

**GS SUSTAIN: Investing in Green Capex****Opportunity set across the supply chain remains attractive; refreshing stocks to own**

We reiterate our bullish outlook for Green Capex as a secular equity theme and refresh our Green Capex highlighted stocks across sectors. We continue to see attractive opportunities across the supply chain with the greatest niche of underappreciated revenue beneficiaries in Industrials sectors, in particular Automotive, Home Builders and Infrastructure Contractors. We highlight 107 stocks of companies exposed to Net Zero, Infrastructure and Clean Water goals that are Buy-rated by our analysts and with corporate returns above industry global or regional averages.

**Four key takeaways**

1. We continue to see Green Capex as a secular theme with \$2.8 trillion increase in annual run rate of investment needed this decade to meet Decarbonization, Infrastructure and Clean Water goals. Publicly traded companies have the ability to invest \$0.9 trillion more (down vs. \$1.0 trillion previously) without stretching balance sheets and while still retaining 30% of operating cash flow as free cash.
2. We refresh our Green Capex stocks to take into account our updated Sustainable Development Goal revenue exposure tool and the latest Environmental & Social scores, analyst corporate financial returns outlook and analyst ratings. We highlight 107 stocks across sectors. We continue to see opportunities across the supply chain of companies with above-average corporate returns.
3. We see continued interest among investors in companies with above-average corporate returns exposed to the theme that are revenue beneficiaries of others' Green Capex or are uniquely vs. cash flow reinvesting to grow. Despite market volatility and inflationary pressures YTD, stocks of Green Revenue beneficiaries, Green Capex reinvestors and Greenablers each modestly outperformed.
4. Stocks we highlight run the gamut from very overweight to underweight in ESG funds. We see the greatest opportunity for discovery value among Industrials sectors, in particular Automotive, Home Builders and Infrastructure Contractors sectors based on median underweight positions among stocks we highlight.

Please also see our [Green Capex: Stimulating Capital and Return on Capital](#) report published in conjunction with this note.

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**Exhibit 1: The stocks we highlight for Green Capex themes have a diversity of industry, product and geographic exposure**

Select Buy-rated stocks that meet key Green Capex investing themes; new additions vs. our Oct. 2021 Investing in Green Capex report are shaded

	Automotive	Capital Goods	Chemicals	Hardware/Tech	Homes / Building Materials	Infrastructure Contractors	Metals & Mining/ Steel	Semiconductors	Software	Solar/Wind Equipment	Utilities	
US & Canada	Amphenol Corp.	Deere & Co.	Air Products	National Instruments Corp.	Carrier Global Corp.	Baker Hughes Co.	Constellium	Advanced Micro Devices Inc.	Datadog Inc.	Array Technologies Inc.	CMS Energy Corp.	Ever
	Aptiv Plc	Eaton Corp.	Linde	TE Connectivity Ltd.	KB Home	Chart Industries	Freeport-McMoRan Inc.	Analog Devices Inc.		Enphase Energy Inc.	Edison International	P
	Magna International Inc.	Emerson Electric Co.				MasTec Inc.	Schnitzer Steel Industries	Applied Materials Inc.		SolarEdge Technologies Inc.	FirstEnergy Corp.	Esse
		Jacobs				T-Mobile US Inc.	Steel Dynamics	Lam Research Corp.		Universal Display Corp.	Public Service Enterprise Group	
											Sempra Energy	
EMEA		ABB Ltd.	Sika		Kingspan	Infrastructure Wireless SpA	Anglo American Plc	ASML Holding	Dassault Systemes	Vestas Wind Systems A/S	Enel SpA	
		Atlas Copco				Vinci	SSAB	ASM International			Iberdrola SA	
		Nexans						Infinion			Orsted A/S	
		Rexel S.A.									SSE Plc	
		Siemens AG										
Mainland China	Li Auto Inc.	Kehua Data Co.	Yunnan Energy	Hongfa Technology	Midea Group		China Hongqiao Group		Sangfor	Flat Glass Group		
	Weichai Power	Lead Intelligent		Nari Tech Co.	Oriental Yuhong		Ganfeng Lithium			LONGi Green Energy		
		Orient Cable		OPT Machine Vision Tech Co.	Zaisheng Technology		GEM Co.			Mingyang		
		Shenzhen Envicool		Shenzhen Inovance			Huayou Cobalt			Riyue Heavy Industry Co.		
							Zijin Mining			Sungrow Power Supply Co.		
										Tongwei		
										Xinqianglian		
Other Asia Pacific	Denso	Daifuku Co.	LG Chem	Delta Electronics	Dakin Industries		Mineral Resources	Mediatek	KPIT Technologies		West Holdings	
		Fanuc		Murata Mfg.				Rohm				
		Keyence						TSMC				
		Misumi Group						United Microelectronics				
		Nidec										
		SMC										
	Yaskawa Electric											
Emerging Markets							Gerdau				Enel Chile	
											Omega Energia S.A.	

Source: Goldman Sachs Global Investment Research

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## Impact: Green Capex needs and opportunity significant

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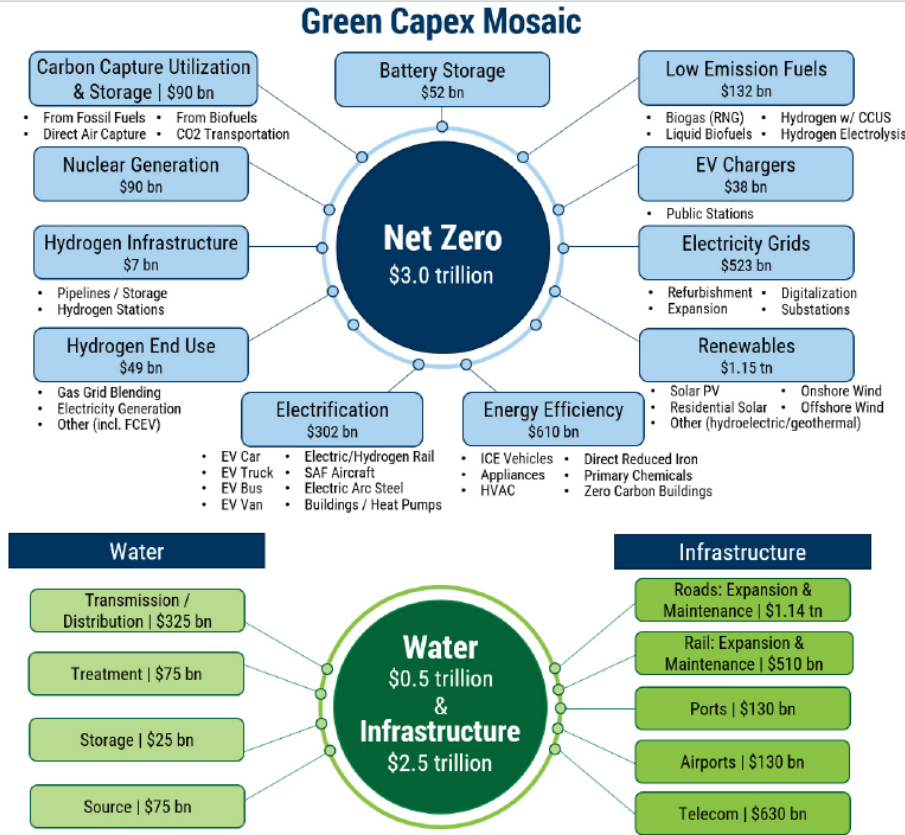
**We believe Green Capex will be the multi-year secular theme — as focus rises to decarbonize the world and meet Clean Water and infrastructure goals — requiring \$6 trillion in annual investments in the 2020s. Half of this is needed for decarbonization to be on path for Net Zero by 2050.** We believe only about a third of the incremental \$2.8 trillion needed to be on path to achieve these broader goals is currently on track from the private sector. As we have highlighted in past reports as well as in our Stimulating capital and return on capital report, we believe an all-in approach is needed that provides opportunity for sectors across the supply chain to participate in achieving these goals. To stimulate additional investment will require the three C's: **C**ollaboration, **C**omprehensive focus and **C**orporate returns.

**We see rising deployment of Green Capex thanks to policy tailwinds such as the Inflation Reduction Act and RePower EU.** We also see potential for publicly traded companies to be investing \$0.9 trillion more in Green Capex (down from \$1.0 trillion previously as detailed later in the report) while still retaining 30% of operating cash flow as free cash flow and while still maintaining 1.5x net debt/EBITDA balance sheet.

**Coming out of our Global Sustainability Forum on September 29, we have further confidence that we are at an inflection in Sustainability investing From Aspiration to Action with an increased urgency to accomplish key Sustainability Development goals and not just a desire to support them.** This will lead, in our view, to a broadening of the investable universe, an increased push to quantify impact, greater engagement vs. exclusion and a rising focus on catalysts for growing Green Capex without sacrificing long-term corporate returns. At the Forum, managements were bullish on innovation and on positive tailwinds from policies like RePowerEU and the Inflation Reduction Act, though with some commentary that the pace of Green Capex expansion could be temporarily delayed by market volatility and inflationary pressures. We remain positive on stocks exposed not only to Green Capex themes such as Energy Efficiency, Clean Reliable Energy (battery storage and hydrogen) and Greenablers but on broader themes such as Circular Economy, Food Security, Biodiversity and ESG Improvers. Together these combined themes will play a role towards achieving Net Zero/Infrastructure/Clean Water goals while mitigating potential negative repercussions on social goals.

**Exhibit 2: The Net Zero, Infrastructure and Clean Water mosaic**

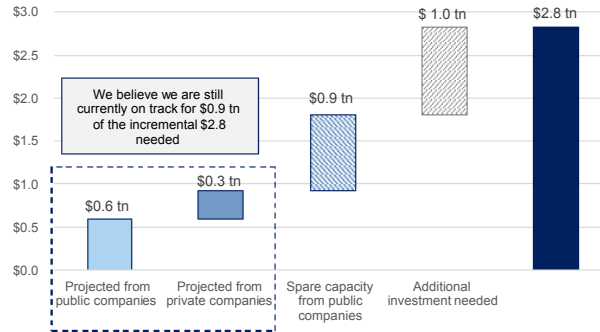
Critical technologies/focus areas and annual investment in the 2020s to achieve Net Zero, Infrastructure and Clean Water needs



Source: IEA, McKinsey, OECD, Company data, Goldman Sachs Global Investment Research

**Exhibit 3: We believe the private sector is still on track for \$0.9 tn (down from \$1.0 tn previously) of the incremental \$2.8 tn Green Capex needed annually in the 2020s. We modestly revise downwards our expectations for Green Capex spare capacity from publicly traded companies, leaving the need for additional investments at \$1.0 tn annually**

Components of incremental annual investment needed this decade to meet Net Zero, infrastructure and clean water goals, \$ trillion



Source: IEA, OECD, McKinsey & Company, FactSet, Prequin, Goldman Sachs Global Investment Research

## Fundamentals: Focus on sectors with corporate returns resilience, attractiveness and/or momentum

**We still believe ESG and generalist investors could look more closely at attractiveness for sectors and companies in the Green Capex mosaic where: (a) corporate returns for the sector are expected to be a combination of resilient, above-average or having favorable momentum in coming years; or (b) sectors in which the spare capacity for additional Green Capex from reinvestment via free cash flow and balance sheet strength is concentrated. We believe these would provide an overview of not only financial strength, but also the opportunity for engagement towards directing capital to maximize Green Capex or ESG improvement.**

**Looking at sectors where corporate returns are expected (1) to be resilient vs. our February report pre-Russia/Ukraine, (2) to be above-average, or (3) to increase in 2023E/2024E vs. 2022E, about half of Green Capex sectors meet 2 of the 3 criteria.** As reported in [Exhibit 4](#), corporate returns are expected:

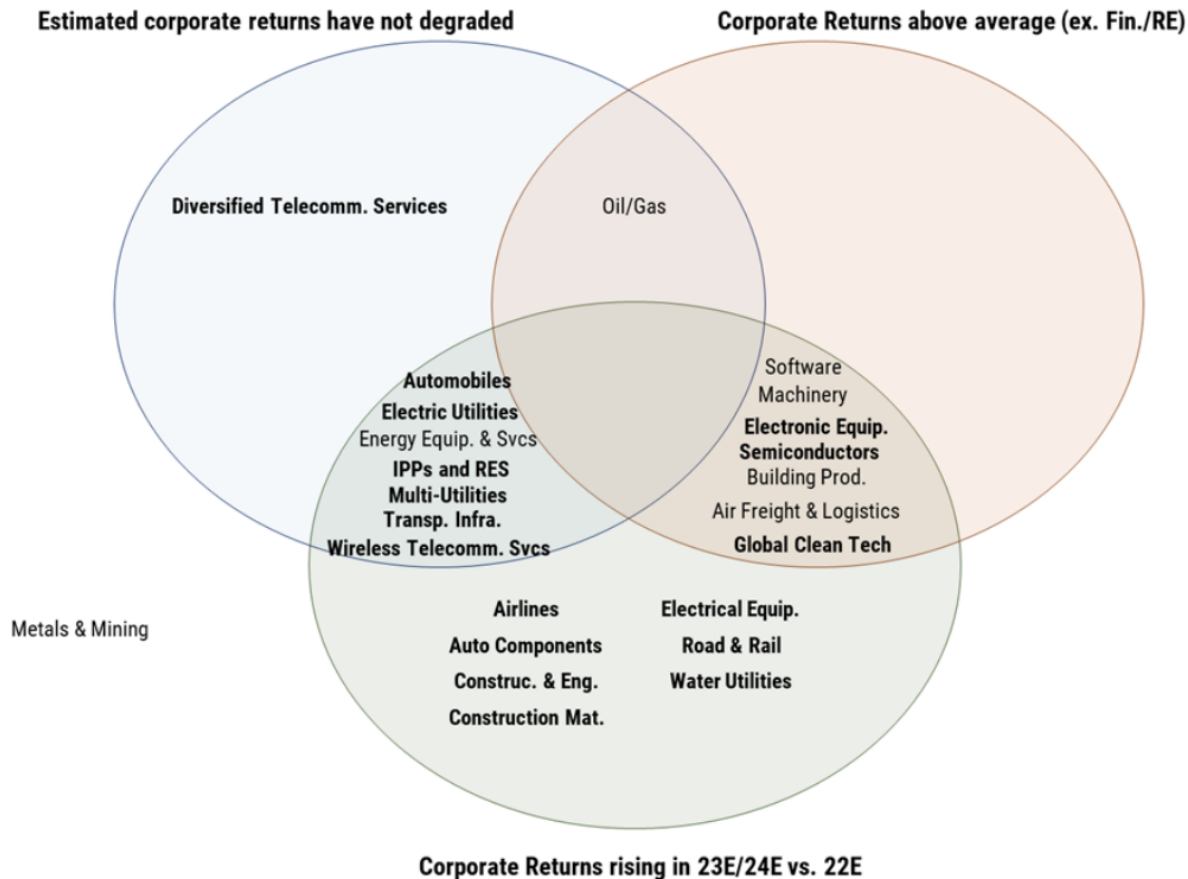
- To be resilient vs. pre-Russia/Ukraine and above-average: **One sector — Oil/Gas.**
- To be resilient vs. pre-Russia/Ukraine and rising in 2023E/2024E vs. 2022E: **Seven sectors — Automobiles, Electric Utilities, Energy Equipment, IPPs and Renewables, Multi-Utilities, Transportation Infrastructure and Wireless Telecommunications Services.**
- To be above-average and rising in 2023E/2024E vs. 2022E: **Seven sectors — Air Freight & Logistics, Building Products, Electronic Equipment, Machinery, Semiconductors, Software and Global Clean Technology.**

Compared to [our prior report in June](#), most notably, there are no sectors that meet all 3 criteria, and corporate returns expectations for Metals & Mining companies have fallen (returns were forecast resilient and above-average in June).

**Among Green Capex-critical sectors, reinvestment rates of operating cash flow into Capex + R&D are expected above-average in 2022E/2023E for 16.** The remaining 7 — Air Freight & Logistics, Building Products, Energy Equipment, Machinery, Metals & Mining, Oil/Gas and Software — are forecast to have reinvestment rates below average. We note that Global Clean Tech companies are expected to see reinvestment rates above average.

**Exhibit 4: No sectors are forecast to have resilient, above-average and rising corporate returns based on current estimates — vs. our analyst estimates in January, where Semis and Software met the criteria; 11 other sectors — ex. Oil/Gas — meet two of the three corporate returns criteria**

Overview of sectors for which (1) corporate returns analyst estimates have not degraded vs. our Feb. 2 report, i.e., pre-Russia/Ukraine, (2) estimated corporate returns in 2022E-23E are above average (ex. Financials and Real Estate) and (3) corporate returns are forecast to rise in 2023E or 2024E vs. 2022E. Bolded sectors have above-average — ex. Financials & Real Estate — reinvestment rate (refers to 2022E-23E average)



Corporate returns are considered not degraded if current estimates are higher than or within 0.2% of prior estimates. Calculations refer to the sector 22E/23E average CROCI.

Source: Goldman Sachs Global Investment Research

**Corporate returns expectations for coming years have been revised downwards since our February update.** As seen in [Exhibit 5](#), returns expectations — referred to cash return on cash invested (CROCI) and excluding Financials and Real Estate — have seen a 20 bps to 40 bps downward revision in 2023E and 2024E vs. [our February 2022 report pre-Russia/Ukraine revisions](#). Our analysts’ estimates now call for corporate returns across all sectors of 12.9%, 12.8% and 12.4% in 2022E, 2023E and 2024E, respectively, on a weighted average basis and excluding Financials and Real Estate. This compares with pre-pandemic corporate returns of 10.5% in 2019 and 10.9% on average in 2010-2019 average for all sectors. Since our [June 2022 update](#), corporate returns expectations for all sectors ex. Financials and Real Estate for 2022E have remained flat, while we note a ~30 bps decrease in 2023E and 2024E estimates.

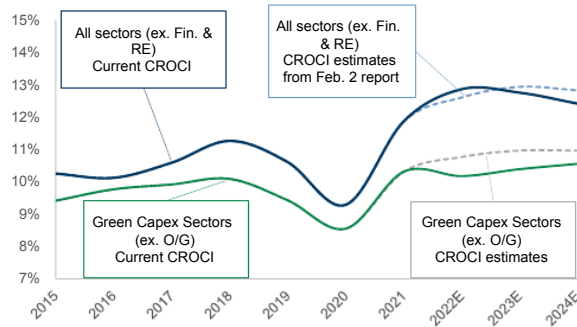
**Corporate returns in Green Capex sectors are projected below prior expectations,**

**but rising in 2023E/2024E vs. 2022E.** As reported in [Exhibit 5](#), on a weighted average basis across Green Capex-critical sectors and excluding Oil/Gas companies — estimates imply ~40-60 bps lower corporate returns in 2022E-2024E vs. [our February report pre-Russia/Ukraine revisions](#). However, corporate returns are expected on the rise for Green Capex sectors — a ~15-20 bps YoY increase in 2023E-2024E — unlike the trend of expected falling corporate returns for overall sectors.

**Returns are expected to have positive momentum in 2022E through 2024E for five sectors: Building Products, Electrical Equipment, Electronic Equipment, Energy Equipment and Road & Rail.** Overall, returns are expected to increase in 2022E vs. 2019 for 9 sectors. The majority of Green Capex sectors are expected to see rising returns in 2023E and 2024E vs. the prior year — 14 sectors in 2023E and 17 sectors in 2024E, out of 23 total.

**Exhibit 5: CROCI estimates for covered companies have seen a slight upward revision in 2022E and a 20 bps downward revision in 2023E since our report in February pre-Russia/Ukraine; the 2022 decrease in returns expectations is more pronounced among Green Capex sectors**

Weighted Average CROCI, all sectors. Comparison of current values (as of Sept. 30) vs. as published in our Feb. 2 Green Capex note; Green Capex sectors exclude Oil & Gas

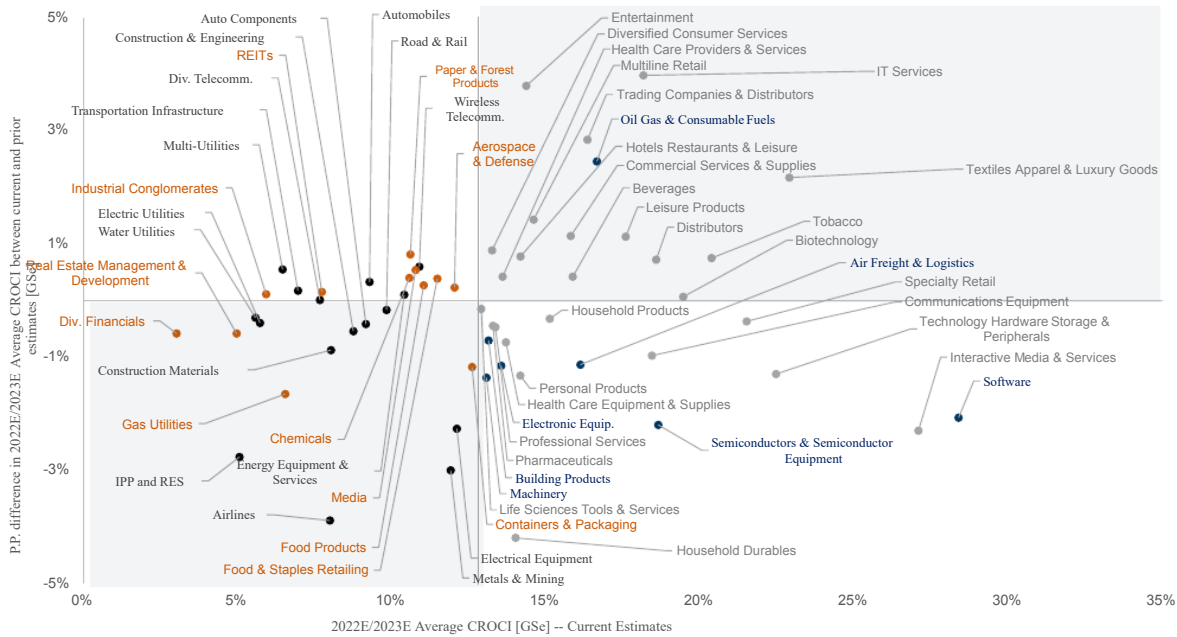


Source: Goldman Sachs Global Investment Research



**Exhibit 6: While corporate returns expectations for 2022E and 2023E have degraded overall since January, there is significant differentiation by sector**

Overview of current CROCI estimates by sector (based on 2022E/2023E average — horizontal axis) and percentage points difference in 2022E/2023E average CROCI between current and pre-Russia/Ukraine war (our February 2022 report) estimates. Vertical line denotes current estimates for average 22E/23E CROCI for all sectors (ex. Financials and Real Estate)

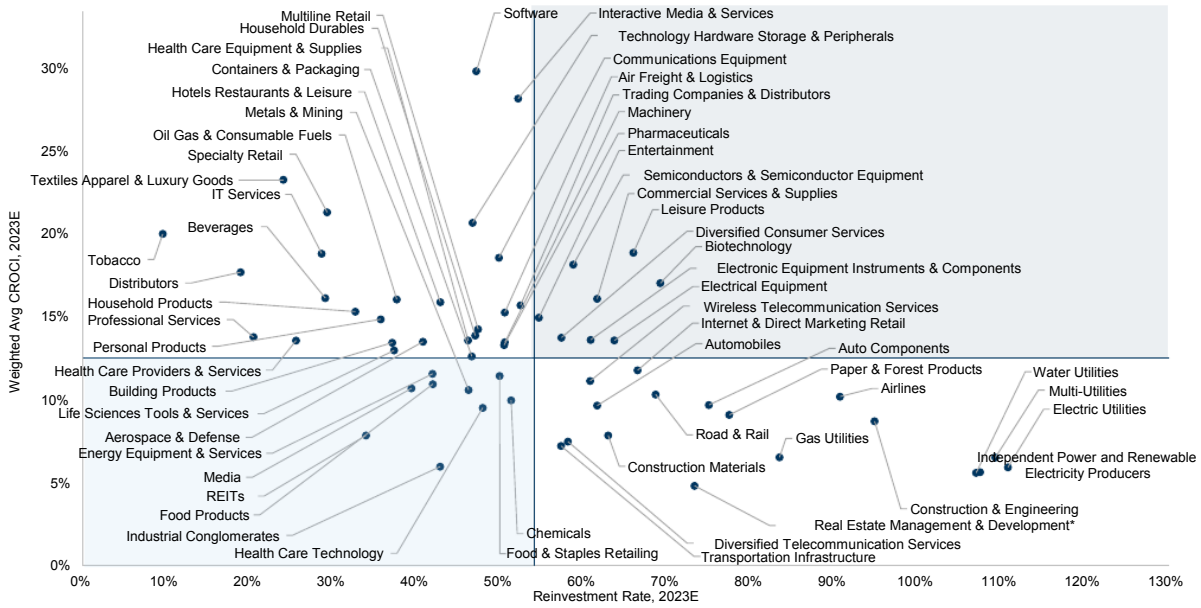


Blue dots and labels: Green Capex sectors with above-average corporate returns. Black dots and labels: Green Capex sectors with below-average corporate returns. Gray dots and labels: Other sectors with above-average corporate returns. Orange dots and labels: Other sectors with below-average corporate returns. Green dot: global clean tech companies

Source: Goldman Sachs Global Investment Research

**Exhibit 7: There are still relatively few sectors with expected above-average corporate returns that are expected to invest more than 60% of adjusted cash flow in R&D and capex — suggesting capacity for further investment**

Reinvestment rate vs. cash return on cash invested weighted average by sector for companies covered by GS Research, 2023E



\* We view Real Estate cash return on cash invested as less comparable than other sectors

Source: FactSet, Goldman Sachs Global Investment Research

## Green Capex stocks: Robust opportunities across the supply chain

**We believe investors can benefit from the Green Capex theme by considering stocks of companies with above-average corporate returns in three categories of impact towards Decarbonization, Infrastructure and Clean Water goals.**

- 1. Revenue Beneficiaries:** Companies whose revenues benefit from broader market Green Capex or Green product demand.
- 2. High and/or Rising Reinvestors:** Revenue beneficiaries that are investing a high and/or rising percentage of operating cash flow into Capex + R&D.
- 3. Greenablers:** We highlight companies levered to Copper/Aluminum, Electricity Transmission, Semiconductors or Cybersecurity where investment in longer lead time projects will be needed more urgently.

We note the Green Capex stocks and themes in this report do not include ESG Improvers, which we have addressed in our ESG of the Future reports on [Green Capex/Green Revenue mix shifts](#) and [improving greenhouse gas emissions intensity](#). Some of the Improvers' business mix shift is the result of Green Capex initiatives.

**Fusing GS SUSTAIN data tools together with fundamentals and our covering analyst views, we identify 107 Buy-rated stocks across the Green Capex mosaic exposed to the Green Capex themes of Decarbonization, Infrastructure and Clean Water.** These companies have:

- Favorable corporate financial returns (cash return on cash invested) vs. peers.
- Estimated 25%-30% or greater revenue exposure to Green Capex-related UN Sustainable Development Goals based on our recently refined GS SUSTAIN SDG tool. The most pertinent to Net Zero, Clean Water and Infrastructure include Clean Water & Sanitation (SDG 6), Affordable & Clean Energy (SDG 7), Industry, Innovation & Infrastructure (SDG 9) and Sustainable Cities & Communities (SDG 11) — exposure and alignment can be identified via our recently-revised UN SDG Alignment tool (see companion report [here](#)).
- Are not in the bottom 20% on an Environmental & Social score.
- Are Buy-rated by our covering analyst.

Please see following sections and [Exhibit 8](#) for more details.

**Diverse geographically and diverse across the supply chain.** Select stocks we highlight comprise 38 stocks in North America, 20 stocks in EMEA, 46 stocks in Asia Pacific, 3 stocks in other Emerging Markets. The most represented vertical is Capital Goods (20 stocks), followed by Metals/Mining/Steel (13 stocks) and Electric/Multi-Utilities (12 stocks). Compared to the 88 stocks we highlighted in the first [Investing in Green Capex report](#) (Oct. 2021), we note that 62 stocks still screen favorably among Reinvestors, Greenablers or Green Revenue Beneficiaries. Out of the 26 stocks no longer highlighted that remain under research coverage, 21 have fallen out of our screen due to rating changes, 1 due to expected corporate returns no longer

above average, 4 due to the Operational E&S score now falling into the bottom quintile of our scoring framework or other recent controversies related to the company operations.

**Exhibit 8: The stocks we highlight for these themes have a diversity of industry, product and geographic exposure**

Select Buy-rated stocks that meet key Green Capex investing themes; new additions vs. our Oct. 2021 Investing in Green Capex report are shaded

	Automotive	Capital Goods	Chemicals	Hardware/Tech	Homes / Building Materials	Infrastructure Contractors	Metals & Mining/ Steel	Semiconductors	Software	Solar/Wind Equipment	Utilities	
US & Canada	Amphenol Corp.	Deere & Co.	Air Products	National Instruments Corp.	Carrier Global Corp.	Baker Hughes Co.	Constellium	Advanced Micro Devices Inc.	Datadog Inc.	Array Technologies Inc.	CMS Energy Corp.	Ever
	Aptiv Plc	Eaton Corp.	Linde	TE Connectivity Ltd.	KB Home	Chart Industries	Freeport-McMoRan Inc.	Analog Devices Inc.		Enphase Energy Inc.	Edison International	p
	Magna International Inc.	Emerson Electric Co.				MasTec Inc.	Schnitzer Steel Industries	Applied Materials Inc.		SolarEdge Technologies Inc.	FirstEnergy Corp.	Esse
		Jacobs				T-Mobile US Inc.	Steel Dynamics	Lam Research Corp.			Public Service Enterprise Group	
							Universal Display Corp.			Sempra Energy		
EMEA		ABB Ltd.	Sika		Kingspan	Infrastruttura Wireless SpA	Anglo American Plc	ASML Holding	Dassault Systemes	Vestas Wind Systems A/S	Enel SpA	
		Atlas Copco				Vinci	SSAB	ASM International			Iberdrola SA	
		Nexans						Infineon			Orsted A/S	
		Rexel S.A.									SSE Plc	
	Siemens AG											
Mainland China	Li Auto Inc.	Kehua Data Co.	Yunnan Energy	Hongfa Technology	Midea Group		China Hongqiao Group		Sangfor	Flat Glass Group		
	Weichai Power	Lead Intelligent		Nari Tech Co.	Oriental Yuhong		Ganfeng Lithium			LONGi Green Energy		
		Orient Cable		OPT Machine Vision Tech Co.	Zaisheng Technology		GEM Co.			Mingyang		
		Shenzhen Envicool		Shenzhen Inovance			Huayou Cobalt			Riyue Heavy Industry Co.		
							Zijin Mining			Sungrow Power Supply Co.		
										Tongwei		
									Xinqianglian			
Other Asia Pacific	Denso	Daifuku Co.	LG Chem	Delta Electronics	Daikin Industries		Mineral Resources	Mediatek	KPIT Technologies		West Holdings	
		Fanuc		Murata Mfg.				Rohm				
		Keyence						TSMC				
		Misumi Group						United Microelectronics				
		Nidec										
		SMC										
	Yaskawa Electric											
Emerging Markets							Gerdau				Enel Chile	
											Omega Energia S.A.	

Source: Goldman Sachs Global Investment Research

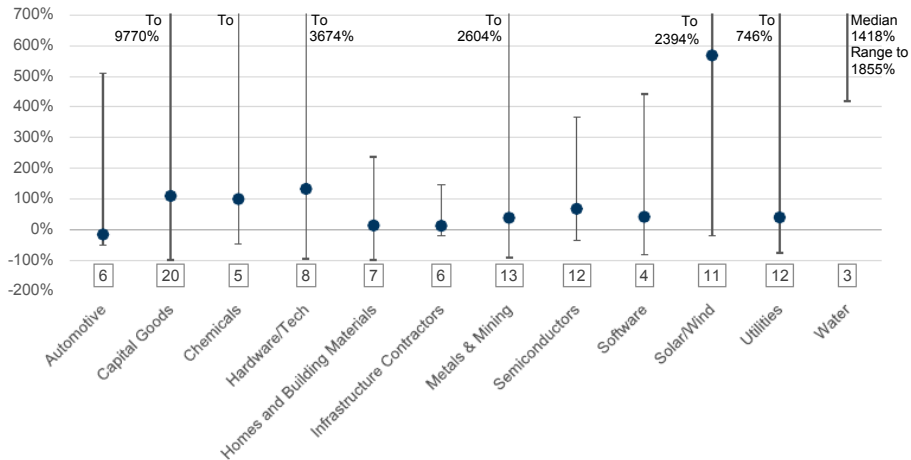
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**ESG fund overweight positions remain highly concentrated in pure-play companies exposed to final products like solar, wind and water.** As we have highlighted in Green Capex reports and in our Nifty 50 series, ESG fund holdings are highly concentrated in near market weight positions of market bellwethers and overweight positions in solar, wind and water. The concentrated overweight positions we believe reflect that we are in the earlier stage in ESG investing where there has been less time/resources devoted to measuring impact, resulting in concentration among companies where there is little debate/controversy about impact. Even among the companies we highlight, there is clear overweight bias among Solar, Wind and Water stocks — Solar/Wind median stock (among the 11 highlighted) is 570% overweight by ESG funds while the median water stock (among 3 highlighted) is 1400% overweight.

**We continue to see room for greater appreciation for the broader Green Capex supply chain, particularly in Hardware/Tech and Capital Goods.** While overweight in ESG funds on a median basis, the range of ownership for companies in these sectors varies greatly. Please see [Exhibit 9](#) for more details. Hardware/Tech and Capital Goods are critical or strongly-needed sectors in the Green Capex mosaic — for Renewables but also Energy Efficiency, Electrification, Electricity Grids, Hydrogen, among others. As a result, we still see scope for rising appreciation among investors for the role Hardware/Tech and Capital Goods companies play on path to Net Zero, Clean Water and Infrastructure goals.

**Exhibit 9: Stocks we highlight that have a wide range of ESG ownership; among Buy-rated stocks we highlight, ESG investors are most overweight — on a median basis — Solar/Wind/Water stocks, and most underweight Automotive and Infrastructure Contractors**

Range of ownership vs. benchmarks by ESG funds for highlight Buy-rated stocks by vertical; dots represent median. Numbers at the bottom represent the number of companies considered in each vertical



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

## Green Capex stock performance: Modest outperformance in 2021, 2022 YTD

**Stocks screening under our Green Capex investment themes have outperformed market benchmarks since the beginning of 2021 and in 2022 YTD.** This refers to both the stock screening under our [Oct. 2021 stock selection criteria](#) and our current screens presented in this report — inclusive of Buy-/Neutral-/Sell-rated stocks. Please see exhibits below for more details. We believe this could have been primarily driven by rising recognition among investors of Green Capex companies' contribution to the broader Green Capex supply chain on path to Net Zero, Clean Water and Infrastructure goals as well as greater focus on quality/corporate returns in the face of volatility/inflationary pressures. In particular, for both universes, stocks meeting the criteria of our Green Capex investment themes have outperformed market benchmarks — sector peers based on GICS 3 classification for Reinvestors, MSCI ACWI for Revenue Beneficiaries and Greenablers — by single digit percentage points in 2022 YTD. Despite the recent outperformance, we still see scope for ESG weightings to grow across these themes on the back of:

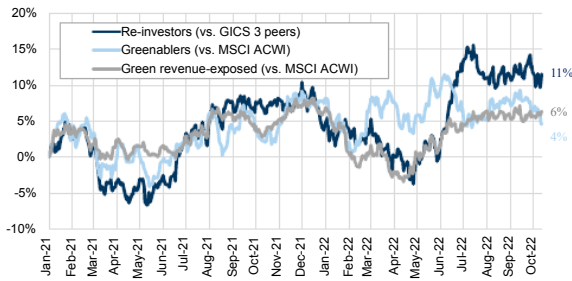
- Exposure to secular growth themes through global investments in climate transition and UN SDGs;
- Attractive profile corporate returns which could support long-term capacity expansions to service Green demand and
- Further discovery value as about 40% of Green Capex stocks in GS coverage are underweight in ESG funds relative to their respective weights in the benchmark.

The difference in relative performance for Green Revenue Beneficiaries based on current selection criteria vs. those presented in our [Oct. 2021 report](#) ([Exhibit 12](#) and [Exhibit 13](#) vs. [Exhibit 10](#) and [Exhibit 11](#)) is primarily due to a sectoral mix shift in universe composition from our updated Sustainable Development Goal revenue tool and latest corporate returns estimates from our analysts. This is driven by an increase in percentage of companies from outperforming sectors such as Metals & Mining, Oil/Gas and Wireless Telecommunications, as well as lower percentage of companies from weaker performing sectors such as Machinery.

**Going forward, we see thematic tailwinds impacting both earnings and Sustainability investor ownership.** Fundamentally, we see Green Capex tailwinds that provide secular sources of rising revenue and investment opportunities and see plenty of opportunities for exposure among companies with above-average corporate returns. Additionally, we believe there could be rising interest for ESG thematic strategies able to capture secular trends such as Green Capex spending as there is greater urgency to accomplish (vs. desire to support) Sustainable Development Goals that leads to expanding investable universe across the supply chain.

**Exhibit 10: Stocks exposed to the Green Capex investment themes based on our Oct. 2021 report screen have broadly outperformed market benchmarks since beginning of 2021**

Average relative stock performance of Green Revenue Beneficiaries, Green Re-investors and Greenablers since Jan. 1, 2021. Based on stock selection tools as of Oct. 2021



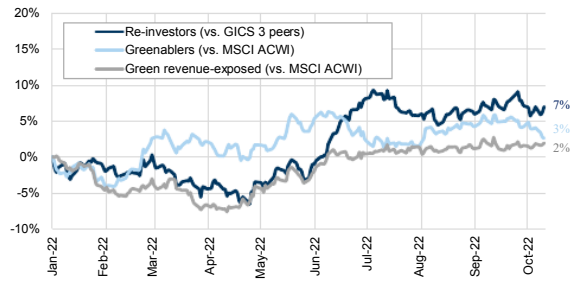
Note: Equal weighted indices. Includes stocks with corporate returns above average – referred to global or regional sector average, ex. Greenablers. Stock selection based on constraints discussed in Green Capex: Making Infrastructure Happen report, but includes Neutral and Sell-rated stocks as opposed to just Buy-rated stocks.

Data as of Oct. 12

Source: Thomson Reuters, Goldman Sachs Global Investment Research

**Exhibit 11: Stocks exposed to the Green Capex investment themes based on our Oct. 2021 report have outperformed market benchmarks by single digits in 2022 YTD**

Average relative stock performance of Green Revenue Beneficiaries, Green Re-investors and Greenablers in 2022 YTD. Based on stock selection tools as of Oct. 2021



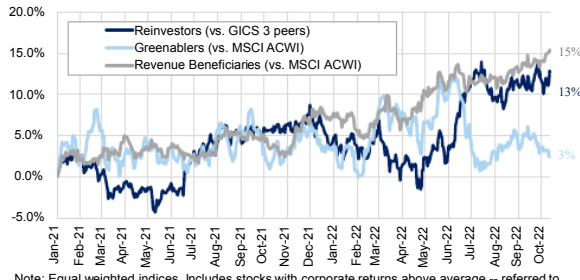
Note: Equal weighted indices. Includes stocks with corporate returns above average – referred to global or regional sector average, ex. Greenablers. Stock selection based on constraints discussed in Green Capex: Making Infrastructure Happen report, but includes Neutral and Sell-rated stocks as opposed to just Buy-rated stocks.

Data as of Oct. 12

Source: Thomson Reuters, Goldman Sachs Global Investment Research

**Exhibit 12: Based on our latest refresh, stocks that screen for our three Green Capex investment themes have outperformed respective benchmarks since the beginning of 2021...**

Average relative stock performance of Green Revenue Beneficiaries, Green Re-investors and Greenablers since Jan. 1, 2021. Based on current stock selection tools.



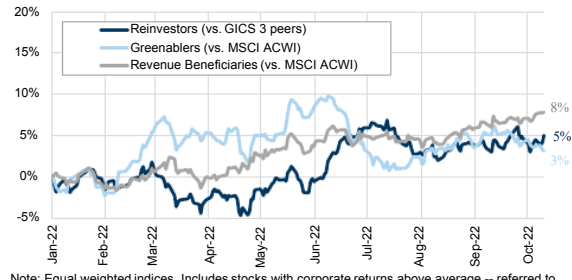
Note: Equal weighted indices. Includes stocks with corporate returns above average – referred to global or regional sector average, ex. Greenablers. Stock selection based on criteria discussed in the report, but includes Neutral and Sell-rated stocks as opposed to just Buy-rated stocks.

Data as of Oct. 12

Source: Thomson Reuters, Goldman Sachs Global Investment Research

**Exhibit 13: ... as well as in 2022 YTD, with Green Revenue Beneficiaries resulting in the greatest relative outperformance**

Average relative stock performance of Green Revenue Beneficiaries, Green Re-investors and Greenablers in 2022 YTD. Based on current stock selection tools.



Note: Equal weighted indices. Includes stocks with corporate returns above average – referred to global or regional sector average, ex. Greenablers. Stock selection based on criteria discussed in the report, but includes Neutral and Sell-rated stocks as opposed to just Buy-rated stocks.

Data as of Oct. 12

Source: Thomson Reuters, Goldman Sachs Global Investment Research



## Green Revenue Beneficiaries

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**We continue to believe investors could potentially reward Green Revenue Beneficiaries across the Green Capex supply chain.** We see rising investors' interest to seek broader exposure to Net Zero, Clean Water and Infrastructure goals, particularly for those companies which stand to potentially be revenue beneficiaries of Green Capex spending upstream in the supply chain. Revenue beneficiaries that are not disproportionately reinvesting capital could also gain greater investor support in the current market more focused on earnings tailwinds than long-term net asset value, in our view.

**Machinery and Electrical Equipment are the most represented sectors among Green Revenue Beneficiaries.** The two sectors are significantly overweight in ESG funds, being owned at 150%-200% of the weight of their sector benchmark — based on GICS 3 classification. However, the range of ownership in ESG funds for companies in those sectors is significantly wide, and thus we still see opportunities for greater recognition in ESG funds of Machinery and Electrical Equipment companies, whose contribution to the Green Capex mosaic extends to almost all verticals. In addition to potential earnings tailwinds, we believe many of the revenue beneficiaries in the Industrials space could receive greater Sustainability investor support for those looking to move earlier in the supply chain but may have "FOME" (Fear of Misaligned Exposure) that limits interest in more historically higher emitting sectors early in the supply chain.

### Methodology

Our Green Beneficiaries screen reflects three criteria: (1) Revenue alignment/eligibility of at least 25%/30% with Sustainable Development Goals related to Net Zero, Clean Water and Infrastructure (Clean Water & Sanitation, Affordable & Clean Energy, Infrastructure & Sustainable Industrialization, and Sustainable Cities & Communities) based on our screens/analyst input; (2) CROCI that exceeds regional sector average for Utilities, the global or regional sector average for all other sectors; (3) the company is not rated in the bottom quintile of our Operational Environmental & Social scoring framework.

We highlight select Green Beneficiaries where our analysts have a Buy rating and that are not highlighted as High and/or Rising Re-investors or Greenablers.

### Exhibit 14: We highlight select Buy-rated stocks that screen as Green Revenue Beneficiaries, sorted by lowest to highest weighting in ESG funds

Based on revenue exposure (>25%-30%) to Net Zero, Clean Water, and Infrastructure and above-average regional or global sector CROCI; excludes companies with bottom quintile scores in the GS SUSTAIN E&S framework

Company	Region	Primary Analyst	GICS 3	Market Cap (\$bn)	GS Coverage		GS SUSTAIN Coverage		Description
					Rating	CROCI, 2022E	Oper. E&S Score, %ile	% Underweight/overweight in ESG funds	
KPIT Technologies	Asia Pacific	Chandramouli Muthiah	Software	\$2	Buy*	37%	43%	-83%	KPIT Technologies Limited is an India-based technology company, which is focused on automobile engineering and mobility solutions.
Jacobs	Americas	Jerry Revich, CFA	Professional Services	\$14	Buy	11%	67%	-81%	Jacobs Solutions Inc. provides a range of engineering design, and architectural services as well as construction and construction management services
Oriental Yuhong	Asia Pacific	Nick Zheng, CFA	Construction Materials	\$9	Buy*	20%	96%	-72%	Beijing Oriental Yuhong Waterproof Technology Co., Ltd. is a China-based company principally engaged in the research, development, manufacture and distribution of waterproof materials.
Emerson Electric Co.	Americas	Joe Ritchie	Electrical Equipment	\$46	Buy	12%	50%	-53%	Emerson Electric Co. is a global technology, software and engineering company that provides various solutions for customers in industrial, commercial and residential markets.
Air Products & Chemicals Inc.	Americas	Duffy Fischer	Chemicals	\$51	Buy	19%	45%	-48%	Air Products and Chemicals, Inc., is an industrial gases company that provides essential industrial gases, related equipment and applications for various industries.
Amphenol Corp.	Americas	Mark Delaney, CFA	Electronic Equipment Instruments & Components	\$42	Buy	18%	53%	-38%	Amphenol is a designer, manufacturer and marketer of electrical, electronic and fiber optic connectors, interconnect systems, antennas, sensors and sensor-based products, and coaxial and specialty cable.
Weichai Power	Asia Pacific	Fei Fang	Machinery	\$11	Buy	35%	91%	-34%	Weichai Power Co., Ltd. is engaged in the manufacturing of transportation equipment, including vehicles and key components, non-automotive engines and other components.
T-Mobile US Inc.	Americas	Brett Feldman	Wireless Telecommunication Services	\$173	Buy*	10%	93%	-21%	T-Mobile US, Inc. is a provider of mobile communications services, including voice, messaging and data in the United States, Puerto Rico and the United States Virgin Islands.
Carrier Global Corp.	Americas	Joe Ritchie	Building Products	\$30	Buy	12%	83%	1%	Carrier Global Corp is a provider of heating, ventilation, and air conditioning (HVAC), refrigeration, fire and security solutions.
Baker Hughes Co.	Americas	Neil Mehta	Energy Equipment & Services	\$23	Buy	8%	80%	1%	Baker Hughes Company is an energy technology company. The Company's segments include Oilfield Services (OFS), Oilfield Equipment (OFE), Turbomachinery & Process Solutions (TPS) and Digital Solutions (DS).
Murata Mfg.	Asia Pacific	Daiki Takayama	Electronic Equipment Instruments & Components	\$33	Buy	16%	74%	5%	Murata Manufacturing Co., Ltd. is primarily engaged in the development and manufacture and sales of capacitors, piezoelectric products, electronic components of modules.
Chart Industries	Americas	Ati Modak	Machinery	\$7	Buy	9%	31%	6%	Chart Industries, Inc. is a manufacturer of engineered cryogenic equipment servicing multiple market applications in the industrial gas and energy industries.
Gerdau	Americas	Marcio Farid	Metals & Mining	\$8	Buy	17%	32%	13%	Gerdau SA is a Brazil-based manufacturer of steel products, through its mills located in Argentina, Brazil, Canada, Colombia, the US and others.
Vinci	Europe	Patrick Creuset	Construction & Engineering	\$48	Buy	10%	28%	16%	Vinci SA is a France-based company active in the concessions and construction industry worldwide.
National Instruments Corp.	Americas	Mark Delaney, CFA	Electronic Equipment Instruments & Components	\$5	Buy	16%	80%	22%	National Instruments Corporation offers modular hardware and open, flexible software systems, to support organizations evolving test and measurement needs.
Mineral Resources	Asia Pacific	Paul Young	Metals & Mining	\$9	Buy	54%	87%	36%	Mineral Resources Ltd is an Australia-based mining services company. The Company owns a portfolio of mining operations across multiple commodities, including iron ore and lithium.
Steel Dynamics Inc.	Americas	Emily Chieng, CFA	Metals & Mining	\$14	Buy	33%	80%	37%	Steel Dynamics, Inc. is a diversified domestic steel producers and metals recycler. The Company's segments include Steel Operations, Metals Recycling Operations, and Steel Fabrication Operations.
Enel Chile S.A.	Americas	Pedro Manfredini	Electric Utilities	\$2	Buy	9%	87%	49%	Enel Chile SA is a Chile-based electricity utility company. The Company, through its combined entities and affiliates, is engaged in the generation, transmission and distribution of electricity businesses.
Eaton Corp.	Americas	Joe Ritchie	Electrical Equipment	\$54	Buy	12%	81%	55%	Eaton Corporation plc (Eaton) is a power management company. The Company provides solutions that help its customers manage electrical and mechanical power.
Siemens AG	Europe	Daniela Costa	Industrial Conglomerates	\$86	Buy	13%	97%	59%	Siemens AG is a Germany-based technology company which operates through several segments: Digital Industries; Smart Infrastructure; Gas and Power; Mobility, and others.
Linde PLC	Americas	Duffy Fischer	Chemicals	\$135	Buy	14%	58%	59%	Linde plc is an industrial gases and engineering company that provides atmospheric gases and process gases.
KB Home	Americas	Susan Maklari	Household Durables	\$2	Buy	20%	65%	70%	KB HOME is a homebuilding company, engaged in selling and building new homes designed primarily for first-time, move-up and active adult homebuyers, including attached and detached single-family residential homes.
Omega Energia S.A.	Americas	Pedro Manfredini	Independent Power and Renewable Electricity Producers	\$1	Buy	-7%	53%	85%	Omega Energia SA operates as a renewable energy company. The company develops and operates wind, hydro and solar plants. Omega Energia serves customers in Brazil.
Daikin Industries	Asia Pacific	Yuichiro Isayama	Building Products	\$47	Buy	15%	68%	87%	Daikin Industrial Ltd. is a Japan-based company principally engaged in the manufacture and sale of air conditioners, refrigerators and chemical products.
Fanuc	Asia Pacific	Yuichiro Isayama	Machinery	\$29	Buy*	15%	97%	90%	Fanuc is a Japan-based manufacturing company mainly engaged in the provision of factory automation (FA) machinery.
Keyence	Asia Pacific	Yuichiro Isayama	Electronic Equipment Instruments & Components	\$87	Buy*	30%	53%	92%	Keyence Corporation is a Japan-based manufacturing company mainly engaged in the development, manufacture and sale of automatic controlling equipment.
Rexel S.A.	Europe	Daniela Costa	Trading Companies & Distributors	\$5	Buy	20%	52%	92%	Rexel SA is a France-based company that is engaged in the distribution of electrical parts and supplies to professionals, for buildings and for residential, industrial, and tertiary infrastructures.

\*Denotes stock is on the respective region's Conviction List

Source: Morningstar, Thomson Reuters, UN Sustainable Development Goals, Goldman Sachs Global Investment Research

### Exhibit 15: We highlight select Buy-rated stocks that screen as Green Revenue Beneficiaries, sorted by lowest to highest weighting in ESG funds (cont.)

Based on revenue exposure (>25%-30%) to Net Zero, Clean Water, and Infrastructure and above-average regional or global sector CROCI; excludes companies with bottom quintile scores in the GS SUSTAIN E&S framework

Company	Region	Primary Analyst	GICS 3	Market Cap (\$bn)	GS Coverage		GS SUSTAIN Coverage		Description
					Rating	CROCI, 2022E	Oper. E&S Score, %ile	% underweight/overweight in ESG funds	
TE Connectivity Ltd.	Americas	Mark Delaney, CFA	Electronic Equipment Instruments & Components	\$37	Buy	14%	57%	97%	TE Connectivity Ltd. is a technology company that designs and manufactures connectivity and sensors solutions in Transportation Solutions, Industrial Solutions and Communications Solutions.
Sika	Europe	Pierre de Fraguier	Chemicals	\$32	Buy	22%	94%	99%	Sika AG is a Switzerland-based company active in the chemicals industry. The Company produces products primarily for the construction, automobiles and auto parts, renewable energy, and components industries.
ABB Ltd.	Europe	Daniela Costa	Electrical Equipment	\$50	Buy*	10%	98%	109%	Abb Ltd is a holding company. The Company's segments include Electrification Products, Robotics and Motion, Industrial Automation, Power Grids, and Corporate and Other.
Dassault Systemes	Europe	Mohammed Moawalla	Software	\$46	Buy	16%	66%	116%	Dassault Systemes SE is a France-based software company, levered to Manufacturing Industries, Life Sciences, Infrastructure & Cities.
Deere & Co.	Americas	Jerry Revich, CFA	Machinery	\$101	Buy	22%	47%	135%	Deere & Company is engaged in equipment operations, comprising: agriculture and turf, construction and forestry, and others.
MasTec Inc.	Americas	Neil Mehta	Construction & Engineering	\$6	Buy	9%	28%	146%	MasTec, Inc. is an infrastructure construction company. The Company operates through five segments: Communications, Clean Energy and Infrastructure, Oil and Gas, Electrical Transmission, and Other.
Tongwei	Asia Pacific	Chao Ji	Food Products	\$31	Buy	55%	29%	221%	Tongwei Co., Ltd is a China-based company principally engaged in the production of feedstuffs and in the research and development, manufacture and distribution of polysilicon and solar cells.
Kingspan	Europe	Pierre de Fraguier	Building Products	\$9	Buy	17%	98%	237%	Kingspan Group Public Limited Company is an Ireland-based company that provides insulation and building envelope solutions.
SSAB	Europe	Nina Dergunova	Metals & Mining	\$4	Buy	18%	85%	251%	SSAB AB is a Sweden-based company active within the steel industry. The Company is engaged in the development, manufacture and marketing of high strength steel products and solutions.
Yaskawa Electric	Asia Pacific	Yuichiro Isayama	Machinery	\$8	Buy	17%	53%	268%	Yaskawa Electric Corporation is a Japan-based company mainly engaged in the manufacture, sale, installation, maintenance and engineering of electrical equipment.
Atlas Copco	Europe	Daniela Costa	Machinery	\$43	Buy*	25%	97%	280%	Atlas Copco AB is a Sweden-based industrial company and offers customers compressors, air treatment systems, vacuum solutions, industrial power tools.
Schnitzer Steel Industries	Americas	Emily Chieng, CFA	Metals & Mining	\$1	Buy	15%	83%	311%	Schnitzer Steel Industries, Inc. is a recycler of ferrous and nonferrous scrap metal, including end-of-life vehicles, and a manufacturer of finished steel products.
Daifuku Co.	Asia Pacific	Yuichiro Isayama	Machinery	\$6	Buy	17%	100%	374%	Daifuku Co., Ltd. is a Japan-based company engaged in the manufacture and sale of material handling systems and equipment, as well as vehicle washers.
Mitsumi Group	Asia Pacific	Yuichiro Isayama	Machinery	\$6	Buy	25%	75%	392%	Mitsumi Group Inc. is a Japan-based company mainly engaged in the factory automation (FA) business, the mold parts business, and the parts and consumables (MRO) business.
Essential Utilities Inc.	Americas	Insoo Kim, CFA	Water Utilities	\$10	Buy	7%	55%	418%	Essential Utilities, Inc. is the holding company for regulated utilities providing water, wastewater, or natural gas services concentrated in Pennsylvania, Ohio, Texas, Illinois, North Carolina, New Jersey, Indiana, and others.
Aptiv Plc	Americas	Mark Delaney, CFA	Auto Components	\$23	Buy	14%	100%	508%	Aptiv PLC is a global technology company serving the automotive sector levered to vehicle components, and provides electrical and electronic and active safety technology solutions.
Nexans	Europe	Daniela Costa	Electrical Equipment	\$4	Buy	9%	53%	526%	Nexans SA is a France-based company engaged in the cable industry. It provides copper and fiber-optic cables and cabling systems to the energy infrastructure, telecom and data, building and Local Area Network (LAN) markets.
Ming Yang Smart Energy Group Ltd	Asia Pacific	Chao Ji	Electrical Equipment	\$9	Buy	53%	86%	551%	Ming Yang Smart Energy is a China-based company which provides high-end equipment manufacturing, which includes large-scale wind turbine and its core components research and development, production, sales.
Nari Tech Co.	Asia Pacific	Chao Ji	Electrical Equipment	\$23	Buy	35%	97%	552%	Nari Technology Co., Ltd. is a China-based company principally engaged in the development, production and sales of hardware and software products related to the power industry.
Vestas Wind Systems A/S	Europe	Ajay Patel	Electrical Equipment	\$20	Buy	6%	78%	583%	Vestas Wind Systems A/S is a Denmark-based company active within the wind power industry. The Company operates through two segments, Project and Service.
Riyue Heavy Industry Co.	Asia Pacific	Chao Ji	Machinery	\$3	Buy*	12%	26%	608%	Riyue Heavy Industry Co., Ltd. is a China-based company mainly engaged in production of large-scale heavy equipment casting, levered to wind energy.
Array Technologies Inc.	Americas	Brian Lee, CFA	Electrical Equipment	\$3	Buy	12%	30%	713%	Array Technologies, Inc. is a manufacturer of ground-mounting tracking systems used in solar energy projects.
Pentair Plc	Americas	Brian Lee, CFA	Machinery	\$7	Buy	12%	50%	1419%	Pentair plc is a diversified industrial manufacturing company. The Company is engaged in Water Quality Systems business and Flow and Filtration Solutions business.
Hongfa Technology	Asia Pacific	Jacqueline Du	Electrical Equipment	\$5	Buy	18%	27%	1778%	Hongfa Technology Co., Ltd. is a China-based company principally engaged in the research, manufacture and sale of relays. In addition to the main product of relays, the Company also provides low-voltage electrical devices.
Evoqua Water Technologies Corp.	Americas	Brian Lee, CFA	Machinery	\$4	Buy	14%	24%	1855%	Evoqua Water Technologies Corp. is a provider of water and wastewater treatment solutions, offering a portfolio of products, services, and expertise to support industrial, municipal, and recreational markets.
Sungrow Power Supply Co.	Asia Pacific	Chao Ji	Electrical Equipment	\$25	Buy*	49%	95%	2394%	Sungrow Power Supply Co., Ltd. is a China-based company principally engaged in the research, development and manufacture of photovoltaic inverters, as well as power station system integration businesses.
Lead Intelligent	Asia Pacific	Jacqueline Du	Machinery	\$11	Buy	73%	41%	9770%	Wuxi Lead Intelligent Equipment Co., Ltd. is a China-based company principally engaged in the research and development, design, production and sales of automation equipment.

\*Denotes stock is on the respective region's Conviction List

Source: Morningstar, Thomson Reuters, UN Sustainable Development Goals, Goldman Sachs Global Investment Research

## High and/or Rising Reinvestors

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**We continue to believe investors will reward High and/or Rising Reinvestors, i.e., those companies that are reinvesting capital on path to Net Zero, Clean Water and Infrastructure goals.** Greater focus on Green Capex initiatives and the need to step up investments vs. historical average, in our view, could catalyze more investors to reward companies that are investing incremental capital towards Green projects, subject to attractive corporate returns over the medium term. As disclosure improves, companies in the Green Capex supply chain that are shifting weightings in their capex/revenue mix towards sustainable use cases will become clearer, potentially opening room for greater appreciation in ESG funds (see our [ESG of the Future report](#) for more details). At the same time, we believe there could be greater willingness by investors to reward companies that not only are increasing their overall reinvestment rate of cash flow to capex and R&D for projects aligned with Net Zero, Clean Water and/or Infrastructure goals, but that are also maintaining an attractive profile in corporate returns. As outlined in our [June 2022 Green Capex report](#), we believe corporate returns could be one of the lenses investors look at companies particularly in times of heightened market volatility.

### **Our Methodology**

Our Rising Re-investors screen reflects four criteria: (1) Revenue alignment/eligibility of at least 25%/30% with Sustainable Development Goals related to Net Zero, Clean Water and Infrastructure (Clean Water & Sanitation, Affordable & Clean Energy, Infrastructure & Sustainable Industrialization, and Sustainable Cities & Communities) based on our UN SDG Alignment tool; (2) reinvestment rate of operating cash flow into capex + R&D rising by at least 5 p.p. in 2022E/2023E vs. 2019; (3) CROCI above global sector or regional sector average; and (4) that the company is not rated in the bottom quintile of our Operational E&S Headline percentile score.

Our High Re-investors screen reflects four criteria: (1) Revenue alignment/eligibility of at least 25%/30% with Sustainable Development Goals related to Net Zero, Clean Water and Infrastructure (Clean Water & Sanitation, Affordable & Clean Energy, Infrastructure & Sustainable Industrialization, and Sustainable Cities & Communities) based on our UN SDG Alignment tool; (2) reinvestment rate of cash flow into capex + R&D that is at least 1.4x sector average or 1.4x global corporate average and above sector average in 2022E/2023E; (3) CROCI that exceeds global sector or regional sector average; and (4) that the company is not rated in the bottom quintile of our Operational E&S Headline percentile score.

We highlight select High, Rising and High-and-Rising Reinvestors where our analysts have a Buy rating.

**Exhibit 16: We highlight select Buy-rated stocks that screen as Rising Reinvestors, sorted by lowest to highest weighting in ESG funds**  
 ree Beneficiaries with 2022E/2023E reinvestment rate of operating cash flows into capex+R&D that exceeds 2019 by 500 or more basis points

Company	Region	Primary Analyst	GICS 3	Market Cap (\$bn)	GS Coverage			GS SUSTAIN Coverage		Description
					Rating	CROCI, 2022E	Reinvestment rate, '22E	Oper. E&S Score, %ile	% underweight/ overweight in ESG funds	
Zaisheng Technology	Asia Pacific	Nick Zheng, CFA	Chemicals	\$1	Buy	13%	67%	49%	-99%	Chongqing Zaisheng Technology Co., Ltd. is a China-based company primarily engaged in the research, development, manufacture and sales of microfiber glass wool products and related equipment.
OPT Machine Vision Tech Co.	Asia Pacific	Jacqueline Du	Electronic Equipment Instruments & Components	\$3	Buy	17%	117%	53%	-96%	OPT Machine Vision Tech Co Ltd is a China-based company mainly engaged in research, development, production and sales of software and hardware products of machine vision.
Li Auto Inc.	Asia Pacific	Fei Fang	Automobiles	\$26	Buy*	11%	87%	73%	-51%	Li Auto Inc is a China-based new energy passenger vehicles (NEV) automaker principally engaged in the design, develop, manufacture and sales of smart electric vehicles.
Edison International	Americas	Michael Lapides	Electric Utilities	\$25	Buy	9%	125%	68%	-36%	Edison International is the holding company of Southern California Edison Company (SCE), primarily engaged in the business of supplying electricity to an approximately 50,000 square mile area of southern California.
Magna International Inc.	Americas	Mark Delaney, CFA	Auto Components	\$14	Buy	12%	68%	25%	1%	Magna International Inc. is a Canada-based mobility technology company. The Company's segments include Body Exteriors & Structures, Power & Vision, Seating Systems and Complete Vehicles.
Midea Group	Asia Pacific	Nicolas Yi	Household Durables	\$50	Buy*	54%	34%	82%	12%	Midea Group Co., Ltd. is a China-based company principally engaged in the manufacture and distribution of household electronics.
SMC	Asia Pacific	Yuichiro Isayama	Machinery	\$29	Buy	23%	34%	85%	29%	SMC Corp is a Japan-based company engaged in the manufacture and sale of automatic control equipment business, and other indispensable elemental equipment for factory automation (FA).
Iberdrola SA	Europe	Alberto Gandolfi	Electric Utilities	\$64	Buy	5%	118%	68%	32%	Iberdrola, S.A. is engaged in carrying out electricity and gas activities in Spain and abroad. The Company's segments include Network business, Deregulated business, Renewable business and Other businesses.
Infrastruttura Wireless SpA	Europe	Andrew Lee	Diversified Telecommunication Services	\$9	Buy	38%	55%	93%	62%	Infrastruttura Wireless Italiane SpA is an Italy-based company. It works in the field of passive infrastructure for mobile phone technology, broadcasting, radio, other wireless services and private mobile networks.
Enel SpA	Europe	Alberto Gandolfi	Electric Utilities	\$46	Buy*	5%	95%	87%	81%	Enel SpA is an Italy-based multinational power company and an integrated operator in the global power, gas and renewables markets. Enel distributes electricity to 74 million users globally.
Delta Electronics	Asia Pacific	James Wang	Electronic Equipment Instruments & Components	\$21	Buy	16%	75%	99%	167%	Delta Electronics Inc is a Taiwan-based company engaged in the manufacture and sales of power supplies and components under Power Supply and Components, Automation, and Infrastructure.
Nidec	Asia Pacific	Daiki Takayama	Electrical Equipment	\$36	Buy	16%	61%	71%	176%	Nidec Corporation is engaged in the manufacture and sale of precision small motors, optical components, electric motors and related components and equipment.
Universal Display Corp.	Americas	Brian Lee, CFA	Semiconductors & Semiconductor Equipment	\$5	Buy	22%	50%	59%	219%	Universal Display Corporation is engaged in the research, development and commercialization of organic light emitting diode (OLED), technologies and materials for use in display and solid-state lighting applications.
West Holdings	Asia Pacific	Takashi Miyazaki	Independent Power and Renewable Electricity Producers	\$1	Buy	13%	880%	53%	746%	West Holdings Corp is a Japan-based company mainly engaged in the design, construction, sales, operation and maintenance (O&M) of public and industrial photovoltaic power generation systems.
Shenzhen Inovance Technology	Asia Pacific	Jacqueline Du	Machinery	\$21	Buy*	36%	80%	21%	3674%	Shenzhen Inovance Technology Co., Ltd is a China-based company principally engaged in the research, development, manufacture and distribution of industrial automatic control products and new energy related products.

\*Denotes stock is on the respective region's Conviction List

Source: Morningstar, Thomson Reuters, UN Sustainable Development Goals, Goldman Sachs Global Investment Research

**Exhibit 17: We highlight select Buy-rated stocks that screen as High Reinvestors, sorted by lowest to highest weighting in ESG funds**

Green Beneficiaries with 2022E/2023E reinvestment rate of cash flows into capex + R&D at least 1.4x sector average or 1.4x global corporate average and above sector average

Company	Region	Primary Analyst	GICS 3	Market Cap (\$bn)	GS Coverage			GS SUSTAIN Coverage		Description
					Rating	CROCI, 2022E	Reinvestment rate, '22E	Oper. E&S Score, %ile	% underweight/overweight in ESG funds	
Kehua Data Co.	Asia Pacific	Tina Hou	Electrical Equipment	\$3	Buy	14%	78%	38%	-100%	Kehua Data Co Ltd is a China-based company principally engaged in the design, manufacture, distribution and provision of services of uninterruptible power systems (UPS) and accessory products.
Freeport-McMoRan Inc.	Americas	Emily Chieng, CFA	Metals & Mining	\$38	Buy*	13%	86%	54%	-85%	Freeport-McMoRan Inc. (FCX) is a mining company. The Company operates through geographical assets with proven and probable reserves of copper, gold and molybdenum, and traded copper producer.
Luoyang Xinqianglian Slewing Bearing Co Ltd	Asia Pacific	Chao Ji	Machinery	\$4	Buy	24%	81%	31%	-22%	Luoyang Xinqianglian Slewing Bearing is a China-based company mainly engaged in research, development, production and sales of large-scale slewing bearings and industrial forgings.
SSE Plc	Europe	Ajay Patel	Electric Utilities	\$20	Buy	7%	146%	97%	46%	SSE PLC is engaged in the generation, transmission, distribution and supply of electricity, in the production, storage, distribution and supply of gas and in other energy services.
LG Chem	Asia Pacific	Nikhil Bhandari	Chemicals	\$28	Buy*	11%	157%	47%	178%	LG Chem Ltd is a Korea-based company principally engaged in the manufacture of petrochemical and battery materials.
Flat Glass Group	Asia Pacific	Chao Ji	Semiconductors & Semiconductor Equipment	\$10	Buy	30%	141%	46%	292%	Flat Glass Group CO., LTD. is a China-based company principally involved in the research, development, manufacturing and sales of solar and traditional glass products.
Orsted A/S	Europe	Alberto Gandolfi	Electric Utilities	\$37	Buy	11%	152%	95%	582%	Orsted A/S, formerly Dong Energy A/S, is a Denmark-based energy company engaged in procuring, producing, distributing and trading energy and related products in Northwestern Europe.
Yunnan Energy	Asia Pacific	Chao Ji	Chemicals	\$23	Buy	28%	161%	74%	1724%	Yunnan Energy New Material Co Ltd is a China-based supplier of film products, packaging and printing products, as well as paper packaging products.
GEM Co.	Asia Pacific	Joy Zhang	Metals & Mining	\$6	Buy	14%	135%	92%	2605%	GEM Co Ltd is a China-based company mainly engaged in the recycling of waste cobalt, nickel, tungsten, copper resources and electronic waste.

\*Denotes stock is on the respective region's Conviction List

Source: Morningstar, Thomson Reuters, UN Sustainable Development Goals, Goldman Sachs Global Investment Research

**Exhibit 18: We highlight select Buy-rated stocks that screen as both High and Rising Reinvestors, sorted by lowest to highest weighting in ESG funds**

Green Beneficiaries with: (a) reinvestment rate of operating cash flows into capex + R&D at least 1.4x sector average or 1.4x global corporate average and above sector average, in 2022E/2023E; and (b) 2022E/2023E reinvestment rate that exceeds 2019 by 500 or more basis points;

Company	Region	Primary Analyst	GICS 3	Market Cap (\$bn)	GS Coverage			GS SUSTAIN Coverage		Description
					Rating	CROCI, 2022E	Reinvestment rate, '22E	Oper. E&S Score, %ile	% underweight/overweight in ESG funds	
CMS Energy Corp.	Americas	Insoo Kim, CFA	Multi-Utilities	\$19	Buy	8%	132%	24%	-66%	CMS Energy Corporation is an energy company operating primarily in Michigan, engaged in independent power production, including the development and operation of renewables.
Anglo American Plc	Europe	Geydar Mamedov	Metals & Mining	\$39	Buy	11%	77%	79%	-20%	Anglo American PLC is a UK-based mining company. The Company has a portfolio of mining operations focused on diamonds, copper, platinum group metals (PGMs), iron ore, and others.
Denso	Asia Pacific	Kota Yuzawa	Auto Components	\$38	Buy*	8%	96%	95%	25%	Denso Corporation is a supplier of automotive components, which manufactures and sells exhaust sensor, ignition coils, starters, alternators, lithium-ion battery packs, and others.
Ningbo Orient Wires & Cables Co Ltd	Asia Pacific	Chao Ji	Electrical Equipment	\$7	Buy	37%	83%	63%	266%	NINGBO ORIENT WIRES & CABLES CO.,LTD. is a China-based company principally engaged in the research, development, production and sale of various wires and cables.
Ganfeng Lithium	Asia Pacific	Trina Chen	Metals & Mining	\$21	Buy	82%	70%	94%	299%	Ganfeng Lithium is a China-based company principally engaged in the research, development, production and sales of deeply processed lithium products.
Huayou Cobalt	Asia Pacific	Joy Zhang	Metals & Mining	\$16	Buy	25%	324%	81%	1519%	Zhejiang Huayou Cobalt Co Ltd is a China-based company mainly engaged in the research, development and manufacturing of new energy lithium battery materials and cobalt new material products.
Shenzhen Envicool Technology	Asia Pacific	Tina Hou	Machinery	\$2	Buy*	15%	133%	38%	NA	Shenzhen Envicool Technology Ltd is a China-based company principally engaged in the research, development, manufacture and distribution of precision temperature control energy saving equipment.

\*Denotes stock is on the respective region's Conviction List

Source: Morningstar, Thomson Reuters, UN Sustainable Development Goals, Goldman Sachs Global Investment Research

# Greenablers in four sectors: Copper/Aluminum, Electricity Transmission, Semiconductors and Cybersecurity

**We believe investors will reward Greenablers, i.e., companies in those sectors where near-term investments are needed to help drive customer execution towards Decarbonization/Clean Water/Infrastructure goals and help alleviate future supply-chain bottlenecks.** In general, we view these sectors as less appreciated by ESG investors, based on our ownership analysis. In the framework of investors potentially looking beyond Solar/Wind/Water stocks and further upstream in the Green Capex supply chain, we believe Greenabler sectors could receive higher priority, on the back of the need for more urgent and timely investments to avoid supply chain bottlenecks downstream due to longer project lead-times. In particular, among those sectors, we believe investors could favor companies able to maintain attractiveness in corporate returns. As outlined in our [October 2021 Green Capex report](#), while not exclusive, we identify four key Greenabler sectors: **Copper/Aluminum, Electricity Transmission, Semiconductors** and **Cybersecurity**. These sectors are critical or — at a minimum — strongly needed for the vast majority of the Green Capex mosaic’s verticals.

## Our Methodology

Our Greenablers screen reflects three criteria: (1) revenue alignment with the specific Greenabler sector (we focus on the four Greenablers we initially identify: Copper/Aluminum, Electricity Transmission, Semiconductors and Cybersecurity); (2) CROCI in 2022E/2023E higher than 5% (a lower corporate returns threshold vs. our other themes to reflect the potential for upward earnings revisions from Green demand going forward) — ex. Utilities for which CROCI needs to be above sector average; and (3) not be rated in the bottom quintile of our E&S Headline percentile score.

We highlight select stocks in Greenablers sectors where our analysts have a Buy rating.

**Exhibit 19: Greenablers in Copper and Aluminum: Buy-rated stocks from our screen; sorted by lowest to highest weighting in ESG funds**  
Excludes companies with bottom quintile scores in the GS SUSTAIN E&S framework

Company	Region	Primary Analyst	GICS 3	Market Cap (\$bn)	GS Coverage		GS SUSTAIN Coverage		Description
					Rating	CROCI, 2022E	Oper. E&S Score, %ile	% underweight/overweight in ESG funds	
Zijin Mining	Asia Pacific	Joy Zhang	Metals & Mining	\$28	Buy*	9%	73%	-92%	Zijin Mining Group Company Ltd is a China-based company engaged in the exploration, mining, smelting and sales of metals. Its main products include gold, copper, lead and zinc, iron, silver, among others.
Freeport-McMoRan Inc.	Americas	Emily Chieng, CFA	Metals & Mining	\$41	Buy*	13%	54%	-85%	Freeport-McMoRan Inc. (FCX) is a mining company. The Company operates through geographical assets with proven and probable reserves of copper, gold and molybdenum, and traded copper producer.
China Hongqiao Group	Asia Pacific	Joy Zhang	Metals & Mining	\$7	Buy	26%	20%	-62%	China Hongqiao Group Limited is a China-based investment holding company principally engaged in the manufacturing and sales of aluminum products.
Anglo American Plc	Europe	Geydar Mamedov	Metals & Mining	\$41	Buy	11%	79%	-20%	Anglo American PLC is a UK-based mining company. The Company has a portfolio of mining operations focused on diamonds, copper, platinum group metals (PGMs), iron ore, and others.
Constellium	Americas	Emily Chieng, CFA	Metals & Mining	\$2	Buy	16%	26%	106%	Constellium SE (France) is a France-based semi-fabricated and fabricated aluminum producer, with exposures to the packaging, aerospace, and automotive end markets across North America, Europe and Asia.

\*Denotes stock is on the respective region's Conviction List

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

**Exhibit 20: Electricity transmission Greenablers: Buy-rated stocks from our screen; sorted by lowest to highest weighting in ESG funds**

Excludes companies with bottom quintile scores in the GS SUSTAIN E&amp;S framework

Company	Region	Primary Analyst	GICS 3	Market Cap (\$bn)	GS Coverage		GS SUSTAIN Coverage		Description
					Rating	CROCI, 2022E	Oper. E&S Score, %ile	% underweight/overweight in ESG funds	
FirstEnergy Corp.	Americas	Michael Lapides	Electric Utilities	\$21	Buy	7%	35%	-77%	FirstEnergy Corp is principally involved in the transmission, distribution, and generation of electricity, serving six million customers within Ohio, Pennsylvania, West Virginia, Maryland, New Jersey, and New York.
Sempra Energy	Americas	Michael Lapides	Multi-Utilities	\$46	Buy	7%	73%	-33%	Sempra Energy provides electric and gas services to customers through regulated public utilities (San Diego Gas & Electric Company (SDG&E), Southern California Gas Company (SoCalGas), and others).
Public Service Enterprise Group	Americas	Michael Lapides	Multi-Utilities	\$28	Buy	6%	86%	-28%	Public Service Enterprise Group Incorporated (PSEG) is an energy company with operations located primarily in the Northeastern and Mid-Atlantic United States.
Iberdrola SA	Europe	Alberto Gandolfi	Electric Utilities	\$60	Buy	5%	68%	32%	Iberdrola, S.A. is engaged in carrying out electricity and gas activities in Spain and abroad. The Company's segments include Network business, Deregulated business, Renewable business and Other businesses.
SSE Plc	Europe	Ajay Patel	Electric Utilities	\$18	Buy	7%	97%	46%	SSE PLC is engaged in the generation, transmission, distribution and supply of electricity, in the production, storage, distribution and supply of gas and in other energy services.
Enel SpA	Europe	Alberto Gandolfi	Electric Utilities	\$41	Buy*	5%	87%	81%	Enel SpA is an Italy-based multinational power company and an integrated operator in the global power, gas and renewables markets. Enel distributes electricity to 74 million users globally.

\*Denotes stock is on the respective region's Conviction List

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

**Exhibit 21: Greenablers in Semiconductors: Buy-rated stocks from our screen; sorted by lowest to highest weighting in ESG funds**

Excludes companies with bottom quintile scores in the GS SUSTAIN E&amp;S framework

Company	Region	Primary Analyst	GICS 3	Market Cap (\$bn)	GS Coverage		GS SUSTAIN Coverage		Description
					Rating	CROCI, 2022E	Oper. E&S Score, %ile	% underweight/overweight in ESG funds	
Advanced Micro Devices Inc.	Americas	Toshiya Hari	Semiconductors & Semis Equip.	\$110	Buy	75%	99%	-35%	Advanced Micro Devices, Inc. is a global semiconductor company. The Company's products include x86 CPUs, APUs, GPUs, SOC, products and chipsets for the personal computer (PC), gaming, datacenter and markets.
United Microelectronics Corp.	Asia Pacific	Bruce Lu	Semiconductors & Semis Equip.	\$14	Buy	12%	73%	-15%	United Microelectronics Corp is a global semiconductor foundry. The Company provides integrated circuit (IC) production for applications spanning across the electronics industry.
Analog Devices Inc.	Americas	Toshiya Hari	Semiconductors & Semis Equip.	\$73	Buy	35%	85%	34%	Analog Devices, Inc. is a semiconductor company that designs, manufactures and markets solutions including integrated circuits (ICs), software and subsystems that leverage analog, mixed-signal and digital signal processing.
TSMC	Asia Pacific	Bruce Lu	Semiconductors & Semis Equip.	\$364	Buy	25%	85%	45%	TSMC is a Taiwan-based company mainly engaged in the provision of integrated circuit manufacturing services. The integrated circuit manufacturing services include process technology, special process technology and others.
ASM International NV	Europe	Alexander Duval	Semiconductors & Semiconductor Equipment	\$11	Buy	33%	72%	50%	ASM International is a supplier of wafer processing equipment, primarily for semiconductor manufacturing industry. The Company designs, manufactures and sells equipment for the production of semiconductor devices.
ASML Holding	Europe	Alexander Duval	Semiconductors & Semis Equip.	\$177	Buy*	58%	100%	57%	ASML Holding N.V. is a manufacturer of chip-making equipment, engaged in the development, production, marketing, selling and servicing of semiconductor equipment systems, consisting of lithography systems.
Lam Research Corp.	Americas	Toshiya Hari	Semiconductors & Semis Equip.	\$52	Buy	47%	85%	77%	Lam Research Corporation is a supplier of wafer fabrication equipment and services, that designs, manufactures, markets, refurbishes and services semiconductor processing equipment.
MediaTek	Asia Pacific	Bruce Lu	Semiconductors & Semiconductor Equipment	\$29	Buy	52%	95%	118%	MediaTek Inc is principally engaged in the research, development, manufacture and distribution of multimedia integrated circuit (IC) chipsets.
Rohm	Asia Pacific	Daiki Takayama	Semiconductors & Semis Equip.	\$7	Buy*	9%	50%	121%	Rohm Co Ltd is a Japan-based company engaged in the manufacture and sale of electronic components in 3 segments: the Large-Scale Integration (LSI), the Semiconductor Devices, and the Modules segment.
Applied Materials Inc.	Americas	Toshiya Hari	Semiconductors & Semis Equip.	\$73	Buy	38%	95%	150%	Applied Materials, Inc. provides manufacturing equipment, services and software to the global semiconductor, display and related industries. Its segments are Semiconductor Systems, Applied Global Services, and Displays.
Universal Display Corp.	Americas	Brian Lee, CFA	Semiconductors & Semis Equip.	\$5	Buy	22%	60%	219%	Universal Display Corporation is engaged in the research, development and commercialization of organic light emitting diode (OLED), technologies and materials for use in display and solid-state lighting applications.
Enphase Energy Inc.	Americas	Brian Lee, CFA	Semiconductors & Semis Equip.	\$38	Buy	131%	67%	327%	Enphase Energy, Inc. is an energy technology company. The Company designs, develops, manufactures, and sells inverters and home energy solutions that manages energy generation, energy storage and control.
Infineon	Europe	Alexander Duval	Semiconductors & Semiconductor Equipment	\$31	Buy	12%	22%	366%	Infineon Technologies AG is a Germany-based designer and manufacturer of semiconductors and related system solutions, and operates in Automotive, Industrial Power Control, Power Management and Security.
LONGi Green Energy Technology Co.	Asia Pacific	Chao Ji	Semiconductors & Semis Equip.	\$52	Buy*	55%	27%	567%	Longi Green Energy Technology Co., Ltd. is a China-based company mainly engaged in the research and development, manufacture and distribution of mono crystalline silicon products.
SolarEdge Technologies Inc.	Americas	Brian Lee, CFA	Semiconductors & Semis Equip.	\$14	Buy*	16%	43%	1227%	SolarEdge Technologies, Inc. offers an inverter solution for a solar photovoltaic (PV) system.

\*Denotes stock is on the respective region's Conviction List

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



**Exhibit 22: Cybersecurity Greenablers: Buy-rated stocks from our screen; sorted by lowest to highest weighting in ESG funds**

Excludes companies with bottom quintile scores in the GS SUSTAIN E&S framework

Company	Region	Primary Analyst	GICS 3	Market Cap (\$bn)	GS Coverage		GS SUSTAIN Coverage		Description
					Rating	GROCI, 2022E	Oper. E&S Score, %ile	% underweight/overweight in ESG funds	
Datadog Inc.	Americas	Kash Rangan	Software	\$26	Buy*	21%	22%	-34%	Datadog, Inc. operates a monitoring and security platform for cloud applications. Its SaaS platform integrates and automates infrastructure monitoring, application performance monitoring and log management.
Sangfor	Asia Pacific	Allen Chang	Software	\$6	Buy	7%	26%	441%	Sangfor Technologies Inc. is a China-based company engaged in software and information technology businesses, with Security services, VPNs, firewalls, and cloud security.

\*Denotes stock is on the respective region's Conviction List

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

## Publicly traded corporate reinvestment rate higher on lower expected cash flow, slightly lower projected capex

### **Consensus expectations for overall capex + R&D modestly decreasing through 2024E, as well as across Green Capex sectors, vs. our prior estimates in June.**

Consensus estimates currently call for annual growth in capex + R&D in 2021-24 of 4.5% vs. 5.3% previously for key sectors relevant for Green Capex. Since [our latest update in June](#) this year, we have seen overall consensus estimates for yoy capex + R&D growth decline almost 3 percentage points for 2022E and remain relatively flat for 2023. Expectations now call for 8% yoy growth in 2022 and 3% in 2023 (vs. about 11%/3% previously) — see [Exhibit 23](#).

Among sectors most aligned with the Green Capex mosaic, we note consensus expectations for 2022E Capex + R&D YoY growth have been revised downwards. FactSet consensus capex + R&D estimates among Utilities and Clean Energy are expected to accelerate vs. our prior report and grow 8.2% in 2022E (vs. 7.7% prior). However, this is more than offset by other Green Capex sectors, which are projected to see 2022E Capex + R&D increasing by 6.6% (vs. 10.7% prior).

**We continue to assume Green mix shift consistent with our forward-looking analyst estimates, indicating a 1.5% Green Capex mix shift through 2025E.** Solely applying overall capex + R&D growth does not factor in mix shift towards Green Capex, an important driver of Green Capex, in our view. As we detailed in [our Nov. 2021 report outlining Green Revenue/Green Capex forecasts](#), our forward-looking estimates for Green Revenue and Green Capex mix by analysts across 19 sectors implies a 1.3% increase, annually, in weighting in Capex towards sustainable use cases through 2025E. Given potential for further upside, in our scenario analysis we round this to 1.5% and apply the mix shift to capex and R&D across all sectors.

**We maintain our expectation for incremental annual Green Capex on track this decade from publicly traded companies to \$0.6 tn.** As detailed in [Exhibit 24](#), we incorporate overall capex + R&D YoY growth expectations in 2022-23 and a 3.5% longer term (unchanged vs. our prior report), combined with a 1.5% per year Green mix shift (unchanged vs. our prior report). The 3.5% long-term CAGR is larger than what consensus estimates expect for yoy growth in 2023 and 2024 — about 3% in both years — but reflects our expectation that consensus expectations could potentially see upside via greater clarity on avenues for corporates to reinvest cash flow and given trends we see in opportunities/needs for investment. Our analysis still implies \$0.6 trillion in higher annual Green Capex on track this decade, on average — when applied across the >7,000 companies in our GS SUSTAIN database.

**We continue to see \$0.3 trillion annually on track from private capital raised for Green Capex-related objectives, on average this decade.** We reiterate our expectations for incremental Green Capex on track this decade from privately held companies of \$0.3 trillion. Our analysis encompasses private capital raised in Renewable Energy, Clean Tech, Environmental Services, Utilities, Water fund. A scenario where

private equity capital raised grows at a 20% CAGR — above the 12% historical CAGR of capital available to invest, and in-line with our Asset Management and Capital Markets teams' view of increasing share of ESG/Infrastructure capital — would imply incremental available capital from privately held companies of \$0.3 tn on average within 2021-2030 (unchanged vs. our prior report in June).

**Exhibit 23: Capex + R&D FactSet consensus expectations for 2022E have moved slightly lower since our last update published in June, more than offset by estimates for 2023E and 2024E accelerating vs. our prior report. As a result, the annual growth in 2021-24 from Green Capex sectors now expected to be 5.9% vs. 5.3% in June**

Overview of Capex + R&D YoY growth for Green Capex sectors (excluding Oil & Gas and Energy Equipment and Services), based on FactSet consensus; Total line includes all sectors (not just Green Capex sectors)

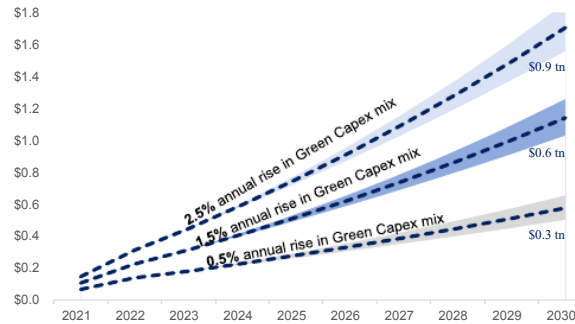
	Capex + R&D YoY Growth -- Weighted Average													
	2022E				2023E				2024E				2020-2024E CAGR	
	Current	vs. -6-mo	vs. -3-mo	vs. -1-mo	Current	vs. -6-mo	vs. -3-mo	vs. -1-mo	Current	vs. -6-mo	vs. -3-mo	vs. -1-mo	Current	-6-mo
Airport Services	17.4%	↑	↑	↓	-11.5%	↓	↓	↓	4.1%	↓	↓	↑	-0.7%	0.0%
Aluminum	22.0%	↑	↓	↓	5.8%	↓	↑	↓	0.4%	↓	↓	↑	-0.9%	-1.3%
Auto Parts & Equipment	8.0%	↓	↓	↓	5.4%	→	→	→	4.6%	↑	→	→	2.4%	-1.6%
Automobile Manufacturers	6.7%	↓	↓	↓	5.2%	→	→	→	3.1%	↑	→	→	4.5%	4.2%
Automotive Retail	12.2%	↓	↑	↑	-6.6%	↓	↓	↓	-0.4%	→	↑	→	8.3%	10.4%
Building Products	9.0%	↓	↓	↓	1.2%	↑	↑	↑	1.8%	↑	↑	↑	6.1%	6.4%
Construction & Engineering	-2.7%	↓	↓	↓	0.8%	↓	↓	→	3.4%	↑	↓	↓	0.3%	1.4%
Construction Machinery & Heavy Trucks	2.2%	↓	↓	↑	3.6%	→	→	↑	1.7%	↑	→	→	5.2%	4.5%
Construction Materials	-4.6%	↓	↓	↓	-3.7%	↓	↑	↑	-1.8%	↓	→	↑	6.3%	5.2%
Copper	42.6%	↓	↓	→	3.9%	↑	↑	→	-8.0%	↓	→	→	11.0%	7.6%
Diversified Metals & Mining	14.0%	↓	↓	→	5.5%	↑	↑	→	-4.3%	→	↑	→	7.7%	5.4%
Diversified Real Estate Activities	20.1%	↑	↑	→	-20.7%	↓	↓	↓	-4.4%	↓	↓	↓	-4.4%	0.1%
Electric Utilities	7.3%	↑	→	→	-0.4%	→	→	→	4.7%	↑	→	→	3.2%	3.3%
Electronic Components	2.2%	↓	↓	↓	-0.5%	↓	↑	↑	-3.1%	↑	↓	↓	1.5%	-2.7%
Electronic Equipment & Instruments	10.3%	↓	→	↓	6.4%	↓	→	→	4.1%	↑	↓	↓	9.7%	5.6%
Electronic Manufacturing Services	-3.2%	↓	↓	↓	6.1%	↓	↓	↑	4.8%	↑	↓	→	6.7%	1.6%
Heavy Electrical Equipment	7.1%	↑	↑	↑	3.3%	↑	↑	↓	3.0%	↓	↓	↑	3.6%	3.0%
Highways & Railtracks	-1.4%	↑	↑	↑	-6.3%	↓	↓	↓	4.7%	↓	↓	↑	-4.8%	-5.0%
Homebuilding	11.4%	↑	↑	→	0.5%	↑	↓	↓	-1.8%	↑	↓	↑	0.3%	0.2%
Household Appliances	-15.5%	↓	↓	→	13.8%	↑	↑	↑	5.5%	↑	→	↑	5.8%	-2.4%
Independent Power Producers & Energy Traders	26.2%	↓	↓	→	-1.4%	↑	↑	↓	1.0%	↓	↑	→	7.8%	6.1%
Industrial Conglomerates	-0.4%	↓	↓	↓	4.6%	↑	↑	↑	5.7%	↑	↑	↑	3.9%	1.9%
Industrial Machinery	17.0%	↑	↑	↓	-1.9%	↓	→	↑	-1.4%	↑	↓	↓	4.4%	4.1%
Integrated Telecommunication Services	-1.9%	↓	↓	→	-5.1%	→	→	→	-2.3%	↓	→	→	-0.8%	0.7%
Marine Ports & Services	19.0%	↑	→	→	-14.1%	↓	↑	↓	-4.4%	↓	↓	↓	7.1%	-4.2%
Multi-Utilities	-1.2%	↑	↓	↓	7.3%	→	→	→	-1.5%	→	↑	→	3.7%	4.3%
Railroads	10.4%	↑	↓	↓	7.9%	↑	↑	↑	0.7%	↑	↑	↓	0.6%	6.2%
Real Estate Operating Companies	-44.0%	↓	↓	↓	-23.3%	↑	↓	↓	2.1%	↑	↑	↑	-5.8%	-4.4%
Renewable Electricity	13.8%	↑	→	→	27.2%	↑	↑	↓	-7.1%	↓	↓	↑	10.3%	20.7%
Semiconductor Equipment	19.8%	→	→	↓	5.2%	→	→	↓	-0.7%	↑	↓	→	9.7%	8.9%
Semiconductors	20.5%	↓	↓	↓	-0.9%	↓	↓	→	5.1%	↑	→	→	12.6%	12.5%
Steel	9.6%	→	↓	↑	1.1%	↓	↓	→	-9.8%	→	→	→	4.1%	2.8%
Systems Software	18.0%	↑	↑	↑	9.2%	↑	↓	→	7.8%	↓	↑	↓	14.2%	14.3%
Trucking	57.0%	↑	↑	↑	16.2%	↑	↑	↑	10.7%	↑	↑	↑	25.3%	13.2%
Water Utilities	2.9%	↑	→	→	1.7%	↑	↓	↑	1.8%	↑	→	→	3.2%	0.8%
Wireless Telecommunication Services	1.9%	→	↓	↓	-4.6%	↓	↓	→	0.5%	↑	→	→	0.0%	0.6%
<b>Total</b>	<b>8.3%</b>	<b>↓</b>	<b>↓</b>	<b>↓</b>	<b>2.8%</b>	<b>→</b>	<b>→</b>	<b>→</b>	<b>2.7%</b>	<b>↑</b>	<b>→</b>	<b>→</b>	<b>5.9%</b>	<b>5.4%</b>
Green Capex sectors	6.9%	↓	↓	↓	1.0%	→	→	→	1.5%	↑	→	→	4.5%	4.4%
Utilities and Clean Energy	8.2%	→	→	→	2.7%	→	↑	→	1.9%	→	→	→	4.3%	4.9%
Other Green Capex sectors	6.6%	↓	↓	↓	0.6%	→	→	→	1.4%	↑	→	→	4.5%	4.3%

Arrows refer to revisions in consensus Capex + R&D yoy growth estimates, current estimates vs. 6/3/1-month old estimates. Green arrow: revision >1%. Yellow arrows: revisions between -1% and +1%. Red arrow: revision below -1%.

Source: FactSet, Goldman Sachs Global Investment Research

**Exhibit 24: We now see incremental Green Capex from publicly traded companies would be \$1.1 tn by 2030, with an annual average of \$0.6 tn in the 2020s — in a scenario where the percent weighting for publicly traded companies of Green investments across all sectors were to rise at a 1.5% annual pace and overall capex + R&D grows at a 3.5% CAGR (both unchanged vs. our prior report in June)**

Incremental Green Capex at different rates of mix shift and post-2023 Capex + R&D growth rates. Values in \$ tn



Bands are indicative of 2.5% / 3.5% / 4.5% range in post-2023 Capex + R&D growth rates

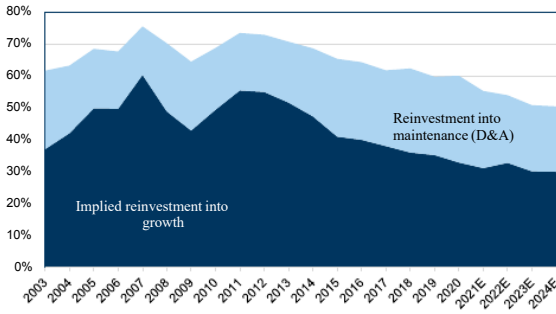
Source: Goldman Sachs Global Investment Research

**We see a modest pick-up in reinvestment rates of cash flows into capex + R&D in 2022E through 2024E vs. our prior [Green Capex: Greenflation, Returns and Opportunity report](#), though still falling vs. the historical average between 2000 and mid-2010s.** Current estimates indicate reinvestment rates of cash flows into capex + R&D have been revised modestly higher vs. [our prior update in June](#) for 2022E through 2024E — about 1 p.p. higher — but are still forecast on the decline vs. the historical average between 2000 and mid-2010s of 60%-70%. Please see [Exhibit 25](#) and [Exhibit 26](#) for more details. **While this might be incrementally positive for Green Capex initiatives, reinvestment rates into capex + R&D would still need to move considerably higher in order to bridge at least partially the gap needed to achieve the full incremental \$2.8 tn annual Green Capex needed in the 2020s on path to Sustainable Development Goals.**

**The uptick in reinvestment rates vs. our prior report in June does not likely equate to a higher contribution to Green Capex initiatives, as it is primarily the result of operating cash flows expectations declining at a faster pace than capex estimates.** Please see [Exhibit 27](#) for more details. The 1 p.p. increase in reinvestment rates in 2022E/2023E is driven by a 4%-5% decrease in operating cash flow expectations — for all sectors ex. Financials and Real Estate — in 2022E-2023E vs. our prior [Green Capex report in June](#). Capex expectations have also been revised downward, but at a slower pace — declining 2%-3% in 2022E-2023E for all sectors ex. Financials and Real Estate — thus resulting in higher reinvestment rates of cash flows into capex + R&D. In 2024E, current estimates call for a 1 p.p. increase in reinvestment rates, derived from a momentum shift in both capex and operating cash flows — with capex expected to accelerate at a faster pace.

**Exhibit 25: Reinvestment Rates of cash flows into Capex + R&D are expected to decline to near 50%-54% in 2022E-2024E vs. the historical average of 60%-70% between 2000 and mid-2010s**

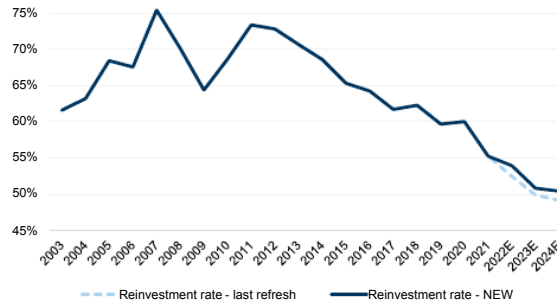
Weighted average reinvestment rate, (capex + R&D) / (operating cash flow + R&D), split by D&A and implied reinvestment into growth; excludes Financials and Real Estate



Source: FactSet, Refinitiv Eikon, Goldman Sachs Global Investment Research

**Exhibit 26: Consensus expectations for reinvestment rate of operating cash flow back to Capex + R&D has risen slightly since our June report by about 1-2 percentage points**

Consensus estimates for reinvestment rates of cash flows into Capex+R&D, 2003 - 2024E — excludes Financials and Real Estate



Source: FactSet, Refinitiv Eikon, Goldman Sachs Global Investment Research

**Exhibit 27: The revisions in expectations for reinvestment rates of cash flows into capex + R&D have been primarily driven by downward revisions in cash flows forecasts, which more than offset a more modest reduction in capex expectations**

Change in expectations for (1) reinvestment rate of cash flows into capex + R&D, (2) capex and (3) cash flows from operating activities. 2022E, 2023E and the 2024E are shown

	Change in Expectations vs. June 2022 report								
	Reinvestment Rate			Capex			Cash Flow		
	2022E	2023E	2024E	2022E	2023E	2024E	2022E	2023E	2024E
Air Freight & Logistics	1%	-1%	1%	4%	1%	-2%	1%	3%	-4%
Auto Components	4%	3%	3%	-5%	-4%	11%	-10%	-8%	6%
Building Products	0%	0%	0%	2%	-2%	-1%	2%	-2%	-1%
Machinery	4%	2%	1%	1%	-1%	-4%	-6%	-4%	-7%
Electrical Equipment	4%	3%	3%	-5%	1%	6%	-10%	-4%	1%
Electronic Equipment Instruments & Components	3%	0%	3%	-2%	-2%	-3%	-6%	-1%	-8%
Airlines	5%	11%	-3%	-9%	0%	-7%	-12%	-13%	-3%
Construction & Engineering	0%	6%	-4%	2%	-2%	1%	2%	-8%	6%
Automobiles	-1%	-3%	1%	-3%	-5%	5%	-2%	0%	4%
Software	0%	1%	3%	-2%	0%	6%	-2%	-2%	0%
Road & Rail	8%	4%	6%	-5%	3%	1%	-14%	-3%	-9%
Semiconductors & Semiconductor Equipment	4%	0%	0%	-1%	-12%	-10%	-7%	-12%	-9%
Metals & Mining	7%	6%	10%	-6%	2%	24%	-20%	-11%	-2%
Construction Materials	2%	1%	3%	-6%	-7%	-4%	-8%	-9%	-9%
Wireless Telecommunication Services	-4%	0%	3%	-4%	-3%	14%	2%	-4%	7%
Diversified Telecommunication Services	3%	0%	0%	1%	-4%	4%	-3%	-4%	3%
Transportation Infrastructure	10%	3%	-4%	-3%	-8%	3%	-16%	-12%	10%
Independent Power and Renewable Electricity Producers	21%	19%	-33%	5%	23%	9%	-16%	2%	46%
Multi-Utilities	-3%	-1%	-3%	1%	2%	1%	3%	3%	4%
Electric Utilities	13%	9%	3%	4%	-2%	3%	-6%	-10%	0%
Water Utilities	10%	-1%	0%	-5%	-6%	-1%	-13%	-5%	-1%
Energy Equipment & Services	13%	1%	3%	12%	11%	41%	-13%	8%	29%
Oil Gas & Consumable Fuels	-1%	-1%	1%	-9%	-2%	3%	-6%	0%	2%
Weighted average all other sectors (ex-Financials)	1%	1%	1%	-1%	-2%	5%	-4%	2%	-1%
Weighted average all sectors (ex-Financials)	1%	1%	1%	-1%	-3%	3%	-5%	0%	-1%

Source: FactSet, Goldman Sachs Global Investment Research

## Less but still robust Green Capex spare capacity, largely on less operating cash flow

**We see a robust \$0.9 trillion of annual spare capacity for additional Green Capex among publicly traded companies under coverage in Green Capex sectors, even as our estimates are 15% below those from our prior report in June.** Please see [Exhibit 28](#) for more details. As detailed above, reinvestment rates of cash flows into capex + R&D are expected to modestly increase among Green Capex-critical sectors, though primarily due to downward revisions to operating cash flow expectations, as capex estimates have been revised modestly downward vs. our June report. At the same time, leverage — measured as net debt/EBITDA — is expected to fall to 1.2x in 2022E for companies in GS coverage ex. Financials and Real Estate, vs. the average in 2010-2019 of 1.7x. For those sectors that are most critical for Green Capex, we see spare capacity among publicly traded companies of an additional \$0.9 tn per year of Green Capex, should reinvestment rates of cash flows and R&D into capex return to 70% and balance sheets normalize at 1.5x Net Debt/EBITDA. This represents about a 15% decrease from our prior estimates for 2022E in June (\$1.0 tn annually, prior).

- Spare capacity for additional Green Capex has increased modestly for 2 sectors — Automobiles and Wireless Telecommunications Services
- Spare capacity is projected flattish for 5 other sectors — Airlines, Building Products, Construction & Engineering, Oil/Gas and Software.
- Spare capacity for additional Green Capex has declined.

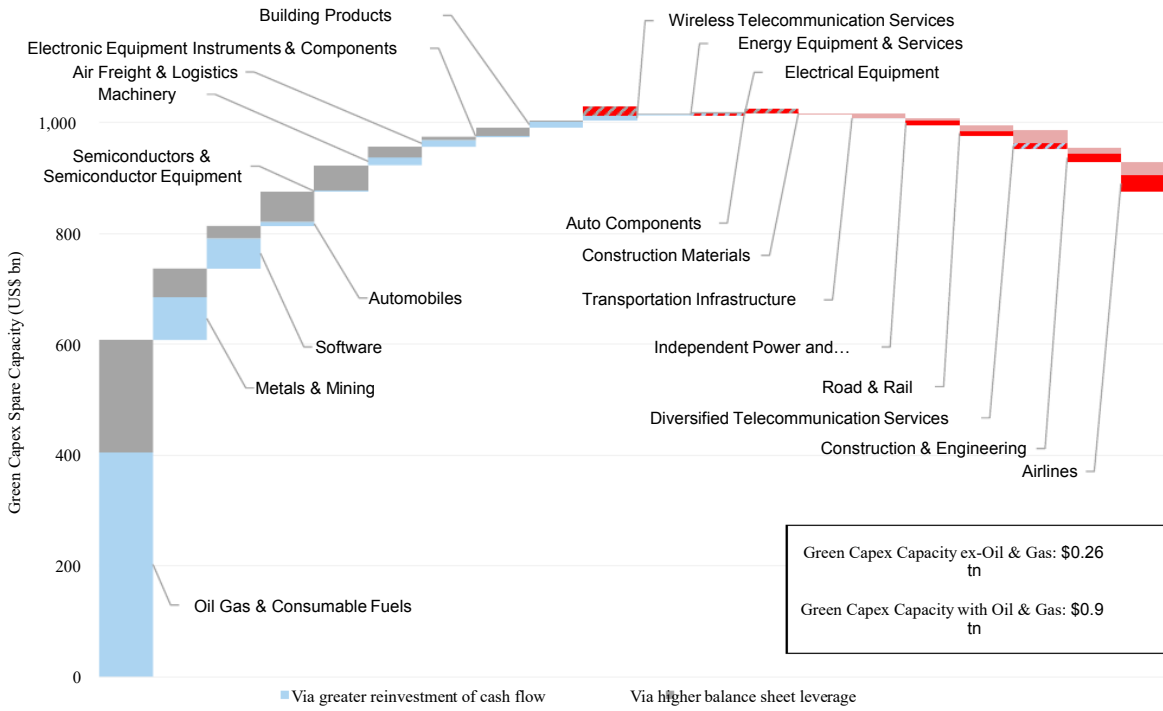
Please see [Exhibit 29](#) for more details.

**Spare capacity for additional Green Capex is still concentrated in a handful of sectors: Oil/Gas, Metals/Mining and Software.** Our analysis indicates those 3 sectors hold about 93% of total Green Capex spare capacity. In particular, \$0.6 tn of the total \$0.9 tn (or 70% of overall spare capacity) lie among publicly traded Oil/Gas companies under GS coverage. Metals/Mining and Software account for 15% and 9% of total spare capacity, respectively.

**We continue to believe the capability to generate favorable returns on Green Capex initiatives — particularly for those sectors such as Oil/Gas and Metals & Mining that have below-average corporate returns — will be key regarding managements' decisions on how to allocate resources vs. returning capital to shareholders.** In our view, investors would “**CARE**” about Green Capex initiatives based on whether the company can demonstrate:

- **C**ore competencies in that area
- **A**vailable capital to deploy
- **R**eturns at the corporate level that are/remain favorable
- **E**xecution to meet goals and raise revenue contribution from Green initiatives that are material.

**Exhibit 28: We see a c.15% decrease vs. our June 13, 2022 report in annual spare capacity for Green Capex from Green Capex-critical sectors based on 70% reinvestment rate and 1.5x leverage — now about \$0.9 trillion annually**  
 Green Capex spare capacity from key relevant sectors needed for Net Zero, Infrastructure and Clean Water goals



Spare Green Capex capacity considers potential for shift in reinvestment and tolerance for leverage. Reinvestment capacity is based on incremental capex/R&D capacity to achieve a 70% 2022E reinvestment rate of cash flow. Leverage capacity is based on incremental spending per year over remainder of decade based on difference between 2022E net debt/EBITDA and 1.5x. Diversified Telecom Services has positive excess capacity from reinvestment that gets cancelled out by leverage impact.

Source: Goldman Sachs Global Investment Research

**Exhibit 29: The 15% decrease in Green Capex spare capacity vs. our prior report is driven by Metals & Mining, Oil & Gas and Semiconductors. Automobiles are Wireless Telecomm. Services are the only ones among Green Capex sectors where spare capacity has increased vs. our June report (expected flattish for 5 sectors and decreasing for the remaining)**

Change in Green Capex spare capacity vs. our June 13, 2022 report — via Greter Reinvestment of Cash Flows into Capex + R&D, Higher Leverage and Total

	Change in Green Capex spare capacity vs. our prior report							
	Driven by Reinvestment Rate			Total Δ \$ bn	Driven by Leverage		Total \$ bn	
	Via Δ CF+R&D \$ bn	Via Δ Capex+R&D \$ bn	\$ bn		\$ bn			
Air Freight & Logistics	\$0	(\$1)	(\$1)	↓	(\$0)	↓	(\$1)	↓
Airlines	(\$3)	\$5	\$2	↑	\$0	→	\$2	→
Auto Components	(\$6)	\$3	(\$3)	↓	(\$1)	↓	(\$4)	↓
Automobiles	(\$6)	\$8	\$3	↑	\$2	→	\$4	↑
Building Products	\$0	(\$0)	\$0	→	(\$0)	→	\$0	→
Construction & Engineering	\$0	(\$1)	(\$0)	→	\$0	→	\$0	→
Construction Materials	(\$2)	\$1	(\$1)	↓	(\$0)	↓	(\$1)	↓
Diversified Telecommunication Services	(\$5)	(\$4)	(\$9)	↓	\$0	→	(\$8)	↓
Electrical Equipment	(\$4)	\$2	(\$2)	↓	(\$1)	↓	(\$3)	↓
Electronic Equipment Instruments & Components	(\$4)	\$1	(\$3)	↓	(\$1)	↓	(\$4)	↓
Energy Equipment & Services	(\$2)	(\$1)	(\$4)	↓	(\$1)	↓	(\$4)	↓
Independent Power and Renewable Electricity Producers	(\$3)	(\$1)	(\$4)	↓	\$0	→	(\$3)	↓
Machinery	(\$5)	(\$1)	(\$6)	↓	(\$2)	↓	(\$8)	↓
Metals & Mining	(\$56)	\$10	(\$46)	↓	(\$23)	↓	(\$69)	↓
Oil Gas & Consumable Fuels	(\$48)	\$38	(\$9)	↓	(\$17)	↓	(\$26)	↓
Road & Rail	(\$6)	\$2	(\$3)	↓	(\$1)	↓	(\$4)	↓
Semiconductors & Semiconductor Equipment	(\$16)	\$2	(\$14)	↓	(\$7)	↓	(\$21)	↓
Software	(\$2)	\$2	(\$1)	↓	(\$2)	↓	(\$2)	→
Transportation Infrastructure	(\$2)	\$0	(\$2)	↓	(\$0)	→	(\$2)	↓
Wireless Telecommunication Services	\$3	\$5	\$8	↑	(\$3)	↓	\$5	↑
<b>Total</b>	<b>(\$166)</b>	<b>\$72</b>	<b>(\$94)</b>	<b>↓</b>	<b>(\$56)</b>	<b>↓</b>	<b>(\$150)</b>	<b>↓</b>
<i>Excluding Oil Gas and Energy Services</i>	<i>(\$116)</i>	<i>\$35</i>	<i>(\$81)</i>	<i>↓</i>	<i>(\$38)</i>	<i>↓</i>	<i>(\$120)</i>	<i>↓</i>

Green arrows: increase greater than 5%. Yellow arrows: percent change between +5% and -5%. Red arrows: decrease greater than 5%.

Source: Goldman Sachs Global Investment Research

**Exhibit 30: Screen of covered companies in Green Capex-critical sectors that represent the bulk of spare Green Capex capacity are largely oil/gas, metals/mining and automobiles companies**

Green Capex spare capacity by company in key relevant sectors needed for Net Zero, Infrastructure and Clean Water

Sub-sector	Company Name	Implied Green capex spare capacity			Sub-sector	Company Name	Implied Green capex spare capacity		
		Greater reinvestment	Higher leverage	Total (\$ bn)			Greater reinvestment	Higher leverage	Total (\$ bn)
1 Oil Gas & Consumable Fuels	Saudi Aramco	\$97	\$53	\$159	26 Metals & Mining	Glencore Plc	\$6	\$2	\$8
2 Oil Gas & Consumable Fuels	Exxon Mobil Corp.	\$35	\$17	\$52	27 Metals & Mining	Fortescue Metals Group	\$5	\$3	\$8
3 Software	Microsoft Corp.	\$27	\$13	\$39	28 Automobiles	Tesla Inc.	\$3	\$5	\$8
4 Oil Gas & Consumable Fuels	Chevron Corp.	\$24	\$14	\$38	29 Metals & Mining	ArcelorMittal	\$5	\$3	\$7
5 Oil Gas & Consumable Fuels	Equinor	\$20	\$17	\$38	30 Semiconductors & Semis Equip.	Qualcomm Inc.	\$5	\$3	\$7
6 Metals & Mining	BHP Group Ltd.	\$25	\$10	\$34	31 Oil Gas & Consumable Fuels	Cenovus Energy Inc.	\$5	\$2	\$7
7 Oil Gas & Consumable Fuels	Shell Plc	\$19	\$13	\$32	32 Wireless Telecomm.	KDDI	\$5	\$2	\$7
8 Oil Gas & Consumable Fuels	Petrobras	\$25	\$7	\$31	33 Software	Oracle Corp.	\$8	(\$1)	\$7
9 Oil Gas & Consumable Fuels	TotalEnergies SE	\$19	\$10	\$29	34 Oil Gas & Consumable Fuels	Pioneer Natural Resources Co.	\$5	\$2	\$7
10 Oil Gas & Consumable Fuels	BP Plc	\$17	\$7	\$24	35 Air Freight & Logistics	United Parcel Service Inc.	\$5	\$2	\$7
11 Wireless Telecomm.	China Mobile (HK)	\$7	\$14	\$21	36 Metals & Mining	Nucor Corp.	\$5	\$2	\$6
12 Oil Gas & Consumable Fuels	ConocoPhillips	\$12	\$6	\$18	37 Oil Gas & Consumable Fuels	Aker BP ASA	\$4	\$2	\$6
13 Automobiles	Stellantis NV	\$4	\$8	\$13	38 Software	Adobe Systems Inc.	\$4	\$2	\$6
14 Automobiles	Toyota Motor	\$3	\$9	\$12	39 Oil Gas & Consumable Fuels	EOG Resources Inc.	\$3	\$3	\$6
15 Oil Gas & Consumable Fuels	Occidental Petroleum Corp.	\$9	\$2	\$12	40 Oil Gas & Consumable Fuels	Imperial Oil Ltd.	\$4	\$2	\$6
16 Oil Gas & Consumable Fuels	China Shenhua Energy	\$6	\$5	\$11	41 Semiconductors & Semis Equip.	Texas Instruments Inc.	\$4	\$2	\$6
17 Oil Gas & Consumable Fuels	Canadian Natural Resources Lt	\$8	\$3	\$11	42 Oil Gas & Consumable Fuels	CNOOC	(\$0)	\$6	\$6
18 Oil Gas & Consumable Fuels	Marathon Petroleum Corp.	\$9	\$2	\$11	43 Oil Gas & Consumable Fuels	Phillips 66	\$4	\$1	\$6
19 Semiconductors & Semis Equip.	Broadcom Inc.	\$10	\$1	\$11	44 Oil Gas & Consumable Fuels	Devon Energy Corp.	\$4	\$1	\$5
20 Oil Gas & Consumable Fuels	ENI	\$6	\$4	\$11	45 Automobiles	BMW	(\$1)	\$6	\$5
21 Automobiles	Volkswagen	(\$0)	\$11	\$11	46 Electronics Equipment	Hon Hai	\$3	\$3	\$5
22 Metals & Mining	Rio Tinto Ltd.	\$5	\$4	\$9	47 Semiconductors & Semis Equip.	MediaTek	\$3	\$2	\$5
23 Oil Gas & Consumable Fuels	Suncor Energy Inc.	\$6	\$3	\$8	48 Semiconductors & Semis Equip.	ASML Holding	\$3	\$1	\$5
24 Oil Gas & Consumable Fuels	Valero Energy Corp.	\$6	\$2	\$8	49 Automobiles	Honda Motor	\$2	\$3	\$5
25 Automobiles	Mercedes-Benz Group AG	\$2	\$6	\$8	50 Automobiles	Nissan Motor	\$4	\$1	\$5

Reinvestment capacity is based on incremental capex/R&D capacity to achieve a 70% 2022E reinvestment rate of cash flow. Leverage capacity is based on incremental spending per year over remainder of decade based on difference between 2022E net debt/EBITDA and 1.5x. Top-50 list excludes Russia-based companies.

Source: Goldman Sachs Global Investment Research

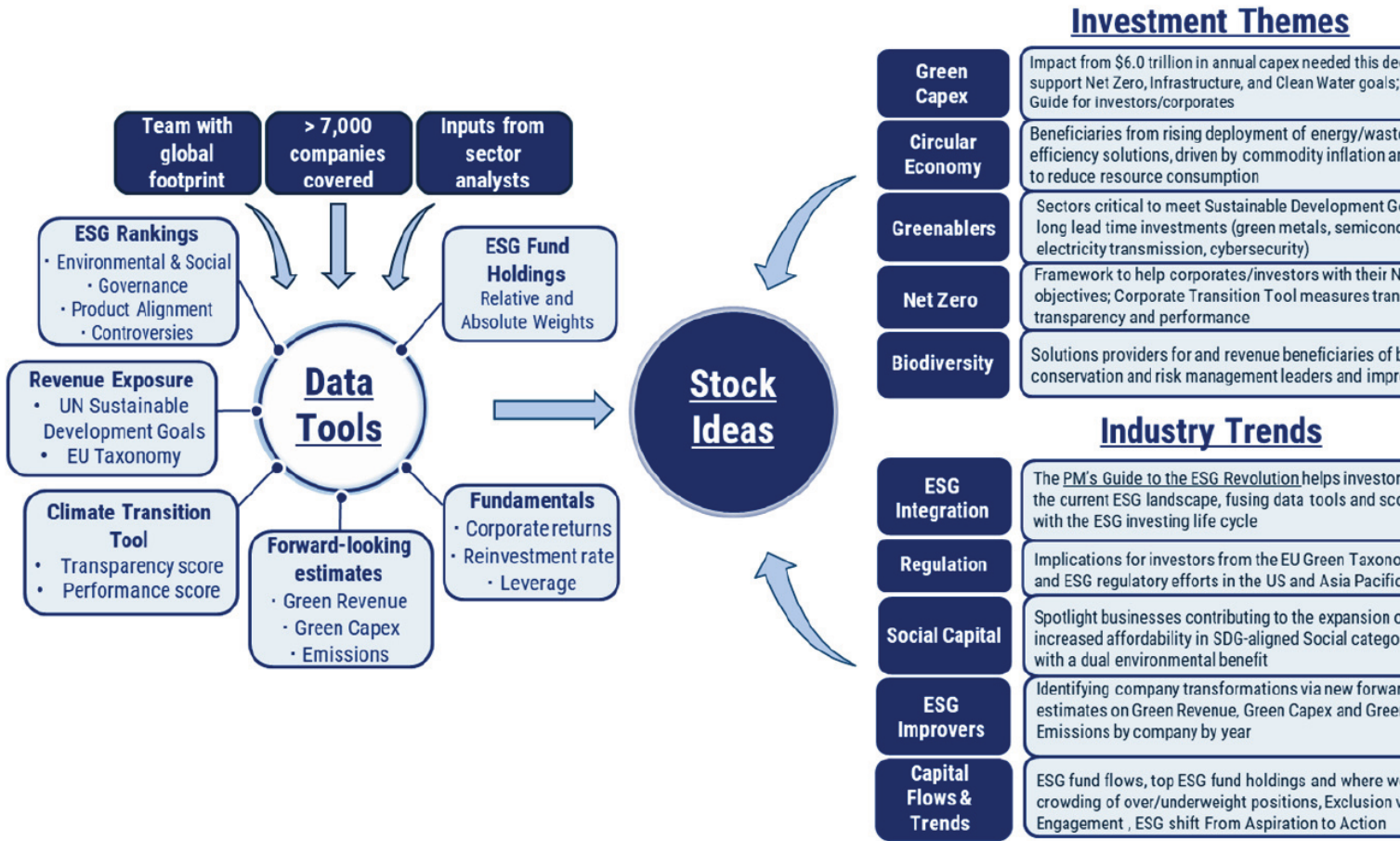


## How GS SUSTAIN can help

**GS SUSTAIN provides access to proprietary tools and resources to quantify impact and identify ESG Improvers, enabling greater recognition of underappreciated opportunities across sectors.** Our offering of SUSTAIN tools can help investors to answer ESG questions at the portfolio and security levels, enabling more systematized and quantitative reporting while providing detailed and transparent data sets for idea generation, security selection and corporate engagement.

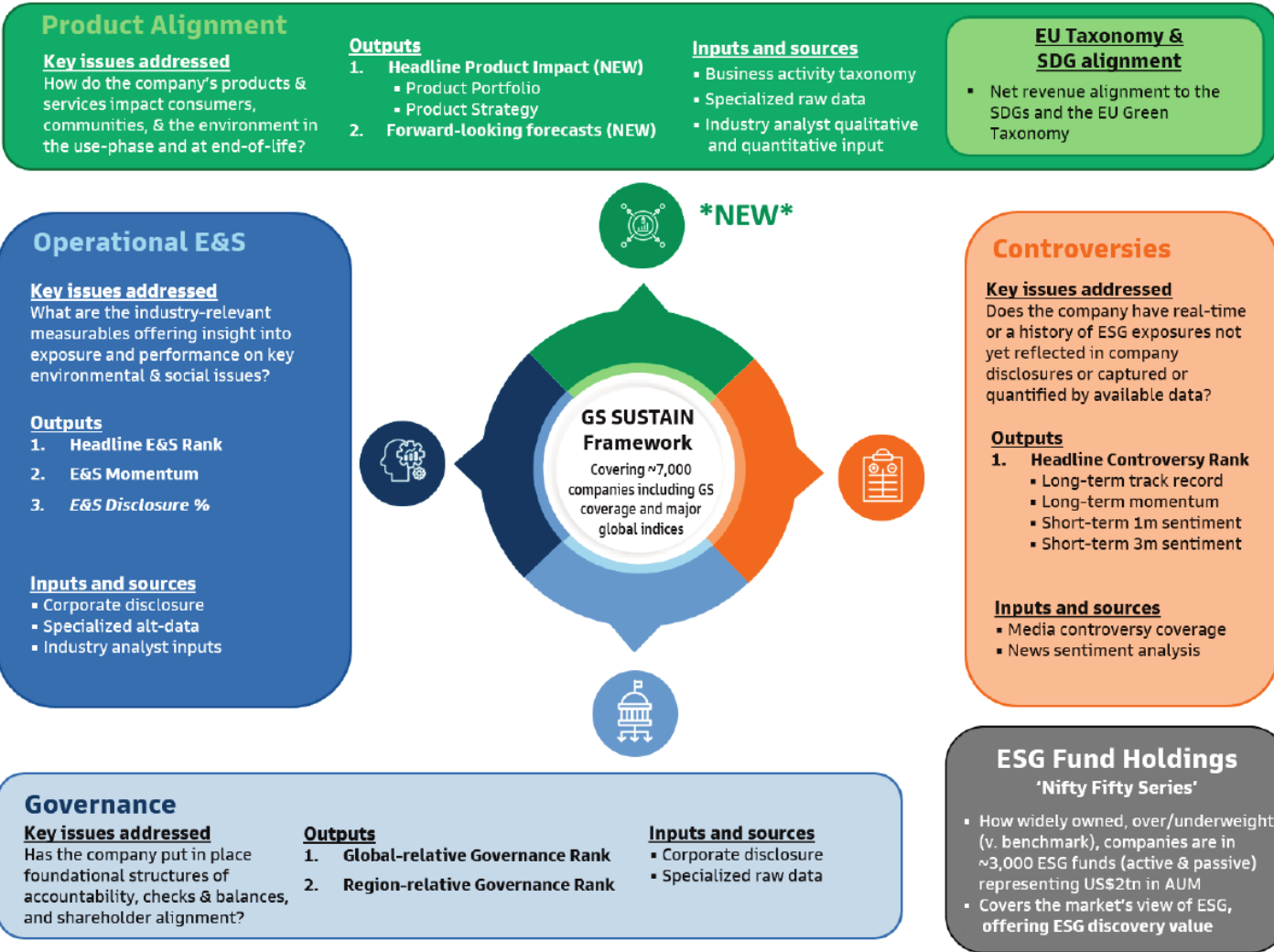
- **Our multi-pronged SUSTAIN scoring framework** can help provide greater granularity and objectivity for asset managers in both security selection and reporting. The framework across >7,000 companies includes our recently introduced Product Alignment framework and can help investors cast a wider net in the search for impact ideas aligned to less obvious sustainability themes. Existing pillars detail performance around sector-specific environmental and social operational metrics, governance, and controversies.
- **Forward-looking estimates.** Looking ahead, we believe investment performance will be more driven by future change and have taken our first steps toward incorporating forward-looking estimates in our proprietary industry analyst inputs, which now include sustainable product revenue and capex in select industries. Furthermore, we have taken first steps to offering quantitative forecasts of sustainable product revenue/capex for ~650 companies in 19 industries. We now add Scope 1 and 2 greenhouse gas emissions for a smaller segment of companies in 7 sectors.
- **EU Taxonomy revenue alignment.** We see the EU Taxonomy as one of the most seminal regulatory developments driving standardization in reporting for corporates/asset managers. Our EU Taxonomy alignment tool maps company revenues to Taxonomy-defined activities to estimate potential Taxonomy-eligible and aligned revenue based on technical screening checks where data exist, and “Do No Significant Harm” and “Minimum Social Safeguards” criteria.
- **SDG revenue alignment.** The UN Sustainable Development Goals (SDGs) have emerged as one of the most commonly used frameworks for taxonomizing impact across a broad set of sustainability challenges. Our SDG alignment tool employs granular revenue data, GS analyst inputs and other company metadata to map alignment, exposure and misalignment to ten of the SDGs we deem to be most investable.
- **ESG fund ownership.** Aggregating fund holdings across a universe of ~3,000 ESG funds, we analyze this pool of ESG assets to better understand trends in ESG ownership at both the sector and company level. The full dataset provides absolute and momentum ESG ownership detail for well over 10,000 securities.
- **ESG fund flows, valuations and performance.** Our ESG Tracker series analyzes the aforementioned ESG fund universe to gauge ESG fund flow momentum and sizing relative to the broader market, breaking out differences by strategy, fund type and fund style. The tracker also examines valuation and performance across categories.

Exhibit 31: GS SUSTAIN: What we offer



Source: Goldman Sachs Global Investment Research

# GS SUSTAIN ESG Pillars



Source: Goldman Sachs Global Investment Research

13 October 2022

## Appendix

Exhibit 32: Company name, ticker and price close as of October 12 for the 107 companies highlighted in the report

Company Name	Ticker	Price Close As of Oct-12	Company Name	Ticker	Price Close As of Oct-12
ABB Ltd.	ABBN.S	SFr 24.98	Li Auto Inc.	2015.HK	HK\$ 81.2
Advanced Micro Devices Inc.	AMD	\$ 57.85	Linde	LIN	\$ 271.59
Air Products & Chemicals	APD	\$ 229.32	LONGi Green Energy	601012.SS	Rmb 48.38
Amphenol Corp.	APH	\$ 67.15	Luoyang Xinqianglian Slewing Bearing	300850.SZ	Rmb 93.95
Analog Devices Inc.	ADI	\$ 138.59	Magna International Inc.	MGA	\$ 47.3
Anglo American Plc	AAL.L	£ 2651.5	MasTec Inc.	MTZ	\$ 65.53
Applied Materials Inc.	AMAT	\$ 76.01	Mediatek	2454.TW	NT\$ 549
Aptiv Plc	APTV	\$ 81.81	Midea Group	000333.SZ	Rmb 48.27
Array Technologies Inc.	ARRY	\$ 16.25	Mineral Resources	MIN.AX	A\$ 70.12
ASM International	ASMI.AS	€ 233.8	Ming Yang Smart Energy Group Ltd	601615.SS	Rmb 26.46
ASML Holding	ASML.AS	€ 414.05	Misumi Group	9962.T	¥ 3160
Atlas Copco	ATCOa.ST	Skr 104.06	Murata Mfg.	6981.T	¥ 6826
Baker Hughes Co.	BKR	\$ 22.64	Nari Tech Co.	600406.SS	Rmb 25.7
Carrier Global Corp.	CARR	\$ 34.88	National Instruments Corp.	NATI	\$ 37.59
Chart Industries	GTLS	\$ 195.77	Nexans	NEXS.PA	€ 92.45
China Hongqiao Group	1378.HK	HK\$ 6.55	Nidec	6594.T	¥ 7715
CMS Energy Corp.	CMS	\$ 53.36	Ningbo Orient Wires & Cables Co Ltd	603606.SS	Rmb 75.8
Constellium	CSTM	\$ 11.06	Omega Energia S.A.	MEGA3.SA	R\$
Daifuku Co.	6383.T	¥ 6890	OPT Machine Vision Tech Co.	688686.SS	Rmb 154.83
Daikin Industries	6367.T	¥ 22535	Oriental Yuhong	002271.SZ	Rmb 25.37
Dassault Systemes	DAST.PA	€ 33.52	Orsted A/S	ORSTED.CO	Dkr 583.3
Datadog Inc.	DDOG	\$ 82.35	Pentair Plc	PNR	\$ 40.58
Deere & Co.	DE	\$ 361.21	Public Service Enterprise Group	PEG	\$ 53.48
Delta Electronics	2308.TW	NT\$ 272	Rexel S.A.	RXL.PA	€ 16.19
Denso	6902.T	¥ 7000	Riyue Heavy Industry Co.	603218.SS	Rmb 21.96
Eaton Corp.	ETN	\$ 135.45	Rohm	6963.T	¥ 9850
Edison International	EIX	\$ 55.56	Sangfor	300454.SZ	Rmb 90.5
Emerson Electric Co.	EMR	\$ 77.5	Schnitzer Steel Industries	SCHN	\$ 28.28
Enel Chile	ENIC	\$ 1.45	Sempra Energy	SRE	\$ 140.7
Enel SpA	ENEI.MI	€ 4.003	Shenzhen Envicool Technology	002837.SZ	Rmb 36.76
Enphase Energy Inc.	ENPH	\$ 248.13	Shenzhen Inovance Technology	300124.SZ	Rmb 61.6
Essential Utilities Inc.	WTRG	\$ 39.41	Siemens AG	SIEGn.DE	€ 102.44
Evoqua Water Technologies Corp.	AQUA	\$ 32.69	Sika	SIKA.S	SFr 206.8
Fanuc	6954.T	¥ 20220	SMC	6273.T	¥ 59500
FirstEnergy Corp.	FE	\$ 36.15	SolarEdge Technologies Inc.	SEDG	\$ 200.6
Flat Glass Group	6865.HK	HK\$ 17.9	SSAB	SSABa.ST	Skr 53.62
Freeport-McMoRan Inc.	FCX	\$ 28.84	SSE Plc	SSE.L	£ 1428
Ganfeng Lithium	1772.HK	HK\$ 53.25	Steel Dynamics Inc.	STLD	\$ 78.87
GEM Co.	002340.SZ	Rmb 7.48	Sungrow Power Supply Co.	300274.SZ	Rmb 126
Gerdau	GGBR4.SA	R\$	TE Connectivity Ltd.	TEL	\$ 108.14
Hongfa Technology	600885.SS	Rmb 34.88	T-Mobile US Inc.	TMUS	\$ 132.94
Huayou Cobalt	603799.SS	Rmb 63.29	Tongwei	600438.SS	Rmb 48.36
Iberdrola SA	IBE.MC	€ 9.208	TSMC	TSM	\$ 64.11
Infineon	IFXGn.DE	€ 23.44	United Microelectronics Corp.	UMC	\$ 5.59
Infrastruttura Wireless SpA	INWT.MI	€ 8.382	Universal Display Corp.	OLED	\$ 94.74
Jacobs	J	\$ 109.58	Vestas Wind Systems A/S	VWS.CO	Dkr 135
KB Home	KBH	\$ 27.54	Vinci	SGEF.PA	€ 83
Kehua Data Co.	002335.SZ	Rmb 46.91	Weichai Power	2338.HK	HK\$ 7.28
Keyence	6861.T	¥ 49160	West Holdings	1407.T	¥ 4040
Kingspan	KSP.I	€ 45.36	Yaskawa Electric	6506.T	¥ 4160
KPIT Technologies	KPIE.BO	Rs 672.65	Yunnan Energy	002812.SZ	Rmb 176.58
Lam Research Corp.	LRCX	\$ 323.98	Zaisheng Technology	603601.SS	Rmb 5.39
Lead Intelligent	300450.SZ	Rmb 51.28	Zijin Mining	2899.HK	HK\$ 7.79
LG Chem	051910.KS	W 591000			

Source: FactSet, Goldman Sachs Global Investment Research



# Disclosure Appendix

## Reg AC

We, Brian Singer, CFA, Enrico Chinello, Ph.D., Michael Hao Wu, CFA, Derek R. Bingham, Evan Tylenda, CFA, Brendan Corbett, Emma Jones, Keebum Kim, Madeline Meyer, Varsha Venugopal, Grace Chen and Rachit Aggarwal, 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

### Distribution of ratings/investment banking relationships

Goldman Sachs Investment Research global Equity coverage universe

	Rating Distribution			Investment Banking Relationships		
	Buy	Hold	Sell	Buy	Hold	Sell
Global	48%	36%	16%	64%	59%	50%

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