



# Responsible Investment Report N°14

## Power hungry AI

*“The real challenge is not just innovation itself, but managing the change it brings about.”*

— Peter Drucker

Generative artificial intelligence (‘Gen AI’) has been the dominant theme in markets this year, driving innovation, investment, and new opportunities. Many are excited about the transformative potential of AI, but there lies an inconvenient challenge beneath this excitement: the increased energy needed to sustain these technological advancements. The International Energy Agency (IEA) predicts that rising Gen AI workloads will double global data centre electricity demand by 2026. This is equivalent to adding the energy needs of Sweden.

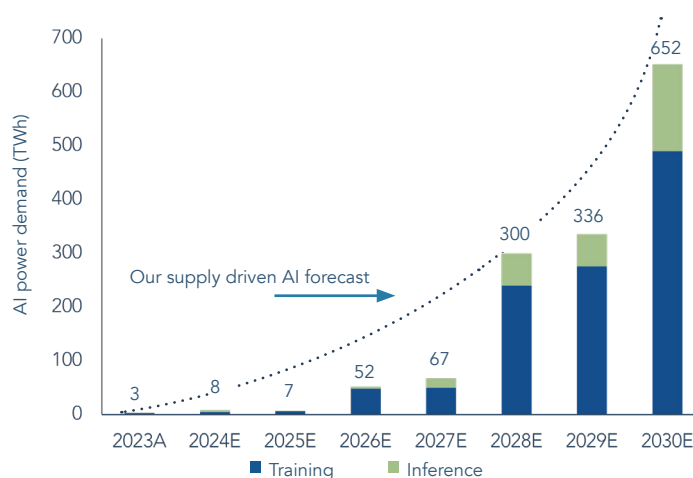
As our major tech holdings—Microsoft, Alphabet, and Meta Platforms—increase their AI investments, we’ve taken a step back to assess the broader business implications and the amount of energy required to power their data centres. The world is complicated, and innovation is often messy. The future of AI will undoubtedly require the careful management of the operational and environmental challenges these innovations bring. As long-term investors, we must understand the implications.

### Why all this energy?

AI’s energy usage can be divided into two primary stages: training and inference. During training, AI models learn from large datasets, requiring intensive computational power to process data, refine algorithms, and enhance their understanding. While OpenAI has not publicly disclosed the exact energy usage for training its first ChatGPT model, estimates based on the number of parameters and the complexity of the model suggest the amount of energy is roughly equivalent to the power consumption of ~150 US homes for an entire year.

Inference, the second stage, refers to how AI models apply their training to new data, making predictions or generating responses. This process is less energy-consuming than training but will become more significant as AI tools are adopted widely across industries. Generating a response to a ChatGPT prompt is approximately 10x more energy intensive than a standard search query on Google. While training is a substantial upfront investment in energy, inference becomes a recurring demand as AI is integrated into more business processes and everyday tasks, see Figure 1.

FIGURE 1: INFERENCE WILL ACCOUNT FOR A GROWING PROPORTION OF AI POWER DEMAND



Source: Wells Fargo, 2024

### The art of balance: weighing opportunity and risk

The value proposition of Gen AI lies in its potential to drive higher levels of efficiency, innovation, and personalised experiences, while transforming industries and solving problems previously beyond our reach.

However, realising this potential requires balancing AI’s benefits with its societal and ethical implications, as well as establishing the right regulatory framework to ensure responsible use. We believe that Microsoft, Alphabet, and Meta recognise this. Their continued licence to operate relies on their ability to navigate these



challenges responsibly.

The energy challenge is one we've encountered before. We don't have to look far back into history to see the same pattern play out – no civilisation has ever managed to decouple economic growth from increased energy consumption.

### Energy bottlenecks and grid electrification

The rapid growth of Gen AI has exposed vulnerabilities in current energy infrastructure. With energy markets already forecast to be tight over the next 5-10 years, growth in AI could exacerbate supply challenges. This is particularly relevant in regions like Ireland and parts of the United States, where the concentration of data centres has already strained electricity grids.

The expansion of AI has necessitated a parallel increase in energy supply and updates to grid infrastructure. Take the US as an example, it is home to 33% of the world's data centres which are expected to account for 6% of the country's total electricity consumption by 2026. Many parts of the US grid that are still in use today were constructed in the mid-20th century. Components—such as transmission lines, transformers, and substations—are nearing or have surpassed their expected lifespans. The grid in its current form is also not fit for electrification, an essential aspect of the energy transition from fossil fuels to cleaner sources of energy.

We've long known that the grid has been underinvested in, but it seems that only now, with the alarmist headlines surrounding Gen AI and its energy consumption, people are finally starting to pay attention to the issue. The grid needs to be upgraded with modern technology so that it is fit for renewable energy transmission. This takes time and, most importantly, investment.

### Reasons to be hopeful

*"In the middle of difficulty lies opportunity."*

— *Albert Einstein*

We're at a crucial turning point when it comes to the energy transition, and we simply can't afford to waste any time. Just as Gen AI has demonstrated the remarkable capabilities

of human ingenuity, addressing the energy dilemma highlights a similar need for creative solutions.

Big tech has a vested interest in solving this problem too. Some of the most innovative minds and companies in the world are stepping up to tackle it. Importantly, they're not just bringing their expertise—they're also backing it with significant financial investment. Microsoft, Alphabet, and Meta Platforms have collectively spent \$100 billion in capital expenditure in 2023, primarily on data centre infrastructure and resource optimisation, including power.

These companies have also set ambitious renewable energy goals, including Microsoft's target of 100% renewable energy by 2025, and Alphabet's goal of 24/7 carbon-free energy by 2030. To achieve this, many are using Power Purchase Agreements (PPAs) to secure financing for new wind, solar, and nuclear projects, driving the expansion of global renewable energy. In 2023, PPA demand surged, largely driven by tech leaders like Microsoft and Alphabet.

They're also investing in next-generation nuclear technology, including small modular reactors (SMRs), which offer low-emission power and flexibility. Microsoft recently signed the world's first fusion energy purchase agreement with Helion Energy, aiming to receive electricity from its first fusion power plant by 2028. While nuclear isn't a short-term solution due to its lengthy development timelines, it presents a promising way to balance AI's growing energy demands with sustainability goals in the long run.

In addition to the development of cleaner energy sources to power data centres, hardware is also expected to become more energy-efficient and cost-effective. NVIDIA's newest Blackwell platform enabling large language models to run at almost 25x less cost and energy consumption using its GB200 chip versus its predecessor, the H100.

### Short-term challenges, long-term vision

In the immediate future, the path to net zero for major tech companies is unlikely to be straight. For example, Microsoft and Alphabet have recently missed some of their emissions reduction targets, citing challenges such as the carbon embedded in building new data centres



and the energy demands of advanced hardware.

Alphabet's total greenhouse gas (GHG) emissions in 2023 were 14.3 million tCO<sub>2</sub>e, representing a 13% year-over-year increase and a 48% increase compared to their 2019 target base year. Similarly, Microsoft's emissions in 2023 were 17.2 million tCO<sub>2</sub>e, a 4% year-over-year increase and a 40% increase from 2020 levels. Despite rising emissions, their assurances of long-term decarbonisation plans and ongoing investments in climate action mean that engagement with them on the matter is not yet necessary.

We believe that the short-term difficulties associated with AI's energy needs should not overshadow the long-term potential of these investments. It's essential to recognise that while AI is energy-intensive, it can help direct the necessary capital investments into long-term, secure, clean energy sources. This in turn will drive decarbonisation in other sectors.

Gen AI may also have substitution effects, where digital processes replace more carbon-intensive activities. Alphabet has leveraged AI to optimise data centres' energy efficiency through AI-driven cooling systems, generative AI for predictive maintenance, and AI-enhanced load balancing. These innovations improve resource allocation, streamline the distribution of computing loads across servers, and significantly reduce power consumption.

The many potential applications of AI are yet to be explored and as the technology continues to mature, its potential to enhance productivity and resource efficiency across industries will become a key factor in driving sustainable economic growth.

### Asking the hard questions

*"Pragmatism and hope are not opposites, they are companions. Real hope sees the difficulties ahead but moves forward with practical steps."*

— Unknown

Our companies have made significant commitments to sustainability, backed by real financial investment. We take these commitments at face value because their track record demonstrates that they have a strong

grasp of the fact that meeting both societal and customer needs is essential for their enduring success.

As shareholders, it's our duty to ensure they stay on course. We will continue to closely monitor how they respond to these challenges and make sure their actions align with sound business principles. If we detect any breakdown in their commitment to corporate integrity and responsible business practices, it will lead us to question management's effectiveness and the long-term sustainability of profits.

Progress is about balancing innovation with responsibility and managing externalities along the way. We believe that with the right mix of capital, patience, and a thoughtful regulatory framework, the challenges related to AI energy intensity can be solved.

It is only by asking these hard questions that we can fully appreciate the true complexity of how businesses operate and navigate the world around them. It is precisely by observing how our investee companies tackle these challenges that we gain valuable insights, which in turn informs our investment conviction.

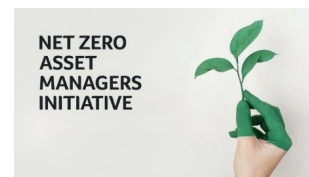
Sian-Azilis Evans

November 2024





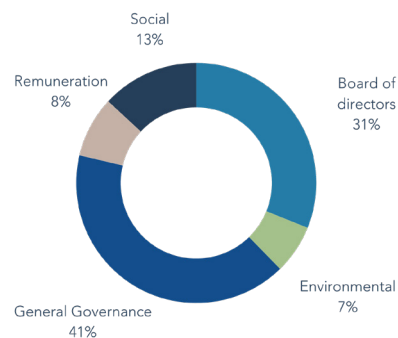
## Responsible Investment at Troy



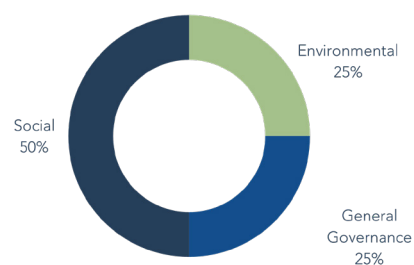
### Voting

	2023	2024 YTD
Meetings Held	98	76
Meetings voted	100%	100%
Meetings with at least 1 vote Against Management*	48%	37%
<b>Management Resolutions</b>		
Total management resolutions	1,618	1,207
Votes against management resolutions*	8%	4%
Votes against ISS recommendations	10%	5%
<b>Shareholder Resolutions</b>		
Total shareholder resolutions	79	62
Votes in favour of shareholder resolutions	43%	26%
Votes against ISS recommendations	24%	16%

### VOTES IN FAVOUR OF SHAREHOLDER RESOLUTIONS – 2024 YTD

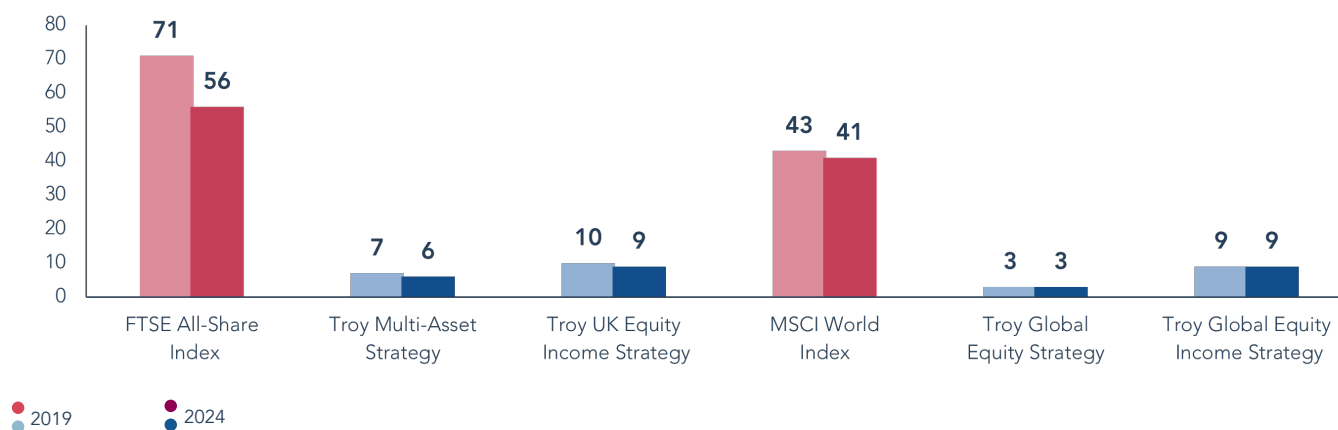


### VOTES AGAINST MANAGEMENT RECOMMENDATIONS - 2024 YTD (BOTH MANAGEMENT AND SHAREHOLDER RESOLUTIONS)



Source: ISS. \*This may include abstentions.

## Portfolio Carbon Footprint (Tons CO2e / \$M Invested)\*

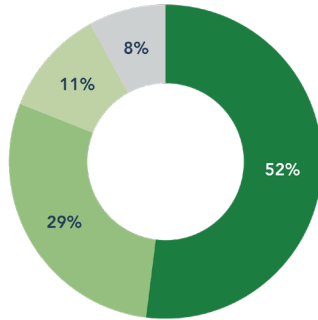
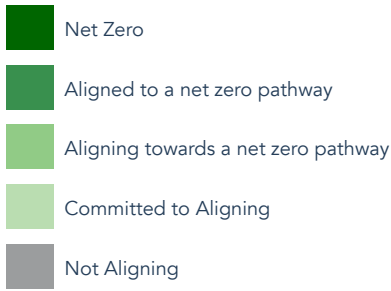


\*Carbon footprint calculated using market capitalisation.

Source: MSCI ESG Manager, portfolio holdings as at 30 September 2024. Asset Allocation subject to change. The information provided is based on calculations relating to corporate securities only. Where the fund holds other asset classes, such as cash or government bonds, these are excluded from the portfolio. The information shown relates to a mandate which is representative of, and has been managed in accordance with, the relevant Troy Strategy. Past performance is not a guide to future performance. All references to benchmarks are for comparative purposes only.



## Current Alignment of our Holdings with Net Zero by 2050

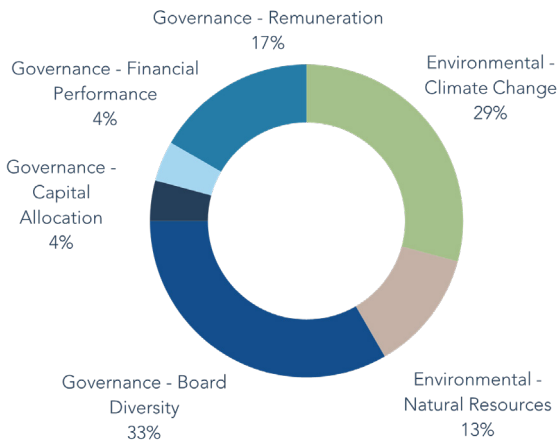


Troy has categorised all equity holdings along an alignment maturity scale in accordance with the Institutional Investors Group on Climate Change's (IIGCC) Net Zero Investment Framework methodology. This reflects our commitment under the Net Zero Asset Managers initiative to ensure our investments are on track to meet global ambitions of net zero emissions by 2050 or sooner. We currently have engagements underway with all holdings deemed 'not aligning', our goal is to move all holdings along the climate maturity scale with the ultimate objective of achieving net zero. For further information please see [Troy's Climate Change Mitigation Policy](#).<sup>2</sup>

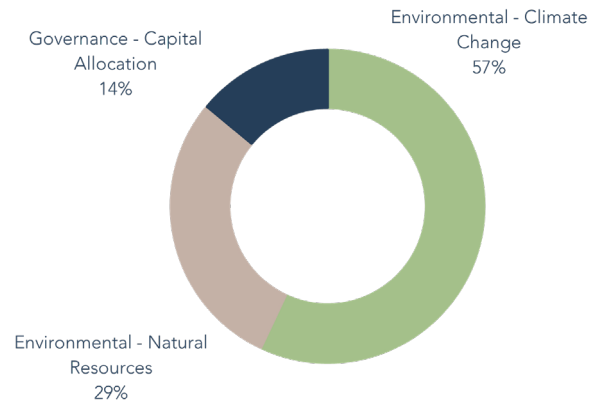
Source: MSCI ESG Manager

## Engagements

### 2023 - 23 ENGAGEMENTS WITH 18 COMPANIES



### 2024 YTD - 7 ENGAGEMENTS WITH 7 COMPANIES



Source: Troy Asset Management, 30 September 2024. \*Environmental, Social or Governance

<sup>2</sup>This policy outlines the consideration of climate risk in our investment decision-making process for mandates which meet the criteria under Article 8 of the European Union's Sustainable Finance Disclosure Regulation



## Disclaimer

Further information relating to how ESG integration is applied to the fund can be found in the fund prospectus and investor disclosure document. For further information relating to Troy's approach to company voting and engagement, please see Troy's Responsible Investment and Stewardship Policy available at [www.taml.co.uk](http://www.taml.co.uk).

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