

'Virtual gold' may glitter, but mining it can be really dirty

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As the poster child for the growing ranks of computer-generated

currencies, bitcoin's recent stratospheric price rises have propelled it from the chat forum-hosted depths of nerddom into the global consciousness.

As it rose from under \$1,000 to over \$19,500 at one point this year, hordes of tech-savvy punters have rushed in to buy, while any investors can now do the same on the US futures markets.

Bitcoin has been called virtual gold, in part because it is created in a process that insiders call mining. And like real mining, it can be dirty.

That's because joining the online gold rush to mine the coins that are streams of computer code requires high-powered rigs that consume considerable amounts of electricity to do the virtual equivalent of blasting through rock by solving a string of highly complex computer algorithms.

Depending on how the electricity used for mining is generated, the virtual currency can have a very real impact by adding pollutants into the air and contributing to global warming.

Out of the bedroom

What barely five years ago was a hobby for "bedroom miners" has mushroomed into a massive, but unregulated, industry that some observers fear is a bubble waiting to explode, potentially causing damage similar to the sub-prime mortgages fiasco that caused the [global economic crisis](#) a decade ago.

Mining involves "adding value by dedicating computational resources to verify transactions in a huge public ledger called a 'blockchain'," explained Julian Oliver, a New Zealander who uses wind power to mine ZCash—a bitcoin cousin.

The miners are thus providing the computer resources for their currency's trading system to operate.

But the number-crunching to pocket coins requires ever more powerful hardware and the means to keep them running, Oliver told AFP.

"At current bitcoin prices things are looking good for miners," he said. "But it's a huge use of energy, whatever the profit margins (and is) not remotely sustainable."

Specialist studies estimate the total annual energy output of the hundreds of thousands of dedicated mining machines worldwide at 35 terawatt hours, according to the Digiconomist website—some 25 percent up on last year.

That puts it on the level of energy consumption of Denmark.

Each transaction consumes roughly 100 kWh—the equivalent of running a lightbulb for three months. By contrast, a [credit card transaction](#) uses about 0.2 kWh.

But focusing on the electricity consumption of cryptocurrency mining "ought not to overshadow pre-existing environmental costs of the traditional financial system," said Oliver, as "cash needs to be printed and transported and banks run off the back of data centres."

Cleaning up

Nadine Damblon, chief executive of HydroMiner, which uses hydroelectric power to mine in the Austrian Alps, said there is a need for greater use of renewables in the industry as Asian miners often rely on coal-generated electricity.

Hydroelectric can play a leading role as "one of the most environmentally friendly ways to generate power," she said.

Damblon believes the market will help solve the problem.

"I think in the case of bitcoin mining the capital will flow into more efficient hardware that will need less energy," said Damblon.

The scale of the long-term environmental threat that mining poses is unclear, as is the degree to which it could act as a catalyst for greater take-up of renewables.

In its Global Cryptocurrency Benchmarking Study, the Cambridge Centre of Alternative Finance found that nearly three-quarters of all major mining zones are in China and the United States.

But the likes of Iceland and Austria are gaining ground. Not only do they offer clean [hydroelectric power](#), but also cold temperatures that help save on cooling computer equipment, which can account for up to a third of energy needs.

What is undeniable, said the report, is that "the [mining](#) sector has evolved in a short time from a hobby activity performed on personal computers into a professional and capital-intensive industry with its own value chain."

As for how many bitcoin mines or miners there are now, nobody really knows.

Green vs anarchist

In terms of large-scale mines "there are perhaps about a hundred," said French information technology specialist Marc Bevand.

"Maybe (there are) a few thousand smaller ones" using "one or two racks" of machines rather than the tens of thousands in the largest Asian mines, San Francisco-based Bevand told AFP.

The push for scale to save on energy costs and go green also risks pushing bitcoin against its libertarian, or even anarchist, founding philosophy.

Bitcoin was created to not only allow secure and anonymous transactions, but for the system to be controlled by users and not by a government or corporation.

The push for scale "would concentrate number-crunching power in the hands of the richest or throw into question bitcoin's (decentralised) philosophy," said Teunis Brosens, a senior economist with ING bank.

He forecasts that eventually "banks will create private blockchains which will not face the problems of scale or regulation" which bitcoin is coming up against.

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