

# The Carbon Transition Score

A systematic tool to help identify leaders and laggards in the low carbon transition

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### In brief

- The Paris Agreement outlines the actions needed to address the threat of climate change. Important implications for equity and fixed income investors that have a decarbonization objective for their portfolio are: (i) Greenhouse gas (GHG) emissions need to reduce, (ii) decarbonisation rates will vary across the economy, (iii) decarbonisation is complementary to climate adaptation and climate resilience, and (iv) transparency is essential.
- J.P. Morgan Asset Management has developed a Carbon Transition Score that incorporates the key implications of the Paris Agreement. This portfolio management tool may identify those companies that are leaders and laggards in the low-carbon transition, compared to their respective sector peer.
- The Carbon Transition Score<sup>1</sup> can be used alongside the EU Climate Benchmark regulation to help provide additional information for portfolios that seek to align to the goals of the Paris Agreement.<sup>2</sup>

## Aligning investments with a low carbon transition

Investors who are seeking to align their investment decisions with the goals of the Paris Agreement may help enable the transition to a low carbon economy while also addressing the potential financial risks in their portfolios that may result from this transition.

There are many ways to answer the question “What does it mean for an investment to be aligned with the objectives of the Paris Agreement?”. In an attempt to provide comparability, transparency and prevent greenwashing, the EU has developed a Climate Benchmark regulation that outlines a set of technical standards for a benchmark to follow in order to either be

<sup>1</sup> Limitations of Data Disclosure: While J.P. Morgan Asset Management looks to data inputs that it believes to be reliable, J.P. Morgan Asset Management cannot guarantee the accuracy, availability or completeness of its proprietary system (including, without limitation, the JPMAM Carbon Transition Score) or third-party data. Under certain of J.P. Morgan Asset Management’s investment processes, data inputs may include information self-reported by companies and third-party providers that may be based on criteria that differs significantly from the criteria used by J.P. Morgan Asset Management, which often include forward looking statements of intent and are not necessarily fact-based or objectively measurable. In addition, the criteria used by third-party providers can differ significantly, and data can vary across providers and within the same industry for the same provider. Assessment of the data may also require subjective judgements. Such data gaps or applied subjective judgements could result in the incorrect, incomplete, or inconsistent assessment of data, an issuer’s carbon transition risks and opportunities.

<sup>2</sup> The Carbon Transition Score is designed for internal use by J.P. Morgan Asset Management only as a portfolio management tool and is not provided directly to clients or third parties. The Carbon Transition Score is used only in certain strategies and, unless otherwise required by the applicable client guidelines or product offering document, is not required to be used or accessed by J.P. Morgan Asset Management portfolio management teams.

considered a Climate Transition Benchmark (CTB), or, more ambitiously, a Paris-Aligned Benchmark (PAB).<sup>3</sup> These benchmarks require, among others, a reduction in greenhouse gas (GHG) emissions intensity of at least 30% and 50%, respectively, compared to the investable universe, and a 7% year on year self-decarbonisation rate.<sup>4</sup>

While the EU Climate Benchmark framework provides an initial step for investors looking to align investments with a low carbon transition, it may lead to missed investment opportunities if investors only follow the technical standards based on current GHG emissions intensity.<sup>5, 6, 7, 8</sup> A more holistic approach can be taken by combining the technical standards of the EU Climate benchmark with J.P. Morgan Asset Management's Carbon Transition Score which takes into account a range of climate-related metrics beyond GHG emissions.

This article outlines the key themes that we believe should be taken into account for clients that are wishing to incorporate the goals of the Paris Agreement into their investment objectives. We then provide an overview of the Carbon Transition Score and show how it is designed to meet the Paris Agreement's core goals. Finally, we look at how the Carbon Transition Score can be used to help construct an equity portfolio and a fixed income portfolio, in order to illustrate how the score can work alongside the EU Climate Benchmark regulations to support achieving the Paris Agreement goals in practice.

## The goals of the Paris Agreement and the themes that are applicable to investors

The Paris Agreement commits countries to limit global temperature rise to well below 2° Celsius (C) above pre-industrial levels and to pursue efforts to limit the increase to 1.5°C above preindustrial levels.<sup>9</sup> This headline goal, adopted by 196 nations in December 2015 at the COP21 climate negotiations, has spurred climate action by governments, corporations and individuals.

However, with global temperature rise since the pre-industrial era already standing at 1.14°C,<sup>10</sup> the latest scientific findings show that it will require deep, sustained and rapid reductions in GHG emissions in order to keep the world on track to meet the Paris Agreement's objectives.<sup>11, 12</sup> Furthermore, since the adoption of the Paris Agreement, awareness has grown around the links between climate-change and broader environmental-related issues, such as water, waste and biodiversity loss, resulting in an additional focus on these themes.<sup>13, 14, 15</sup> For example, climate change exacerbates water scarcity and quality, making water- and climate-related action tightly linked.<sup>16</sup>

<sup>3</sup> "Regulation (EU) 2019/2089 of the European Parliament and of the Council of 27 November 2019 amending Regulation (EU) 2016/1011 as regards EU Climate Transition Benchmarks, EU Paris-aligned Benchmarks and sustainability-related disclosures for benchmarks", Official Journal of the European Union L 317/17, pp.17-27 (9 December 2019). <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32019R2089>

<sup>4</sup> Intensity is calculated as GHG emissions divided by enterprise value including cash (EVIC). Both benchmarks are also required to apply some baseline exclusions for controversial weapons and societal norms violators (for example, United Nations Global Compact principles and Organisation for Economic Co-operation and Development guidelines). The PAB guidelines include additional exclusions.

<sup>5</sup> Institutional Investors Group on Climate Change, "Enhancing the Quality of Net Zero Benchmarks", IIGCC (2023).

<sup>6</sup> 2° Investing Initiative, "EU Climate Benchmarks Factsheet: Technical Analysis of Key Elements of the Climate Benchmark Standards and Potential Solutions", 2DII (May 2020).

<sup>7</sup> Mercer, "A Landscape Overview of Transition-Oriented Climate Indexes", Mercer Canada (2022).

<sup>8</sup> Amenc, N., Ducoulombier, F., "Unsustainable Proposals: A Critical Appraisal of the TEG Final Report on Climate Benchmarks and Benchmarks' ESG Disclosures and Remedial Proposals", Scientific Beta (February 2020).

<sup>9</sup> Paris Agreement, 2015: United Nations Framework Convention on Climate Change.

<sup>10</sup> Decadal average global temperature rise for 2013-2022 since the pre-industrial era (1850-1900). Climate Change Tracker (2022), Indicators of Global Climate Change for Policy Makers..

<sup>11</sup> Forster, P. M., et al., "Indicators of Global Climate Change 2022: Annual Update of Large-Scale Indicators of the State of the Climate System and Human Influence", Earth System Science Data, 15, 2295-2327 (2023).

<sup>12</sup> Core Writing Team, Lee, H., and Romero, J. (eds.), "Summary for Policymakers. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change", IPCC, pp. 1-34 (Geneva, Switzerland, 2023). doi: 10.59327/IPCC/AR6-9789291691647.001

<sup>13</sup> United Nations Sustainable Development Goals, "Press Release – H UN Historic UN Conference Marks Watershed Moment To Tackle Global Water Crisis and Ensure a Water Secure Future", UN 2023 Water Conference.

<sup>14</sup> United Nations Environment Programme, "Press Release -- Historic Day in the Campaign to Beat Plastic Pollution: Nations Commit to Develop a Legally-Binding Agreement", UNEP Environmental Rights and Governance (2 March 2022).

<sup>15</sup> United Nations Environment Programme, UN Biodiversity Conference (COP 15): [www.unep.org/un-biodiversity-conference-cop-15](http://www.unep.org/un-biodiversity-conference-cop-15).

<sup>16</sup> United Nations, Climate Action – Water – at the centre of the climate crisis (November 2022).

The Paris Agreement outlines several actions to address the threat of climate change. The themes that are most relevant for investors that have decarbonization objectives are:

**1. GHG emissions need to reduce:** In order to keep global temperature rise to well below 2°C, global GHG emissions must peak as soon as possible and net zero emissions should be reached around 2050.<sup>17</sup>

**2. Decarbonisation rates will vary across the economy:**

The Paris Agreement highlights that decarbonisation is not expected to be globally uniform. Investors can consider this from a sectoral perspective, as some sectors have a clear path to a low-carbon transition, while others do not currently have a set of readily available solutions, and further technological development is required.

**3. Decarbonisation should be complemented by action on climate adaptation and climate resilience:**

While decarbonisation is key to minimising climate-related risks by keeping global temperature rise to well below 2°C, it is clear that climate change is already impacting the welfare of millions of people.<sup>18</sup> Therefore, the Paris Agreement highlights the importance of adapting to changing climate, reducing vulnerability and building climate resilience in order to cope with these growing climate change impacts. A key contribution is the sustainable management of natural resources such as forests, water and raw materials.

**4. Transparency is essential:** Clear and timely reporting of GHG emissions and climate-related data, and detailed target setting is needed in order to ensure accountability, for example by allowing progress towards decarbonisation goals to be tracked.

**J.P. Morgan Asset Management’s Carbon Transition Score**

The four investor-relevant themes identified in the Paris Agreement are incorporated into the J.P. Morgan Asset Management Carbon Transition Score. This proprietary tool has been developed for internal use by J.P. Morgan Asset Management as an additional tool that may be used to help identify those companies that are leaders and laggards in the low-carbon transition, compared to their respective sector peers.

The leaders are companies already aligned to a low carbon economy as well as those that are in the process of becoming aligned. The laggards are companies that are taking less action than their peers towards managing the risks and opportunities of the low-carbon transition. The Carbon Transition Score is designed to help identify these leaders and laggards at a given point in time, based on the latest data on a range of climate-related metrics.

The score covers three essential pillars – emissions, resource management and risk management – reflecting the range of challenges companies face and the interconnection between GHG emissions and other environmental issues. These three pillars are comprised of seven indicators (**Exhibit 1**) that reflect key themes in a low-carbon transition, and use inputs from a number of metrics to consider company performance.

Companies receive an overall Carbon Transition Score ranging between 0 and 1, where 1 is the best, based on how well they perform in each metric and indicator compared to their peers. The Carbon Transition Score can be applied to any corporate issuer (provided there is sufficient available data), making it a useful tool across both equity and fixed income portfolios.

Company GHG emissions are considered in three of the indicators: Site emissions, indirect emissions, and consumer emissions and opportunities. The Carbon Transition Score then goes further, incorporating a broader set of nature-related metrics that are intertwined with climate vulnerability and action on decarbonisation.<sup>19,20</sup> For example, the water management and waste management indicators are comprised of metrics related to water use efficiency, waste recycling and air pollution.

The metrics are a combination of point-in-time metrics that measure current performance and establish a baseline, and forward-looking metrics that have been selected to consider how this baseline may shift over time. The forward-looking metrics include companies’ decarbonisation targets, the carbon reserves for fossil fuel companies, and the use or generation of renewable electricity.

As a result, the Carbon Transition Score is designed to help identify companies that we believe may be more aligned to a low-carbon transition relative to their peers.

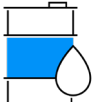






<sup>17</sup> The timing of net zero GHG emissions varies by greenhouse gas. Carbon dioxide emissions should reach net zero earlier than other GHG emissions.

<sup>18</sup> IPCC, “Summary for Policymakers. In: Climate Change 2023: Synthesis Report”. doi: 10.59327/IPCC/AR6-9789291691647.001.

<sup>19</sup> CDP, Planet Tracker, “High and Dry – How Water Issues are Stranding Assets: A Report Commissioned by the Swiss Federal Office for the Environment (FOEN)”, CDP Worldwide (May 2022).

<sup>20</sup> The Royal Society, “Effects of Net-Zero Policies and Climate Change on Air Quality”, (November 2021).

Exhibit 1: J.P. Morgan Asset Management Carbon Transition Score – Pillars and indicators

Carbon Transition Score		
Emissions	Resource management	Risk management
 <p><b>Site emissions</b> Exposure to future carbon pricing</p>	 <p><b>Indirect emissions</b> Adoption of renewable energy and energy efficiency</p>	 <p><b>Physical risk</b> Exposure to extreme weather events and changes in climate</p>
 <p><b>Consumer emissions &amp; opportunities</b> Supply chain impact and benefits from changing consumer behaviors</p>	 <p><b>Water management</b> Efficient and considered use of water</p>	 <p><b>Reputational risk</b> Governance of climate related risks</p>
	 <p><b>Waste management</b> Consideration of waste and air pollution</p>	

Source: J.P. Morgan Asset Management. For illustrative purposes only.

## The Carbon Transition Score can be used to assess climate-related environmental objectives at the company level

To show how the Carbon Transition Score reflects the four investor-relevant themes identified from the Paris Agreement, we've looked in detail at the alignment to each theme across an equity and fixed income universe. In our analysis, we use the MSCI World Index for the equity universe examples and the Bloomberg US Corporate Index for the fixed income universe examples.<sup>21</sup>

### Emissions need to reduce

The key objective of the Paris Agreement is to reduce global GHG emissions. The Carbon Transition Score uses historical and current GHG emissions intensity to define a baseline for emissions reduction, and forward-looking metrics that consider decarbonisation targets in order to identify those companies that plan to reduce emissions in the future. Using these metrics, we can see how a company's emissions have changed, and consider how this may evolve over time.

All GHG emissions metrics are considered on an individual scope basis to reflect the varying importance of Scope 1, Scope 2 and Scope 3 emissions for different sectors.<sup>22,23</sup> The metrics are also normalised by revenues in order to measure GHG emissions intensity impartially for companies with different growth rates.

To see if the Carbon Transition Score identifies companies that have a lower GHG emissions intensity than their peers, we look at the GHG emissions intensity for companies in each Carbon Transition Score quartile.<sup>24</sup> We find that the Carbon Transition leaders (companies in the top quartile), have the lowest Scope 1+2 GHG emissions intensity consistently over time (**Exhibit 2A, Exhibit 2C**). This result is seen in both the equity universe and the fixed income universe, helping to show the functionality across different asset classes and sectors. We see similar behaviour when considering Scope 1+2+3 GHG emissions intensity (**Exhibit 2B, Exhibit 2D**), although there is less consistency in quartile ordering. This result could be partly driven by lower quality data for Scope 3 emissions.

Next, we use the fixed income universe to look at the potential change in Scope 1+2 emissions over the subsequent five years, taking into account company-level targets and industry trends.<sup>25</sup> We find that the average projected rate of change of GHG emissions for the top quartile (the best Carbon Transition Score at a given point in time) is always negative, and always has the largest decrease (**Exhibit 3**).

<sup>21</sup> There are variations in the input data and some of the metrics used in the equity and fixed income version of the score used here, reflecting differing use cases and type of investments. The output of the equity and fixed income versions should not be compared to each other.

<sup>22</sup> Scope 1: Direct emissions from owned and controlled assets, such as company facilities and vehicles, as well as fugitive emissions, Scope 2: Indirect emissions from purchased electricity, steam, heat or cooling, Scope 3: Indirect emissions from the rest of a company's value chain, occurring either before (upstream) or after (downstream) its activities. The Greenhouse Gas Protocol separates those emissions into 15 separate sub-categories.

<sup>23</sup> A Corporate Accounting and Reporting Standard Revised Edition, Greenhouse Gas Protocol, World Resources Institute and World Business Council for Sustainable Development, 2004.

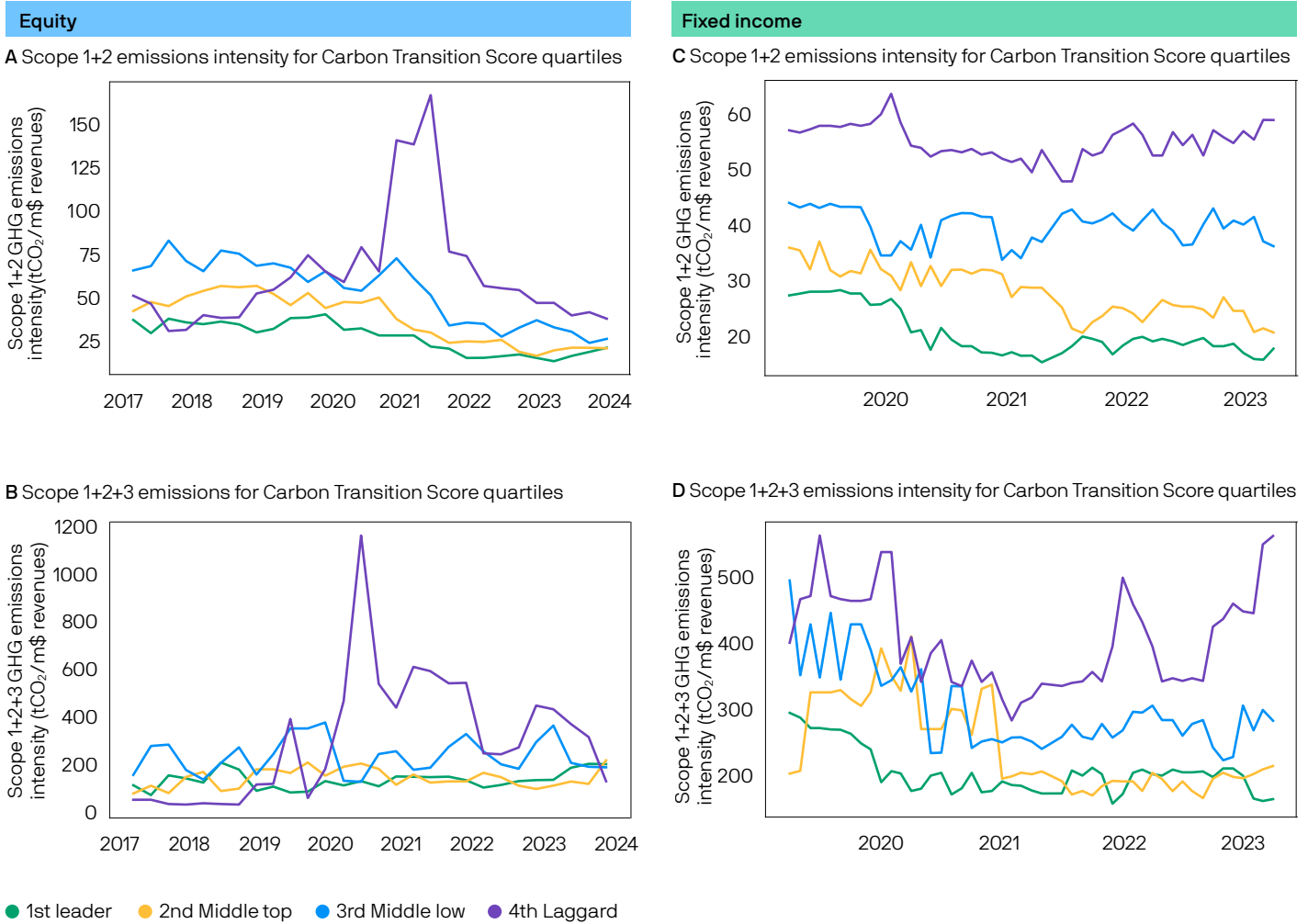
<sup>24</sup> Median GHG emissions intensity is used and quartiles are calculated separately for each sector.

<sup>25</sup> This metric calculates the percentage change in GHG emissions over five years, starting from the current year.

**Exhibit 2: GHG emissions intensity for carbon transition score quartiles**

**GHG emissions are lowest for the top quartile of the Carbon Transition Score**

Scope 1+2 emissions (A, C) and Scope 1+2+3 emissions (B, D) for the equity (A, B) and fixed income (C, D) universe.

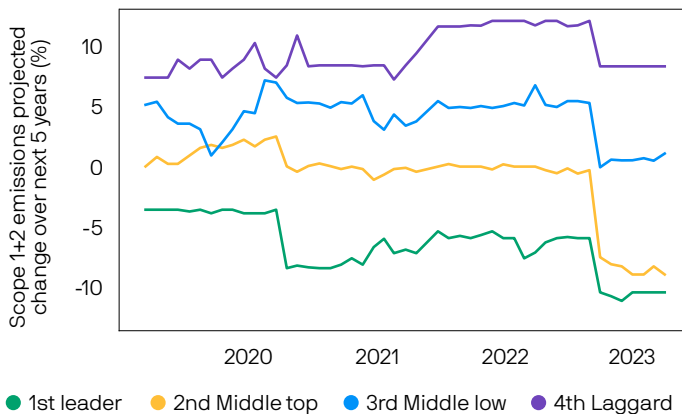


Source: J.P. Morgan Asset Management. S&P Global Trucost. Data as of October 2023. "tCO<sub>2</sub>" = tonnes of carbon dioxide.

**Exhibit 3: Projected GHG emissions change for carbon transition score quartiles for the fixed income universe**

**Projected decarbonisation rates are largest for the top quartile of the Carbon Transition Score**

Projected Scope 1+2 emissions for Carbon Transition Score quartiles



Source: J.P. Morgan Asset Management. S&P Global Trucost. Data as of October 2023.



Taking this finding, together with the findings from the GHG emissions intensity metric, suggests that those companies identified by the Carbon Transition Score as low carbon transition leaders have the greatest potential to reduce GHG emissions (as seen through the projected GHG emissions change metric) and, if their decarbonisation targets are met, may be expected to end up reducing GHG emissions the most over time, resulting in a lower GHG emissions intensity in later years.

### Decarbonisation rates will vary across the economy

Sectors for which scalable, low-carbon solutions are already available, are expected to be able to decarbonise faster than sectors where significant technological development is still needed to scale low-carbon alternatives.

Sectors with low Scope 1 and Scope 2 emissions can make use of existing low-emissions technologies, many of which are cheaper than existing carbon intensive technologies.<sup>26</sup> For instance, a company can reduce their Scope 1 fleet emissions by choosing to purchase electric vehicles, or they can reduce their Scope 2 emissions by switching from fossil fuels to renewable electricity generation.

In high-emitting sectors, the options are more varied. The maturity of available technological alternatives as well as the source (Scope 1, 2 or 3) of the emissions can play a role. Certain sectors, such as energy and transport, can also transition towards the use or production of many existing low-carbon technologies, but the rate of company-level decarbonisation can vary significantly depending on factors such as the willingness or ability of companies to invest in or develop these low carbon technologies as well as consumer demand for low-carbon solutions. In high-emitting sectors where there is not yet a clear pathway to decarbonisation, incremental action can still be taken, but will be mostly focused on improving efficiency.

As a result, comparisons of company-level carbon intensity and decarbonisation performance should, at a minimum, be at the sector level, so that these varying speeds of transition are taken into account, and so that those leading within their sectors are recognised.

Sector-specific decarbonisation challenges are considered in the Carbon Transition Score in two distinct ways. First, scores are calculated at the sector

level, meaning that companies are always compared to their peers. Second, a sector-specific materiality weighting is applied to each of the indicators shown in **Exhibit 1**, whereby the highest weighting is put on the most meaningful indicators for each sector.

The materiality weighting is based on the Sustainability Accounting Standards Board (SASB) materiality map, and is enhanced and complemented by input from J.P. Morgan Asset Management's sector specialists.<sup>27</sup> For example, since the SASB materiality map does not explicitly include Scope 3 emissions, the materiality of the consumer emissions and opportunities indicator is derived directly from input from sector specialists. This approach ensures that the Carbon Transition Score captures the relevance of different climate-related topics for each sector.

To illustrate the importance of the sector-specific considerations, **Exhibit 4** shows a snapshot of the median Scope 1, Scope 2 and Scope 3 emissions grouped by sector.<sup>28,29</sup> There is significant variation in GHG emissions between sectors. Furthermore, we see that the largest scope of GHG emissions also varies significantly between sectors, due to the differing sources of GHG emissions across sectors, highlighting the importance of also treating scopes individually.

The materiality matrix takes these considerations into account by applying relatively more weight to the GHG emissions scopes that are more important for each sector. The automobiles and components sector, for example, has relatively more weight placed on the consumer emissions and opportunities indicator, while the utilities and materials sectors have relatively more weight placed on the direct emissions indicator (**Exhibit 4B**).

As total GHG emissions intensity varies by sector and scope, it follows that decarbonisation rates will also vary across sectors and scopes. Moreover, meaningful decarbonisation rates are best understood at the sector level due to the varying challenges in decarbonisation, as discussed earlier. To consider the relationship between GHG emissions intensity and decarbonisation rates, the median Scope 1+2 and Scope 1+2+3 emissions intensity for each sector in 2021 is compared to the annual average decarbonisation rate for the respective GHG emissions scopes for each sector between 2017 and 2021<sup>30</sup> (**Exhibit 5**).

<sup>26</sup> IPCC, "Summary for Policymakers. In: Climate Change 2023: Synthesis Report". doi: 10.59327/IPCC/AR6-9789291691647.001.

<sup>27</sup> Sustainability Accounting Standards Board standards: <https://sasb.org/standards/>

<sup>28</sup> Sector categorisation differs between the equity universe and the fixed income universe.

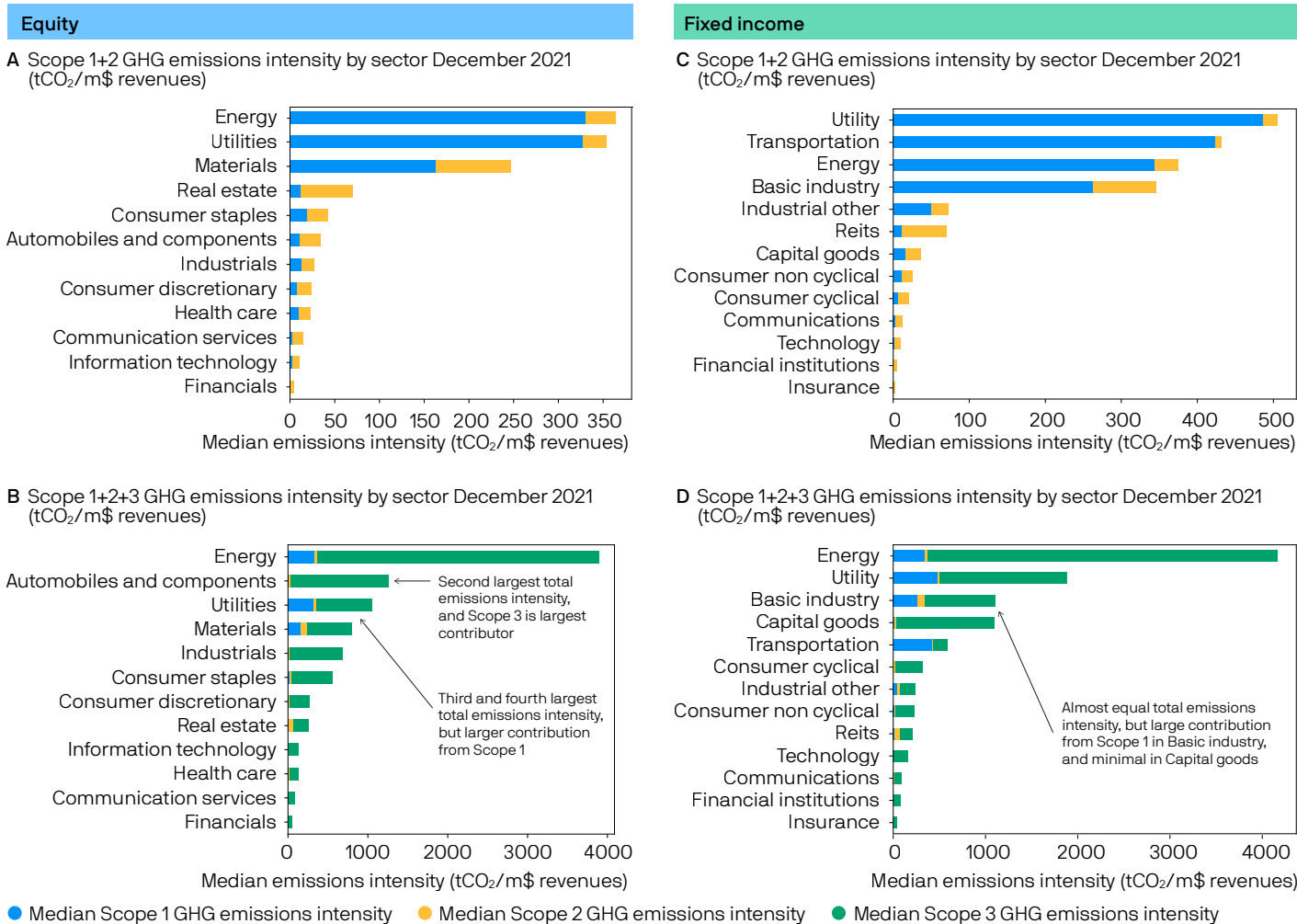
<sup>29</sup> Median GHG emissions intensity is calculated separately for each scope.

<sup>30</sup> Median GHG emissions intensity is calculated as the median of the summed GHG emissions intensity for Scope 1+2 and Scope 1+2+3.

**Exhibit 4: Median Scope 1, 2 and 3 emissions intensity per sector**

*The largest scope of GHG emissions varies by sector*

Scope 1 and 2 emissions intensity (A, C) and Scope 1, 2 and 3 emissions intensity (B, D) for the equity (A, B) and fixed income (C, D) universe.



Source: J.P. Morgan Asset Management. S&P Global Trucost. Data as of October 2023. "tCO<sub>2</sub>" = tonnes of carbon dioxide.

We find that energy companies have the largest GHG emissions intensity for Scope 1+2+3 and also have produced one of the largest average increases in GHG emissions (**Exhibit 5B, Exhibit 5D**). This combination of high GHG emissions intensity and increased GHG emissions is driven in part by increased demand for fossil fuels, especially coal, in the economic recovery that followed the Covid-19 pandemic, and resulted in record carbon dioxide emissions levels in 2021.<sup>31</sup> On the other hand, utilities companies, which have the largest median Scope 1+2 emissions intensity in both the equity and fixed income universe, have seen some of the larger decreases in GHG emissions (**Exhibit 5A, Exhibit 5C**).

This decrease is driven by a drop in Scope 1 emissions as a result of some companies switching from fossil fuel generation to renewable generation.<sup>32, 33</sup> A more detailed discussion on decarbonisation rates across different sectors is provided in our recent paper: "How Investors Can Perform Decarbonisation Analysis".<sup>34</sup>

In acknowledgement of the sector level differences laid out above, the Carbon Transition Score considers each GHG emissions scope separately and all calculations are sector specific.

<sup>31</sup> International Energy Agency, "Global Energy Review: CO<sub>2</sub> Emissions in 2021", IEA (Paris, 2023). <https://www.iea.org/reports/global-energy-review-co2-emissions-in-2021-2><https://www.iea.org/reports/global-energy-review-co2-emissions-in-2021-2>. Licence: CC BY 4.0.

<sup>32</sup> International Energy Agency, "Renewables: Overview", <https://www.iea.org/reports/renewable-electricity>.

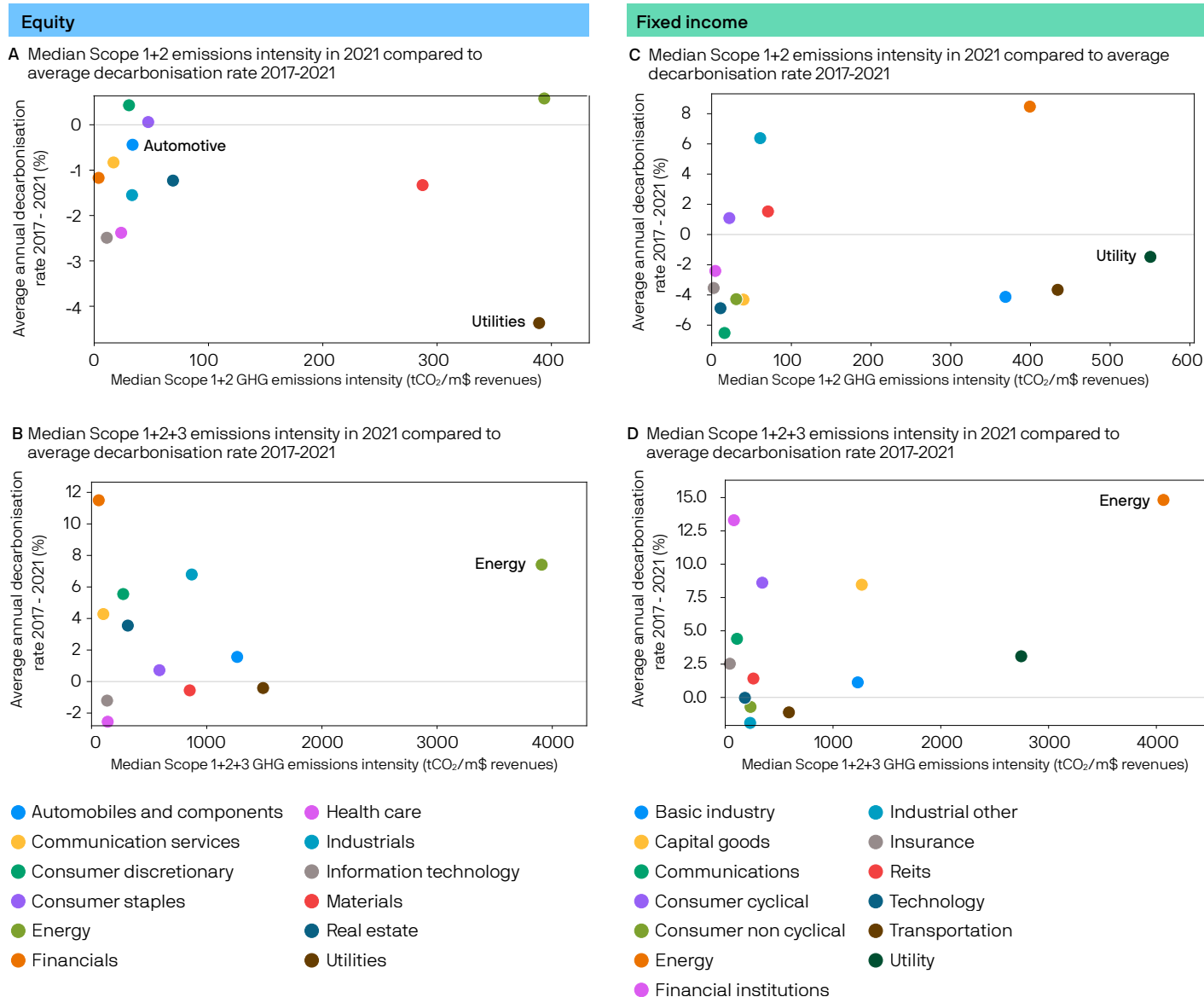
<sup>33</sup> Rack, Y., "As Net Zero Pressure Grows in Europe, Some Utilities, Enjoy 'Head Start'", S&P Global Market Intelligence (13 April 2021).

<sup>34</sup> J.P. Morgan Asset Management, "How Investors Can Perform Decarbonisation Analysis", 11 October 2023.

**Exhibit 5: Median GHG emissions intensity in 2021 and average annual decarbonisation rate 2017-2021 per sector**

*Decarbonisation rates vary across sectors and GHG emissions scopes*

Scope 1+2 emissions (A, C) and Scope 1+2+3 emissions (B, D) for the equity (A, B) and fixed income (C, D) universe.



Source: J.P. Morgan Asset Management, S&P Global Trucost. Data as of October 2023. "tCO<sub>2</sub>" = tonnes of carbon dioxide.

**Decarbonisation should be complemented by action on climate adaptation and climate resilience**

While decarbonisation is the cornerstone of the Paris Agreement, this is just one part of a wider low-carbon transition. Therefore, primarily focusing on GHG emissions may be an overly constraining approach for investors looking to reflect the wider climate-related themes of the Paris Agreement in their investment decisions.

The Carbon Transition Score includes a range of metrics beyond GHG emissions, considering broader topics such as energy use, water efficiency and waste, as well as incorporating the more overarching elements of climate-related governance (see **Exhibit 1**). Therefore,

each metric alone only partially contributes to the overall ranking and company score. As a result, we find that the Carbon Transition Score is not strongly correlated to emissions intensity, or any other metric, for any particular sector. Instead, companies that do better than their peers across a range of metrics have a better Carbon Transition Score. For instance, we find that companies in the top quartile Carbon Transition Score also have lower energy use intensity and water use intensity, over time (**Exhibit 6**). While there is more variability in the data for the lower quartiles, likely due to more extreme values where energy and water use are particularly high for some companies, this remains broadly true across quartiles for both the equity and fixed income universe.



### Transparency is essential

The Carbon Transition Score rewards companies that are providing the most information about their climate-related policies and impacts. Although estimated data is included for select metrics, the majority of inputs used in the score are based on reported information. For many companies, collecting and reporting this type of non-financial data is fairly novel, which can impact data quality including in relation to accuracy and completeness. In addition, certain datapoints are more relevant to each sector, meaning that the quality and quantity of data is expected to be higher where it is more material for the sector. This element is taken into account within the Carbon Transition Score methodology through a coverage check that disregards datapoints for each company in a sector for which there is no or very low reporting. As reporting becomes

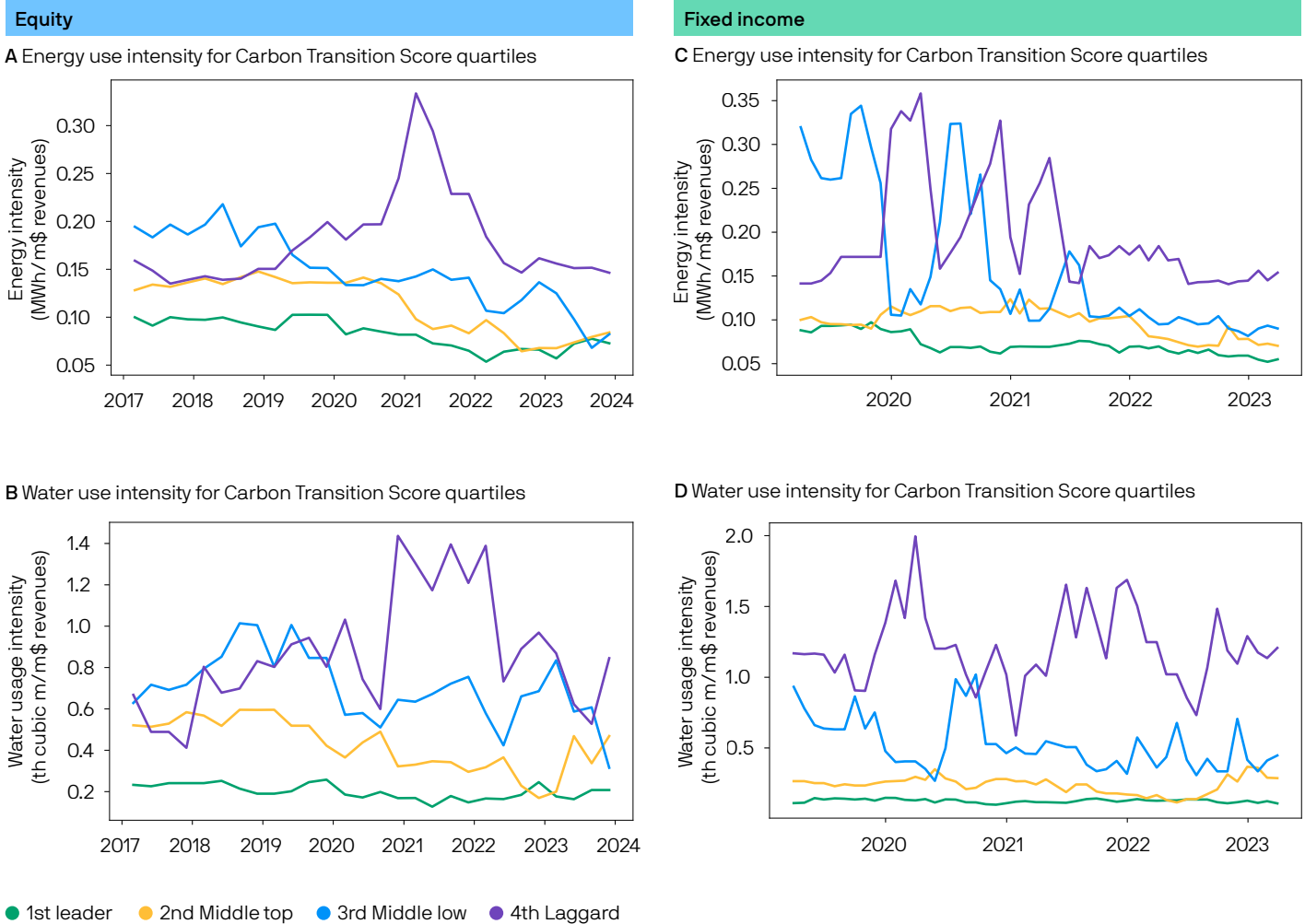
more common, as a result of mandatory and voluntary disclosure requirements, the quantity and quality of climate-related data is expected to continue to increase and improve.<sup>35</sup> In the meantime, the focus on rewarding transparency aims to incentivise disclosure.

Additionally, the methodology of the Carbon Transition Score itself follows a systematic process that allows for the full decomposition of a score to each individual driving input. Altogether, this focus on transparency in both the inputs and the score methodology allows the Carbon Transition Score to be used by J.P. Morgan Asset Management in an intuitive manner.

**Exhibit 6: Energy use and water use intensity for carbon transition score quartiles**

*Energy use intensity and water use intensity are lowest for the top quartile of the Carbon Transition Score*

Energy use intensity (A, C) and water use intensity (B, D) for the equity (A, B) and fixed income (C, D) universe.



Source: J.P. Morgan Asset Management. S&P Global Trucost. Data as of October 2023.

<sup>35</sup> Taskforce on Climate-related Financial Disclosures, "2023 Status Report", TCFD (October 2023).

## Case Study: Using the Carbon Transition Score to construct a smarter decarbonisation portfolio

In this case study we combine the Carbon Transition Score with the minimum requirements of the EU CTB regulation. We apply an optimisation process to construct two portfolios from equity and fixed income benchmark indices, respectively.<sup>36</sup> As a result the portfolio holdings reflect companies that we believe are best positioned for a low-carbon transition at each rebalancing.

We have previously shown that including the Carbon Transition Score in portfolio construction may help deliver a low tracking error due to its sector neutrality against the respective benchmark index.<sup>37</sup> In this case study, we show how investors with a decarbonisation objective –

in addition to their financial objective - benefit from using the Carbon Transition Score due to the use of forward-looking metrics and additional environmental indicators that help navigate the uncertainties inherent in the decades-long, low carbon transition.

This case study addresses some of the issues that have been raised with portfolios that meet only the minimum requirements of the EU CTB, as outlined in **Table 1**: (i) potential for sector bias, (ii) under-specification for the complexity of the low carbon transition, (iii) delayed response to value-chain effects and (iv) no direct tracking of company-level decarbonisation progress.

**Table 1: Issues identified with the EU climate benchmark framework and how these can be addressed in the J.P. Morgan Asset Management carbon transition score**

Issue	EU Climate Benchmark framework	J.P. Morgan Asset Management Carbon Transition Score
Potential to exclude high emitting sectors	A benchmark may completely exclude some high-emitting sectors in order to meet decarbonisation objectives. Although there is a built-in mechanism to deter this from happening – the “Equity Exposure Constraint” – the mechanism applies only to high emitting sectors as a group, rather than to individual sectors .	Illustrative portfolio is constructed to retain the same sector exposure ( <b>Exhibit 7A, Exhibit 7C</b> ) as the investable universe.
GHG Emissions may not be the most relevant metric to track a low carbon transition	The use of GHG emissions as the core benchmark metric may miss key information, such as whether a company has a decarbonisation target and whether its business model is in transition. This issue is particularly relevant for companies in hard-to-abate sectors, which may be enabling the transition, but might face exclusion from such a benchmark if they are unable to achieve sufficient GHG emissions reductions themselves. Furthermore, the focus on historical GHG emissions can penalise companies that are at the start of their decarbonisation journey.	A large range of metrics are considered beyond GHG emissions, providing a more holistic view of a company’s low carbon transition ( <b>Exhibit 1, Exhibit 6, Exhibit 9</b> ).
Not all emissions scopes considered initially in regulations	Scope 3 emissions are phased in to the minimum requirements for the carbon footprint calculations. Starting with the highest emitting sectors and expanding to cover all sectors by the end of 2024.	Scope 3 emissions are considered in the score across all sectors from the start. Different emissions scopes are also considered separately to acknowledge different challenges across scopes ( <b>Exhibit 1, Exhibit 3</b> ).
Normalising GHG emissions using enterprise value	Enterprise value including cash (EVIC) is not directly related to company-level decarbonisation. Typically, revenues would be used to normalise GHG emissions. <sup>38</sup>	GHG Emissions are normalised using revenues ( <b>Exhibit 2</b> ). EVIC is used only during the portfolio optimisation step to align with the EU Benchmark regulations.

Source: J.P. Morgan Asset Management.

<sup>36</sup> In our analysis the reference benchmarks are the MSCI World Index for the hypothetical equity portfolio and the Bloomberg US Global Corporate Index for the hypothetical fixed income portfolio

<sup>37</sup> JPM Carbon Transition Global Equity: A framework to build stronger portfolios for a low-carbon world (August 2023).

<sup>38</sup> The benchmark regulations specify the use of enterprise Value for normalising GHG emissions, but the subsequent handbook suggests using enterprise value including cash (EVIC) to avoid the potential for negative enterprise value, and this is now the norm. [https://finance.ec.europa.eu/system/files/2019-12/192020-sustainable-finance-teg-benchmarks-handbook\\_en\\_0.pdf](https://finance.ec.europa.eu/system/files/2019-12/192020-sustainable-finance-teg-benchmarks-handbook_en_0.pdf).

Our case study portfolios are effective at reallocating capital towards companies that are low-carbon transition leaders, and thus away from laggards, given that the average Carbon Transition Score of the respective portfolios is higher than that of the reference benchmark (Exhibit 7B, Exhibit 7D).

Furthermore, due to the sector neutrality of the score (Exhibit 7A, Exhibit 7C), this shift in capital can take place across all sectors of the economy. In this way, these illustrative Carbon Transition portfolios are differentiated from thematic portfolios that are usually concentrated on specific sectors or exclude others.

**Exhibit 7: Sector exposure and average carbon transition score**

**Carbon transition portfolios retain sector neutrality against their benchmark, while having a better Carbon Transition score**

Sector weights (A, C) and the average Carbon Transition Score over time (B, D) for equity (A, B) and fixed income (C, D) portfolios. Index for the hypothetical equity portfolio is MSCI World (A, B), and index for hypothetical fixed income portfolio is Bloomberg US Global Corporate Index (C, D)



Source: J.P. Morgan Asset Management. Data as of October 2023.

The EU CTB requires a 30% lower carbon footprint compared to the investable universe. Hence, we see that, by design, the illustrative portfolios have a lower carbon footprint compared to their benchmarks over time (**Exhibit 8A, Exhibit 8C**).<sup>39,40</sup> We thus expand our analysis of carbon metrics to the weighted average carbon intensity (WACI),<sup>41</sup> which considers the GHG emissions intensity of companies and is useful for evaluating exposure to carbon intensive companies.<sup>42</sup> Earlier, in **Exhibit 2**, we showed that companies with a better Carbon Transition Score tend to have a lower

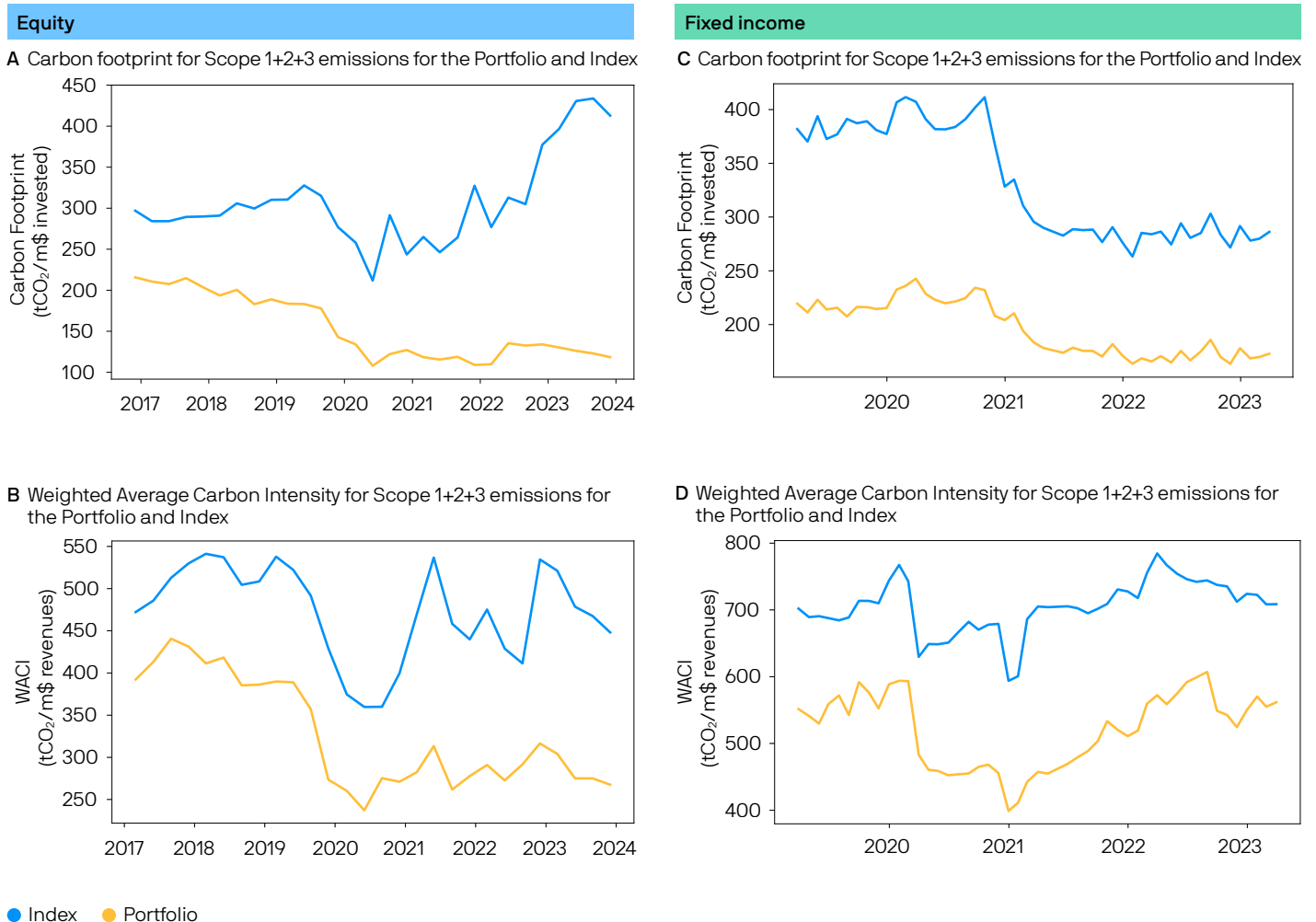
GHG emissions intensity. **Exhibit 8B, 8D** shows how this tendency results in a consistently lower WACI for both the equity and fixed income carbon transition portfolios compared to their benchmarks.

The trend in the WACI is not as consistent as for the carbon footprint, as these portfolios are not optimised to have a lower WACI. For example, we can see the impact of the Covid-19 pandemic in reducing WACI for both the carbon transition portfolios and their benchmarks, and the subsequent increase in WACI during the post-pandemic recovery.

**Exhibit 8: Carbon metric analysis**

**Carbon transition portfolios have a lower carbon footprint and WACI compared to their benchmark**

Carbon footprint (A, C) and WACI (B, D) for equity (A, B) and fixed income (C, D) portfolios.



Source: J.P. Morgan Asset Management. S&P Global Trucost. Data as of October 2023. "tCO<sub>2</sub>" = tonnes of carbon dioxide.

<sup>39</sup> For clarity, we do not illustrate here the additional 7% year-on-year self-decarbonisation of each portfolio, as this calculation requires a separate adjustment to enterprise value including cash (EVIC) to account for inflation.  
<sup>40</sup> Calculated using Scope 1+2+3 emissions, which goes further than the EU CTB minimum requirements  
<sup>41</sup> Calculated using Scope 1+2+3 emissions.  
<sup>42</sup> Carbon exposure metrics and their use cases are discussed further in our recent paper, "Understanding Carbon Exposure Metrics".

We now focus on the broader set of climate-related and forward-looking metrics that are considered within the Carbon Transition Score to understand how the illustrative portfolios perform (**Exhibit 9**). We find that, in general, the illustrative portfolios have lower energy intensity, water use intensity and a higher proportion of companies with decarbonisation targets compared to their benchmarks. These findings mirror those of the universe-level Carbon Transition Score, shown in **Exhibit 6**, but with some fluctuation in performance as the illustrative portfolios are not optimised for these metrics in particular. For instance, the equity portfolio has consistently lower energy intensity, but at times slightly higher water use intensity than its benchmark (**Exhibit 9A, Exhibit 9B**), whereas for the fixed income portfolio the reverse is true (**Exhibit 9D, Exhibit 9E**). Meanwhile, both the equity and fixed income portfolios have a higher proportion of companies with decarbonisation targets, compared to their benchmarks (**Exhibit 8C, Exhibit 8F**). If companies achieve these decarbonisation targets, this could then result in further decarbonisation of the portfolio, which would be captured by the carbon footprint and WACI metrics.

These findings illustrate that the carbon transition portfolios are achieving decarbonisation by identifying carbon transition leaders rather than by simply excluding high emitting sectors.

Overall, we believe that using the Carbon Transition Score in portfolio construction may help to achieve meaningful decarbonisation over time, while retaining sector neutrality and seeking to meet the EU Climate benchmark regulation. In combination with previous analysis showing that the Carbon Transition Score is also able to achieve a low tracking error, we conclude that the Carbon Transition Score can be used as a core input for investors that are wanting to incorporate the objectives of the Paris Agreement in their investment decisions alongside their financial ambitions.



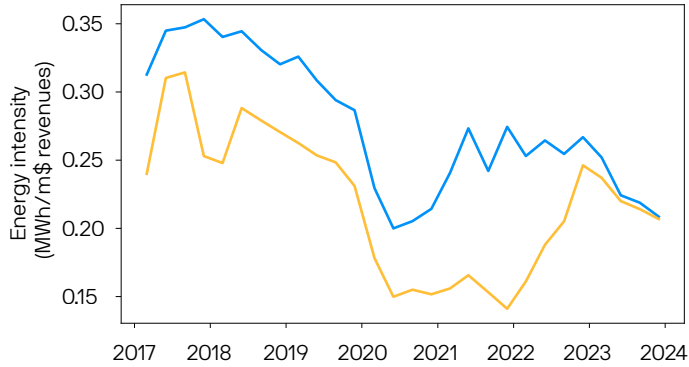
**Exhibit 9: Energy intensity, water use intensity and target coverage analysis**

*Carbon transition portfolios tend to have better performance across a range of climate related metrics compared to their benchmark*

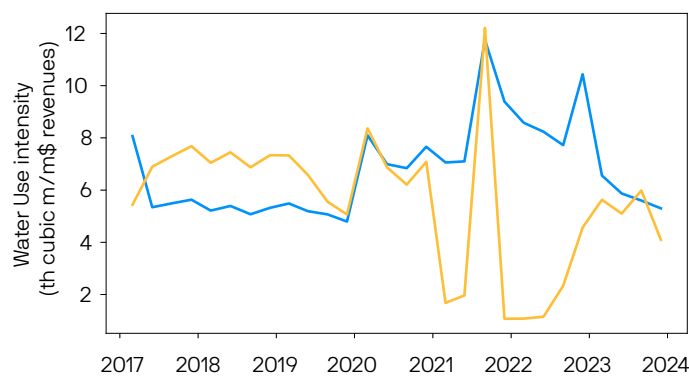
Water use intensity (A, D), energy intensity (B, E) and target coverage (C, F) for equity (A, B, C) and fixed income (D, E, F) portfolios.

**Equity**

**A** Energy intensity for the Portfolio and Index

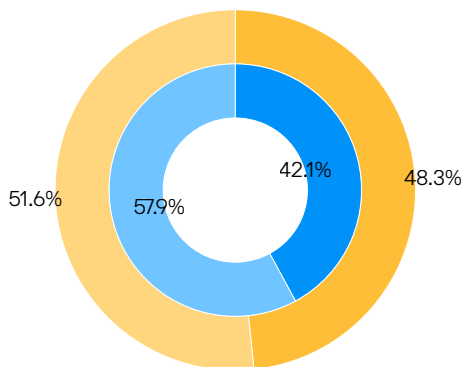


**B** Water use intensity for the Portfolio and Index



● Index ● Portfolio

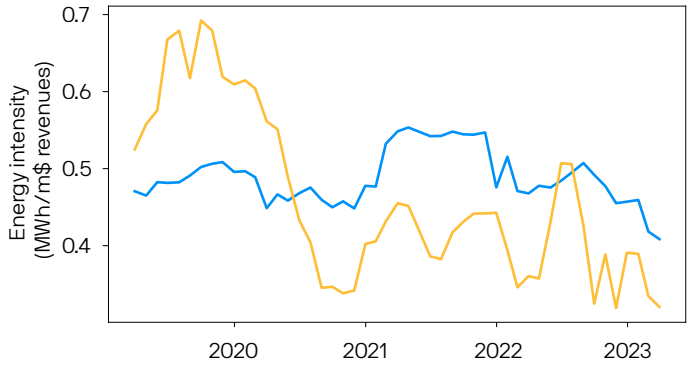
**C** Percentage of the Portfolio and Index with an SBTi target in 2023



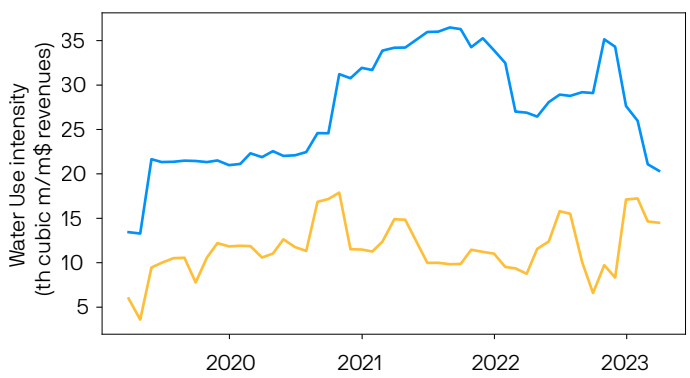
● Portfolio target ● Portfolio no target ● Index target ● Index no target

**Fixed income**

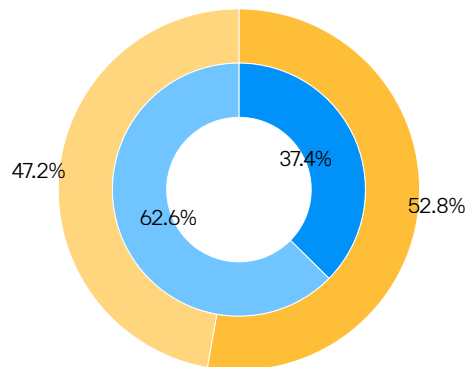
**D** Energy intensity for the Portfolio and Index



**E** Water use intensity for the Portfolio and Index



**F** Percentage of the Portfolio and Index with an SBTi target in 2023



Source: J.P. Morgan Asset Management. S&P Global Trucost. Science Based Targets initiative (SBTi). Data as of October 2023. "tCO<sub>2</sub>" = tonnes of carbon dioxide.

## Conclusion

The Carbon Transition Score is a proprietary tool developed by J.P. Morgan Asset Management for its use in certain client portfolios with investment objectives aligned to the Paris Agreement.

The advantages of adding the Carbon Transition Score to our portfolio management toolbox include its ability to address key themes of the low carbon transition that are receiving increasing attention by investors:

- The recognition that the low carbon transition is path dependent and therefore will develop at different speeds across economic sectors. This calls for a differentiated sector perspective.
- The expectation that investment decisions should be based on forward-looking indicators to capture relevant information for assessing the likely trajectory of companies in the low carbon transition.
- The additional insight available from a range of relevant metrics compared to the one-dimensional focus on GHG emissions. A set of well-researched indicators is an additional tool to help navigate the complex economic, financial and social interdependencies of the low carbon transition.

By leveraging active insights and proprietary research to take into account a range of metrics beyond GHG emissions, the Carbon Transition Score is designed to help identify low-carbon transition leaders across sectors. It provides an additional building block that can, for example, help provide additional portfolio insights within with the boundaries of the EU Climate Benchmark requirements.

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LV-JPM54649 | 01/24 | 09hb230812103740