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Bloomberg Terminal

ESG

Environmental and Social Scores

Methodology and Field Information

Bloomberg

Contents

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Introduction

In recent years, environmental, social and governance (ESG) issues have increasingly influenced and impacted business decisions. Businesses need to manage the effects of climate change and shifting societal norms, among other key issues, making transparency, disclosure, and measurability of ESG issues paramount. Advances in corporate reporting on ESG issues should help investors and other stakeholders better understand how businesses can and will respond to this dynamic landscape – but only if the information can be evaluated easily and transparently.

In this document, Bloomberg outlines the methodology for proprietary Environmental and Social Scores (ES Scores). This initiative, through which we will release scores for all sectors, is grounded in Bloomberg's decade-long effort to champion useful, comparable, and consistent sustainability disclosures and their use in financial decision-making.

The increased availability of accurate and timely information helps to drive growth in all markets. Sustainable finance and investing will likewise benefit from standardized, transparent company data. As a steward of this information, Bloomberg plays a key role in facilitating corporate ESG reporting. Bloomberg also serves as a central point of contact in maintaining a platform to support the analytics, including developing measures for ensuring the integrity and comparability of the data.

Data-driven scores are a powerful vehicle for making ESG data accessible and intelligible to investors and other interested parties. By introducing transparent, data-driven ESG Scores, Bloomberg is highlighting the value of sustainability information and promoting improved disclosure from a wide range of businesses around the world.

In addition to ES Scores, Board Composition Scores have been released as a first step toward comprehensive governance (G) scores. This effort will integrate seamlessly with Bloomberg's data, analytics and research solutions, Bloomberg news and media platforms, and the company's support for market infrastructure to improve both the supply and demand side of sustainable finance.

In developing proprietary scores, Bloomberg's work has been informed by investors who flagged the critical challenge of deploying company-reported ESG data in the investment decision-making process. Bloomberg ESG scores summarize corporate sustainability data and simplify the integration of ESG analysis into business and investment analysis.

Bloomberg's ES Scores have been developed by a group of specialized cross-business contributors in research and consultation with external experts and through active engagement with clients to learn from their observations and experiences.

Key Contributors to Bloomberg's Environmental and Social (ES) Scores	
Sustainable Finance Solutions	Global Data
Quantitative Research	Index Research
Bloomberg Intelligence	BloombergNEF
Bloomberg Law and Government	

Approach to Bloomberg Environmental and Social Scores

Bloomberg's rationale for developing ES Scores is driven by the growing demand for ESG information, the emergence of global sustainability frameworks, and the specific nature of reported ESG data and performance scores. Sustainability frameworks, such as those of the Sustainability Accounting Standards Board (SASB) and the Task Force on Climate-related Financial Disclosures (TCFD),[1] are emblematic of the shift toward viewing business relevance and financial materiality as the key considerations for selecting industry-specific ESG themes and data for use in decision-making and reporting.

Bloomberg's goal in developing the ES Scores is to evaluate and present ESG data so that it can be: 1) integrated into analysis more easily, 2) made more comparable within specific industries, 3) used to identify leaders and laggards, and 4) deployed to complement or validate research-driven performance scores. The key challenge that Bloomberg's users face in this effort is the overwhelming number of company- and third-party-reported ESG fields, including both the sources and the data types. Looking at energy and climate change alone, for example, Bloomberg offers almost 200 different company-reported data fields. Users of sustainability information are also faced with non-comparable disclosures and substantial disclosure gaps within and across firms.

Finally, while frameworks and reporting recommendations are useful, interpreting and deriving insights from this guidance requires substantial research, informed judgment, and analytical resources. Research-driven scores have thus far stood as the main summary indicators of performance for investment managers, asset owners, corporate leaders, and others. However, such scores often diverge for reasons that are not necessarily clear to users of this information.

In order to address these challenges, Bloomberg has brought a range of resources and assets together in developing the ES Scores. The goals and processes include the following:

- Improving ESG data in existing data fields with more precision, coverage, and history and through new industry-specific datasets
- Providing an organizing structure and taxonomy to clarify hierarchies and ES issues and to translate from reporting frameworks
- Offering guidance on materiality to highlight and rank key issues by industry
- Leveraging fundamental research to provide context and practical insights
- Using quantitative analysis to incorporate standing guidelines and principles and to aggregate data for analytical use.

Bloomberg's ESG Scores bring together various data sources offered on the Bloomberg Terminal® service, principally company-reported sustainability information and financial fundamentals data, with proprietary research assets and analytics, such as Bloomberg Intelligence ESG research and the Bloomberg Industry Classification Standard (BICS).

Bloomberg's ES Scores product is supported by evidence, research, consultation, and analytical rigor. Bloomberg Intelligence's dedicated ESG team conducts top-down materiality assessments by industry; these are detailed in this document. A broader, bottom-up consultation assesses existing and new data to determine their suitability for describing and quantifying material sustainability issues. Rigorous quantitative techniques are then applied to ensure that meaningful signals are reflected in the Scores.[2]

Bloomberg's Process for ES Scores Product Development

External Frameworks	External frameworks used to prioritize sustainability performance drivers and to group issues
Key Issue Research	Research on key issues through both proprietary analysis and external consultation to specify the data fields best aligned with priority themes
ESG Data Analysis	Analysis of existing ESG data, especially disclosure and suitability, to describe key sustainability issues and activity metrics for normalization
New ESG Fields	Development and collection of new ESG data fields to fill gaps in industry-specific sustainability information
Taxonomy/Grouping	Grouping of sustainability themes and corresponding data fields
Issue Priorities	Research, evaluation, and assignment of issue priorities by industry
Data Attributes	Assignment of field qualifiers for importance of disclosure, polarity (e.g., positive = better or worse), fit, consistency, and quality of data fields
Quantitative Data Survey	Quantitative evaluation of quality and coverage of ESG data
Field Score	Deployment of field-level, industry-specific scoring methodologies
Aggregation and Weighting	Incorporation of weighting schema to aggregate from Bloomberg Field Scores up to Sub-Issues, Issues, and Pillars
Review and Feedback	Internal score review and feedback to calibrate and refine industry scoring models

Issue Priorities and Score Template Inputs

Bloomberg's ES Scores draw on major sustainability reporting frameworks used by public companies around the world to highlight the most material sustainability issues. Bloomberg identifies disclosed corporate information that aligns with these issues, particularly with regard to corporate strategy, operations, and priorities, transforming this information into a useful tool for investment decision-making and other types of competitive analysis. By embracing materiality as the central concept, Bloomberg's approach focuses on the drivers of operating performance and the impacts of sustainable operating strategies on the environment and society.

While developing inputs for the ES Scores methodology, Bloomberg Intelligence conducted an industry-specific assessment of sustainability issues, prioritizing and ranking the sets of Issues using proprietary and external sources. The analysis of what is relevant and material for each industry provides context for the categorization of Sub-Issues, as well as data field selection, normalization, and transformation decisions. Details on Bloomberg's sector specific analysis and Issue prioritization can be found in our ES Scores Methodology Industry Guide (Industry Guide) on the terminal at BESG <GO> under Bloomberg ESG Scores. The Industry Guide will also provide details on business activities for companies within each sub-industry, explanations, and examples for how each ES Issue scored impacts the sub-industry, company specific examples of ES risks and opportunities, as well as detailed metrics and fields used to score each sub-industry.

This analysis and the inputs of BI industry analysts also drives which level of BICS is selected to determine peer groups and scoring templates. For example, the Chemicals industries are scored in the following BICS Level 4 groups: Basic & Diversified Chemicals, Specialty Chemicals, and Agricultural Chemicals to differentiate the sustainability risks and opportunities of the sub-industries from one another.

ESG Integration and Guiding Frameworks

As an example of this consultative process, Bloomberg referred to the following ESG reporting frameworks as well as numerous industry associations during the development of its ES Scores. For a complete list of frameworks and industry associations by sector please refer to the Industry Guide.

Name of Reporting Framework	Type
Sustainability Accounting Standards Board	NGO
Task Force on Climate-related Financial Disclosures (TCFD)	NGO
GRI	NGO
CDP	NGO

The Industry Guide will also provide details on business activities for companies within each sub-industry, as well as explanations and examples for how each ES Issue scored impacts the sub-industry, transparency, and disclosure.

Disclosure as a Dimension of Performance

Corporate-reported sustainability information is at the heart of the ES Scores and Bloomberg has invested in improving the datasets that support scoring, with work undertaken to fill gaps and align the scoring process with emerging sustainability frameworks. Given the dual objectives of evaluating performance and incentivizing disclosure, the ES Scores approach focuses on improving the transparency, sophistication, and comparability of sustainability-related information provided by individual companies.

The ESG data used for ES Scores consists of voluntary disclosures captured only from direct (primary) sources in order to ensure accuracy and consistency with original corporate information. These sources include sustainability reports, annual filings, proxy statements, corporate governance reports, supplemental releases, and company websites. Certain fields are derived by Bloomberg using company-reported underlying data to increase comparability and standardization such as the Employee Fatality Rate (F1442), which uses Employee Fatalities (ES053) and Total

Employees (ES043) as inputs into the calculation. Other fields used in the ES Scores are obtained from fundamental equities datasets, such as data on revenues.

Bloomberg runs sophisticated, multi-layer quality control systems to ensure that the data conforms to the highest standards. In addition, only comparable and comprehensive data are included in the product. Environmental and social data feeding the ES Scores are updated annually and are aligned with the fiscal year end. It is important to note that sustainability reporting may have lags and reporting dates can depend on the company, industry, and region.

New company-reported data fields, including both quantitative and qualitative fields, have been added for the development of ES Scores, often to fill gaps in industry-specific sustainability information. The field IDs for the newly added data begin with SA followed by a 3-digit identifier (e.g., SA001). Some of these newly added fields are universal for all industries and provide a more complete look at a company's sustainability performance. These fields have been backfilled for all available history. Other fields are specific to an industry and have data starting from fiscal year 2015. These fields can be accessed via ESGD <GO> or by creating custom templates on FA ESG <GO> to visualize on the Bloomberg Terminal® service.

When the recommendations of sustainability reporting frameworks reach beyond current corporate disclosure patterns, more widely reported proxy fields have been introduced to enhance existing and new data. In some cases, Bloomberg has modified the key performance indicators recommended by reporting guidelines in order to enhance standardization across regions, jurisdictions, and industries. Future versions of these scores may integrate third-party information.

Fields that would ideally be scored but are not being disclosed at the present time are added to a watch list. All fields used by each sector's scoring framework and those to be tracked for future inclusion in the ES Scores appear on the Bloomberg Terminal® service in the ESG Materiality Framework, which can be found on BESG <GO> under Bloomberg ESG Scores and by running DOCS 2093704 <GO>.

While the dataset includes both quantitative and binary qualitative "policy" fields, the former are weighted more heavily to emphasize the value of the quantitative disclosures. The quantitative methodology has integrated a disclosure factor to incentivize companies to report on material sustainability issues and to install transparency as a dimension of corporate performance.

Corporate sustainability disclosures vary widely by industry and dimension. Environmental data fields benefit from better quantitative disclosures. Social fields often have limited disclosure, although this is likely to evolve over time. Any Issue being scored that relies heavily on qualitative data fields will enjoy higher average disclosure marks because these fields indicate the existence of corporate disclosures. However, the fields do not assess the quality of those disclosures. In cases where scoring relies heavily on qualitative fields, Issue Scores may reflect a lower evaluation of company performance, not necessarily due to poor marks on disclosed information, but rather as a result of lack of disclosure, which is an important distinction.

The Appendices in the Industry Guides feature notes on transparency in the scoring models, including the estimation methods used and provision of scoring templates by industry.

Issue Priority and the Current State of Disclosure

Since the frameworks used to develop Bloomberg's ES Scores do not assign weightings to the Issues that they identify as important, Bloomberg has developed a three-part assessment to determine Issue priorities:

- **Probability:** Each Issue was assigned a ranking of high, medium, or low to represent the probability of the Issue (cost/opportunity) materializing.
- **Magnitude:** Each Issue was assigned a ranking of high, medium, or low to represent the magnitude or potential severity of the financial cost or opportunity.
- **Timing:** Each Issue was assigned a classification of short-term, medium-term, or long-term. Short–term suggests that the financial impact can occur within 2 years. Medium-term indicates that the financial impact is more likely to occur in 2-5 years, and long-term in 5–10 years. The financial impact of medium- and long-term Issues may be more dependent on physical and regulatory changes.

For example, environmental fines, which would be captured under Ecological Impact, have a medium probability and a high magnitude. In 2019, Vale received USD 125.5 million in fines for non-compliance with environmental laws and regulations as a result of their tailing dam rupture at the Córrego do Feijão Mine.[3] As this event resulted in fatalities and injuries of employees it would also be captured in fatality and safety incident fields under Occupational Health & Safety Management. In Metals & Mining and Steel industries, Energy Management also has a high magnitude and as the costs and use of energy are continuous, the probability is also high. This distinction in probability is one reason why the Energy Management Issue has a priority of 1 for all sub-industries, while Ecological Impact has a lower priority.

Activity metrics, detailed for each industry in Appendix 1 of the Industry Guides, are also selected to normalize data fields where appropriate. Where an optimal activity was not available (e.g., industry production metrics), the methodology uses more universal metrics such as sales revenue or number of employees.

Summary tables in each Industry Guide describe key Issues and show transparency into Issue Priorities. Details are also provided on the availability of associated quantitative data, as well as additional transparency to explain the assignment of Issue Priorities for each industry. Summary information about disclosure is also included in each Issue section. Note that field groups with only qualitative data receive lower weightings (as discussed in this Methodology). Field lists associated with each industry, including the activity metrics, are included in the Industry Guide Appendices, as are box plots that illustrate disclosure dispersion.

Score Framework and Issue Priorities

Score Framework and Structure

Bloomberg's ES Scores are structured into the following hierarchy: Pillars, Issues, Sub-Issues and Fields. Each Issue contains at least one Sub-Issue, which aggregates associated ES data fields.

Pillars, Issues and Sub-Issues

To see a list of the specific Issues that are scored for each sector and industry please refer to the Industry Guides.

ENVIRONMENTAL

Air Quality
Air Emissions
Air Emissions Policies

Climate Exposure
Transition Risk

Ecological Impact
Ecosystem Protection
Environmental Fines
Environmental Incidents

Energy Management
Energy Consumption
Renewable Energy Use

Environmental Supply Chain Management
Sustainable Sourcing

GHG Emissions Management
GHG Emissions
GHG Emissions Policies
GHG Regulation
GHG Target

Sustainable Product
Green Product

Waste Management
Hazardous Waste Generation
Hazardous Waste Recycling
Waste Generation
Waste Recycling

Water Management
Wastewater
Water Use
Water Use Policies

SOCIAL

Community Rights & Relations
Community & Human Rights
Community Relations

Ethics & Compliance
Business Ethics
Competitive Behavior
Legal & Regulatory Management

Labor & Employment Practices
Labor Actions
Organized Labor
Training

Occupational Health & Safety Management
Fatalities
Health & Safety Fines
Health & Safety Policies
Safety Incidents

Operational Risk Management
Operational Incidents
Operational Preparedness

Product Quality Management
Product Quality & Safety

Social Supply Chain Management
Supplier Social Compliance

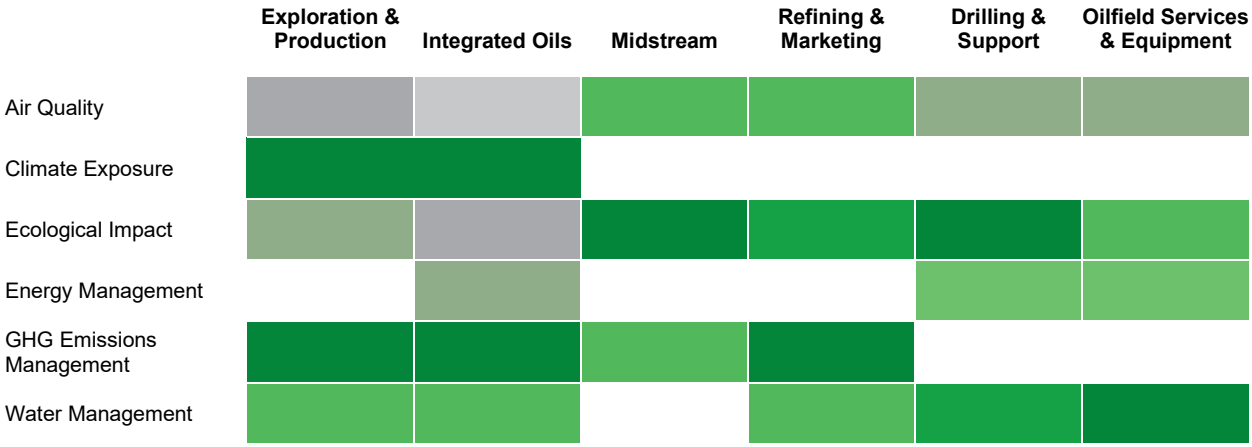
Issue Priorities

Bloomberg Intelligence has prioritized and ranked industry-specific risks and opportunities associated with material sustainability themes and embodied in Bloomberg Issues. These rankings are provided by industry, with rationales for each Issue's priority level, which reflects the following inputs:

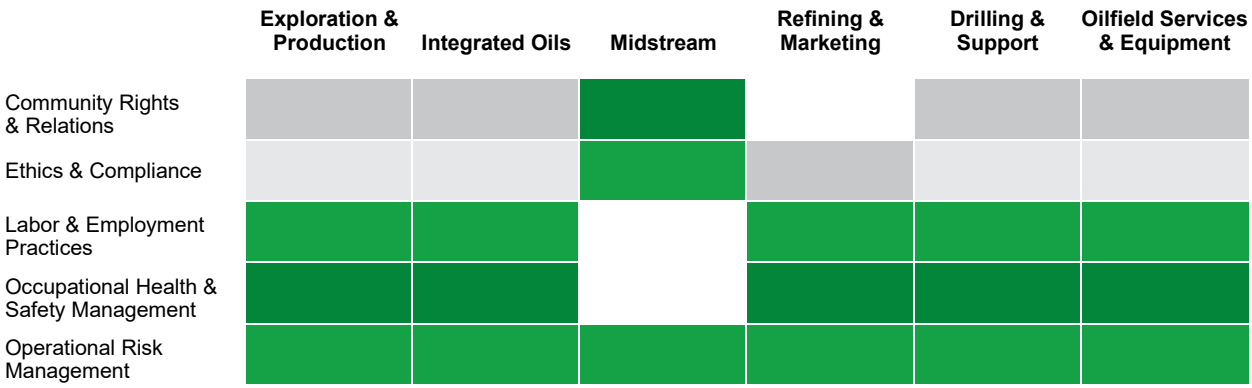
- Internal discussions and interviews with Bloomberg Intelligence industry analysts.
- Analysis and news by Bloomberg Intelligence and Bloomberg Law and Government that highlight financial impacts related to key environmental and social risks in the industry (e.g., litigation, fines, reputational/brand risk, employee turnover).
- Bloomberg proprietary research on data related to industry activities and operations and their impacts.
- Academic/scientific studies that point to industry exposure to the highlighted factors.
- Regulatory actions in relevant jurisdictions to limit, track, and control negative impacts associated with industry activities and operations.

The level of BICS that is used for each scored group of companies can vary depending on the alignment of the business activities and their relative sustainability exposures. Industry and sub-industry specific priority rankings can be found in the Industry Guides; as an illustrative example, the Oil & Gas priority rankings are provided in the tables below.

Heat Map of Issue Priorities for the Oil & Gas Industry – Environmental Issues and Priorities



Heat Map of Issue Priorities for the Oil & Gas Industry – Social Issues and Priorities



Dark green represents the highest priorities and gray represents the lowest priorities.

Scoring Methodology

Bloomberg's approach to scoring ESG performance is characterized by a bottom-up, model-driven method driven primarily by self-reported, publicly available information that results in a fully transparent, parametric, rules-based scoring framework. It features:

- Qualitative input from research analysts and industry experts for identifying appropriate fields and metrics, as well as their relevance to specific issues and industries.
- Statistical and data science techniques to assist in identifying peer groups.
- Factor analysis to aid in identifying unique environmental and social issues.
- Incentives for improved transparency and disclosure, so that the best scores reflect both good sustainability performance and good disclosure.

The following sections detail technical protocols for generating E and S scores. Attributes assigned to data fields and the approach to field transformations are described below. Field-level scoring approaches are illustrated in the next section, followed by weighting and aggregation decisions. Additional details, such as scoring templates by industry and data fields with no disclosure to be monitored in future versions, are available in the Appendices.

Principles of Quantitative ES Scores Methodology

One key goal of Bloomberg's quantitative approach to scoring E and S company performance is to build an extendible "toolkit" to score corporate ES data based on the type of data. In analyzing the E and S data to develop these scores, certain principles and benefits of the approach adopted for Bloomberg's proprietary ES Scores have emerged:

- Guidelines or principles, when available, must be translated into quantitative thresholds.
- Normalizing data is necessary to compare metrics.
- Model choice helps address size bias.
- Factor analysis aids in identifying individual issues from multiple related fields.
- Data science techniques assist in identifying peer groups.
- Scoring from fields up to higher levels requires an aggregation approach that rewards consistent performance and penalizes uneven performance.
- Disclosure must be a score dimension due to limited reporting and wider efforts to improve transparency and standardization of reporting.

Parametric Approach to Scoring

Quantitative analysis of corporate ESG performance in the current marketplace for sustainable finance and investing data and analytics relies heavily on quantitative and qualitative analyses by researchers and on a wide range of information sources, including company reporting, NGO monitoring and data, government information, and various news sources. These information sources and the resulting summary analytics (i.e., scores) have varying levels of frequency and transparency. As a result, the drivers of ESG Scores can be difficult to discern. Much like other investment research, the results may capture subjective, potentially invisible weightings and heuristics that lead to biases not easily understood by a user.

Bloomberg's approach to these ES Scores, as well as our aforementioned G scores, aims to deliver a transparent, parametric, rules-based scoring framework driven by self-reported company information. The use of a parametric approach that closely approximates the empirical distribution is intended to address the challenges that arise in commonly used approaches to ranking sustainability performance by percentiles:

- Parameters can be estimated in a robust manner to limit sensitivity to outliers.
- Parameters can be fixed or slowly adjusted over time, for instance, using data from the three previous years to estimate parameters for a given year's scoring (as in the current methodology).
- Companies can be scored as soon as data in the current scoring year is available without having to wait for all companies to report because parameters are estimated from historical data.

Parametric Analysis	Percentiles Bucketing
Scores companies as they report	Requires most/all data to be reported for a peer group to rank
Preserves trends with slower-moving parameters	Suffers from small peer groups or low-disclosure industries
Better Identifies performance differences in peer groups	Can obscure trends in data over time
Is more robust to outliers	Can be sensitive to outliers

The table above highlights the differences between using parametric approaches to scoring vs. bucketing into percentiles.

While percentiles bucketing is a simple approach to sorting companies (or companies within a defined peer group) by the value of a field and to assigning scores that correspond to some quantile (i.e., percentiles), the drawback is that data is not always available at the same time. As a result, quantiles cannot be computed until all data for a reporting year is available.

Role of Peer Groups: A key consideration in the estimation process is establishing suitable peer groups from which data can be sampled to determine appropriate parameters. The general approach to peer groups is to compare data and evaluate for statistical differences. If statistical tests suggest that the differences in the data across industries are not significant, then pooling the data across 2 or more industries is considered as a means of increasing the number of data points available for determining scoring parameters. Often, however, there is inadequate data to determine that the datasets are statistically different. In that case, the ES Scores approach defers to the opinion of fundamental industry and ESG analysts' judgement.

In cases where established external benchmarks or widespread consensus of ideal standards exist, Field Scores can be computed for all companies against one universal standard, i.e., an estimate of a single set of parameters for all companies. As a benefit, each company's score would be directly comparable, in an absolute way, to every other company's score, regardless of sectors and industries. A second advantage of universal scoring is that pooling all available data to estimate one universal relationship across all companies lends greater statistical confidence to the parameter estimates.

In Bloomberg's ES Scores methodology, fatalities provide an example of such "absolute scoring." In recognizing the universal value of a human life, we score fatalities for all companies, regardless of industry or size, to a common standard. All binary fields are also absolute, by their nature, because they represent only two states — a company's disclosure of a given policy or the lack of one.

However, the evaluation of several fields is meaningful only within smaller peer groups. Scope 1 Greenhouse Gas Carbon Dioxide Emissions is one such field. The expected quantity of a company's emissions is a function of the nature and the amount of the activity that produces them. Emissions produced by upstream exploration and production activities are not comparable to those produced by downstream distribution activities because the nature of those activities is different.

As a result, scores evaluated relative to smaller, industry-specific peer groups are "relative," i.e., ranked only within that peer group (industry, in the case above). In other words, a company that scores a 7 on a particular field is better than a peer that scores a 5, but no direct way is available to compare it to a company from a different peer group that also scores a 7 in that field. The peer group used for each field is listed in the appendices of the Industry Guides.

Finally, it is worth noting that scoring based on empirical distributions, regardless of parametric- or percentile-driven approach, can lead to high scores that may not correspond to an ESG goal. For example, if all participants in a given industry have high pollution levels, the best relative performer will still receive a high score.

Where quantitative guidance is available, the current version of the ES Scores attempts to integrate meaningful thresholds, such as a 1% of revenues materiality test. However, given the rarity of such benchmarks, Bloomberg's current approach corresponds most closely to "best in class" approaches to integrating ESG into portfolio construction. Future iterations will be able to include thresholds such as those set by the European Union's Taxonomy for climate change mitigation and adaptation.

Field Attributes

Data fields are aggregated into Sub-Issues, Issues, and Pillars. The input of BI analysts determines the relative importance of various scores in the aggregation process. Furthermore, key attributes are captured for use as score inputs. Industry specific model inputs are provided in Appendix 2 in the Industry Guide.

BI Issue Priority is determined by Bloomberg Intelligence research analysts to reflect the varying degrees of relevance and importance of various environmental or social Issues to a particular industry. This value determines the weight assigned to each Issue in aggregated E and S scores.

Field Type indicates whether field values are quantitative or binary. Quantitative field types have values that are numerical. Binary field types have either "Yes" or "No" values and represent Bloomberg's E and S policy fields — indicating whether or not a company has disclosed information on a particular topic. As such, binary fields do not assess the quality of disclosure.

Fit/Quality values are also determined by BI analysts. These values can be High, Medium, or Low and are used to weight individual Field Scores into aggregated Sub-Issue Scores.

- High (H): The metric is a good measure of what is called for in various ESG reporting frameworks, and the data is comparable.
- Medium (M): The metric is either a good measure (as above), or the data is comparable, but not both.
- Low (L): The metric is not a good measure and the data is not comparable, or the field is a qualitative Policy field.4

Polarity (positive or negative) is used to reflect activities that decrease or increase E, S, financial, operational, or reputational risks. In other words, positive polarity is assigned where a higher field value means lower E or S risk, or higher E or S opportunity and, therefore, a higher score.

Disclosure Factor (DF) determinations are made to guide the treatment of missing data within the scoring framework. Each field is assigned a DF rating of A, B, or C.

- DF Rating A: Fields used in the scoring model that are called for by a multitude of ESG disclosure frameworks and investors receive a DF of A.
- DF Rating B: Fields used in the scoring model that are a proxy for fields called for by a multitude of ESG disclosure frameworks or are called for by only a limited number of ESG disclosure frameworks and investors receive a DF of B.
- DF Rating C: Fields used in scoring that are not disclosed by companies, but instead are derived based on non-ESG information (for example, value of carbon in publicly disclosed oil & gas reserves) receive a DF of C.

Activity metrics are used to normalize sustainability performance relative to operating or financial metrics. For instance, GHG emissions scale most closely with the economics of production, whereas spending on worker training scales most closely with number of employees. In cases where precise scaling quantities are not available, more universal metrics, such as Revenues are used.

Activity metrics that quantify the amount of activity may differ depending on industry fundamentals and the availability of widely reported data. For many industries, revenues are used as the common activity metric due to the wide range of products and the lack of product-specific financial data.

Fields that are already normalized — such as per-unit measures, percentages, and standardized calculations like Total Recordable Incident Rate (TRIR) — are not assigned corresponding activity metrics.

Fields that are categorical or binary, including policy fields, are not assigned corresponding activity metrics.

Similarly, fields that are scored regardless of company size or activity levels — such as number of sites in environmentally sensitive areas — do not have activity metrics.

Taxonomy Inclusion Start Year (four-digit year) is used to determine the first fiscal year for which a field will be included in the scoring framework. If the value is blank the field will be included in the scoring framework from fiscal year 2015. For instance, the Glasgow Financial Alliance for Net Zero (GFANZ) was launched in 2021. Thus, field SA904, which indicates whether a company is a GFANZ signatory, has 2021 as its Taxonomy Inclusion Start Year.

Taxonomy Inclusion End Year (four-digit year) indicates that a field is no longer considered material or relevant to the scoring framework and will be excluded from the scoring framework after the specified fiscal year. In other words, the specified fiscal year will be the last year for which such a field will affect scoring. If this value is blank, it means that the field remains material and will be included in the scoring framework.

Field Transformation

Before scoring, it is sometimes useful to apply a field transformation to calculate “clean” values for a desired metric or to reduce the impact of missing data by using a proxy calculation. The goal of field transformations is to maximize the suitability of the data specified for evaluation in the scoring model to the sustainability Issue being scored.

As an example, field SA023: Percentage of Hazardous Waste Recycled is transformed to represent the amount of hazardous waste not recycled as a percent of total waste. Thus, the polarity for scoring changes from positive to negative because of this field transformation. This transformation is designed to ensure that a company with no hazardous waste is not penalized.

The transformation formula is ((100-SA023)/100)*SA016. This can be interpreted as:

- SA023 is the percentage of hazardous waste recycled
- SA016 is the percentage of all waste that is hazardous.
- 100-SA023: is the percentage of hazardous waste not recycled.
- (100-SA023)/100*SA016 is the hazardous waste not recycled as a percentage of total waste.

If, for example, 60% of hazardous waste was not recycled and 50% of all waste was hazardous, then 30% of all waste was unrecycled hazardous waste.

Most field transformations will apply to all sectors; however, there are some formulas that are used to increase the amount of available data that are not needed for industries with adequate reporting.

Field Scoring

This process uses various field-level scoring methods that depend on Field Type, Unit, Polarity, and presence of an Activity Metric. Resulting Field Scores will range from 0 to 10.

A parametric approach is used to score fields. For all field types, parameters are estimated empirically for peer groups, with the exception of binary fields, categorical scoring fields, and Fatalities. Scores are computed for the current year’s data using parameters that have been estimated from data that corresponds to the three years prior to the current year.

Depending on the type of field and the nature and availability of accompanying data, parameters are estimated, and fields are scored using different statistical techniques. Each method is described with some illustrative examples in this section. Appendix 1 in the Industry Guide contains a table that lists the specific technique and peer group used for each field.

Finally, in a few cases, some fields are not relevant to all companies in a sector and, so, may not have values disclosed. An example would be SA141 - Nuclear Waste. In such cases, a set of conditions is used to determine if the field is relevant to a company. If it is found to be relevant, the field is scored normally following the process detailed above. However, if the field is determined to not be relevant—in this example, because a company does not have any nuclear operations—then the field is awarded a pre-determined score and full disclosure factor points.

Intensity Fields

A large number of field types represent various quantities (e.g., number of spills, amount of emissions) that need to be scaled by an activity metric before they can be scored. Regression techniques are employed here. Parameters that describe the relationship between the activity metric and field values for particular peer groups are estimated. The assumed distribution in each case depends on the type of field value. Thus, separate processes are required to estimate regular Intensity fields and Count Intensity fields.

Regular Intensity Fields

ESG analysts commonly use intensity ratios to determine a company's environmental or social impact as it pertains to a particular ESG field, especially those related to the economics of production such as greenhouse gas emissions. The intensity ratio is calculated as Field Value/Activity Level. Accordingly, Intensity fields are paired with activity metrics to allow the scoring of the field value relative to a company's activity level. This is done to address the extent to which the size of a company or the extent of its physical processes that drive emissions may influence the associated sustainability exposures. An example would be to analyze and rank companies' GHG Scope 1 emissions relative to production. Bloomberg's empirical analysis suggests that this can be enhanced in two ways:

- The relationships are closer to linear on logarithmic scales, rather than nominal.
- Plotting Activity versus Field Value shows diminishing marginal intensity for some fields and industries. In other words, in certain industries, as company activity grows, the incremental amount of impact (emissions produced, for example) per unit of activity falls.

One consequence of this is that nominal ratios can be biased against smaller companies for activities that display a pattern of diminishing marginal intensity. The methodology proposed here is flexible and appears to better fit the economics of production and scale patterns that are evident in the data.

In further detail, the current estimation process for scoring these fields is as follows. A company's intensity ratio is typically expressed as:

$$Intensity = \frac{Impact}{Activity}$$

This can be rewritten as:

$$Impact = Intensity \times Activity^{\gamma}$$

We introduce the exponent γ to capture possible nonlinearity between production activities and their impacts. If γ=1, then the relationship is linear; γ<1 would imply marginal impact that decreases with increasing levels of activity.

Rewriting this equation in logarithmic terms and introducing an innovation term ε, we have:

$$log\ Impact = logIntensity + \gamma logActivity + \varepsilon$$

This allows us to utilize regression techniques to estimate the necessary parameters. The intensity term is the intercept, the elasticity term (γ) is the slope co-efficient and the innovation (ε) is the company-specific term. ε is assumed to be normally distributed, with a mean of zero and a standard deviation of σ.

We first estimate the intensity, elasticity, and standard deviation of the innovations (σ) for all companies in a given peer group (e.g., industry) for a specific year. We then average the estimated intensities, elasticities, and standard deviation of the innovations over the three most recent years. This provides us with a model to predict a company's Impact given its level of Activity. The Field Score for Company i is calculated in terms of the normalized innovation as:

$$Score_i = 10 \times \left[1 - CDF\left(\frac{\varepsilon_i}{\sigma}\right)\right]$$

That is, ε_i is the difference between a company's actual and expected Impact (in log terms) and the Score is a function of how much lower or higher the company's Impact is relative to what is predicted by the properties estimated from its peer group. CDF is the cumulative distribution function for the standard normal distribution (with a mean of 0 and a standard deviation of 1). According to this model, a company that has a lower impact than what is predicted from the properties of its peer group (i.e., a negative innovation) will receive a high score and vice versa.

Finally, it is worth pointing out that in all cases where the elasticity (γ) is 1 — which is the traditional assumption — the ranking on intensities (Impact/Activity) is equivalent to the ranking on innovations (ε).

Figure 1 shows an example for scoring Scope 1 Greenhouse Gas (GHG) emissions. The dashed line represents the line that can be drawn from the estimated intercept ($logIntensity$) and slope co-efficient (γ). Any data points on this line are considered "average" and would receive a score of 5. Points above the line, colored in shades of red, indicate companies that have higher–than-average GHG emissions than their peers, adjusted for their size (i.e., the activity metric — Revenue in this case), and receive lower scores. Similarly, points below the line, colored in shades of green, represent companies that have performed better relative to their peers and thus receive higher scores.

As an example, in 2018, Chemicals company LG Chem (051910 KS) reported 5.42 million metric tons of Scope 1 GHG emissions and its Revenue was approximately $25.6 billion. This point lies below the estimated line and resulted in a score of 7.8. Air Liquide (AI FP) reported similar Revenue, approximately $24.8 billion, but had 15.39 million metric tons of GHG emissions which resulted in a score of 2.9.

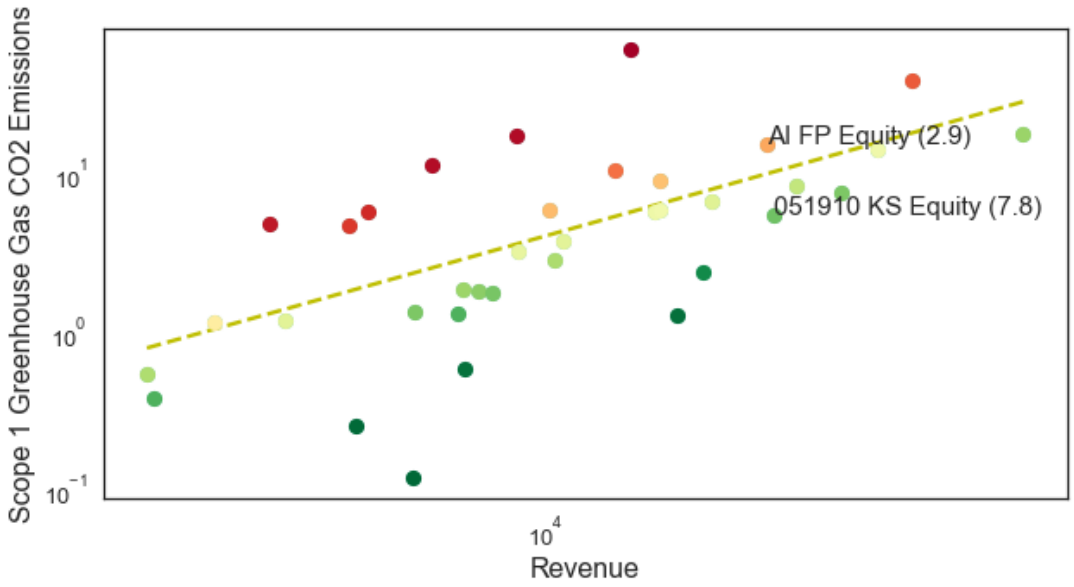


Figure 1: Example of Scoring Scope 1 GHG CO2 Emissions (F0947)

Count Intensity Fields — Negative Polarity

Many count fields such as those that enumerate incidents and spills, have negative polarity. We estimate the parameters for these fields using regression techniques as well, but rather than implementing the (log-log) linear regression illustrated previously, we assume a negative binomial distribution for count fields. This captures the nature of the values (being integers) and shows that many of the values are zero.

Figure 2 shows the scoring curve for the Number of Significant Spills. The dashed line represents the combination of the Number of Significant Spills and Revenue that would be considered "average" and receive a score of 5. Values that are reported as exactly 0 are shown as stars. In 2018, Chemicals company Rongsheng Petro Chemical Company (002493 CH) had Revenue of approximately $13.8 billion. It reported no Significant Spills and received a score of 10 as a result. On the other hand, Eastman Chemical Company (EMN US) had approximately $10.2 billion in Revenue but reported 54 Significant Spills. This is significantly higher than the Number of Spills considered average for that level of Revenue and, accordingly, resulted in a score of 0.8.

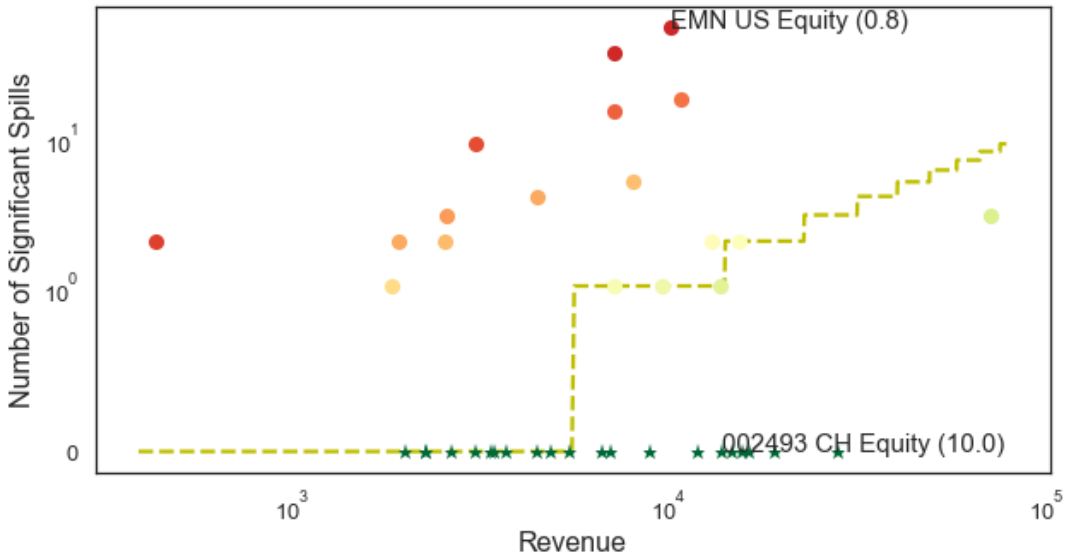


Figure 2: 2018 Scoring Curve for Number of Significant Spills (SA215)

Zero-inflated Intensity Fields

Some fields have values that can be assumed to be continuously distributed, but with a positive mass at zero; an example would be the volume or number of hydrocarbon spills.5 In such cases, we use a Tweedie distribution (specifically, a compound Poisson–gamma distribution) to account for the nature of the distribution. Field values equal to 0 are assigned a score of 10, while other field values are scored based on the activity metric and the relevant parameters estimated for the field.

Figure 3 shows that Oil & Gas company Medco Energy (MEDC) reported 356m^3 of hydrocarbons spilled in 2018. It had $5.8 billion of TIC and received a score of 0.38. Kosmos Energy (KOS) reported 0m^3 of hydrocarbons spilled and received a score of 10. Its TIC of $5.1 billion was not a relevant input into the score calculation since all companies reporting 0m^3 of spills are awarded a perfect score.

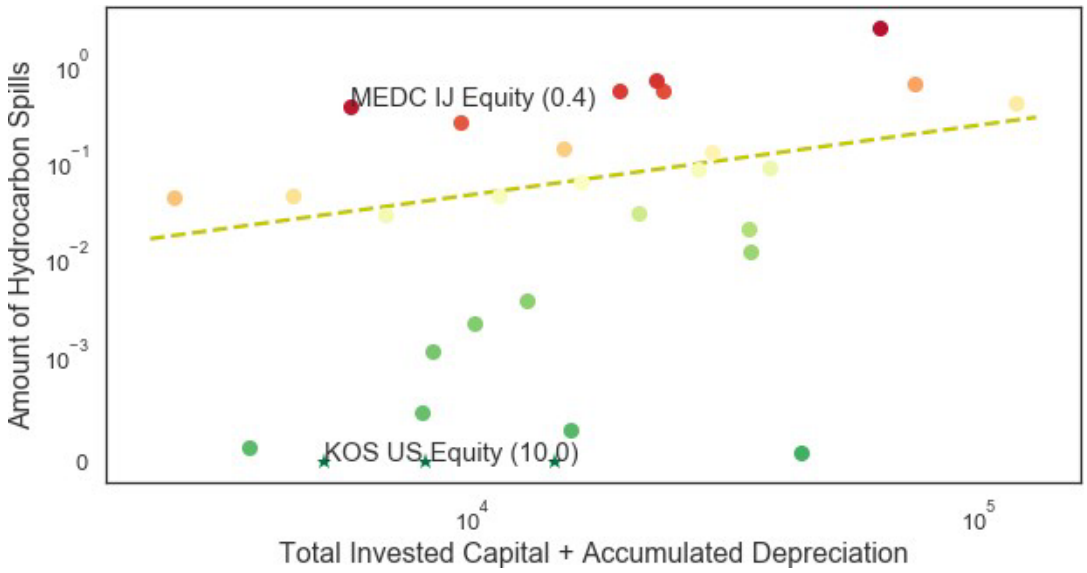


Figure 3: Example of Scoring Hydrocarbon Spills (ES249)

Percentage Fields

Percentage fields lie on a range from 0 to 100, which means values of either 0 or 100 should get full credit (i.e., a score of 10), depending on the polarity. For such fields, the cumulative distribution function (CDF) for beta distribution is used to define a scoring curve. Beta distributions are a family of continuous probability distributions defined on an interval from 0 to 1 parametrized by two positive-shape parameters, denoted by α and β. In the following example, the score appears on the Y-axis, while the field value appears on the X-axis.

Figure 4 provides an example; Chemicals company, Nitto Denko Corporation (6988 JP) — which reported 20.6% Hazardous Waste out of Total Waste discarded in 2018 — received a score of 6.0; PPG Industries (PPG US) reported 49.7% in the same year and received a score of 1.8.

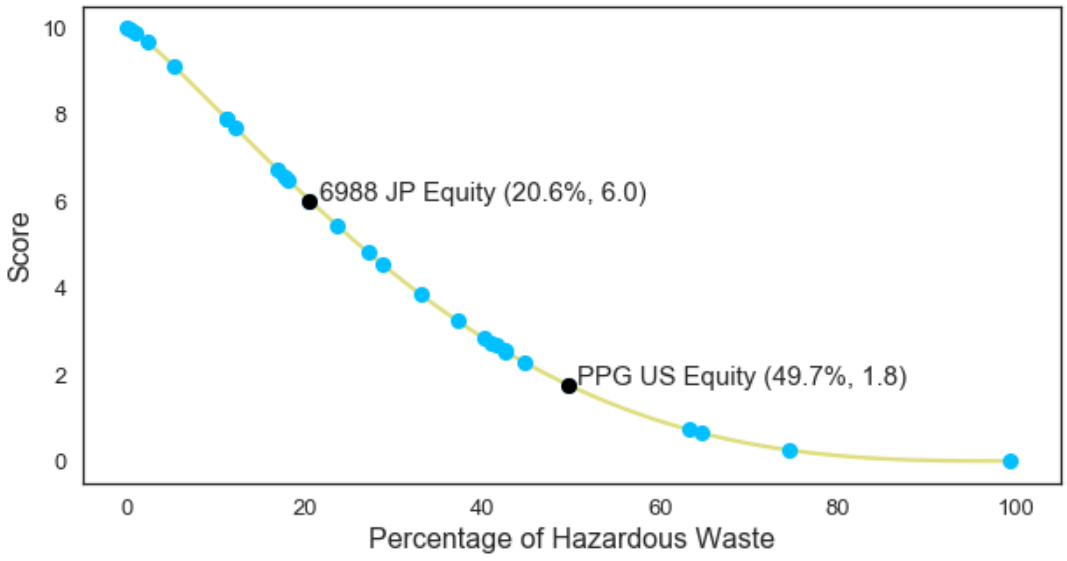


Figure 4: 2018 Scoring Curve for Percentage of Hazardous Waste (SP016)

Rate Fields

Fields for which the unit is a rate are scored slightly differently depending on properties of the rate field such as its polarity, the expected mode of the distribution, and whether zero rates are common. For example, incident rates and fatalities both have negative polarities and commonly reported zero values. On the other hand, some fields that would typically be scored as regular intensity fields are reported as rates. In the case of a regular intensity field, as we have described previously, we take logs of the field's value and its corresponding activity metric and score it using standard regression techniques and an assumed normal distribution. Consequently, when the relationship is reported as a rate—e.g., Training spending per employee or Energy per unit of production—a lognormal distribution is the most appropriate and it is equivalent to scoring the field as a regular intensity field when the elasticity of the intensity is believed to be 1.

Rate Type	Has Zeros?	Mode	Polarity	Distribution	# of Parameters	Examples	Notes
Episodic Rate	Y	0	-	Exponential	1	Total recordable incident rate	Exponential distribution fits data characteristics (0 is a common incident rate) and one parameter leads to stable estimates
Fatality Rate	Y	0 or higher	-	Gamma	2	Fatality rate	An extra parameter is needed to fit the tail to better differentiate low performance
Intensity Rate	N	Strictly positive	+ or -	Lognormal	2	Training spending per employee, Energy per unit of production	Data and mode are strictly positive

Episodic Rate Fields — Negative Polarity

Fields for which the unit is incidents per unit time and have a negative polarity associated with them are scored using curves specified by the exponential distribution. This guarantees a score of 10 for fields with a value of 0.

Figure 5 shows an example of such a field. Bharat Petroleum (BPCL) reported a total recordable incident rate for contractors of 0.05 (per 200,000 hours worked or per 100 contractors) in 2018 and received a score of 9.02, while EQT Corporation (EQT) reported a rate of 0.79 and received a score of 1.73.

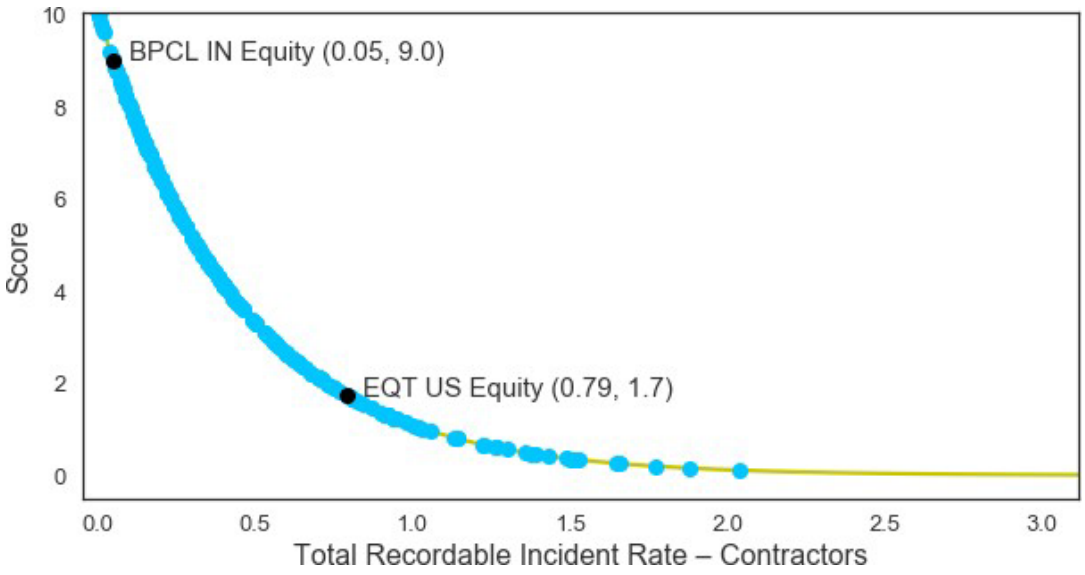


Figure 5: 2018 Scoring Curve for Total Recordable Incident Rate – Contractors (ES261)

Fatality Rate Fields — Negative Polarity

For fatality rates, the scoring curve is specified by a gamma distribution and the parameters are not estimated from the data, but are defined to result in a scoring curve with the following properties:

- A fatality rate of 0 will result in a score of 10.
- Any fatality rate above 0 will have its score adjusted by a factor of 0.7. Thus, the maximum possible score for a non-zero fatality rate is 7.
- A fatality rate of 1 (in 1,000) will get a score near 1, while rates greater than 2.5 will receive scores near 0.

As seen in Figure 6, John Wood Group (WG/) had a fatality rate of 0.02 in 2018 and its score was 5.13. Baytex Energy (BTE) had a fatality rate of 0.57 and so its score was 1.36.

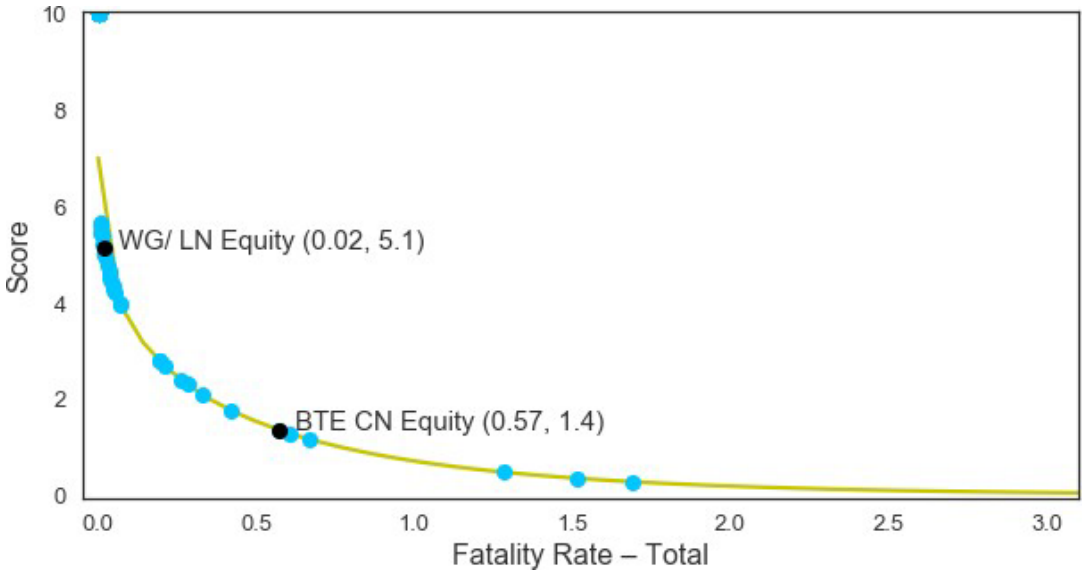


Figure 6: Total Workforce Fatality Rate Scoring Curve (RX389)

Rate Intensity Fields

Sometimes, a field that would typically be scored as a regular intensity field is reported as a rate. In such cases, we estimate the parameters for a rate intensity field using a lognormal distribution. The mean and standard deviation are estimated to correspond to the central tendency and width of the distribution. Since there is no previously determined ideal rate for these positive polarity rate fields, as is the case with negative polarity rate fields, the field value that receives a score of 10 is also determined empirically for that field.

Figure 7 shows the scoring curve for Energy Per Unit of Production, which has a negative polarity. In 2018, Nucor Corporation (NUE) reported 1.36 Mega Watt hours (MWh) of energy consumed per unit of production, resulting in a score of 9.8. Severstal (CHMF), on the other hand, reported 6.68 MWh of energy consumed per unit of production and received a score of 2.3.

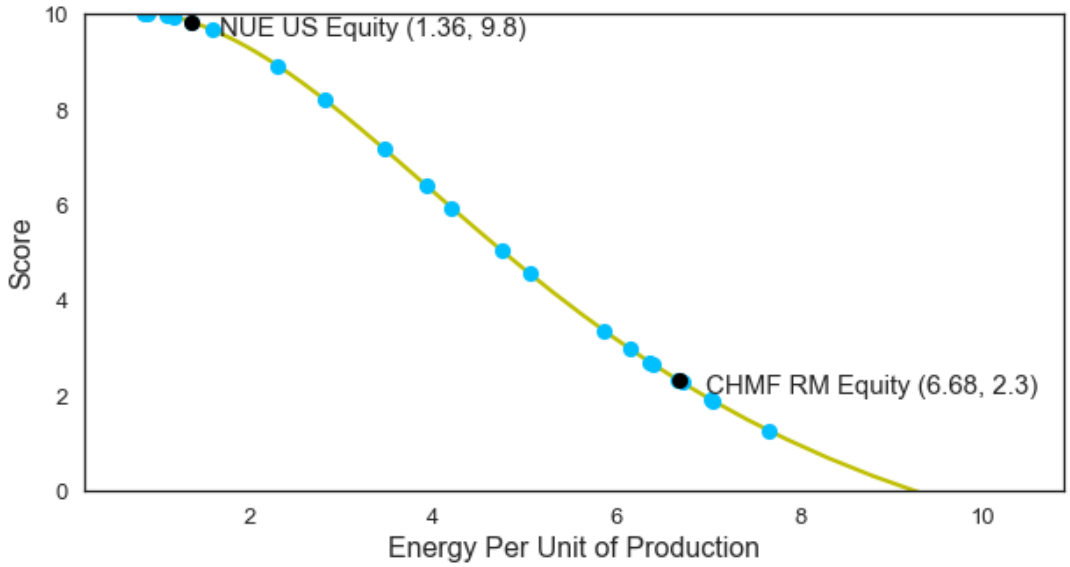


Figure 7: 2018 Scoring Curve for Energy Per Unit of Production (ES494)

Figure 8 shows an example of a positive polarity rate intensity field: Training Spending per Employee. Saipem (SPM) received a score of 0.98 for $187 spent per employee in 2018, while KS Innovation (096770) scored 9.43 for $3,118 spent per employee.

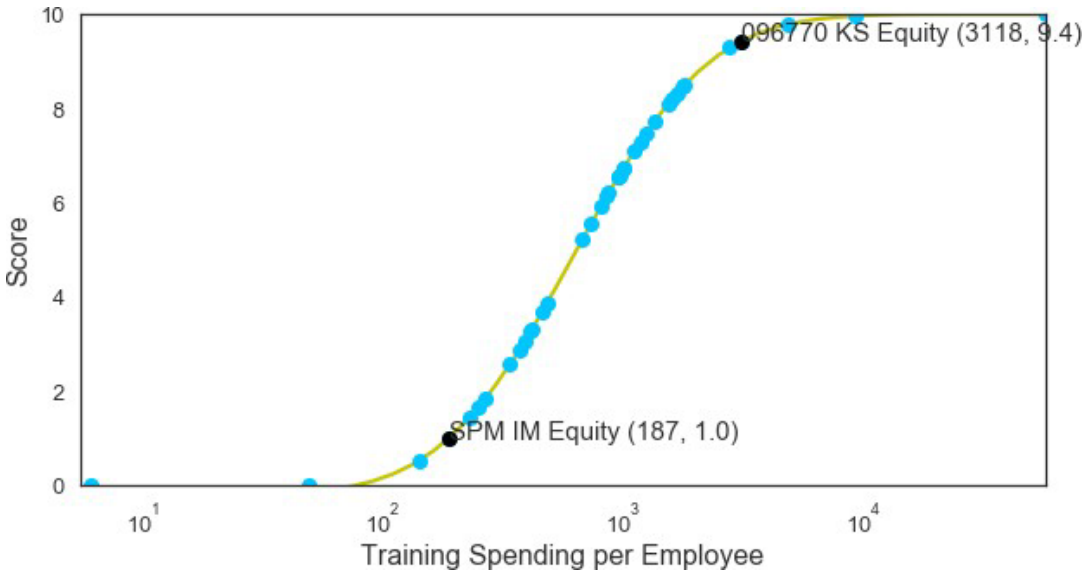


Figure 8: 2018 Scoring Curve for Training Spending Per Employee (RX321)

Categorical Scoring Fields

In certain cases, where data is insufficient for estimating parameters reliably, the scores are determined by grouping ranges of outcomes into categories and assigning the same score for all values within a range (complete list of categorical scoring fields and associated values in Appendix 3). Such fields may or may not have associated activity metrics.

Two examples of this type would be: 1) the number of environmental fines and 2) the amount of environmental fines. The first example illustrates the concept that companies fined a small number of times will receive a penalty for one to nine fines, whereas companies fined a substantial number of times will receive harsher score penalties.

In the second example, for the amount of environmental fines, 1% of revenues is used as a commonly accepted threshold for financial materiality, with the deepest penalty at 1% or more of revenue. Amounts greater than 0 and up to 1% will receive a small penalty.

Value	Score
0	10
1-9	6
10-99	3
100+	0

Figure 9: Categorical Scoring for Number of Environmental Fines (ES032)

Value	Score
0%	10
Greater than 0% and up to 1%	7
Greater than 1% and up to 2%	2
Greater than 2% and up to 5%	1
Greater than 5%	0

Figure 10: Categorical Scoring for Amount of Environmental Fines (ES033) with Activity Metric defined as Sales Revenue Turnover (IS010)

Binary Fields

Binary fields represent Bloomberg ESG policy fields, which are given a value of Y or 1, if the company discloses on the selected topic, and a value of N or 0, if the company does not disclose on that topic. In other words, these fields are indicative of disclosure, not the company's actual performance on the topic that is described in the disclosure.

If the field is Binary, the company gets either a full credit (a score of 10), or zero credit (a score of 0) based on the field value (Y/N), as well as taking polarity (positive vs. negative) into account. As an example, SA161 - GHG Emissions Reduction Policy indicates whether or not the company has disclosed a policy or a strategy to reduce GHG emissions specifically. If the company has disclosed, it gets a score of 10; otherwise, it gets a score of 0.

Binary+ Fields

Binary+ fields are similar to Binary fields. However, in this case there is a quantitative element underpinning the policy that is disclosed. An example of such a field is SA559 - Net Zero Emissions Target which indicates whether a company has set Emissions Targets to become carbon neutral by a target date in the future.

Similar to a Binary field, a company will get a full credit (a score of 10) or no credit (a score of 0) based on the field value (Y or N, respectively). In addition to this, the company will also earn disclosure credit (relative to its disclosure rating) depending on the field value (Y/N). If the field value is Y its disclosure points will contribute to the points earned, and if the field value is N, it will not receive those disclosure points.

Score Aggregation

Generating a composite that describes performance across broader sustainability issues can be complex in light of the disclosure issues discussed previously. As a consequence, Bloomberg's proprietary approach toward aggregation attempts to reward consistent performance and penalize uneven performance. However, it also works to temper the penalties by making use of other attributes, such as research-driven BI Issue Priorities.

Field Scores, as described here, roll up to Sub-Issue Scores, Issue Scores, and Pillar Scores.

Disclosure as a dimension of performance is taken into account at the Issue level, where a Disclosure Factor is introduced to summarize the availability of quantitative fields for scoring.

Bloomberg's approach to aggregation at the Issue level emphasizes quantitative disclosure.

Because policy performance can be perfect, even while quantitative disclosure is poor or even zero, the aggregation approach aims to minimize the potential to score well through disclosure of qualitative information alone.

Sub-Issue Scores

Sub-Issue Scores are aggregated from Field Scores by a weighted average, depending on the Fit/Quality attribute. The Fit/Quality level is used to determine the weight, where High = 9, Medium = 4, and Low = 1. If a company does not disclose on a given field in a given year, that field is ignored, resulting in a redistribution of the weights attached to each field.

The levels for each field are determined by BI analysts, as described in previous sections.

As listed in Figure 1, for example, F0947 (Scope 1 Greenhouse Gas / Carbon Dioxide Emissions) is assigned a High level in the Chemicals sector, while SA119 (Community Engagement Policy) is assigned a Medium level.

Issue Scores and Disclosure Factors

Sub-Issue Scores are aggregated into Issue Scores. In addition to capturing sustainability performance Issues prioritized by materiality rank, Issue Scores highlight disclosure performance.[6] By incorporating the level of disclosure at the Issue Score level, Sub-Issue and Field Scores reflect only disclosed performance (or are blank due to lack of available data).

Only quantitative fields and Binary+ fields are considered in the calculation of the Disclosure Factor. First, binary policy fields reflect disclosure in themselves; if Bloomberg does not find evidence of a certain policy, the field is set to "No" and is not blank. Second, companies may disclose qualitative information, but not supply data for the quantitative fields. For example, in the Water Management Issue, many companies report on Water Policies (ES247), but fewer companies disclose the amount of freshwater they withdraw (SA020). It is harder to evaluate qualitative disclosures given their wide-ranging content and complexity.

As a result, Bloomberg's approach to aggregation at the Issue level emphasizes quantitative disclosure to avoid a perfect policy performance score, with poor or zero quantitative disclosures. Essentially, the aggregation approach aims to minimize the potential to score well by disclosing only qualitative information.

In order to accomplish this, the disclosure levels are built into a separate Disclosure Factor, which is then aggregated into performance scoring at the Issue Score level. Bloomberg's dual goal of measuring performance and incentivizing disclosure dictates that it would be an incomplete measure of a company's performance to aggregate to a higher-level score by averaging lower-level scores only for data that has been disclosed.

In sum, this approach at the Issue Score level is motivated by the following principles:

- **No use of imputation for undisclosed values:** Bloomberg's proprietary scores currently reflect self-reported, publicly available information, or the lack thereof. This advances the goal of incentivizing transparency. Using imputation would have the opposite effect.[7]
- **Desirability of both good disclosure and good performance:** The best scores should come from transparency and decision-useful sustainability disclosures, as well as from good sustainability performance. If only one aspect is good, the scores are capped.
- **Incentives for disclosure**: Bloomberg's core value is transparency. Bloomberg ESG Scores offer an incentive to company disclosure, even if a disclosure reflects poor performance. Except for the very worst cases, even a poor performance in a given category should result in a better score than undisclosed performance.

In summary, Issue Scores work as follows:

1. Determine an average performance score of Sub-Issue Scores; this is the "Performance Score."
2. Measure disclosure of quantitative and Binary+ fields, with the result being a weighted percentage, called a "Disclosure Factor."
3. The Disclosure Factor determines a performance range.
4. Scale and shift the Performance Score into the disclosure-driven range, as noted in Figure 11.

Disclosure Factor	Issue Score Range
0	0-3
1	0-10

Figure 11: Target Issue Score Ranges for Varying Levels of Disclosure

5. Zero disclosure results in Performance Scores being adjusted to a 0-3 range. Perfect disclosure results in Performance Scores being adjusted to a 0-10 range.
6. Additionally, there is a disclosure-incentive Issue Score boost for all but the lowest Performance Scores (everything above 1.5).

Technical Description

Issue Scores are a function of the weighted generalized mean (p-mean) of the Sub-Issue

Scores (i.e., the Performance Score) and a Disclosure Factor (DF).

The Sub-Issue Score weights are given by:

- One quarter (¼) if the Sub-Issue only contains binary policy fields
- One (1) otherwise

P-means are used to reward excellence across the board and to penalize less consistent performance between the various Sub-Issues being aggregated. As with all Bloomberg ESG (sub) scores, we use weighted shifted p-means with the power p=0.5 and shift s=1.[8]

$$M(x,w,p,s) = \left(\sum_{j=1}^{n} w_j \left(x_j + s\right)^p\right)^{1/p} - s$$

As noted earlier, Disclosure Factors (DF) are assigned at the field level to determine treatment of missing data in the scores model, with the following ratings of A, B, and C. Each connotes expectations about the nature of disclosure.

Policy fields are binary and always have a value of Yes (the specified policy is publicly disclosed) or No (the policy is not publicly disclosed), and thus do not require missing data treatment and do not have a Disclosure Factor.

A company's Disclosure Factor score for an Issue is computed as a weighted percentage over all fields within an Issue topic. Points are earned if the field is disclosed and the activity metric is disclosure (where relevant only), meaning that the points are earned where we are able to generate a field score; the point value depends on a field's Disclosure Factor as shown in Figure 12.

Certain fields are less detailed or transparent than their A or B counterparts. These fields are designated A- or B- and are assigned 25% of the point value of the full letter rank. For example, the optimal reporting procedure for the Total Recordable Incident Rate is to report for employees (ES121) and contractors (ES261) separately. Accordingly, both of those fields have a Disclosure Rank of A. However, if a company only discloses an aggregated number for the entire workforce (SA201), that field has a DF of A- and receives some points, but not the full point value for the disclosure.

Disclosure Factor	Point Value
A	5
A-	1.25
B	2
B-	0.5
C	0

Figure 12: Point Values for Disclosure Factor Calculation

The Disclosure Factor is then computed as

$$\mathrm{DF} = \frac{\sum_{\mathrm{Fields}} \text{Point Value if field can be scored}}{\sum_{\mathrm{Fields}} \text{Point Value}}$$

This results in a number between 0 and 1.

The Disclosure Factor is used to determine Upper and Lower Targets (UT and LT) for Issue Scores. Both targets increase with increasing levels of disclosure. This is illustrated in Figure 12.

The Upper Target is 3 if the DF is 0, and it is 10 if the DF is 1. Thus, a company that does not disclose any quantitative information cannot receive an Issue Score greater than 3. Furthermore, disclosing information that only pertains to quantitative fields in which performance is good does not necessarily result in a high Issue Score, as the DF will account for the lack of full disclosure by capping the score at the UT. The UT is a curved line that increases more dramatically at lower levels of disclosure, reflecting the higher marginal value of new disclosure at low levels of disclosure.

$$\mathrm{UT} = 3 + \left[\sqrt{\mathrm{DF}} \times (10 - 3)\right]$$

The LT, for performance scores 1.5 or greater,[9] is 0.45 if the DF is 0 and it is 4 if the DF is 10. The LT is meant to provide a score incentive to increase disclosure, even for fields where performance is not exemplary, as all but the lowest Performance Scores (those below 1.5) will see Issue Scores proportionally floored at the LT that corresponds to the DF.

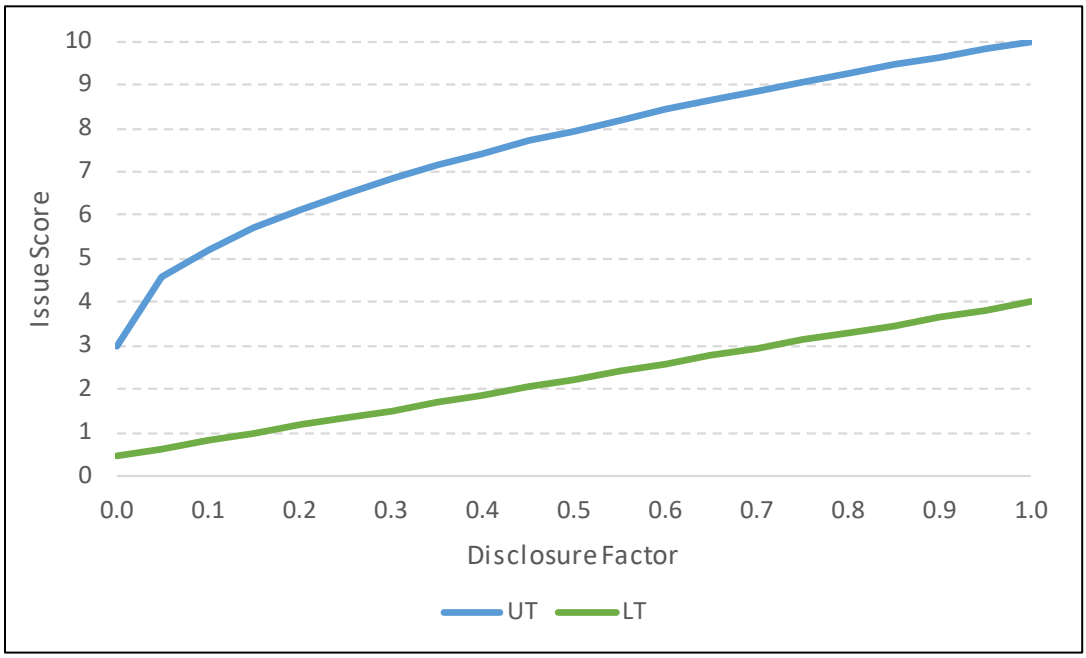


Figure 13: Upper and Lower Targets (UT and LT) as a Function of Disclosure Factor

Given the Sub-Issue p-mean M (i.e., the Performance Score) and Upper and Lower Targets, the formula for the Issue Score is

$$Issue\ Score(M, DF) = \begin{cases} \frac{LT}{1.5} \times M & M < 1.5 \\ LT + \left[\left(\frac{UT - LT}{8.5}\right) \times (M - 1.5)\right] & 1.5 \leq M \leq 10 \end{cases}$$

Visually, Figures 14-16 show how the Upper Target (UT) and Lower Target (LT) define a target range of possible Issue Scores along the Y-axis. This target range is a function of the level of disclosure. Only very poor performance (i.e., a Performance Score of less than 1.5) results in a score below target.

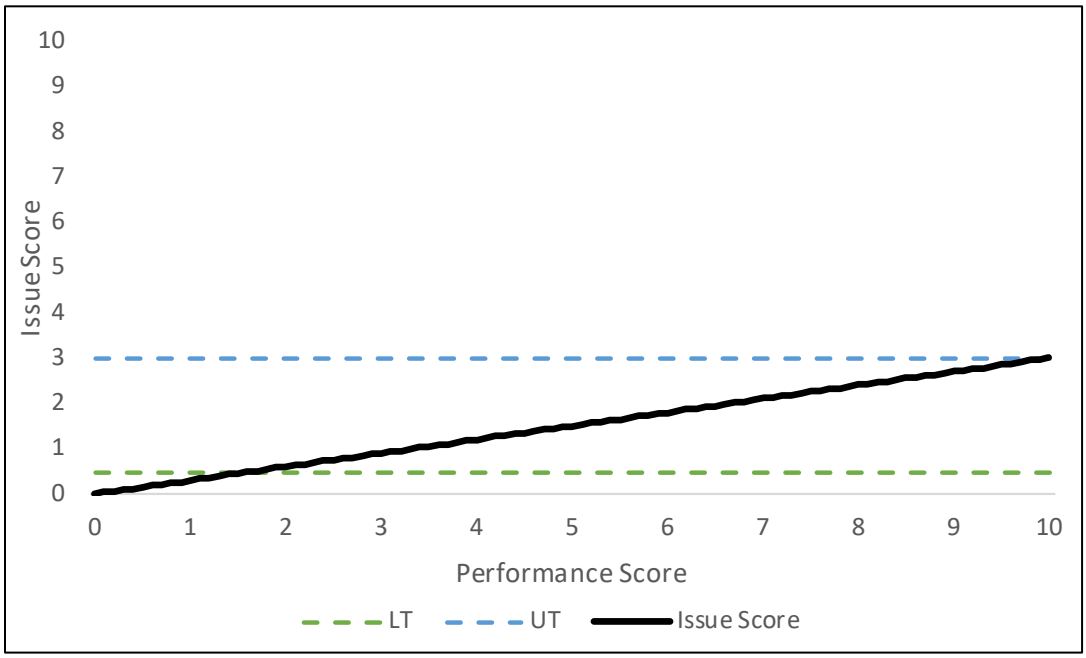


Figure 14: Illustration of Issue Score When Disclosure Factor=0

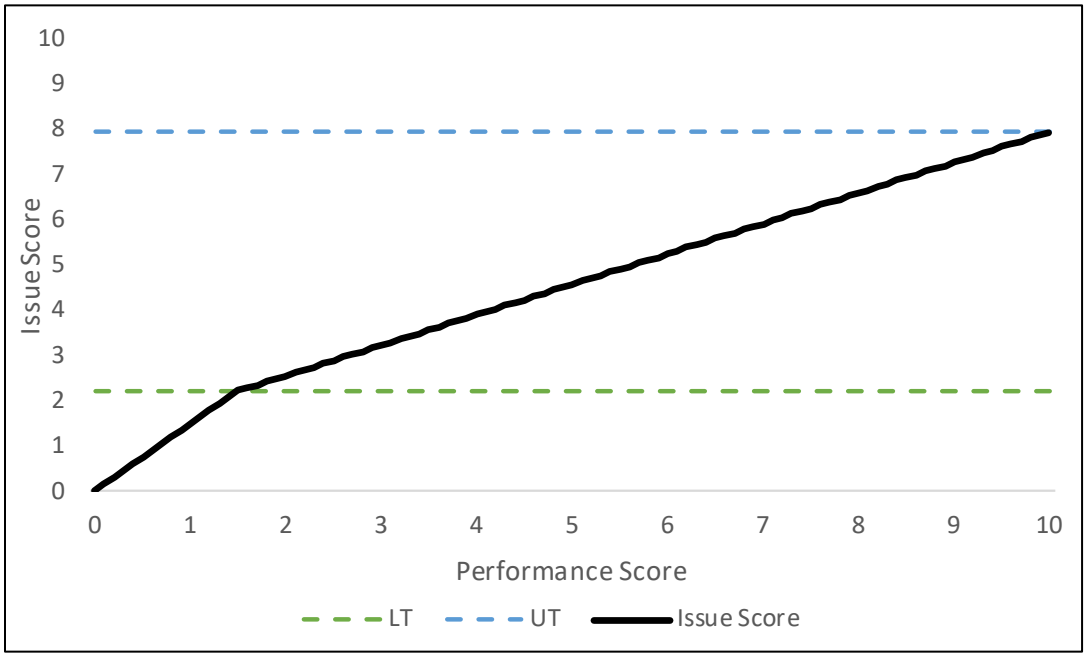


Figure 15: Illustration of Issue Score When Disclosure Factor=0.5

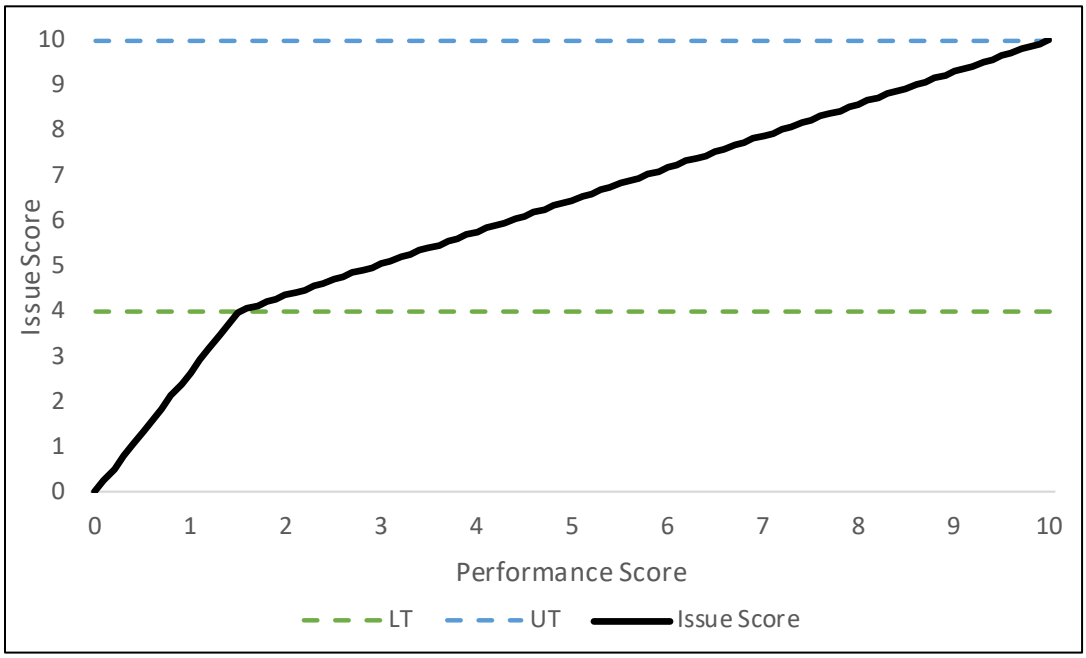


Figure 16: Illustration of Issue Score When Disclosure Factor=1

Pillar Scores

The Pillar Score is a weighted generalized mean (p-mean) of Issue Scores, where the weights are determined by the Issue Priority ranking. The values of the power and shift (p=0.5 and s=1) are the same as they are in the calculation of Issue scores.

Step 1: Initial Weights

BI Issue Priority rankings are assigned weights (w̃) that are determined as a function of a ranking (k) of their relative importance.

$$\tilde{w} = 1 + e^{0.5\times(3-k)}$$

Note that the weights do not decrease in a linear fashion. This reflects the relatively high importance of the top rankings and implies that lower priority Issues have a lesser effect on Pillar Scores, but still serve an essential disclosure role.

Step 2: Weighting Adjustment

Issue Scores containing only binary fields have their weight reduced by 80% to reflect that quantitative fields have better scoring power than binary fields.

For example, the Operational Risk Management Issue for Oil & Gas Midstream Producers only reflects whether or not a company has an Emergency Response and Preparedness Policy (SA086, which is a part of the Operational Preparedness Sub-Issue).

Pillar Disclosure

The Pillar Disclosure measures the level of disclosure a company offers for the fields under each of its pillars. Unlike the Disclosure factor that is used to compute Issue Scores, the Pillar Disclosure requires only the relevant Quantitative or Binary+ field to be disclosed and does not require the activity metric to be disclosed to earn the associated Points.

The Pillar Disclosure value is computed as follows:

$$\text{PD} = \frac{\sum_{\text{Fields}} \text{Point Value if disclosed}}{\sum_{\text{Fields}} \text{Point Value}}$$

This results in a number between 0 and 1.

The Pillar Disclosure does not affect the Pillar Score and should be used for informational purposes as a measure of disclosure only.

Enhancements and Limitations

Bloomberg's ES Scores are intended to introduce transparent scoring for companies based on company-disclosed data, proprietary fundamental industry research and proprietary quantitative transformations and analyses.

Current limitations, primarily driven by the uneven and rapidly evolving nature of company reporting, as well as formal frameworks used by companies to guide their reporting decisions, should ultimately be addressed, and overcome and thus enable the enhancement of Bloomberg's ES Scores. Enhancements will focus on improving the effectiveness of the scores in assessing both sustainability performance and the quality and comprehensiveness of disclosure. These enhancements may result in changes to the scoring templates and parameters that currently drive the quantitative model. Assessments and potential changes entail the following activities:

- **Sector review:** Each sector framework will be reviewed once per year to evaluate changes in guidance embodied in frameworks, corporate disclosure, availability of company-reported and third-party data, and other key drivers. Notably, fields identified as on watch for disclosure will be re-examined for inclusion. Data fields may also be removed.
- **New data and imputation:** Data enhancements may include imputation of key data fields (e.g., greenhouse gas emissions), inclusion of additional proprietary data (e.g., ES news sentiment data, geolocated data, or asset-level information) or integration of third-party data (e.g., government or NGO data).
- **Regulatory action or collective consensus:** New additions to the methodology could be introduced in response to regulatory behavior, such as that introduced by the European Union Taxonomy or additional impact measurement, according to the Sustainable Development Goals.
- **Restatements:** Restatements may take place on occasion due to corrections or data backfills, for example. Any restatements will be managed with consultation and expert judgment and changes will be communicated clearly.

Given the challenges of incomplete reporting from industry, Bloomberg's ES Scores aim to summarize risks that can feasibly be assessed through a combination of data collection, research, and analysis. However, the data fields and analysis used in these scores are not exhaustive, but rather representative of sustainability risks and opportunities. ES Score users are expected to combine these scores with their own analysis and judgment to determine their suitability for the intended goal.

Bloomberg expects to communicate changes to the methodology to users on an annual basis, at least. Bloomberg also intends to establish a process to facilitate stakeholder communication and effective consideration of feedback about trends in disclosure, market participants' use of scores, and the quantitative models, among other items. Bloomberg intends to take scoring methodology decisions with internal and external consultation via appropriate scores governance and normal user feedback channels.

In addition to the ES Scores, Bloomberg determines and/or makes available a number of other calculated values, such as indices, fixings, financial rates, and other values. As with all such Bloomberg-calculated values, usage restrictions apply. Specifically, unless expressly agreed in writing by Bloomberg, neither the ES Scores nor any information or data provided in connection with the ES Scores may be used for any of the following purposes: (i) valuation or accounting purposes; (ii) to determine any interest or other amounts payable under or in respect of a financial instrument or a financial contract; (iii) to determine the price at which a financial instrument may be bought or sold or traded or redeemed; (iv) to determine the value of a financial instrument; or (v) to measure the performance of an investment fund, including without limitation, for the purpose of tracking return or defining the asset allocation of a portfolio or of computing performance fees.

Endnote

1 Both the Sustainability Accounting Standards Board (SASB) and the Task Force on Climate-related Financial Disclosures (TCFD) received founding support from Bloomberg.

2 This is described in the Methodology with supporting information in Appendices.

3 2019 Sustainability Report, Vale, http://www.vale.com/EN/investors/information-market/annual-reports/sustainability-reports/Sustainability%20Reports/Relatorio_sustentabilidade_vale_2019_alta_en.pdf

4 Policy fields can be “M” if they are the only fields in an Issue category.

5 A continuous random variable is one for which the set of possible values (its range) is infinite, as contrasted to a discrete random variable that has a countable set of possible values (e.g., the roll of a die). Since the continuous random variable has an infinite number of possible values, the probability of observing any single specific value is zero (only ranges of its values can have a non-zero probability). However, since many companies can report zero hydrocarbon spills, the probability of observing a value of exactly zero is not zero. Hence, we utilize a distribution in which the probability of observing a zero value is inflated.

6 Issue Scores are not just about incorporating disclosure. They are in some sense the most valuable sub-scores — the Goldilocks “just right” point where individual ESG issues are scored without the detail of “too many” Field Scores.

7 Going forward, data imputation may support more tactical field inclusion with adjustments to avoid disclosure bias. Any imputations would seek to avoid disclosure bias as a concern so that, when a field is included that few companies disclose, companies are not given an incentive to avoid disclosing subpar results.

8 The p-value of 0.5 is chosen as the midpoint of the values that represent an arithmetic mean (p=1) and a geometric mean (p=0). The shift value s=1 is chosen to avoid large penalties for scores near 0.

9 More precisely, when the weighted p-mean of policy and disclosed quantitative Field Scores is 1.5 or greater.