher fatality rates, lower female diversity relative to peers, and higher CO2 emissions and energy intensity vs. peers. With our removal of Halliburton **we add Schlumberger**. Known for its technology leadership in the sector (the company has spent more on R&D than major peers Halliburton and Baker-Hughes combined over each of the last three years), Schlumberger scores in the 90<sup>th</sup> percentile on E&S factors in our framework, scoring especially well on measures of water withdrawal, energy, CO<sub>2</sub> and hazardous waste intensity. The company also receives third-party assurance on its sustainability reporting and has executive compensation links to ESG performance. The company's 10.3% avg. 2017-19E CROCI falls in the 71<sup>st</sup> percentile relative to global GICS 3 peers.

**Watchful on BHP Billiton.** BHP has performed well historically on our E&S scoring until the most recent year when it fell into the 8<sup>th</sup> percentile relative to Mining & Materials peers. This was mainly the result of the Samarco (Brazil) dam collapse, which resulted in 19 fatalities in 2015, raising the company's fatality rate to the 67<sup>th</sup> percentile vs. the prior year's zero fatalities. Because fatalities can be a relatively volatile metric from year to year compared to more stable metrics (energy use and diversity), this single event resulted in a significant negative swing from the previous year's overall positive score. BHP also scores poorly on waste recycling, hazardous waste intensity and employee turnover, but scores favorably on water withdrawal and renewable energy usage. Given the company's historic E&S leadership, we opt to retain the company on the GS SUSTAIN Focus List at this time, watching to see if the company returns to the levels of its stronger track record as 2016's data becomes available.

**Watchful on Bank Rakyat; passes relative to EM peers.** While Bank Rakyat falls in the 4<sup>th</sup> quartile against global bank peers, we also consider an EM-relative ranking given differing regulatory hurdles and systematically lower E&S scores in emerging markets, on which the company attains the 3<sup>rd</sup> quartile. The company has the lowest employee turnover relative to EM bank peers, but average employee pay and female diversity rank lower. While Bank Rakyat does not have an explicit data privacy policy, they have a structured service quality system in place (i.e., ISO 9001), a rarity among EM peers in our framework.

**Exhibit 31: GS SUSTAIN Focus List E&S scores**

GICS 1	Focus List	Sector	Latest E&S Overall Score	GICS 1	Focus List	Sector	Latest E&S Overall Score
Consumer Discretionary	Amazon.com Inc.	Software & Internet	45%	Health Care	Amgen Inc.	Pharmaceuticals	96%
	Delphi Automotive Plc	Automobiles	27%		Bristol-Myers Squibb Co.	Pharmaceuticals	84%
	Dollar Tree Stores Inc.	Retailing	40%		Cochlear Ltd.	Med Tech	53%
	Inditex	Brands	100%		Coloplast	Med Tech	75%
	InterContinental Hotels Group	Hospitality	59%		CSL Ltd.	Pharmaceuticals	73%
	Nike Inc.	Brands	90%		Edwards Lifesciences Corp.	Med Tech	92%
	Priceline.com Inc.	Software & Internet	78%		Novo Nordisk	Pharmaceuticals	94%
	Richemont	Brands	92%		Roche	Pharmaceuticals	96%
	TJX Cos.	Brands	82%		Shire	Pharmaceuticals	80%
	Tiffany & Co.	Retailing	96%		Acuity Brands Inc.	Multi-industry Mfg.	35%
Consumer Staples	Colgate-Palmolive Co.	Consumer Staples	84%	Industrials	Assa Abloy B	Multi-industry Mfg.	41%
	Estee Lauder Co.	Consumer Staples	97%		Atlas Copco	Multi-industry Mfg.	98%
	Reckitt Benckiser	Consumer Staples	86%		Geberit Holding	Multi-industry Mfg.	28%
EOG Resources Inc.	Oil Producers	29%	Ryanair		Airlines	45%	
Energy	Halliburton Co.	Oil Services	10%	Safran	Aerospace & Defense	19%	
	AIA Group	Insurance	81%	Wabtec Corp.	Multi-industry Mfg.	54%	
Financials	Arthur J. Gallagher & Co.	Insurance	69%	Information Technology	Alphabet Inc.	Software & Internet	45%
	Bank Rakyat Indonesia	Banks	21%		Apple Inc.	Hardware	79%
	Firstrand Ltd.	Banks	96%		ASML Holding	Semiconductors	97%
	HDFC Bank	Banks	47%		Facebook Inc.	Software & Internet	45%
	Prudential Plc	Insurance	25%		Intuit Inc.	Software & Internet	70%
	Signature Bank	Banks	57%		Tencent Holdings	Software & Internet	78%
	Svenska Handelsbanken	Banks	89%		TSMC	Semiconductors	87%
	U.S. Bancorp	Banks	57%		Visa Inc.	IT Services	84%
Materials	BHP Billiton Plc	Mining & Materials	8%	Real Estate	Public Storage Inc.	Real Estate	42%
	Chr Hansen	Chemicals	84%				
	Novozymes	Chemicals	100%				

Source: Goldman Sachs Global Investment Research

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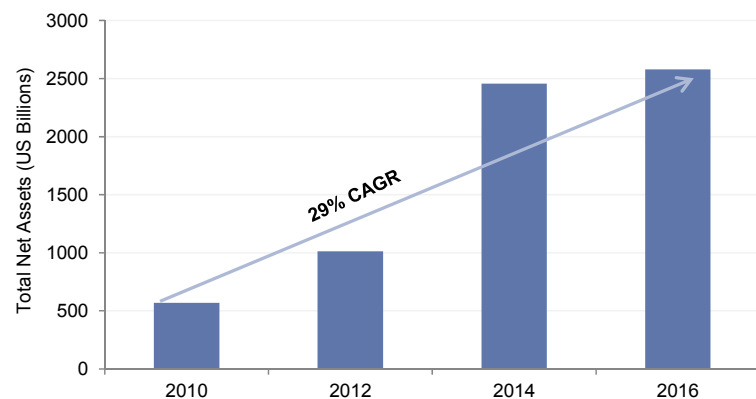
# The ESG investing opportunity

**We see a growing recognition among investors that ESG represents a rare source of secular growth in active management, driven in part by heightened interest among populations that are controlling an increasingly large proportion of investable assets – namely, women and millennials** (see Exhibits 32-33). ESG-integrated investing also represents a defensible active strategy, in our view, given its diverse and often customized nature. Due to the broad and multi-faceted spectrum of ESG issues and diverse values of savers, we view ESG-integrated assets as a category uniquely well suited for active management owing to a need for customized options.

Sustainable investment assets globally have grown over 25% from 2014 to 2016 according to the Global Sustainable Investment Alliance, with the largest pockets of recent growth coming from the US, Canada, Japan and Australia/New Zealand.<sup>4</sup> While Europe remains the leader in ESG assets, with over 52% of all global ESG managed assets, countries such as the US are making up a growing share of the pie (38%). Pooled ESG investment products (mutual funds, ETFs, etc.) in the US have grown at a 29% CAGR since 2010 according to US SIF.

## Exhibit 32: Funds incorporating ESG in the US have grown 4.5x over 2010 levels

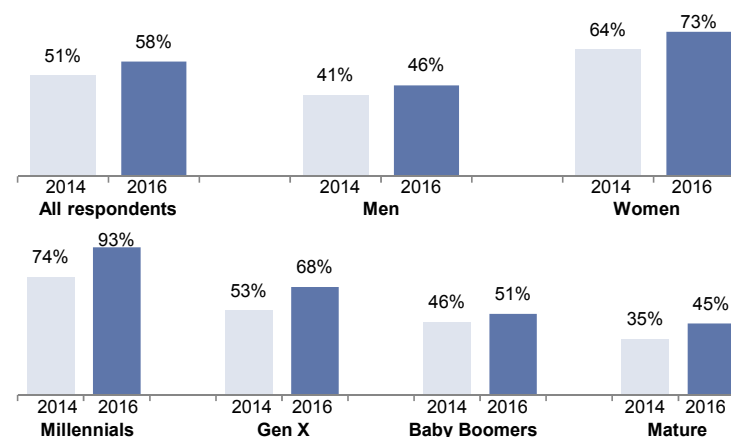
Investment assets incorporating ESG in the US (2010-2016), including mutual funds, variable annuities, closed-end funds, ETFs, alternative investment funds and other pooled products



Source: US SIF Foundation

## Exhibit 33: Women and Millennials driving growing interest in ESG incorporation

% who agree social or environmental impact is important to investment decisions (2016)



Source: U.S. Trust Wealth and Worth Survey

<sup>4</sup> 2016 Global Sustainable Investment Review, Global Sustainable Investment Alliance, 2016



## Appendices

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**Exhibit 34: 3-year rolling alpha relationship for all numeric metrics with above 20% disclosure (including those not in our framework)**

		Water Withdrawal	Water Recycling	Energy Usage	Renewable Energy	Total Waste	Waste Recycling	Hazardous Waste	Airlines GHG Emissions	Total GHG Emission	Scope 1 Emissions	VOC Emissions	SOx & NOx Emissions	Employee Turnover	Training Hours	Employee Comp.	Women Managers	Women Employees	Minority Employees	Last Time Injury Rate	Total Injury Rate	Fatalities Rate
		Resource Intensity				Waste and Emissions								Employee Engagement & Diversity					Worker Safety			
Basic Resources	Oil Producers	3.0%	1.0%	4.2%		0.1%	-0.5%	3.7%		4.0%	4.4%	2.6%	3.5%	1.2%	1.3%	0.2%	-1.7%	3.4%		1.3%	4.5%	-1.8%
	Oil Refiners	7.8%	8.7%	2.8%		0.5%	-11.1%	7.2%		6.8%	8.4%	4.2%	0.2%	1.9%	-5.7%	-2.2%	1.0%	11.2%		1.7%	-6.8%	3.3%
	Mining & Materials	-0.4%	9.7%	-12.3%	0.9%	-10.4%	16.7%	-0.4%		-7.7%	-11.3%		-6.0%	4.7%	-4.5%	-1.2%	-2.7%	6.5%		0.7%	1.0%	0.3%
	Steel	-2.1%	-1.4%	3.8%		-2.3%	-6.7%	-1.0%		2.6%	0.5%	-11.6%	0.9%	-11.1%	-2.8%	0.8%	4.3%	1.5%		0.2%	-4.5%	1.1%
	Paper & Packaging	-1.7%		-4.9%	-12.9%	4.5%	3.0%	-10.6%		-1.6%	-3.0%		-3.7%	0.5%	-2.9%	3.8%	-0.8%	11.2%		7.0%	10.9%	-1.2%
	Chemicals	6.1%	-1.1%	3.1%		1.5%	-0.9%	-6.9%		3.3%	5.3%	-4.7%	2.9%	-0.1%	-1.2%	-1.9%	5.6%	4.1%		-5.0%	0.0%	3.9%
Utilities	Utilities	-0.9%		-1.1%		-1.3%	3.7%	-3.5%		1.2%	2.3%		0.9%	-1.4%	-1.5%	-5.8%	1.8%	3.1%		-3.0%	-3.0%	1.2%
Manufacturing	Aerospace & Defense	1.3%		-1.2%	-1.5%	-1.2%	-11.8%	5.5%		1.5%	1.0%			-0.6%	-0.4%	3.8%	-3.1%	9.2%		-2.5%	-8.8%	5.2%
	Automobiles	0.5%	-0.1%	-5.1%		1.6%	5.2%	0.0%		-2.8%	-2.2%	4.4%	-3.6%	5.6%	-2.7%	-5.1%	-6.0%	-2.6%		0.8%	-1.4%	1.3%
	Consumer Durables	-5.1%		0.2%		-3.4%	-1.6%	-10.2%		-0.8%	1.8%			2.1%		1.6%	-5.3%	-0.3%		-8.4%	0.6%	1.8%
	Consumer Staples	2.7%		3.9%		-3.6%	-1.4%	-3.2%		3.3%	-1.4%		-0.2%	-0.7%	1.8%	2.8%	0.9%	2.7%		-2.8%	2.4%	0.8%
	Multi-industry Manufacturing	-0.6%		1.4%		-3.9%	-1.7%	1.6%		-0.8%	2.3%	-3.7%	-0.4%	-3.6%	1.9%	1.8%	-1.1%	1.8%		-0.5%	-4.4%	3.6%
Industrial Services	Airlines	8.1%		-0.8%		5.8%	7.3%	10.2%	5.7%	-1.1%	-0.5%		19.0%	-3.9%	4.6%	5.0%	0.4%	2.3%		-22.1%	-26.8%	2.2%
	Shipping	-5.9%		1.9%		1.7%	0.3%			1.2%	-2.0%			0.7%	-1.5%	-4.6%	0.0%	-4.6%		-4.7%	-6.0%	1.8%
	Infrastructure	-8.8%	7.0%	-7.7%		-14.2%	-4.9%	13.4%		-7.2%	13.0%			1.2%	1.9%	3.8%	5.4%	6.1%		15.9%	9.3%	4.7%
	Engineering & Construction	0.1%		4.7%		1.9%	9.5%			3.3%	-1.6%			-8.5%	-6.1%	-6.5%	10.0%	12.8%		-11.1%	-0.5%	3.5%
	Oil Services	10.6%		5.1%		-12.7%		8.3%		0.5%	-3.3%			0.7%	-5.4%	12.9%	11.3%	7.1%		-6.6%	-6.9%	0.0%
	Telecom Services	2.1%		3.0%		-6.0%	-1.3%	-0.7%		-2.8%	-0.3%			3.2%	4.9%	3.3%	-1.1%	1.4%		0.1%	-1.0%	3.4%
Multi-industry Services	-6.4%		-9.9%		-4.3%				6.0%	3.6%			3.0%	8.6%	4.1%	2.2%	15.6%		11.8%	12.8%	7.0%	
IP & Design	Semiconductors	-4.6%	4.9%	-4.7%		-5.9%	-2.2%	-1.9%		-4.6%	-11.3%	-4.3%	1.7%	-1.6%	-8.5%	0.8%	-4.8%	0.7%		-2.7%	0.3%	-16.0%
	Hardware	-0.2%	2.8%	-1.5%		-6.0%	-2.1%	-2.5%		-4.2%	-2.2%		-0.2%	2.2%	0.0%	0.8%	-2.9%	1.0%		-2.9%	-2.0%	
	Brands	-16.0%		-3.9%		0.9%	-2.1%	3.2%		-7.1%	-2.8%			11.2%	-2.1%	-17.7%	-7.0%	-4.9%		21.1%	5.2%	
	Med Tech	-2.1%		2.1%		-2.2%	2.0%	-1.3%		3.1%	-1.2%					-0.3%	3.0%	4.9%		-2.0%	4.3%	
	Pharmaceuticals	6.3%		4.1%		-9.2%	0.8%	5.2%		6.1%	8.0%	3.2%	5.7%	10.3%		-3.8%	3.1%	11.7%		1.7%	4.1%	2.9%
Real Estate Centric	Retailing	4.1%		-4.4%		-0.9%	-0.3%			-0.9%	2.8%			0.4%	-1.7%	0.1%	0.3%	-2.6%				
	Hospitality	8.1%		7.5%		-12.7%	19.4%			2.1%	2.3%			-3.0%		-3.9%	-3.1%	6.1%				
	Gaming	7.5%		10.5%		-2.2%	10.1%			4.1%	0.0%					-7.9%	-5.0%	10.3%		4.2%		
	Real Estate	-2.1%		1.2%		2.2%	-0.4%			0.8%	-0.5%			-2.1%	-0.3%	-3.9%	-4.8%	-2.0%				
Business Services	Business Services	1.7%		1.3%	-4.0%	3.9%				-1.8%	5.5%			3.9%	1.9%	2.2%	5.7%	3.4%		-4.7%	-2.3%	
	IT Services	6.7%		5.1%	6.0%	-9.4%	-2.9%			3.8%	2.3%			-1.7%	-6.2%	1.7%	5.0%	2.1%				
	Software & Internet					-3.1%	0.4%			-3.1%	0.4%					1.9%		-2.1%				
	Media	1.3%		-2.3%		1.8%				-2.0%	1.2%			8.0%	6.2%	8.4%	1.2%	4.4%				
Financials	Asset Management			-1.0%		3.5%				0.9%	2.5%			0.2%		6.5%	1.5%	-3.8%				
	Banks	-1.6%		2.8%		0.6%	0.0%			0.9%	0.0%			-1.1%	2.6%	-0.2%	2.5%	-0.3%	0.8%			
	Insurance	5.0%		3.0%		0.0%	2.5%			3.2%	-1.5%			3.3%	-2.3%	1.5%	-2.8%	-4.9%				
<b>Sub-sector Average</b>		0.7%	3.5%	0.3%	-2.3%	-2.4%	1.0%	0.8%	5.7%	0.3%	0.6%	-1.2%	1.5%	0.8%	-0.7%	0.1%	0.4%	3.3%	0.8%	-0.5%	-0.8%	1.4%
<b>Sub-sector Median</b>		0.5%	2.8%	1.4%	-1.5%	-1.3%	-0.4%	-0.4%	5.7%	0.9%	0.4%	-0.6%	0.6%	0.6%	-1.4%	0.8%	0.4%	2.7%	0.8%	-1.3%	-0.5%	1.8%
		<div style="display: flex; justify-content: space-between; align-items: center;"> <span>Alpha Scale</span> </div>																				

Source: FactSet, Thomson Reuters, Bloomberg, Goldman Sachs Investment Research

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**Exhibit 35: 5-year consistent disclosure alpha relationship for all numeric metrics with above 20% disclosure (including those not in our framework)**

		Water Withdrawal	Water Recycling	Energy Usage	Renewable Energy	Total Waste	Waste Recycling	Hazardous Waste	Airlines GHG Emissions	Total GHG Emission	Scope 1 Emissions	VOC Emissions	SOx & Nox Emissions	Employee Turnover	Training Hours	Employee Comp.	Women Managers	Women Employees	Minority Employees	Lost Time Injuries	Total Injury Rate	Fatalities Rate	
		Resource Intensity				Waste and Emissions						Employee Engagement & Diversity					Worker Safety						
Basic Resources	Oil Producers	6.1%	-6.6%	4.0%		-0.4%	6.3%	1.1%		6.5%	6.2%	1.7%	3.2%	5.5%	2.7%	0.9%	0.6%	3.0%		1.5%	5.5%	-1.4%	
	Oil Refiners	5.2%	8.1%	-5.3%		4.4%	-2.5%	11.0%		6.0%	11.8%	14.9%	4.2%	-0.3%	6.2%	13.6%		16.1%		-2.6%	-15.0%	24.8%	
	Mining & Materials	1.1%	12.2%	-11.0%	8.6%	-10.5%	17.7%	3.7%		-2.1%	-9.8%		-3.5%	8.6%	-4.6%	-0.2%	-5.7%	1.0%		-0.4%	-2.8%	-2.3%	
	Steel	7.6%	2.9%	7.5%		-1.0%	-11.2%	-2.1%		8.8%	4.6%	-15.1%	5.4%	-6.0%	3.4%	-4.7%					2.6%	0.7%	8.8%
	Paper & Packaging	0.0%		-7.5%	-23.1%	-0.7%	0.2%	-12.7%		-1.0%	0.6%		-3.2%	0.0%	1.7%	4.0%	-3.9%		15.3%		6.2%	14.0%	-0.7%
Chemicals	5.9%		4.8%		0.9%	-1.3%	-6.3%		3.0%	7.1%	-3.1%	3.2%	2.2%	-4.2%	-1.9%	9.6%	5.5%			-4.4%	-5.2%	12.5%	
Utilities	Utilities	-1.7%	-10.8%	0.8%		-3.3%	2.2%	-1.8%		2.2%	3.6%	2.9%	1.5%	-2.2%	-3.0%	-8.4%	0.2%	4.2%		0.0%	-4.2%	0.9%	
Manufacturing	Aerospace & Defense	0.7%		0.0%		2.5%	-2.1%	-3.2%		6.3%	3.6%			12.0%	3.5%	3.7%	3.5%	6.0%		-4.1%	-4.3%	NA	
	Automobiles	2.2%		-5.2%		-0.2%	11.6%	-0.5%		-0.4%	0.5%	1.3%	-10.3%	14.6%	-1.7%	-4.0%		-0.2%		3.0%	-1.5%	-1.4%	
	Consumer Durables	-5.3%		-1.7%		-6.1%	2.6%	-4.3%		-0.8%	-0.5%	-7.1%	-10.0%	3.1%		-8.9%	-6.6%	1.5%			2.4%	NA	
	Consumer Staples	0.8%		3.3%		-1.8%	-0.9%	-1.7%		3.6%	1.2%		0.0%	6.0%	-3.1%	0.4%	-1.8%	1.3%		-0.5%	1.8%	-2.3%	
	Multi-industry Manufacturing	-1.4%		2.3%		-4.8%	-2.2%	4.8%		1.6%	4.0%	-0.5%	-2.2%	-1.0%	14.5%	0.0%	-4.9%	0.1%		0.8%	-1.4%	5.4%	
Industrial Services	Airlines	13.1%		5.0%		-9.8%	-28.5%		3.4%	7.0%	10.9%		24.6%	-9.0%	5.4%	-9.7%	3.3%	-0.1%		-26.1%	-20.7%	NA	
	Shipping	-3.7%		-0.8%		3.7%				-0.1%	-5.3%		8.1%	-0.5%		-8.3%		-3.1%		-10.0%	-5.4%	8.8%	
	Infrastructure	-8.5%		-6.5%		-10.4%	-9.5%	18.1%		-2.4%	16.9%			-4.8%	-0.1%	0.5%	4.7%	1.8%			NA	8.0%	
	Engineering & Construction	-6.0%		8.7%		7.5%	10.6%			2.4%	-10.6%			-8.9%	-4.5%	0.7%	7.7%	13.5%		-5.6%	-12.3%	7.2%	
	Oil Services	14.2%		0.2%		-6.0%		0.7%		-1.0%				4.5%		17.2%	7.8%	8.9%		-9.8%	-4.1%	8.3%	
	Telecom Services	1.5%		-0.6%		-6.7%	3.8%	-1.3%		-3.0%	-5.3%			2.6%	0.6%	1.5%	-3.2%	3.1%			7.2%	0.7%	
	Multi-industry Services			8.6%		-11.1%				12.1%	9.2%			6.4%	NA	2.0%	12.2%	10.4%		-0.1%		11.7%	
IP & Design	Semiconductors	5.4%	5.5%	1.7%		-4.8%	-3.0%	7.1%		2.0%	-10.3%	-3.7%	3.0%	4.8%	-13.0%	11.8%	-15.3%	-4.6%		-14.1%	-4.6%	NA	
	Hardware	2.2%	9.3%	-0.2%		-5.0%	-1.6%	-0.6%		-6.6%	-6.1%		-1.1%	19.2%	4.5%	3.6%	-0.8%	3.4%		4.9%	2.9%		
	Brands	-2.6%		-2.8%		2.7%	3.2%	-1.4%		-0.7%	-2.5%			14.4%	0.6%	-17.1%	-10.2%	-6.2%		49.1%			
	Med Tech	-2.4%		0.1%		-6.0%	-3.4%	-2.2%		3.1%	0.9%			5.5%		-3.2%	7.1%	11.7%		-5.7%	7.1%		
	Pharmaceuticals	4.2%		6.0%		-11.7%	-0.6%	9.2%		6.1%	10.8%	5.4%	7.1%	9.0%		-6.8%	-1.8%	9.5%		-0.6%	3.7%	5.4%	
Real Estate Centric	Retailing	0.9%		0.4%		1.7%	-0.9%			-0.1%	7.0%			5.8%	-2.2%	2.0%	1.5%	0.6%					
	Hospitality	-0.5%		5.6%		-25.9%	25.9%			-3.2%	8.0%			5.6%	-6.0%	-2.7%		9.7%					
	Gaming	2.9%		-11.0%			NA			3.2%						-5.7%		13.8%					
	Real Estate	-2.2%		1.5%		0.9%				-1.0%	3.3%			-2.4%	4.4%	-2.3%		-2.6%					
Business Services	Business Services			-3.1%						-7.1%	-3.8%			1.6%	NA	-1.0%	-0.8%	-5.2%		-2.4%			
	IT Services	7.9%		5.1%		-14.5%				2.7%	-1.5%			5.6%	0.4%	-1.8%	5.8%	9.6%					
	Software & Internet			0.7%						1.3%	0.4%			-10.9%		6.9%	9.3%	-12.8%					
	Media			6.0%		4.9%				2.0%	7.8%			9.2%	0.9%	4.4%	-2.2%	9.5%					
Financials	Asset Management			-13.0%		-4.2%	1.3%			6.9%	7.2%			-9.4%		6.7%	NA	-11.5%					
	Banks	-0.8%		0.9%		-2.2%				1.3%	4.1%			-0.6%	3.8%	-1.6%	6.1%	-1.1%	0.0%				
	Insurance	3.6%		4.3%		-6.5%	2.3%			2.9%	-1.9%			10.5%	-0.9%	4.4%	-3.1%	-6.7%					
<b>Sub-sector Average</b>		1.7%	2.9%	0.3%	-7.3%	-3.9%	0.8%	0.9%	3.4%	1.8%	1.9%	-0.3%	1.9%	3.0%	0.4%	-0.1%	0.7%	3.2%	0.0%	-0.8%	-1.7%	5.6%	
<b>Sub-sector Median</b>		1.0%	5.5%	0.7%	-7.3%	-3.8%	-0.6%	-1.0%	3.4%	2.0%	2.3%	0.4%	2.3%	3.8%	0.6%	0.0%	0.2%	3.0%	0.0%	-0.6%	-1.5%	5.4%	



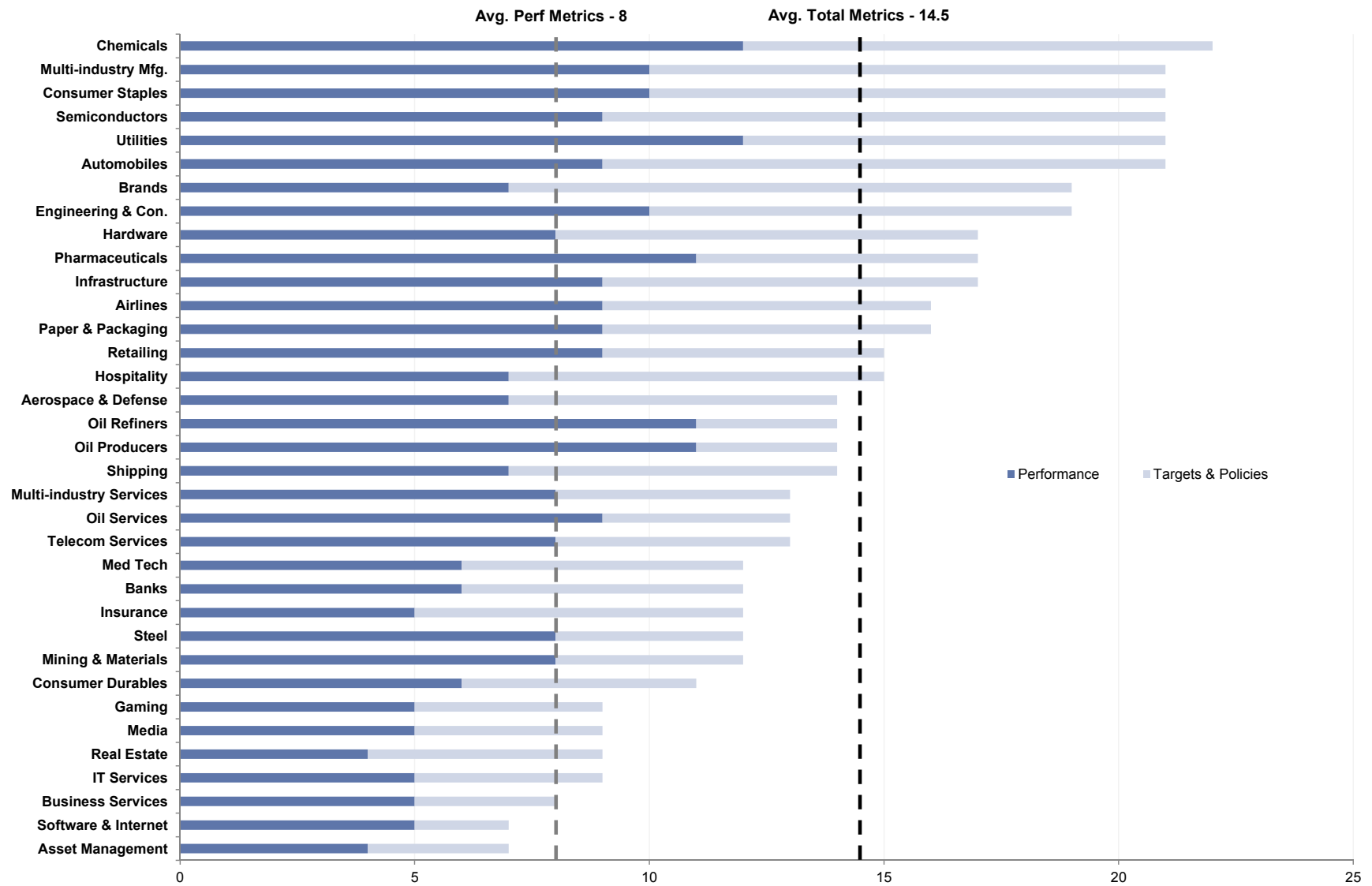
Source: FactSet, Thomson Reuters, Bloomberg, Goldman Sachs Investment Research

**Exhibit 36: Policy metric rolling 3-year alpha test with above 20% disclosure, "Yes" policy, (including those not in our framework)**

		Environmental Targets and Policies								Human Capital				Supply Chain				Customer Policies				Operations							
		Emissions Targets	NOx and SOx Reduction	VOC Reduction	Renewable Energy Policy	Energy Efficiency Targets	Water Efficiency Targets	Waste Reduction Targets	Toxic Chemicals Reduction	Product Impact Policy	Biodiversity Impact Policy	Diversity & Opp. Policy	Training & Dev. Targets	Flexible Working Policy	Employees H&S Systems	Env. Supply Chain Policy	H&S Supply Chain Policy	Child Labor Policy	Forced Labor Policy	Customer Labor Policy	Data Privacy Policy	Product & Service Quality	H&S Products / Services	Business Ethics Tools	Bribery & Corruption Policy				
Basic Resources	Oil Producers	0.1%	-3.2%	-1.0%	-2.3%	-1.5%	-0.3%	-3.1%	-3.5%			-5.0%	-1.5%	-0.8%	-2.2%	-3.5%			0.9%	-0.8%	-0.3%			-2.8%	-1.4%				
	Oil Refiners	6.9%	-12.5%	-7.2%	-4.9%	5.3%	-1.4%	-7.2%	5.3%	-6.5%			-0.1%	8.3%	-7.2%	-5.4%	2.2%			-9.2%	-1.3%	-8.7%			2.3%	2.2%			
	Mining & Materials	3.5%	5.1%		-1.7%	-8.0%	-9.2%	-1.7%	1.0%	-5.0%	-19.6%	-5.4%	-2.0%	-3.3%	-2.1%		-7.6%	-1.2%	2.7%	2.1%	5.6%			-7.9%	-7.5%				
	Steel	0.4%	-8.6%	-5.2%	-5.6%	5.2%	-0.7%	-3.0%	-9.3%	-4.1%			-10.3%	-4.0%	-2.4%	-10.2%	-6.1%	-8.2%	-2.4%	-1.2%	-0.5%			-2.4%	-2.5%				
	Paper & Packaging	12.6%	0.6%	-3.4%	5.0%	0.6%	2.2%	-10.6%	4.3%	-2.3%			-1.6%		-7.2%	-2.9%	-3.7%	1.8%	-0.6%	-6.7%	3.9%	-6.4%			12.1%	10.1%			
Chemicals	0.4%	-4.8%	0.9%	0.3%	-1.2%	1.1%	-3.8%	0.6%	-1.9%	-7.7%	2.2%	0.6%	-5.6%	-1.0%	-4.6%	-6.6%	-8.1%	-0.8%	-2.6%	-1.2%	-2.0%			0.7%	-1.2%				
Utilities	Utilities	1.7%	-2.1%		-2.5%	1.8%	-2.6%	-0.8%	-4.5%			-1.0%	0.4%	-4.8%	0.6%	1.4%			0.8%	2.1%	-3.3%			0.6%	0.5%				
Manufacturing	Aerospace & Defense	-0.9%			-2.3%	1.9%	-13.2%	-5.4%	2.6%	-5.4%	10.2%	-11.0%	2.0%	-1.4%	-2.3%	-7.2%			-6.8%	-7.3%	0.3%			-1.9%	-1.2%				
	Automobiles	-23.0%	-2.7%	-2.7%	-3.2%	6.6%	16.9%	-9.1%	-2.8%	4.0%	-3.5%	4.9%	-8.6%	2.4%	-0.6%	-3.1%	-0.9%			1.2%	2.7%	-2.9%	0.3%	2.2%	1.9%				
	Consumer Durables	-8.3%		-1.1%	-4.3%	4.7%	-5.6%	-5.6%	-11.1%	-0.2%	2.5%		-8.0%	-1.0%	-8.5%	-7.9%	-4.8%	-10.3%	-1.2%	-5.2%	-5.5%	-0.9%			3.0%	-8.0%			
	Consumer Staples	3.5%			-0.3%	-0.1%	-3.6%	0.8%	0.8%	-2.3%		-4.4%	2.2%	0.4%	1.0%	0.0%	-3.9%	-1.3%	2.7%	4.1%	-2.5%	-0.8%			2.0%	3.9%			
	Multi-industry Manufacturing	-6.1%		0.4%	-2.9%	3.9%	5.3%	-0.4%	0.0%	-5.2%		-0.5%	2.1%	-4.0%	0.1%	-1.3%			-0.7%	0.7%	-1.1%			-1.0%	-2.6%				
Industrial Services	Airlines	11.4%	-6.2%		7.9%	-	-8.4%		1.8%			7.7%	-0.7%	5.2%	-2.5%	-16.3%			6.1%	-5.0%	-5.5%			3.9%	3.7%				
	Shipping	-3.5%	0.0%		0.6%	4.5%	3.3%		-0.5%	0.3%			-0.6%	3.8%	4.2%	2.7%			0.3%	0.9%	1.4%			2.1%	2.0%				
	Infrastructure	8.6%			-6.8%	10.1%	1.6%	-8.9%		-6.8%	-9.0%			-8.8%	-7.7%	-5.7%	-6.1%			-2.6%	-0.3%	-0.8%			-3.1%	-4.1%			
	Engineering & Construction	-2.2%			-3.7%	-11.9%		-1.0%		-6.8%	-2.3%			-0.2%	4.6%	-5.3%	2.9%	3.6%			1.9%	-4.5%	-11.2%			-3.3%	-1.1%		
	Oil Services	6.3%			-4.3%			-8.3%		-5.5%	-2.3%			-8.1%	-1.0%	-8.3%			-2.2%	-4.7%	-10.4%			3.2%	-0.8%				
	Telecom Services	5.7%			-5.6%	5.3%		-4.4%		-1.5%			-11.8%	-1.3%	0.4%	-4.0%	-4.8%			-2.1%	-2.5%	0.9%			-3.4%	-6.4%			
	Multi-industry Services	10.7%			3.1%			3.0%		-0.6%			-4.2%		-2.1%	6.8%			-9.0%	-0.2%	-2.8%			-4.0%	-4.2%				
IP & Design	Semiconductors	1.5%		3.1%	-3.9%	2.0%	4.4%	4.3%	-1.4%	3.7%			4.1%	-0.5%	5.8%	-0.3%	9.6%	-1.1%	-2.2%			6.6%	8.0%			9.8%	5.5%		
	Hardware	-6.0%		3.0%	-2.0%	20.8%	-3.2%	-5.0%	-3.7%	-2.9%	-1.2%			0.8%	0.3%	-1.0%	-0.1%	-5.7%	-1.6%	-1.6%			-2.5%	1.6%	0.1%	0.9%	-2.6%		
	Brands	27.7%			1.2%	0.5%	6.8%	-3.9%	1.7%	4.3%			1.7%	-0.6%	0.9%	2.3%	5.0%	4.9%	10.2%			6.4%	3.0%	-5.8%			7.0%	3.8%	
	Med Tech	15.7%			-1.3%	-10.2%		1.5%	-1.2%	1.1%			1.5%	2.7%	0.5%	3.5%			6.3%	2.5%	-3.6%			4.6%	4.1%				
	Pharmaceuticals	-9.1%			-7.5%	1.1%	2.4%	-11.1%	-7.6%	-7.6%			5.2%	-6.1%	-9.8%	-9.8%	-8.5%			-11.8%	2.3%			3.0%	-4.8%				
Real Estate Centric	Retailing	-4.0%			-6.4%	-4.1%		-2.7%		-4.3%			-0.5%	-7.4%		-3.5%	-4.3%	-6.3%	-1.9%			-2.9%	-1.7%		-1.1%			-1.9%	-1.4%
	Hospitality	-8.1%			-3.3%		3.9%	-1.7%	-2.0%	0.3%	0.7%			-6.3%	3.1%	-5.5%			1.1%	-9.3%	-0.8%	0.0%			6.1%	1.2%			
	Gaming				-12.2%			4.4%					10.5%			-2.4%			-11.9%	2.0%			1.0%	2.5%					
	Real Estate	8.0%			-1.8%	2.3%		-1.7%		-1.7%			-2.8%	-1.6%	-0.3%	-1.9%				0.4%			-0.1%	-2.3%					
Business Services	Business Services	0.3%			-5.3%			-2.8%		-5.0%			-7.1%	0.4%	1.1%	-0.1%			-4.0%	2.2%			-6.9%	-14.3%					
	IT Services	-9.9%			-9.7%	-2.7%	2.3%	-8.5%		-8.1%			-6.6%	-7.1%	-4.8%	-7.6%	-4.8%			-4.6%	-9.0%			7.8%	8.6%				
	Software & Internet				-6.6%			-9.6%		-7.9%			-8.6%	-11.1%						-4.0%			2.7%	-7.0%					
	Media	5.4%			-0.2%			0.4%		0.0%			-4.8%	3.0%		2.3%			0.5%			2.2%	2.6%						
Financials	Asset Management	-15.3%			-3.3%			2.6%		-2.9%			2.8%	0.0%		0.1%			-4.7%			-6.9%	-7.0%						
	Banks	2.2%			-1.1%	1.0%		-2.4%		-2.9%			-1.8%	-0.6%		-2.5%			-2.2%			1.1%	0.8%						
	Insurance	4.2%			2.4%	2.9%		1.1%		1.4%			2.8%	0.5%		1.8%			-0.7%			-2.2%	0.7%						
<b>Sub-sector Average</b>		1.2%	-3.4%	-1.3%	-2.7%	1.6%	0.8%	-2.9%	-2.7%	-1.6%	-3.4%	-0.6%	-2.6%	-0.8%	-2.3%	-1.9%	-2.7%	-4.1%	-0.6%	-1.9%	-0.9%	-2.3%	-0.4%	0.9%	-0.8%				
<b>Sub-sector Median</b>		1.5%	-3.0%	-1.1%	-2.9%	1.9%	2.2%	-2.4%	-2.0%	-1.2%	-3.5%	3.6%	-1.8%	-0.6%	-1.8%	-2.2%	-3.7%	-4.6%	-1.3%	-2.2%	-0.7%	-1.6%	-0.4%	1.0%	-1.1%				

Source: FactSet, Thomson Reuters, Goldman Sachs Global Investment Research

**Exhibit 37: Number of numeric and binary E&S metrics across our framework by sub-sector**



Source: Goldman Sachs Global Investment Research

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**Exhibit 38: Numeric metrics included in our framework by sub-sector**

		Water Withdrawal	Water Recycling	Energy Usage	Renewable Energy	Total Waste	Waste Recycling	Hazardous Waste	Airlines GHG Emissions	Total GHG Emission	Scope 1 Emissions	VOC Emissions	SOx and Nox Emissions	Employee Turnover	Training Hours	Employee Compensation	Women Managers	Women Employees	Minority Employees	Lost Time Injury Rate	Total Injury Rate	Fatalities Rate	
		Resource Intensity				Waste and Emissions						Employee Engagement & Diversity					Worker Safety						
Basic Resources	Oil Producers																						
	Oil Refiners																						
	Mining & Materials																						
	Steel																						
	Paper & Packaging																						
	Chemicals																						
Utilities	Utilities																						
Manufacturing	Aerospace & Defense																						
	Automobiles																						
	Consumer Durables																						
	Consumer Staples																						
	Multi-industry Manufacturing																						
Industrial Services	Airlines																						
	Shipping																						
	Infrastructure																						
	Engineering & Construction																						
	Oil Services																						
	Telecom Services																						
	Multi-industry Services																						
IP & Design	Semiconductors																						
	Hardware																						
	Brands																						
	Med Tech																						
	Pharmaceuticals																						
Real Estate Centric	Retailing																						
	Hospitality																						
	Gaming																						
	Real Estate																						
Business Services	Business Services																						
	IT Services																						
	Software & Internet																						
	Media																						
Financials	Asset Management																						
	Banks																						
	Insurance																						

Source: Goldman Sachs Global Investment Research

**Exhibit 39: Policy metrics included in our framework for each sub-sector**

		Emissions Targets	NOx and SOx Reduction	VOC Reduction	Renewable Energy Policy	Energy Efficiency Targets	Water Efficiency Targets	Waste Reduction Policy	Toxic Chemicals Reduction	Product Impact Policy	Biodiversity Impact Policy	Diversity & Opp. Targets	Training & Dev. Policy	Flexible Working Policy	Employees H&S Systems	Env. Supply Chain Policy	H&S Supply Chain Policy	Child Labor Policy	Forced Labor Policy	Customer H&S Policy	Data Privacy Policy	Product & Service Quality	H&S Products / Services	Business Ethics Tools	Bribery & Corruption Policy	
		Environmental Targets and Policies								Human Capital			Supply Chain		Customer Policies			Operations								
Basic Resources	Oil Producers																									
	Oil Refiners																									
	Mining & Materials																									
	Steel																									
	Paper & Packaging																									
Utilities	Chemicals																									
	Utilities																									
Manufacturing	Aerospace & Defense																									
	Automobiles																									
	Consumer Durables																									
	Consumer Staples																									
Industrial Services	Multi-industry Manufacturing																									
	Airlines																									
	Shipping																									
	Infrastructure																									
	Engineering & Construction																									
	Oil Services																									
	Telecom Services																									
IP & Design	Multi-industry Services																									
	Semiconductors																									
	Hardware																									
	Brands																									
Real Estate Centric	Med Tech																									
	Pharmaceuticals																									
	Retailing																									
	Hospitality																									
Business Services	Gaming																									
	Real Estate																									
	Business Services																									
	IT Services																									
Financials	Software & Internet																									
	Media																									
	Asset Management																									
	Banks																									
	Insurance																									

Source: Goldman Sachs Global Investment Research

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**Exhibit 40: Top and bottom 10-scoring companies in our E&S scoring framework, grouped by GICS 1 sector, MSCI ACWI (more available upon request)**

Consumer Discretionary		Consumer Staples		Energy		Financials		Health Care	
Company name	Rank	Company name	Rank	Company name	Rank	Company name	Rank	Company name	Rank
<b>Top 10</b>		<b>Top 10*</b>		<b>Top 10*</b>		<b>Top 10*</b>		<b>Top 10*</b>	
Industria de Diseno Textil SA	100%	Natura Cosmeticos SA	100%	Tesoro Corp	100%	Nedbank Group Ltd	100%	Cigna Corp	100%
Coway Co Ltd	100%	CVS Health Corp	100%	Core Laboratories NV	100%	Discovery Ltd	100%	Johnson & Johnson	100%
Taylor Wimpey PLC	100%	L'Oreal SA	99%	PTT PCL	98%	Caixabank SA	99%	Aetna Inc	98%
Whitbread PLC	100%	Amorepacific Corp	97%	Royal Dutch Shell PLC	98%	Wells Fargo & Co	99%	Humana Inc	98%
Prosiebensat 1 Media SE	100%	Estee Lauder Companies Inc	97%	Enbridge Inc	97%	First Financial Holding Co Ltd	99%	Amgen Inc	96%
Lotte Shopping Co Ltd	99%	Pernod Ricard SA	97%	Bharat Petroleum Corporation Ltd	96%	Insurance Australia Group Ltd	99%	Roche Holding AG	96%
Bayerische Motoren Werke AG	99%	SPAR Group Ltd	94%	Baker Hughes Inc	93%	Bank of America Corp	97%	UCB SA	96%
Walt Disney Co	98%	Etablissements Franz Colruyt NV	94%	BP PLC	93%	Commonwealth Bank of Australia	97%	Medtronic PLC	95%
Pandora A/S	98%	Amorepacific Group	93%	Ecopetrol SA	93%	Royal Bank of Canada	97%	Sysmex Corp	95%
Barratt Developments PLC	98%	LG Household & Healthcare Ltd	93%	Exxon Mobil Corp	93%	Mapfre SA	97%	Ramsay Health Care Ltd	94%
		Unilever NV	93%	Total SA	93%	Intact Financial Corp	97%	Galenica AG	94%
<b>Bottom 10*</b>		<b>Bottom 10*</b>		<b>Bottom 10</b>		<b>Bottom 10*</b>		<b>Bottom 10*</b>	
Michelin SCA	0%	Carlsberg A/S	0%	Origin Energy Ltd	0%	Mitsubishi UFJ Lease & Finance	0%	Terumo Corp	0%
Foschini Group Ltd	0%	Kirin Holdings Co Ltd	0%	Idemitsu Kosan Co Ltd	0%	Yes Bank Ltd	0%	Bayer AG	0%
Mohawk Industries Inc	0%	Casino Guichard Perrachon SA	1%	PKN Orlen	0%	Admiral Group PLC	0%	Shanghai Pharmaceuticals Hldg	1%
Sega Sammy Holdings Inc	0%	Companhia Brasileira de Distribuicao	1%	Snam SpA	0%	HSBC Holdings PLC	1%	Mettler-Toledo International Inc	1%
Genting Singapore PLC	0%	Metro AG	1%	Petrobras	1%	Orix Corp	1%	Merck & Co Inc	1%
McDonald's Japan Ltd	0%	Calbee Inc	1%	Sasol Ltd	1%	China Taiping Insurance Holdings	1%	Teva Pharmaceutical Industries	2%
Grupo Televisa SAB	0%	Toyo Suisan Kaisha Ltd	1%	Tenaris SA	3%	BM&F Bovespa	1%	Gething AB	4%
Surya Citra Media Tbk PT	0%	Anheuser Busch Inbev SA NV	3%	Santos Ltd	5%	Bank Danamon Indonesia Tbk PT	1%	Dr.Reddy's Laboratories Ltd	4%
Hikari Tsushin Inc	0%	Nissin Foods Holdings Co Ltd	3%	Adaro Energy Tbk PT	6%	Doha Bank QSC	1%	Healthscope Ltd	5%
Valeo SA	1%	Koninklijke Ahold Delhaize NV	4%	Saipem SpA	7%	Grupo Financiero Banorte	1%	Weigao Group	5%
Dongfeng Motor Group Co Ltd	1%	Pick N Pay Stores Ltd	4%			Haci Omer Sabanci Holding AS	1%	Mitsubishi Tanabe Pharma Corp	5%
Mahindra and Mahindra Ltd	1%					Chailease Holding Co Ltd	1%		
<b>Industrials</b>		<b>Information Tech</b>		<b>Materials</b>		<b>Real Estate</b>		<b>Telecom</b>	
Company name	Rank	Company name	Rank	Company name	Rank	Company name	Rank	Company name	Rank
<b>Top 10*</b>		<b>Top 10</b>		<b>Top 10</b>		<b>Top 10*</b>		<b>Top 10*</b>	
ManpowerGroup Inc	100%	Nokia Corp	100%	Novozymes A/S	100%	City Developments Ltd	100%	Sprint Corp	100%
Aeroports de Paris SA	100%	Amadeus It Group SA	100%	Ancor Ltd	100%	Intu Properties PLC	99%	Advanced Info Service PCL	97%
Komatsu Ltd	100%	Intel Corp	100%	Hitachi Metals Ltd	100%	Mitsubishi Estate Co Ltd	98%	StarHub Ltd	97%
China Everbright International Ltd	100%	Lenovo Group Ltd	99%	Johnson Matthey PLC	99%	Mirvac Group	98%	Tim Participacoes SA	97%
Royal Mail PLC	100%	Gemalto NV	99%	Siam Cement PCL	99%	Daiwa House Industry Co Ltd	97%	LG Uplus Corp	94%
Siemens AG	98%	Workday Inc	99%	Givaudan SA	98%	Hang Lung Properties Ltd	95%	China Mobile Ltd	94%
Atlas Copco AB	98%	Hitachi High-Technologies Corp	98%	Imerys SA	97%	Lend Lease Group	95%	KDDI Corp	93%
Hyundai Heavy Industries Co Ltd	97%	Auto Trader Group PLC	97%	Akzo Nobel NV	97%	Stockland Corporation Ltd	95%	Mobil'nye Telesistemy PAO	92%
SK Holdings Co Ltd	97%	ASML Holding NV	97%	UltraTech Cement Ltd	96%	Hulic Co Ltd	95%	KT Corp	89%
Brenntag AG	96%	Quanta Computer Inc	96%	Koninklijke DSM NV	96%	Nomura Real Estate Holdings Inc	93%	Nippon Telegraph and Telephone	89%
Northrop Grumman Corp	96%					Deutsche Wohnen AG	93%	Swisscom AG	89%
Zhuzhou CRRC Times Electric Co Ltd	96%								
<b>Bottom 10*</b>		<b>Bottom 10*</b>		<b>Bottom 10*</b>		<b>Bottom 10*</b>		<b>Bottom 10*</b>	
AviChina Industry & Technology Co	0%	Hamamatsu Photonics KK	0%	Hindalco Industries Ltd	0%	Multiplan SA	0%	CenturyLink Inc	0%
Embraer SA	0%	Cap Gemini SA	0%	Vedanta Ltd	0%	New World Development Co Ltd	1%	Millicom International Cellular SA	1%
Leonardo Finmeccanica SpA	0%	NTT Data Corp	0%	Suzano Papel e Celulose SA	0%	China Evergrande Group	1%	DiGi.Com Bhd	2%
China Southern Airlines Co Ltd	0%	GCL-Poly Energy Holdings Ltd	0%	JSW Steel Ltd	0%	China Resources Land Ltd	1%	Axiata Group Bhd	3%
Bureau Veritas SA	0%	Citrix Systems Inc	0%	Severstal' PAO	0%	Westfield Corp	1%	Vodafone Qatar QSC	3%
Intertek Group PLC	0%	Symantec Corp	0%	Potash Corporation of Saskatchewan I	1%	Central Pattana PCL	3%	Telenor ASA	6%
Koninklijke Boskalis Westminster NV	0%	Hitachi Ltd	1%	Formosa Plastics Corp	2%	First Capital Realty Inc	3%	Asia Pacific Telecom Co Ltd	7%
Atlantia SpA	0%	Keyence Corp	1%	Titan Cement Company SA	3%	Host Hotels & Resorts Inc	5%	Bharti Infratel Ltd	7%
OHL Mexico SAB de CV	0%	Casestek Holdings Ltd	1%	Daicel Corp	3%			AT&T Inc	9%
NWS Holdings Ltd	0%	Konica Minolta Inc	1%	Cementos Argos SA	4%			Telkom SA SOC Ltd	10%
G4S PLC	0%			K&S AG	4%			Turk Telekomunikasyon AS	10%
Union Pacific Corp	0%			Linde AG	4%			PLDT Inc	10%
<b>Utilities</b>									
Company name	Rank	Company name	Rank	Company name	Rank	Company name	Rank		
<b>Top 10*</b>		<b>Top 10 cont.*</b>		<b>Bottom 10*</b>		<b>Bottom 10 cont.*</b>			
GAIL (India) Ltd	100%	Tokyo Gas Co Ltd	96%	Tauron Polska Energia SA	0%	Enel Generacion Chile SA	4%	*Most sectors show more or less than 10 companies based on ties in scoring	
Osaka Gas Co Ltd	99%	Companhia Energetica de Minas Gera	95%	PGE Polska Grupa Energetyczna SA	1%	Fortum Oyj	5%		
Perusahaan Gas Negara (Persero) Tb	98%	Exelon Corp	95%	Enea SA	2%	Xcel Energy Inc	5%		
Hong Kong and China Gas Co Ltd	98%	Centrica PLC	94%	Electricity Generating PCL	2%	AES Corp	7%		
Enagas SA	97%	SSE PLC	92%	AGL Energy Ltd	2%	AES Gener SA	7%		
		Consolidated Edison Inc	92%	Enel SpA	4%	Colbun SA	7%		

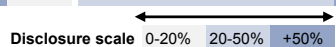
Source: Goldman Sachs Global Investment Research



**Exhibit 41: Numeric metric disclosure across all metrics, MSCI ACWI**

Avg disclosure across MSCI ACWI by sub-sector (2012-2015)

		Water Withdrawal	Water Recycling	Energy Usage	Renewable Energy	Total Waste	Waste Recycling	Hazardous Waste	Airlines GHG Emissions	Total GHG Emissions	Scope 1 Emissions	VOC Emissions	SOX and NOx Emissions	Employee Turnover	Training Hours	Employee Compensation	Women Managers	Women Employees	Minority Employees	Lost Time Injury Rate	Total Injury Rate	Fatalities Rate
		Resource Intensity				Waste and Emissions				Employee Engagement & Diversity						Worker Safety						
Basic Resources	Oil Producers	62%	35%	66%	6%	48%	31%	44%		67%	56%	39%	58%	45%	34%	56%	41%	62%	10%	53%	62%	64%
	Oil Refiners	55%	25%	62%	4%	65%	46%	49%		59%	48%	32%	55%	37%	38%	64%	26%	59%	8%	45%	53%	39%
	Mining & Materials	71%	53%	75%	27%	59%	40%	48%		72%	66%	13%	59%	56%	49%	64%	50%	69%	2%	70%	57%	74%
	Steel	74%	45%	79%	10%	62%	54%	33%		69%	48%	27%	67%	49%	50%	76%	37%	57%	4%	58%	37%	50%
	Paper & Packaging	61%	19%	68%	31%	67%	57%	41%		66%	55%	11%	48%	39%	41%	59%	38%	59%	9%	54%	55%	53%
Chemicals	71%	23%	76%	17%	71%	60%	45%		76%	57%	43%	56%	50%	35%	61%	42%	62%	2%	64%	50%	42%	
Utilities	Utilities	57%	13%	55%	13%	49%	41%	39%		68%	51%	9%	60%	44%	40%	59%	42%	60%	19%	45%	47%	45%
Manufacturing	Aerospace & Defense	59%	6%	62%	20%	59%	42%	41%		73%	59%	14%	11%	32%	36%	58%	41%	58%	11%	47%	44%	31%
	Automobiles	60%	20%	66%	10%	60%	50%	27%		68%	49%	36%	40%	31%	32%	59%	28%	49%	1%	38%	35%	26%
	Consumer Durables	56%	14%	56%	12%	57%	55%	25%		59%	48%	18%	19%	27%	18%	47%	23%	46%	2%	32%	40%	22%
	Consumer Staples	53%	15%	61%	18%	54%	50%	26%		59%	45%	5%	24%	29%	30%	60%	35%	49%	6%	39%	32%	35%
Multi-industry Manufacturing	51%	15%	56%	9%	51%	47%	26%		59%	45%	21%	20%	26%	26%	58%	32%	45%	4%	39%	29%	27%	
Industrial Services	Airlines	56%	13%	70%	1%	51%	32%	32%	76%	76%	63%	14%	42%	48%	42%	90%	45%	73%	18%	32%	31%	31%
	Shipping	34%	2%	53%	6%	42%	29%	11%	2%	51%	43%	3%	16%	33%	25%	73%	26%	47%	8%	33%	24%	29%
	Infrastructure	59%	26%	60%	17%	59%	38%	43%		51%	51%	7%	16%	55%	58%	64%	52%	66%	2%	32%	48%	50%
	Engineering & Construction	35%	5%	54%	9%	39%	33%	16%		56%	48%	5%	13%	37%	40%	59%	30%	58%	3%	38%	44%	29%
	Oil Services	24%	8%	29%	0%	22%	16%	21%		47%	39%	10%	13%	30%	22%	20%	34%	34%	7%	52%	50%	44%
	Telecom Services	40%	4%	59%	19%	40%	32%	22%		57%	52%	2%	4%	48%	43%	72%	50%	68%	9%	25%	33%	34%
Multi-industry Services	32%	18%	32%	4%	25%	14%	3%		54%	52%	12%	14%	35%	24%	58%	29%	42%	7%	35%	20%	42%	
IP & Design	Semiconductors	44%	30%	55%	9%	55%	48%	46%		63%	61%	22%	29%	43%	44%	69%	34%	48%	9%	44%	45%	23%
	Hardware	53%	26%	62%	9%	63%	50%	30%		67%	52%	14%	32%	21%	38%	51%	28%	48%	4%	28%	28%	15%
	Brands	44%	7%	46%	10%	34%	29%	22%		51%	40%	5%	9%	27%	23%	57%	40%	60%	8%	24%	21%	15%
	Med Tech	30%	2%	40%	6%	29%	28%	23%		43%	33%	7%	8%	15%	10%	42%	25%	32%	2%	26%	27%	14%
Pharmaceuticals	44%	11%	50%	13%	48%	39%	28%		47%	35%	22%	31%	25%	10%	57%	32%	43%	3%	33%	27%	24%	
Real Estate Centric	Retailing	22%	5%	35%	7%	27%	25%	6%		42%	36%	1%	2%	25%	23%	55%	32%	40%	7%	12%	14%	11%
	Hospitality	39%	3%	57%	5%	24%	21%	12%		62%	54%	0%	13%	28%	19%	56%	31%	47%	4%	13%	12%	15%
	Gaming	36%	5%	32%	1%	27%	22%	4%		40%	34%	0%	0%	14%	15%	72%	33%	49%	1%	21%	11%	10%
Real Estate	32%	8%	40%	6%	28%	27%	9%		42%	30%	1%	2%	25%	25%	51%	23%	35%	2%	10%	15%	19%	
Business Services	Business Services	25%	0%	41%	22%	25%	16%	10%		46%	37%	0%	0%	29%	27%	49%	46%	49%	8%	34%	23%	16%
	IT Services	38%	16%	47%	20%	33%	20%	16%		54%	46%	7%	16%	29%	32%	44%	37%	46%	1%	17%	18%	12%
	Software & Internet	9%	0%	18%	7%	10%	8%	5%		25%	21%	2%	2%	9%	9%	56%	16%	21%	5%	5%	4%	5%
	Media	24%	2%	32%	8%	25%	18%	7%		41%	38%	1%	1%	22%	20%	60%	33%	44%	5%	12%	14%	10%
Financials	Asset Management	15%	6%	24%	6%	23%	19%	5%		44%	42%	2%	0%	31%	16%	85%	38%	48%	2%	7%	6%	4%
	Banks	32%	4%	46%	11%	30%	21%	9%		44%	39%	2%	5%	41%	43%	78%	40%	58%	9%	14%	19%	16%
	Insurance	33%	4%	48%	11%	34%	31%	7%		58%	46%	1%	0%	33%	23%	61%	39%	53%	6%	8%	13%	5%
<b>Sub-sector Average</b>		<b>44%</b>	<b>14%</b>	<b>52%</b>	<b>11%</b>	<b>43%</b>	<b>34%</b>	<b>24%</b>	<b>39%</b>	<b>56%</b>	<b>46%</b>	<b>12%</b>	<b>22%</b>	<b>33%</b>	<b>30%</b>	<b>60%</b>	<b>35%</b>	<b>51%</b>	<b>6%</b>	<b>33%</b>	<b>31%</b>	<b>28%</b>
<b>Sub-sector Median</b>		<b>44%</b>	<b>11%</b>	<b>55%</b>	<b>9%</b>	<b>42%</b>	<b>32%</b>	<b>23%</b>	<b>39%</b>	<b>57%</b>	<b>48%</b>	<b>7%</b>	<b>16%</b>	<b>31%</b>	<b>30%</b>	<b>59%</b>	<b>34%</b>	<b>49%</b>	<b>5%</b>	<b>33%</b>	<b>29%</b>	<b>26%</b>



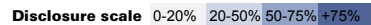
Source: Thomson Reuters, Bloomberg, Goldman Sachs Global Investment Research

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**Exhibit 42: Policy metric disclosure across all metrics, MSCI ACWI**

Percentages represent avg. 2012-2015 binary disclosure (companies with a “Yes”) for each sub-sector

		Emissions Targets	NOx and SOx Reduction	VOC Reduction	Renewable Energy Policy	Energy Efficiency Targets	Water Efficiency Targets	Waste Reduction Policy	Toxic Chemicals Reduction	Product Impact Policy	Biodiversity Impact Policy	Diversity & Opp. Targets	Training & Dev. Policy	Flexible Working Policy	Employees H&S Systems	H&S Supply Chain Policy	Child Labor Policy	Forced Labor Policy	Customer H&S Policy	Data Privacy Policy	Product & Service Quality	H&S Products / Services	Business Ethics Tools	Bribery & Corruption Policy	
Basic Resources	Oil Producers	45%	40%	27%	42%	30%	18%	56%	12%	45%	68%	14%	81%	38%	66%	39%	28%	13%	15%	25%	52%	37%	0%	79%	78%
	Oil Refiners	36%	66%	40%	46%	28%	9%	69%	30%	80%	48%	4%	81%	30%	75%	31%	20%	11%	14%	29%	62%	57%	3%	58%	72%
	Mining & Materials	51%	47%	5%	70%	38%	31%	77%	16%	43%	76%	24%	78%	22%	73%	42%	19%	24%	20%	28%	44%	51%	0%	71%	78%
	Steel	63%	49%	33%	67%	39%	12%	82%	38%	56%	51%	13%	88%	31%	57%	60%	31%	21%	17%	27%	44%	68%	4%	68%	71%
	Paper & Packaging	61%	36%	20%	78%	52%	49%	81%	15%	76%	56%	3%	79%	13%	68%	57%	20%	28%	27%	44%	64%	59%	1%	80%	88%
	Chemicals	67%	36%	34%	59%	46%	31%	73%	38%	81%	37%	20%	86%	39%	70%	61%	32%	23%	20%	70%	51%	70%	19%	69%	77%
Utilities	Utilities	48%	52%	3%	50%	28%	14%	67%	14%	64%	65%	12%	84%	30%	56%	44%	29%	11%	13%	39%	55%	34%	0%	61%	63%
Manufacturing	Aerospace & Defense	58%	10%	19%	52%	46%	33%	69%	37%	79%	15%	21%	82%	42%	71%	57%	27%	10%	13%	45%	51%	65%	0%	77%	84%
	Automobiles	61%	28%	53%	59%	43%	40%	75%	42%	83%	33%	21%	83%	34%	56%	65%	22%	13%	13%	66%	61%	52%	35%	51%	53%
	Consumer Durables	42%	6%	23%	45%	24%	25%	60%	37%	65%	31%	14%	77%	36%	44%	60%	32%	31%	34%	52%	56%	37%	2%	64%	65%
	Consumer Staples	54%	11%	7%	66%	40%	45%	67%	15%	42%	34%	13%	79%	35%	50%	58%	29%	31%	31%	63%	47%	48%	55%	53%	66%
	Multi-industry Manufacturing	47%	14%	23%	52%	39%	22%	63%	33%	78%	18%	16%	79%	31%	52%	49%	27%	16%	18%	43%	44%	53%	14%	57%	65%
Industrial Services	Airlines	68%	35%	19%	45%	42%	6%	83%	18%	60%	5%	17%	87%	26%	58%	46%	26%	6%	8%	77%	79%	33%	0%	56%	62%
	Shipping	34%	26%	2%	45%	20%	5%	45%	6%	48%	24%	11%	68%	22%	34%	30%	16%	4%	5%	30%	44%	35%	2%	48%	49%
	Infrastructure	47%	9%	2%	60%	33%	26%	61%	3%	34%	51%	11%	70%	27%	49%	31%	10%	10%	7%	45%	28%	57%	2%	43%	58%
	Engineering & Construction	44%	11%	5%	45%	24%	15%	69%	19%	76%	59%	18%	89%	31%	69%	42%	28%	12%	13%	29%	51%	57%	0%	56%	55%
	Oil Services	25%	14%	13%	22%	14%	6%	33%	5%	34%	25%	5%	64%	24%	51%	12%	17%	4%	8%	26%	45%	29%	0%	73%	74%
	Telecom Services	40%	2%	1%	58%	36%	7%	65%	9%	65%	18%	17%	85%	42%	37%	52%	33%	14%	17%	48%	75%	34%	1%	69%	71%
Multi-industry Services	41%	15%	9%	21%	13%	14%	43%	7%	58%	18%	18%	50%	11%	23%	40%	13%	6%	9%	43%	37%	23%	5%	45%	54%	
IP & Design	Semiconductors	40%	9%	32%	40%	35%	34%	67%	45%	58%	13%	14%	71%	21%	60%	61%	31%	26%	32%	19%	62%	71%	3%	62%	68%
	Hardware	51%	13%	22%	51%	38%	23%	73%	69%	72%	22%	9%	79%	37%	64%	72%	41%	27%	29%	34%	64%	64%	1%	61%	63%
	Brands	38%	7%	16%	52%	27%	20%	64%	34%	39%	15%	14%	80%	31%	24%	57%	45%	31%	38%	38%	54%	20%	7%	53%	60%
	Med Tech	22%	3%	7%	37%	20%	13%	54%	21%	25%	8%	11%	72%	23%	29%	33%	16%	6%	9%	42%	61%	41%	13%	70%	73%
	Pharmaceuticals	38%	12%	14%	47%	29%	24%	51%	23%	19%	20%	13%	65%	33%	40%	35%	24%	13%	10%	52%	52%	16%	19%	61%	58%
Real Estate Centric	Retailing	32%	2%	1%	45%	29%	12%	63%	14%	42%	14%	13%	76%	21%	12%	40%	26%	21%	20%	51%	53%	11%	32%	51%	55%
	Hospitality	57%	13%	4%	57%	42%	54%	78%	21%	38%	31%	16%	80%	37%	29%	52%	22%	32%	25%	56%	60%	25%	38%	66%	69%
	Gaming	5%	0%	0%	23%	11%	9%	53%	3%	15%	9%	7%	76%	16%	17%	21%	2%	1%	2%	20%	53%	15%	0%	40%	46%
	Real Estate	28%	1%	4%	40%	23%	18%	40%	5%	39%	19%	10%	53%	22%	24%	26%	11%	2%	3%	16%	42%	10%	0%	45%	50%
Business Services	Business Services	28%	0%	8%	51%	13%	7%	54%	9%	37%	7%	9%	70%	38%	32%	37%	12%	10%	12%	13%	66%	30%	0%	72%	79%
	IT Services	32%	4%	5%	37%	29%	23%	54%	11%	46%	11%	12%	73%	45%	27%	40%	23%	15%	17%	10%	77%	39%	2%	71%	75%
	Software & Internet	15%	0%	4%	28%	9%	1%	34%	9%	28%	0%	5%	45%	22%	6%	16%	7%	3%	7%	14%	60%	10%	0%	59%	54%
	Media	27%	0%	2%	39%	17%	11%	50%	0%	31%	8%	11%	70%	32%	15%	34%	17%	9%	7%	18%	62%	13%	2%	69%	72%
Financials	Asset Management	22%	0%	0%	27%	12%	8%	44%	1%	17%	4%	7%	83%	29%	7%	22%	3%	2%	3%	0%	72%	0%	0%	65%	62%
	Banks	27%	1%	1%	33%	21%	8%	46%	1%	49%	2%	13%	77%	30%	10%	34%	7%	5%	4%	3%	64%	16%	0%	47%	55%
	Insurance	37%	0%	1%	35%	24%	7%	43%	0%	42%	3%	16%	76%	44%	5%	34%	6%	4%	3%	4%	74%	13%	0%	60%	67%
<b>Sub-sector Average</b>		<b>41%</b>	<b>16%</b>	<b>13%</b>	<b>46%</b>	<b>29%</b>	<b>19%</b>	<b>60%</b>	<b>19%</b>	<b>50%</b>	<b>26%</b>	<b>13%</b>	<b>75%</b>	<b>30%</b>	<b>42%</b>	<b>43%</b>	<b>21%</b>	<b>14%</b>	<b>15%</b>	<b>35%</b>	<b>56%</b>	<b>37%</b>	<b>7%</b>	<b>61%</b>	<b>65%</b>
<b>Sub-sector Median</b>		<b>40%</b>	<b>11%</b>	<b>7%</b>	<b>45%</b>	<b>29%</b>	<b>15%</b>	<b>63%</b>	<b>15%</b>	<b>46%</b>	<b>19%</b>	<b>13%</b>	<b>78%</b>	<b>31%</b>	<b>44%</b>	<b>40%</b>	<b>22%</b>	<b>12%</b>	<b>13%</b>	<b>34%</b>	<b>55%</b>	<b>35%</b>	<b>2%</b>	<b>61%</b>	<b>65%</b>



Source: Thomson Reuters, Goldman Sachs Global Investment Research

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**Exhibit 43: Numeric metric definitions**

<b>Resource Intensity</b>	
<b>Water Withdrawal</b>	Total water withdrawal in cubic meters per unit of revenue (USD)
<b>Water Recycling</b>	Amount of water recycled or reused as a percentage of water withdrawal
<b>Energy Usage</b>	Total direct and indirect energy consumption in gigajoules
<b>Renewable Energy Use</b>	Amount of energy consumed that was generated by a renewable energy source as a percentage of total energy usage. This includes REC (Renewable Energy Certificates) amounts company purchased
<b>Waste / Emissions</b>	
<b>Total Waste Intensity</b>	Total amount of waste produced in tonnes per unit of revenue (USD).
<b>Waste Recycling Ratio</b>	Total recycled and reused waste produced in tonnes divided by total waste produced in tonnes
<b>Hazardous Waste Intensity</b>	Total amount of hazardous waste produced in tonnes per unit of revenue (USD)
<b>Airlines Total GHG Emissions</b>	GHG intensity for airlines per million revenue passenger miles flown
<b>CO2 Equivalents Emission Total</b>	Total CO2 and CO2 equivalents emission in tonnes per unit of revenue (USD)
<b>CO2 Equivalent Emissions Scope 1</b>	Direct CO2 and CO2 equivalents emission in tonnes per unit of revenue (USD)
<b>VOC Emissions</b>	Total amount of volatile organic compounds (VOC) emissions in tonnes per unit of revenue (USD)
<b>Total SOx and Nox Emissions</b>	Total amount of NOx and SOx emissions emitted in tonnes per unit of revenue (USD)
<b>Human Capital</b>	
<b>Turnover of Employees</b>	Annual percentage of employee turnover
<b>Average Training Hours</b>	Average hours of training per year per employee
<b>Average Employee Compensation</b>	Total labor expenses divided by number of employees
<b>Women Managers</b>	Percentage of women managers
<b>Women Employees</b>	Percentage of women employees
<b>Minority Employees</b>	Percentage of minority employees
<b>Worker Safety</b>	
<b>Lost Time Injury Rates</b>	Total number of injuries that caused the employees and contractors to lose at least a working day per one million hours worked
<b>Total Injury Rate</b>	Total number of injuries and fatalities including no-lost-time injuries per one million hours worked
<b>Fatalities Rate</b>	Total employee and contractor fatalities per 1000 employees

Source: Thomson Reuters, Bloomberg

**Exhibit 44: Policy metric definitions**

<b>Environmental Targets and Policies</b>	
<b>Targets Emissions</b>	Has the company set targets or objectives to be achieved on emission reduction?
<b>NOx and SOx Emissions Reduction</b>	Does the company report on initiatives to reduce, reuse, recycle, substitute, or phase out SOx (sulfur oxides) or NOx (nitrogen oxides) emissions?
<b>VOC Emissions Reduction</b>	Does the company report on initiatives to reduce, substitute, or phase out volatile organic compounds (VOC)?
<b>Renewable Energy Policy</b>	Does the company make use of renewable energy?
<b>Targets Energy Efficiency</b>	Has the company set targets or objectives to be achieved on energy efficiency?
<b>Targets Water Efficiency</b>	Has the company set targets or objectives to be achieved on water efficiency?
<b>Waste Reduction Policy</b>	Does the company report on initiatives to recycle, reduce, reuse, substitute, treat or phase out total waste?
<b>Toxic Chemicals Reduction</b>	Does the company report on initiatives to reduce, reuse, substitute or phase out toxic chemicals or substances?
<b>Product Impact Minimization</b>	Does the company report on take-back procedures and recycling programmes to reduce the potential risks of products entering the environment or does the company report about product features or services that will promote responsible and environmentally preferable use?
<b>Biodiversity Impact Reduction</b>	Does the company report on its impact on biodiversity or on activities to reduce its impact on the native ecosystems and species, as well as the biodiversity of protected and sensitive areas?
<b>Human Capital Policies</b>	
<b>Targets Diversity and Opportunity</b>	Has the company set targets or objectives to be achieved on diversity and equal opportunity?
<b>Training and Development Policy</b>	Does the company have a policy to support the skills training or career development of its employees?
<b>Flexible Working Hours</b>	Does the company claim to provide flexible working hours or working hours that promote a work-life balance?
<b>Employees H&amp;S OHSAS 18001</b>	Does the company have health and safety management systems in place like the OHSAS 18001 (Occupational Health & Safety Management System)?
<b>Supply Chain Policy</b>	
<b>Policy Environmental Supply Chain</b>	Does the company have a policy to include its supply chain in the company's efforts to lessen its overall environmental impact?
<b>Policy Supply Chain Health &amp; Safety</b>	Does the company have a policy to improve employee health & safety in its supply chain?
<b>Policy Child Labor</b>	Does the company have a policy to avoid the use of child labor?
<b>Policy Forced Labor</b>	Does the company have a policy to avoid the use of forced labor?
<b>Customer Policies</b>	
<b>Policy Customer Health &amp; Safety</b>	Does the company have a policy to protect customer health & safety?
<b>Policy Data Privacy</b>	Does the company have a policy to protect customer and general public privacy and integrity?
<b>Product and Service Quality - ISO 9001</b>	Does the company claim to have an ISO 9000 certification or any industry specific certification (QS-9000-automotive, TL 9000-telecommunications, AS9100-aerospace, ISO/TS 16949-automotive, etc.)?
<b>Health / Safety Products and Services</b>	Does the company reportedly develop or market products and services that foster specific health and safety benefits for the consumers (healthy, organic or nutritional food, safe cars, etc.)?
<b>Operational Policies</b>	
<b>Business Ethics Improvement Tools</b>	Does the company have appropriate communication tools (whistleblower, ombudsman, suggestion box, hotline, newsletter, website, etc.) to improve general business ethics?
<b>Policy Bribery and Corruption</b>	Does the company describe in the code of conduct that it strives to avoid bribery and corruption at all its operations?
<b>Bonus metrics</b>	
<b>Audited CSR Reporting</b>	Does the company have an external auditor of its CSR/H&S/Sustainability report?
<b>ESG Linked Compensation</b>	Does the company have any non-financial/ESG related oriented compensation policy? Includes things like customer satisfaction / health and safety, environmental and social factors

Source: Thomson Reuters

# Disclosure Appendix

## Reg AC

We, Derek R. Bingham, Evan Tylenda, CFA, Hugo Scott-Gall, Jaakko Kooroshy, Gabriel Wilson-Otto, CFA and Christopher Vilburn, CFA, hereby certify that all of the views expressed in this report accurately reflect our personal views about the subject company or companies and its or their securities. We also certify that no part of our compensation was, is or will be, directly or indirectly, related to the specific recommendations or views expressed in this report.

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Goldman Sachs Investment Research global Equity coverage universe

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	Buy	Hold	Sell	Buy	Hold	Sell
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