



# Metaverse & Climate

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Received:  July 05, 2023

Published:  July 14, 2023

## Introduction

The innovative technological platform called the metaverse combines several technologies to offer a lifelike experience in a virtual setting. The future of metaverse is undoubtedly vast, and although it's in the process of being developed, it has arrived. And it's changing how we live. The metaverse has the potential to impact every aspect of businesses, and human experiences, including customer experience, redefining the approaches of our interaction, conducting business, and living. With (partial) transitioning from physical to virtual, the metaverse promises to address the carbon footprint issue.

## Metaverse & Climate

The immersive features of the metaverse provide substitutes for resource-intensive physical items that may otherwise increase consumer demand and harm sustainability. At the same time, this immersive quality of metaverse experiences might also help us get past the behavioural barriers to acting on climate change issues. The ability to use technology to identify and implement carbon reduction strategies will likely be the metaverse's most significant contribution to sustainability. Customers, for instance, may assign more of their outlays for specific products/services to eco-friendly virtual alternatives that use fewer resources to produce and thus contribute less wastage. In another instance, one of the more exciting uses of the metaverse could be in official travel. People have already discovered that meetings could be held remotely. Future corporate interactions might occur in the metaverse, recapturing some advantages of in-person meetings and cutting down on the emissions associated with discretionary air travel. By viewing the physical world through the lens of a virtual one, digital twins allow us to improve it. According to estimates, a building's carbon footprint can be cut by 50% with a digital-twin. With the help of digital twin technology, it is feasible to combine a wide variety of data sources to anticipate variables like air-pollution and carbon emissions and then identify solutions to these problems [1].

However, on the flip side, increasing engagement in metaverse space (and similar interfaces) may impact the environment. Therefore, the existing metaverse-based business models could threaten our world's sustainability. For example, as per an estimate, today, one Ethereum transaction accounts for an average of 60% more energy than 100,000 credit-card transactions, whereas a Bitcoin transaction, on average consumes 14X more power. An NFT transaction, on average, emits 48 kilograms of CO<sub>2</sub>, analogous to consuming about 18 liters of diesel [2,3].

A better environment and social outcomes must guide the organization's efforts to invest and formulate strategies, to explore the possibilities of the metaverse. Also, a cost-benefit arbitrage of leveraging metaverse must be carried out to have a more comprehensive view of these possibilities. Additionally, the metaverse will need a lot of computing power, so developing new data centers is inevitable. IT infrastructure with high capacity is required to support the metaverse's expectations. Business executives should therefore prioritize expanding and modernizing data centers, which begins with analyzing the current infrastructure and putting frameworks in place to gauge its environmental impact. If data centers are necessary, the IT industry must seek alternatives to reduce its enormous carbon footprint, more than that of every nation barring the USA, China, and India. It is estimated that the communications, media and service businesses produce more carbon emissions than all other sectors combined, even though most climate activists focus on reducing emissions from the automotive, aviation, and energy sectors.

Data centers have the same carbon footprint as the aviation industry, using 3% of the world's electrical supply and emitting around 2% of all greenhouse gas emissions. According to recent projections, by 2025, data centers will be responsible for 3.2 per cent of all global carbon emissions and may use one-fifth of all electricity produced. By 2040, digital data storage is predicted to account for 14% of global emissions, or roughly the same as the US

today. Data centers have the IT industry's fastest-growing carbon impact, doubling energy requirements every four years. IT giants have already used renewable energy for their computing needs; others may soon follow suit [4].

The management of end-user devices is the other area that may be addressed to tackle the problem of sustainability in online computing in general and the metaverse. Global carbon emissions from end-user devices like laptops, tablets, smartphones, and printers are 1.5 to 2.0 times greater than data centers. Companies have many more end-user devices than servers in on-premises data centers, which is one factor. Additionally, the devices are typically replaced much more frequently: the average replacement cycle for smartphones is two years, for laptops, it is four, and for printers, it is five. The industry standard for replacing servers is every five years. Even more concerning, emissions from end-user devices-as per a McKinsey study- are projected to grow at a CAGR of 12.8% annually [5]. Manufacturing, upstream transportation, and disposal are responsible for around three-fourths of global emissions.

Organizations, however, can do a lot to address this issue also. In general, for instance, sourcing adjustments can reduce emissions from end-user devices by 50 to 60 per cent or more, primarily by purchasing fewer devices per person and prolonging the lifespan of each appliance through recycling [5]. These alternatives won't cost anything and will cut costs, but businesses would want to consider how they will affect employee satisfaction. Also, businesses can recycle their equipment more aggressively. As companies in the semiconductor industry are already boosting their pledges to emission reduction, CIOs might exert pressure on suppliers to employ greener products. Optimizing computing requirements for data centers and increasing cloud usage to manage workloads are


other low-cost, high-impact activities.

## Conclusion

There are differing views on the phenomenon called metaverse. Much debate has been over whether the metaverse will be helpful or detrimental to our future [6]. While many see it as the next logical step for humanity after the internet, many critics believe it may do more harm than good. One of the concerns is the effect of the metaverse on the environment. Artificial intelligence (AI) systems require tremendous computing power, which could increase carbon emissions. Although an immersive experience like metaverse may reduce the need for physical travel, saving a lot of energy and resources, reducing fuel consumption, and reducing the emission of hazardous gases, its underlying technology can exacerbate environmental climate change. Moreover, all stakeholders must explore feasible solutions to combat the unintended consequences of the ecological impacts of the metaverse.

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DOI: [10.32474/JBRS.2023.02.000142](https://doi.org/10.32474/JBRS.2023.02.000142)



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