Preqin ESG Solutions
Overview and
Methodology Document

PREQIN

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A. Introduction to Preqin ESG Solutions

I. ESG considerations and their relevance to alternative investments

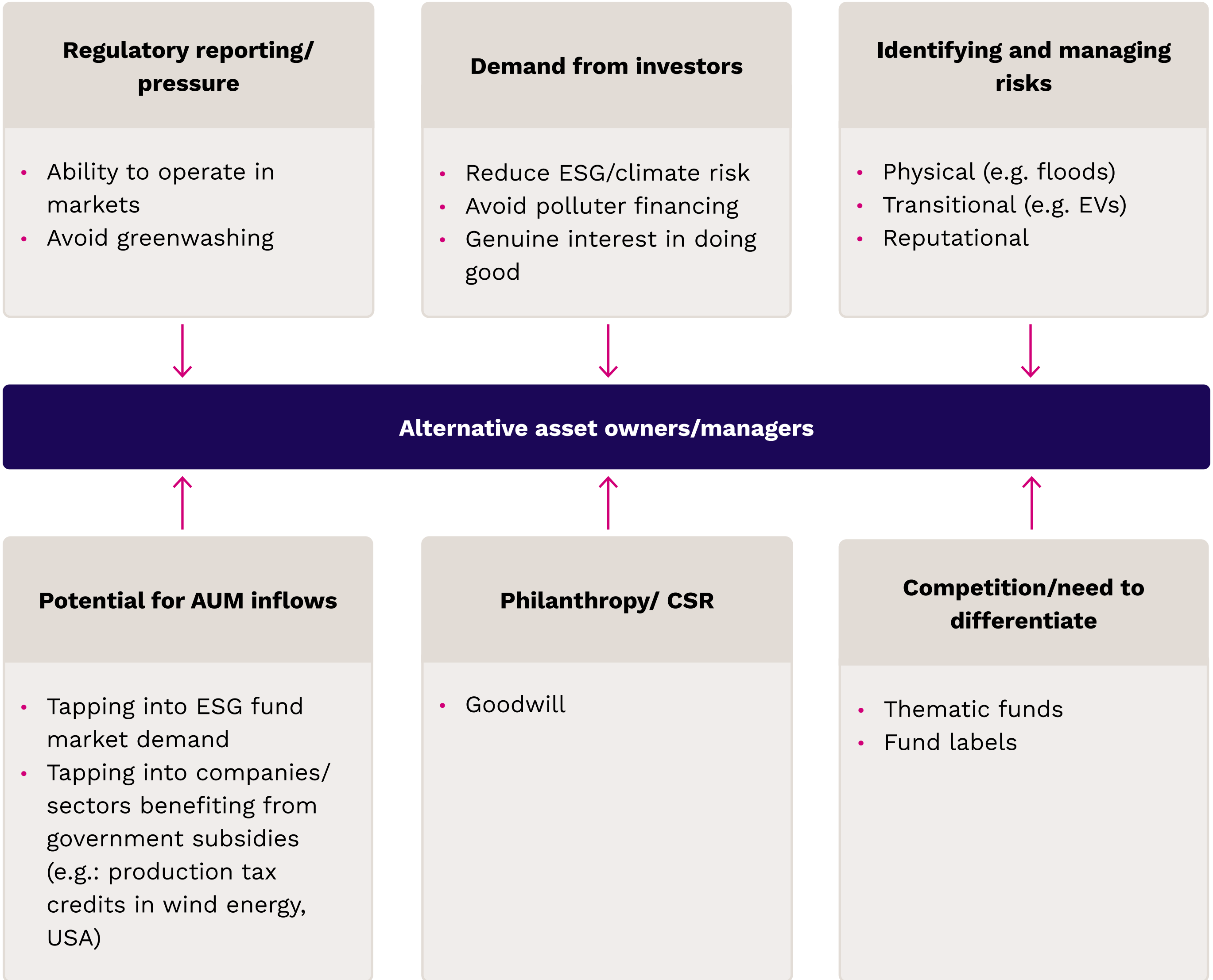
The alternative investment market is inherently opaque and less regulated compared to public markets. It often relies on relationships and the sharing of private information between financial market participants rather than public disclosures. While this enables investors to customize sustainable frameworks according to their needs, it also reduces the possibility of market standardization. A lack of standardization further increases the complexity of comparing assets against each other within an industry or region while sourcing deals or screening investments.

Since environmental, social, and governance (ESG) factors are a relatively recent consideration within the investment landscape, the frameworks and standards for ESG are still evolving. This means that the ESG landscape in general – particularly in alternatives – has been difficult to navigate, particularly given the variety of demands from investors and increased regulatory scrutiny of ESG in alternative assets. According to the Alternative Investment Management Association, "The landscape is populated by both authentic practitioners who have built their investment approaches on coherent strategies as well as entrants who are responding to trends and exploring marketing opportunities."

Alternative investments also differ from public assets in scale and size. Alternatives tend to have a much wider variation in revenues, geographies, employee count, as well as the absolute number of individual assets that need to be evaluated for ESG.

The current market forces that have been driving the demand for ESG integration in alternatives can be broken down into broad categories, including investor demand, risk, regulation, competition, philanthropy and assets under management (AUM) growth potential.

Fig. 1: Market forces driving the demand for ESG in alternatives



Recently, investor demand and regulatory pressure seem to be the dominant forces accelerating adoption of ESG in investments. While the EU has been at the forefront of regulatory change, other regions are catching up quickly and it is only a matter of time before we see more markets introducing mandatory ESG regulations for investment operations.

Most of the regulations have taken a gradual approach, applying initially to publicly listed assets. However, they are beginning to widen their scope to bring alternative assets under their purview. For example, the European Council recently clarified the applicability of the SFDR regulation for alternative funds and respective fund managers in the EU.

II. Preqin ESG Solutions value proposition

Preqin ESG Solutions endeavors to help a wide range of private market participants navigate the complexity of finding, screening, and evaluating assets, funds, and managers through a sustainability lens, thereby enabling them to make more informed and future-resilient investment decisions. We are also constantly refining our solutions to better cater to customer needs across the investment process.

We leverage our relationships with private market participants to gather ESG-related data points from every possible area. Where these data points do not exist, we provide their **viable estimates**, based on multiple auxiliary data sources (both proprietary and public) and innovative models, developed by our ESG team. Wherever we see fit to complement or expand the range of solutions we offer, we also partner with expert organizations that have a strong track record in private markets. All our ESG products are built on a foundation of Preqin Pro – the industry's most comprehensive **database of top-quality** private market financial **data**. Our ability to merge informed proxies with financial data enables us to deliver **solutions that scale** – from a single asset, through portfolio and fund managers, up to the institutional investor level. What we offer is comparable metrics that seamlessly integrate into both fund manager and institutional investor workflows.

While we set no barriers to the availability of our solutions and have often seen clients find new uses for them, the summary below contains common use cases developed to cater to specific customer and market needs:

If you are:

→ **An investor (LP):**

- **Fund sourcing** – Reduce the amount of time and resources needed to find and compare funds based on bespoke ESG investment preferences [fund-level solutions]
- **Fund manager due diligence** – Reduce the amount of time and resources needed to screen fund managers and contact them [GP-level solutions]
- **Competitor intelligence** – Evaluate the strategies and initiatives taken by other LPs as well as the ESG funds they have invested in in the past [LP-level solutions]
- **Asset-level transparency** – Get an unbiased view of the underlying assets and evaluate them across a wide range of ESG indicators, risks, and metrics [asset-level solutions]
- **Fund performance evaluation** – Compare the performance of invested ESG funds against similar ESG funds through performance benchmarks [fund-level solutions]

- **A fund manager (GP):**
  - **Fundraising** – Reduce the amount of time and resources needed to find investors, their past investments, and strategies with respect to sustainability [LP-level solutions]
  - **Deal sourcing and early due diligence** – Expand the watchlist and reduce the time and effort needed to search for relevant deals based on a range of ESG indicators, risks, and metrics [asset-level solutions]
  - **Competitor intelligence and market analysis** – Evaluate the strategies and initiatives taken by other GPs, as well as ESG funds [GP-level solutions]
- **A consulting partner (SP):**
  - **Business development** – Filter the list of LPs or GPs that are likely to need support in their ESG integration journeys [LP-level and GP-level solutions]
  - **Asset-level transparency** – Obtain an initial view across portfolios and how they rank on various ESG factors [asset-level solutions]
- **A private company:**
  - **Fundraising** – Gain access to a wide range of GPs to identify a list that is likely to be interested in investing [GP-level solutions]

Alongside the above use cases, we also provide a wide range of thought leadership content that provides a fresh perspective on ESG for all financial market participants and helps them keep abreast of the latest developments in ESG for alternatives.

III. Achievements and accolades

2024

- ESG Insight Awards 2024: **Winner** – Best ESG Risk Data Provider; **Finalist** – Best ESG Research Provider. Best Unstructured ESG Data Provider

2022

- Probitas Partners 2023 *Institutional Investors Private Equity Survey*: **Winner** – #1 for Benchmark Tools and Datasets
- Wealth and Finance International Fund Awards: **Winner** – Best Private Equity Firm Database
- Investment Week's Sustainable Investment Awards: **Finalist** – Best Sustainable Investment Research and Ratings Provider
- Investment Week's Women in Investment Awards: **Finalist** – Shifra Ansonoff is a finalist for Team Leader of the Year
- A-Team Group ESG Insight Awards: **Shortlisted** – Best Overall ESG Data Provider, Best ESG Research Provider, Best ESG Risk Data Provider, and Best Analytics Provider for ESG
- Traders Magazine Markets Choice Awards 2022: **Shortlisted** – Best New Product for ESG Solutions Real Deals ESG Awards: Shortlisted – ESG Data Provide
- Megabuyte100 Awards: **Shortlisted** – Banking and Insurance (Software and Digital Platforms)
- ESG Investing Awards: **Runner Up** – Best Specialist ESG Data Provider

2023

- ESG Investing Awards: **Winner** – Best ESG Data Provider, Best ESG Research: Vendor; **Finalist** – Best Specialist ESG Research, Best Specialist ESG Data Provider.
- Investment Week Sustainable Investment Awards: **Finalist** – Best Sustainable Investment Thought Leadership Paper ('ESG in Alternatives 2022: The Transparency Tipping Point'), Best Sustainable Investment Research Team, Best Sustainable Investment Research and Ratings Provider
- Environmental Finance Sustainable Investment Awards 2023: **Winner** – ESG Research of the Year (Europe)

2021

- Alt Credit European Performance and Services: **Finalist** – Best Data and Information Provider

2020

- ESG Investing Awards: **Finalist** – Best Specialist Data Provider
- WealthBriefing European Awards: Best Data Provider

B. Methodologies

I. Asset-level solutions

Asset-level datasets form the building blocks for almost any part of the investment lifecycle, and in sustainability integration in particular. Most financial market participants agree the more granular the data the better. This is because the accuracy and reliability of financial analysis increases significantly with better data transparency and traceability, which makes asset level ESG data one of the most sought-after and invaluable insights for investors.

However, it is unrealistic to expect perfectly traceable asset level ESG data across 100% of the coverage universe. There are various reasons some of the asset level ESG data is incomplete, disparate and sometimes unavailable, including:

- ESG considerations in investing are constantly evolving. There are industry and geographic differences in not only which ESG metrics are relevant, but also if they should be considered relevant today. This means companies in different sectors and geographies look at ESG data in significantly different ways.
- Governments, regulators, and investors often prioritize different ESG metrics. This often leads to companies disclosing a minimum set of ESG data that can satisfy demands from all parties.
- Specifically for smaller companies, there simply aren't enough resources available to correctly measure their ESG data so some report partial ESG data which includes only what they have been able to measure or interpret.
- ESG guidelines evolve over time as standards organizations and regulators try to make them more relevant and accurate. However, this can introduce inconsistencies over time or between companies using different guidelines. (E.g., location-based vs market-based Scope 2 emissions measurements.
- Some companies interpret sustainability differently or deliberately obfuscate sustainability information to appear more sustainable than they are. This is referred to as 'greenwashing'.
- The range of demands and the worry of not meeting sustainable targets has led some companies to delay reporting ESG data in the hopes of buying time to make amends. This is commonly known as 'green hushing'.

- Reported data is difficult to find and often contains gaps. Sustainability practitioners have realized that industry benchmarks and estimations are the next best alternative until reporting improves. In addition to improving coverage, data analytics using reported ESG data vs benchmarks often uncovers anomalies in reported ESG data.

Fig. 2: Asset level solutions

To help investors navigate their way through the abundance of information, the lack of adherence to standards, and the disparities in asset-level ESG data, Preqin provides a range of solutions. The diagram below summarizes the various asset-level solutions that Preqin provides. What follows is a detailed description of each of the solutions and the way Preqin has interpreted, applied, and validated the approach.

Asset-level solutions

→ **Fund inclusions:** Identify assets that certain types of ESG fund managers (e.g. impact investors) prefer.

→ **EU taxonomy eligibility:** Identify if the company could potentially be eligible to be included under EU taxonomy-approved activities (climate adaptation/mitigation) before performing further due diligence.

→ **UN SDG alignments:** Identify companies that perform activities that could potentially be aligned with UN Sustainable Development Goals.

→ **Controversial industries:** Understand if the company exists within an industry or performs an activity that is deemed controversial with respect to ESG aspects.

→ **Investors ESG management indicators:** Gauge the ESG disclosure requirements of the company based on the ESG strategies and priorities of its investors.

→ **Risk and impact solutions:**

- **SASB/industry materiality:** Identify the most material ESG risk factors of a company based on the industries it operates in.
- **Geographic materiality:** Identify the most material ESG risk factors of a company based on the location it is headquartered in.
- **Impact assessment:** Get a complete picture of the direct as well as indirect impact of the companies' operations on the environment and society quantified in monetary equivalents.

→ **ESG metrics:** Gain an insight into 20+ ESG metrics of a company split across different areas of its value chain.

→ **Real estate metrics:** Obtain valuable insight into carbon and energy metrics as well as green building certifications across 80,000+ properties.

i. Fund inclusions
Our research teams regularly collect and update fund managers' strategies as well as ESG fund labels. We are also able to capture the details of deals that are associated with a fund. The fund inclusions criterion simply shows the number and types of funds that are associated with or include this asset in their portfolios.

ii. EU taxonomy eligibility model

What is EU taxonomy?
The European Commission defines the EU taxonomy as:

The EU taxonomy is a cornerstone of the EU's sustainable finance framework and an important market transparency tool. It helps direct investments to the economic activities most needed for the transition, in line with the European Green Deal objectives. The taxonomy is a classification system that defines criteria for economic activities that are aligned with a net zero trajectory by 2050 and the broader environmental goals other than climate.

To make it easier for financial market participants to understand it, the European Commission has created a tool called the EU taxonomy Navigator. Key clarifications are included in the table below:

Fig. 3: EU taxonomy navigator, European commission (europa.eu)

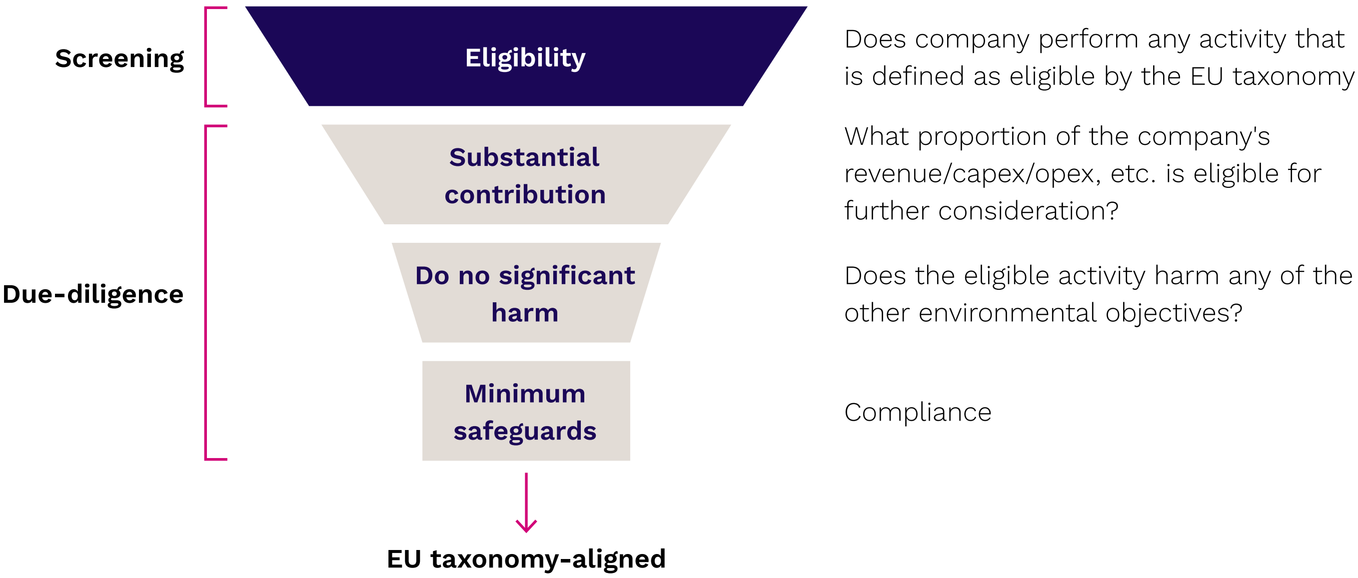
What the EU taxonomy is	What the EU taxonomy is not
A classification system to establish clear definitions of what is environmentally sustainable economic activity	It is not a mandatory list to invest in
Tool to help investors and companies make informed investment decisions on environmentally sustainable activities for the purpose of determining the degree of sustainability of an investment	It is not a rating of "greenness" of companies
Reflecting technology and policy developments: the taxonomy will be updated regularly.	It does not make any judgement on the financial performance of an investment
Facilitating transition of polluting sectors	What is not green is not necessarily brown. Activities that are not on the list, are not necessarily polluting activities. The focus is simply on activities that contribute substantially to environmental objectives.
Fostering transparency by disclosure for financial markets participants and large companies related to the taxonomy	

Where is it applicable?
The EU taxonomy can be thought of as a classification system that works at a business activity level. This allows it to be flexible enough to be used in multiple ways. From a regulatory perspective, the EU taxonomy forms the foundation for multiple regulations such as the Sustainable Finance Disclosure Regulation (SFDR) and the Corporate Sustainability Reporting Directive (CSRD). There are multiple nuances in the applicability of these directives and more information can be found here - EU taxonomy for sustainable activities - European Commission (europa.eu)

How can it be applied?
Broadly, the EU taxonomy covers multiple-level screens and defines different criteria for financial market participants to assess a company and identify what portion of its activities/operations can be identified as "green". It contains 4 stages as shown in the diagram below:

- **Stage 1: Eligibility** – This is the first step and is undertaken to identify if a company is likely to have an activity that contributes to one of the six environmental objectives outlined by the EU.
- **Stage 2: Substantial contribution** – This step checks what proportion of the company could be attributed to the activity identified.
- **Stage 3: Do no significant harm** – This is where an additional check is done to ensure that when aligning to one of the six objectives, the activity does not harm any of the other 5 objectives outlined by the EU.
- **Stage 4: Minimum safeguards** – This is to ensure that the company has minimum safeguards in place and does not have any other major social/governance/sanctions issues.

Fig. 4: EU taxonomy stages to assess a company



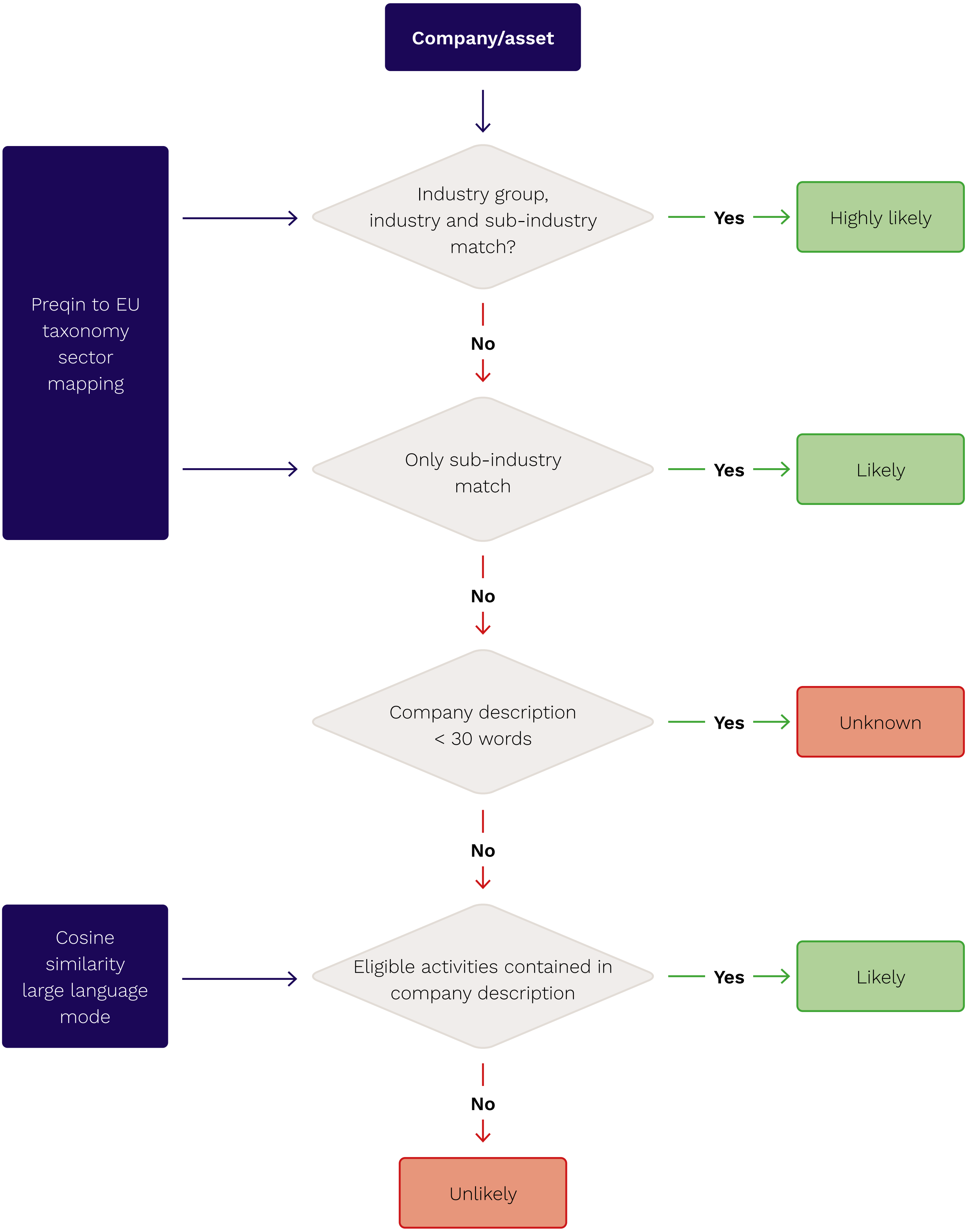
EU taxonomy alignment is the last step of the process and a company (or % of a company's revenue) can be said to be EU taxonomy-aligned only when it passes through all these four stages. As can be seen, while the first step covers screening, the other three steps are more focused on due diligence. In private assets, the due diligence steps typically happen between the investor and the fund manager.

Preqin's current model endeavors to help investors and fund managers identify which companies are more likely to be eligible to comply with the EU's compliance criteria.

How to identify EU taxonomy eligibility:
To simplify the EU taxonomy eligibility at an industry and business activity level, the European Commission provides a mapping to business activities with North American Industry Classification System (NAICS) codes. They also provide a tool to make the navigation to the right mapping easier via the EU taxonomy Compass tool.

1. **Preqin's EU taxonomy eligibility model:**
To make it easier for users to identify which company is more likely to be eligible for EU taxonomy, Preqin has mapped eligible business activities to our industry classification and company descriptions. The flowchart below summarizes the way Preqin's model works.
Note: Currently, Preqin's model caters to two of the six objectives of EU taxonomy – climate adaptation and climate mitigation. We regularly update our models to be in line with the annual updates from the European Commission and will be adding the four additional categories soon.

Fig. 5: Preqin's EU taxonomy eligibility model



The taxonomies that are used in this model:

- Industry taxonomy
- Activities taxonomy – Here, we simply utilize the taxonomy defined by the EU in their EU taxonomy Compass tool.

iii. SDG alignment model

Sustainable development goals (SDGs) are commonly associated with impact investing. Impact investing is broadly used to describe the investment strategy/philosophy of investing with the objective of having a significant and (ideally) measurable impact on various ESG metrics while not overlooking the financial gains.

The most common frameworks for identifying and measuring impact investing in both private and public markets are: the UN sustainable development goals (SDGs), MandG III, and Global Impact Investing Network (GIIN). We utilize the UN SDGs framework in our models.

UN Sustainable Development Goals:

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 sustainable development goals (SDGs), which are an urgent call for action by all countries – developed and developing – in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.

These are further split into 17 specific goals that all member states will aim to achieve by 2030. The diagram on the next page summarizes these goals.

Fig. 6: United Nations Sustainable Development Goals

Preqin's model is based on the first 16 goals. Our current model does not capture SDG 17 since it is based on the partnerships and initiatives a company is taking. However, we are looking at capturing details of a range of asset level ESG partnerships and might make this available to users in future releases.

Preqin's UN SDG model endeavors to help investors understand the potential alignments of a company's business activities with the UN SDGs.

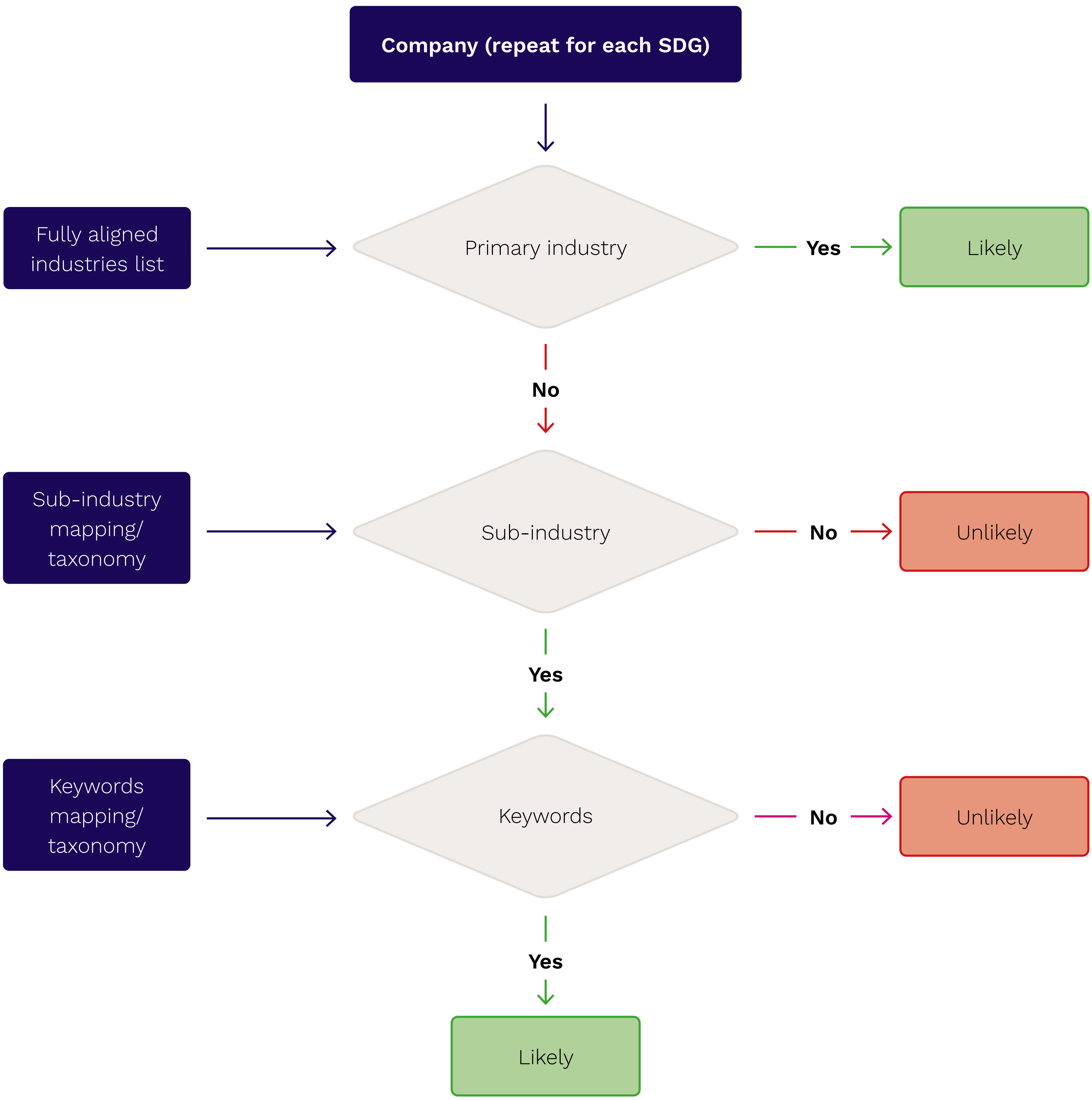
UN SDGs alignment model:

This model looks at a company's industry classification as well as its description (usually from its website) to identify which specific SDGs it aligns to. The diagram below summarizes this in a flowchart. It can be broken down into the following steps:

- **Step 1:** We first check if the company has a primary industry/ business activity that is aligned with an SDG. This is true only for some specific industries such as renewables.

- **Step 2:** Where the company does not have an SDG-aligned primary industry, we further check for sub-industries which reflect the various business activities that the company performs. If a company is found to have a relevant sub-industry, we do not directly label the SDG alignment but proceed to Step 3.
- **Step 3:** Since sub-industries are still quite broad, we further fine-tune the SDG alignment using a list of keywords that we have carefully curated.

Fig. 7: UN SDGs alignment model



Known shortcomings we are looking to resolve in future versions of the models:

- The purpose of these models is to provide a starting point for identifying company alignments. However, this does not currently evaluate the intent or gather evidence on the positive impact of the alignments.
- Negative screen – Currently the model tags a company as SDGs-aligned based on alignments that omit the other business activities the company performs. In future versions, we are looking at adding a negative screen to exclude companies that are potentially controversial or known to have a negative impact. (E.g. Oil and gas exploration companies with a renewables business division are currently tagged as aligned but will be excluded in future versions of the model).
- There might be instances where a company is part of an impact fund, but our models have not been able to identify SDG alignments. This would most likely be due to insufficient information about the company for the model to make a prediction.

iv. Controversial industries mapping
Our research team is constantly up to date with the ESG landscape. Recently, we have come across industries that many ESG practitioners and regulators look at as having a significant negative impact on various ESG parameters. For example, the contribution of the oil and gas industry to climate change. We have carefully curated a list of these industries and mapped them to Preqin's industry classification system to come up with a controversial industries taxonomy.

For every company, we try to display all the activities that it performs that might be deemed as controversial by various ESG practitioners.

v. Investor ESG management indicators
This is simply a list of the ESG management indicators of all the (known) investors in the company. More details on the methodology for management indicators are here.

vi. Risk and impact solutions overview

What is ESG risk and why is it important?
ESG risk is an area of the market that has typically been difficult to standardize, because there are many diverse factors that can lead to financial or societal loss. For example, impact risk reflects the impact an event, like the Deepwater Horizon oil spill, has on society, while physical risk manifests in adverse climate events like the recurrence of devastating Malaysian floods. The effect of climate activism or greenwashing on corporate reputation is an example of both regulatory

and reputational risk, and even the transition to climate-friendly technologies comes with its own risk to industries that may face loss of business as EVs and renewables gain traction.

The concept of 'materiality' in ESG:
ESG risk can arise from many factors and apply to a wide range of business considerations. However, not all types of risk are relevant for all companies and industries. For example, a company that has no association with any country subject to sanctions might not consider sanctions a relevant risk.

One of the more popular ESG frameworks that attempts to standardize risk has been built by the Sustainability Accounting Standards Board (SASB). SASB is a non-profit organization that has been part of International Sustainability Standards bureau (ISSB) since 2022 and is tasked with building sustainable accounting standards. At the core of the definition of standards by SASB is the concept of 'materiality'. The concept is influenced by the general concept of 'materiality' in finance.

However, the concept of 'materiality' in finance (Ref: IFRS - Amendment issued: IASB clarifies its definition of 'material') cannot be directly applied to ESG considerations. Therefore, the use of this term by SASB caused a lot of confusion in the sustainability world as SASB has acknowledged in this blog - Materiality: The Word that Launched a Thousand Debates - SASB (ifrs.org)

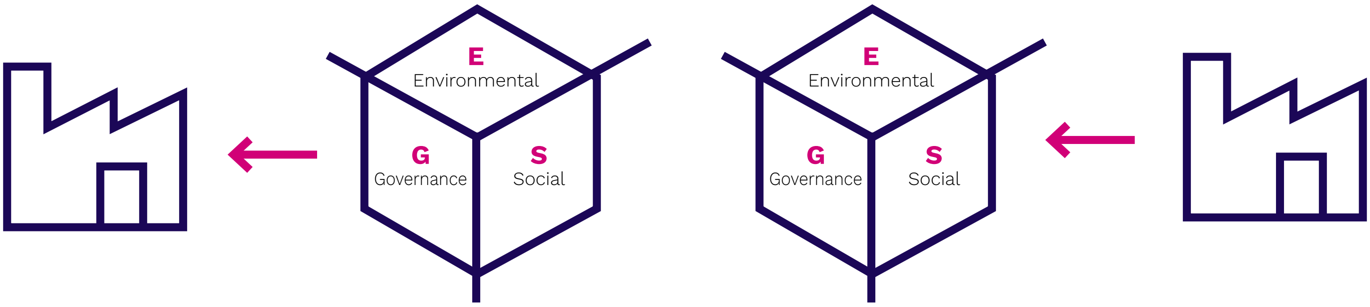
Preqin's interpretation of 'materiality'
After looking at various research papers and ongoing debates among ESG practitioners, we realized that materiality could broadly be looked at in two ways:

- **Financial materiality** – This is primarily about understanding the external risks of various ESG aspects (e.g., floods) and how they are likely to affect a company's operations (e.g., mining operations). This is where we have attempted to apply the SASB materiality map which provides a very good framework for classifying and understanding financial materiality. More details about the SASB materiality map can be found here – Exploring materiality - SASB (ifrs.org)
- **Impact materiality** – This is primarily about understanding the internal risks that the various operations of a company (e.g., carbon monoxide emissions) have on the people, planet, and economy (e.g., respiratory health). We have partnered with the Impact Institute, which develops open-source standards for impact valuation and provides organizations with the tools, training, and services to implement them. More details about the Impact Institute can be found here – Impact Institute - We empower

organizations. The details of the specific approaches we use, including the Global Impact Database (GID), can be found in this section.

Fig. 8: Financial and impact materiality

Financial materiality | **Impact materiality**



- Which ESG risks and opportunities are relevant because they may cause a loss or benefit to the company's operations or processes
- Outside-in

SASB STANDARDS
Now part of IFRS Foundation

- How do the company's operations and initiatives positively/negatively affect people, the planet and the economy
- Inside-out

IMPACT INSTITUTE

General assumptions used by Preqin while implementing risk models:

→ We utilize the data that is currently readily available to us, and information about the company that we don't currently have could potentially include/exclude some of the risks we identify

→ All the risk assessments are based on these factors relating to the company:

- The industries that the company operates in
- The country where the company is headquartered
- Where applicable, the latest revenue figures of the company available to us

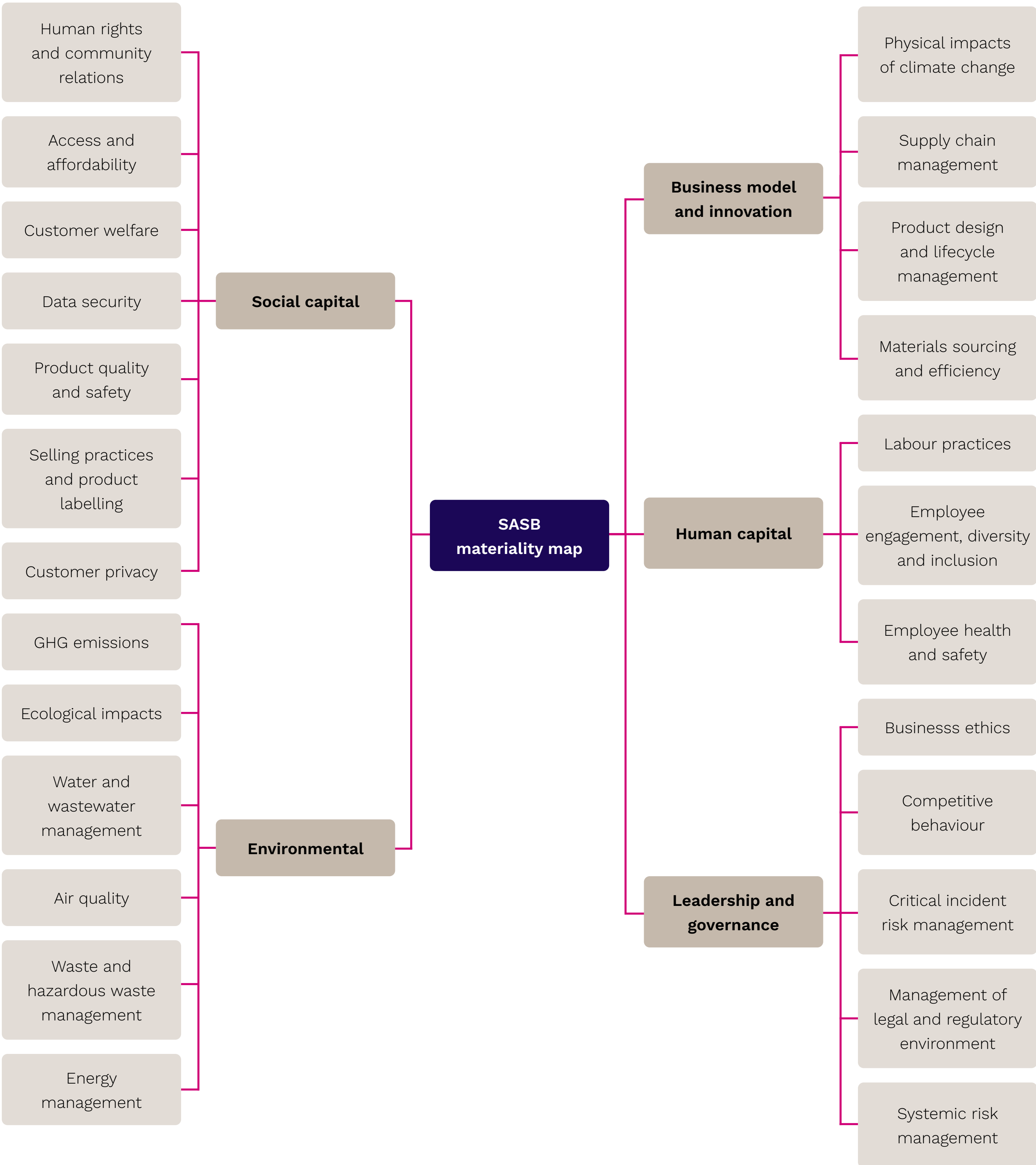
vii. Industry materiality (SASB)

We utilize the SASB materiality map which divides materiality into 5 dimensions which are further broken down into 26 factors. The materiality map provides a mapping between various industries and the factors that are material for each industry.

We've attempted to bring together all the factors from SASB into a graphic that provides a complete picture of the five key dimensions (in green) and the 26 factors as they relate to the five dimensions.

The purpose of the materiality map is to enable users to identify which of the 26 factors would be material based on the industry that the company operates in.

Fig. 9: SASB dimensions and factors



To apply these to Preqin's universe of companies, we have mapped SASB industries to Preqin companies. For every company on Preqin Pro, we show which of the 26 factors are relevant based on the industries that the company operates in. To make it easier for users to pick the E, S, and G risks, we have mapped the five dimensions that SASB provides into three categories.

Fig. 10: SASB dimension and Preqin category mapping

SASB dimension	Preqin category
Environmental	Environmental
Business model and innovation	
Social capital	Social
Human capital	
Leadership and governance	Governance

viii. Geographic materiality (SASB)

While SASB does not provide a mapping for geography-based risk, we have utilized the way SASB breaks down risk into five dimensions and 26 factors to build a geographic risk model. Broadly, the model proposes that if a company is operating in a country where we see a significant risk related to any of the SASB factors, the risk factor would be material for the company as well. Here, the definition of risk is simply based on a comparison or ranking between different countries rather than an absolute measurement of risk.

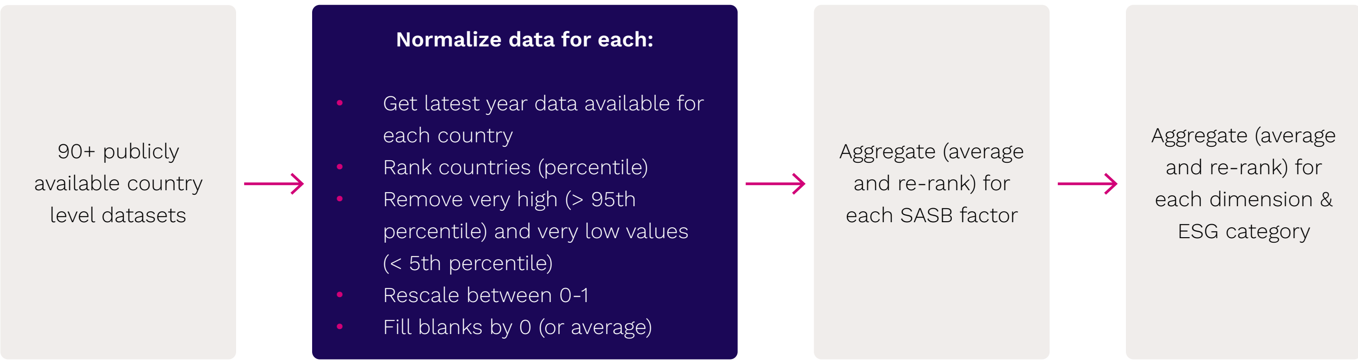
The key point to bear in mind here is that the geographic risk model primarily highlights the risks that are most material where the company is headquartered. This is irrespective of the industry the company operates in. So, the Industry and Geographic Materiality need to be looked at together to get a complete picture of all the potential risks that are relevant when analyzing the company.

The diagram below summarizes the general approach we use for calculating the geographic risk model scores. It consists of the following steps:

- We have carefully curated a list of 90+ data sources that can help us gauge the level of risk. Most of these data sources utilize publicly available survey-based information that is often used to understand how countries fare on various econometric and general indicators. (E.g., access to drinking water in countries can help us understand the level of water management in the country.) A full list of sources is available here

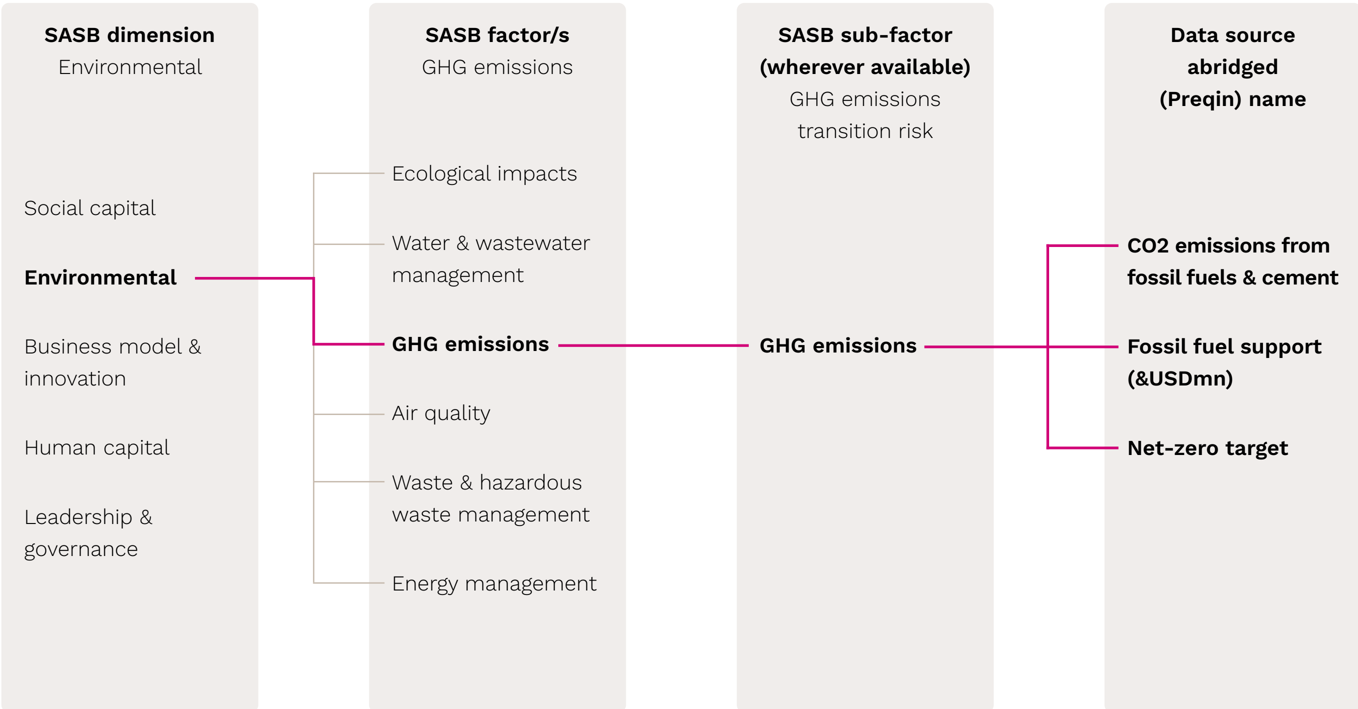
- Since these are country-level datasets, there tends to be disparity between the latest year the data was reported for different countries. Here, we utilize the latest available data for each country. Further, based on the metric under consideration, where specific datapoints are unavailable we either assume that level is the lowest on the scale, or insert an average value. Wherever necessary we also introduce proxies (e. g. "World Bank development index") to be able to fine tune the metrics for countries where datapoints are unavailable. This ensures that the averages or minimum scores we assign to countries are based on the peer-groups rather than overall averages.
- Once all the datasets are collated, we rank the countries for each of these risks, providing a score between 0 and 1 which represents their risk relative to the same data from other countries in the dataset. Once a country has a score for each risk, these are totaled and used to rank the countries relative to each other using the same system of a score between 0 and 1.
- Lastly, we utilize averaging and re-ranking as we roll-up from 90 sources to 26 SASB factors and from 26 SASB factors to 5 SASB dimensions and further to E, S, and G.

Fig. 11: Calculating geographic risk model scores



The diagram below shows the way the sources roll up to a SASB factor for one of the SASB dimensions.

Fig. 12: How sources roll up to SASB factors and dimensions



ix. Impact materiality

As we mentioned above, impact materiality seeks to take an inside-out approach where we look at the effect of a company's operations on people, the planet, and the economy. Since it is hard to standardize and quantify impact, we bank on the good work done by True Price, which originally developed the methods and tools to measure and monetize impact, and scaled by our partner, the Impact Institute.

<u>Introduction to the Impact Institute</u>

Impact Institute is a social enterprise and a spin-off of True Price. True Price, founded in 2012, developed methods and tools to measure and monetize impact. In 2018, True Price decided to continue as a non-profit focused on maintaining a standard and community to realize true pricing, a system where consumers can see and voluntarily pay the true price of their products. All services, as well as the development of new methods and technologies, have been spun off to the Impact Institute, which develops open-source standards for impact measurement and valuation and provides organizations with the tools, training, and services to implement them.

Fig. 13: GID | 1,5m+ data points to quantify outcomes of investments

30+ data sources

↓

28 physical indicators

↓

15 Impact Metrics

Environmental	Contribution to climate change
	Air pollution
	Water pollution
	Use of scarce water
	Fossil fuel depletion
	Use of scarce materials
	Land occupation
Social	Gender wage gap
	Underpayment
	Forced labour
	Child labour
	Workplace H&S incidents

↓

Across 140 countries & regions

↓

Across 65 sectors

↓

Across 3 value chain segments

↓

Across 2 types of units: footprint/monetized

Impact Institute's Global Impact Database (GID)

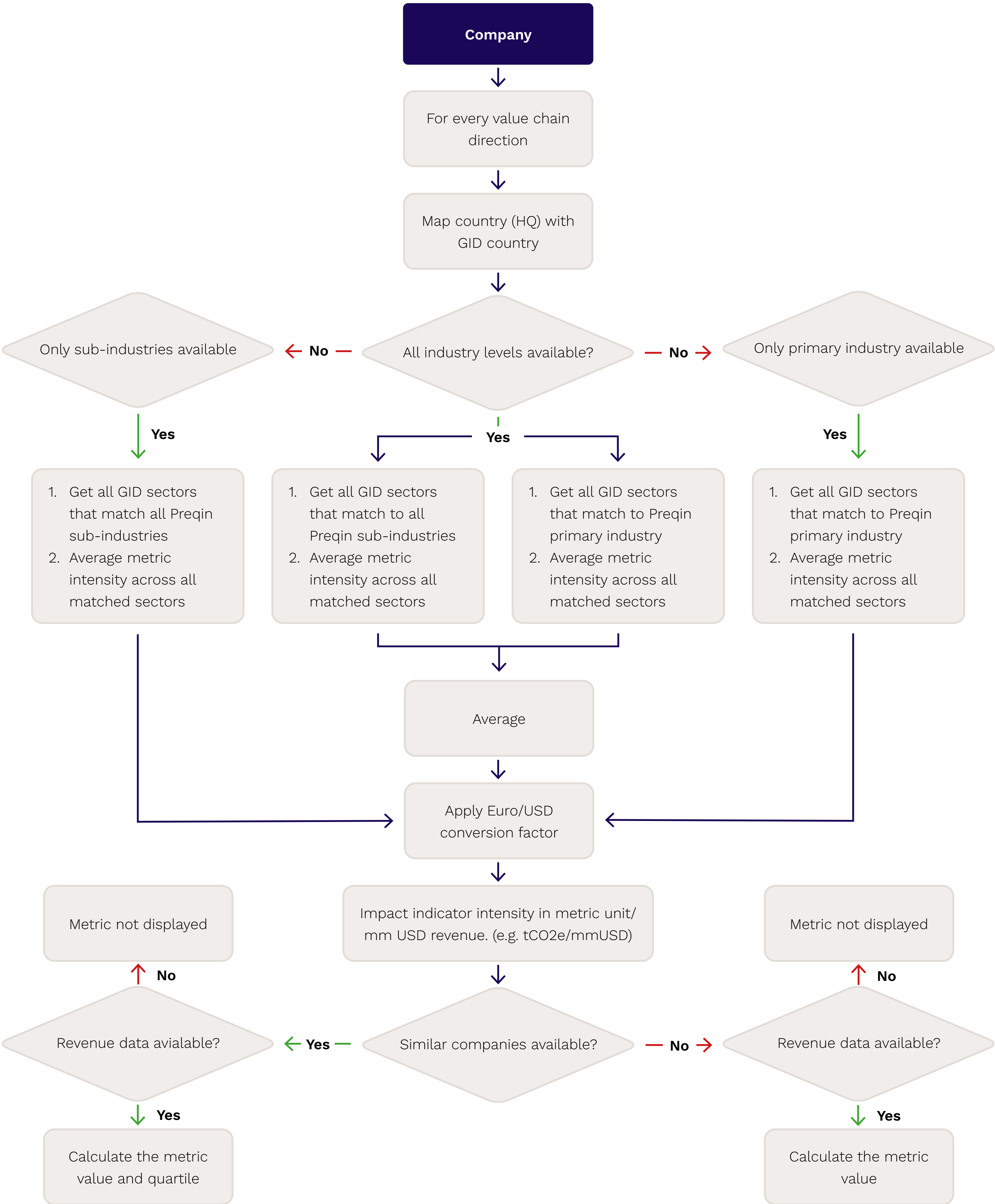
The Global Impact Database (GID) is a model built by the Impact Institute that quantitatively describes the global economy and estimates economic, social, and environmental impacts of investments for 140+ countries in 65 sectors. Investments stimulate economic production, which has direct and indirect impacts on the economy, the environment and society. The GID estimates this impact based on data on the interconnectedness of industries in various countries and their environmental and social performance from global databases. The output of the GID model can be used directly for top-down impact estimates. The diagram below summarizes the scale of the GID. More details on the GID and how it is conceptualized and built are included in the Appendix.

How we use GID to calculate impact

GID's global dataset quantifies the ESG impact of companies based on their location, the sector they operate in and the direct and indirect actions that affect their impact. The environmental, social and governance impact of a company comes from their direct operations as well as from the impacts of their suppliers (upstream impact) and their customers (downstream impact). Together these are known as value chain directions. GID measures impact intensity which is quantified in Euros per Euro of revenue of the company. This is available for every combination of Country – Sector – Value Chain Direction. For every company, we utilize the flowchart below to calculate the Impact indicator intensity in USD/mmUSD revenue. A summary of the steps followed in the flowchart above:

- For every company, GID provides Impact intensities in Euro per Euro of revenue for 11 Impact Indicators (six Environmental and five Social). Each of these indicators is split into the following value chain directions: Direct, Upstream, Downstream and Total.
- We combine Upstream and Downstream directions under the Indirect label to make it easier to interpret.
- Since private markets are opaque, we sometimes do not have revenue data or full sector information available for companies.
- The rest of the flowchart above is built to be able to handle special cases where we have limited data but are still able to provide an estimated value for impact intensity.
- Further, at Preqin, we utilize the company descriptions from a company's website to be able to compare which companies perform similar activities. These are called similar companies. More details about this are available in the Appendix. These groups of companies allow us to rank companies within a similar set. This in turn allows users to understand if the company is better or worse than its peers on various impact dimensions.
- Lastly, since GID is denominated in Euros, we have applied conversion factors to convert the metrics to USD denominations.

Fig. 14: Calculating the impact indicator intensity



Overall, for every company (wherever it's possible to calculate) we have:

Estimated environmental impact: This is the monetized equivalent environmental impact of the company's operations which includes its overall value chain on both the suppliers and consumers sides. Another way of looking at this is the amount of money that is needed to correct the negative impact of this company's operations on the environment, across the value chain. We denominate this as intensity and therefore this is the equivalent impact in USD per million USD revenue of the company.

Estimated social impact: Similarly, this is the monetized equivalent social impact of the company's operations which includes its overall value chain on both the suppliers and consumers sides. Another way of looking at this is the amount of money that is needed to correct the negative impact of this company's operations on society, across the value chain. We denominate this as intensity and therefore this is the equivalent impact in USD per million USD revenue of the company.

Impact ranking: This is where we utilize the company's revenues (where available) to calculate the absolute impact in monetary terms for a range of indicators associated with the environment and society. Further, the quartiles are calculated to show the best and worst peers and where the company stands. We've also enabled flexibility to see this comparison for direct, indirect, or total impacts.

Impact breakdown: This further breaks down the indirect portion of the impacts for all the environmental and social indicators.

Note on quartiles: Everywhere in the Impact Assessment section, we denominate Q1 as the best or the best 25% of the companies, in other words the companies that have the least impact. We move towards the worst 25% as we move towards Q4 or in other words the companies that have the most significant impact.

How we use GID to calculate impact metrics

Besides impact intensity, GID also provides a range of metrics which they quantify in metric unit (e.g., kgCO2e) per Euro of revenue of the company. This is again available for every combination of Country – Sector – Value Chain Direction. For every company, we utilize the flowchart below to firstly map the GID country and industries to Preqin country and industry levels. Further, we multiply the mapped value with revenue to get the absolute estimated value of each of the metrics.

Estimated metric value: This is simply the estimated value of the metric that is split into the different value chain directions – Direct, Upstream, Downstream or Total.

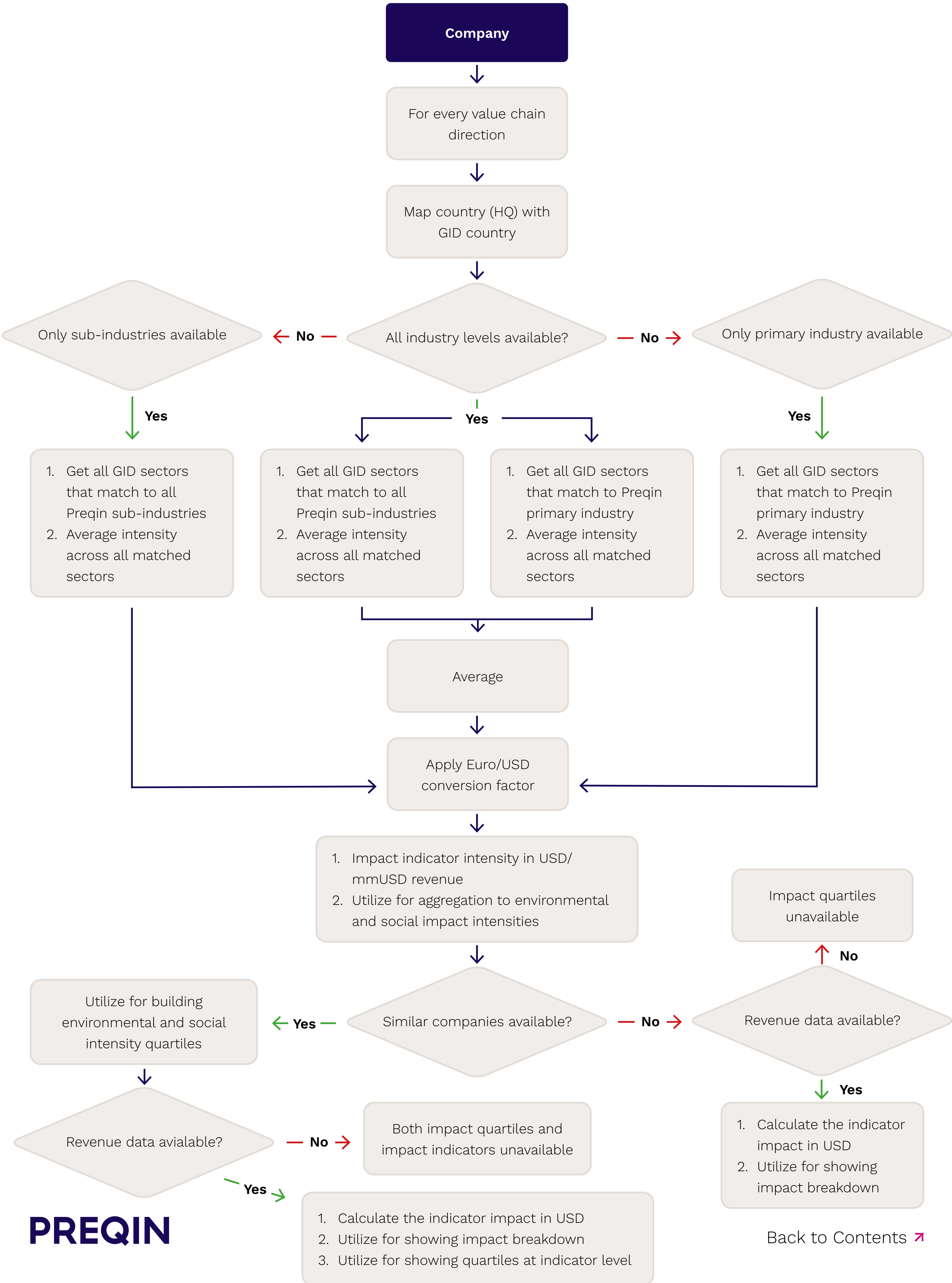
Metric ranking: This is where we utilize similar companies (where available) to calculate the rank of this company among peers for each of the ESG metrics. Further, the quartiles are calculated to show the best and worst peers and where the company stands. We have also enabled flexibility to see this comparison for Direct, Upstream, Downstream, or Total estimated values for each ESG metric.

Limitations of impact materiality

As with all datasets, there are limitations that users should consider. Some of the known limitations include:

- Since private markets are opaque, we typically do not have revenue breakdown by business activity, which is needed to add a level of accuracy to impact as well as ESG metrics estimates.
- As revenue forms the basis for estimation, we provide a detailed impact assessment and ESG metrics only for companies where we have revenue information.
- Some of the limitations of the data provided by third parties will remain in the estimates.
- Data may not reflect the most recent situation, both in impact data and trade data. This is because the best available impact data based on completeness, granularity and year of origin is used. Impact data is validated against other datasets to ensure results are comparable with other sources.
- The value chain data does not reflect the effects of specific suppliers and clients because it is representative of an average company across a country or industry. Therefor it cannot reflect any diversions from this average. The top-down approach, which collates industry and country data and derives averages for companies within those parameters, is used when bottom-up data, i.e. information disclosed directly by the companies, is not feasible in terms of time and data availability. Data points that may be correct but differ significantly from other observations are considered outliers and can be accidentally corrected. We aim to ensure our impact data is as robust as possible by validating it against other datasets to ensure results are comparable with other sources. The GID is based on multiple different data sources. Each source might have errors in their data due to mismeasurements, input errors, etc., so it seems reasonable to assume the outliers identified are actually outliers.
- Impacts due to the use of goods and services by final consumers are not considered. The data needed to link consumer impacts to countries and sectors is not available. The best available data based on completeness, granularity and year of origin is used.

Fig. 15: Calculating ESG metrics



x. Real estate carbon and energy metrics

Preqin tracks real estate carbon emissions estimates, energy usage estimates, and green building certificates at the asset-level. Although there is increasing interest in disclosing real estate sustainability metrics, investment professionals often face significant challenges with access to standardized and high-quality, asset-level data. Leveraging Measurabl's Whole Buildings Estimates data service, we adopt its best-in-class machine learning (ML) models to provide comprehensive and standardized carbon and energy metrics at the granular level. This first-of-its-kind solution increases transparency and accountability for sustainability in private real estate investment.

Introduction to Measurabl

Measurabl, the world's most widely adopted ESG technology for real estate, is at the forefront of driving sustainable real estate. With a database consisting of 80,000+ buildings and over 18 billion square feet of real estate across 93 countries worldwide, Measurabl leverages ESG data to create investment-grade estimates on sustainability metrics for any building in the world with high accuracy. Through its data services, Measurabl empowers real estate organizations to optimize their sustainability performance, manage physical risk exposures, and accelerate sustainable finance initiatives such as decarbonization.

Introduction to Measurabl's ML model

Measurabl utilizes its proprietary ML model to generate historical usage estimates of buildings with varying features. These datasets undergo a rigorous data cleaning process to ensure maximum data integrity and quality. The ML model is also subject to a 'training' process whereby patterns between usages and input features are learned, allowing the model to estimate usage for any combination of building features. This process enables the model to generate any historical usage estimates for new buildings based on its specified building features. The ML model is used in conjunction with inputs and Measurabl's database to derive Whole Building Estimates.

II. Fund-level solutions

Fig. 16: Fund level solutions

Our fund level data includes the following ESG metrics:

- **Fund labels:** Identify funds with sustainable investing labels that align with your ESG mandate. The labels tracked include ESG integration, SDG, impact, climate, sharia, and EU regulation SFDR article 8 and article 9.
- **SASB risk map:** Identify the most material ESG risk factors for a specific fund.
- **Management indicators:** Evaluate the potential positive impact of a fund's portfolio.

ESG fund labels

If you are tasked with creating a new fund, ESG fund labels enable you to benchmark your offering against the competition, so you can better position the new fund in market and strengthen your fundraising. If you are an institutional investor, this component enables you to discover strategies and investment funds that align with your ESG mandate.

ESG funds in the market are identified – and tagged – according to eight common types:

A. **ESG integration:** Funds that consider environmental, social and governance principles in their investment strategies. These may encompass ESG as a whole or the E, S or G individually, with financial returns remaining the funds' primary directive.

B. **Impact:** Funds focused on generating positive social or environmental effects. These funds are generally values-driven and pursue societal or environmental objectives complementary to financial performance.

C. **SFDR Article 8:** Funds defined by the European Union's Sustainable Finance Disclosure Regulation (SFDR) as promoting environmental and/or social matters without having sustainable investment as its primary objective (i.e., not *impact* funds).

What qualifies as promotion:

- Any disclosure or provision of information and an "impression" that the investments pursued by a fund also consider specific environmental or social characteristics.
- Principal Adverse Sustainability Indicators (PASIs) integrated into investment decisions.

Other criteria:

1. A fund must be subject to binding criteria in relation to its environmental and/or social characteristics; mere integration of sustainability risks is not sufficient.
2. Investee companies must have good governance practices.

D. **SFDR Article 9:** Funds whose objective, as defined by the European Union's Sustainable Finance Disclosure Regulation (SFDR), is either sustainable investment or reducing carbon emissions.

What qualifies as sustainable investment:

- Any disclosure or provision of information and an "impression" that the investments pursued by a fund also consider specific environmental or social characteristics.
- Principal Adverse Sustainability Indicators (PASIs) integrated into investment decisions.

E. SDG: Funds seeking investments in assets aligned with the United Nations Sustainable Development Goals (SDGs).

F. Climate: Funds focused on supporting the mitigation of climate change.

G. Sharia-compliant: Faith-based funds that adhere to Sharia Law and the Islamic religion's principles it represents. Sharia funds do not invest in companies that deal with the production of weapons, alcohol, pork, gambling and tobacco. Their key principles include promoting businesses that benefit society and investments with increased transparency. Sharia rules preclude short-selling and excess leveraging, and prohibit the trading of derivatives or futures.

H. Energy transition: Funds that focus investments on supporting the transition to renewable energy sources. This tag applies to any fund whose objective is to support the global transition to sustainable energy sources.

When is a fund tagged?

Funds are tagged in the following instances:

1. The tag label (e.g., 'Impact') is included in the fund's name.

2. Marketing materials or other collateral explicitly identify the fund with a tag label.
3. GPs self-declare their fund to be associated with a tag label.

Management indicators
At fund level, we simply cascade the management indicators of the GP that has launched the fund. More details about this are in the GP management indicators section.

III. GP level solutions

GP management indicators
The management indicators component covers any ESG policies, management practices, and rules of doing business that have been disclosed and updated within the past two years. Institutional investors can use management indicators, in conjunction with the ESG affiliations and ESG contacts components, to identify fund managers with an ESG-integrated investment workflow. There are 76 indicators for GPs. By leveraging established ESG frameworks and standards,

Fig. 17: GP level solutions

Our GP level data includes the following ESG metrics:

- **Management indicators:** Determine the level of transparency across a set of core ESG indicators aligned with leading ESG frameworks and standards.
- **GP regulatory disclosures:** Track firm-level adherence to ESG regulatory requirements.
- **ESG affiliations and memberships:** Analyze third-party memberships related to funds and evaluate their ESG commitments.
- **ESG contacts:** Access contact details (name, role, email, office location, phone number, and LinkedIn) for dedicated ESG contacts.
- **SASB risk map:** Identify the most material ESG risk factors for a specific GP.

Preqin has curated a set of core ESG data points, specifically applicable to private markets. Relying on valuable input from our ESG Advisory Council, comprised of more than 50 clients who partner in our research and development program, this product was designed to incorporate and build upon existing domain knowledge. A full list of sources we have curated the management indicators from are included in the appendix.

Additionally, we calculate the percentage of fund managers on Preqin Pro that have publicly or privately disclosed each of the 76 indicators. This ratio informs our clients about market-wide disclosure rates – what we call frequency.

Generating the ESG disclosure rate

The ESG disclosure rate for each GP profile, which calculates the percentage of ESG indicators that are publicly or privately disclosed, is calculated as follows:

Preqin's ESG disclosure rate provides an indication of how transparent a firm is in relation to core ESG facets.

Our search functionality enables clients to compare between firms according to a variety of ESG criteria, including:

- A firm's overall ESG disclosure rate
- Disclosure of specific management indicators

$$\textit{Preqin ESG disclosure rate} = \frac{\textit{Number of ESG indicators disclosed}}{37}$$

- Management indicators governance type (at firm, portfolio, or asset levels)
- ESG affiliations

Other core filters from the wider Preqin offering include, but are not limited to:

- Assets under management
- Asset class
- Location
- Strategy
- Sector
- Geography

GP regulatory disclosures
GP regulatory disclosures provide an overview of a fund manager's adherence to ESG regulatory requirements. This dataset currently covers the EU Sustainable Finance Disclosure Regulation (SFDR), which is binding as of 2022, and will be expanded to cover other global regulations as they are introduced. GP regulatory disclosures seamlessly integrate fund sourcing and due diligence with regulatory compliance.

Preqin's regulatory disclosures track firm-level disclosures mandated by regulatory bodies. Our dataset currently includes the following, collected through the public domain by Preqin's ESG research team:

- **SFDR Article 3:** Disclosure of a 'Sustainability Risk Policy' that includes information on the integration of sustainability risk considerations in the firm's investment decision-making process.
- **SFDR Article 4:** Disclosure of a 'Principal Adverse Impacts Statement' (PAI) that includes a due diligence assessment of sustainability impacts. Alternatively, disclosure of the firm's rationale for not publishing it.
- **SFDR Article 5:** Disclosure of remuneration policies that include information on how the firm integrated its consideration for sustainability risks.

We aim to expand the list of disclosures as they are introduced by regulatory bodies.

ESG affiliations
To commit to an affiliation, firms need to dedicate time and resources to integrate ESG into their practices. As a result, affiliations indirectly signal management priorities. If you are an institutional investor, the ESG affiliations component – in conjunction with Transparency KPIs and ESG Contacts – enables you to identify fund managers with ESG-integrated investment workflows. If you are committed to Net Zero, ESG affiliations indicate which fund managers have pledged to manage their Scope 3 emissions. This information enables you to quickly shortlist the funds which track and actively manage their carbon footprints.

Based on their prevalence in the industry, we amassed an extensive dataset tracking 40+ third-party organizations to which LPs and GPs are affiliated. Preqin's ESG research team collects this information from the public domain and includes it on both LP and GP ESG profiles. For each organization we calculate the percentage of the 60k+ LPs and GPs featured on Preqin Pro who are affiliated with it. While conducting this calculation, we consider only firms with at least a single affiliation. The resulting ratio informs our clients about the extent to which the standards promoted by this organization permeate the market. Using similar terminology to management indicators, we call this data point *frequency*. An institutional investor or fund manager's association with a specific organization can provide further insight into a firm's ESG practices, indicating obligations that are perhaps otherwise not publicly disclosed. For a full list of affiliations currently tracked by Preqin please see Appendix B.

ESG contacts

The ESG contacts component enables you to directly reach out to key players on the ESG scene, providing a target list of contacts that can be instrumental in your business development. The availability of an ESG contact is also an indirect indicator of how serious an organization is about the role of ESG in its investment workflow.

The existence of ESG teams within fund managers and institutional investor firms is a recent phenomenon. As it becomes more mainstream, we map the presence of ESG capabilities and expertise within organizations. The ESG contacts component enables you to not only verify if a firm has a dedicated ESG team, but also access contact details of various team members. This insight enables you to research individuals' backgrounds and trace their career paths, as well as gain insight into how the team was created and has grown. This is critical information when it comes to evaluating ESG capacity and expertise within an organization.

IV. LP level solutions

LP management indicators

The management indicators component covers any ESG policies, management practices, and rules of doing business that have been disclosed and updated within the past two years. Fund managers can use it to pinpoint areas of ESG governance where they are weaker than their peers – and, therefore, where improvements need to be made to attract investors. There are 53 indicators for LPs. By leveraging established ESG frameworks and standards, Preqin has curated a set of core ESG data points, specifically applicable to private markets. Relying on valuable input from our ESG Advisory Council, comprised of more than 50 clients who partner in our research and development program, this product was designed to incorporate and build upon existing domain knowledge. A full list of sources we have curated the management indicators from are included in the appendix.

LP ESG mandates

LP ESG mandates provide information on the ESG mandates of institutional investors active in the alternatives market. If you are a fund manager, or a placement agent or prime broker fundraising on their behalf, access to LP ESG mandates enables you to create target lists of entities who are likely to invest with you.

Fig. 18: LP level solutions

Our LP level data includes the following ESG intelligence metrics:

- **Management indicators:** Measure the level of disclosure across a set of core ESG indicators aligned with leading ESG frameworks and standards, plus see the ESG KPIs for the fund managers the LP has invested with.
- **LP ESG mandates:** Find LPs with ESG mandates, practices and policies aligned with your sustainability objectives.
- **ESG affiliations and memberships:** Analyze third-party memberships related to funds and evaluate their ESG commitments
- **ESG contacts:** Access contact details (name, role, email, office location, phone number, and LinkedIn) for dedicated ESG contacts.

LP ESG mandates enables our clients to identify LPs who have announced their commitment to investing in ESG-aligned funds or assets within the next 12 months. Leveraging our strong client relationships, Preqin's investor research team collects proprietary information directly from LPs regarding their investment plans for the next 12 months. This dataset includes:

- Types of managers they plan to invest with
- The number of funds they plan to invest in
- Asset classes
- Strategies to be employed
- Locations and markets
- Industries

LP ESG mandates then build on this dataset by tagging firms committed to including ESG in their investment plans during the indicated period. Clients get to see a list of entities committed to directing capital towards ESG investments and a tally of the total proposed allocations.

ESG affiliations

To commit to an affiliation, firms need to dedicate time and resources to integrating ESG into their practices. As a result, affiliations indirectly signal management priorities. If you are an institutional investor, the ESG affiliations component – in conjunction with the management indicators and ESG contacts – enables you to identify fund managers with ESG-integrated investment workflows. If you are committed to Net Zero, ESG affiliations indicate which fund managers have pledged to manage their Scope 3 emissions. This information enables you to quickly shortlist the funds which track and actively manage their carbon footprints.

Based on their prevalence in the industry, we amassed an extensive dataset tracking 40+ third-party organizations to which LPs and GPs are affiliated. Preqin's ESG research team collects this information from the public domain and includes it on both LP and GP ESG profiles. For each organization we calculate the percentage of the 60k+ LPs and GPs featured on Preqin Pro who are affiliated with it. While conducting this calculation, we consider only firms with at least a single affiliation. The resulting ratio informs our clients about the extent to which the standards promoted by this organization permeate the market. Using similar terminology to the management indicators, we call this data point *frequency*. An institutional investor or fund manager's association with a specific organization can provide further insight into a firm's ESG practices, indicating obligations that are perhaps otherwise not publicly disclosed. For a full list of affiliations currently tracked by Preqin please see Appendix B.

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C. Model validation approaches and results

I. How we validate EU taxonomy eligibility model

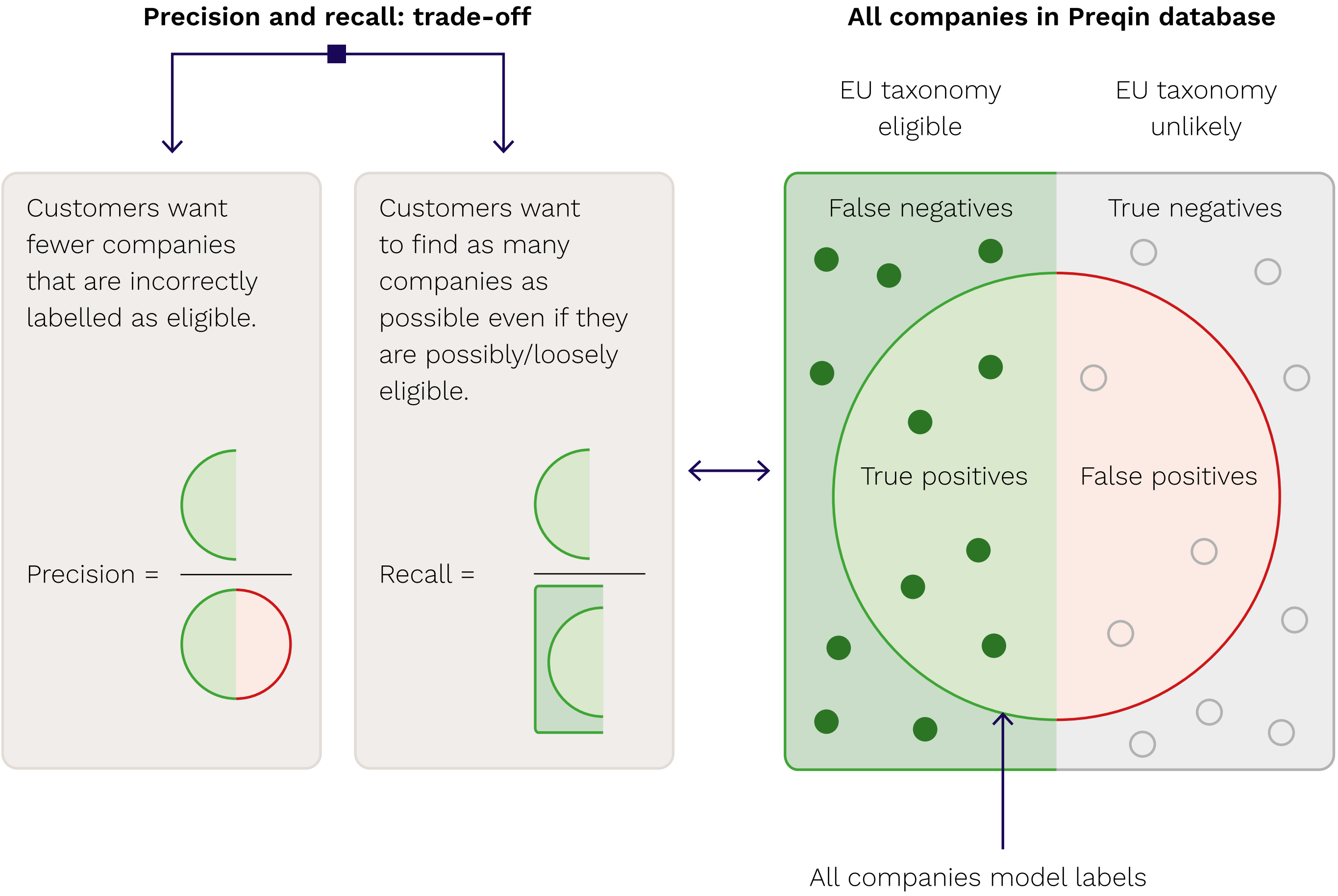
As mentioned in the model details above, we make use of algorithmic models to gauge the EU taxonomy eligibility.

There are two key aspects that classification models generally work on:

- The model can make a prediction based on the amount of information that is available to it.
- We can calibrate the model to work a certain way to reduce the chances of errors in results we are interested in seeing. However, this often comes with a trade-off resulting in increased chances of errors in other areas. However, the art lies in identifying the areas where our tolerance for errors is high and where it is low.

For the EU taxonomy eligibility model, there is a trade-off between finding eligible companies accurately and finding all the companies that could possibly be eligible. The diagram below summarizes this trade-off. In our case, given that this is a screening process, we have tried to calibrate the models more towards trying to find all the companies that are likely to be eligible. As seen from the trade-off below, this also means that there might be some companies that could be found to be not eligible after due diligence. Our current models have been able to achieve a good recall i.e., finding all the companies that could possibly be eligible while still achieving a reasonable level of accuracy.

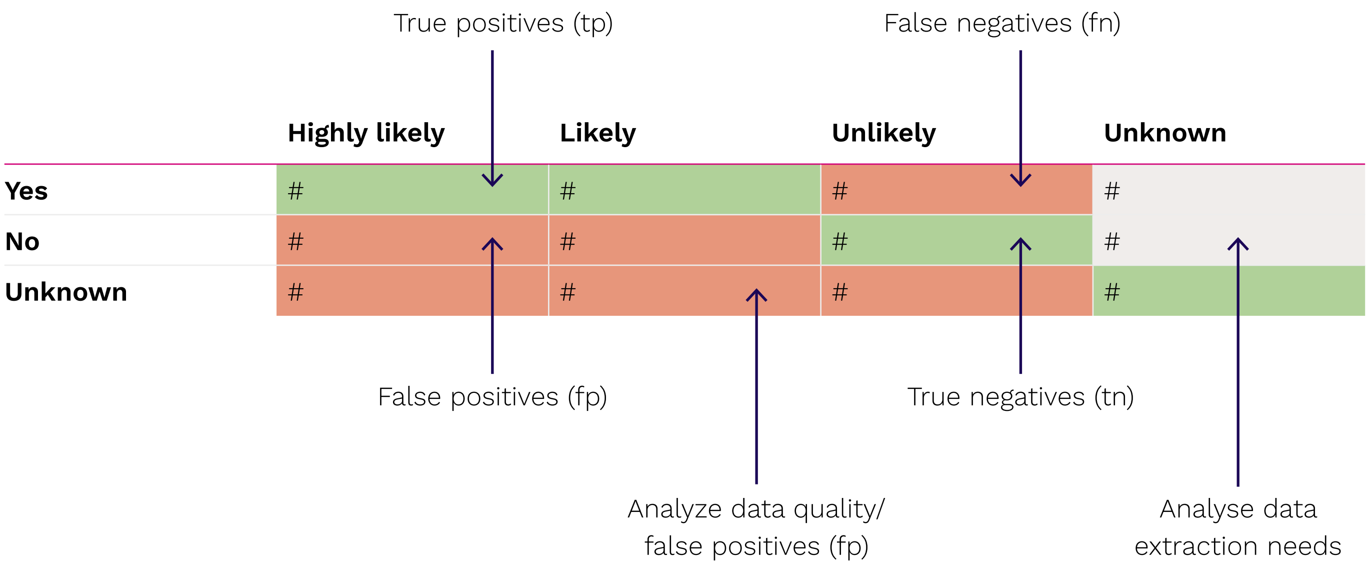
Fig. 19: Precision and recall trade-off



The data science validation chart below summarizes the results of our tests of the model vs data that was labelled by our in-house researchers. In simple terms, it suggests that the model can find:

- At least 8 out of every 10 companies that are potentially EU taxonomy eligible. This means that it can correctly find 80% of all the companies from Preqin's coverage of companies that are likely eligible, and it misses very few that might be eligible.
- At least 6 out of every 10 companies it labels would be correctly EU taxonomy eligible after further due diligence.

Fig. 20: Confusion matrix



$$\text{Precision} = \frac{tp}{tp + fp}$$

$$\text{Recall} = \frac{tp}{tp + fn}$$

Thresholds we want to achieve (analyse both with/without Unknown category):

- Precision > 0.7
- Recall > 0.8

Fig. 21: Model evaluation matrix

	Precision	Recall	F1-score	Support
Not eligible	0.66	0.40	0.50	273
Eligible	0.58	0.80	0.68	287
Accuracy			0.61	560
Macro avg.	0.62	0.60	0.59	560
Weighted avg.	0.62	0.61	0.59	560

II. Results of SDGs model validation

As part of the validation, 550 companies were distributed among five analysts who were tasked to manually label the companies. The analysis revealed that there were some areas where there was considerable subjectivity with labelling. The table below has some refined guidelines for adding consistency to how we build and evaluate models where such subjectivity exists.

The table below summarizes the results of the model across the 16 SDGs. Our objective here was to get a good precision threshold of 0.7 for as many SDGs as possible while still having a decent recall of over 0.5.

Fig. 22: SDG model validation results

SDG	True positive	False positive	True negative	False negative	Precision	Recal
SDG01	7	4	483	6	0.64	0.54
SDG02	11	15	472	2	0.42	0.85
SDG03	42	10	436	10	0.81	0.81
SDG04	13	7	478	2	0.65	0.87
SDG05	3	0	495	2	1.00	0.60
SDG06	10	2	487	1	0.83	0.91
SDG07	11	0	482	7	1.00	0.61
SDG08	13	8	467	12	0.62	0.52
SDG09	1	24	466	9	0.04	0.10
SDG10	6	1	489	4	0.86	0.60
SDG11	3	2	487	8	0.60	0.27
SDG12	13	9	466	11	0.59	0.54
SDG13	7	6	485	2	0.54	0.78
SDG14	5	20	470	5	0.20	0.50
SDG15	6	4	486	4	0.60	0.60
SDG15	4	12	480	4	0.25	0.50

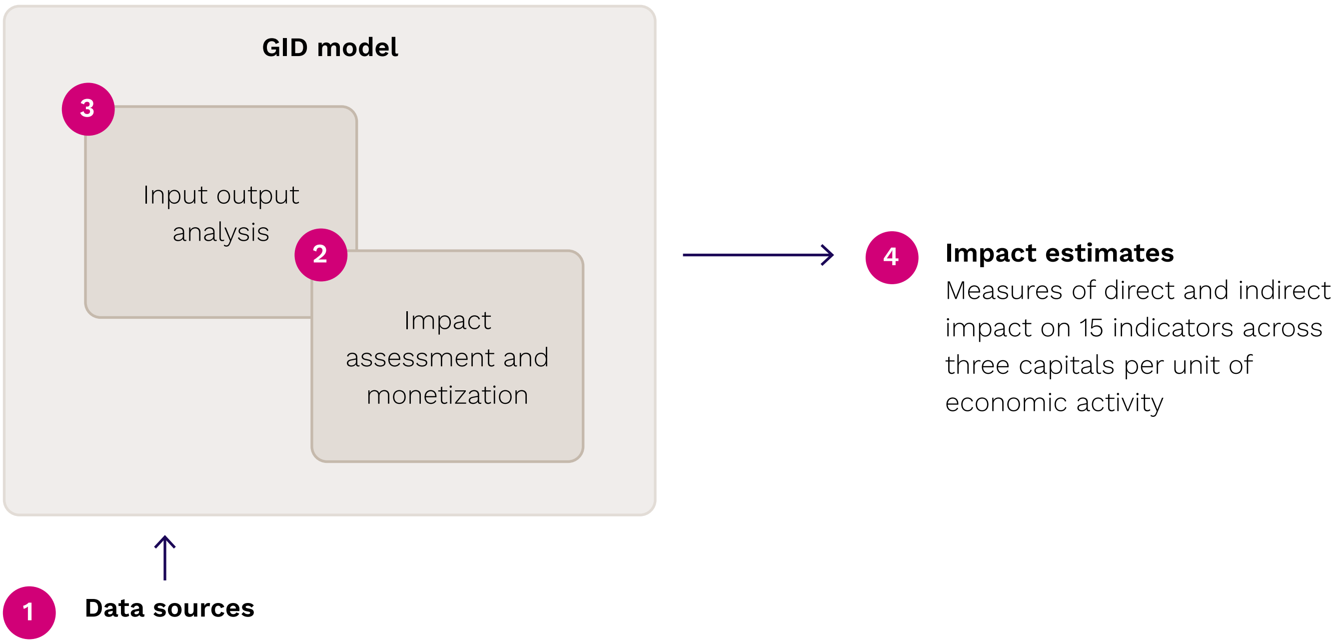
- The model meets the precision threshold (0.7) for 5 SDGs.
- Nearly good for 6 other SDGs.
- Not yet good on precision for 5 SDGs.

D. The Impact Institute (GID) – Technical details

I. Building blocks of the GID

1. Raw data
    - Secondary data used to estimate and attribute value chain impact multipliers of country sectors.

Fig. 23: GID model building blocks



- Input output databases
- Other social, environmental and economic global databases
- Impact literature

2. Impact assessment and monetization
    - Production of direct impact indicator estimates for each country and sector.
    - Description: Impact assessment and monetization consists of taking a selection of extensions and converting them into impact indicators that are expressed in monetary terms. Conversion from extensions to indicators requires

impact factors and conversion to monetary units requires monetization factors. These impact factors and monetization factors are further explained below:

– Impact factors – factors that are multiplied by extensions to convert them into a standardized set of GID indicators e.g., kilograms of different green-house gas emission are converted into kilograms of CO2 equivalents.

– Monetization factors – factors that are multiplied by GID indicators producing a comparable set of monetized GID impacts e.g., kilograms of CO2 equivalents and m3 of scarce water use are converted to comparable $ (or Euro) values.

3. Input output (I/O) analysis

- Process of estimating value chain connections.

4. Impact estimates

- Measures of direct and indirect impact on 23 indicators per unit of economic activity (revenue per year) along the value chain.

- **Description:** GID uses I/O analysis to produce estimates of what the impact of economic stimulation is throughout the economy. Raw GID data has the unit impact per Euro economic activity in a specific sector. However, by sourcing from a sector, you not only stimulate economic activity in the sector where you source from, but also in sectors where that sector in turn sources from. Similarly, if an organization (e.g., a bank) stimulates economic activity through provision of loans, it not only activates the economic sector it directly lends to, but also their value chain. The principle of 'value chain responsibility' states that an organization should take (co-) responsibility of the impacts in their value chain. GID helps the user to do that. For every Euro of sourcing, GID traces what other sectors are stimulated, and what is the cumulative effect of all these sectors on the impacts. Similarly, for every Euro of interest income from business lending, it traces how the loan has stimulated economic activity at the direct business client and beyond – and how much impact results from that. The impact estimates are represented by impact indicators describing the impact of global value chains.

II. Raw data

The raw data used in GID is described below:

- Input output (I/O) data – trade data describing the interconnectedness of the global economy.
- Extensions – Datasets extending the I/O trade data describing the social, environmental and economic performance of sectors worldwide. These are provided by I/O databases in the form of environmental and socio-economic extensions and derived from public sources such as Wageindicator, ILOStat, and OECD statistics.
- The main data sources used in GID include as GTAP, SHDB, Eora, and Exiobase.

III. Input output analysis

Input-output analysis (IOA) is an economic technique that represents the interdependencies between different countries and sectors. It is a well-established method used for academic articles and research papers, that is now also being utilized for sustainability reporting by corporate and financial institutions. IOA is widely used. A selection of academic articles and research papers where IOA is the main technique used for estimating environmental and social value chain impacts are listed below:

- Evaluating the environmental impacts of dietary recommendations. Behrens, Paul et al. PNAS. Web. December, 2017
- The Global Resource Footprint of Nations: Carbon, water, land and materials embodied in trade and final consumption calculated with EXIOBASE 2.1. Tukker, Arnold et al. ResearchGate. Web. June, 2014.
- Carbon Footprint of Nations: A Global, Trade-Linked Analysis. Hertwich, Edgar and Glen Peters. ACS Publications. Web. June 15, 2009.

The use of IOA for estimating environmental value chain impacts is known as environmentally extended input-output analysis (EEIO). For more information about the EEIO approach refer to the paper below:

- An Introduction to Environmentally-Extended Input-Output Analysis. Kitzes, Justin. ResearchGate. Web. September, 2013.

IV. Framework

The GID is built using the following frameworks as its foundations:

- The International Integrated Reporting Council's (IIRC's) Integrated Reporting (IR) Framework is used to define the categories of capital that the impact indicators are grouped by.

- Universal Declaration of Human Rights is the basis of the rights-based method to quantify and monetize externalities for social, human, and natural capital.
- UN Guiding Principles for Business and Human Rights and the Principles for True Pricing by True Price are the basis for the remediation cost approach used to develop the monetization factors.
- Framework for Impact Statements (FIS) is followed regarding the principle of value chain responsibility, as well as in how impacts are monetized.
- Principles for True Pricing are used for measuring and monetizing non-economic impacts on social, human, and natural capital.
- The GID methodology follows the Integrated Profit and Loss assessment methodology (IAM) Core with regard to the principle of value chain responsibility and valuation.

V. Direct vs indirect impact

The GID assesses the impact of one dollar of economic activity (revenues per year) based on the country and sector where it takes place. It provides direct and indirect impact multipliers.

Direct impact: Impact originating from a company's own operations.

Indirect impact: Impact in the value chain that is linked to the upstream and downstream activities of a company.

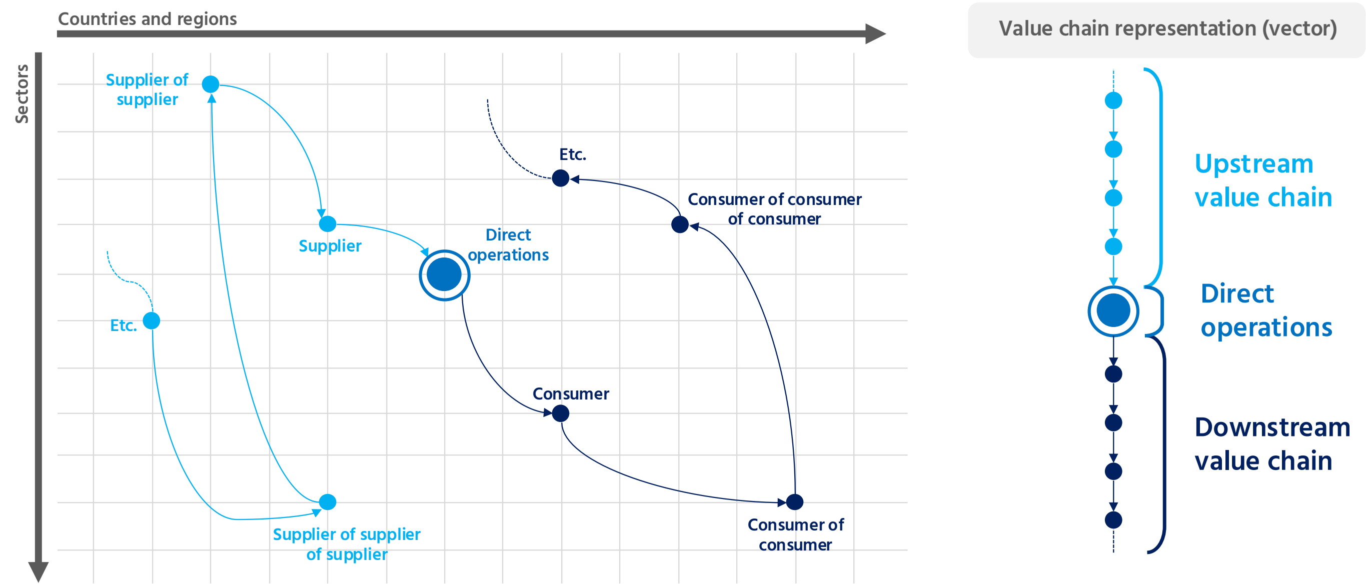
Total impact: Sum of direct and indirect impact. It reflects the total impact originating from a given company's value chain.

VI. Supply chain

The diagram below shows a representation of the range of impacts the GID measures across the value chain. The input/output model takes into account the entire upstream and downstream value chain which spans multiple industries and regions.

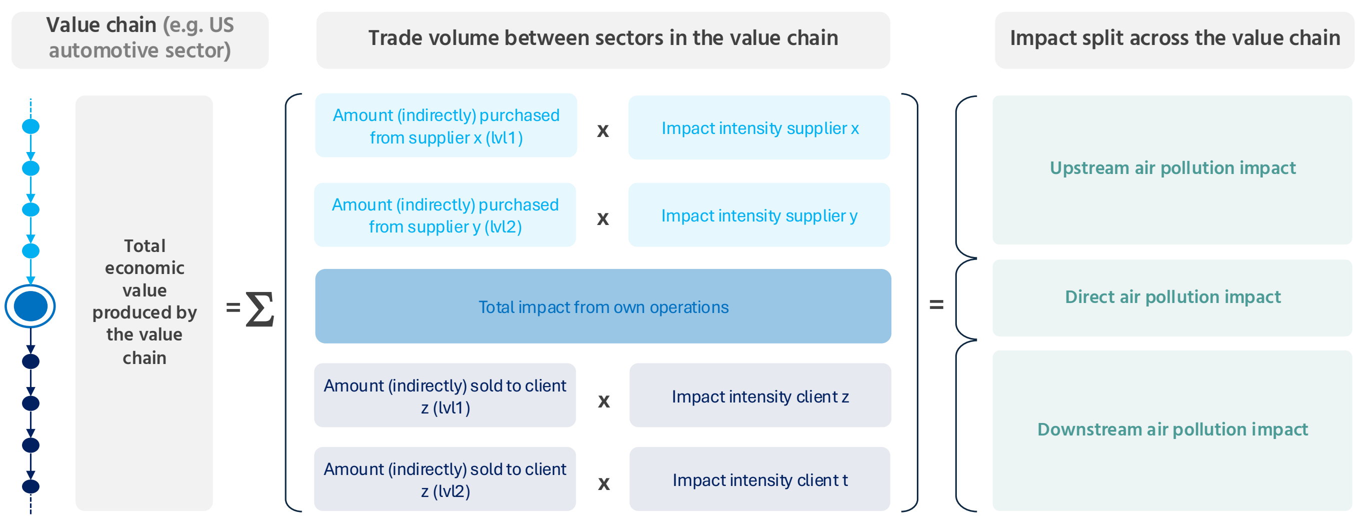
Fig. 24: Modelling the world economy

We model the world economy following a Multi-Regional Input/Output model



Another way to understand how the impact is measured across the value chain is demonstrated in the diagram below.

Fig. 25: Attributing impacts across value chains



E. How Measurabl uses Whole Building Estimates to calculate metrics

I. Energy and carbon estimates at the building level are calculated using a three-step process:

1. The ML model is used to compute energy usage estimates from a trained database. Measurabl's database draws from 545,000+ monthly data points across 100+ primary use types. These estimates are computed in both log and linear space to minimize the impact of outlier data.

2. Drawing from similar buildings, the energy mix fraction is calculated for each building. We characterize similar buildings as those that share the same use type and geographical location.

3. Using both computed energy mix fractions and GHG methodology, the final step involves taking the energy usage estimates to calculate carbon emissions estimates. These estimates show the expected energy consumption and carbon emissions for each building over the duration of the specified historical timeframe.

II. The ML model consists of:

- Building features: By utilizing building features that are universally available across all building use types, we can better understand the variance in usage patterns.

- High-level use types: By incorporating standardized, high-level use types such as 'retail', 'residential', 'office', etc., the model can differentiate between subtypes that belong to the same category. In situations where only the highest use type is given, the average is calculated for all buildings that exhibit the least granular subtype.

- Granular subtype: The granular subtype may be used to calculate an average for all buildings based on the specific subtype. Granular subtypes separate high-level use types into further categories. For example, if 'residential' is the high-level use type, the granular subtype may include 'residential: multifamily housing', 'residential: senior care facility", etc.

- Time series data: Calendarized monthly usages taken from 2017 onward are directly collected from utility bills and aggregated at the building level. Datasets are updated monthly to ensure the data used is the most recent.

For further information on Measurabl's methodology, please refer to its collateral here.

F. Appendix A

ESG Management Indicators

Indicator	Key Question	Indicator Applicability	Governance Type	ESG Pillar	Theme	Framework
DEI due diligence reporting lines	Does the GP/LP disclose who is responsible for DEI at an executive level?	GP/LP	Firm	Social	DEI	ILPA
DEI policy or initiative	Does the GP/LP have an initiative or policy in place that targets DEI?	GP/LP	Firm	Social	DEI	ILPA
DEI policy or initiative for portfolio companies/assets	Does the GP have any DEI-related policies or initiatives that apply at the asset-level?	GP	Asset	Social	DEI	ILPA
Family leave policy	Does the GP/LP have a family leave policy?	GP/LP	Firm	Social	DEI	ILPA
Tracks employee diversity	Does the GP/LP reference tracking the amount of employee diversity?	GP/LP	Firm	Social	DEI	Ratings providers
Breakdown of pay details at the portfolio company/ asset-level	Does the GP provide a breakdown of pay details for the employees of its portfolio companies?	GP	Firm	Social	DEI (gender)	Ratings providers
Gender breakdown of the board of directors	Does the GP/LP disclose that there is female representation on its own board of directors?	GP/LP	Firm	Social	DEI (gender)	Ratings providers
Gender breakdown of the executive committee	Does the GP/LP disclose that there is female representation on its own executive committee?	GP/LP	Firm	Social	DEI (gender)	Ratings providers

Indicator	Key Question	Indicator Applicability	Governance Type	ESG Pillar	Theme	Framework
Gender breakdown of the executive committee or senior management at the portfolio company/asset-level	Does the GP disclose that there is female representation on the executive committee or senior management of its portfolio companies?	GP	Asset	Social	DEI (gender)	Ratings providers
Gender breakdown of the senior management	Does the firm disclose that there is female representation on its own senior management?	GP/LP	Firm	Social	DEI (gender)	Ratings providers
Gender breakdown of the wider company	Does the GP/LP disclose that there is female representation in the workforce?	GP/LP	Firm	Social	DEI (gender)	Ratings providers
Gender breakdown of the wider company at the portfolio company/ asset-level	Does the GP/LP disclose that there is female representation in the workforce at the asset-level?	GP/LP	Asset	Social	DEI (gender)	Ratings providers
Emissions targets	Does the GP disclose any emission reduction targets that apply to the GP specifically?	GP/LP	Firm	Environment	Emissions	Ratings providers
Emissions targets for portfolio companies/assets	Does the GP disclose any emission reduction targets that apply to its portfolio companies or assets specifically?	GP	Asset	Environment	Emissions	TCFD
GHG emissions	Does the GP/LP disclose its own GHG emissions?	GP/LP	Firm	Environment	Emissions	TCFD
GHG emissions of portfolio companies/assets	Does the GP/LP track emissions on the portfolio or asset level?	GP/LP	Asset	Environment	Emissions	Ratings Providers
GHG emissions: Scope 1	Does the GP/LP track Scope 1 GHG emissions?	GP/LP	Firm	Environment	Emissions	SFDR

Indicator	Key Question	Indicator Applicability	Governance Type	ESG Pillar	Theme	Framework
GHG emissions: Scope 1 of portfolio companies/assets	Does the GP/LP track Scope 1 GHG emissions at the portfolio or asset level?	GP/LP	Asset	Environment	Emissions	TCFD
GHG emissions: Scope 2	Does the GP/LP track Scope 2 GHG emissions?	GP/LP	Firm	Environment	Emissions	SFDR
GHG emissions: Scope 2 of portfolio companies/assets	Does the GP/LP track Scope 2 GHG emissions at the portfolio or asset level?	GP/LP	Asset	Environment	Emissions	TCFD
GHG emissions: Scope 3	Does the GP/LP track Scope 3 GHG emissions?	GP/LP	Firm	Environment	Emissions	SFDR
GHG emissions: Scope 3 of portfolio companies/assets	Does the GP/LP track Scope 3 GHG emissions at the portfolio or asset level?	GP/LP	Asset	Environment	Emissions	TCFD
GHG intensity of portfolio companies/assets	Does the GP/LP disclose their GHG intensity for portfolio companies/assets?	GP/LP	Asset	Environment	Emissions	SFDR
Adherence to any ISO standards	Does the GP mention that it adheres to any ISO standards or JIS Q standards?	GP/LP	Firm	Governance	Internal operations	Ratings providers
Adopts a green building or energy management standard	Does the GP disclose that their offices abide by a green building standard or energy management standard?	GP/LP	Firm	Environment	Internal operations	Ratings providers
Any mention of ESG consideration in operations	Does the GP/ LP mention any consideration of ESG in its own operations?	GP/LP	firm	Governance	Internal operations	SASB
Board of directors	Does the GP/LP disclose that they have a board of directors?	GP/LP	Firm	Governance	Internal operations	Ratings providers

Indicator	Key Question	Indicator Applicability	Governance Type	ESG Pillar	Theme	Framework
Dedicated sustainability report	Does the GP/LP disclose a sustainability report publicly?	GP/LP	Firm	Governance	Internal operations	Ratings providers
Employee engagement surveys	Does the GP/LP have any employee engagement or satisfaction surveys?	GP/LP	Firm	Social	Internal operations	ILPA
ESG integration within performance reviews and/or compensation mechanisms	Does the GP incorporate ESG objectives into performance reviews and compensation mechanisms?	GP	Firm	Governance	Internal operations	UNPRI
Governing, leadership, or executive bodies, including the board of directors	Does the GP/LP disclose its board members, C-level staff or leadership?	GP/LP	Firm	Governance	Internal operations	Ratings providers
List of investors by type	Does the GP mention the types of investors they work with?	GP	Firm	Governance	Internal operations	UNPRI
Ownership structure of the firm	Does the GP/LP disclose who owns the firm?	GP/LP	Firm	Governance	Internal operations	Ratings providers
Registered investment advisor or a registered broker dealer status	Does the GP disclose that they are regulated by a securities regulator suffices?	GP	Firm	Governance	Internal operations	ILPA
Spending on political donations and/or lobbying expenditures	Does the GP/LP disclose the amount it has spent on political donations or lobbying expenditures?	GP/LP	Firm	Governance	Internal operations	Ratings providers
Statements, policies, or initiatives related to climate change	Does the GP/LP disclose any policy related to climate change, carbon or emissions?	GP/LP	Firm	Environment	Internal operations	TCFD
Waste generation metrics	Does the GP/LP have any waste creation tracking and disposal metrics?	GP/LP	Firm	Environment	Internal operations	Ratings providers

Indicator	Key Question	Indicator Applicability	Governance Type	ESG Pillar	Theme	Framework
Anti-money laundering and/or "know your client" (AML KYC) policy	Does the GP have an anti-money laundering/"know your client" (AML KYC) policy?	GP/LP	Firm	Governance	Internal operations (policies)	Ratings providers
Code of conduct	Does the GP/LP have a code of conduct that applies to its own employees?	GP/LP	Firm	Governance	Internal operations (policies)	ILPA
Insider trading policy	Does the GP/LP have an insider trading policy?	GP/LP	Firm	Governance	Internal operations (policies)	Ratings providers
Modern slavery or human rights policy	Does the GP/LP have a modern slavery policy?	GP/LP	Firm	Social	Internal operations (policies)	Ratings providers
Political donations and/or lobbying expenditure policy	Does the GP/LP disclose the amount it has spent on political donations or lobbying expenditures?	GP/LP	Firm	Governance	Internal operations (policies)	Ratings providers
Privacy policy	Does the GP/LP have a privacy policy?	GP/LP	Firm	Governance	Internal operations (policies)	Ratings providers
Sustainable supply chain framework	Does the GP/LP disclose a policy outlining their supply chain code of ethics or how sustainability is integrated along their supply chain?	GP/LP	Firm	Governance	Internal operations (policies)	Ratings providers
Whistleblower or anonymous incident reporting process	Does the GP/LP disclose a whistleblower policy, whistleblower or anonymous hotline for reporting breaches in conduct, or other system for reporting internal issues anonymously?	GP/LP	Firm	Governance	Internal operations (policies)	Ratings providers
Anti-money laundering and terrorist financing training	Does the GP/LP offer training on anti-money laundering and terrorist financing?	GP/LP	Firm	Governance	Internal operations (training)	Ratings providers

Indicator	Key Question	Indicator Applicability	Governance Type	ESG Pillar	Theme	Framework
Code of business ethics training	Does the GP/LP have any code of business ethics-related trainings?	GP/LP	Firm	Governance	Internal operations (training)	ILPA
DEI training	Does the GP/LP have any DEI-related trainings?	GP/LP	Firm	Social	Internal operations (training)	ILPA
Development or training programs	Does the GP/LP offer development or training programs?	GP/LP	Firm	Social	Internal operations (training)	Ratings providers
Employee training hours	Does the GP/LP disclose the number of hours spent on employee training?	GP/LP	Firm	Governance	Internal operations (training)	Ratings providers
Employee training on data security or privacy	Does the GP/LP offer training on data security and privacy?	GP/LP	Firm	Governance	Internal operations (training)	Ratings providers
Management training	Does the GP/LP offer dedicated training sessions for its employees in management positions?	GP/LP	Firm	Governance	Internal operations (training)	Ratings providers
Training for investment professionals on ESG risks and opportunities in investment activities	Does the GP/LP equip invesmtent professionals to understand and identify the relevance and importance of ESG risks and opportunities in investment activties?	GP/LP	Firm	Governance	Internal operations (training)	UNPRI
Any mention of ESG consideration in investing	Does the GP/LP mention consideration of ESG factors in its investment process?	GP/LP	Portfolio	Governance	Investment strategy	SASB
Breakdown of energy efficiency for real estate assets	Does the GP disclose a breakdown of the energy efficiency of their real estate assets?	GP	Asset	Environment	Investment strategy	SFDR

Indicator	Key Question	Indicator Applicability	Governance Type	ESG Pillar	Theme	Framework
Dedicated ESG investment policy	Does the GP/LP have a dedicated investment policy focusing on ESG, responsible investing, impact, sustainability, or any other ESG-related topic?	GP/LP	Portfolio	Governance	Investment strategy	UNPRI
Dedicated ESG investment staff	Does the GP/LP have a dedicated ESG team and/or employee?	GP/LP	Firm	Governance	Investment strategy	UNPRI
ESG commitments included in fund documents	Does the GP incorporate ESG commitments in fund documentation such as Limited Partnership Agreement (LPA), side-letters, or other fund documents?	GP	Portfolio	Governance	Investment strategy	UNPRI
ESG considerations included in deal documentation	Does the GP incorporate ESG considerations into deal documentation such as Shareholders' Agreements during deal structuring?	GP	Portfolio	Governance	Investment strategy	UNPRI
ESG due diligence reporting lines	Does the GP/LP disclose who is responsible for ESG at the executive level?	GP/LP	Firm	Governance	Investment strategy	UNPRI
ESG risks and opportunities included on Limited Partners Advisory Committee and Annual Investor Meeting agenda	Does the GP include the management of ESG risks and opportunities on the Limited Partners Advisory Committee and Annual Investor Meeting agenda?	GP	Portfolio	Governance	Investment strategy	UNPRI
Investments in portfolio companies/ assets explicitly aligned with the UN Sustainable Development Goals	Has the GP/LP invested in companies/ assets tied to the UN sustainable development goals?	GP/LP	Portfolio	Governance	Investment strategy	Ratings providers

Indicator	Key Question	Indicator Applicability	Governance Type	ESG Pillar	Theme	Framework
Total AUM as subject to ESG criteria or policies	What is the GP/LP's AUM that is subject to ESG criteria?	GP/LP	Portfolio	Governance	Investment strategy	UNPRI
Environmental impact studies conducted on portfolio companies/assets	Does the GP conduct environmental impact studies on its portfolio companies/assets?	GP	Asset	Environment	Investment strategy (due dilligence)	ILPA
List of exclusionary screening factors	Does the GP/LP disclose which factors it uses to screen or exclude potential investments?	GP/LP	Portfolio	Governance	Investment strategy (due dilligence)	Ratings providers
Policy specifying how ESG factors are used after investing in portfolio companies/assets, or in company exits	Does the GP consider ESG factors after making an investment?	GP	Portfolio	Governance	Investment strategy (due dilligence)	UNPRI
Policy specifying how ESG factors are used before investing in portfolio companies/assets	Does the GP consider ESG factors before making an investment?	GP	Portfolio	Governance	Investment strategy (due dilligence)	UNPRI
Social impact studies conducted on portfolio companies/assets	Does the GP conduct social impact studies on its portfolio companies or properties?	GP	Asset	Social	Investment strategy (due dilligence)	Ratings providers
Code of conduct for portfolio companies/assets	Does the GP disclose a portfolio company/asset code of conduct?	GP	Portfolio	Governance	Investment strategy (stewardship)	Ratings providers
Employee engagement surveys for portfolio companies/assets	Does the GP have any employee engagement or satisfaction surveys for its portfolio companies/assets?	GP	Asset	Social	Investment strategy (stewardship)	ILPA

Indicator	Key Question	Indicator Applicability	Governance Type	ESG Pillar	Theme	Framework
Engagement process or considerations specifically focused on ESG issues with portfolio companies/assets	Does the firm disclose any ESG-specific engagement practices or engagement policy with its portfolio companies/assets?	GP	Portfolio	Governance	Investment strategy (stewardship)	Ratings providers
ESG educational programs designed and run for portfolio companies/assets	Does the GP provide education to portfolio companies/assets about ESG issues?	GP	Portfolio	Governance	Investment strategy (stewardship)	Ratings providers
Policy detailing engagement processes with portfolio companies/assets	Does the GP disclose an engagement policy or practices with its portfolio companies or assets?	GP	Portfolio	Governance	Investment strategy (stewardship)	Ratings providers
Reporting or monitoring portfolio companies/assets using ESG KPIs	Does the GP monitor ESG performance in their portfolio companies?	GP	Portfolio	Governance	Investment strategy (stewardship)	UNPRI
Share of portfolio companies/ assets where engagements were conducted on ESG policies or issues	Does the GP disclose how many companies they have engaged with regarding ESG policies/issues?	GP	Portfolio	Governance	Investment strategy (stewardship)	Ratings providers

ESG Management Indicators Disclosure Guidance

Indicator	Guidance
DEI due diligence reporting lines	Disclosure of who is ultimately responsible for enforcing DEI policy, DEI reviews, DEI oversight, or other DEI procedures in the investment process. This includes designated groups, parties, or people inside the company responsible for overseeing DEI. This will also be considered disclosed if an executive team is also a DEI team. Otherwise, the reporting lines and ultimate DEI authority must be disclosed.
DEI policy or initiative	This is marked as disclosed if the firm specifically mentions the existence of a diversity policy or discloses the policy itself. This can include a formal policy, an actual initiative or target for inclusion in hiring, a process to hire more diverse candidates, or adoption of a third-party policy on diversity.
DEI policy or initiative for portfolio companies/assets	This is marked as disclosed if the firm specifically mentions the existence of a diversity policy or discloses the policy itself for their portfolio companies or assets. This can include a formal policy, an actual initiative or target for inclusion in hiring, a process to hire more diverse candidates, or adoption of a third-party policy on diversity.
Family Leave policy	This is marked as disclosed if the firm specifically mentions the existence of a family leave policy or discloses the policy itself.
Tracks employee diversity	This is marked as disclosed if the firm tracks any form of diversity metric (i.e., gender, ethinicity, demographic, etc.). Although we are at a base level assessing proof of concept, actual metrics may also be disclosed.
Breakdown of pay details	This is marked as disclosed if the firm discloses the breakdown of pay details numerically.
Breakdown of pay details at the portfolio company/asset-level	This is marked as disclose if the firm discloses the breakdown of pay details numerically in their portfolio companies or assets
Gender breakdown of the board of directors	Disclosure of the gender of members of a firm's board of directors or the breakdown of gender on the board by percentage which indicates the inclusion of at least one female board member. The amount of female representation on the board is immaterial in this instance, as we are assessing transparency and not firm performance. We do not accept nor assume gender through photos.
Gender breakdown of the executive committee	Disclosure of the gender of members of a firm's executive committee or the breakdown of gender on the executive committee by percentage which indicates the inclusion of at least one female executive committee member. The amount of female representation on the executive committee is immaterial in this instance, as we are assessing transparency and not firm performance. We do not accept nor assume gender through photos.
Gender breakdown of the executive committee or senior management at the portfolio company/asset-level	Disclosure of the gender of members of a firm's executive committee/senior management or the breakdown of gender on the executive committee/senior management by percentage which indicates the inclusion of at least one female executive committee/senior management member for their portfolio company or assets. The amount of female representation on the executive committee/senior management is immaterial in this instance, as we are assessing transparency and not firm performance. We do not accept nor assume gender through photos.

Indicator	Guidance
Gender breakdown of the senior management team	Disclosure of the gender of members of a firm's senior management or the breakdown of gender on the senior management team by percentage which indicates the inclusion of at least one female senior management member. The amount of female representation on the senior management team is immaterial in this instance, as we are assessing transparency and not firm performance. We do not accept nor assume gender through photos.
Gender breakdown of the wider company	Disclosure of the gender of members of a firm's wider company or the breakdown of gender in the wider company by percentage which indicates the inclusion of at least one female employee. The amount of female representation in the company is immaterial in this instance, as we are assessing transparency and not firm performance. We do not accept nor assume gender through photos.
Gender breakdown of the wider company at the portfolio company/asset-level	Disclosure of the gender of members of a firm's wider company or the breakdown of gender in the wider company by percentage which indicate the inclusion of at least one female employee for their portfolio company or assets. The amount of female representation in the company is immaterial in this instance, as we are assessing transparency and not firm performance. We do not accept nor assume gender through photos.
Emissions targets	Disclosure of numerical or measurable emissions reductions targets.
Emissions targets for portfolio companies/assets	Disclosure of numerical or measurable emissions reductions targets for the portfolio company or assets. Targets can be specific to an asset or apply to the general portfolio.
GHG emissions	This is marked as disclosed if the firm discloses their Scope 1, Scope 2 and/or Scope 3 GHG emissions. This must include numerical figures, generally recorded in tCO2e. Additionally, this indicator will also be considered disclosed if a firm adheres to ISO14064, as this is the international standard for disclosure.
GHG emissions of portfolio companies/assets	This is marked as disclosed if the firm discloses Scope 1, Scope 2 and/or Scope 3 GHG emissions for their portfolio companies. This must include numerical figures, generally recorded in tCO2e.
GHG emissions: Scope 1	This is marked as disclosed if the firm discloses Scope 1 GHG emissions. This must include numerical figures, generally recorded in tCO2e.
GHG emissions: Scope 1 of portfolio companies/assets	This is marked as disclosed if the firm discloses Scope 1 GHG emissions for their portfolio companies. This must include numerical figures, generally recorded in tCO2e.
GHG emissions: Scope 2	This is marked as disclosed if the firm discloses Scope 2 GHG emissions. This must include numerical figures, generally recorded in tCO2e.
GHG emissions: Scope 2 of portfolio companies/assets	This is marked as disclosed if the firm discloses Scope 2 GHG emissions for their portfolio companies. This must include numerical figures, generally recorded in tCO2e.
GHG emissions: Scope 3	This is marked as disclosed if the firm discloses Scope 3 GHG emissions. This must include numerical figures, generally recorded in tCO2e.
GHG emissions: Scope 3 of portfolio companies/assets	This is marked as disclosed if the firm discloses Scope 3 GHG emissions for their portfolio companies. This must include numerical figures, generally recorded in tCO2e.

Indicator	Guidance
GHG intensity of portfolio companies/assets	This is marked as disclosed if the firm discloses carbon intensity for their portfolio companies. This must include numerical figures.
Adherence to any ISO standards	ISO standards are specific standards set by the International Organization for Standardization. A full list of standards is available here. The firm may adhere to any ISO standard for this indicator to be considered disclosed.
Adopts a green building or energy management standard	This is marked as disclosed if the firm discloses a third-party standard for green building or energy management.
Any mention of ESG consideration in operations	Mention of ESG on a firm's website, policies, reports, or other collateral. This indicator is considered disclosed if any material suggests that the company is using ESG in some way, either in their portfolio management or in their own business operations, such as management of diversity or carbon emissions. This does not include philanthropy or CSR initiatives, but must specifically mention information about environmental risk management, labor risk management, or governance issues.
Board of directors	This is meant to simply capture the disclosure of any board of directors at the firm level.
Dedicated sustainability report	This is marked as disclosed if the firm has released a sustainability, corporate responsibility, CSR, ESG, socially responsible, impact, or other ESG/impact-related report within the past two years. This may include UNPRI Public Signatory Reports.
Employee engagement surveys	This is marked as disclosed if the firm mentions or publishes the results of an employee engagement survey.
ESG integration within performance reviews and/or compensation mechanisms	This is marked as disclosed if the firm mentions ESG practices or initiatives being a component of the compensation structure or performance reviews of their employees, and determines the pay they are getting.
Governing, leadership, or executive bodies, including the board of directors	This is meant to simply capture the disclosure of any executives or governing bodies at the firm level. This may include disclosure of the board of directors, Chief Executive Officer or executive team, or any other firm leadership.
List of investors by type	Disclosure of a basic list of client types, often included in UNPRI Public Signatory Reports.
Ownership structure of the firm	Ownership structures specifically refer to whether the General Partner is publicly listed (if they have an investor relations section on their website or if they are listed on any global exchange and have a stock ticker, for instance) or if they list the owner(s) of the company.
Registered investment advisor or registered broker dealer status	This specifically refers to whether the firm is regulated by a securities regulator, either as a registered investment advisor, broker, or other regulated entity that can legally give investment advice.
Spending on political donations and/or lobbying expenditures	This refers to evidence of political donations and/or lobbying expenditure. We also accept mentions of no political donations or lobbying expenditure being made.
Statements, policies, or initiatives related to climate change	This is marked as disclosed if the firm discloses any statements, policies, or initiatives related to climate change, carbon, or emissions. This is related to the company itself, which may include statements regarding the risks of climate change, announced initiatives to measure or manage climate risk as part of a firm's business model or investment strategy, or disclosure of a carbon or climate change-related policy.

Indicator	Guidance
Waste generation metrics	Any numerical metric on waste generation (i.e., recycling, waste disposal, etc.) are accepted.
Anti-money laundering and/or "know your client" (AML KYC) policy	This is marked as disclosed if the firm specifically mentions the existence of an anti-money laundering and/or "know your client" (KYC) policy or discloses the policy itself.
Code of conduct	Disclosure of a code of conduct policy, which may take the form of an ethics code, bribery code, or other code of conduct that employees must abide by.
Insider trading policy	This is marked as disclosed if the firm specifically mentions the existence of an insider trading policy or discloses the policy itself. This policy or mention of its existence may be included within a disclosed code of conduct policy, for example.
Modern slavery or human rights policy	This is marked as disclosed if the firm specifically mentions the existence of a modern slavery, human trafficking, or human rights policy or discloses the policy itself. This may also include policies applicable to parent or subsidiary companies.
Political donations and/or lobbying expenditure policy	This is marked as disclosed if the firm specifically mentions the existence of a policy relating to any political donations, contributions or expenditures, or lobbying-related activities, or discloses the policy itself.
Privacy policy	This is marked as disclosed if the firm specifically mentions the existence of a privacy policy or discloses the policy itself, including those of the parent company. This will also be considered disclosed if a firm adheres to ISO standards or JIS Q standards related to privacy, data protection or data management.
Sustainable supply chain framework	This is marked as disclosed if the firm specifically mentions the existence of a sustainable supply chain framework or discloses the policy itself. This may also include how the firm is adding sustainable practices to their supply chain network.
Whistleblower or anonymous incident reporting process	This is marked as disclosed if the firm specifically mentions the existence of a whistle-blower policy or discloses the policy itself. This may include a whistleblower or anonymous hotline for reporting breaches in conduct, or another system for reporting internal issues anonymously.
Anti-money laundering and terrorist financing training	Any mention of anti-money laundering or terrorrist financing training, or testing on readiness will suffice. In order to be marked as disclosed, the training must have happened; the intent to conduct this training is not sufficient.
Code of business ethics training	Any mention of training relating to their code of ethics/code of conduct policy. In order to be marked as disclosed, the training must have happened; the intent to conduct this training is not sufficient.
DEI training	Any mention of training relating to diversity, equity, and inclusion. In order to be marked as disclosed, the training must have happened; the intent to conduct this training is not sufficient.
Development or training programs	Any mention of training or development programs from the firm for their employees. In order to be marked as disclosed, the training must have happened; the intent to conduct this training is not sufficient.
Employee training hours	Disclosure of the number of hours of training spent by employees. This must include numerical figures, and may be average or actual hours.

Indicator	Guidance
Employee training on data security or privacy	Any mention of training on data security or privacy. In order to be marked as disclosed, the training must have happened; the intent to conduct this training is not sufficient.
Management training	Any mention of training exclusively for employees in management positions. This excludes manager onboarding training and management-related training sessions for non-managers. In order to be marked as disclosed, the training must have happened; the intent to conduct this training is not sufficient.
Training for investment professionals on ESG risks and opportunities in investment activities	Any mention of training specifically for investment professionals on investment ESG risks and opportunities. In order to be marked as disclosed, the training must have happened; the intent to conduct this training is not sufficient.
Any mention of ESG consideration in investing	Mention of ESG consideration in a firm's investment process. This may include the disclosure of an ESG policy or any mention of ESG as a factor, consideration, or potential risk or opportunity in investing.
Breakdown of energy efficiency for real estate assets	This is marked as disclosed if the firm discloses a third-part standard for energy efficiency (i.e., EPC ratings, LEED, BREEAM, etc.). This applies to the asset-level only.
Dedicated ESG investment policy	Any disclosed investment policy that mentions the consideration of ESG in investing. This specifically refers to an investment policy that extends beyond ESG in firm operations.
Dedicated ESG investment staff	Disclosure of any staff members specifically dedicated to implementing ESG policies, strategies, and procedures in the investment process. This may be a dedicated business unit, team, or individual.
ESG commitments included in fund documents	This is marked as disclosed if a firm's fund documents (i.e., LPAs, Side-Letters, etc.) include ESG commitments.
ESG considerations included in deal documentation	This is marked as disclosed if a firm's deal documentation (i.e., Shareholder's Agreements) includes ESG considerations.
ESG due diligence reporting lines	Disclosure of who is ultimately responsible for enforcing ESG policy, ESG reviews, ESG oversight, or other ESG procedures in the investment process. This includes designated groups, parties, or people inside the company responsible for overseeing ESG. This will also be considered disclosed if an executive team is also an ESG team. Otherwise, the reporting lines and ultimate ESG authority must be disclosed.
ESG risks and opportunities included on Limited Partners Advisory Committee and Annual Investor Meeting Agenda	This is marked disclosed if a firm includes ESG as a topic during investor meetings or LP Advisory Committees.
Investments in portfolio companies/assets explicitly aligned with the UN Sustainable Development Goals	Disclosure of individual investments in portfolio companies tied to the Sustainable Development Goals, clearly stated as such.
Total AUM as subject to ESG criteria or policies	Disclosure of a currency amount of assets under management that are subject to ESG policies or assessment. If a disclosed ESG policy explicitly states its applicability to total AUM, this will also be considered disclosed. Otherwise, this must be numerical.

Indicator	Guidance
Environmental impact studies conducted on portfolio companies/assets	This is marked as disclosed if the firm mentions that they conduct environmental impact studies before investing in portfolio companies, while holding and engaging with portfolio companies, or as part of typical portfolio company exits. Environmental impact studies may include pollution studies, emissions studies, or any other study that is related to the environment as part of investing. This must specifically be a study conducted on one or more of the companies in which they invest, going beyond the mere consideration of environmental impacts of their portfolio companies.
List of exclusionary screening factors	This is marked as disclosed if the firm mentions the specific screening factors they used. Examples of screening factors include Controversial Weapons, Tobacco and Fossil Fuels.
Policy specifying how ESG factors are used after investing in portfolio companies/assets, or in company exits	Disclosure of a policy specific to post-investment processes that includes ESG engagements, tracking ESG factors, and/or how ESG is considered when exiting an investment.
Policy specifying how ESG factors are used before investing in portfolio companies/assets	Disclosure of a policy specific to pre-investment due diligence that includes the consideration of ESG factors before making an investment, the application of an exclusionary policy, or the consideration of environmental or social impacts of portfolio companies before investing.
Social impact studies conducted on portfolio companies/assets	This is marked as disclosed if the firm mentions that they conduct social impact studies before investing in portfolio companies, while holding and engaging with portfolio companies, or as part of typical portfolio company exits. Social impact studies may include diversity impact, employment of underrepresented groups, or any other study that is related to the society as part of investing. This must specifically be a study conducted on one or more of the companies in which they invest, going beyond the mere consideration of social impacts of their portfolio companies.
Code of conduct for portfolio companies/assets	Disclosure of a code of conduct explicitly stated as applicable to portfolio companies. This may take the form of an ethics code, bribery code, or other code of conduct that employees must abide by
Employee engagement surveys for portfolio companies/assets	Disclosure of employee engagement surveys conducted on any topic for at least one portfolio company or asset. Evidence of employee engagement surveys conducted is sufficient, and results are not necessary.
Engagement process or considerations specifically focused on ESG issues with portfolio companies/assets	Disclosure of an engagement policy that details an engagement process with portfolio companies on ESG specific issues. This must include evidence of a process or issue that exemplifies how engagement happens. ESG issues may include any environmental issues (waste, water, energy, pollution, carbon, regulatory fines for environmental damage, etc.), social issues (employees and employee management, social protests, religious issues, etc.), or governance issues (management team composition, leadership structure, business ethics or codes of conduct, bribery, corruption, etc.).
ESG educational programs designed and run for portfolio companies/assets	The existence of any formal educational programs designed for portfolio companies that address ESG issues. This may include portfolio company trainings offered by the GP on topics such as workforce management, environmental law, corporate structures, stakeholders, diversity and inclusion, or anything else related to ESG.

Indicator	Guidance
Policy detailing engagement processes with portfolio companies/assets	Disclosure of an engagement policy that details a general engagement process with portfolio companies on any topic or issue. This must include evidence of a process or issue that exemplifies how engagement happens.
Reporting or monitoring portfolio companies/assets using ESG KPIs	This is marked as disclosed if the firm mentions that they monitor ESG performance, or any specific ESG issues (i.e. carbon emissions, workforce performance, board diversity and makeup, environmental law compliance, etc), in their portfolio companies. Although we are at a base level assessing proof of concept, actual metrics may also be disclosed.
Share of portfolio companies/ assets where engagements were conducted on ESG policies or issues	Disclosure of the number of companies that were reviewed for ESG issues or against an ESG policy either before or after investment. This does not necessarily need to include what they were reviewed for as long as it specifies, even generically, "ESG issues" or "ESG" as the basis for review.

Appendix B

ESG-Related Affiliations and Initiatives

The UN Principles for Responsible Investment (UNPRI or PRI)
The PRI is a United Nations-supported international network of investors. Through committing to six aspirational principles, the signatories of the PRI work together to support the integration of ESG in investment decisions and create a more sustainable global financial system.

Task Force on Climate-related Financial Disclosures (TCFD)
The TCFD was created by the G20 Financial Stability Board to facilitate and improve reporting of climate-related financial information. It provides a set of disclosure recommendations to support informed capital allocation, and enhance market participants' understanding of material climate-related risks and opportunities. The recommendations focus on four core areas: 1. Governance: the organization's governance around climate-related risks and opportunities. 2. Strategy: the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy and financial planning. 3. Risk management: the processes used by the organization to identify, assess and manage climate-related risks. 4. Metrics and targets: the metrics and targets used to assess and manage relevant climate-related risks and opportunities.

Sustainability Accounting Standards Boards (SASB)
SASB is a non-profit organization providing a set of industry-specific disclosure standards across ESG topics. The standards are available across 77 industries, and identify the most relevant ESG issues to financial performance in each industry. Alongside the SASB Materiality Map, these standards help investors determine which ESG issues are material for reporting as well as helping facilitate more standardized benchmarking.

Global Impact Investing Network (GIIN)
GIIN is a global network of investors, focusing on reducing barriers to impact investment by building critical infrastructure and developing activities, education and research to facilitate the development of a coherent impact investing industry.

Global Reporting Initiative (GRI)
The GRI is a global reporting initiative. Through the GRI Standards, they provide guidance on ESG disclosures for investors and other stakeholders.

Global ESG Benchmark for Real Assets (GRESB)
GRESB is an investor-led organization providing standardized ESG data to capital markets. It is considered the leading ESG benchmark for real estate and infrastructure investments.

CDP
CDP (formerly known as the Carbon Disclosure Project) is a non-governmental organization (NGO) supporting companies, financial institutions and cities in disclosing and managing their environmental impact. It runs a global environmental disclosure system in which nearly 10,000 companies, cities, states and regions report on their risks and opportunities related to climate change, water security and deforestation.

Climate Disclosure Standards Board (CDSB)
The CDSB is an international consortium of businesses and environmental non-governmental organizations (NGOs) committed to advancing and aligning the global mainstream corporate reporting model to equate natural capital with financial capital.

Sustainable Development Goals (SDGs)
The SDGs are a set of 17 global goals, established by the UN General Assembly in 2015. The goals address key global challenges, covering issues such as poverty, inequality, climate change, environmental degradation, peace and justice. They are often referred to in the context of impact investing, as a framework for defining and assessing impact.

Institutional Limited Partners Association (ILPA)
ILPA is a global organization dedicated to advancing the interests of limited partners and their beneficiaries through education, research, advocacy and events. Through their Due Diligence Questionnaire and Diversity Metric Template, they provide a standardized framework for integrating and monitoring ESG and DEI.

Net Zero Alliances
Net Zero Alliances include all those affiliations committed to supporting the goal of emitting net zero greenhouse gases by 2050 or sooner, aligned with the global effort to limit warming to 1.5 degrees Celsius. These include the Net Zero Asset Managers Initiative, Glasgow Financial Alliance for Net Zero, Net-Zero Asset Owner Alliance, Net-Zero Banking Alliance, Net Zero Investment Framework 1.0, Race to Zero, Paris Aligned Initiative Net Zero Asset Owner Commitment, amongst others.

EU Sustainable Finance Action Plan
The EU Sustainable Finance Action Plan is the European Union's strategy for sustainable finance. It aims to reorient capital flows towards sustainable finance, manage financial risk stemming from ESG issues, and facilitate more transparency and long-termism in financial activities. The Plan consists of several components, including:

1. The EU Taxonomy: provides a framework for defining environmentally sustainable economic activities. It identifies three criteria an economic activity must satisfy to be considered sustainable, and a list of six environmental objectives.
2. The Sustainable Finance Disclosure Regulation (SFDR): imposes a set of disclosure requirements for asset managers and other financial market participants to provide standardized disclosures on how ESG factors are integrated at the entity and product level.

ESG-Related Affiliations and Initiatives

- BVCA – Responsible Investment Advisory Board
- CDP Climate Change
- CDP Forests
- Global Impact Investing Network
- Global Real Estate Sustainability Benchmark (GRESB)
- Institutional Investors Group on Climate Change
- Principles for Responsible Investment (PRI)
- United Nations Environment Programme Finance Initiative
- United Nations Global Compact
- AFIC – La Commission ESG
- American Investment Council (ESG guidelines)
- Asian Corporate Governance Association
- Australian Council of Superannuation Investors
- AVCA: Sustainability Committee
- CDP Water
- Ceres
- CFA Institute Centre for Financial Market Integrity
- Climate Action 100+

- Code for Responsible Finance in the 21st Century
- Code for Responsible Investment in SA (CRISA)
- Council of Institutional Investors
- ESG Research Australia
- Eumedion
- Extractive Industries Transparency Initiative (EITI)
- Global Investors Governance Network (GIGN)
- Green Bond Principles
- HKVCA: ESG Committee
- Interfaith Center on Corporate Responsibility
- International Corporate Governance Network
- International Integrated Reporting Council (IIRC)
- Invest Europe Responsible Investment Roundtable
- Investor Network on Climate Risk (INCR)/CERES
- Local Authority Pension Fund Forum
- Net Zero Alliances
- Operating Principles for Impact Management
- Principles for Financial Action in the 21st Century
- Principles for Sustainable Insurance
- Regional or National Social Investment Forums (e.g. UKSIF, Eurosif, ASRIA, RIAA), specify
- Responsible Finance Principles in Inclusive Finance
- Shareholder Association for Research and Education (Share)

Strictness of the requirements:

- High: The affiliation includes mandatory commitments like targets, disclosures, or reporting.
- Medium: The affiliation includes/suggests voluntary commitments like targets, disclosures, or reporting.
- Low: The affiliations does not require any mandatory or voluntary commitments.

Membership Composition	Key Focus	Minimum requirements	Ongoing commitments
Academia	Accountability	Application Process	Ongoing Active Engagement
Companies	Advocacy	Annual Fee	Accomplish Membership Agreement
Government	Benchmarking	Active Engagement	Maintain Annual Fee
General Partners	Climate	Mandatory Reporting	Mandatory Reporting
Limited Partners	Corporate Governance	Membership Agreement	Not Disclosed
Service Providers	Reporting	Not Disclosed	Voluntary Reporting
	Disclosure	Voluntary Reporting	
	Environmental, Social and Governance	Open Membership by Firm Type	
	Forestry & Biodiversity		
	Impact Investing		
	Net Zero		
	Engagement		
	Policy		
	Research & Data		
	Responsible Investment		
	Sustainable Development Goals		
	Sustainable Finance		
	Transparency		
	Water & Biodiversity		

Appendix C

Impact/SDGs taxonomy
Preqin's Impact Taxonomy is based on UN SDG definitions and tries to map Sustainable Development Goals with specific industries, business activities and keywords. The keywords help further refine the identification of SDG alignments of companies. We further use stemming for the keywords to ensure we match more variations of the term. (e.g., fish, fishing, fisheries etc., all have the root term 'fish'). The table below contains an abridged view on the taxonomy. The full taxonomy ranges across 171 sub-industries and 554 keywords. Please drop us an email at TeamESG@preqin.com if you would like to access the full taxonomy file.

SDG Num.	SDG Title	Primary Industries (Where Applicable)	Sub-Industries (Examples)	Keywords (Examples)
SDG01	No poverty	-	• Education and training services • Consumer finance • Business support services	• Affordable • Deprived • Developing
SDG02	Zero hunger	Agribusiness	• Food and beverage distribution • Farm equipment • Agribusiness	• Agro • Farm • Hunger • Regenerative agriculture
SDG03	Good health and well-being	Biotechnology Healthcare Medical Devices and Equipment	• Cardiology • Healthcare • Hospitals	• Diseases • Health • Medicines • Surgery
SDG04	Quality education	Education/Training	• Education and training services • Schools • Education and training software	• Education • Vocational • Training
SDG05	Gender equality	-	• Social networking and communication platform • Consulting services	• Women • Empowerment • Gender
SDG06	Clean water and sanitation	-	• Water and Sewer Utilities • Environmental Services • Waste Management	• Aquifers • Arid • Drinking water

SDG Num.	SDG Title	Primary Industries (Where Applicable)	Sub-Industries (Examples)	Keywords (Examples)
SDG07	Affordable and clean energy	Renewable energy	• Wind power • Energy storage and batteries • Waste to energy	• Affordable • Alternative energy • Bioenergy
SDG08	Decent work and economic growth	-	• Human resources services • HR and workforce software • Consulting services	• Quality Jobs • Career • Child Labor
SDG09	Industry, innovation, and infrastructure	-	• Rail transport • Transportation services • Public transit/ transportation	• Infrastructure • Industrial • Innovation
SDG10	Reduced inequalities	-	• Childcare services • Education and training	• Discriminatory • Empower • Inequality
SDG11	Sustainable cities and communities	Automobiles, Other Vehicles and Parts	• Automobiles • Other vehicles and parts • Logistics software • Pollution control	• Urban • Affordable • Building • Housing
SDG12	Responsible consumption and production	Biopolymers	• Recycling • Green IT • Environmental services	• Sustainable • Consumption • Reduce • Waste
SDG13	Climate action	-	• Pollution control • Environmental services	• Climate • Adaptation • Green • Carbon accounting
SDG14	Life below water	-	• Marine • Recycling • Rubber and plastics	• Marine • Oceans • Coastal
SDG15	Life on land	-	• Pollution control • Environmental services • Recycling	• Forests • Ecosystems • Biodiversity • Conservation
SDG16	Peace, justice, and strong institutions	-	• Legal software • Retail law • Newspapers	• Accountable • Crime • Justice • Law

Fine-tuning our SDG definitions to apply SDGs to subjective business activities:
As our research analysts were going through the companies to manually look for SDG alignments for generating a validation dataset, we realized that SDG alignments could be subjective for a few industries and business activities. The table below is a reference that highlights the areas where SDG alignments could be subjective.

SDG Num.	SDG Title	To Include	To Exclude
SDG02	Zero hunger	Eateries serving underserved populations, food banks, any type of food production, farming, farm equipment manufacturing, food distribution	Restaurants, eateries, fast-food chains, food delivery services. Food manufacturing/ processing
SDG03	Good health and well-being	Medical equipment manufacturers, experimental therapies (e.g., gene), pharmaceutical companies, health testing, services providers, fitness, recreational centers, beauty treatments, spas etc.	-
SDG04	Quality education	Any type of education services or platforms irrespective of the medium – online, distance, including music, arts	-
SDG07	Affordable and clean energy	Solar, wind, carbon trading, biofuel etc and marketplaces and related service providers	Big conventional energy, oil and gas, mining companies which have a small renewables division
SDG08	Decent work and economic growth	Microfinance, regional banks, job search firms/websites	Strategy consulting companies, financial advice firms, law firms, large banks, and asset managers
SDG09	Industry, innovation, and infrastructure	Technology firms focused on – gene therapy, AI, blockchain, cloud computing	Large software/tech companies.
SDG11	Sustainable cities and communities	E-scooters, electric cars	-
SDG12	Responsible consumption and production	Any type of recycling e.g., waste, IT equipment	-
SDG16	Peace, justice, and strong institutions	Independent and regional news and media	Mainstream media houses

Appendix D

Research Data Update Process
Preqin has a dedicated ESG research team responsible for data collection. Our transparency profiles are populated with data sourced in one or both of the following ways:

- **Public disclosures:** Information available in the public domain including legal filings, regulatory disclosures, sustainability reports, firms' websites, and other related documents. All the sources are identified and manually validated by our team of dedicated ESG researchers and quality assurers. To uphold quality and consistency, all disclosures must satisfy the criteria outlined in the ESG transparency KPIs guidance in Appendix A. This guidance was written to enhance the transparency of our data-collection process and to provide our clients with documentation enabling deeper engagement.
- **Private disclosures:** Private documents shared with Preqin that satisfy the same criteria as public disclosures. This feature of ESG profiles allows for a more comprehensive representation of a firm's ESG efforts. To guarantee data quality while respecting our clients' privacy concerns, all the documents are securely submitted to Preqin's ESG research team via our encrypted document-storing capabilities. They are reviewed internally, to ensure the required criteria are met, and that any private disclosures are reflected on firm profiles without a source. This unique data-collection process leverages Preqin's strong relationships with our clients and our esteemed reputation in the industry.

We update ESG transparency profiles with both public and private disclosures every 12-18 months at most – or on request. For a disclosure to be valid, all the supporting documents must have been updated in the past two years.

Appendix E

Controversial Industries Taxonomy

Industry/vertical	Level 1	Level 2	Level 3
Industry	Consumer discretionary	Consumer products	Alcoholic beverages
			Cigarettes, cigars and e-cigarettes
		Travel and leisure	Casinos and gambling
		Consumer services	Adult entertainment
	Energy and utilities	Oil and gas	Oil and gas equipment and services
			Oil and gas exploration and production
			Oil and gas transportation
			Petroleum refining
			Petroleum wholesale distribution
	Industrials	Defence	
			Commodity chemicals
			Explosives
			Petrochemicals
		Mining	Coal and lignite mining
			Metal mining
			Mining and quarrying of non-metallic minerals
			Precious metals and minerals
Vertical	Cannabis/medical marijuana		
	Robotics	Drones	

Industry Sub-industry Vertical

Appendix F

Understanding the geographic risk model

The table below explains our interpretation of the SASB factor definitions (https://sasb.ifrs.org/standards/materiality-finder) and adapting them for geographic risk as well as what each of the factors mean. Due to the limited number of data sources that capture specific aspects at country level and are also available on a global scale, in some cases we have had to reduce or select aspects from the SASB factor definition that we could explain with the available data. We constantly look for more data sources and try to identify which ones are most suitable to explain the geographic risk better. We seek to improve the scope of SASB considerations at factor level with future versions of our model.

Dimension	SASB factor	SASB factor interpretation (Preqin)
Environmental	Air quality	Countries with poor air quality which impacts on mortality. There is a higher risk of: 1. Employees of the company located in this country having lower productivity because of respiratory health. 2. Drastic measures and regulations being put in place by the government to improve air quality which might increase costs/reduce profits of some of the company activities.
	Ecological impacts	Countries with the highest risk of deforestation. Companies in these countries pose a higher potential risk of biodiversity damage.
	Energy management	Countries which rely more on conventional sources for energy requirements or have lower use of renewables in the grid. Companies with operations in these countries would have limited scope to switch to renewables to reduce their Scope 2 emissions.
	GHG emissions	Countries that either have higher CO2 emissions from fossil fuels, flaring or are not taking as many concrete steps (Net-Zero targets) to decarbonize. Companies in these countries could face greater challenges or costs related to transitioning to cleaner energy because of government regulation or investor demands.
	Waste and hazardous waste management	Countries that generate high levels of hazardous and plastic waste and that have limited systems in place to manage them effectively. Companies in these countries face higher potential costs of managing waste.

Dimension	SASB factor	SASB factor interpretation (Preqin)
Environmental	Water and wastewater management	Companies located in countries that lack good management of drinking/commercial/sewage/piped water are less likely to be able to manage water themselves and have higher risk of employees and operations facing issues related to water.
Governance	Business ethics	Countries with higher perceived corruption and lower amount of financial disclosure requirements. Companies in these countries face a higher risk of being perceived/scrutinized for corrupt practices as well as face financial loss due to unavailability of relevant disclosures.
	Business model resilience	Countries with fewer opportunities/inclination for scientific research, IP, and innovation. Companies based in these countries may be less responsive to managing ESG and political transitions with technological solutions.
	Competitive behaviour	Countries where there is a higher prevalence of unfair trade practices, corruption and governments are perceived to lack the ability or the will to formulate sound policies to permit and promote private sector development. Companies in these countries are likely to face greater challenges in overcoming competitive pressure and navigating the business environment.
	Critical incident risk management	Countries with lower insurance premiums as a percentage of their GDP. Companies in these countries would likely have less insurance protection against loss of business operations and potentially no protection against critical, low probability, high impact incidents.
	Management of legal and regulatory environment	Countries where there is less legal protection, contract enforcement, property rights, police protection and where governments lack the ability or will to implement sound policies and regulations for private sector development. Companies in these countries are likely to face greater challenges navigating the legal and regulatory environment.
	Materials sourcing and efficiency	Countries that import higher amounts of raw materials are likely to be more susceptible to import variations/shortages/sanctions/tariffs etc. Companies in these countries would more likely face a higher risk when sourcing raw materials.
	Physical impacts of climate change	Countries with a vulnerable population (due to factors such as a low subsistence rate, poor drinking water availability, minimal insurance protection) as well as higher incidences of economically damaging climate related disasters in the past. Companies in these countries face a higher risk of climate change related disasters having a major impact on vulnerable populations, supply chains and employees.
	Product design and lifecycle management	Countries with poor waste management (solid, electronic, recyclable) availability. Companies in these countries are likely to find it more challenging to efficiently manage waste and recycling generated by their products.
	Supply chain management	Countries with higher corruption perception and poorer trade-related infrastructure. Companies in these countries are likely to face delays and greater risk to their supply chains.

Dimension	SASB factor	SASB factor interpretation (Preqin)
Governance	Systemic risk management	Countries where there is less legal protection, contract enforcement, property rights, police protection. Companies in these countries are more exposed to systemic risks due to the failure of the legal system and the need to have safeguards in place.
Social	Access and affordability	Countries with a higher number of people below the poverty line and greater income inequality. Companies in these countries face a greater challenge making products accessible and affordable in domestic markets.
	Customer privacy	Countries that have fewer secure internet servers per million population are less likely to be able to protect sensitive consumer data against breaches.
	Customer welfare	Countries with higher alcohol/tobacco/unhealthy food consumption and that lacks universal health coverage. Companies in these countries need to factor in a higher risk of their product and services causing harm to vulnerable populations with pre-existing health conditions.
	Data security	Countries that have fewer secure internet servers per million population are likely to face a higher risk of data breaches.
	Employee engagement, diversity and inclusion	Countries with less gender diversity in education, the workforce, and government, as well as lower employment tenure. Companies in these countries have a higher risk of a less diverse workforce.
	Employee health and safety	Countries with more work-related accidents are likely to have poor safety standards and protection in place. Companies in these countries are more likely have a higher risk of health and safety incidents
	Human rights and community relations	Countries with lower levels of nourishment, drinking water availability, housing, healthcare accessibility and a low subsistence rate. Also, countries that have a poor track record of human rights violations. There is a higher risk of the operations in these countries having a negative impact on the community. There is also greater potential for companies to do more for society in these countries.
	Labor practices	Countries where a more significant percentage of children are engaged in child labor, where more time is spent doing unpaid domestic work and which have lower perceived civil liberties. Companies located in these countries are at higher risk of directly/indirectly engaging in child labor/ unfair labor practices.
	Product quality and safety	Countries with less regulation of product markets. For companies in these countries, there is a higher risk of product safety and quality standards being overlooked.
	Selling practices and product labelling	Countries with less regulation of product marketing. For companies in these countries, there is a higher risk of products and marketing misleading their consumers. (e.g., higher incidence of greenwashing)

Appendix G

Geographic Risk Model Full List of Data Sources

Dimension	SASB factor	Indicator name	Data source ame	Source
Environmental	Air quality	Air pollution related mortality	Age-standardized death rate attributable to household air pollution and ambient air pollution (per 100,000 population)	Our World in Data
	Ecological impacts	Permanent deforestation risk	Permanent deforestation (% of forest area, 5-year average)	Our World in Data
	Energy management	Non-renewable energy risk	Share of renewable energy in total primary energy supply (%)	OECD
		High footprint electricity production	Carbon intensity of electricity - gCO2/kWh	Our World in Data
		High fossil fuel consumption	Fossil fuel consumption	Our World in Data
		Non-renewable electricity generation risk	Share of renewable energy in total electricity generation (%)	Our World in Data
	GHG emissions	High CO2 emissions from fossil fuels and cement	CO_2 emissions from fossil fuel combustion and cement production (tCO2/capita)	Global Carbon Project
		Delayed net-zero targets risk	Net-zero target	NetZero Tracker
		High fossil fuel support	Fossil fuel support	OECD
		High per capita GHG emissions	Per capita GHG emissions	Our World in Data
		High CO2 emissions	CO2 emissions by country	Our World in Data
		High GHG emissions	GHG emissions by country	Our World in Data
		High flaring emissions	CO2 emissions from flaring by country	Our World in Data

Dimension	SASB factor	Indicator name	Data source ame	Source
Environmental	GHG emissions	High emissions from oil	CO2 emissions from oil by country	Our World in Data
		High emissions from gas	CO2 emissions from gas by country	Our World in Data
	Waste and hazardous waste management	High per capita hazardous waste generation	Hazardous waste generated per capita	Our World in Data
		High per capita plastic waste management	Mismanaged plastic waste per capita	Our World in Data
	Water and wastewater management	Water management safety risk	Population using safely managed water services (%)	JMP
		Sewage management safety risk	Population using safely managed sanitation services (%)	JMP
		Basic sanitation availability risk	Population using at least basic sanitation services (%)	JMP
		Drinking water availability risk	Population using at least basic drinking water services (%)	JMP
		Lack of access to managed (piped) water	Access to improved water source, piped (% of urban population)	WHO and UNICEF
Governance	Business ethics	Corruption perception risk	Corruption Perception Index (worst 0-100 best)	Transparency International
		Lack of financial disclosure risk	Business extent of disclosure index (0=less disclosure to 10=more disclosure)	World Bank
	Business model resilience	Lack of scientific journals risk	Scientific and technical journal articles (per 1,000 population)	National Science Foundation
		Lack of innovation risk	Triadic patent families filed (per million population)	OECD
		Lack of research rigor risk	Researchers (per 1,000 employed population)	OECD
	Competitive behaviour	Cartels risk	OECD cartels database	OECD
		Lack of government regulatory quality risk	Regulatory quality	World Bank
		Barriers to business risk	Ease of doing business ranking	World Bank

Dimension	SASB factor	Indicator name	Data source ame	Source
Governance	Critical incident risk management	Low insurance premiums as percent of GDP	GCI 4.0: Insurance premium	World Bank
		Low non-life insurance premiums as percent of GDP	GCI 4.0: Non-life insurance premiums	World Bank
	Ecological impacts	Deforestation risk	Annual deforestation	World Bank
	Management of legal and regulatory environment	Lack of government regulatory quality risk	Regulatory quality	World Bank
		Lack of rule of law risk	Rule of law	World Bank
	Materials sourcing and efficiency	Raw materials imports risk	Raw materials imports by country in US$ thousand	WITS
	Physical impacts of climate change	Undernourishment risk	Prevalence of undernourishment (%)	FAO
		Drinking water availability risk	Population using at least basic drinking water services (%)	JMP
		Uninsured risk	Insurance penetration	OECD
		High annual economic damages resulting from natural disasters	Decadal average: Annual economic damages from disasters as a share of GDP, 2020	Our World in Data
		High number of deaths from natural disasters	Number of deaths from natural disasters, 2023	Our World in Data
		High annual change in surface temperature	Annual change: Average monthly surface temperature	Our World in Data
		High annual change in temperature anomalies	Absolute annual change in monthly temperature anomalies	Our World in Data
		Adolescent fertility risk	Adolescent fertility rate (births per 1,000 females aged 15 to 19)	UNDESA
		Food production as a high %GDP risk	Agriculture, forestry and fishing value added (% of GDP)	World Bank
		Deforestation risk	Annual deforestation	World Bank
		Hunger risk	Global Hunger Index	Our World in Data

Dimension	SASB factor	Indicator name	Data source ame	Source
Governance	Physical impacts of climate change	Poor living standards risk	Urban population living in slums (%)	Our World in Data
		Urban coastal disasters risk	Urban populations living within 100km of coastline (%)	Resource Watch (SEDAC Earth Data)
		Urban coastal disasters risk	Rural populations living within 100km from coastline (%)	Resource Watch (SEDAC Earth Data)
		Urban flood risk	Urban populations living within < 5m elevation (%)	Resource Watch (SEDAC Earth Data)
		Rural flood risk	Rural populations living within <5m elevation (%)	Resource Watch (SEDAC Earth Data)
	Product design and lifecycle management	High per capita non-recycled waste risk	Non-recycled municipal solid waste (kg/capita/day)	OECD
		High per capita electronic waste risk	Electronic waste (kg/capita)	UNU-IAS
		High per capita solid waste risk	Municipal solid waste (kg/capita/day)	World Bank
	Supply chain management	Corruption perception risk	Corruption Perception Index (worst 0-100 best)	Transparency International
		Logistics risk	Logistics Performance Index: Quality of trade and transport-related infrastructure (worst 1-5 best)	World Bank
	Systemic risk management	Lack of rule of law risk	Rule of law	World Bank
Social	Access and affordability	Income inequality (Gini) risk	Gini coefficient adjusted for top income	OECD
	Customer privacy	Lack of access to secure internet servers	Secure internet servers (per million people)	World Bank
	Customer welfare	Alcohol consumption health risk	Total per capital (15+) consumption (in liters of pure alcohol) by country	WHO
		Obesity health risk	Prevalence of obesity, BMI ≥ 30 (% of adult population)	WHO
		Tobacco consumption health risk	Prevalence of current tobacco use (% of adults)	World Bank
		Healthcare accessibility risk	Universal health coverage (UHC) index of service coverage (worst 0-100 best)	Our World in Data

Dimension	SASB factor	Indicator name	Data source ame	Source
Social	Data security	Lack of access to secure internet servers	Secure internet servers (per million people)	World Bank
	Employee engagement, diversity and inclusion	Gender inequality - labor force	Ratio of female-to-male labor force participation rate (%)	ILO
		Share of women in government	Seats held by women in national parliament (%)	IPU
		Employment tenure risk	Employment by job tenure intervals – average tenure	OECD
		Tertiary education risks	Tertiary educational attainment (% of population aged 25 to 34)	OECD
		High gender wage gap	Gender wage gap (% of male median wage)	OECD
		Gender inequality - time spent doing unpaid work	Gender gap in time spent doing unpaid work (minutes/day)	OECD
		Gender inequality - education opportunities	Ratio of female-to-male mean years of education received (%)	UNESCO
		Primary education risk	Net primary enrolment rate (%)	UNESCO
		Lower secondary education risk	Lower secondary completion rate (%)	UNESCO
		Literacy rate risk	Literacy rate (% of population aged 15 to 24)	UNESCO
		Gender inequality in stem	Female share of graduates from STEM fields at the tertiary level (%)	World Bank
		Employment tenure risk	Employment by job tenure intervals – average tenure	OECD
	Employee health and safety	Work related mortality	Work related mortality in the world	International Labor Organization (ILO)
	Human rights and community relations	Undernourishment risk	Prevalence of undernourishment (%)	FAO
		Drinking water availability risk	Population using at least basic drinking water services (%)	JMP

Dimension	SASB factor	Indicator name	Data source ame	Source
Social	Human rights and community relations	Shelter risk	Population with rent overburden (%)	OECD
		Adolescent fertility risk	Adolescent fertility rate (births per 1,000 females aged 15 to 19)	UNDESA
		Healthcare accessibility risk	Universal health coverage (UHC) index of service coverage (worst 0-100 best)	Our World in Data
		Human rights violation risk	Human Rights Index	Our World in Data
	Labor Practices	Incidence child labor (% of children over 5 years)	Percentage of children (aged 5-17 years) engaged in child labor (economic activities and household chores)	HDX (Humanitarian Data Exchange)
		High employee burnout risk	Annual working hours per worker	Our World in Data
		Lack of organized domestic labor risk	Time spent on unpaid care and domestic work, 2021 (rural - female)	Our World in Data
		World bank low-income group risk	World bank income groups (proxy)	Our World in Data
		Lack of civil liberties risk	Civil liberties index (proxy)	Our World in Data
	Product quality and safety	Lack of product market regulation risk	Product market regulation	OECD
	Selling practices and product labelling	Lack of product market regulation risk	Product market regulation	OECD

Note: Overall, the current model uses 79 sources. However, some sources are used as inputs in multiple SASB factors as they often add an important aspect to the factor. Therefore, some rows have been duplicated in the table above to reflect these multiple factors, while also endeavoring to display how the sources are transformed into indicators and then are rolled-up into SASB factors.

Appendix H

Sources Used as reference for building the Management Indicators

Indicators were sources from the following frameworks:

- **The Sustainability Accounting Standards Board (SASB)**

List of indicators as part of the Materiality Map for Asset Management sector

- **The United Nations Principles for Responsible Investment (UNPRI)**
  - List of indicators as part of standardized UNPRI Transparency Reports for firms
  - List of questions and best practices from UNPRI technical guide for Limited Partners (LPs)
  - List of questions from UNPRI LP responsible investment DDQ
- **The Task Force for Climate-related Financial Disclosures (TCFD)**
  - List of questions from the TCFD recommendations
- **Institutional Limited Partnership Association (ILPA)**
  - List of questions from the ILPA due diligence questionnaire
- **Public market ESG ratings providers**
  - List of indicators commonly applied to public market ESG rating analysis

We have identified **76 indicators** as being relevant to ESG integration in private markets. To create custom filters for various use cases, each indicator has been categorized according to the following tags:

- **Governance type:** Tags indicating whether the indicator is primarily related to firm, portfolio, or asset-level governance.
- **ESG pillar:** Tags indicating whether the indicator is primarily related to environmental, social, or governance pillars.
- **ESG theme:** Tags indicating the SASB material issue or theme, as well as themes specific to private markets.
- **ESG framework:** Tags pointing to the frameworks from which the indicator is sourced.

Appendix I

How to read the ESG Metrics

Group	ESG metrics	Units	How to read the metric
Environmental	GHG emissions	TCO2-eq	It estimates the average greenhouse gas emissions in tonnes of CO2 equivalent (TCO2-eq)
	Air pollution - NH3	kg	It estimates the average air pollution released from ammonia in kilograms (kg)
	Air pollution - NMVOC	kg	It estimates the average air pollution released from Non Methane Volatile Organic Compounds (NMVOCs) in kilograms (kg)
	Air pollution - Nox	kg	It estimates the average air pollution released from nitrogen oxides in kilograms (kg)
	Air pollution - PM2.5	kg	It estimates the average air pollution released from particulate matter with a diameter of 2.5 micrometers or smaller in kilograms (kg)
	Air pollution - SO2	kg	It estimates the average air pollution released from sulfur dioxide in kilograms (kg)
	Human toxicity (carcinogenic)	DALY	It estimates the average release of air pollutants that cause carcinogenic harm to human health in disability-adjusted life years (DALY)
	Human toxicity (non-carcinogenic)	DALY	It estimates the average release of air pollutants that cause non-carcinogenic harm to human health in disability-adjusted life years (DALY)
	Marine ecotoxicity	kg 1,4 DB-eq	It estimates the average release of airborne pollutants impacting the toxicity of marine ecosystems in kilograms of 1,4 dichlorobenzene equivalent (kg 1,4 DB-eq)
	Freshwater ecotoxicity	kg 1,4 DB-eq	It estimates the average release of airborne pollutants impacting the toxicity of freshwater ecosystems in kilograms of 1,4 dichlorobenzene equivalent (kg 1,4 DB-eq)
	Terrestrial ecotoxicity	kg 1,4 DB-eq	It estimates the average release of airborne pollutants impacting the toxicity of terrestrial ecosystems in kilograms of 1,4 dichlorobenzene equivalent (kg 1,4 DB-eq)
	Freshwater eutrophication	kg P-eq	It estimates the average eutrophication of freshwater ecosystems in kilograms of phosphorus equivalent (kg P-eq)

Group	ESG metrics	Units	How to read the metric
Environmental	Marine eutrophication	kg N	It estimates the average eutrophication of marine ecosystems in kilograms of nitrogen (kg N)
	Land occupation - Crops	MSA-ha	It estimates the biodiversity loss resulting from the occupation of land for crop cultivation, measuring the decrease in mean species abundance per hectare (MSA-ha)
	Land occupation - Forestry	MSA-ha	It estimates the biodiversity loss resulting from the occupation of land for forestry, measuring the decrease in mean species abundance per hectare (MSA-ha)
	Land occupation - Pastures	MSA-ha	It estimates the biodiversity loss resulting from the occupation of land for pastures, measuring the decrease in mean species abundance per hectare (MSA-ha)
	Use of scarce water	m3 scarcity-adjusted	It estimates water usage in cubic meters, adjusted for scarcity in the region
	Use of scarce materials	kg Cu-eq	It estimates the depletion of rare or limited non-living resources in kilograms of copper equivalent (kg Cu-eq)
Social	Underpayment	USD	It estimates the average amount by which employees have been underpaid in monetary values
	Child labor - Risk	FTE-eq	It estimates the risk of child labor in the value chain as a share of the total workforce
	Child labor - Lost education	USD	It estimates the economic loss in terms of future earnings for a child who is prevented from attending school during their youth due to engagement in labor in monetary values
	Gender wage gap	USD	It estimates the average difference in annual earnings between male and female employees in similar positions in monetary values
	Forced labor (low severity)	Vulnerable people	It estimates the prevalence of low severity forced labor in the value chain with a focus on individuals considered vulnerable
	Forced labor (medium severity)	Vulnerable people	It estimates the prevalence of medium severity forced labor in the value chain with a focus on individuals considered vulnerable
	Workplace health and safety incidents	DALY	It estimates the impact of workplace health and safety incidents in disability-adjusted life years (DALY)

Appendix J

Preqin industry classification to EU taxonomy industry taxonomy mapping

Preqin industry group	Preqin primary industry	Preqin sub industries	Eu taxonomy eligibility
Raw materials and natural resources	Forestry and timber	-	Climate adaptation/ mitigation
Industrials	Energy storage and batteries	-	Climate adaptation/ mitigation
Raw materials and natural resources	Materials	Masonry materials	Climate adaptation/ mitigation
		Steel and metals	Climate adaptation/ mitigation
	Chemicals	-	Climate adaptation/ mitigation
		Commodity chemicals	Climate adaptation/ mitigation
Energy and utilities	Renewable energy	Solar power	Climate adaptation/ mitigation
		Wind power	Climate adaptation/ mitigation
		Hydro power	Climate adaptation/ mitigation
		Geothermal	Climate adaptation/ mitigation
		Biomass	Climate adaptation/ mitigation
	Power and utilities	Water and sewer utilities	Climate adaptation/ mitigation
		Waste management	Climate adaptation/ mitigation
Industrials	Environmental services	Recycling	Climate adaptation/ mitigation
		Pollution control	Climate adaptation/ mitigation
	Rail transport		Climate adaptation/ mitigation
Consumer discretionary	Transportation services	Public transit/transportation	Climate adaptation/ mitigation
		Car hire services	Climate adaptation/ mitigation
Industrials	Logistics and distribution	Freight shipping services	Climate adaptation/ mitigation
Consumer discretionary	Transportation services	Marine	Climate adaptation/ mitigation
Industrials	Ship building and repair		Climate adaptation/ mitigation

Preqin industry group	Preqin primary industry	Preqin sub industries	Eu taxonomy eligibility
Consumer discretionary	Consumer services	Home repair services	Climate adaptation/ mitigation
Information technology	IT infrastructure		Climate adaptation/ mitigation
Business services	Business support services	Engineering	Climate adaptation/ mitigation
Telecoms and media	Media	Radio broadcasting and programming	Climate adaptation
Financial and insurance services	Insurance		Climate adaptation
Consumer discretionary	Education/training		Climate adaptation
	Consumer services	Event management	Climate adaptation
Telecoms and media	Media	Music production and distribution	Climate adaptation
Industrials	Environmental services	Green IT	Climate mitigation