

Why Density Will Become the Most Important Metric for Data Center Cooling

High-density data centers have advanced and complex cooling needs. Explore data center cooling solutions and discover the benefits of immersion cooling.

What the Advancement of Immersion Cooling Will Look Like in the Coming Year

Immersion cooling is an effective and sustainable precision data center cooling solution. Explore imminent advancements in this exciting technology.

Future Proofing Your Data Center Starts Now and Here's How

The global economy is undergoing a digital transition that depends on data centers. Future-proofing readies data centers for their upcoming duties.

Is It Possible for Green Energy and Blockchain Technology to Coexist?

Blockchain has become a huge part of the [global economy](#). It fuels billions and billions of dollars of transactions around the world. The technology underlying blockchain however has a relatively high energy-use profile, drawing attention to another new technology: environmentally responsible immersion cooling techniques like [GRC's liquid cooling tanks](#).

In many people's minds, blockchain is associated with digital asset mining and cryptocurrencies. That may have been the case, but now, there are several other applications. International payments have become the number one use case, with around [16% of the blockchain market](#). Other key use cases include provenance or lineage at nearly 11% – the tracing and authentication of components for products.

Of the organizations making use of blockchain, [45% are developing secure information exchange](#). Additionally, many are using currencies like Bitcoin (the initial blockchain use case) and Ethereum. There are now around [10,000 different cryptocurrencies!](#) This represents a massive increase over the last few years, as blockchain technology has gone mainstream. This rapidly increasing use, however, poses a problem for energy management.



The Issue with Blockchain and Crypto Mining

The issue with blockchain, including its most prevalent use in mining cryptocurrencies, is its immense energy consumption. Bitcoin and other applications conduct processor-intensive, hash calculations to enable people and institutions to make transactions autonomously. [The entire network uses several gigawatts, or billions of watts](#) of electricity to power this functionality – more than some countries!

If you add up all of that power use over the year, it totals [122.87 terawatt-hours for Bitcoin alone](#). That's billions of dollars of electricity, and since over 60% of the world's electricity is still produced using fossil fuels that electricity consumption means a tremendous amount of toxic fumes and greenhouse gases. And that's just Bitcoin. Other cryptocurrencies and blockchain applications use comparable amounts.

While [efforts towards more efficient blockchain technologies are underway](#), for now, they remain among the more prevailing polluters of these new processes. The energy use of Bitcoin and other blockchain technologies is only increasing, as these become ever more prevalent in society. As people become responsive to green issues like sustainability and greenhouse gas emissions, it's critically important to consider the indirect environmental cost of blockchain.



Is the Promise of Green Energy the Silver Lining?

Green energy, the carefully-considered production of power to protect the environment offers an exciting prospect for the world of crypto. Clean electricity from solar or hydro cuts emissions on the production side. On the consumption side, clean tech like [GRC's liquid immersion systems](#) makes blockchain more environmentally friendly.

For example, you can run the processor-intensive calculations for blockchain in a [GRC HashRaQ](#) that cuts energy requirements by as much as 90%! How? By deploying liquid immersion cooling technology that is [1,200 times more efficient](#) than traditional air cooling. The same technique also enables the GRC HashTank to perform even more efficiently at 95% energy reduction in a shipping container!

Back on the green energy production side, [startups are working to enable people to select renewable electricity sources on the grid through blockchain](#). In Estonia, people can already access real-time data on power production sources. Green power will likely soon make electricity more affordable and resilient, not to mention sustainable, through the intelligence of blockchain smart contracts.



Bringing together the generation and use of electricity, blockchain can enable

people to see instantly how much we are using and where. Leveraging real data, blockchain enhances reliability to enable renewable energy producers and users to make more efficient use of resources.

You can see with confidence that you're using clean electricity. The blockchain networks allow the electricity market to function transparently, allocating production and use to make the most of green sources like biomass. This completes the circle, from production with green energy to use with smart tools like immersion cooling.

Immersion Cooling Techniques: What You Should Know

[GRC's immersion cooling techniques work smoothly with blockchain.](#) As blockchain continues its formidable march into more corners of the economy, data centers need to respond with effective cooling techniques to handle the heat.

The intense computational requirements of blockchain push servers to the max. This imposes a price constraint as cooling comprises one of the main costs of a data center. Air-cooled data centers, quite simply, cost too much for crypto mining to be profitable.

Liquid immersion cooling offers superior performance at a far lower cost. Upfront data center costs can be cut in half while [eliminating 95% of cooling costs!](#) This technology works efficiently anywhere, unlike older air-cooling methods.

Whether you're building a new data center or have a spare piece of land, you can easily deploy immersion cooling to slash costs. The [HashTank](#) portable data center and the [HashRaQ](#) rack system both provide industry-leading green cooling for your blockchain applications.

For the most intensive workloads out there, even at well over 100 kilowatts per rack, immersion cooling effortlessly dissipates heat. Liquid is the ideal environment for removing waste heat. This approach also simplifies site requirements to save even more money. You'll be amazed at how clean, quiet, and efficient the immersion cooling systems are.

In addition to the lower costs and greater cooling capacity, immersion cooling techniques offer protection against environmental contaminants such as dust and corrosion. Furthermore, this approach does not require fans or many other moving parts from traditional cooling, thus extending the life of your expensive hardware.

Immersion cooling will take literally billions of tons of pollutants out of the environment by displacing messy [air cooling](#) while enabling the spread of blockchain. All things considered, liquid immersion cooling is a win-win solution. From day one through the total cost of ownership, you'll see a handsome ROI and a more rewarding outcome for the environment.

Get The "Greener" Cooling Solution With GRC

While blockchain applications like cryptocurrencies and digital asset mining have increased the demands on data centers and the power supply, GRC now offers the technology along with the expertise to manage these cooling demands effectively.

GRC's modular cooling systems are cost-effective to install and operate. They produce a deeper cooling of your crypto rigs or other data-intensive IT infrastructure. You can upgrade to liquid anywhere, from a state-of-the-art data center to an unused area in a brewery!

Join the green revolution. Get the cost savings while doing your bit for the long-term sustainability of our environment. [Learn how GRC's liquid immersion cooling](#)

[tech can make your data center smarter and greener while keeping revenues in the black.](#)

The Effects of Data Centers on the Environment

[There are several million data centers globally.](#) Each power-hungry facility can pack in tens of thousands of servers, guzzling environmental resources [more than entire countries.](#) The combined environmental effect of all of these data centers has become a growing concern to governments and the broader public. Data center operators must respond.

In recent years we have seen the rapid emergence of massive “hyperscale” data centers. Over just a few years, [these giant data centers—with the biggest being the size of multiple football fields—have literally doubled the amount of energy they use,](#) racing towards 100 terawatt-hours per year of energy consumption. They have thousands of servers running 24 hours a day, 365 days a year. New “edge” data centers are also sprouting up and adding to the already-high power consumption rates.

Data centers serve as the giant “brains” of our Internet age, constantly processing to enable society’s growing dependence on social networks, online banking, cloud computing, and an ever-expanding list of devices. There is a dark side to this data center dependence, however: the detrimental and, until recently, mostly overlooked toll on the environment.

What Are Data Centers and How Do They Work?

Data centers are concentrated locations hosting banks and banks of servers and networking gear. They process mountains of information and on any given day, tens of millions of servers in the over 7.2 million data centers around the world are running applications for a range of customers around the globe.

Data centers drive nearly all of the information flowing through laptops, tablets, smartphones, and other digital devices. Whether posting a cat video on Twitter or working on a spreadsheet in the cloud, both cause a chain reaction and use energy. This energy use includes not just the personal devices themselves, but all that’s consumed by the centers to feed the devices.

Data center energy continues to accelerate as billions of devices continue to join the Internet of Things (IoT), artificial intelligence (AI) becomes ubiquitous, and other applications like blockchain-powered cryptocurrency evolve. In addition to the ITE infrastructure to support all this digital activity, data centers also need [cooling equipment](#) to manage the heat generated by all this computing.

The Environmental Toll from Data Centers



While the development of mega data centers has proven hugely beneficial for businesses and the global economy and helps billions of people work and play each day, it is extracting a huge toll on the environment. It takes electricity, and vast amounts of it, to power the millions of servers, and to run the cooling systems that remove the immense amount of heat generated by power-hungry processors.

With approximately 62% of the world's electricity supply coming from burning fossil fuels, mostly coal and natural gas, electricity production generates the [second-largest share of greenhouse gas emissions](#), according to the U. S. Environmental Protection Agency (EPA).

In some cases, as much as half of the electricity guzzled in data centers goes into archaic air-cooling systems rather than powering the servers themselves. Moving from air-cooled systems to [immersion cooling solutions can eliminate much of this waste](#) and significantly reduce the harmful effects on the environment.

How Bad Is It So Far?

In 2016, it was reported that the [world's data centers](#) used more than Britain's total electricity consumption – 416.2 terawatt-hours, significantly higher than the UK's 300 terawatt-hours. At 3% of the global electricity supply (2019 figures), data centers have the same carbon footprint as the aviation industry.

Recognizing this trend, the European Union (EU) has [threatened](#) to enact green data center laws aimed at getting data centers on the continent to be climate neutral by 2030. Reports suggest that a group of European data center operators—in an attempt to preempt any legislation—have signed a pact to self-regulate themselves. While the push to reduce the climate impact of data centers is playing out in Europe, it has the potential of a ripple effect across the Atlantic as some companies that signed the pact in Europe are US-based multinationals, including Amazon Web Services, Google, Equinix, and CyrusOne.

Several other aspects of the data center industry harm the environment. These facilities are big users of batteries that require mining heavy metals like lead. Other common sources of data center pollution include diesel generators and electronic waste. As with the more central concerns of powering servers and cooling systems, the severity of these environmental problems depends on how efficiently the data center runs. For example, there are some cooling systems that use toxic coolants with global warming potential (GWP). This is in sharp contrast to [liquid cooling systems like GRC's that use environmental-friendly materials](#).

Developments like this have drawn widespread media attention and have pushed Amazon, Microsoft, and Google ([accounting for half of all major hyperscale data centers— 659 in 2021](#)) to move towards greener data centers that use renewable energy and more efficient [cooling technology](#).

How Does the Future Look?

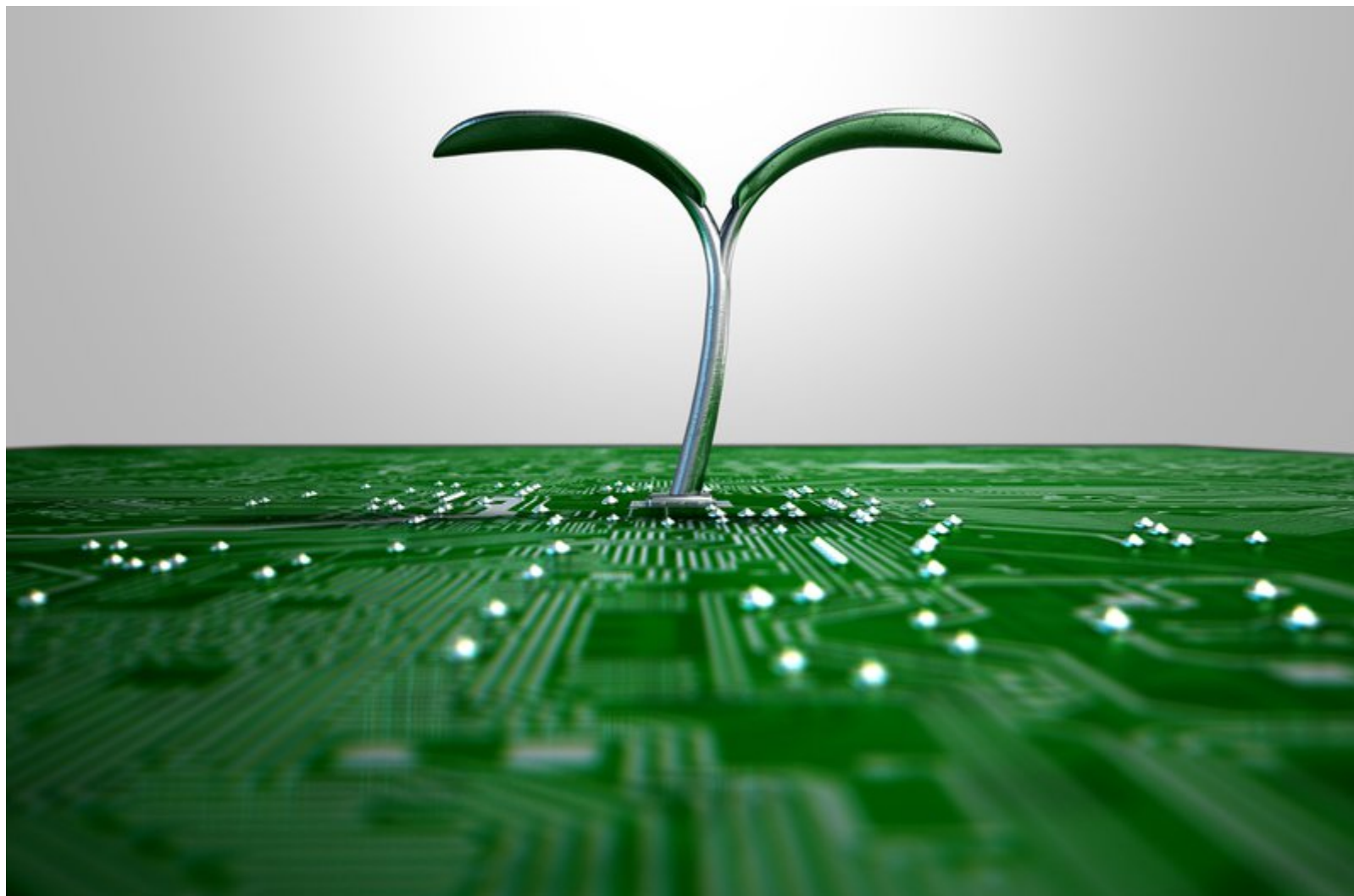
[The broader economy is predicted to use 4% more power in 2022](#) as it recovers from COVID, while [experts expect data centers to use hundreds more terawatt-hours in the coming years](#), adding to the environmental strain. The exact numbers depend on user behavior and how efficient future processors will be. It will take some technological innovations and responsible ownership for data centers to contribute to tomorrow's low-carbon economy.

With that said, all eyes will be on data centers to operate in a more environmentally accountable manner. With crypto and 5G and high-performance computing on the rise, we will see data centers using more resources, especially at the edge. Processors including those for graphics and AI and crypto multi-core chips will burn through far more power. The pressure on data centers to be environmentally responsible is ever-increasing.

Is There a Way to Lessen the Impact?

But it's not all doom and gloom. There are ways that data centers can immediately begin to reduce their carbon footprints and lessen their environmental impact. For one, facilities can commit to transitioning from fossil fuels to renewables. Renewable energy sources including processed vegetable oil and geothermal, in particular, will become more popular as data centers look to go carbon-neutral.

Another option for reducing the environmental impact is to employ data center infrastructure management (DCIM) tools to measure the lifecycle environment conditions of a facility. This approach can track the performance of individual servers or other assets to enable smarter risk management and maintenance.



One of the largest impacts on data center sustainability is to tackle the number one source of unnecessary power consumption by upgrading from air cooling to liquid immersion cooling. [Liquid immersion cooling systems are far more energy-efficient](#) and can siphon off over a thousand times more heat from servers than archaic air-cooled systems do. This makes cooling much less of an electricity drain, considerably lessening the environmental strain.

Discover Data Center Cooling With GRC

Single-phase, liquid immersion cooling offers by far the most efficient method to cool data centers and shrink their carbon footprint. This remarkable technology is making waves throughout the industry from hyperscalers to the edge and everywhere between.

With liquid immersion cooling, data centers can cut 90% of their cooling energy needs. Not only does that prevent tons of carbon emissions from polluting the environment, but it also cuts costs drastically. Furthermore, the immersed servers are protected against corrosion, dust, and a range of other risks, lowering the cost of maintenance and replacement.

Data centers have rapidly become integral drivers of all aspects of modern society, and with that role comes the burden of accountability to manage their harmful emissions responsibly. The opportunity to run more environmentally friendly and lower cost operations exists with advanced cooling solutions from GRC. [Explore this responsible approach](#).