Goldman Sachs | Equity Research

1 February 2022 | 10:40PM GMT

Note: The following is a redacted version of the original report published February 1, 2022 [32 pgs].

GS SUSTAIN: EU Taxonomy Series

Progress on the Journey to Alignment

The EU Taxonomy is ramping up to become the 'common green standard' used to credentialize companies' green revenue and capex, and investors' green investments. However, corporates' and investors' ability to navigate the complexities and challenges with assessment and reporting will be critical to the EU Taxonomy's ultimate success. We are seeing rising pressure on corporates and investors to follow the Taxonomy, which has led to growing adoption that in turn will drive significant impacts for capital allocation, cost of capital and company valuations. Additionally, as market sentiment potentially shifts towards supporting ESG improvers, the Taxonomy could help provide basis for owning companies in transition.

With the initial climate phase of the Taxonomy having taken effect, we see 2022 becoming a critical period of experimentation and engagement between investors and corporates around disclosures and alignment-estimation models leading up to full Taxonomy application from January 1, 2023. As part of this process, we revise our GS SUSTAIN Taxonomy Tool to include more granular revenue data, helping to increase our coverage of companies with eligible-revenue (>5% rev.) from 47% to 61% (in MSCI ACWI), and add new datasets including forward-looking 'green' revenue and capex figures from our sector analysts, raising our coverage of potentially-aligned companies from 7% to 11% (in MSCI ACWI). Overall we assess how ~7,000 global companies may be eligible and aligned to the Taxonomy criteria.

Evan Tylenda, CFA
+44(20)7774-1153 |
evan.tylenda@gs.com
Goldman Sachs International

Madeline Meyer
+44(20)7774-4593 |
madeline.r.meyer@gs.com
Goldman Sachs International

Grace Chen
+44(20)7774-5119 | grace.j.chen@gs.com
Goldman Sachs International

Brian Singer, CFA
+1(212)902-8259 | brian.singer@gs.com
Goldman Sachs & Co. LLC

Derek R. Bingham
+1(415)249-7435 |
derek.bingham@gs.com
Goldman Sachs & Co. LLC

Emma Jones
+61(2)9320-1041 | emma.jones@gs.com
Goldman Sachs Australia Pty Ltd

Brendan Corbett
+1(415)249-7440 |
brendan.corbett@gs.com
Goldman Sachs & Co. LLC

Rachit Aggarwal
+1(212)934-7689 |
rachit.aggarwal@gs.com
Goldman Sachs India SPL

Keebum Kim
+852-2978-6686 | keebum.kim@gs.com
Goldman Sachs (Asia) L.L.C.

Goldman Sachs does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision. For Reg AC certification and other important disclosures, see the Disclosure Appendix, or go to www.gs.com/research/hedge.html. Analysts employed by non-US affiliates are not registered/qualified as research analysts with FINRA in the U.S.

The EU Taxonomy - Navigating the 'green' road less traveled

The EU Taxonomy will require companies to disclose their 'green' revenue, capex and opex meeting strict performance criteria and investors to report their exposure to 'green' companies in ESG funds.

As part of the European Green Deal's strategy to transform the EU into a more resource-efficient economy with net zero emissions by 2050, the EU Taxonomy aims to re-direct capital flows to more sustainable outcomes, providing financial market participants with greater transparency by establishing consistent criteria for determining which economic activities and investment projects can be considered green or not. **The Taxonomy's success will hinge on its ability to ensure its complexity does not lead to an outsourcing of investor responsibility to assess corporate environmental transition risks or opportunities, nor serve as a crutch that threatens ESG innovation in corporate strategy and investor decisionmaking, in our view.**

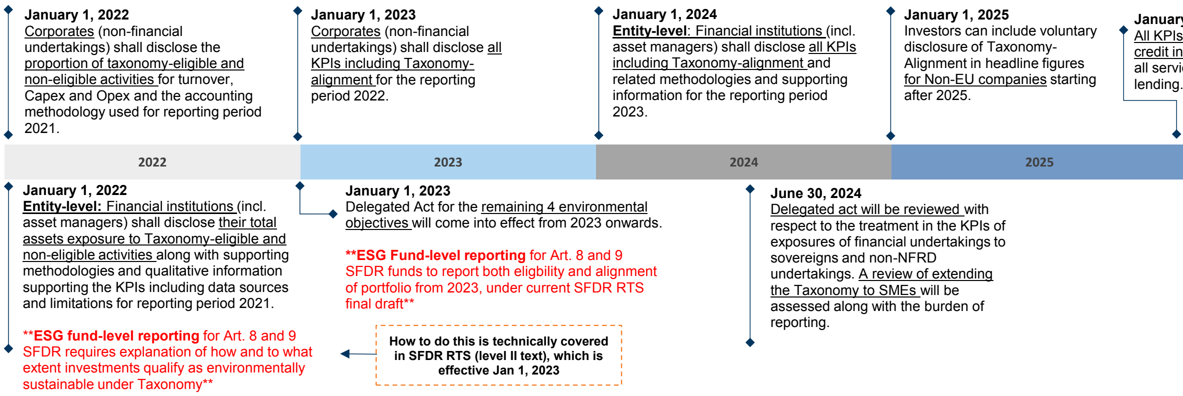
We have seen rising pressure on corporates and investors to follow the Taxonomy, which has led to growing adoption and clear implications for capital markets. From **the corporate side**, we note rising mentions of the EU Taxonomy in earnings calls ahead of the reporting obligations starting in 2022, though in our industry conversations there remains confusion around reporting obligations from corporates that could impinge reporting deadlines. On **the investor side,** we see: 1) rising flows into ESG funds (Art 8. & Art 9.) in which many are required to report investment exposure under the Taxonomy, 2) end-client and fund distribution platforms requesting ESG funds taxonomy-alignment stats regardless of whether it features in the strategy of the fund, and 3) direct financial incentives for Luxembourg funds to reduce their tax rate based on higher levels of Taxonomy alignment.

Concerns of Taxonomy dilution and 'greenwashing' following likely inclusion of nuclear and gas power (where replacing coal) are overdone, in our view, mainly given that the EU Commission has stated that they will amend the existing Taxonomy Disclosure Delegated Act to ensure that investors can identify if, and to what extent, activities include gas or nuclear activities "so they can make an informed choice" in final Taxonomy reporting requirements. **Some investors have already expressed that they will request Taxonomy figures from data providers which exclude nuclear and gas. Additionally, we expect potential ESG fund support for the technologies to be tempered by existing exclusions.**

Our Taxonomy eligibility and alignment tool covers ~7,000 global companies where ~4,000 have some potentially-eligible revenue and ~660 companies have some potentially-aligned revenue. *Nuclear and gas power are not currently included in our assessment.*

Enhancing our GS SUSTAIN Taxonomy Tool with improved granularity for identifying potential-eligibility and alignment, along with forward-looking views on green revenue and capex from our sector analysts. With this report we update our revenue mapping to the 90+ activities covered under Climate Change Mitigation using new granular revenue data that increases our coverage of companies to 61% from 47% (MSCI ACWI companies with >5% of eligible-rev.) previously. We also incorporate new datasets to measure alignment, including select current and future green revenue and capex estimates from our sector analysts for ~180 companies, where relevant — providing a more forward-looking view of potential Taxonomy-alignment.

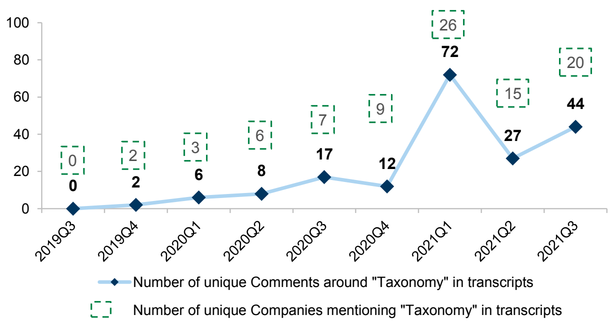
Exhibit 1: Timeline of reporting requirements for the EU Taxonomy for corporates and asset managers



Source: European Commission, Goldman Sachs Global Investment Research

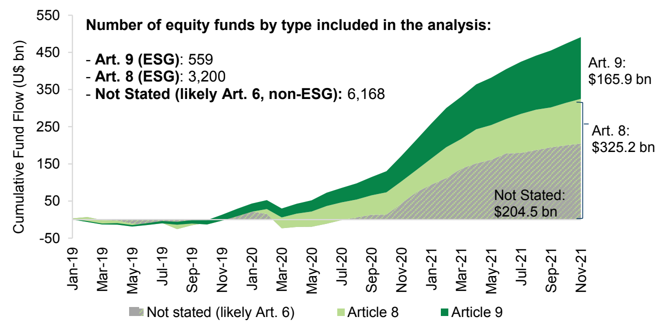
Our Thesis in Six Charts

Exhibit 2: Discussions around the Taxonomy in earnings calls have seen steady growth in the past two years
Number of comments discussing EU Taxonomy, STOXX 600 transcripts



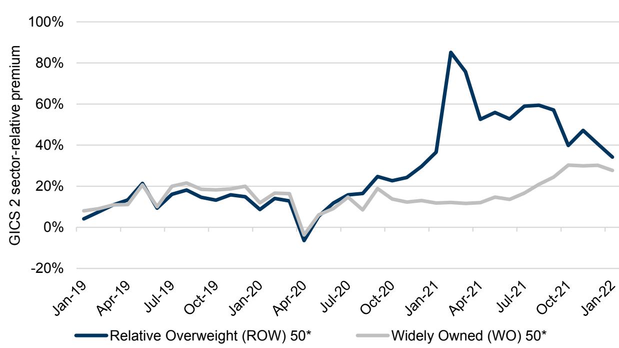
Source: Refinitiv Eikon, Goldman Sachs Global Investment Research

Exhibit 3: Article 8 & 9 ESG equity fund flows have rapidly outgrown non-ESG counterparts in Europe
Cumulative fund flow of Eur. Eq funds by type (U$bn) 2019-2021 (Nov.)



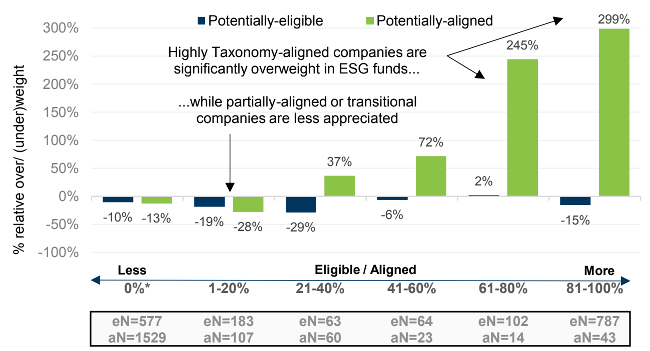
Source: Morningstar, Goldman Sachs Global Investment Research

Exhibit 4: The reward for high representation in ESG funds is clear as premiums for ESG fund favorites continued in 2021...
Trimmed mean 12m fwd consensus EV/EBITDA vs. ACWI GICS 2 peers



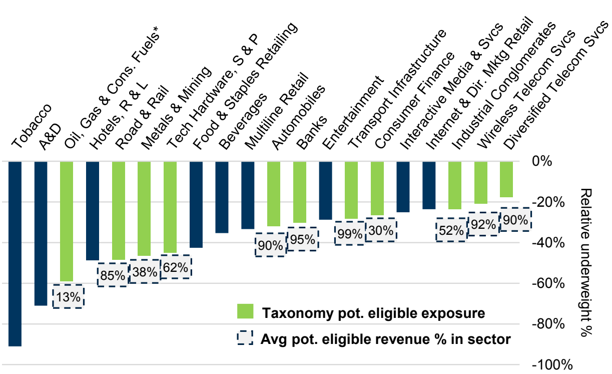
Source: Morningstar, Thomson Reuters, FactSet, Goldman Sachs Global Investment Research

Exhibit 5: ...with Taxonomy-alignment corresponding to greater weights in ESG funds, with more room for partially-aligned stocks
ESG funds' relative weight for eligible/aligned rev groupings, Oct 2021



Source: Morningstar, Goldman Sachs Global Investment Research

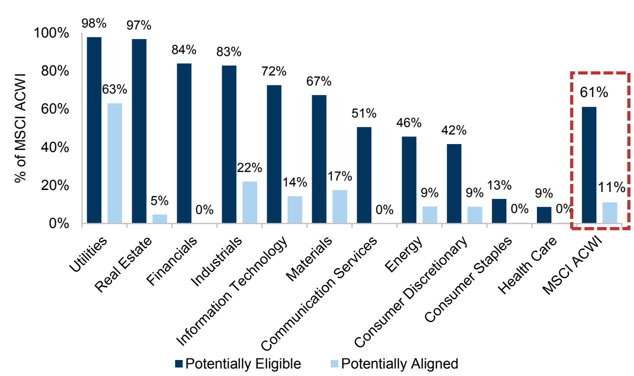
Exhibit 6: Some of the most underweight industries in ESG funds have portions of revenue that are eligible under the Taxonomy
GICS 3 industries most relatively underweight in ESG funds, Oct 2021, with avg. eligible revenue % in exposed sectors



*The Oil & Gas industry has some exposure to low-carbon activities (chemicals, renewables, bio fuels, etc.) defined under the Taxonomy.

Source: Morningstar, Goldman Sachs Global Investment Research

Exhibit 7: Over half of global companies have some exposure to the EU Taxonomy, with only 11% potentially-aligned (>5% rev.)
MSCI ACWI exposure by GICS 1, >5% rev potentially eligible/aligned



Source: European Commission, FactSet, Goldman Sachs Global Investment Research

Taxonomy 101 - What is the EU Taxonomy?

The EU Taxonomy is a classification system of economic activities that substantially contribute towards a sustainable economy by defining what is green or not across six environmental objectives. The aim is to facilitate the flow of capital towards environmentally friendly activities by helping investors make informed decisions on a company's economic activities that have a meaningful influence on environmentally sustainable outcomes. The Taxonomy gives credit to clear and obvious green activities such as wind, solar, recycling, EVs, etc, but also transitional activities that need to decarbonize such as cement, steel, aluminum, and petchems where meeting strict carbon thresholds.

Exhibit 8: The six EU Taxonomy Environmental Objectives

	Environmental Objectives	Status
1	**Climate Change Mitigation**	Activities currently finalised
2	**Climate Change Adaptation**	
3	Sustainable Use and Protection of Water and Marine Resources	Activities to be finalised in 2022 est.
4	Transition to a Circular Economy, Waste Prevention and Recycling	
5	Pollution Prevention and Control	
6	Protection of Healthy Ecosystems	

Source: EU Commission

Large European corporates (>500 employees) will be required to report business exposure to activities defined under the Taxonomy and also 'aligned (green)' revenue, capex and opex where activities meet the strict Taxonomy criteria. Eventually under the Corporate Sustainability Reporting Directive (CSRD) reporting, SMID and potentially private companies will be expected to also report exposure and alignment to the Taxonomy. **Asset managers** with ESG funds (Article 8 or 9 under SFDR) will be required to disclose information on how and to what extent the taxonomy has been applied to define environmentally sustainable investments within the ESG products they offer, with detailed reporting on investments' exposure to companies with eligible and aligned ('green') revenue. EU Member States and EU Institutions will also be required to follow the EU Taxonomy when legislating on sustainable financial products or sustainable fund labels.

For an economic activity to be included in the EU Taxonomy, it must **(1) substantially contribute to at least one of the six environmental objectives and comply with the technical screening criteria, (2) do no significant harm ('DNSH' criteria)** to any of the remaining objectives, and **(3) meet minimum social safeguards** in the performance of the activity.

Current Climate Taxonomy: The Taxonomy has currently been finalized for Climate Change Mitigation and Adaptation objectives with application from 2022. For details on reporting timelines see (Exhibit 1).

The Remaining Environmental Objectives: The remaining four environmental objectives (water, waste & circular economy, pollution prevention, and healthy ecosystems) are awaiting final approval from the EU Commission, which is expected in 2022 and is expected to apply from 2023 for corporates and investors.

Corporates: Implications of the Taxonomy

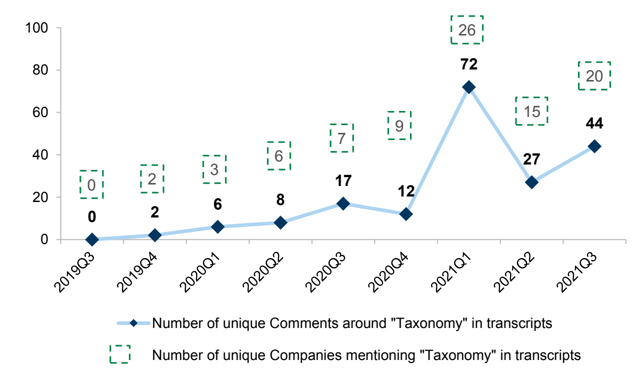
'The Taxonomy could provide unique opportunities for buying old inefficient buildings that do not check the ESG box for other buyers, but we can purchase and turn into clean ESG assets and sell to more willing buyers.' - Real Estate Company CEO on an earnings call with investors

Early recognition of the Taxonomy as influential to investors amongst European corporates is growing, but still nascent as reporting requirements launch in 2022. Assessing recent earnings transcript from STOXX 600 companies ('19-21), we identified 57 unique companies mentioning the EU Taxonomy in investor earnings calls, equating to roughly 17% of the 334 STOXX 600 companies with significant revenue eligible (>20%) to the Taxonomy based on our GS SUSTAIN Taxonomy Tool. Corporate and investor dialog around the Taxonomy has been picking up in the past two years, especially for utility companies (Exhibit 10), which are well covered and eligible under the climate change mitigation environmental objective of the Taxonomy. We find that total number of comments around the Taxonomy has risen from 0 in 2019 Q3 to 44 in 2021 Q3 (latest available), with a notable spike of 72 towards the finalization phase in Q1 2021 (Exhibit 9). **As company reporting for eligible revenues will be required starting 2022 and aligned revenue from 2023, we expect to see an acceleration of companies discussing Taxonomy figures in conversations with investors, though the complexity and confusion surrounding the Taxonomy may limit reporting abilities initially.**

Initial corporate and investor discussions about the topic include the timeline of Taxonomy incorporation, the process in place to report, initial results of the assessments, relevance for financing and explaining green capex investments. From our conversations, large EU corporates largely see the Taxonomy as useful for establishing a 'common language' to help communicate decarbonization and green strategies to investors.

Exhibit 9: Discussions around the Taxonomy in earnings calls have seen growth recently, with a notable spike towards finalization in Q2 21...

Number of comments and companies discussing EU Taxonomy during corporate events, STOXX 600* transcipts 2019 Q3 - 2021 Q3

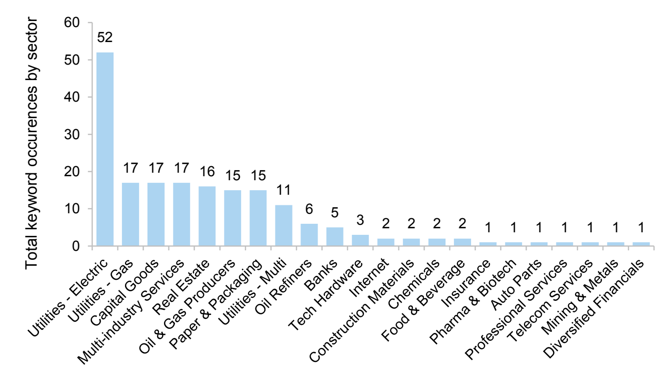


*company coverage rate is ~60% for STOXX 600 in our transcript tool

Source: Refinitiv Eikon, Goldman Sachs Global Investment Research

Exhibit 10: ...especially among Utilities

Total comments around EU Taxonomy by sector, STOXX 600 transcripts 2019 Q3 - 2021 Q3



*company coverage rate is ~60% for STOXX 600 in our transcript tool

Source: Refinitiv Eikon, Goldman Sachs Global Investment Research

Large EU companies will be required, where eligible, to report their green revenue, capex and opex as defined by the Taxonomy criteria. Non-EU companies can voluntarily report Taxonomy figures, while investors can build estimates for global companies' Taxonomy alignment.

Companies recognize the benefits of establishing a 'common language' for measuring and communicating environmental performance... In our conversations with Air Liquide and Snam SpA, both companies noted that having a common framework and language available to external stakeholders will increase transparency and provide consistency between companies for communicating transitional activities in their projects. Additionally, given that the EU Taxonomy will be defining what green revenue and capex means in a world hungry for standardization, **we see the Taxonomy naturally becoming the tool to credentialize corporates' green investments, especially as investors take a more forward look on companies.**

...yet significant challenges exist for corporates to incorporate the Taxonomy. The Taxonomy requires extensive detail and data that many organizations may not have at present, and will require engaging many internal and external stakeholders and building new workflows to accommodate. Determining Taxonomy alignment for companies requires a multi-layered approach as companies need to: 1) understand their placement within the NACE codes and map which revenue and capex segments are relevant; 2) calculate performance on technical screening criteria; 3) conduct due diligence on Do No Significant Harm (DNSH) criteria; and 4) ensure Minimum Social Safeguards (MSS) are in effect. Thus, companies need to introduce experts, engage external stakeholders, partner with human resources or other social teams, and work through the chain of command to gather all data and ensure compliance.

The EU Taxonomy will be relevant for global companies which can voluntarily report Taxonomy-eligibility and alignment and where European funds investing globally can develop estimates for Non-EU corporates. **In addition, to date more than 20 jurisdictions globally have developed or are in the process of developing their own green taxonomies and taxonomy-like frameworks, with many leveraging the EU Taxonomy as a foundation.**

At COP26, the International Platform on Sustainable Finance (IPSF) published the Common Ground Taxonomy, highlighting similarities and differences between the EU and China's green taxonomies in terms of their approaches and outcomes through activity-by-activity mapping. Please see Appendix for summary tables of global Taxonomies in development (Exhibit 25-Exhibit 28).

Investors: Implications & considerations for capital markets

The ambitions of the European Commission are to establish the Taxonomy as the definitive 'green label' to help capital markets facilitate the flow of capital towards sustainable outcomes. The EC must, by law, embed the Taxonomy criteria into all future relevant regulation, investment fund labels and standards, while the European Central Bank also plans to use the EU Taxonomy as a guide for its risk assessments and asset purchase program. **We see the Taxonomy leading to large implications for capital flows, lower cost of capital and higher valuations for companies that fit into the Taxonomy — which will have significance to global ESG and generalist investors.**

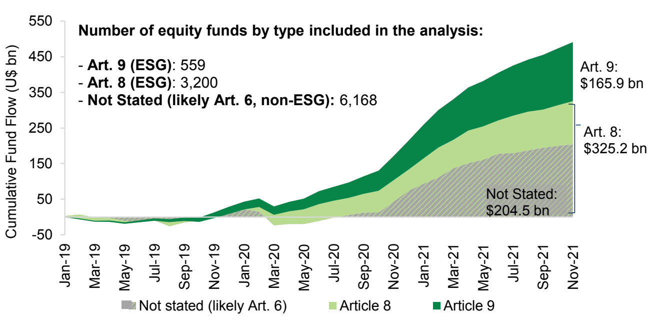
Regulatory and market pressure on ESG funds to follow the EU Taxonomy is mounting

We see **2022 as an experimental year for investors to apply Taxonomy data sets and engage with companies** in preparation for the 2023 full implementation deadline for the first phase of corporate & ESG fund Taxonomy-alignment reporting.

We see the EU Taxonomy becoming widely adopted by investors for three main reasons: 1) Starting January 1, 2023, a large portion of funds classified as Article 8 or 9 under SFDR will be required to report their exposure to companies with Taxonomy-aligned green revenue and capex, **2)** Additional pressure to report Taxonomy-alignment is coming from end clients, voluntary standards and fund distribution platforms, critical gatekeepers for flows, regardless of whether the Taxonomy is used as part of the ESG strategy, and **3)** many ESG funds are now directly financially incentivized to invest in Taxonomy-aligned companies via tax breaks.

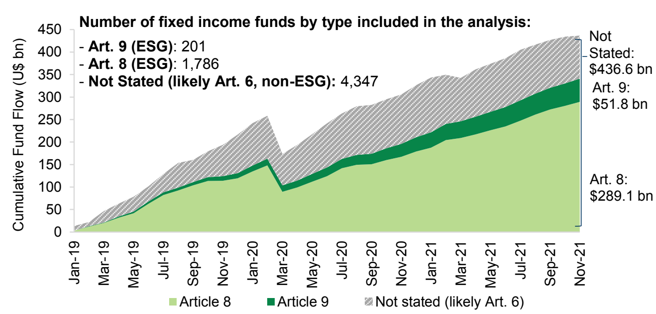
Flows into Article 8 & 9 funds, which have specific Taxonomy reporting requirements, have significantly outpaced Article 6 (or 'not stated') despite the latter representing nearly 2x the number of funds, providing a clear signal to asset managers. Cumulative flows into Article 8 & 9 (labeled as of Jan '22) for both Equity and Fixed Income funds reached ~US$491 bn between Jan '19 and Nov '21 (latest avail.), while undefined counterparts (likely Article 6) saw inflows of only ~US$205 bn during the same period (Exhibit 11). This was despite the number of 'not stated' funds standing at 6,168 vs. 3,200 for Article 8 and 559 for Article 9. **This sends a clear market signal for asset managers to launch and or relabel funds as ESG (Art. 8 & 9) to attract flows, something corroborated by our industry conversations where many asset managers said they find it 'difficult to sell Article 6 (non-ESG) funds'.**

Exhibit 11: Cumulative fund flow of Article 8 & 9 Equity funds have rapidly outgrown non-ESG counterparts
Cumulative fund flow of European Equity funds by type (U$bn)



Source: Morningstar, Goldman Sachs Global Investment Research

Exhibit 12: Article 8 & 9 Fixed Income cumulative flows have grown since '19, albeit to a lesser degree than non-ESG peers
Cumulative fund flow of European Fixed Income funds by type (U$bn)



Source: Morningstar, Goldman Sachs Global Investment Research

Many voluntary initiatives, collaborative investor groups and pledges are relying on the EU Taxonomy to help guide investors' climate efforts. We see signs of the EU Taxonomy already being explicitly adopted to drive **net zero investment strategies** among a number of signatories behind the $57 trillion in AUM supporting the global Net Zero Asset Managers Initiative (NZAM). For instance, one large European asset manager targets to double the proportion of AUM in climate solutions as defined by the EU Taxonomy by 2030 and another aims to have over 30% of the portfolio invested in companies offering Taxonomy-aligned climate solutions. The Paris Aligned Investing Initiative (PAII), a global collaborative forum that seeks to align investment portfolios to the Paris Agreement, recommends setting portfolio-level interim targets for the percentage of revenues or capex tied to climate solutions using the EU Taxonomy climate mitigation criteria.

Flows into ESG funds and adoption of the EU Taxonomy are set to grow under new MiFID II Sustainability 'suitability preferences' and Luxembourg tax incentives

New MiFID II sustainability amendments explicitly highlight Taxonomy-aligned financial products as a potential solution to satisfying clients 'suitability preferences', likely further spurring demand for Taxonomy-aligned products.

Direct financial incentives now exist for a large portion of W. Europe and Global ESG funds to follow the EU Taxonomy. Luxembourg-based retail funds can benefit from a reduced subscription tax rate for their portion of net assets invested in Taxonomy-compliant activities under Luxembourg's 2021 Budget Law (Exhibit 13). Retail funds are generally subject to an annual subscription tax at a rate of 0.05% on their net asset value. This rate may now be reduced to 0.01% based on the level of fund alignment to the EU Taxonomy. This has significant implications given **Luxembourg accounts for 36% of all ESG AUM domiciled in Western Europe and 28% of global ESG AUM, representing the single largest location of ESG funds by any country .**

This is the first example of a direct financial incentive for investors to follow Taxonomy-alignment, with potentially more to follow. Though initial indications of ESG funds applying for the Luxembourg tax incentive remains low, based on our industry conversations we expect adoption to increase over time as investors' awareness and datasets mature. This will further drive flows into ESG funds and could lead to incentives for fund managers to seek maximum Taxonomy-alignment to credentialize their ESG funds, in our view.

Exhibit 13: Lux funds to receive tax break for higher levels of Taxonomy-alignment Tax rates applicable based on level of fund alignment

Percentage of net assets invested into qualifying assets	Subscription tax rate applicable to the portion of qualifying assets
At least 5%	0.04%
At least 20%	0.03%
At least 35%	0.02%
At least 50%	0.01%

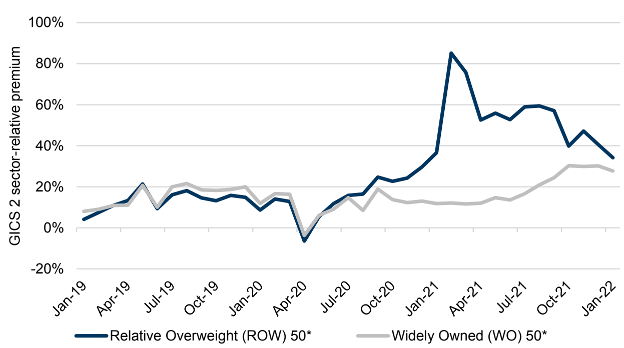
Source: Luxembourg Tax Authority

EU Taxonomy implications for companies and stocks

The reward for Taxonomy-alignment is clear — further ESG scarcity value, higher multiples and lower cost of capital. Given mounting regulatory and marketing pressure for funds to adopt the EU Taxonomy, we see crowding into Taxonomy-aligned companies as a likely outcome. This could lead to significant scarcity value that could drive higher multiples and lower costs of capital. Assets pouring into the ESG category and increased pricing of ESG risks & opportunities have had a material impact on valuation premiums for well-positioned beneficiaries in recent years — companies most relatively overweight in ESG funds ('ESG fund Nifty Fifty') trade at industry-relative premiums nearly 3x greater than that of two years prior (Exhibit 14).

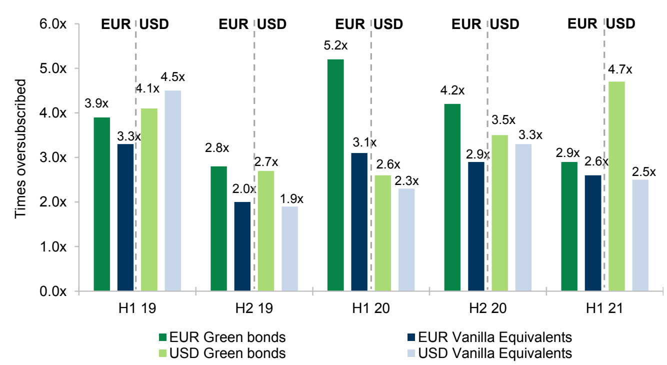
Green bonds are witnessing similar trends of 'crowding' and scarcity value as they are typically more oversubscribed than vanilla equivalents. On the credit side, according to the Climate Bonds Initiative, Green bonds have been 1.0x more oversubscribed than vanilla equivalents in Europe, and 0.6x in the US, since 2019. In 1H21, Green bonds achieved greater spread compression on average vs. vanilla equivalents. Spread compression averaged 20.4 bps for green bonds in EUR vs. 19.6 bps for EUR vanilla bonds. In the US, spread compressions averaged 29.9 bps for green bonds vs. 24.8 bps for vanilla. 1H21 did see a reduction in the % of EUR green bonds with larger oversubscription rates than vanilla equivalents, at 40% vs. 70% H2 2020. **Companies can now issue Taxonomy-aligned project debt without having to follow strict Green Bond Standards that we believe will be in focus for the growing ESG fixed income fund universe.**

Exhibit 14: Premiums for ESG fund favorites have continued to grow through 2021, highlighting the reward for thematic/ESG alignment
Trimmed mean of 12-mo fwd consensus EV/EBITDA vs. ACWI GICS 2 peers (Jan' 2019 to Jan' 2022)



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

Exhibit 15: Both Europe and US Green Bonds have been more oversubscribed than vanilla equivalents
Average rate of oversubscription for Green vs. vanilla bonds for EUR and US, 2019 H1 - 2021 H1



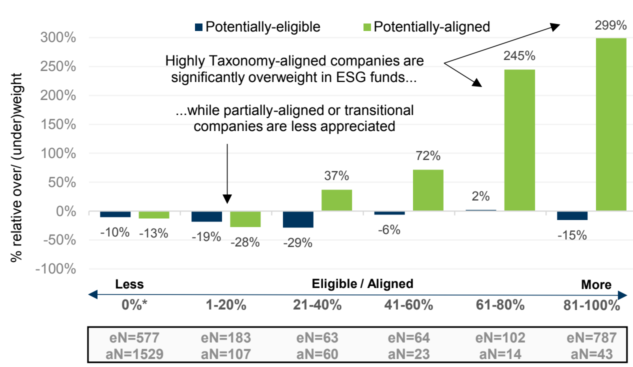
Source: Climate Bonds Initiative

Clear Taxonomy-aligned winners are well owned in ESG funds currently, while partially-aligned companies are less appreciated. According to our assessment, companies with 81-100% Taxonomy-aligned revenue in the MSCI ACWI are currently 299% relative overweight in ESG funds (N=43). For companies with only partially-aligned revenue, weightings within ESG funds fall as alignment falls. While companies with 61-80% aligned revenue are 245% relatively overweight in ESG funds, companies with 41-60% aligned revenue are only 72% relatively overweight. While most of the 100% Taxonomy-aligned companies in our framework correspond to clear and obvious Green activities (renewables, EVs, etc.), **we ultimately believe ESG funds will begin to reward partially Taxonomy-aligned companies as investors look for ESG improvers and appreciation for transitional companies grow.**

As market sentiment potentially shifts towards supporting ESG improvers, the Taxonomy could help provide basis for owning companies in transition. Thus the Taxonomy could reshuffle the balance of what gets owned in ESG funds - presenting opportunities for ESG 'value' or 'momentum' strategies where companies require significant transition financing. While some activities and industries currently fall outside of the Taxonomy's scope, eligible activities right now capture the vast majority of high-emitting sectors (~80% of CO_2 emissions in Europe), many of which are underweight in ESG funds currently. For example, Taxonomy-eligible transitional industries include (% underweight) oil & gas (-59%), road & rail (-49%), automobiles (-32%), and metals & mining (-46%). These high-emitting industries will be pivotal to the climate transition and can now in whole or partially be recognized as 'green' under the Taxonomy where meeting the strict criteria, which could improve their investability among ESG funds. We have already seen some movement in these sectors, with electric utilities relative weight of -2% in October 2021 up from -38% in December 2019. **Gauging companies' taxonomy-aligned capex will be critical for assessing future revenue exposures and could support ESG improver/momentum strategies.**

Exhibit 16: Higher levels of alignment correspond to greater weight in ESG funds with room for more representation amongst partially-aligned companies

Relative over/underweight % in ESG funds for eligible and aligned revenue groupings in the MSCI ACWI, Oct 2021

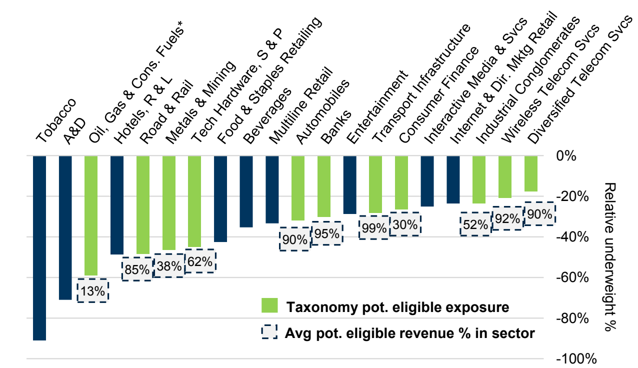


0% includes 0% eligibility/alignment and "more info req."

Source: Morningstar, Goldman Sachs Global Investment Research

Exhibit 17: Some of the most underweight industries in ESG funds have portions of their revenue that are potentially eligible under the Taxonomy

GICS 3 industries most relatively underweight in ESG funds, Oct 2021



*The Oil & Gas industry has some exposure to low-carbon activities (chemicals, renewables, bio fuels, etc.) defined under the Taxonomy. Direct Mining activites are not yet covered under the Taxonomy, but primary steel and aluminium production are included.

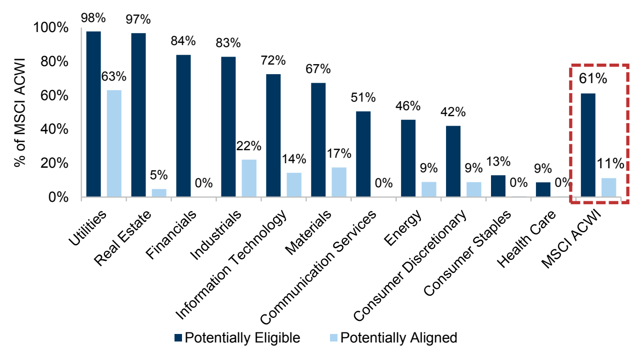
Source: Morningstar, Goldman Sachs Global Investment Research

The EU Taxonomy is relevant to the majority of global companies, but alignment figures are likely to remain very low initially.

Through our updated Taxonomy mapping we find that **the number of MSCI ACWI companies with >5% of revenue tied to potentially-eligible Taxonomy activities has increased to 61% under the revised draft Delegated Act (Exhibit 18).** These figures are up from 41% with our first tool in 2020, which was based on the 72 climate change mitigation activities in the TEG Final Report. Average eligible revenue across the MSCI ACWI, including companies with 0% or no info available, sits at 50% (Exhibit 20). Regions such as Japan and Asia ex J continue to have higher relative levels of potential eligibility to the Taxonomy given the economies' exposure to manufacturing industries that can potentially fit into defined activities (Exhibit 19, Exhibit 21).

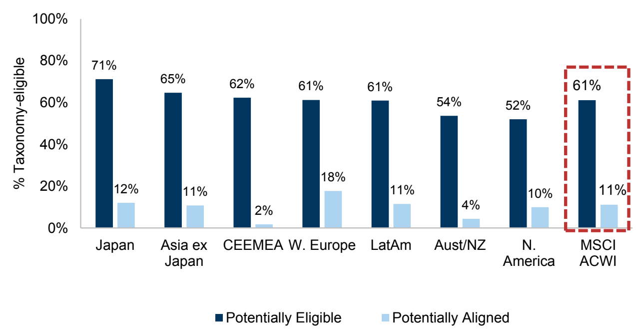
When assessing exposure of companies with potential alignment using existing data, we find that **only 11% of companies in the MSCI ACWI have >5% revenue that is potentially Taxonomy-aligned to screening criteria,** without factoring in DNSH and Minimum Social Safeguards criteria (Exhibit 18). Many activities require further information that is largely not yet available to determine alignment on a systematic basis. **Average aligned revenue across the MSCI ACWI sits at only 5% (Exhibit 20). The highest average alignment comes from Utilities with 26% vs. other sectors and W. Europe at 7% vs. other regions (Exhibit 21).**

Exhibit 18: Over half of global companies have some exposure (>5% rev.) to the EU Taxonomy, while only 11% are potentially-aligned (>5% rev.)
Exposure % of MSCI ACWI companies by GICS 1 sector with >5% revenue potentially eligible and potentially aligned



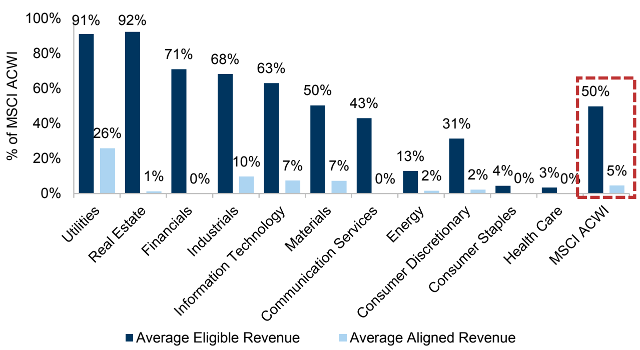
Source: European Commission, FactSet, Goldman Sachs Global Investment Research

Exhibit 19: Japan's economy has the highest exposure to eligible activities and W. Europe to aligned activities
Exposure % of MSCI ACWI companies by region with >5% revenue potentially eligible and potentially aligned



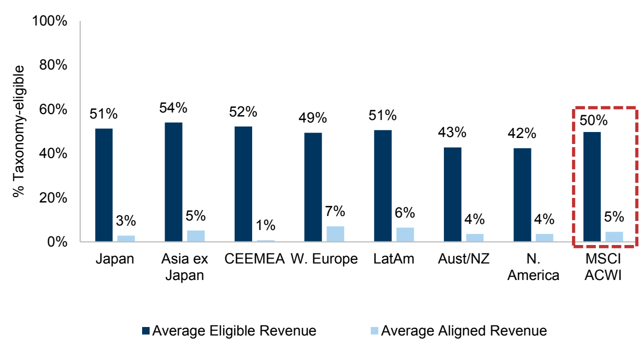
Source: European Commission, FactSet, Goldman Sachs Global Investment Research

Exhibit 20: Assessing average eligibility and alignment, Utilities have the highest % of potentially aligned revenue by a wide margin
Average Taxonomy-eligible and aligned revenue by GICS 1 sector amongst MSCI ACWI companies



Source: European Commission, FactSet, Goldman Sachs Global Investment Research

Exhibit 21: W. Europe has the highest % of potentially aligned revenue on average
Average Taxonomy-eligible and aligned revenue by region amongst MSCI ACWI companies



Source: European Commission, FactSet, Goldman Sachs Global Investment Research

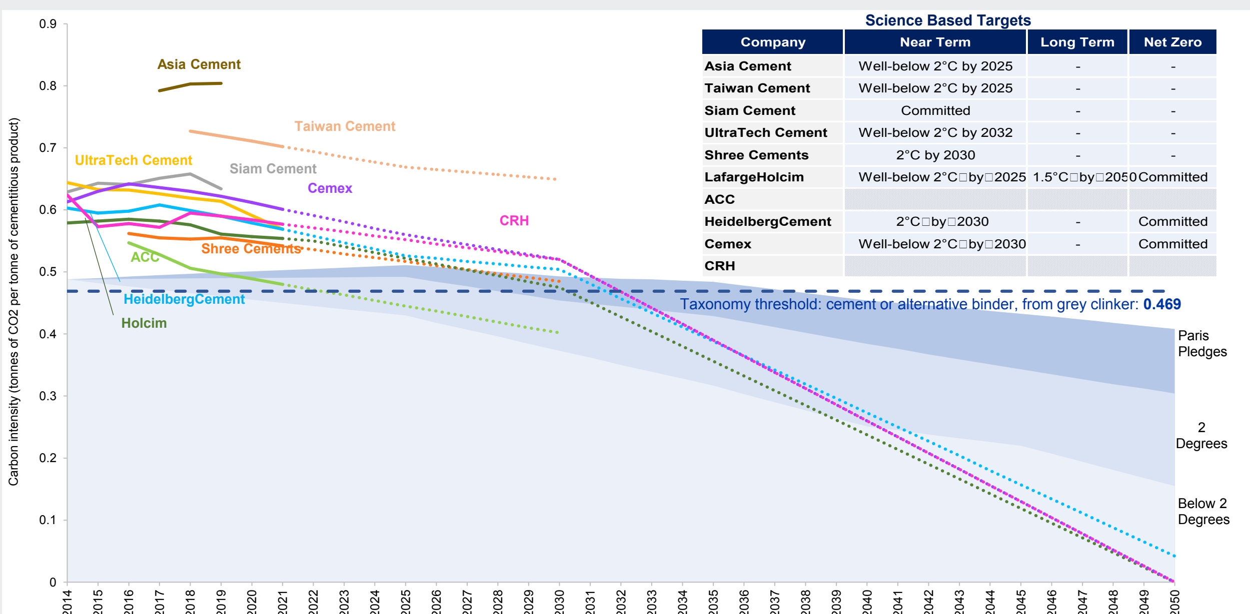
EU Taxonomy - the potential arbiter of net zero alignment for transition activities

How will the Taxonomy and other net zero emission initiatives align? We have seen rapid growth in the number of companies setting ambitious net zero carbon plans and committing to science-based emission targets. Although the spirit of these initiatives is aligned with the Taxonomy, company performance may not correspond at any given time, to allow companies to align with the Taxonomy criteria. The barriers to committing to simpler emissions reduction or net zero targets is significantly lower than the Taxonomy rules and often incorporates carbon offsets, which are not allowed under the Taxonomy. **Nevertheless, in our view, the Taxonomy is likely to become the arbiter for validating company decarbonization progress and Green activities for covered activities, but this will depend heavily on market acceptance and will be competing with other low carbon initiatives and frameworks for support.**

Measuring cement industry progress against the Taxonomy using the Transition Pathway Initiative (TPI): The TPI uses emission target modeling conducted by the International Energy Agency to establish sectoral pathways that serve as a carbon performance benchmark. We analyze ten of the largest cement producers and compare their carbon performance against TPI benchmarks and Taxonomy thresholds for 'manufacture of cement'. TPI uses one of the main CO_2 accounting metrics suggested by the Global Cement and Concrete Association – *specific net CO_2 emissions per tonne of cementitious product*. At an entity-level, no companies currently meet the Taxonomy threshold set for cement or alternative binder of 0.469 tCO_2e per tonne of cement. Three companies—Asia Cement, Taiwan Cement and Holcim—have set aggressive SBTs out to 2025, aiming to reach targets for a 'Well-Below 2 Degrees' scenario.

Exhibit 22: While no cement company meets the carbon threshold criteria for cement at a group level, those with Science Based Targets may have more alignment at a plant level currently or in the future

Carbon Intensity (tCO2) per tonne of cemetitious product pathways for cement producers (solid line = reported, dotted line = targeted)



Company	Near Term	Long Term	Net Zero
Asia Cement	Well-below 2°C by 2025	-	-
Taiwan Cement	Well-below 2°C by 2025	-	-
Siam Cement	Committed	-	-
UltraTech Cement	Well-below 2°C by 2032	-	-
Shree Cements	2°C by 2030	-	-
LafargeHolcim	Well-below 2°C by 2025	1.5°C by 2050	Committed
ACC			
HeidelbergCement	2°C by 2030	-	Committed
Cemex	Well-below 2°C by 2030	-	Committed
CRH			

Scope of emissions covered: Scope 1 emissions from cement production, including CO2 emissions from burning fossil fuels to heat kilns, the calcination process and on-site use of company vehicles, but excluding emissions from on-site power generation, alternative fuels and raw materials, and off-site use of the company's vehicles.

Source: Transition Pathway Initiative, EU Commission, Science Based Targets initiative, Goldman Sachs Global Investment Research

Appendix

Exhibit 23: Disclosure of Sustainable investment information and Calculation of Taxonomy alignment of investments for Article 8 funds

Article 16a
Sustainable investment information in the asset allocation section for financial products that promote environmental or social characteristics

1. For financial products referred to in Article 6 of Regulation (EU) 2020/852, the section referred to in point (d) of Article 13(3) shall also contain the following information:

a) a graphical representation in the form of a pie chart of:
   i. the minimum taxonomy alignment of aggregated investments calculated in accordance with paragraphs 1 to 4 of Article 16b
   ii. the minimum taxonomy alignment of aggregated investments excluding sovereign exposures, calculated in accordance with paragraph 5 of Article 16b

   When aggregating the taxonomy alignment of the investments in non-financial undertakings, the same key performance indicator shall be used. When aggregating the taxonomy alignment of the investments in financial undertakings, the same key performance indicator shall be used for the same type of financial undertaking. For insurance and reinsurance undertakings that carry out non-life underwriting activities, the key performance indicator may combine the investment and the underwriting key performance indicators in accordance with Article 8 of Regulation (EU) 2020/852

b) a description of the investments underlying the financial product that are in Taxonomy-aligned economic activities, including whether the compliance of those investments with the requirements laid down in Article 3 of Regulation (EU) 2020/852 will be subject to an assurance provided by one or more auditors or a review by one or more third parties and, if so, the name or the names of the auditor or third party;

c) where the financial product invests in sustainable investments with an environmental objective which invests in economic activities that are not Taxonomy-aligned economic activities, clear explanation of the reasons for doing so; and

d) for financial products referred to in Article 6 of Regulation (EU) 2020/852 that have sovereign exposures and where the financial market participant cannot assess the extent to which those exposures contribute to Taxonomy-aligned economic activities, a narrative explanation of the proportion in total investments of investments that consist of those exposures.

2. For financial products including sustainable investments with a social objective, the section referred to in point (d) of Article 13(3) shall also contain the minimum share of those sustainable investments.

Article 16b
Calculation of the taxonomy alignment of investments

1. The taxonomy alignment of investments shall be calculated in accordance with the following formula:

$$\frac{\textit{market value of all taxonomy-aligned investments of the financial product}}{\textit{market value of all investments of the financial product}}$$

where 'taxonomy-aligned investments of the financial product' shall be the sum of the market values of the following investments of the financial product:

a) for debt securities and equities of investee companies, where a proportion of activities of those investee companies is associated with Taxonomy-aligned economic activities, the market value of that proportion of those debt securities or equities;

b) for debt securities other than those referred to in point (c) where a proportion of the proceeds are required by their terms to be used exclusively on Taxonomy-aligned economic activities, the market value of the proportion of those proceeds;

c) for green bonds issued under Union legislation on environmentally sustainable bonds, the market value of those green bonds;

d) for investments in real estate assets which qualify as Taxonomy-aligned economic activities, the market value of those investments;

e) for investments in infrastructure assets which qualify as Taxonomy-aligned economic activities, the market value of those investments;

f) for investments in securitisation positions with underlying exposures in Taxonomyaligned economic activities, the market value of the proportion of those exposures; and

g) for investments in financial products referred to in Article 5 and Article 6 of Regulation (EU) 2020/852, the market value of the proportion of those financial products representing the taxonomy alignment of investments calculated in accordance with this Article.

h) The calculation shall be performed by applying the methodology used to calculate net short positions laid down in Article 3, paragraphs 4 and 5 of Regulation (EU) No 236/2012 of the European Parliament and of the Council

2. See right box

3. For disclosures referred to in Articles 16a(1)(a) and 25(1)(a), in the case of investee companies that are non-financial undertakings referred to in Article 8(2) of Regulation (EU) 2020/852 and other non-financial undertakings, the calculation referred to in paragraph 2 shall use the same type of key performance indicator for all non-financial undertakings, which shall be turnover. By way of derogation from the first subparagraph, where a more representative calculation of the taxonomy alignment is given by capital expenditure or operating expenditure due to the features of the financial product, the calculation may use the most appropriate of those two indicators.

4. In the case of investee companies that are financial undertakings subject to Article 8(1) of Regulation (EU) 2020/852 and for other financial undertakings, the calculation referred to in paragraph 2 shall use key performance indicators referred to in points (b) to (e) of Section 1.1 of Annex III of Commission Delegated Regulation (EU) 2021/XXX [insert reference to Article 8 Taxonomy Regulation Delegated Act].

5. For disclosures referred to in point (ii) of Article 16a(1)(a), point (ii) of Article 25(1)(a), point (iii) of Article 61a(b) and point (iii) of Article 67a(b), paragraphs 1 to 4 shall apply except that the sovereign exposures shall be excluded from the calculation of the numerator and of the denominator of the formula contained in paragraph 1.

2. For the purposes of point (a) of paragraph 1, the proportion of activities of investee companies associated with Taxonomy-aligned economic activities shall be calculated on the basis of the most appropriate key performance indicators for the investments of the financial product using the following information:

a) for investee companies referred to in Article 8(1) and (2) of Regulation (EU) 2020/852, on the basis of the disclosures made by those investee companies in accordance with that Article; and

b) for other investee companies, on the basis of equivalent information.

The description shall include:

a) in respect of investee companies that are non-financial undertakings, whether the taxonomy alignment of investments is measured by turnover, or whether a more representative calculation of the taxonomy alignment is given when measured by capital expenditure or operating expenditure due to the features of the financial product, the reason for that decision, including how it is appropriate for investors in the financial product;

b) where information relating to the taxonomy alignment of investments is not readily available from public disclosures by investee companies, details of how equivalent information was obtained directly from investee companies or from third party providers; and

c) a breakdown of the minimum proportions of investments in the enabling activities referred to in Article 16 of Regulation (EU) 2020/852 and transitional activities referred to in Article 10(2) of that Regulation, in each case expressed as a percentage of all investments of the financial product.

Source: ESMA, EBA, compiled by Goldman Sachs Global Investment Research

Exhibit 24: Disclosure of Sustainable investment information and Calculation of Taxonomy alignment of investments for Article 9 funds

Article 25

Sustainable investment information in the asset allocation section for financial products with the objective of sustainable investment

1. For financial products referred to in Article 5 of Regulation (EU) 2020/852, the section referred to in point (d) of Article 20(3) shall also contain the following information:

a) a graphical representation in the form of a pie chart of:
   i. the minimum taxonomy alignment of aggregated investments calculated in accordance with paragraphs 1 to 4 of Article 16b
   ii. the minimum taxonomy alignment of aggregated investments excluding sovereign exposures, calculated in accordance with paragraph 5 of Article 16b.

   When aggregating the taxonomy alignment of the investments in non-financial undertakings, the same key performance indicator shall be used. When aggregating the taxonomy alignment of the investments in financial undertakings, the same key performance indicator shall be used for the same type of financial undertakings. For insurance and reinsurance undertakings that carry out non-life underwriting activities, the key performance indicator may combine the investment and the underwriting key performance indicators in accordance with Article 8 of Regulation (EU) 2020/852

b) where the financial product invests in sustainable investments with an environmental objective which invests in economic activities that are not Taxonomy-aligned economic activities, a clear explanation of the reasons for doing so;

c) a description of the investments underlying the financial product that are in Taxonomyaligned economic activities, including whether the compliance of those investments with the requirements laid down in Article 3 of Regulation (EU) 2020/852 will be subject to an assurance provided by one or more auditors or a review by one or more third parties and, if so, the name or the names of the auditor or third party; and

d) for financial products referred to in Article 5 of Regulation (EU) 2020/852 that have sovereign exposures and where the financial market participant cannot assess the extent to which those exposures contribute to Taxonomy-aligned economic activities, a narrative explanation of the proportion in total investments of investments that consist of those exposures.

2. For financial products including sustainable investments with a social objective, the section referred to in point (d) of Article 20(3) shall also contain the minimum share of those sustainable investments.

Article 16b

Calculation of the taxonomy alignment of investments

1. The taxonomy alignment of investments shall be calculated in accordance with the following formula:

$$\frac{\textit{market value of all taxonomy} - \textit{aligned investments of the financial product}}{\textit{market value of all investments of the financial product}}$$

where 'taxonomy-aligned investments of the financial product' shall be the sum of the market values of the following investments of the financial product:

a) for debt securities and equities of investee companies, where a proportion of activities of those investee companies is associated with Taxonomy-aligned economic activities, the market value of that proportion of those debt securities or equities;

b) for debt securities other than those referred to in point (c) where a proportion of the proceeds are required by their terms to be used exclusively on Taxonomy-aligned economic activities, the market value of the proportion of those proceeds;

c) for green bonds issued under Union legislation on environmentally sustainable bonds, the market value of those green bonds;

d) for investments in real estate assets which qualify as Taxonomy-aligned economic activities, the market value of those investments;

e) for investments in infrastructure assets which qualify as Taxonomy-aligned economic activities, the market value of those investments;

f) for investments in securitisation positions with underlying exposures in Taxonomyaligned economic activities, the market value of the proportion of those exposures; and

g) for investments in financial products referred to in Article 5 and Article 6 of Regulation (EU) 2020/852, the market value of the proportion of those financial products representing the taxonomy alignment of investments calculated in accordance with this Article.

h) The calculation shall be performed by applying the methodology used to calculate net short positions laid down in Article 3, paragraphs 4 and 5 of Regulation (EU) No 236/2012 of the European Parliament and of the Council

2. See right box

3. For disclosures referred to in Articles 16a(1)(a) and 25(1)(a), in the case of investee companies that are non-financial undertakings referred to in Article 8(2) of Regulation (EU) 2020/852 and other non-financial undertakings, the calculation referred to in paragraph 2 shall use the same type of key performance indicator for all non-financial undertakings, which shall be turnover. By way of derogation from the first subparagraph, where a more representative calculation of the taxonomy alignment is given by capital expenditure or operating expenditure due to the features of the financial product, the calculation may use the most appropriate of those two indicators.

4. In the case of investee companies that are financial undertakings subject to Article 8(1) of Regulation (EU) 2020/852 and for other financial undertakings, the calculation referred to in paragraph 2 shall use key performance indicators referred to in points (b) to (e) of Section 1.1 of Annex III of Commission Delegated Regulation (EU) 2021/XXX [insert reference to Article 8 Taxonomy Regulation Delegated Act].

5. For disclosures referred to in point (ii) of Article 16a(1)(a), point (ii) of Article 25(1)(a), point (iii) of Article 61a(b) and point (iii) of Article 67a(b), paragraphs 1 to 4 shall apply except that the sovereign exposures shall be excluded from the calculation of the numerator and of the denominator of the formula contained in paragraph 1.

2. For the purposes of point (a) of paragraph 1, the proportion of activities of investee companies associated with Taxonomy-aligned economic activities shall be calculated on the basis of the most appropriate key performance indicators for the investments of the financial product using the following information:

a) for investee companies referred to in Article 8(1) and (2) of Regulation (EU) 2020/852, on the basis of the disclosures made by those investee companies in accordance with that Article; and

b) for other investee companies, on the basis of equivalent information.

For the purposes of point (c) of paragraph 1, the description shall include:

a) in respect of investee companies that are non-financial undertakings, whether the taxonomy alignment of investments is measured by turnover, or whether a more representative calculation of the taxonomy alignment is given when measured by capital expenditure or operating expenditure due to the features of the financial product, the reason for that decision, including how it is appropriate for investors in the financial product;

b) where information relating to the taxonomy alignment of investments is not readily available from public disclosures by investee companies, details of how equivalent information was obtained directly from investee companies or from third party providers; and

c) a breakdown of the minimum proportions of investments in the enabling activities referred to in Article 16 of Regulation (EU) 2020/852 and transitional activities referred to in Article 10(2) of that Regulation, in each case expressed as a percentage of all investments of the financial product.

Source: ESMA, EBA, compiled by Goldman Sachs Global Investment Research

Exhibit 25: Summary table of national sustainable finance taxonomies

In regulation/In use

Country or Jurisdiction	State of play	Objectives	Coverage / granularity	Usability	Approach to eligibility
EU	**In regulation** with additional delegated acts to follow	(i) CCM, (ii) CCA, (iii) sustainable use and protection of water and marine resources, (iv) transition to a circular economy, (v) pollution prevention and control, (vi) and protection and restoration of biodiversity and ecosystems	Taxonomy based on NACE codes (EU industry classification derived from UN ISIC code). 9 broad categories with additional NACE subcategories. Activities within select sectors 7 sectors: 1. Agriculture & forestry, 2. Environmental protection and restoration activities, 3. Manufacturing, 4. Energy, 5. Water and waste, 6. Transport, 7. Buildings, 8. ICT & 9. Professional services Taxonomy covers economic activities of roughly 40% of listed companies.	Mandatory for EU Member states, Large corporate and financial market participants Where: Taxonomy to be used as reference for green investment funds (e.g., retail funds and green bonds) Taxonomy to be used for disclosure (e.g., investors and large companies to disclose share of taxonomy-aligned investments/ activities).	**Technical Screening Criteria** Do No Significant Harm" principle Minimum social safeguards Room for transition and enabling activities
China	**In use** Green Bond Endorsed Projects Catalogue (2021 Edition) released by the PBC, the NDRC, and the China Securities Regulatory Commission (CSRC).	i) Environmental improvement ii) Addressing climate change iii) More efficient resource utilization	6 Level-I industry categories: 1. Energy-saving and environmental protection industry, 2. Cleaner production industry, 3. clean energy industry, 4. ecoenvironment industry, 5. green upgrading of infrastructure, 6. Green services.	Mandatory for green bonds issuance	**Whitelist** Binary (green/not green) Activities linked to industry-specific green standards and criteria set by competent regulatory authorities.
Japan	**In use** Basic Guidelines on Climate Transition Finance released in May 2021 **Under development** METI has set up a Roadmap Taskforce to formulate sector-specific roadmaps.	Focus on transition pathways for high emitting companies/ sectors and ensure the credibility of transition finance label.	Roadmaps to Carbon Neutrality by 2050 are the attachments to the Basic Guidelines. Target sectors to be published in 2021 include steel, chemistry, electric power, gas, petroleum, cement and paper/pulp	Guidelines released are legally non-binding	**Principles-based** guidelines with forthcoming cases studies and Industry transition pathways for sectors
Russia	**In use**	(i) Environmental improvement; (ii) Pollution reduction; (iii) Greenhouse emissions reduction; (iv) Energy efficiency enhancement; (v) CCA	Taxonomy covers 9 sector categories: 1. waste management and recycling, 2. energy, 3. construction, 4. industrial production, 5. transport, 6. water supply and wastewater disposal, 7. forestry, 8. conservation of natural landscapes and biodiversity, 9. ICT	Financial instruments but not government financial instruments	**Whitelist** Mandatory verification to obtain green certification for a financial instrument

Source: UN - Department of Economic and Social Affairs, International Platform on Sustainable Finance

Exhibit 26: Summary table of national sustainable finance taxonomies

In draft

Country or Jurisdiction	State of play	Objectives	Coverage / granularity	Usability	Approach to eligibility
ASEAN	**Version 1 Published** The association of ASEAN central banks has set up an ASEAN Taxonomy Board to develop, maintain and promote a multi-tiered ASEAN Taxonomy for Sustainable Finance.	(i) CCM, (ii) CCA, (iii) Protection of healthy ecosystem and diversity, (iv) Promotion of resource resilience and transition to circular economy	The focus sectors have been chosen based on ISIC, covering Agriculture, forestry, and fishing; Manufacturing; Electricity, gas, steam, and air conditioning supply; Transportation and storage; Construction & Real estate activities; Water supply; sewerage, waste management and remediation activities.	The ASEAN Taxonomy will be the overarching guide for all ASEAN Member States complementing their respective national sustainability initiatives and serving as ASEAN's common language for sustainable finance.	**Screening Criteria** Do No Significant Harm" principle Remedial efforts to transition
Colombia	**In draft**	7 objectives: (i) CCM; (ii) CCA (iii) Sustainable use and protection of water and marine resources; (iv) Transition to a circular economy (v) Pollution prevention and control (vi) Protection of healthy ecosystems (vii) **Social / SDG**	8 Broad categories	Green Labelled financial instruments	**Voluntary.** No certification mechanism discussed **TSC proposed** Other eligibility features: Minimum safeguards and DNSH
South Korea	**Draft published** 'K-taxonomy' draft open for public consultation in Korean	(i) CCM, (ii) CCA, (iii) sustainable conservation of water, (iv) circular economy, (v) pollution prevention management, (vi) biodiversity conservation	53 activities in 9 major categories: 1. Energy, 2. Manufacturing, 3. Cities and buildings, 4. Transportation, 5. Resource circulation, 6. CO2 capture, 7. Water., 8. Biodiversity & Agriculture, 9. Research and education.	It is recommended to applied to green projects selected in accordance with the Korean Green Bond Guidelines. It is expected to be applied to green bonds first and then to other green financial activities e.g. green loans and green funds. It is noted that the taxonomy may also be used by any entity or financial institution to assess the sustainability of an individual assets or to disclose the proportion of sustainable assets of an entity.	**Similar structure to EU Taxonomy**, substantial contribution + DNSH + minimum safeguards. **Also contains exclusions criteria**
Malaysia	Published	5 Guiding Principles (GPs): (1) CCM, (2) CCA, (3) No significant harm to the environment, (4) Remedial measures to transition, (5) Prohibited activities	Principles 1 &2 are applicable at the activity level whereas 3 and 4 should be applicable at the entity level.	Applicable to Financial Institutions to assess whether financed activities are (i) Climate supporting (see GP1 to 3); (ii) Transitioning (GP4) or (iii) Watchlist. This facilitates standardized reporting of climate-related exposures.	**Principles-based Taxonomy** provides the 5 principles with examples as to what types of investment qualify under each. This list is non-exhaustive.
New Zealand	**In Draft** Published in Dec 2020 seeking stakeholder feedback	Sustainable Agriculture (SAFI)	Agriculture only	To be used by the finance sector in considering agriculture lending and investment	Aims to seek equivalence, to bridge the gap between international and domestic standards
South Africa	**Draft published** Public consultation in June 2021	Initial coverage: (i) CCM, (ii) CCA Future coverage: (iii) Sustainable use and protection of water and marine resources, (iv) Sustainable resource use and circularity, (v) Pollution prevention, (vi) Ecosystem protection and restoration	Based on SIC code Covers: 1. Agriculture forestry, fisheries and land use; 2. Industry; 3.Energy; 4. Water and waste; 5. Transportation; 6. ICT; 7. Construction; Enabling activities, system resilience and innovation; 8.Social resilience	TBC, likely all financial instruments	**Technical Screening Criteria** Do No Significant Harm" principle Room for transition and enabling activities

*Data complied in Sep 2021

Source: UN - Department of Economic and Social Affairs, International Platform on Sustainable Finance

Exhibit 27: Summary table of national sustainable finance taxonomies

Under development

Country or Jurisdiction	State of play	Objectives	Coverage / granularity	Usability	Approach to eligibility
Bangladesh	**Existing:** Bangladesh Bank (BB) published a Sustainable Finance Policy for Banks and Financial Institutions in December 2020 **In development:** Green Bond taxonomy (not yet published)	**Existing:** (i) CCM, (ii) CCA, (iii) sustainable protection of water and marine resources, (iv) transition to a circular economy, waste prevention and recycling, (v) pollution prevention and control, (vi) protection and restoration of biodiversity and healthy ecosystems	**Existing:** 1. Renewable energy, 2. Energy efficiency, 3. Alternative energy, 4. Waste, 5. Recycling, 6. Green Brick production, 7. Green buildings **In development:** Likely to align with EU taxonomy sector coverage	**Existing** It is used to encourage and supervise banks and FIs to grant sustainable loans and conduct sustainable investments. The list of green products/ projects/initiatives is also used as eligibility criteria for whether bank assets can be refinanced with BB under the Refinance Scheme for Green Finance. **In development** Mandatory nature of future taxonomy is yet to be confirmed.	**Existing:** 1.Must make substantial contribution to environmental objectives, + 2. DNSH + 3. minimum social and governance safeguards. **Similar to EU at a high level** except that the eligibility is defined using a **Whitelist** approach where a List of eligible Green Products/ Projects/ Initiatives is provided. List of eligible projects possibly in sync with local conditions and should create widespread awareness of sustainability and environmental issues for banks and FI. It also provides two exclusion lists of economic activities considered ineligible for financing and sustainable finance respectively **In development:** Likely to use TSC approach
Canada	**Under development** Industry-led (not connected to a regulatory framework / not a government policy document)	Transition focused taxonomy and specifically on GHG emissions reduction	Part I: Transition definition, principles and detailed corporate disclosures requirement. Part II: 8 sector-specific transition taxonomy: (i) Energy (ii) Utilities, (ii) Agriculture, (iv) Forestry, (v) Cement, (vi) Steel (vii) Aluminium, (viii) Mineral mining.	Likely applicable to transitionbased financial instruments (bonds and loans)	**Voluntary** classification tool **Activity-and sub-activity based**: aligned with EU, CBI and ICMA.
Dominican Republic	**Under development**				
India	**Under development** Phase 1 expected to be completed in 2021 (*note that India has green bond guidelines in place but these are separate to a detailed taxonomy)	Environmental and social objectives being defined. Phase 1: climate change and climate adaptation and resilience.	Sustainable Activities will be defined for up to four sectors. Sector selection criteria not yet defined.	All financial instruments (likely) Mandatory for the listing of green bonds on recognized stock exchanges	In synch with international taxonomies, such as the EU and CBI, but likely to go beyond as it aims to integrate social objectives along with environmental objectives **Binary (green/not green)**
Indonesia	**Under development**	TBC – likely to be comparable with EU in terms of environmental objectives	TBC – likely to be comparable with EU in terms of economic classifications		**Technical screening criteria (TBC)** 2 categories: "green" and "towards green". Thresholds to reflect the country's objectives and capacities
Kazakhstan	**Under development** The New Environmental Code of Kazakhstan is expected to come in force in July 2021, which will include: definitions of green technologies, green finance, green projects, classification of green projects (taxonomy), green bonds and green loans.	TBC	TBC	Anticipated to cover green finance instruments such as green bonds, loans, technologies, and projects. Will include a Register of green technologies and projects – a digital data base that gathers information on green technologies and projects	The Rules for recognizing technologies as "green" technologies, will outline the procedure for recognizing technologies and projects as green, verification of green activities with accordance to the green taxonomy, functions of the Service Operator.
Mongolia	**Approved** Mongolia Green Taxonomy	(i) CCM and CCA, (ii) pollution prevention, (iii) resource conservation, and (iv) livelihood improvement It includes livelihood improvement as one of its overall objectives, adding a social element to the taxonomy	Covers 58 activities from eight sectors 8 sector categories are: 1. renewable energy; energy efficiency; 2.pollution prevention and control; sustainable agriculture, land use, forestry, biodiversity conservation and ecotourism; low-pollution energy; green buildings; sustainable water and waste use; and clean transport	The taxonomy is designed to be applied for a wider range of financial instruments, including loans, bonds, equity investment, insurance, etc. Beyond the eligibility of green financial products, it is also used for banks to report exposures and for the central bank to track the development of its green loan markets	**White List** It stipulates a list of activities considered as environmentally sustainable for investment purposes and does not provide technical criteria
Philippines	**Under development** a Green inter-agency taskforce with the Philippines Securities and Exchange Commission and the central bank has started the process	TBC	TBC		
Singapore	**Under development**	4 objectives proposed: (i) CCM; (ii) CCA; (iii) Protect biodiversity; (iv) Promote resource resilience	ISIC sectors and sub-sectors are covered. Proposed sectors: Agriculture, construction & real estate, transportation, energy, industrial. Additional enabling sectors may include waste, ICT and CCS.	Financial sector	A combination of principle-based criteria and quantifiable thresholds for activities via a 'traffic light system' green (clear aligned), yellow (activities with pathways to becoming green) and red (activities that are inconsistent with the taxonomy). The conceptual framework of the traffic light system was set out in the consultation document published in January 2021, and the granular criteria is now being developed. Other eligibility features: a) Do no significant harm; b) no negative impact on communities' social and economic wellbeing, unless the trade-offs can be justified in the long run; c) no breach local laws and regulations.
Sri Lanka	**Under development** Central Bank of Sri Lanka with technical assistance from IFC Further information expected in Q4 2021	TBC	TBC	TBC	TBC Will likely utilise elements of China and EU taxonomies
UK	**Under development** Green Technical Advisory Group (GTAG) announced	GTAG will provide the UK government with non-binding advice on how to adapt the EU taxonomy for UK purposes.	TBC Likely based on EU approach	TBC	TBC Likely based on TSC approach as per the EU
Vietnam	**Under development,** expected end 2021.	TBC	Energy, Transport, Water, Buildings, Land use and Marine resources, Industry, Waste, ICT Using the Vietnam Standard Industrial Classification (VSIC)		**Technical screening criteria (TBC)** Likely mandatory Comparable metrics and thresholds to EU to determine whether an economic activity is aligned with Vietnam's climatetransition pathway.

*Data complied in Sep 2021

Source: UN - Department of Economic and Social Affairs, International Platform on Sustainable Finance

Exhibit 28: Summary table of national sustainable finance taxonomies

In discussion

Country or Jurisdiction	State of play	Objectives	Coverage / granularity	Usability	Approach to eligibility
Thailand	**In discussion** Workplan to develop a green taxonomy initiated			Financial sector	
Chile	**In discussion** Taxonomy Roadmap for Chile published in 2021	Likely climate mitigation, adaptation and other environmental objectives	Priority sectors to address are Energy, Transport, Buildings, and Industry (mining).		Likely leverage EU Taxonomy. Taxonomy type: Technical screening criteria likely
Mexico	**In discussion**	includes six elements: principles, criteria, methodologies, operational and governance mechanisms, reporting framework, and diffusion mechanisms			
Australia	**In discussion** Private sector-led initiative				**Voluntary** (likely leveraging the EU Taxonomy).

*Data complied in Sep 2021

Source: UN - Department of Economic and Social Affairs, International Platform on Sustainable Finance

Disclosure Appendix

Reg AC

We, Evan Tylenda, CFA, Madeline Meyer, Grace Chen, Brian Singer, CFA, Derek R. Bingham, Emma Jones, Brendan Corbett, Rachit Aggarwal and Keebum Kim, hereby certify that all of the views expressed in this report accurately reflect our personal views about the subject company or companies and its or their securities. We also certify that no part of our compensation was, is or will be, directly or indirectly, related to the specific recommendations or views expressed in this report.

Unless otherwise stated, the individuals listed on the cover page of this report are analysts in Goldman Sachs' Global Investment Research division.

GS Factor Profile

The Goldman Sachs Factor Profile provides investment context for a stock by comparing key attributes to the market (i.e. our coverage universe) and its sector peers. The four key attributes depicted are: Growth, Financial Returns, Multiple (e.g. valuation) and Integrated (a composite of Growth, Financial Returns and Multiple). Growth, Financial Returns and Multiple are calculated by using normalized ranks for specific metrics for each stock. The normalized ranks for the metrics are then averaged and converted into percentiles for the relevant attribute. The precise calculation of each metric may vary depending on the fiscal year, industry and region, but the standard approach is as follows:

Growth is based on a stock's forward-looking sales growth, EBITDA growth and EPS growth (for financial stocks, only EPS and sales growth), with a higher percentile indicating a higher growth company. **Financial Returns** is based on a stock's forward-looking ROE, ROCE and CROCI (for financial stocks, only ROE), with a higher percentile indicating a company with higher financial returns. **Multiple** is based on a stock's forward-looking P/E, P/B, price/dividend (P/D), EV/EBITDA, EV/FCF and EV/Debt Adjusted Cash Flow (DACF) (for financial stocks, only P/E, P/B and P/D), with a higher percentile indicating a stock trading at a higher multiple. The **Integrated** percentile is calculated as the average of the Growth percentile, Financial Returns percentile and (100% - Multiple percentile).

Financial Returns and Multiple use the Goldman Sachs analyst forecasts at the fiscal year-end at least three quarters in the future. Growth uses inputs for the fiscal year at least seven quarters in the future compared with the year at least three quarters in the future (on a per-share basis for all metrics).

For a more detailed description of how we calculate the GS Factor Profile, please contact your GS representative.

M&A Rank

Across our global coverage, we examine stocks using an M&A framework, considering both qualitative factors and quantitative factors (which may vary across sectors and regions) to incorporate the potential that certain companies could be acquired. We then assign a M&A rank as a means of scoring companies under our rated coverage from 1 to 3, with 1 representing high (30%-50%) probability of the company becoming an acquisition target, 2 representing medium (15%-30%) probability and 3 representing low (0%-15%) probability. For companies ranked 1 or 2, in line with our standard departmental guidelines we incorporate an M&A component into our target price. M&A rank of 3 is considered immaterial and therefore does not factor into our price target, and may or may not be discussed in research.

Quantum

Quantum is Goldman Sachs' proprietary database providing access to detailed financial statement histories, forecasts and ratios. It can be used for in-depth analysis of a single company, or to make comparisons between companies in different sectors and markets.

Disclosures

Logo disclosure

Please note: Third party brands used in this report are the property of their respective owners, and are used here for informational purposes only. The use of such brands should not be viewed as an endorsement, affiliation or sponsorship by or for Goldman Sachs or any of its products/services.

As of January 1, 2022, Goldman Sachs Global Investment Research had investment ratings on 3,096 equity securities. Goldman Sachs assigns stocks as Buys and Sells on various regional Investment Lists; stocks not so assigned are deemed Neutral. Such assignments equate to Buy, Hold and Sell for the purposes of the above disclosure required by the FINRA Rules. See 'Ratings, Coverage universe and related definitions' below. The Investment Banking Relationships chart reflects the percentage of subject companies within each rating category for whom Goldman Sachs has provided investment banking services within the previous twelve months.

Regulatory disclosures

Disclosures required by United States laws and regulations

See company-specific regulatory disclosures above for any of the following disclosures required as to companies referred to in this report: manager or co-manager in a pending transaction; 1% or other ownership; compensation for certain services; types of client relationships; managed/co-managed public offerings in prior periods; directorships; for equity securities, market making and/or specialist role. Goldman Sachs trades or may trade as a principal in debt securities (or in related derivatives) of issuers discussed in this report.

The following are additional required disclosures: **Ownership and material conflicts of interest:** Goldman Sachs policy prohibits its analysts, professionals reporting to analysts and members of their households from owning securities of any company in the analyst's area of coverage. **Analyst compensation:** Analysts are paid in part based on the profitability of Goldman Sachs, which includes investment banking revenues. **Analyst as officer or director:** Goldman Sachs policy generally prohibits its analysts, persons reporting to analysts or members of their households from serving as an officer, director or advisor of any company in the analyst's area of coverage. **Non-U.S. Analysts:** Non-U.S. analysts may not be associated persons of Goldman Sachs & Co. LLC and therefore may not be subject to FINRA Rule 2241 or FINRA Rule 2242 restrictions on communications with subject company, public appearances and trading securities held by the analysts.

Additional disclosures required under the laws and regulations of jurisdictions other than the United States

The following disclosures are those required by the jurisdiction indicated, except to the extent already made above pursuant to United States laws and regulations. **Australia:** Goldman Sachs Australia Pty Ltd and its affiliates are not authorised deposit-taking institutions (as that term is defined in the Banking Act 1959 (Cth)) in Australia and do not provide banking services, nor carry on a banking business, in Australia. This research, and any access to it, is intended only for "wholesale clients" within the meaning of the Australian Corporations Act, unless otherwise agreed by Goldman Sachs. In producing research reports, members of the Global Investment Research Division of Goldman Sachs Australia may attend site visits and other meetings hosted by the companies and other entities which are the subject of its research reports. In some instances the costs of such site visits or meetings may be met in part or in whole by the issuers concerned if Goldman Sachs Australia considers it is appropriate and reasonable in the specific circumstances relating to the site visit or meeting. To the extent that the contents of this document contains any financial product advice, it is general advice only and has been prepared by Goldman Sachs without taking into account a client's objectives, financial situation or needs. A client should, before acting on any such advice, consider the appropriateness of the advice having regard to the client's own objectives, financial situation and needs. A copy of certain Goldman Sachs Australia and New Zealand disclosure of interests and a copy of Goldman Sachs' Australian Sell-Side Research Independence Policy Statement are available at: https://www.goldmansachs.com/disclosures/australia-new-zealand/index.html. **Brazil:** Disclosure information in relation to CVM Resolution n. 20 is available at https://www.gs.com/worldwide/brazil/area/gir/index.html. Where applicable, the Brazil-registered analyst primarily responsible for the content of this research report, as defined in Article 20 of CVM Resolution n. 20, is the first author named at the beginning of this report, unless indicated otherwise at the end of the text. **Canada:** Goldman Sachs Canada Inc. is an affiliate of The Goldman Sachs Group Inc. and therefore is included in the company specific disclosures relating to Goldman Sachs (as defined above). Goldman Sachs Canada Inc. has approved of, and agreed to take responsibility for, this research report in Canada if and to the extent that Goldman Sachs Canada Inc. disseminates this research report to its clients. **Hong Kong:** Further information on the securities of covered companies referred to in this research may be obtained on request from Goldman Sachs (Asia) L.L.C. **India:** Further information on the subject company or companies referred to in this research may be obtained from Goldman Sachs (India) Securities Private Limited, Research Analyst - SEBI Registration Number INH000001493, 951-A, Rational House, Appasaheb Marathe Marg, Prabhadevi, Mumbai 400 025, India, Corporate Identity Number U74140MH2006FTC160634, Phone +91 22 6616 9000, Fax +91 22 6616 9001. Goldman Sachs may beneficially own 1% or more of the securities (as such term is defined in clause 2 (h) the Indian Securities Contracts (Regulation) Act, 1956) of the subject company or companies referred to in this research report. **Japan:** See below. **Korea:** This research, and any access to it, is intended only for "professional investors" within the meaning of the Financial Services and Capital Markets Act, unless otherwise agreed by Goldman Sachs. Further information on the subject company or companies referred to in this research may be obtained from Goldman Sachs (Asia) L.L.C., Seoul Branch. **New Zealand:** Goldman Sachs New Zealand Limited and its affiliates are neither "registered banks" nor "deposit takers" (as defined in the Reserve Bank of New Zealand Act 1989) in New Zealand. This research, and any access to it, is intended for
"wholesale clients" (as defined in the Financial Advisers Act 2008) unless otherwise agreed by Goldman Sachs. A copy of certain Goldman Sachs Australia and New Zealand disclosure of interests is available at: https://www.goldmansachs.com/disclosures/australia-new-zealand/index.html. **Russia:** Research reports distributed in the Russian Federation are not advertising as defined in the Russian legislation, but are information and analysis not having product promotion as their main purpose and do not provide appraisal within the meaning of the Russian legislation on appraisal activity. Research reports do not constitute a personalized investment recommendation as defined in Russian laws and regulations, are not addressed to a specific client, and are prepared without analyzing the financial circumstances, investment profiles or risk profiles of clients. Goldman Sachs assumes no responsibility for any investment decisions that may be taken by a client or any other person based on this research report. **Singapore:** Goldman Sachs (Singapore) Pte. (Company Number: 198602165W), which is regulated by the Monetary Authority of Singapore, accepts legal responsibility for this research, and should be contacted with respect to any matters arising from, or in connection with, this research. **Taiwan:** This material is for reference only and must not be reprinted without permission. Investors should carefully consider their own investment risk. Investment results are the responsibility of the individual investor. **United Kingdom:** Persons who would be categorized as retail clients in the United Kingdom, as such term is defined in the rules of the Financial Conduct Authority, should read this research in conjunction with prior Goldman Sachs research on the covered companies referred to herein and should refer to the risk warnings that have been sent to them by Goldman Sachs International. A copy of these risks warnings, and a glossary of certain financial terms used in this report, are available from Goldman Sachs International on request.

European Union and United Kingdom: Disclosure information in relation to Article 6 (2) of the European Commission Delegated Regulation (EU) (2016/958) supplementing Regulation (EU) No 596/2014 of the European Parliament and of the Council (including as that Delegated Regulation is implemented into United Kingdom domestic law and regulation following the United Kingdom's departure from the European Union and the European Economic Area) with regard to regulatory technical standards for the technical arrangements for objective presentation of investment recommendations or other information recommending or suggesting an investment strategy and for disclosure of particular interests or indications of conflicts of interest is available at https://www.gs.com/disclosures/europeanpolicy.html which states the European Policy for Managing Conflicts of Interest in Connection with Investment Research.

Japan: Goldman Sachs Japan Co., Ltd. is a Financial Instrument Dealer registered with the Kanto Financial Bureau under registration number Kinsho 69, and a member of Japan Securities Dealers Association, Financial Futures Association of Japan and Type II Financial Instruments Firms Association. Sales and purchase of equities are subject to commission pre-determined with clients plus consumption tax. See company-specific disclosures as to any applicable disclosures required by Japanese stock exchanges, the Japanese Securities Dealers Association or the Japanese Securities Finance Company.

Ratings, coverage universe and related definitions

Buy (B), Neutral (N), Sell (S) Analysts recommend stocks as Buys or Sells for inclusion on various regional Investment Lists. Being assigned a Buy or Sell on an Investment List is determined by a stock's total return potential relative to its coverage universe. Any stock not assigned as a Buy or a Sell on an Investment List with an active rating (i.e., a stock that is not Rating Suspended, Not Rated, Coverage Suspended or Not Covered), is deemed Neutral. Each region's Investment Review Committee manages Regional Conviction lists, which represent investment recommendations focused on the size of the total return potential and/or the likelihood of the realization of the return across their respective areas of coverage. The addition or removal of stocks from such Conviction lists do not represent a change in the analysts' investment rating for such stocks.

Total return potential represents the upside or downside differential between the current share price and the price target, including all paid or anticipated dividends, expected during the time horizon associated with the price target. Price targets are required for all covered stocks. The total return potential, price target and associated time horizon are stated in each report adding or reiterating an Investment List membership.

Coverage Universe: A list of all stocks in each coverage universe is available by primary analyst, stock and coverage universe at https://www.gs.com/research/hedge.html.

Not Rated (NR). The investment rating, target price and earnings estimates (where relevant) have been suspended pursuant to Goldman Sachs policy when Goldman Sachs is acting in an advisory capacity in a merger or in a strategic transaction involving this company, when there are legal, regulatory or policy constraints due to Goldman Sachs' involvement in a transaction, and in certain other circumstances. **Rating Suspended (RS).** Goldman Sachs Research has suspended the investment rating and price target for this stock, because there is not a sufficient fundamental basis for determining an investment rating or target price. The previous investment rating and target price, if any, are no longer in effect for this stock and should not be relied upon. **Coverage Suspended (CS).** Goldman Sachs has suspended coverage of this company. **Not Covered (NC).** Goldman Sachs does not cover this company. **Not Available or Not Applicable (NA).** The information is not available for display or is not applicable. **Not Meaningful (NM).** The information is not meaningful and is therefore excluded.

Global product; distributing entities

The Global Investment Research Division of Goldman Sachs produces and distributes research products for clients of Goldman Sachs on a global basis. Analysts based in Goldman Sachs offices around the world produce research on industries and companies, and research on macroeconomics, currencies, commodities and portfolio strategy. This research is disseminated in Australia by Goldman Sachs Australia Pty Ltd (ABN 21 006 797 897); in Brazil by Goldman Sachs do Brasil Corretora de Títulos e Valores Mobiliários S.A.; Public Communication Channel Goldman Sachs Brazil: 0800 727 5764 and / or contatogoldmanbrasil@gs.com. Available Weekdays (except holidays), from 9am to 6pm. Canal de Comunicação com o Público Goldman Sachs Brasil: 0800 727 5764 e/ou contatogoldmanbrasil@gs.com. Horário de funcionamento: segunda-feira à sexta-feira (exceto feriados), das 9h às 18h; in Canada by either Goldman Sachs Canada Inc. or Goldman Sachs & Co. LLC; in Hong Kong by Goldman Sachs (Asia) L.L.C.; in India by Goldman Sachs (India) Securities Private Ltd.; in Japan by Goldman Sachs Japan Co., Ltd.; in the Republic of Korea by Goldman Sachs (Asia) L.L.C., Seoul Branch; in New Zealand by Goldman Sachs New Zealand Limited; in Russia by OOO Goldman Sachs; in Singapore by Goldman Sachs (Singapore) Pte. (Company Number: 198602165W); and in the United States of America by Goldman Sachs & Co. LLC. Goldman Sachs International has approved this research in connection with its distribution in the United Kingdom.

Effective from the date of the United Kingdom's departure from the European Union and the European Economic Area ("Brexit Day") the following information with respect to distributing entities will apply:

Goldman Sachs International ("GSI"), authorised by the Prudential Regulation Authority ("PRA") and regulated by the Financial Conduct Authority ("FCA") and the PRA, has approved this research in connection with its distribution in the United Kingdom.

European Economic Area: GSI, authorised by the PRA and regulated by the FCA and the PRA, disseminates research in the following jurisdictions within the European Economic Area: the Grand Duchy of Luxembourg, Italy, the Kingdom of Belgium, the Kingdom of Denmark, the Kingdom of Norway, the Republic of Finland, Portugal, the Republic of Cyprus and the Republic of Ireland; GS -Succursale de Paris (Paris branch) which, from Brexit Day, will be authorised by the French Autorité de contrôle prudentiel et de resolution ("ACPR") and regulated by the Autorité de contrôle prudentiel et de resolution and the Autorité des marches financiers ("AMF") disseminates research in France; GSI - Sucursal en España (Madrid branch) authorized in Spain by the Comisión Nacional del Mercado de Valores disseminates research in the Kingdom of Spain; GSI - Sweden Bankfilial (Stockholm branch) is authorized by the SFSA as a "third country branch" in accordance with Chapter 4, Section 4 of the Swedish Securities and Market Act (Sw. lag (2007:528) om värdepappersmarknaden) disseminates research in the Kingdom of Sweden; Goldman Sachs Bank Europe SE ("GSBE") is a credit institution incorporated in Germany and, within the Single Supervisory Mechanism, subject to direct prudential supervision by the European Central Bank and in other respects supervised by German Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht, BaFin) and Deutsche Bundesbank and disseminates research in the Federal Republic of Germany and those jurisdictions within the European Economic Area where GSI is not authorised to disseminate research and additionally, GSBE, Copenhagen Branch filial af GSBE, Tyskland, supervised by the Danish Financial Authority disseminates research in the Kingdom of Denmark; GSBE - Sucursal en España (Madrid branch) subject (to a limited extent) to local supervision by the Bank of Spain disseminates research in the Kingdom of Spain; GSBE - Succursale Italia (Milan branch) to the relevant applicable extent, subject to local supervision by the Bank of Italy (Banca d'Italia) and the Italian Companies and Exchange Commission (Commissione Nazionale per le Società e la Borsa "Consob") disseminates research in Italy; GSBE - Succursale de Paris (Paris branch), supervised by the AMF and by the ACPR disseminates research in France; and GSBE - Sweden Bankfilial (Stockholm branch), to a limited extent, subject to local supervision by the Swedish Financial Supervisory Authority (Finansinpektionen) disseminates research in the Kingdom of Sweden.

General disclosures

This research is for our clients only. Other than disclosures relating to Goldman Sachs, this research is based on current public information that we consider reliable, but we do not represent it is accurate or complete, and it should not be relied on as such. The information, opinions, estimates and forecasts contained herein are as of the date hereof and are subject to change without prior notification. We seek to update our research as appropriate, but various regulations may prevent us from doing so. Other than certain industry reports published on a periodic basis, the large majority of reports are published at irregular intervals as appropriate in the analyst's judgment.

Goldman Sachs conducts a global full-service, integrated investment banking, investment management, and brokerage business. We have investment banking and other business relationships with a substantial percentage of the companies covered by our Global Investment Research Division. Goldman Sachs & Co. LLC, the United States broker dealer, is a member of SIPC (https://www.sipc.org).

Our salespeople, traders, and other professionals may provide oral or written market commentary or trading strategies to our clients and principal trading desks that reflect opinions that are contrary to the opinions expressed in this research. Our asset management area, principal trading desks and investing businesses may make investment decisions that are inconsistent with the recommendations or views expressed in this research.

The analysts named in this report may have from time to time discussed with our clients, including Goldman Sachs salespersons and traders, or may discuss in this report, trading strategies that reference catalysts or events that may have a near-term impact on the market price of the equity securities discussed in this report, which impact may be directionally counter to the analyst's published price target expectations for such stocks. Any such trading strategies are distinct from and do not affect the analyst's fundamental equity rating for such stocks, which rating reflects a stock's return potential relative to its coverage universe as described herein.

We and our affiliates, officers, directors, and employees, excluding equity and credit analysts, will from time to time have long or short positions in, act as principal in, and buy or sell, the securities or derivatives, if any, referred to in this research.

The views attributed to third party presenters at Goldman Sachs arranged conferences, including individuals from other parts of Goldman Sachs, do not necessarily reflect those of Global Investment Research and are not an official view of Goldman Sachs.

Any third party referenced herein, including any salespeople, traders and other professionals or members of their household, may have positions in the products mentioned that are inconsistent with the views expressed by analysts named in this report.

This research is not an offer to sell or the solicitation of an offer to buy any security in any jurisdiction where such an offer or solicitation would be illegal. It does not constitute a personal recommendation or take into account the particular investment objectives, financial situations, or needs of individual clients. Clients should consider whether any advice or recommendation in this research is suitable for their particular circumstances and, if appropriate, seek professional advice, including tax advice. The price and value of investments referred to in this research and the income from them may fluctuate. Past performance is not a guide to future performance, future returns are not guaranteed, and a loss of original capital may occur. Fluctuations in exchange rates could have adverse effects on the value or price of, or income derived from, certain investments.

Certain transactions, including those involving futures, options, and other derivatives, give rise to substantial risk and are not suitable for all investors. Investors should review current options and futures disclosure documents which are available from Goldman Sachs sales representatives or at https://www.theocc.com/about/publications/character-risks.jsp and https://www.fiadocumentation.org/fia/regulatory-disclosures_1/fia-uniform-futures-and-options-on-futures-risk-disclosures-booklet-pdf-version-2018. Transaction costs may be significant in option strategies calling for multiple purchase and sales of options such as spreads. Supporting documentation will be supplied upon request.

Differing Levels of Service provided by Global Investment Research: The level and types of services provided to you by the Global Investment Research division of GS may vary as compared to that provided to internal and other external clients of GS, depending on various factors including your individual preferences as to the frequency and manner of receiving communication, your risk profile and investment focus and perspective (e.g., marketwide, sector specific, long term, short term), the size and scope of your overall client relationship with GS, and legal and regulatory constraints. As an example, certain clients may request to receive notifications when research on specific securities is published, and certain clients may request that specific data underlying analysts' fundamental analysis available on our internal client websites be delivered to them electronically through data feeds or otherwise. No change to an analyst's fundamental research views (e.g., ratings, price targets, or material changes to earnings estimates for equity securities), will be communicated to any client prior to inclusion of such information in a research report broadly disseminated through electronic publication to our internal client websites or through other means, as necessary, to all clients who are entitled to receive such reports.

All research reports are disseminated and available to all clients simultaneously through electronic publication to our internal client websites. Not all research content is redistributed to our clients or available to third-party aggregators, nor is Goldman Sachs responsible for the redistribution of our research by third party aggregators. For research, models or other data related to one or more securities, markets or asset classes (including related services) that may be available to you, please contact your GS representative or go to https://research.gs.com.

Disclosure information is also available at https://www.gs.com/research/hedge.html or from Research Compliance, 200 West Street, New York, NY 10282.

© 2022 Goldman Sachs.

No part of this material may be (i) copied, photocopied or duplicated in any form by any means or (ii) redistributed without the prior written consent of The Goldman Sachs Group, Inc.