DIGITAL ASSET RESEARCH

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Ethereum Merge Update - What to Expect

SUMMARY

- The merge is a monumental event for the digital asset market since it is a major update for the Ethereum network, which is one of the largest blockchains. Ethereum's native token, ETH, is the second largest digital asset by market capitalization.
- The merge transitions the Ethereum network from a Proof-of-Work consensus mechanism to Proof-of-Stake.
- The merge reduces the Ethereum network's energy consumption by more than 99%.
- The merge reduces the supply issuance rate of new ETH by ~89.4%
- The merge does not directly address the Ethereum network's high transaction fees and scalability issues.

This report examines the effects of Ethereum's transition to Proof-of-Stake (PoS), provides an overview of Ethereum's roadmap, and discusses how the merge lays the foundation for Ethereum's future. Our analysis consists of DAR data sources, public sources, media reports, and press releases.

THE MERGE & PROOF OF STAKE

Ethereum is currently undergoing the merge update as it transitions from Proof-of-Work (PoW) to Proof-of-Stake (PoS). The Ethereum merge is a two-step event. On 6 September 2022, the first step of the Ethereum merge update, called Bellatrix, was activated. This initiated the Ethereum network's move toward PoS. The second step, called Paris, is expected to happen sometime between 13-15 September 2022.

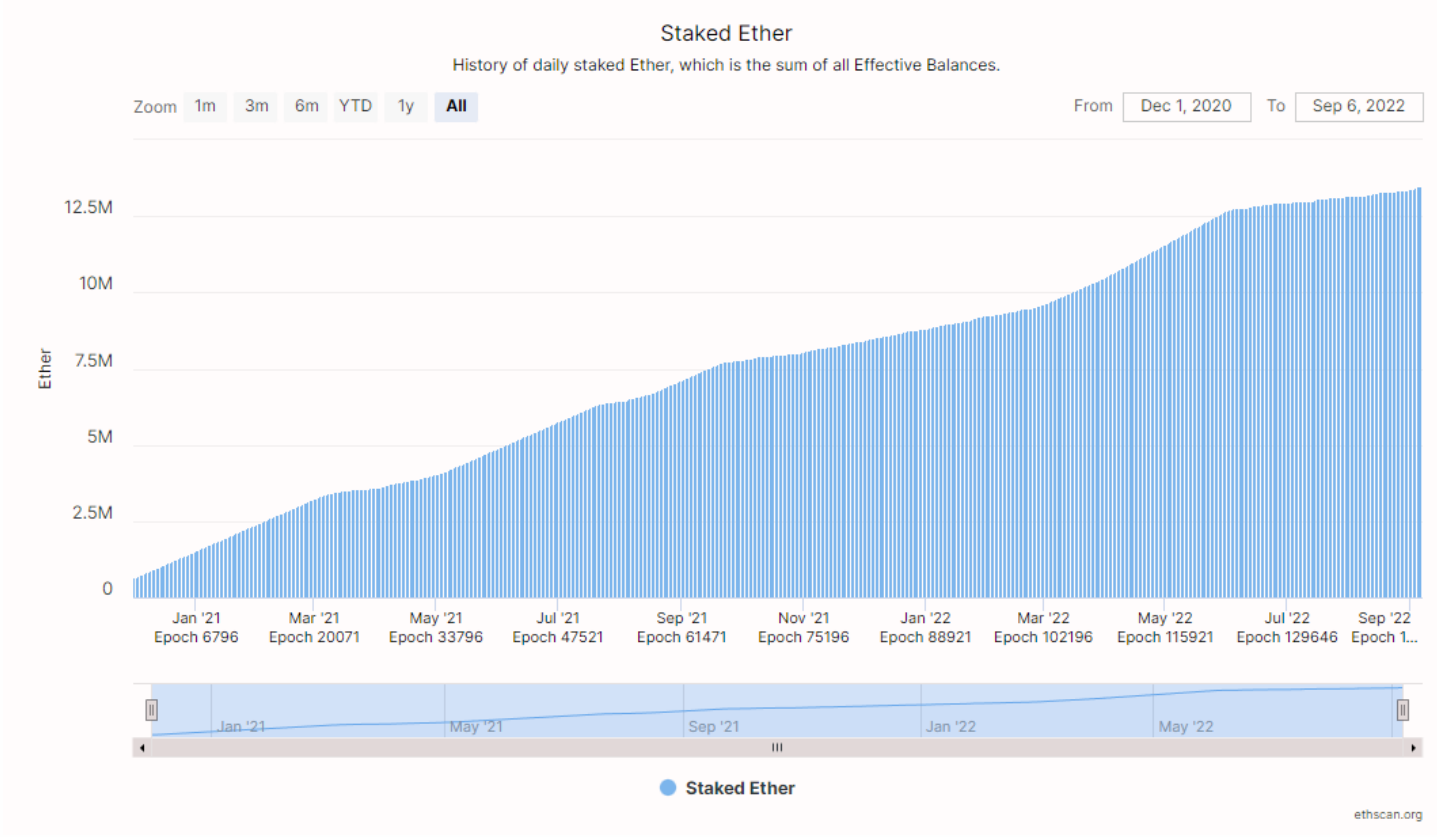
The process itself is called the "merge" because Ethereum already has an existing PoS chain called the Beacon Chain, which was introduced in 2020. However, the Beacon Chain is not utilized to process transactions and has been merely running in parallel as a staging area to prepare for the Ethereum main chain's PoS upgrade.

Unlike a PoW consensus mechanism, PoS does not require an enormous amount of computational energy to power the network. Currently, the Ethereum blockchain is utilizing a PoW consensus mechanism, which requires miners to solve mathematical problems by brute forcing solutions via computation. This requires specialized computer equipment, known as mining rigs, that use a significant amount of energy to do the required work.

After the merge, the Ethereum blockchain will no longer require a massive amount of computing power to secure, validate, and facilitate transactions. The merge will reduce the network's energy consumption by approximately 99% and remove the need for mining rigs to mint new ETH. Instead, Ethereum will transition to PoS, a consensus mechanism in which network validators (essentially the replacements for miners) are required to stake ETH to help secure the network.

As of 6 September 2022, a total of 13,486,703 ETH was staked on the Ethereum Beacon Chain, which was roughly equivalent to $21.1 billion.

Figure A – Total ETH Staked



Source: ethscan.org

WHAT IS THE MERGE GOING TO DO?

The primary result of the Ethereum merge is the network transitioning from PoW to a PoS consensus mechanism. There are also numerous second order effects that will occur because of this change:

- **Replacement of miners with validators**

  Fundamentally, PoW requires miners to take capital risks in the form of hardware and electricity costs, whereas PoS requires validators to take capital risks in the form of staking their ETH.

  Protocol designers argue that PoS will cause a reflexive game theory whereby validators are incentivized to sustain the value of their capital. In the case of PoW, miners care less about the value of the underlying asset because their costs are measured in hardware and electricity bills. This is why many BTC and ETH miners are using futures to hedge their exposure, similar to how farmers might use hedges to offset risks associated with their harvests. PoW miners need to sell the results of their mining activities to cover operational costs. With PoS, validators' incentives are more aligned with the underlying blockchain network and the associated assets. If the value of ETH plummets, validators are not forced to operate at a loss because being a validator does not require an enormous amount of computational power nor specialized mining rigs; if the value of ETH rises, validators are not tempted to sell as they can compound their yield by staking the ETH instead.

  In a PoS system, validators that do not properly participate in the network and break rules will suffer under a mechanism called slashing. Slashing is the act of the Ethereum network confiscating a significant portion of the validators' stake. An example of rule breaking behavior that could lead to slashing is the act of validating fraudulent blocks.

- **Reduction in new ETH supply issuance**

  Currently, ~13,000 new ETH are mined every day on the main chain. Miners receive newly issued ETH as a block reward, presently set at a constant rate of 2 ETH per block. Additionally, the Beacon Chain is also currently producing ~1,600 new ETH per day. After the merge, only the ~1,600 ETH from staking rewards will be produced on a daily basis, representing a ~89.4% reduction in the amount of annual ETH issuance.

  ETH Issuance Breakdown

	Pre-Merge	**Post-Merge**
Total ETH Supply (Q2 2022)	119,300,000 ETH	119,300,000 ETH
Execution Layer (PoW)	4,930,000 ETH	0

Consensus Layer (PoS)	584,000 ETH	584,000 ETH
Inflation Rate (Annually)	**~4.62%**	**~0.49%**

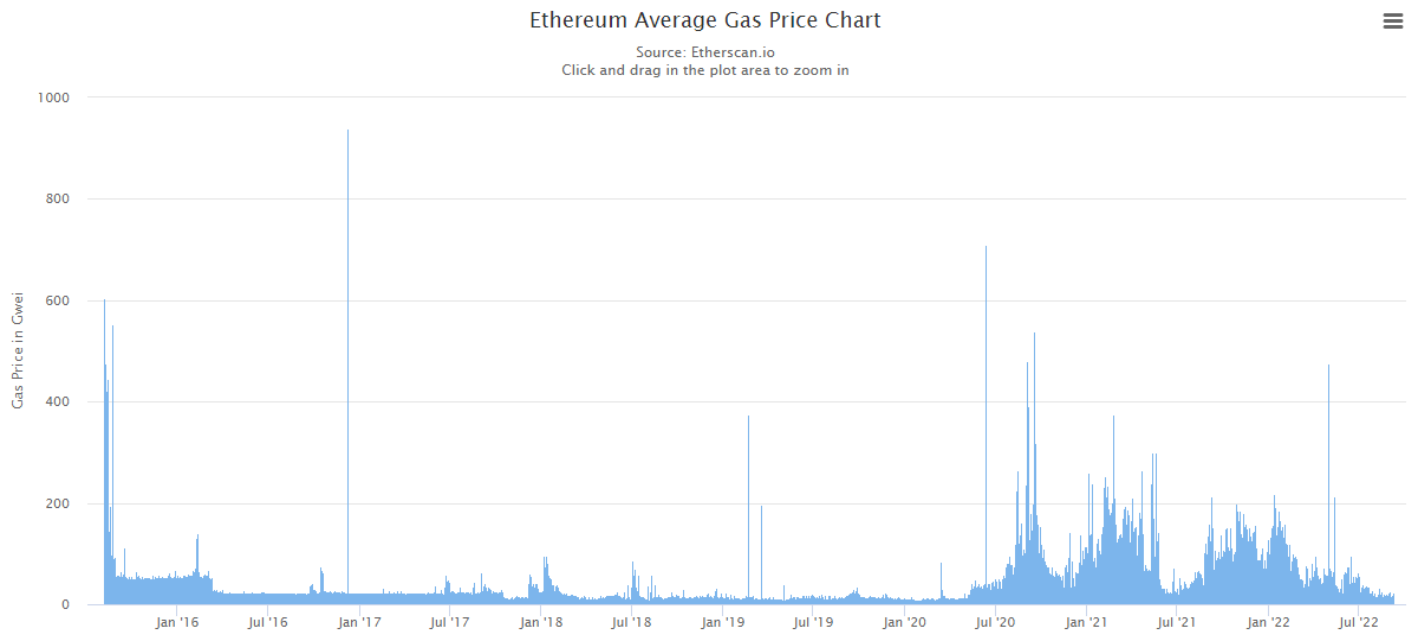
- **Classification of ETH as an ESG-friendly asset**

  The investment industry is becoming more aware of the environmental impact that assets might have on the Earth's climate. Outside of the digital asset market, the ESG narrative has been trending for the last couple of years. Bitcoin's enormous energy consumption, which is equivalent to a small country, is also often cited as the reason for institutions to not invest in the asset. In fact, the White House Office of Science and Tech has stated that crypto mining threatens US climate change efforts. After Ethereum transitions to PoS, it will become much more ESG-friendly, an important consideration for many institutional asset allocators.

WHAT HAPPENS AFTER THE MERGE?

Ethereum is the most dominant blockchain network with smart contract functionality. There are many decentralized applications (dApps) built on top of Ethereum, facilitating billions of dollars of value transfer every day. Users that interact with these dApps need to pay the Ethereum network's gas fees. At the last digital asset market cycle peak, when the price of Ethereum reached ~$4,000, gas fees were very high, which led to a popular belief that Ethereum needs to increase its transaction throughput and reduce gas fees. Without addressing these issues, the Ethereum network will not be able to scale.

Unfortunately, the merge **will not address Ethereum's transaction throughput and gas fee issues**. However, the next planned update after the merge, called the Shanghai upgrade, is intended to reduce gas fees. The Shanghai upgrade is planned for early 2023 and will finally enable ETH stakers to withdraw their staked assets.



Additionally, Vitalik Buterin, Ethererum's co-founder, has provided an updated Ethereum roadmap that includes a series of interconnected protocol upgrades that, when implemented, will make the network more scalable, secure, and sustainable. Buterin also said that at the very end of the roadmap, the Ethereum network will be able to process 100,000 transactions per second.

ARGUMENT AND DISCOURSE ABOUT THE MERGE

As the merge is happening, there are increasing discussions about whether there will be a fork of the Ethereum network by miners who want to maximize their profits by supporting a PoW chain. Amidst these discussions, several exchanges such as Poloniex, Gate.io, and Bitmex, have started supporting ETHPoW markets. These markets are generally exchange-specific, in the form of IOUs or other financial contracts that can only be traded on that particular exchange.

A PoW fork of the Ethereum network might cause a messy situation in the Decentralized Finance (DeFi) market as there will then be forked versions of DeFi protocols, which may lead to arguments about how value will accrue and disperse. In the scenario that an Ethereum PoW fork retains 1% of the original Ethereum network's value, it will still be a $1+ billion market cap asset. How exactly this will affect the DeFi market is yet to be determined, but it is a critical factor that market participants are paying close attention to.

CONCLUSION

The merge will transition the Ethereum network from PoW to PoS. This will reduce the Ethereum network's energy consumption by more than 99% and decrease new ETH supply issuance by ~89.4%, but will not immediately reduce gas prices or solve scalability issues. The merge will also help establish ETH as the leading blockchain network if it can successfully conduct an upgrade at a massive scale while being one of the most decentralized networks.

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