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Bitcoin's wasted power – and how it could be used to heat homes

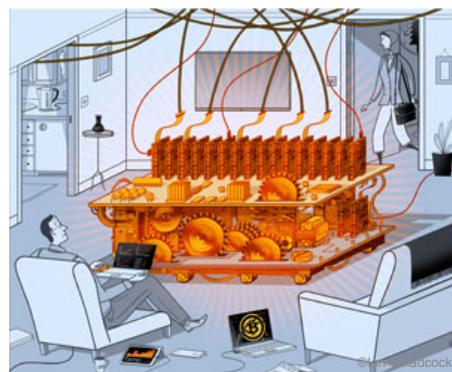
By Izabella Kaminska Author alerts

Could an energy intensive, electrical mining rig offer a smart solution to heating our homes?

It doesn't take a computer scientist to tell you that society requires an awful lot of energy. But what computer scientists are increasingly trying to tell us is that the next few decades could deliver some serious changes with regards to how smartly we consume and distribute that energy. This is what the transition to smart devices, smart grids and smart meters is all about.

Computer scientists could now also be about to provide their own incentives to smarten up the network more quickly. Take Bitcoin, the private and digital money system valued at about \$6.5bn, which derives its value from being "mined" by those who feel inclined to support its peer-to-peer communications network cryptographically.

By providing the resources that link the network, miners become the tool by which the online public record of transactions, known as the block chain, is updated, as well as the process by which new coins are minted. Since the coins are backed by nothing other than the digital process which confirms transactions, a limited supply is essential to preserve their value (no more than 21m units will ever be created).



The jury is still out on whether the virtual currency will prove to be a reliable store of value or medium of exchange in the currency sense, but one thing that's harder to deny is the technological arms race the movement has fuelled in its wake. The prospect of free money, it turns out, encourages people to innovate and invest in smart systems quickly.

Some cryptography academics, such as Nicolas Courtois at University College London's computer science department, estimate that \$1bn to \$1.5bn has already been invested in the computer infrastructure that supports the network.

To date, most of this money has been used to develop microchips or huge data centres that can help miners improve their chances of acquiring Bitcoins. Now miners are beginning to realise that to stay ahead of the game, they need to become energy efficient, too.

This is because Bitcoin's biggest problem, by a distance, is its carbon footprint. Estimates of the network's energy use vary from 7.31 gigawatt-hours per year at the most conservative – equal to about 680 average American homes – to that of the entire power consumption of Cyprus. Either way, Tim Swanson, author of *The Anatomy of a Money-like Informational Commodity: A Study of Bitcoin* (2014), has estimated that a minimum price of \$444 per coin is needed for the most efficient miners to break-even on the energy costs involved. Prices in recent months have been stagnating at about \$500 per coin level.

For most miners, the solution to mounting energy costs has meant setting up in countries where energy is cheap, where renewables are abundant or where the climate is cool enough to avoid the additional costs needed to control overheating systems. But since not everyone can move to such places, the latest fad among commercial rig developers is the idea of smart mining devices, which can use residual heat from their systems to warm the homes of Bitcoin miners instead. But can heating your home with an energy intensive electrical mining rig ever be more efficient than using a conventional central heating system?

Bitcoin enthusiasts contend that, if you happen to be dependent on electrical heating anyway (often the case in cold climates), heating your home with a Bitcoin mining device can help you earn money to offset your energy costs.

It doesn't have to be restricted to Bitcoin. In the long run we could design heating systems that earn their keep by calculating almost anything. An obvious use would be processing the calculations needed to manage not only your home's energy efficiency but that of the wider network. The microclimate engineers I talked to about the idea didn't think it was entirely absurd; however, they did stress that electrical heating systems are something that could only ever be efficient in cold climates or in places where alternatives to electric heating are not viable. The best use in their mind was to heat outdoor swimming pools, or anything that required a constant and stable heat source.

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For the most part, that excludes regular homes where the focus is on climate control. And anyway, they added, in the vast majority of urban locations, there's already too much residual "low-waste" heat that we don't know what to do with. There is much more demand on a global level for cooling systems.

The sad verdict, consequently, is that whether a mining rig redeploys its residual heat in a smart way or not, Bitcoin's block-chain technology remains too energy intensive on a net basis to make it a credible alternative. The only real potential is if miners become incentivised to develop renewable energy systems directly.

Whether that sort of financial imperative can lead to the development of smarter renewable technology is yet to be seen. Still, if it does inspire, say, solar panels that can pay their way with both household energy production and calculation work, it could really accelerate society's transition to smart living.

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Illustration by Ian Whadcock

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