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Crypto Is Mostly Over. Its Carbon Emissions Are Not.

The environmental toll of Bitcoin could be even higher this year than last.

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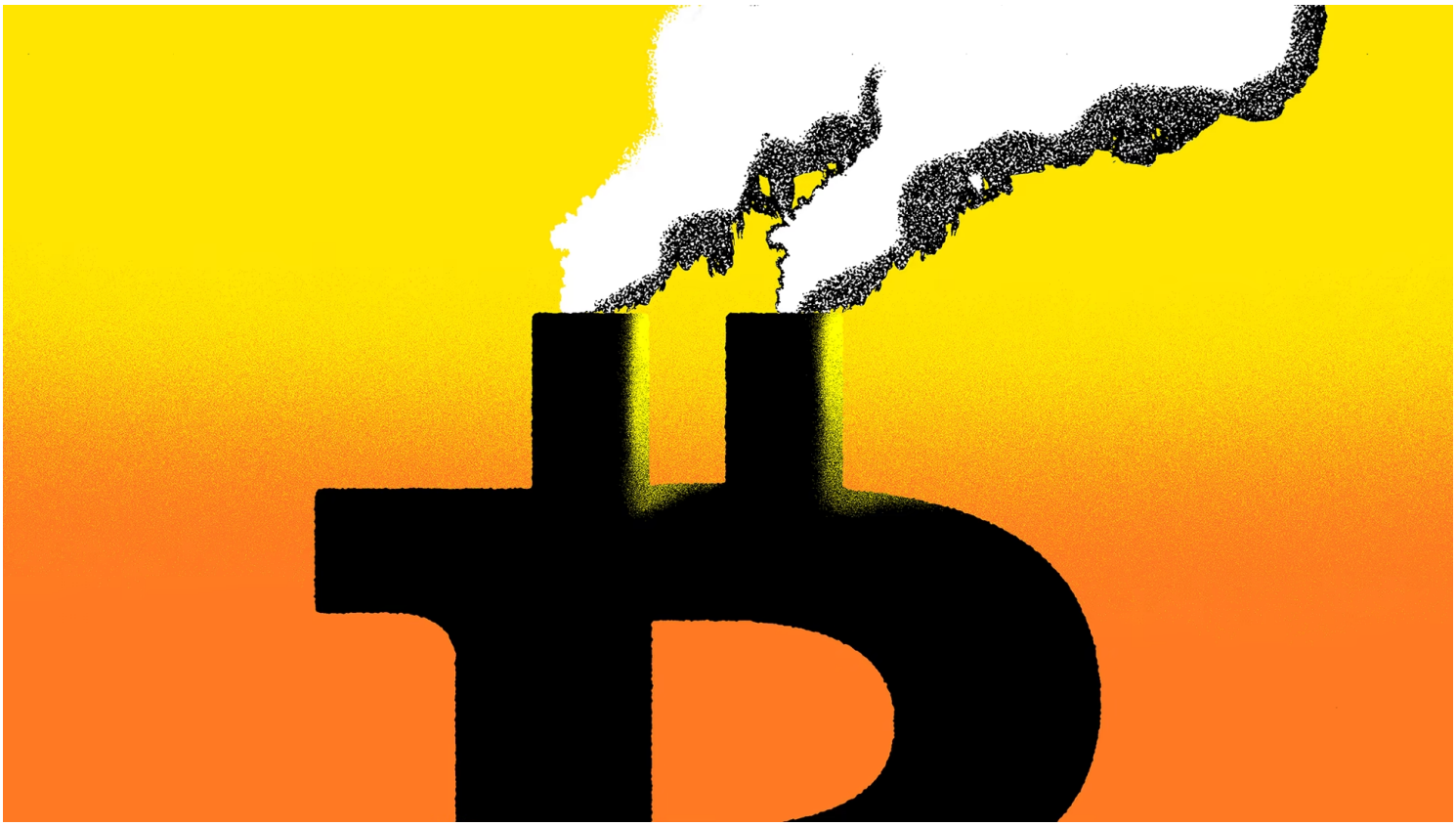

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At this point, for most of us, cryptocurrency seems like nothing more than a fad. After the FTX bankruptcy and broader crypto crash last year, basically all of the celebrities who were promoting crypto have gone silent. "MiamiCoin," hyped by Miami Mayor Francis Suarez as a new source of income for the city, is now worthless. The Wild West days of the industry may be over. Recently, the head of the SEC warned crypto firms to "do their work within the bounds of the law" or face enforcement actions. Lots of people lost money in the crash, but from the planet's perspective, the industry's downfall is good news: The computing power fueling the crypto boom was so substantial that it was causing substantial greenhouse-gas emissions.

And yet crypto's greenhouse-gas emissions are still shockingly high, according to an industry tracker run by the University of Cambridge. The tracker focuses on bitcoin, the cryptocurrency with by far the largest market share, and estimates that at its current rate of "mining" new coins, bitcoin will release about 62 megatons of "carbon-dioxide equivalent" each year—about as much as the entire country of Serbia emitted in 2019. That's up from about 43 megatons a year in December, and just slightly below the all-time peak of nearly 74 in May 2021. Many people who've invested in crypto tend to have a lot of sunk costs, whether digital wallets bulging with various coins, tokens, or expensive physical setups designed to make more. Even now that the boom times are over, they have no reason to stop.

Mining bitcoin does not involve actually digging anything out of the ground—unless you count the fossil fuel that often powers it. The process involves using heavy-duty

computers to grind through trillions of calculations, solving equations to create virtual coins. The method is known as "proof of work." Once upon a time, bitcoin mining was something that people did if they had a couple of spare computers they wanted to put to work. Over time, it's taken more and more computing power to unlock a single coin; now most mining is done in large-scale operations using purpose-built mining rigs.

And it is America's problem now. After China clamped down on crypto mining in 2021, such computing work increased in the United States. Miners set up shop in communities with low energy prices. And owners of unprofitable power-generation infrastructure, such as waste-coal-burning power plants, opened up crypto-mining operations to create another revenue stream. These companies have put a lot of money into their hardware and their physical space, and they will continue mining until they are actively losing money. "There are miners that have been quoted saying, 'As long as the price is over $10,000 per coin, it still can generate money,'" Elizabeth Moran, a policy advocate at the green law firm Earthjustice, told me. And that is a big reason crypto keeps spewing out so many emissions even during the "crypto winter": Bitcoin prices in particular have held up, in fact they just passed $28,000 a coin. That's still far below their peak of almost $68,000 in late 2021, but represents a bit of a comeback from the sub-$16,000 prices of last fall.

So it is still very possible to make money at this game. Some companies bypass the energy grid entirely; depending on the price of gas and the price of bitcoin, turning natural gas into crypto might be twice as profitable as selling it to the wholesale gas market. Gas companies bring in a trailer or three jam-packed with generators, plugging one end into the well and the other into "shipping containers full of bitcoin

miners," says Rob Altenburg, the senior director for energy and climate at PennFuture, an environmental nonprofit. "We've heard of three different companies doing it. But we've got thousands of fracked gas wells across the state and just simply have no way of knowing where this is happening." Gas drilling is heavily regulated, but crypto mining itself is not.

A recent federal investigation in Colorado found crypto mining powered by gas wells on public-lease lands, creaming energy off before it hit the grid and converting it to crypto without paying any royalties. The report noted that because the generators and rigs are usually on trailers, the entire operation can be moved quickly, so miners can stay ahead of government oil and gas inspectors. Other "behind-the-meter" operations are physically located at power plants. The natural-gas-fired Greenidge Generation Station, on the shores of Seneca Lake in upstate New York, opened a massive bitcoin-mining operation plugged right into the plant, which in 2021 consumed the bulk of the electricity it produced. Tapping into energy before it hits the grid is just one way bitcoin miners keep costs down; they'll seek out and exploit any cheap source of energy.

Crypto doesn't have to torch the planet. The second-largest cryptocurrency, Ethereum, switched to a different method of creating its tokens in September 2022. The new approach, called "proof of stake," uses significantly less computing power, so much so that after the switch, the company's total energy consumption dropped 99.95 percent. "It is impossible for bitcoin to switch to proof of stake, because the bitcoin network is completely decentralized," Kyle Schneps, the director of public policy at Foundry, a major mining financier, told me. "There is no governing body that could make such a decision."

Renewables could also power bitcoin mining, just like they power anything else. Maybe as much as 38 percent of bitcoin mining is currently powered by renewables, according to the Cambridge tracker, though no one really knows. But that hasn't gone up since the crypto winter. Schneps said that bitcoin mining could *help* with the energy transition: Renewable-energy companies can always sell their energy to bitcoin miners when demand is otherwise low, keeping them profitable enough to stay in business and grow. But it's not clear if mining operations that run only at certain times would be profitable.

For now, bitcoin will remain an albatross on the planet at just the moment that the energy transition ramps up. Cambridge predicts that its environmental impact in 2023 will be worse than it was in 2022. The Super Bowl ads and awkward late-night celebrity endorsements may be gone, but crypto is not dead. Still embraced by true believers and international criminals, the hard drives grind on, in shipping containers and empty warehouses and back lots of power plants, endlessly calculating, spinning money out of carbon and faith.

Lots of other digital activities do consume power and cause greenhouse-gas emissions—questing with pals, hoarding years of work emails on the cloud, making friends with a hallucinating AI. One analysis in 2019 suggested that our online lives were responsible for 3.7 percent of planet-wide emissions; the number may have gone up since. Schneps likened bitcoin's global electricity consumption to "roughly the same as video games." But even if that's true, while two-thirds of Americans play video games, just 21 percent of Americans own crypto, and even less bitcoin in particular. The massive environmental impact of bitcoin is harder to swallow because it is part of an industry that is, in essence, "smoke and mirrors," as the crypto blogger James Block

put it in an interview with Charlie Warzel. "There's nothing produced by these companies."

Finance experts around the world largely agree with Block. In December, a director-general at the European Central Bank, Ulrich Bindseil, called for serious financial institutions to stop legitimizing cryptocurrency, saying bitcoin was "not suitable as an investment." If the world is going to continue to burn fossil fuels, it makes sense to do so for things that genuinely contribute to people's well-being, not for risky virtual tokens untethered to any real thing of value in the world.