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## The Ethereum “Merge” – What are the implications for the future of the crypto industry?

*While the failed crypto exchange FTX has heightened uncertainty over this asset class, another potentially seismic event for the industry took place recently when the Ethereum blockchain merged with another blockchain (Beacon Chain). “The Merge” saw Ethereum switch its verification system from the established proof-of-work (PoW) protocol to a proof-of-stake (PoS) approach, with major implications for sustainability, scalability, and other factors related to blockchains.*

While the attributes and potential benefits of blockchain technology have been apparent for some time, one of its most high profile drawbacks – particularly as the sustainability movement has progressed – has been the high levels of energy consumption involved in the “mining” process. The sustainability factor, combined with the inability of Ethereum to cater for rapid growth and demand for its limited block space, has resulted in “The Merge” – the name given to the upgrade from proof-of-work (PoW) as a consensus mechanism for Ethereum to proof-of-stake (PoS).



### Defining blockchain

A blockchain is a database or ledger that is composed of a timestamped and immutable chain of records that grows as new records – or blocks – are added to it. Because blockchains reside on multiple computers at the same time, rather than on a single, centralized server, blockchain technology is sometimes known as distributed ledger technology (DLT).

Ethereum is a decentralized blockchain with smart contract functionality. Ether (ETH) is its native currency. Smart contracts are programmable contracts based on predefined conditions. Decentralized applications (DApps) are applications built using smart contracts. DApps are increasingly popular, challenging the capacity of the network.





### Proof-of-work versus proof-of-stake

Since the inception of blockchain, PoW has been the consensus mechanism for blockchain construction. PoW refers to the intensive processing initiated by programmers who look to solve mathematical puzzles that earn the right to update the blockchain and claim a reward of a predetermined amount of cryptocurrency. Because of the amount of processing power involved, it becomes impractical for any individual or group to tamper with a valuable cryptocurrency's blockchain, thereby ensuring security.



### Implications for Ethereum

The Merge has tremendous implications for the Ethereum network. Perhaps the greatest is in relation to sustainability and the shift from the energy-intensive and operationally fraught mining process of PoW to PoS which requires minimal energy consumption. In order to discourage malicious behavior when validating transactions, PoW validators need to tie up substantial sums in hardware and electricity expenses. Instead, PoS requires participants to post ETH as collateral (hence "staking"). Their costs therefore are limited to the opportunity cost associated with locking up that capital, reducing Ethereum's energy footprint by more than 99%.

The substantial costs involved with PoW means there are significant economies of scale possible, which benefits large participants and comes at the expense of individuals and smaller actors. The result is concentration of control of the network by larger players. PoS eliminates this as all that is required to participate in network validation is the staking of a sum of ETH. This democratization of participation essentially promotes decentralization of the network in terms both of size of participants and geographic spread, ultimately making the network more secure. Slashing is an additional security feature of PoS, allowing the network to seize a portion of the stake assets of malicious actors or remove them from the chain entirely.

The lower costs associated with the POS system also mean that Ethereum will be able to pay validators less in reward for providing the same level of network security. This eliminates the inflationary nature of blockchain ecosystems.







### **The Merge and scalability**

The Merge also promotes scalability through the introduction of sub-blockchains (“shard chains”) that split the network horizontally into smaller component pieces. This structure means less processing burden on the networks’ nodes. Instead of having to store all blockchain data and validating transactions across the whole network, the chains limit this to a much smaller component of the network. This allows validation to take place on cheaper hardware, meaning more global participation and decentralization of the network.

### **Ethereum fees and transaction speeds**

The Merge has been criticized for being an over-hyped event. The criticism appears to relate to transaction speeds and fees – specifically “gas” fees – and the fact that neither of these are expected to be reduced post-Merge.

Gas refers to the unit that measures the amount of computational effort required to execute specific operations on the Ethereum network. Because each Ethereum transaction requires computational resources to execute, each transaction is subject to a fee, known as a gas fee. These fees are paid in Ethereum's native currency, ether (ETH). According to Ethereum, The Merge was a change of consensus mechanism, not an expansion of network capacity, and so was never intended to lower gas fees.

Likewise with transaction speeds. In blockchain systems, a transaction's "speed" can be measured in a few ways, including time to be included in a block and time to finalization. According to Ethereum, *“both of these change slightly, but not in a way that users will notice.”*

Nonetheless, and in spite of these “non-improvements,” on the sustainability issue alone the Merge would appear to have raised a considerable challenge for competing networks and done much to improve the credibility of crypto in spite of difficulties elsewhere in the industry.

**Intuition Know-How contains a number of tutorials relevant to Ethereum and the crypto industry in general:**

- [Information Technology \(IT\) in Business](#)
- [Data Security](#)
- [FinTech – An Introduction](#)
- [Cryptography](#)
- [Blockchain – Primer](#)
- [Crypto Assets](#)





## Sustainable Commodities – Can they play a role in the transition to a low-carbon economy?

*Many commodities have become key inputs to the global economy, but their production is often associated with processes that have serious environmental and ethical issues – deforestation, greenhouse gas (GHG) emissions, and forced/child labor, to name but a few. Are the negative impacts of commodity production inevitable or can sustainability-linked initiatives ensure the commodities sector plays its part in the green transition?*

A consensus is emerging that the global economy is entering into an inflationary regime in which market prices for commodities will be supported – a so-called commodities “supercycle.”

On the demand side, policy choices on the part of businesses and governments related to deglobalization, mitigation of geopolitical risks and supply chain sensitivities that promote re-shoring/onshoring/near-shoring, are reinforcing this trend.

On the supply side, commodities have suffered from years of underinvestment with investors looking for short-term guaranteed returns rather than investment for long-term growth, with consequences for pricing. There have been tendencies to limit production and this has been compounded by the movement toward environmental, social, and governance (ESG) investing that has suppressed investment into energy, metals, and other commodities perceived as “dirty.”



### Commodities demand on the increase

But, somewhat ironically, the move toward the green transition and energy sustainability will see increased reliance on commodities. Wholesale electrification will place great demands on copper and other metals, while the building of the infrastructure to complete the green energy transition over the longer term will be dependent on fossil fuels in the shorter term. So how to reconcile increased commodities production and investment with ESG principles?







Critical metals and rare earth elements are essential to hardware such as circuits and microchips in computers, mobile phones, and networks. Aluminum and steel are used to case these elements as well as the metals used in batteries (such as cobalt, nickel, and lithium). Tin is essential to the information and communications technology (ICT) sector as it is used in soldering circuit boards. Copper is the foundation of electricity networks and renewables technologies and is also key in ICT.

### Recycling rare metals

A number of measures have been advanced to mitigate ESG impacts, principally around recycling of electronic waste (e-waste) which is currently estimated to be just 20 percent of the 50 million metric tons produced annually. It has until now proved technically challenging to recycle rare metals and efforts are being made to do more at the level of product design to make re-use of components easier. Another area where ESG-minded investors are examining supply chains is in the area of agreements on observance of minimum ESG standards between lower-income, metal-mining countries, and consuming countries.



### Policymaker engagement critical to ESG

The limitations of confining engagement on critical sustainability issues to individual companies is becoming apparent. The area of deforestation is exemplary here. As one asset manager puts it:

*"Deforestation is a material risk for investors. They are concerned with not only its financial impacts but also the broader consequences on biodiversity, climate change, and the violation of the rights of indigenous people and local communities, all of which increases potential reputational, operational, and regulatory risks. [...] Engaging with companies is important to halt deforestation, but there are limits to what individual firms can achieve. Given that the responsibility for oversight of forests and nature lies with governments, investors can help enable industry solutions by engaging directly with policymakers."*





### **Energy subsidies equals missed opportunity**

Ironically, following the Russian invasion of Ukraine and subsequent disruption to the energy market causing runaway price inflation, government policy has set back a rare opportunity to accelerate the transition to sustainable energy sources. The response to the 2008 global financial crisis that combined bailouts of the financial system with austerity measures is credited with the subsequent rise in populism. In recognition of this and, in contrast, the response to the COVID crisis was generous and redistributive. The same approach has held for the energy crisis where governments have favored massive subsidies when non-intervention would surely have suppressed demand and concentrated minds on the need to transition from fossil fuels.

Ultimately, the trend toward sustainable commodities will likely be driven by new or modified investment mandates emanating from asset owners combined with what seems like an increasing willingness of commodity consumers to bear the increased cost involved in ensuring that commodities meet requisite ESG standards.

**Intuition Know-How contains many tutorials relevant to commodities, sustainability, and ESG. These include:**

- **Commodities – An Introduction**
- **Commodities – Physical Trading**
- **Commodities – Oil**
- **Commodities – Natural Gas**
- **Commodities – Coal**
- **Commodities – Electricity**
- **Commodities – Emissions**
- **Commodities – Non-Ferrous Metals**
- **ESG – Primer**
- **ESG – An Introduction**
- **ESG Factors**
- **Climate Risk – An Introduction**
- **Climate Risk – Banking & Decarbonization**
- **Sustainable & Responsible Investing – An Introduction**
- **Sustainable Finance – An Introduction**
- **Sustainable Finance – Principles & Frameworks**
- **Sustainable Finance in Practice**
- **Biodiversity & Financial Institutions**

