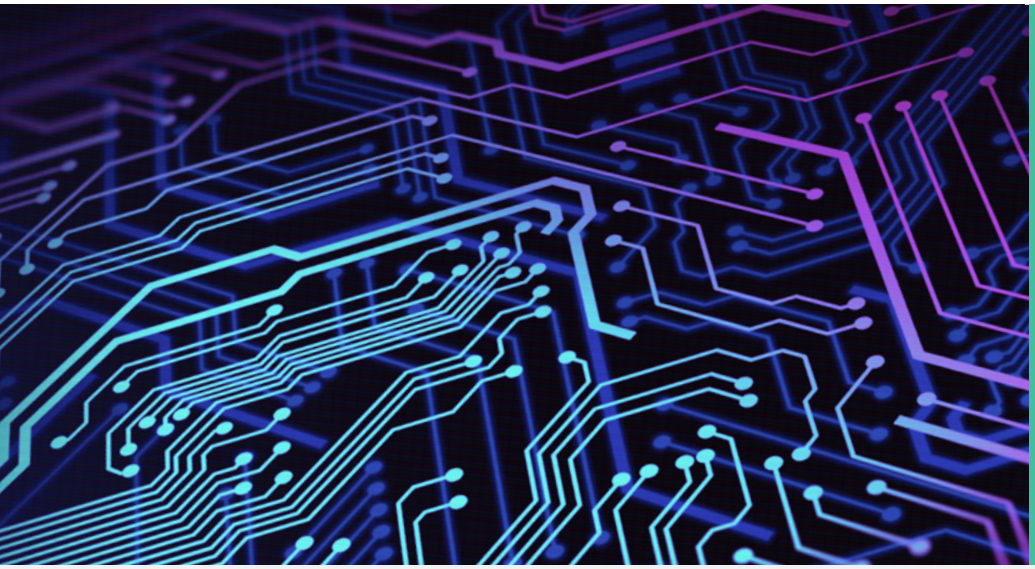
Morgan Stanley
INVESTMENT MANAGEMENT

Calvert

Code, Capital, and Carbon: Digital Assets and Sustainable Investing



DIGITAL ASSETS | October 2026

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The architecture of money and financial systems – long dominated by sovereign currencies and centralized intermediaries – is undergoing a profound technological change. First through bitcoin then through other blockchain and distributed ledger applications, we have witnessed the growth of permissionless systems capable of near instantaneous value transfer without reliance on governments and third-party intermediaries. At times, sustainable investing, which has also experienced considerable growth over a similar period, has appeared at odds with the development of the various forms of distributed ledger technology. Calvert believes this misses the mark.

With a total market value of $2.9+ trillion as of September of 2026[1], digital assets are comparable to some of the world's most valuable companies and monetary metals. Perspectives from investors, users and regulators run the gamut – from excitement to cautious optimism to outright opposition. Where skepticism and opposition have existed, particularly among investors pursuing sustainable investment mandates, much of the debate has centered on the more controversial aspects of digital assets, such as the energy intensity of bitcoin mining or illicit activity that leverages the technology's permissionless nature. But these are only two of many factors in deciding whether a digital asset allocation can be compatible with a sustainable investing mandate. Perhaps a better question to consider is why blockchain technologies and sustainable investing have both experienced substantial growth over a similar period in financial market history. **We believe both are responding, at least in part, to real and perceived shortcomings in institutional trust across society, including within existing monetary and financial systems.**

The intellectual foundations of Bitcoin and blockchain technology were laid well before the Global Financial Crisis, yet the shadow of the crisis proved to be a catalyst to this new technology given the corresponding erosion of trust in the global financial system. Institutions long regarded as pillars of stability became sources of systemic vulnerability, prompting review of currency systems and traditional financial intermediation. The decentralized nature of blockchain technology was a result of efforts to overcome presumed deficiencies of trust, privacy, censorship and centralized points of failure. In this context, the growth of sustainable investing reflects an effort to strengthen trust in financial markets by creating long-term value while reducing negative externalities, such as economic inequality or environmental degradation, that can ultimately undermine market efficiency.

Digital assets can enable new opportunities to improve and expand existing financial systems to (i) increase financial inclusion through permissionless access, (ii) reduce friction in payments and settlement costs, (iii) hedge currency debasement, and increasingly, (iv) innovate at the intersection of digital infrastructure and the energy transition. With greater regulatory clarity now emerging, most notably in the U.S., digital assets' positive foundational attributes are likely to become more central to the global financial ecosystem.

The Ethos of Bitcoin

The birth of the Bitcoin Protocol was the culmination of decades of development in various computer science disciplines. Prior innovations in public-key cryptography and hash-based proofs laid the groundwork, but the persistent challenge had been the *double spend problem* – the technical dilemma of preventing digital tokens from being copied or reused without a trusted arbiter. It was Satoshi Nakamoto's insight to stitch these innovations together with a decentralized consensus mechanism implemented through proof-of-work and a shared public record of transactions that established a protocol where shared economic incentives could replace centralized authority.

His innovation reflected a documented concern with the structural fragilities of conventional finance, particularly the reliance on trusted intermediaries and the capacity of central banks to expand the money supply at their discretion. This motivation is most directly expressed in Bitcoin's design: a fixed issuance schedule and hard-capped supply that removes monetary policy from human discretion, and a public, auditable ledger that allows any participant to verify the system without

[1] Messari. (2026). *Total crypto market capitalization* [Data set]. Blockworks. Retrieved as of September 30, 2026.

relying on a central authority. More succinctly: monetary rules should be predictable, verifiable and not subject to discretionary political interference.

Early collaborators were not drawn by speculation, but by the promise of a decentralized monetary network that operated outside the existing financial system and an assertion that monetary trust could be embedded in algorithmic certainty rather than institutional reliability.

Bitcoin did more than merely introduce a new asset class – it introduced a new method of financial participation. It recognizes money as more than a medium of exchange, and at its core, as a social contract and a basis for participation in a civil society. Bitcoin's permissionless design eliminates the need for institutional onboarding, credit history or government-issued identification, which is particularly useful in regions where banking infrastructure is scarce, unstable or exclusionary. Its functional neutrality does not discriminate between users and does not impose conditions on its use. **This inherently aligns with improving access to financial services, a shared aim of sustainable development.**

But nonetheless, permissionless blockchains do create real challenges and negative externalities. One such challenge is illicit use. Illicit activity using some form of cryptocurrency continues to grow and amounted to approximately $154 billion in 2025[2], which represents close to 1% of attributable transaction volume. This illicit activity is also increasingly professionalized and used by nation state actors to circumvent Western sanctions.[2] Critics also point to the concentration of bitcoin ownership among a relatively small set of holders and argue that the embedded gains of early adopters risk reinforcing wealth inequality. This is a distributional outcome the protocol's rule-based neutrality was never designed to address and a dynamic that is likely to persist, at least in the near term. However, participation appears to have broadened considerably, with the number of wallet addresses holding bitcoin increasing substantially in recent years. Bitcoin's effectiveness as a store of value also remains subject to debate, given that realized outcomes have historically depended heavily on entry timing. Some of this volatility may reflect an asset still progressing along its adoption curve, although excessive leverage and market cyclicality have also contributed to its historically pronounced price swings. Indeed, bitcoin's implied volatility has compressed to multi-year lows in 2026, while successive market cycles have produced progressively shallower drawdowns.

Financial Inclusion and the Proliferation of Stablecoins

Perhaps the most prevalent digital asset use case beyond bitcoin is the stablecoin, a digital token pegged to a fiat currency, 99% of which are pegged to the U.S. dollar (USD). The growth of stablecoins from zero to a $300 billion[3] market in less than a decade is perhaps one of the greatest financial inclusion narratives of our time, especially in emerging and frontier markets where local currencies remain volatile. Tether (USDT), the largest stablecoin by value and approximately 70% of the market, now boasts more than 500 million users globally.[4] By combining relative price stability with near immediate transmission and settlement, stablecoins address friction in payments and remittances.

Use cases for stablecoins and financial inclusion are numerous:

BANKING THE UNBANKED WITHOUT A BANK

Approximately 1.3 billion adults remain unbanked[5], yet in many of these markets, mobile phone penetration exceeds access to banking. Because stablecoins can be held in self-custodied digital wallets on mobile phones, onboarding can be processed virtually, enabling greater competition and customer choice while reducing friction and transaction fees. As smartphone adoption rises across emerging markets, where bank account ownership lags global averages, these devices provide a scalable distribution channel for stablecoins.

FACILITATING FLOWS

Global remittance flows exceeded $850 billion annually with an average remittance cost of ~6% per transaction, materially above the UN Sustainable Development Goal

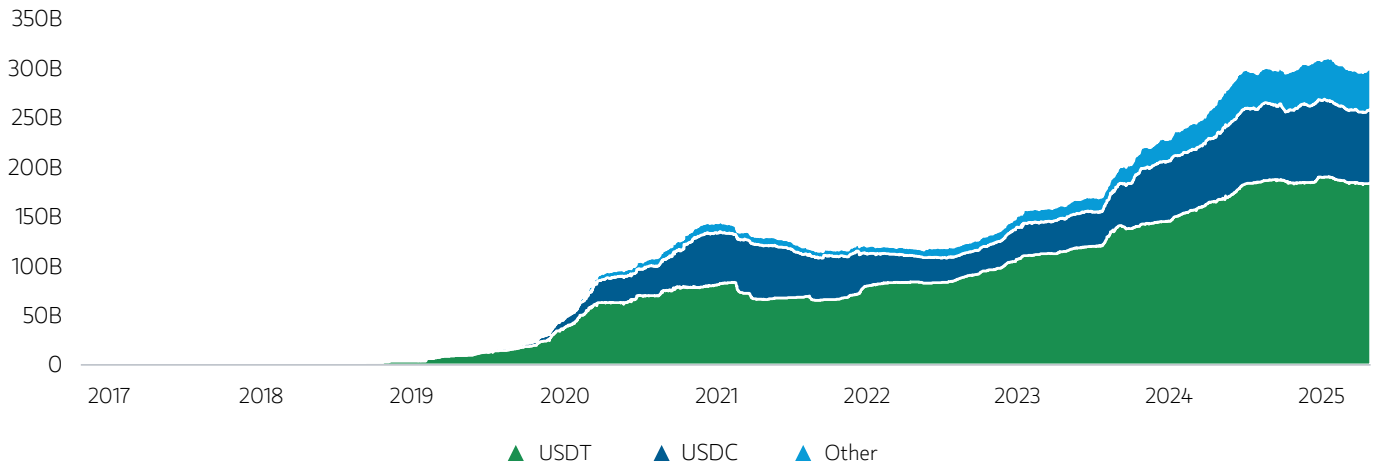
[2] Chainalysis. (2026, March 5). *The 2026 crypto crime report*.

[3] DeFiLlama. Total Stablecoin Supply [data set]. Data through August 30, 2026.

[4] The Block. (2025, October 21). Tether hits 500 million users as stablecoin supply nears $182 billion.

[5] Klapper, L., Singer, D., Starita, L., & Norris, A. (2025). *The Global Findex Database 2025: Connectivity and financial inclusion in the digital economy.* World Bank.

Growth in Total Stablecoin Supply (USD)



Source: DeFiLlama, Data through August 31st, 2026. USDT (Tether USD) is a U.S. dollar–pegged stablecoin issued by Tether Ltd.; USDC (USD Coin) is a U.S. dollar pegged stablecoin issued by Circle Internet Financial; Other represents the aggregate value of the next 23 largest U.S. dollar–pegged stablecoins so that the total stablecoin supply represents the aggregate value of the top 25 USD stablecoins.

of 3%.[6] Stablecoins not only enable near-instant cross-border transfers, but also settlement fees often measured in cents to a few dollars. For migrant corridors such as U.S.–Latin America or the Persian Gulf–South Asia, stablecoins translate to faster, incremental income for some of the world's poorest communities.

PURCHASING POWER STABILITY

In high-inflation economies, especially countries facing significant currency debasement, stablecoins function as a digital proxy for hard currency. In these environments, access to USD bank accounts may be restricted or capital controls may apply, but USD-pegged stablecoins provide users with a portable hedge against local currency volatility. For example, in 2019 when Lebanon's local currency lost over 90% of its value relative to USD, stablecoin usage increased.

LIQUIDITY FOR A GROWING POOL OF FINANCIAL APPLICATIONS

Stablecoins have become a core pillar of digital asset infrastructure with monthly on-chain transfer volumes reaching into the trillions of dollars. Ethereum, the second largest blockchain by market capitalization, is a decentralized, programmable network that underpins a large share of crypto activity and accounts for around half of all stablecoin supply. Ethereum's smart contract functionality enables stablecoins to move seamlessly across wallets, exchanges and decentralized applications, making it the primary settlement layer for dollar-denominated digital value on-chain. On Ethereum alone, stablecoin volumes now exceed $2 trillion per month, comparable to the roughly $27 trillion in combined annual transaction volumes processed by Visa and Mastercard in 2025.[7]

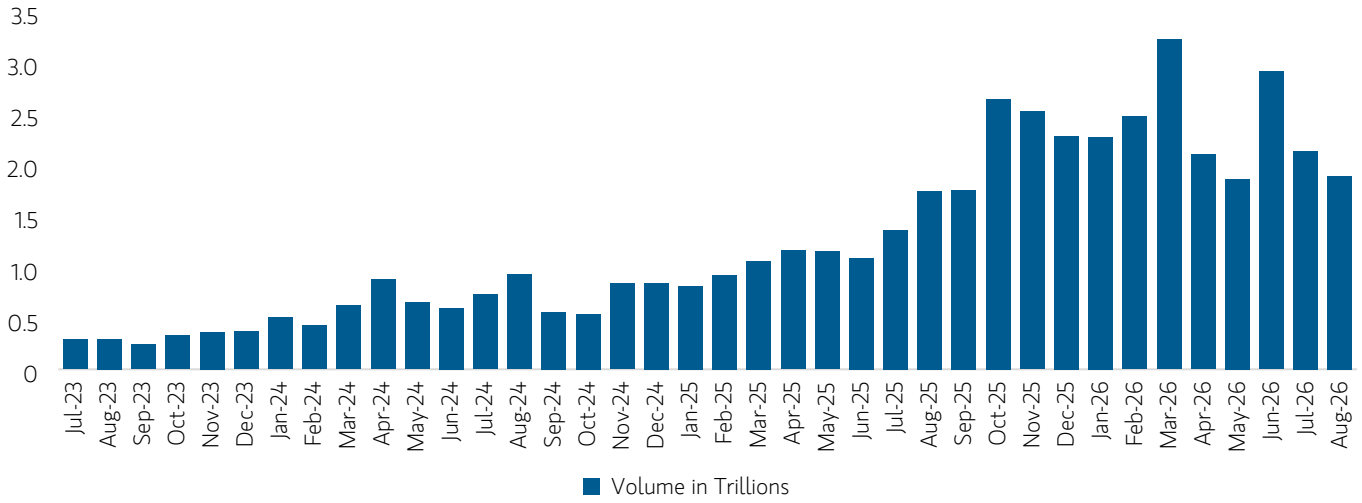
This growing ecosystem can also support decentralized finance (DeFi) applications offering lending and collateralized borrowing products. While risk management and regulatory oversight remain critical and still underdeveloped in many markets, stablecoins can create pathways for underbanked users to access payment and credit instruments without relying on standing banking relationships or credit histories.

It is important to note – the financial inclusion case for stablecoins is not predicated on displacing banks, but on augmenting access. The combination of relative stability, low settlement friction and programmable functionality positions stablecoins as a scalable solution for inclusive finance. Durable impact will depend however on regulatory clarity, consumer protection and integration with compliant on- and off-ramps across jurisdictions. But as digital assets mature and operate under increasingly supportive regulatory regimes, financial inclusion will only proliferate and support sustainable development aims. For investors with a strong emphasis on sustainability, a key question arises: **Are the potential benefits of digital assets for financial inclusion materially undervalued?**

[6] World Bank. (n.d.). *Remittance Prices Worldwide* [Data set]. Retrieved August 9, 2026.

[7] The Block. (2026). *Ethereum on-chain volume of stablecoins* [Data set]. Retrieved May 11, 2026.

Ethereum On-Chain Stablecoin Transaction Volumes ($)



Source: The Block, Data through August 31st, 2026. The on-chain volume of stablecoins shows the aggregate value in USD of transfers on Ethereum.

Smart Contracts and Programmable Infrastructure

While stablecoins are one of the clearest, financially inclusive applications of distributed ledger technology, the smart contract platforms supporting these ecosystems may ultimately prove equally important from both an energy efficiency and financial access perspective. Networks such as Ethereum and Solana can enable a broad range of applications related to payments, lending, insurance, identity, capital formation and digital commerce because of the programmability of smart contracts.

Rather than relying on continuous, computational competition to secure the ledger, like the proof-of-work (PoW) protocol of Bitcoin, proof-of-stake (PoS) utilizes cryptographic validation and economic incentives through bonded collateral. In September 2022, Ethereum transitioned from PoW to PoS in one of the most significant energy efficiency upgrades undertaken by a major blockchain. Estimates of the network's electricity consumption before and after the transition indicate a reduction of over 99%, while Ethereum has maintained decentralized network functionality and broad global participation.[8]

Solana, alternatively, was architected around high-throughput processing and low operational costs with comparatively minimal energy expenditure on a per transaction basis. This efficiency has implications not only for resource consumption, but also for affordability and scalability of consumer-facing applications. Transaction fees on Solana are often measured in fractions of a cent, facilitating microtransactions and high-frequency financial activity difficult to support through many traditional payment rails.

Importantly, smart contract platforms should not necessarily be viewed as a replacement for traditional finance, but rather as a potential upgrade to certain use cases and processes where material frictions continue to exist. Banks, payment networks and capital markets continue to play critical roles in credit creation and financial intermediation. At the same time, programmable blockchain networks may improve certain areas of financial functionality, particularly when settlement speed, interoperability, accessibility or automation are important considerations.

Beyond finance, programmable blockchains support emerging applications related to digital identity, transparent charitable distribution and tokenized ownership structures. While early, they demonstrate how smart contract platforms can support broader forms of digital coordination and economic participation.

For investors evaluating digital assets, the analysis increasingly extends beyond cryptocurrencies and toward

[8] Neumüller, A., Sims, H., Coelho, H., Wu, W., Bear, K., Arner, D. W., Proskalovich, R., & Zhang, B. Z. (2026). *Ethereum after the Merge—A change in power: Evaluating the post-Merge environmental footprint*. Cambridge Centre for Alternative Finance, Cambridge Judge Business School.

the functionality of the underlying networks themselves. Ethereum and Solana illustrate that blockchain systems can combine lower operational intensity with scalable financial infrastructure capable of supporting a wide range of applications.

Bitcoin, Proof-of-Work and the Global Energy System

For many investors with sustainability goals, the energy consumption of the Bitcoin Network is of central interest. Bitcoin's PoW consensus mechanism is computationally heavy and energy intensive, but it is this energy that provides the security underpinning Bitcoin's permissionless and censorship-resistant financial transactions. When sovereign currencies can face debasement to satisfy near-term needs and political aims, grounding a scarce monetary asset to energy production is at the core of Bitcoin's value proposition.

Focusing solely on Bitcoin's energy consumption provides an incomplete picture of its value. In our view, bitcoin mining has the potential to function as a catalyst within certain aspects of the energy transition. Three underappreciated dimensions of bitcoin's relationship with energy deserve mention: (i) its ability to enhance grid stability, (ii) its potential to improve unit economics for renewable energy, and (iii) the possible reduction of greenhouse gas (GHG) emissions through methane capture to fuel bitcoin mining.

Bitcoin's total energy use cannot be directly measured, so approximation relies on theoretical modeling and survey data. Bitcoin mining's electricity consumption is currently estimated to be ~138 TWh per year or about 0.5% of global electricity consumption, and surveys suggest a majority of this consumption is derived from sustainable sources.[9]

Bitcoin mining is also unusually portable. An Application Specific Integrated Circuit, or ASIC, is the primary computer hardware that is used in bitcoin mining. ASICs are modular and largely location-agnostic so a substantial share of computational needs can migrate toward the lowest-cost energy sources. This flexibility was demonstrated in 2021 when 60-75% of the network's computational power, then located in China, was forced offline and redeployed across new geographies within months. Even in steady-state conditions, mining has shown seasonal mobility, chasing cheaper hydroelectric power during rainy seasons.[10]

A Note on Proof-of-Work and Proof-of-Stake

Proof-of-Work (PoW) and Proof-of-Stake (PoS) blockchains differ fundamentally in how they secure the network, resulting in dramatically different energy profiles. PoW secures the network through external resource expenditure, namely energy and specialized hardware, while PoS secures it through internal economic bonding: validators lock up capital that can be penalized, or "slashed," for misbehavior. Both rely on cryptography, but PoS achieves security without PoW's continuous energy cost.

Their security guarantees are not equivalent but rest on different assumptions. Which method is stronger depends on the type of attack considered and remains actively debated. PoW offers a longer record of adversarial exposure and ties security to physical costs that are difficult to fake, but it is energy- and capital-intensive, and in practice mining can be concentrated. PoS is far more energy-efficient and allows participation without specialized hardware, but it is newer, has a shorter track record, and depends on additional assumptions, such as staking that can concentrate among large providers.

Bitcoin (PoW) relies on miners repeatedly hashing block data with specialized hardware in a race to meet a network-set difficulty target. This process is deliberately energy-intensive: security is derived from the economic and physical cost of expending electricity. Bitcoin's total energy consumption is driven by factors such as mining difficulty, hardware efficiency, electricity prices, and the value of the block reward. Energy use scales with the economics of securing the network rather than with transaction volume.

By contrast, Ethereum (PoS) replaced mining with staking in its 2022 "Merge." Validators are pseudo-randomly selected, weighted by the ETH they lock up as collateral, to propose and attest to blocks. This eliminates the need for energy-intensive mining hardware, and Ethereum's energy consumption dropped by roughly 99.95% after the transition. (See Footnote 9).

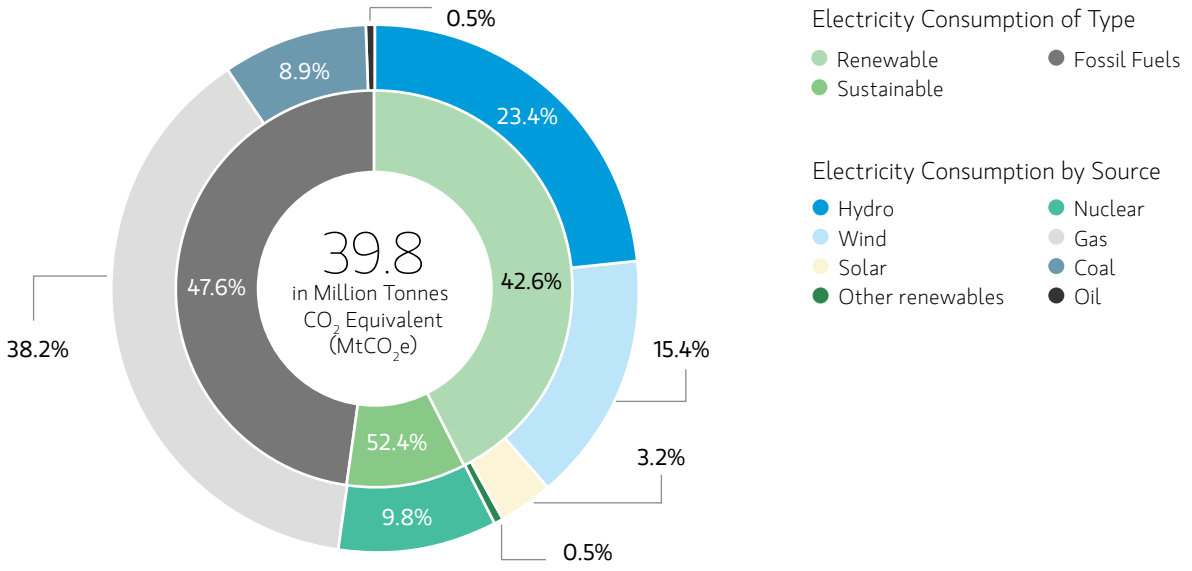
GRID STABILITY AND FLEXIBLE DEMAND

Electricity grids are undergoing structural transformation due in part to the energy transition and the growing demand for power. As intermittent renewables such as wind and solar gain share, variability and supply-demand mismatches have increased, creating operational challenges. Within this context, bitcoin mining represents

[9] Neumueller, A., Pieters, G. C., Mohaddes, K., Rousseau, V., & Zhang, B. Z. (2025, April 28). *Cambridge digital mining industry report: Global operations, sentiment, and energy use*. Cambridge Centre for Alternative Finance, Cambridge Judge Business School.

[10] Cambridge Centre for Alternative Finance. (n.d.). *Cambridge Bitcoin mining map* [Data set]. Retrieved August 9, 2026.

Electricity Consumption of Bitcoin Mining by Source



Source: Cambridge Centre for Alternative Finance. Cambridge Digital Mining Industry Report. April 2025.

a distinct form of electricity demand as mining loads can be curtailed, ramped down or shut-off within minutes without damaging equipment or incurring significant restart costs, differentiating it from most industries with rigid baseload needs.

In traditional grids, short-term demand is relatively inelastic, requiring operators to rely on peaking plants or reserve capacity to manage spikes in electricity demand. Flexible demand resources like bitcoin mining can reduce system costs and enhance grid reliability. During periods of grid stress, miners can curtail consumption. During periods of excess generation and low prices, miners can absorb surplus electricity.

In Texas, where rapid wind and solar expansion has led at times to negative or near-zero wholesale electricity prices, miners are able to function as a "buyer of last resort," monetizing surplus energy so renewable generators are not forced to cut output and reduce revenues. Conversely, during extreme weather events, miners participating in demand response programs have curtailed operations, allowing energy to be used for more pressing consumer needs. Importantly, this flexibility is economically incentivized, aligning private incentives with grid reliability without regulatory or administrative mandates.

Unlike cloud or AI data centers, which require latency-sensitive or mission-critical baseload power, bitcoin mining has no set obligations. Blocks can be mined anywhere and temporary shutdowns by individual miners do not impair network integrity. When critics argue that adding demand inherently increases grid stress, many assume homogeneous, inflexible power demand. Bitcoin mining represents a source of large-scale and economically motivated flexible demand, which are increasingly valuable attributes in complex power systems.

Importantly, these benefits are context dependent rather than universal. Bitcoin mining is most likely to support grid efficiency where electricity systems experience periodic surplus generation, miners participate in enforceable curtailment programs, market rules appropriately compensate flexible demand, and mining does not materially increase costs or other negative externalities for consumers and communities. Such as with other flexible loads, outcomes ultimately depend on local electricity market design and operating conditions. Looking ahead, a growing number of mining companies are diversifying into AI and high-performance computing (HPC), attracted by stronger economics for certain workloads. Unlike bitcoin mining, however, AI and HPC workloads generally require higher uptime, lower latency, and more reliable power, making them less suitable as flexible demand resources.

RENEWABLE ENERGY UNIT ECONOMICS

Beyond grid operations, bitcoin mining may also improve renewable project economics. Renewable generation costs have declined substantially, but monetization can remain challenging. As renewable penetration increases, wholesale prices during peak generation often fall and curtailments further erode returns, particularly in regions with transmission constraints or uneven demand.

Bitcoin mining introduces an incremental revenue stream without reliance on subsidies or long-term power purchase agreements. By co-locating mining rigs with renewable assets, miners can monetize excess or stranded output. For example, in parts of East Africa, bitcoin miners partner with renewable mini-grids and use mining to absorb surplus generation when local demand is low. This effectively adds a new revenue stream that can help small renewable plants and mini-grids become more financially viable so they can deliver electricity to challenging locations, supporting a host of development needs. Even modest improvements in capacity utilization can meaningfully enhance internal rates of return of renewable projects.

Renewable energy generation certainly does not depend on bitcoin mining for long-term viability, but miners' price-sensitivity and flexibility align naturally with renewable generation profiles. Still, mining revenues are volatile and regulatory uncertainties persist – bitcoin mining should be treated as a supplementary source of revenue rather than foundational to renewable power project models. But the fact remains, the Bitcoin Network's relationship with the energy system can be utilized in certain ways to support important sustainability goals.

METHANE MITIGATION AND EMISSIONS REDUCTION

Bitcoin mining can reduce methane emissions by creating an economic incentive to capture and combust methane that otherwise would have been vented or wasted, particularly in remote locations without pipeline or grid access. This potential benefit is environmentally consequential because methane is a highly potent greenhouse gas (GHG), with global warming impact significantly greater than carbon dioxide. Over a 20-year time horizon, methane has a global warming potential of 86x that of carbon dioxide, declining to 27-30x over a 100-year horizon. Molecule for molecule, methane traps more heat than carbon dioxide but has an atmospheric lifespan of ~12 years, whereas carbon dioxide can remain in the atmosphere for decades or centuries. Reducing methane emissions is widely viewed as one of the most effective near-term strategies for slowing climate change.[11]

Roughly 60% of methane emissions are believed to be derived from human activity: estimates vary but emissions are primarily attributed to agricultural practices (~40%), fossil fuel extraction and use (~35%), and waste decomposition (~20%).[11] In oil and gas production, methane is frequently flared or vented when transport infrastructure is unavailable, resulting in substantial environmental harm. Bitcoin mining enables on-site utilization of stranded gas by deploying mobile generators and mining hardware at wells where methane is combusted to generate electricity. This model has been deployed at a number of oil and gas production sites, using otherwise stranded natural gas to generate electricity for bitcoin mining. The same logic extends to the waste sector, which accounts for roughly a fifth of anthropogenic methane emissions as noted above. Regulatory collection requirements generally apply only to landfills above certain size thresholds, leaving a long tail of smaller sites where gas is vented because conventional gas-to-energy economics do not clear. A peer-reviewed modeling study in the Journal of Cleaner Production found that adding bitcoin mining as an on-site power offtaker can make methane capture financially viable at precisely these low-flow landfills and, notably, without the government subsidies such projects have typically required.[12]

Proponents argue this achieves more complete combustion than intermittent or poorly operating flares while capturing energy that would otherwise be wasted. The climate benefit, however, is contingent on the counterfactual. Compared with venting or incomplete flaring, onsite mining meaningfully reduces emissions but when compared with a properly operating flare, the incremental benefit is smaller.

The right baseline for an investor considering a sustainability mandate is not zero emissions, but the impact of the methane that would otherwise be vented. Against that baseline, the use of bitcoin mining to economically incentivize the capture of methane

[11] Climate and Clean Air Coalition. (n.d.). Methane. Retrieved August 9, 2026.

[12] Climate and Clean Air Coalition. (n.d.). Methane. Retrieved August 9, 2026.

can lower net emissions. Bitcoin mining is not by any measure a comprehensive climate solution. However, its ability to operate off-grid, at small scale and with flexible deployment enables access to otherwise wasted resources. In a capital-constrained energy transition complicated by rising demand and policy uncertainty, bitcoin mining may provide marginal efficiency gains and cost-effective mitigation, further aligning environmental and commercial incentives. For those investors focused on sustainability, a question to consider: **Is bitcoin an underutilized enabler of the energy transition?**

Institutional Adoption and Sustainability Considerations

The institutional adoption of digital assets in 2026 is best described as a transition from exploration to implementation, where pilot programs and opportunistic exposures are evolving into deliberate allocations within portfolios. Large asset owners such as pension funds, sovereign wealth funds and endowments are no longer asking whether to engage, but how much and through which structures.

Allocation to digital assets generally remain modest, with institutional exposure often concentrated in bitcoin and, to a lesser extent, Ethereum through regulated investment vehicles such as ETFs/ETPs, commingled funds and separately managed accounts. According to the 2026 EY-Parthenon and Coinbase Institutional Digital Assets Survey, 73% of surveyed institutional investors plan to increase their digital asset allocations in 2026, while 81% prefer to access spot cryptocurrency exposure through ETFs or ETPs and 66% already do so.[13] These survey findings suggest that digital assets are increasingly being incorporated into institutional investment frameworks, although portfolio allocations remain subject to market conditions, regulatory developments and internal governance processes.

Despite this progress, institutional constraints have tempered momentum: direct ownership of cryptocurrencies and tokens remains relatively rare among traditional asset owners due to custody and legacy operational infrastructure. Instead, institutions currently favor regulated wrappers and intermediated exposure, which align with existing investment committee processes and risk frameworks.

Regulatory fragmentation also remains a consistent hurdle. In the United States, recent SEC and CFTC guidance has provided greater clarity on the treatment of digital assets under federal securities and commodities laws, although the allocation of regulatory authority remains subject to an evolving statutory and regulatory framework. Additionally, digital asset activities may be subject to requirements administered by banking regulators and FinCEN, as well as state-level licensing and regulatory regimes, creating a multilayered compliance environment. Europe, by contrast, has so far made greater progress on this issue as it has pursued harmonization through the Markets in Crypto-Assets Regulation (MiCA), which came into full effect in 2024. While MiCA replaced divergent national regimes with a single EU-wide licensing and disclosure framework, it still leaves issues surrounding decentralized finance (DeFi) and staking largely unaddressed. Although progress is being made, greater regulatory clarity that is less subject to political change would further accelerate institutional adoption.

Sustainability considerations also persist largely as a secondary, but still relevant, constraint. Lingering reputational sensitivities and concerns about energy intensity continue to shape investment committee discussions. As institutions evaluate and implement digital asset exposures, we hope the full spectrum of potential risks and benefits of this technology will be fairly evaluated.

[13] Rudd, M. A., Jones, M., Sechrest, D., Batten, D., & Porter, D. (2024). An integrated landfill gas-to-energy and Bitcoin mining framework. Journal of Cleaner *Production*, 472, 143516.

[14] Coinbase & EY-Parthenon. (2026, March). *Volatility drives discipline, not retreat: 2026 institutional investor digital assets survey.*

Conclusion

Digital assets represent more than a speculative financial innovation – they constitute an emerging asset class and foundational financial infrastructure capable of many benefits still not fully understood by many in traditional financial markets. Benefits include expanding access to financial services, reducing settlement inefficiencies, mitigating the long-term effects of deliberate currency debasement, and perhaps even accelerating innovation at the nexus of digital systems and the energy transition. As regulatory clarity and institutional adoption advances in major markets, the innovation brought to financial services by the digital asset ecosystem is poised to align with many sustainable investing aims in ways that have not always been readily recognized.

Risk Considerations

Investing involves risk including the risk of loss. There is no guarantee that any investment strategy, including those with an ESG focus, will work under all market conditions. Investors should evaluate their ability to invest for the long-term, especially during periods of downturn in the market.

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INDEX DEFINITIONS

An **ASIC** is a specialized hardware device designed to perform a single computational task efficiently; in the context of blockchain, ASICs are purpose-built to execute the hash functions required for Proof-of-Work mining (e.g., SHA-256 in Bitcoin) with significantly greater speed and energy efficiency than general-purpose hardware.

Smart contracts are digital contracts stored on a blockchain that are automatically executed when predetermined terms and conditions are met.

Public key cryptography is a cryptographic framework in which each participant generates a unique key pair, one public and one private, enabling secure communication, authentication, and digital signatures without requiring a shared secret in advance.

Hash-based proofs are cryptographic constructions that use one-way hash functions to demonstrate the integrity, existence, or computational work associated with data without revealing the underlying information itself.

Proof of Work is a consensus mechanism in which network participants compete to solve a cryptographic puzzle, typically by finding a hash value below a specified target threshold, and the first to do so earns the right to append a new block of transactions to the blockchain. The difficulty of the puzzle ensures that altering past records would require prohibitively large computational resources.

Proof of Stake is a consensus mechanism in which validators are selected to propose and validate new blocks based on the amount of cryptocurrency they have staked, rather than computational work.

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