

# Metaverse: Could creating a virtual world build a more sustainable one? (PART 2)



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## This is a critical moment in the environmental and social sustainability of the metaverse. Business leaders can't be spectators.

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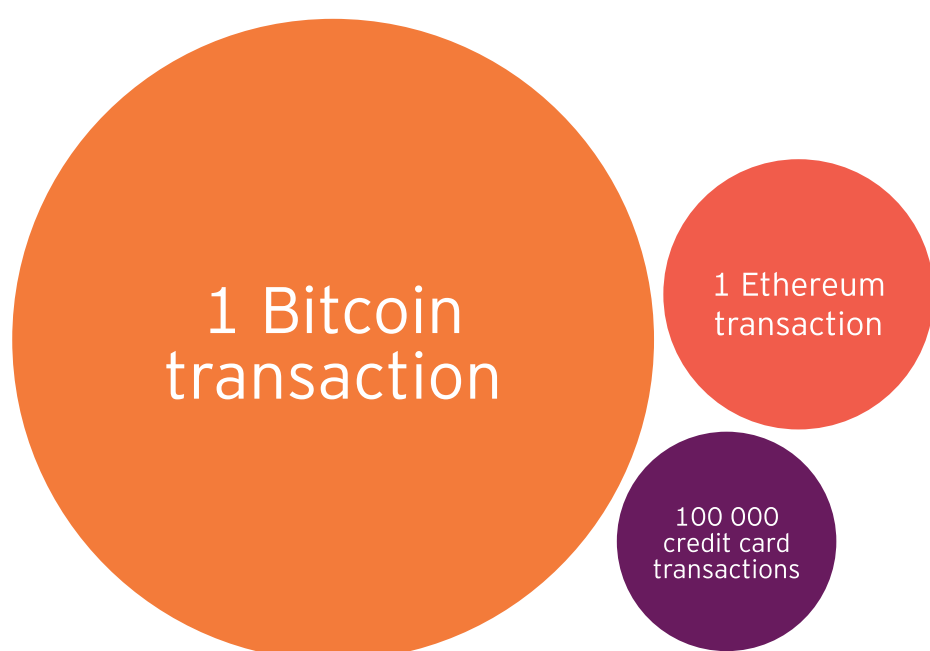
### Powering metaverse commerce

The conventions of commerce – creating, selling, owning, investing – being established around the metaverse are much more problematic from a climate perspective. Non-fungible tokens (NFTs) minted through blockchain-based processes and paid for with cryptocurrency, have become the predominant means for conveying ownership rights to assets such as digital art and virtual land.

Yet, an average Ethereum transaction consumes 60% more energy than 100,000 credit card transactions, while an average Bitcoin transaction consumes 14 times more energy (see Figure 2).

Only about 25% of the energy going into bitcoin mining is renewable. One analysis found that the average single NFT transaction produced 48 kg of CO<sub>2</sub>, the equivalent of burning 18 liters of diesel.

Figure 2: Crypto transactions are far more energy intensive than conventional ones: Average energy consumption per transaction



Bitcoin and Ethereum transactions are estimated to consume over 300 terawatt hours of electricity annually, more than global data center consumption.<sup>6</sup> Where data centers serve billions of people globally – arguably everybody with a connected device – there are currently only about 300 million cryptocurrency users.<sup>7</sup> An industry shift to proof of stake in transactions, which is less energy intensive than proof of work, could lower cryptocurrency power consumption.

This chasm between the distribution of costs and benefits underscores the need for urgent intervention by regulators, investors, consumers and other stakeholders to make metaverse commerce sustainable now before exponential growth makes it much more difficult.

### CHAPTER 2

## Substituting the physical with virtual

“The metaverse offers capabilities which are not bounded by the physical world and which could be a strong enabler of the things businesses are already trying to do,” says Thomas Møller, EY-Parthenon EMEA Digital Leader. “From testing, to assembly and dismantling, to new product and service development, virtualization could enable the faster creation of better customer outcomes and experiences, yet with less real-world resource consumption,” Møller adds.

Substituting resource-intensive physical goods and real-world experiences with digital and virtual alternatives in the metaverse could drive substantial sustainability benefits. Digital twins of the physical world combining IoT, visualization and real-world data from a variety of sources will enable new levels of optimization – from the planet to the individual human.

### Virtual consumption: fewer real resources

Digital products and virtual experiences in the metaverse will likely be significantly less resource-intensive and more carbon-efficient than comparable ones in the real world. As metaverse offerings become increasingly more compelling, consumers might shift the allocation of their limited budgets to more sustainable virtual options, yielding significant positive sustainability impacts.

Embodied in the global denim trade, for example, is 16.0 Mt CO<sub>2</sub>e and 4.7 billion m<sup>3</sup> of water annually. If consumers opted to buy virtual denim for their avatars instead of real denim for their physical bodies, the carbon and water savings could be substantial. Already, 21% of consumers intend to buy fewer physical items in the future because they expect to do more things digitally, according to the EY Future Consumer Index.

If this kind of substitution reduced the physical denim trade by 10% it would reduce CO<sub>2</sub> emissions by the equivalent of the annual emissions of nearly 350,000 American internal combustion automobiles, and water consumption by the equivalent of the annual average per capita footprint of over 400,000 Chinese consumers. Taken across the various categories of consumer spending, substitution effects could result in substantial carbon and resource efficiencies.

A lifelike virtualization of the experience of trying on clothes could also yield meaningful sustainability benefits. As online sales have increased globally so have returns. In the US, for example, 21% of online sales were returned in 2021. Customers often over-buy, “bracketing” sizes or colors.<sup>10</sup> The returns result in a doubling of the transportation miles, packaging and stocking. Companies sometimes overproduce items in response to these false signals, leading to more waste. ■

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