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Index Carbon Analysis: S&P500

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KEY FINDINGS
- Scope 1&2 emissions have returned to 2021 levels
- Top 10 emitters represent 50.6% of index emissions (2.8% of market cap)
- Index faces 33% potential carbon liability under IPCC Net Zero scenario by 2050

ⓘ This series examines the carbon footprint of major indices, revealing key sector patterns, company-level drivers, and potential carbon liabilities under different climate scenarios.

Emissions   million tonnes

S&P500 companies cut their Scope 1 and 2 carbon output in 2023, returning to 2021 levels, while supply chain emissions (Scope 3) bucked the trend with an uptick from 2022.
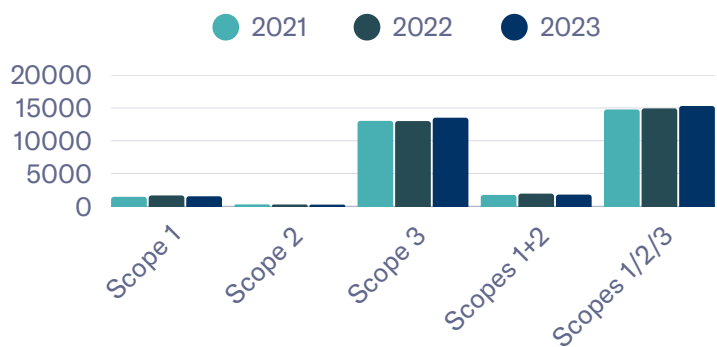

Emissions Intensity   tonnes per $USDm of market cap

The 2023 bull market meant that soaring valuations drove carbon intensity down dramatically, though still shy of 2021's more efficient levels.
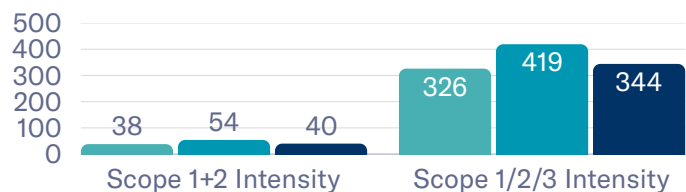
Sectors: Biggest Movers in Total Emissions   from 2022 to 2023
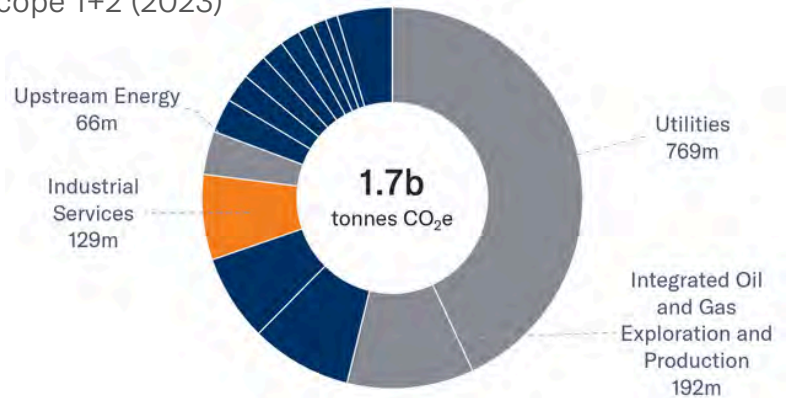
Focusing on Scope 1 and 2 emissions, we can see the emissions reductions predominantly stem from **utilities**, **oil & gas exploration**, and **upstream energy**, though **industrial services** increased from 2022 to 2023.
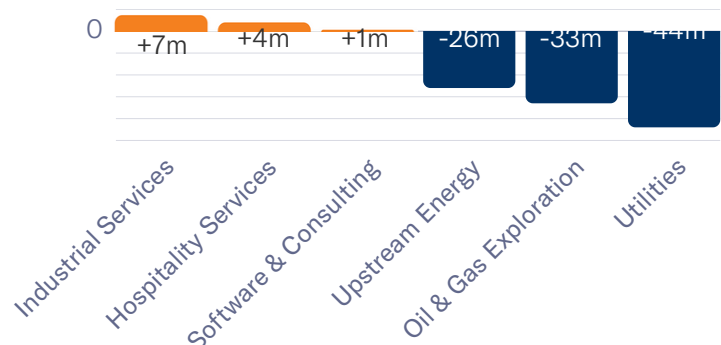
Total Emissions Across Sectors   Scope 1+2 (2023)

Utilities, oil and gas, and energy sectors remain the dominant source of Scope 1 and 2 emissions, collectively accounting for over 70% of the index total.
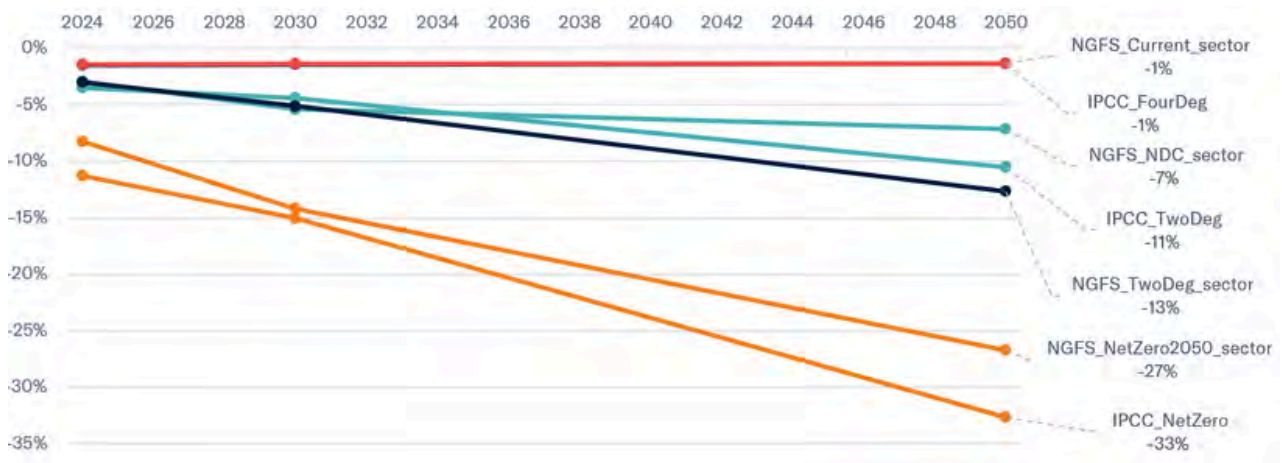

Upstream Energy 66m

Industrial Services 129m

1.7b tonnes CO$_2$e

Utilities 769m

Integrated Oil and Gas Exploration and Production 192m

Capital vs Emissions Weight of Top 10 Emitters   Scopes 1/2/3 (2023)

Of the 500 constituents in the index, over half of the total emissions come from just 10 companies, representing 3% of the index by capital weight.

Capital Weight in Portfolio   2.8%

Emissions Weight in Portfolio (Scopes 1, 2, 3)   50.6%

- Exxon Mobil Corp.
- Cummins, Inc.
- Chevron Corp.
- Caterpillar, Inc.
- Emerson Electric Co.
- GE Aerospace
- Trane Technologies Plc
- Ingersoll Rand, Inc.
- Carrier Global Corp.
- Phillips 66
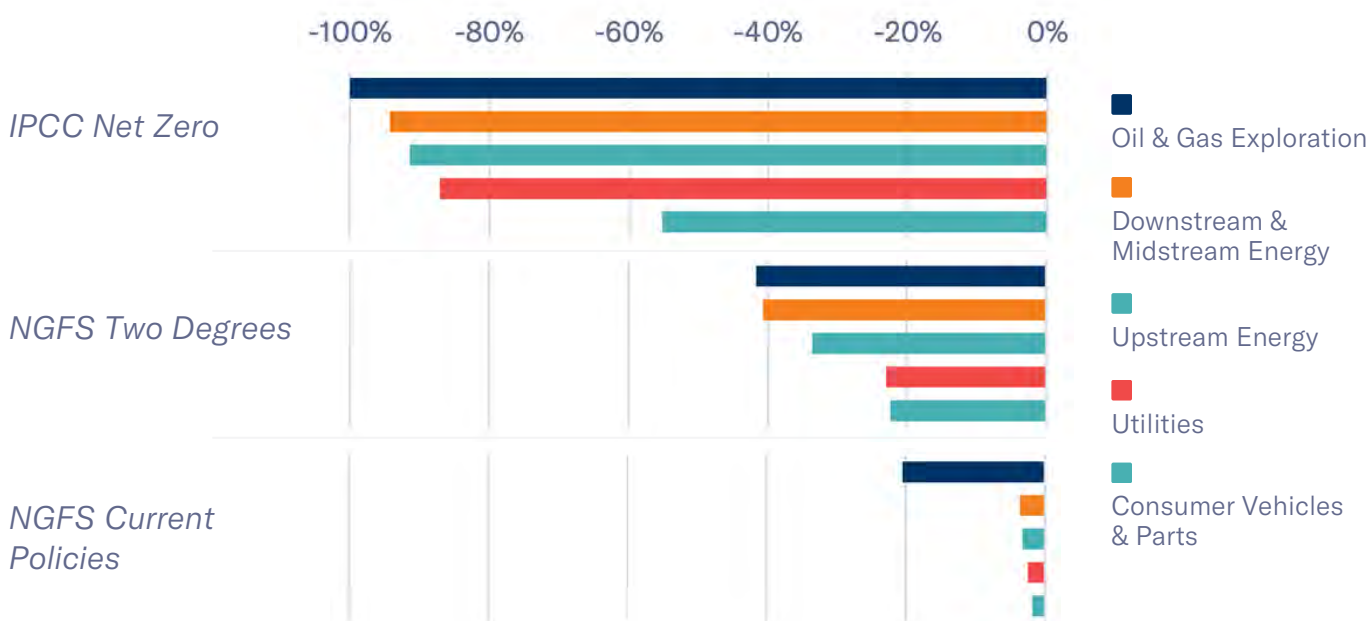
Potential Carbon Liability

Across the index, we observe a potential carbon liability of up to 33% under the IPCC Net Zero scenario in 2050, with only a 1% potential loss under the IPCC Four Degree and NGFS Current Policies scenarios.

NGFS_Current_sector -1%

IPCC_FourDeg -1%

NGFS_NDC_sector -7%

IPCC_TwoDeg -11%

NGFS_TwoDeg_sector -13%

NGFS_NetZero2050_sector -27%

IPCC_NetZero -33%

Total Emissions Across Sectors Scope 1+2 (2023)

The high-emitting sectors flow through to carbon risk, with oil and gas, utilities, and energy the largest contributors of PCL generally across scenarios.

IPCC Net Zero

NGFS Two Degrees

NGFS Current Policies

- ■ Oil & Gas Exploration
- ■ Downstream & Midstream Energy
- ■ Upstream Energy
- ■ Utilities
- ■ Consumer Vehicles & Parts

Post-Election Analysis

In the wake of Trump's election victory, we analysed how different sectors responded to his pro-business stance and 'drill-baby-drill' rhetoric. While it's been well documented that the broad market rose, with the index climbing 3.1% between October 30th and November 8th, we identified that four of the five highest emitting sectors beat the broader market.

Industrial manufacturing, oil & gas exploration, and downstream & upstream energy sectors all posted returns between 4.5% and 7.5%. The sole exception among high emitters was utilities (-0.4%), which lagged behind. While concerns about clean energy tax credits played a role, the fall likely stemmed from expectations of higher yields under Trump which typically hamper utility investments.

Despite the strong performance of fossil fuel-related industries, the real story wasn't about traditional energy at all - it was about Elon Musk, with the automotive sector surging 21.2%, driven almost entirely by Tesla's remarkable rally.

EXPERT OPINION

Markets can show knee-jerk reactions to political shifts, but the real story is the longer-term technology-driven low carbon transformation. Despite traditional energy gains recently, Tesla's performance shows how electrification and innovation are reshaping the transport sector to be on a lower carbon trajectory. Outside of COVID, US emissions fell 5% during Trump's last term as market forces drove a shift from coal to gas - showing how economic factors often outweigh politics in decarbonisation.

Dr Ben McNeil,
Head of Climate & Data Science

Our machine learning models achieve strong accuracy across all scopes, with WMAPE (Weighted Average Median Absolute Percentage Error) ranging from 15.3% to 18.1%.

For detailed methodology and validation metrics, read our white paper: emmi.io/newsroom/white-paper-nov-2024

Note: All years of analysis have been conducted using the current constituent list of the S&P500.

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About Emmi Solutions

Emmi is 'Your investor toolkit' – we provide financed emissions data and climate risk analysis across all major public and private asset classes. These support climate-related reporting, and analysis that feeds into investment management processes.

We use proprietary machine-learning models and algorithms to do this. Our tools translate emissions into financial implications, based on climate and pricing scenarios. This gives our clients actionable insights about their carbon exposure.

This diagnostics 'toolkit' is backed by our team of climate and finance experts.

Emmi believes that a low carbon economy is possible, and that properly incentivising and mobilising capital is the fastest and most cost-effective way to reach Net Zero and beyond.

Incorporating the cost of carbon into every decision will enable the finance sector, and its customers, to efficiently allocate resources towards this goal, which will accelerate decarbonisation.

To achieve this, and to meet regulatory requirements, there is a need for a broad spectrum of quality carbon emissions data and climate risk analysis. We have built Emmi to solve that problem.