osmosis
INVESTMENT MANAGEMENT

Comparing Environmental Footprints: Emerging Markets vs Developed Markets

December 2024

Comparing Environmental Footprints: Emerging Markets vs Developed Markets

Key takeaways

- The MSCI Emerging Markets index has a much higher environmental footprint than the MSCI World Index across carbon, water, and waste
- Roughly a third of this intensity increase is attributable to an increased exposure to 'heavier' sectors in the Emerging Markets and two thirds is driven by the companies themselves being more inefficient
- There is a general trend that companies in the Developed Markets design products, and companies in the Emerging Markets manufacture them, making the latter more resource intensive
- For each of the environmental performance indicators—carbon, water, and waste—the greatest difference in footprints between Emerging and Developed markets is seen in the GICS Information Technology sector
- Large footprints provide an opportunity for investors looking for large environmental reductions with relatively low active risk

Emerging markets (EM) offer huge opportunity for environmental impact and footprint reductions. Osmosis finds that across carbon, water, and waste, footprints are larger in the EM than in the developed markets (DM), illustrated in Figure 1. The most notable discrepancy is seen in EM's carbon footprints, which are almost six times higher than those in DM. Waste footprints follow closely, being almost five times as high, while water footprints in EM are more than twice as high as in DM.

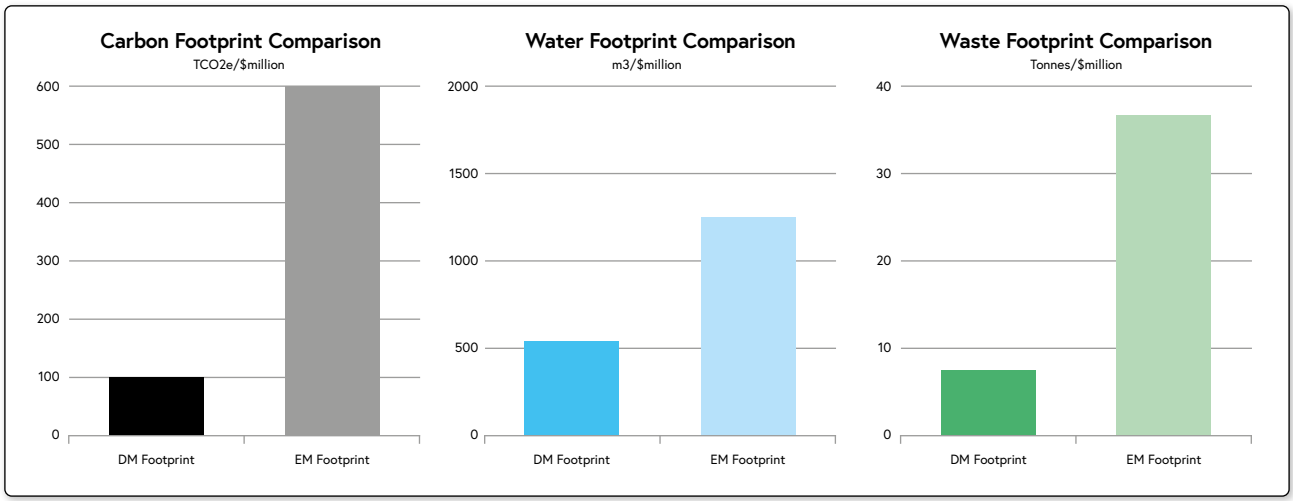

Figure 1: Osmosis IM, December 2024

The key driver of these higher footprints is the intensity of companies' activities rather than the sectoral composition of the index itself, though a lean towards heavier sectors in the EM does play a role. This pattern is particularly evident in water usage, where the EM index demonstrates much higher water intensity at the company level. This piece discusses the differences between the two indexes on a weighted basis, from year end 2024. All analysis refers to Global Industry Classification Standard (GICS) sectors, unless otherwise specified as Osmosis Sectors. Our 34 Osmosis Sectors are constructed in-house, offering a detailed classification which more effectively compares the operational efficiency of companies than 'off the shelf' sector definitions.

Carbon footprint disparities.

Unsurprisingly, the GICS utilities sector is the largest contributor to carbon footprints in both EM and DM, followed by the materials, and energy sectors. The utilities sector alone accounts for approximately 40% of total emissions in both markets, illustrated in Figure 2.

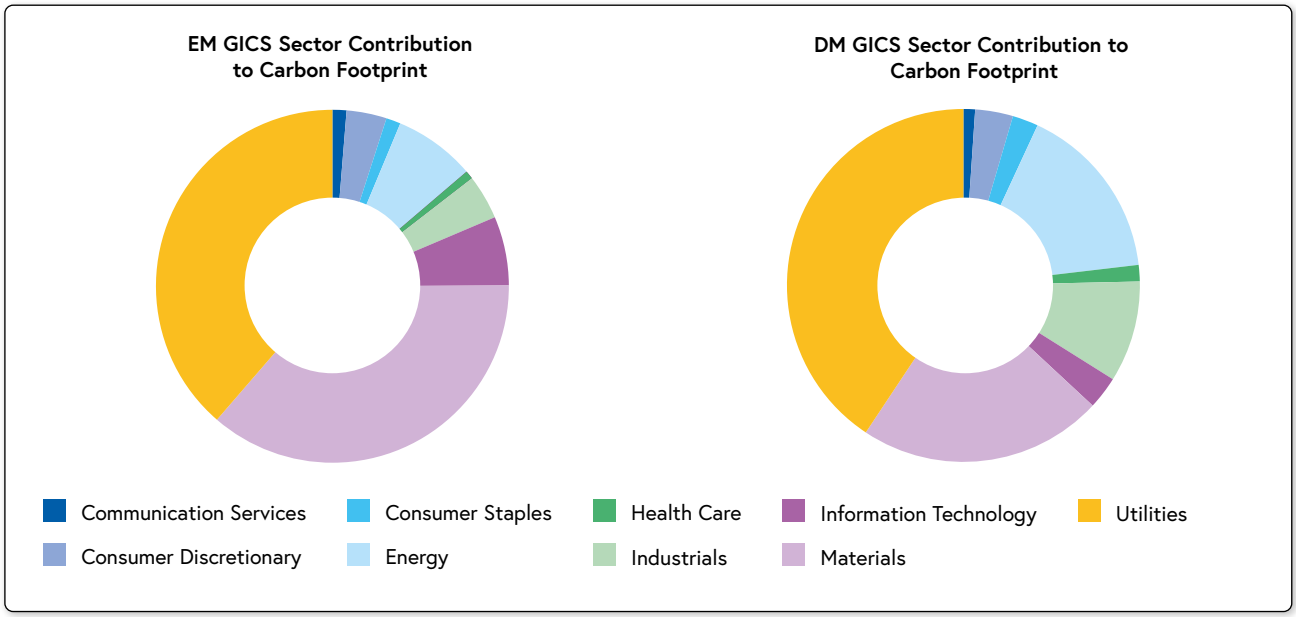

Figure 2: Osmosis IM, December 2024

The EM has a slightly higher weighting to these sectors, indicating a lean towards more carbon-intensive industries. However when looking at the sectors themselves, we see utilities, materials, and energy in the EM are significantly more carbon-intensive than their DM counterparts, with the utilities and materials sectors emitting nearly five times as much, and the energy sector emitting twice as much, as shown in Figure 3 below.

A more detailed breakdown of these heavy GICS sectors into Osmosis sectors further underscores the disproportionate environmental impact of carbon-intensive sectors relative to their index weight. In EM, construction & materials, electricity and gas, water & multi-utilities collectively account for 57% of total emissions while representing only 4% of the total index weight. Similarly in DM, electricity, chemicals, and oil & gas producers contribute 54% of emissions and make up just 6% of the index weight. This highlights how heavy industries have an outsized carbon footprint compared to their representation in market indices.

From an Osmosis sector perspective, these high-emitting sectors are significantly more intensive in the EM. A prime example of this is the construction & materials sector, the single largest contributor to EM's carbon footprint, accounting for nearly 20%. The sector's carbon footprint is fourteen times higher in EM than in DM, primarily due to the higher concentration of cement companies in the EM. Cement companies make up 25% of the sector in EM, compared to just over 5% in DM. Cement production is highly carbon-intensive because of the calcination of limestone and heating processes.

The greatest difference in carbon footprints between GICS sectors in the two indexes comes from the Information Technology (IT) sector, where EM IT companies are nearly 12 times more carbon-intensive than their DM equivalents, illustrated in Figure 3. The primary reason for EM IT emissions being much higher is the outsourcing of manufacturing from DM to EM. DM companies like Apple and NVIDIA tend to focus on design, while production is outsourced to EM manufacturers such as TSMC and Foxconn.

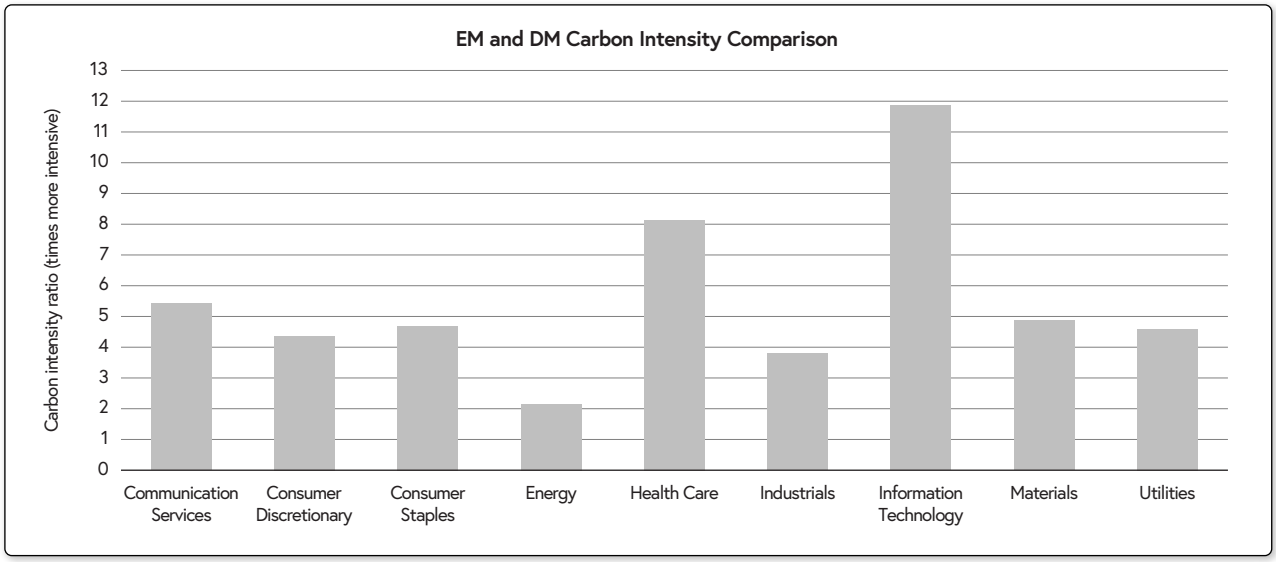

Figure 3: Osmosis IM, December 2024. Sectors are GICS

Water footprint disparities

Water footprint differences are similarly pronounced between indexes, with EM sectors exhibiting far greater water footprints than their DM counterparts. Figure 4 illustrates how the most intensive GICS sectors in EM are IT, utilities, and materials and in DM, it is utilities, materials and consumer discretionary.

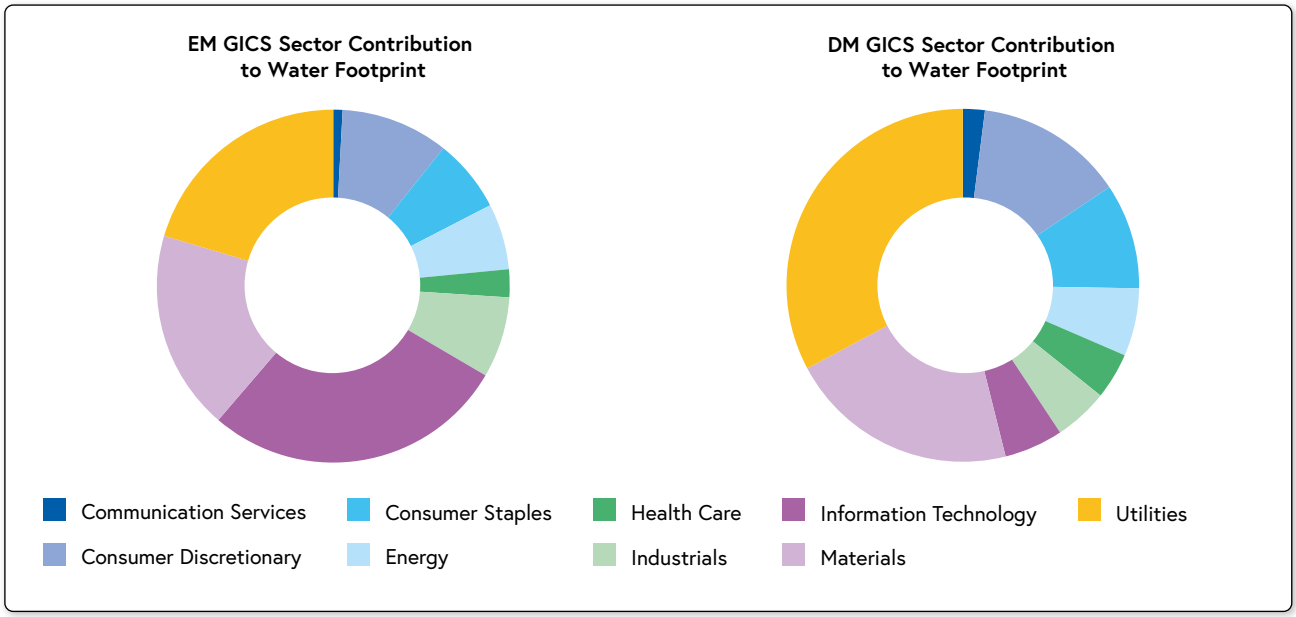

Figure 4: Osmosis IM, December 2024

Despite accounting for a similar sector weight in both markets, the footprint of EM IT is nearly 12 times greater than in DM, shown in Figure 5. The generalisation that DM companies design IT products to be manufactured in the EM is again at play here. The high water usage is partly due to the large quantities of ultra-pure water needed for chip cleaning. As chips can often be smaller than bacteria or a red blood cell, this water is used to rinse chips of residue during the fabrication process.

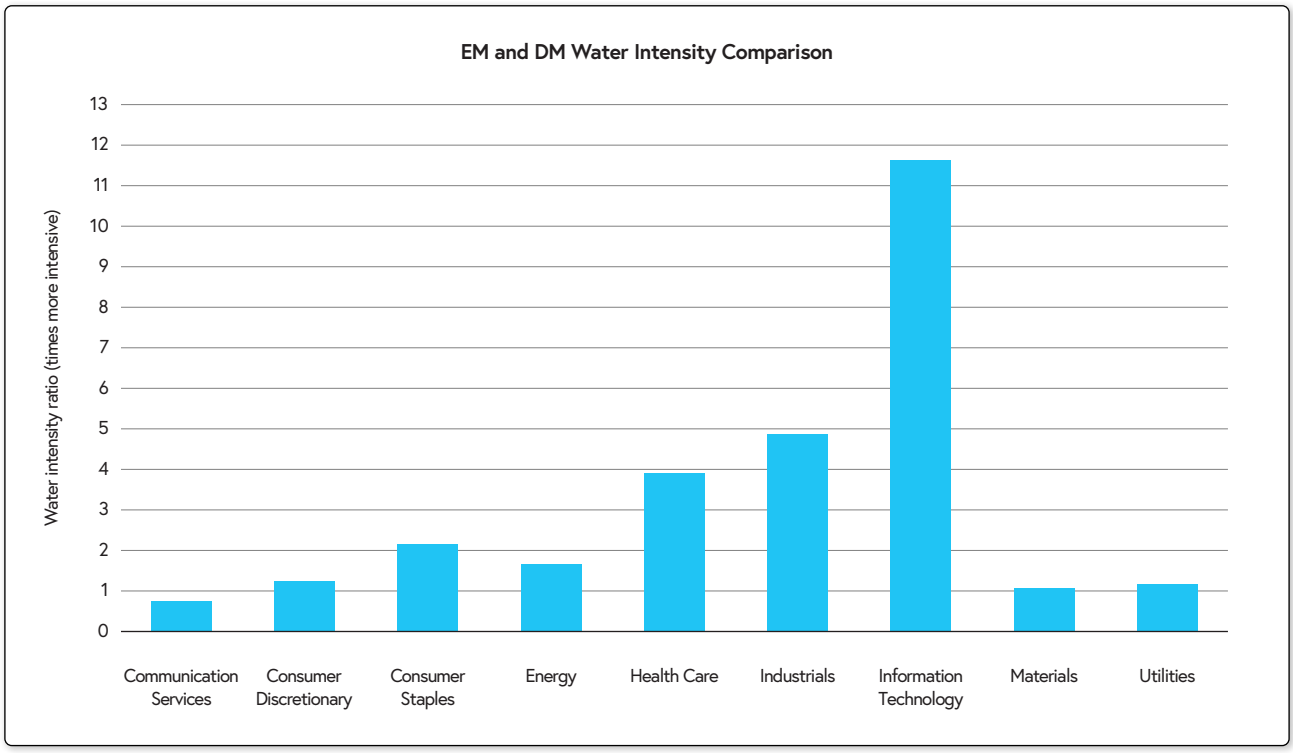

Figure 5: Osmosis IM, December 2024. Sectors are GICS

Waste footprint disparities

EM's waste footprint is almost five times greater than DM's. The largest contributor to EM's waste footprint is the GICS Materials sector, which alone accounts for 55% of the waste footprint in EM, compared to just over 20% in DM, shown in Figure 6. Further, the waste footprint of the GICS Materials sector in EM is over 13 times higher than in DM, even though the sector's weighting is only twice as large. This highlights that while the sector itself is more intensive in EM, the companies within it also exhibit much poorer waste-related performance.

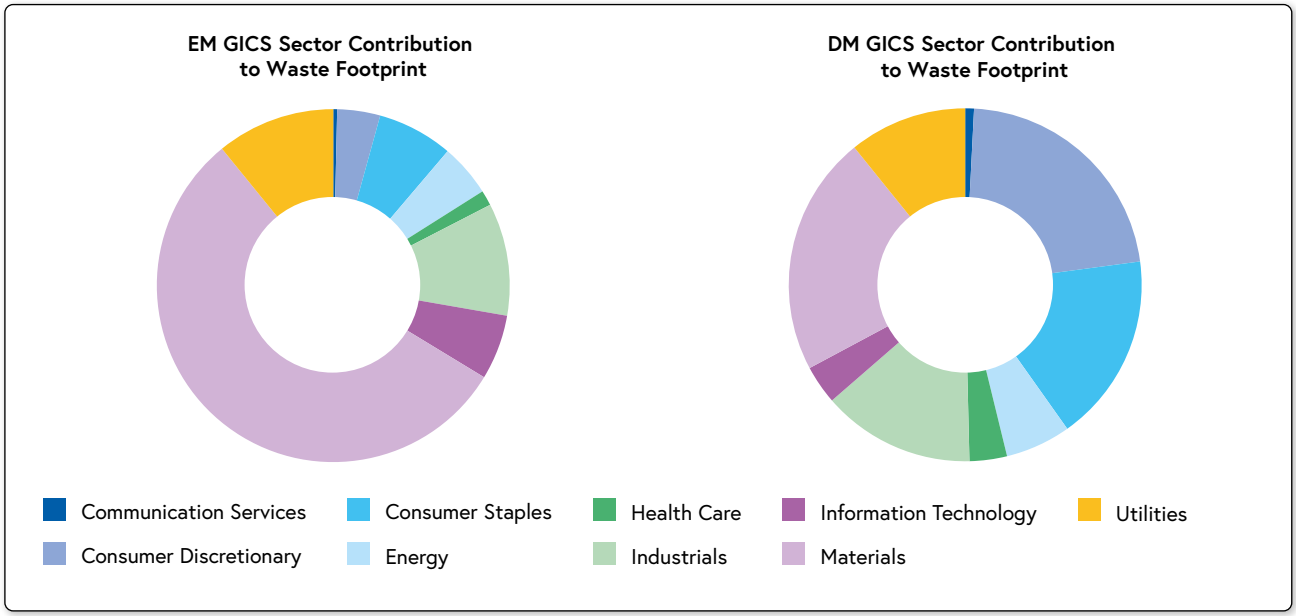

Figure 6: Osmosis IM, December 2024

The larger waste footprints of the GICS Materials sector in EM are mainly driven by the Osmosis industrial metals sector, which is over 20 times more intensive in EM than in DM. While steel-related activities dominate this sector in both EM and DM, EM businesses are significantly more diversified, with greater involvement in more resource-intensive activities such as mining and aluminium production, making the sector considerably more intensive overall. Similarly, the Osmosis mining sector, which contributes to the significant footprint of the GICS Materials sector, is five times more intensive in EM than in DM. While DM companies typically focus on extracting high-value, precious metals like gold and copper, the EM mining sector is more diversified. Additionally, approximately 20% of the EM mining sector is dedicated to coal mining, which results in much higher waste generation due in part to the large volumes of materials processed.

Both the Osmosis mining and industrial metals sectors also hold greater weight in EM, with the EM Osmosis mining sector being more than three times the size of its DM counterpart, and the EM Osmosis industrial metals sector over five times larger. This disparity is partly due to DM outsourcing mining and metal production to EM, where critical mineral reserves are more abundant. A major driver of this trend is the growing demand for critical minerals fuelled by the global energy transition. Lithium, for instance, is a vital element in rechargeable batteries, which power electric vehicles and enable large-scale energy storage for renewable sources like solar and wind. Similarly, copper plays a crucial role in green technologies like solar panels and wind turbines.

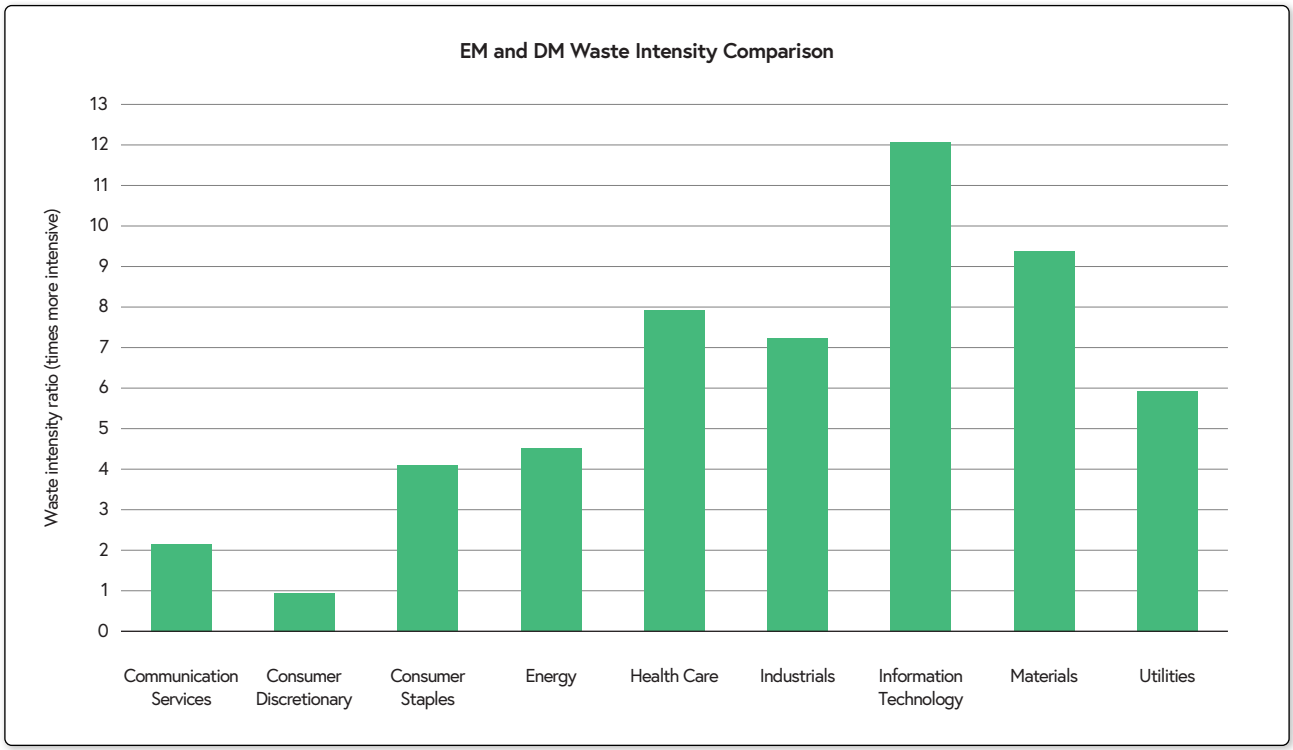

Figure 7: Osmosis IM, December 2024. Sectors are GICS

Among the GICS sectors, the IT sector shows the largest disparity in waste footprints between DM and EM, as illustrated in Figure 7. While waste is less of a concern in IT compared to more intensive sectors like materials, the main driver of the difference, like in carbon and water footprints, is the outsourcing of production by DM IT companies to EM. DM companies typically have lower waste intensities due to a primary focus in IT design activities. The waste output of EM IT is comparatively much more intensive, with the main waste generated in EM IT manufacturing coming from e-waste, such as batteries, as well as scrap and excess material waste from the production of IT hardware, like computers and mobile phones.

Conclusion

Across carbon, water, and waste, EM exhibit higher environmental footprints compared to DM. While sector weightings contribute, with the EM index skewed towards heavier, more resource-intensive sectors, the primary driver is the higher environmental impact of the companies within EM. The greatest disparities are observed in carbon intensity, followed by waste and water footprints. The GICS IT sector, which shows the largest disparities across all environmental footprints, exemplifies how outsourcing production to EM can shift more intensive, environmentally damaging activities to these markets.

The higher footprints in EM present significant opportunities for environmental improvements, with relatively low active risk compared to DM. These findings underscore the importance of EM investment in driving the global transition to a low-carbon economy. Given that the increased footprints are largely driven by DM outsourcing more resource-intensive production to EM, adopting a whole-economy investment approach is essential to addressing these challenges.

Important Information

This document was prepared and issued by Osmosis Investment Research Solutions Limited ("OIRS"). OIRS is an affiliate of Osmosis Investment Management US LLC (regulated in the US by the SEC) and Osmosis Investment Management UK Limited (regulated in the UK by the FCA with FRN 765056). OIRS and these affiliated companies are wholly owned by Osmosis (Holdings) Limited ("Osmosis"), a UK-based financial services group. Osmosis has been operating its Model of Resource Efficiency since 2011.

This research provided is for information purposes and does not constitute an offer or solicitation of an offer or any advice or recommendation to purchase any securities. No representations, express or implied, are made as to the accuracy or completeness of such statements, assumptions, estimates or projections or with respect to any other materials herein.