Ethereum: Post-Merge Value

I.   Executive summary

This report intends to give readers an understanding of the Merge, outline the key changes to both the network and token economics, as well as provide our outlook for ETH going into and after the Merge in September.

We recommend an Overweight in ETH as we approach the Merge, with a 3-month price target of US$1850. Our base case assumes a smooth implementation of the Merge, some clarity regarding shard implementation, and a relatively stable macro / inflation environment.

Key stats	
Date	25-Aug-2022
Price (in USD)	1,700
Market cap	
Circulating (in bn)	207
Fully diluted (in bn)	207
Circulating as % of fully diluted (%)	*100%*
As a % of ETH market cap	*n.a.*
As a % of BTC	*50%*

Key Takeaways

1. Overall growth in its network activity has slowed substantially in the past 6 months, partially due to the decline in DeFi yields and speculative NFT price performance. But with only ~15M monthly active users (~500k per day), there are ample growth opportunities for Ethereum in the long run. ETH value is buoyed by expectations for increased bandwidth and user adoption, and looking beyond the current depressed activity levels and revenue generation.

2. Ethereum's switch from POW to POS consensus mechanism paves the way for future evolution that will allow for faster and cheaper scaling, which will further enhance its status as the premier smart contract protocol and dApp ecosystem. But actual speed and cost improvements will need to wait until 2023 (the "Surge"), and this timing could be a negative surprise to some.

3. Staking demand post-Merge could increase from the current 13m ETH, with overall POS staking APR likely in the 6.2-6.8% range in the near term. This should also impact the yield offered in the DeFi space. However, the yield is paid in-kind with more ETH, so we believe that token value and network activity outlook will remain the dominant decision factors in deciding whether / when to purchase ETH tokens for staking purposes.

4. Reduced token inflation should boost ETH value by 20-30%, and any incremental buying for ETH 2.0 POS staking will also reduce circulating supply. While these improvements to tokenomics should be priced in by now, we believe that the floor price for ETH in a Bear scenario should be substantially higher than the US$900 level we reached back in June.

5. Further Bull scenario upside will need to come from i) smooth execution of the Merge for both Ethereum and the dApps built on top of this network, and ii) improved clarity on the timing and implementation of the Surge in 2023, when capacity will actually increase, and gas fees will actually decline.

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II. Key Charts

Exhibit 1. Ethereum Daily Transactions

Ethereum Daily Transactions Chart
Source: Etherscan.io
Click and drag in the plot area to zoom in

Exhibit 2. Daily Active Addresses

Active Ethereum Addresses
Source: Etherscan.io
Click and drag in the plot area to zoom in

Exhibit 3. Network Difficulty

Ethereum Network Difficulty Chart
Source: Etherscan.io
Click and drag in the plot area to zoom in
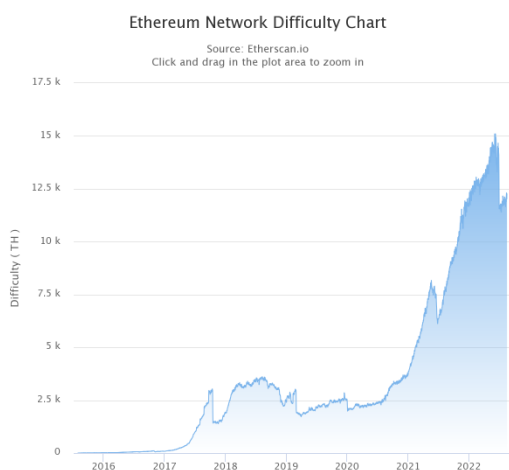
Exhibit 4. Ethereum Market Capitalization

Ether Market Capitalization Chart
Source: Etherscan.io
Click and drag in the plot area to zoom in
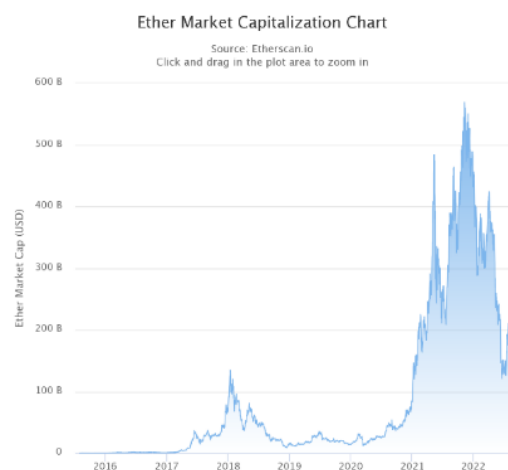
Exhibit 5. Network Validators

Validators
History of daily active validators.

Exhibit 6. Value Staked

Staked Ether
History of daily staked Ether, which is the sum of all Effective Balances.

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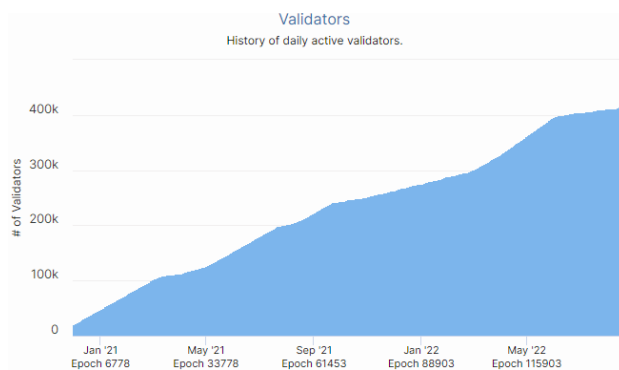Henry Byun, Market Analyst henry@gsgasset.com
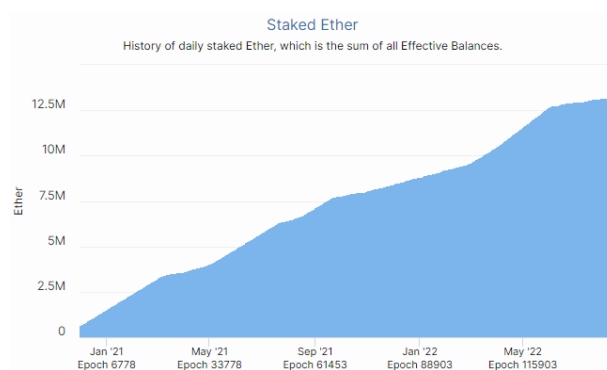
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Exhibit 7. Market Cap / Realised Cap

Exhibit 8. Exchange Balance Flow

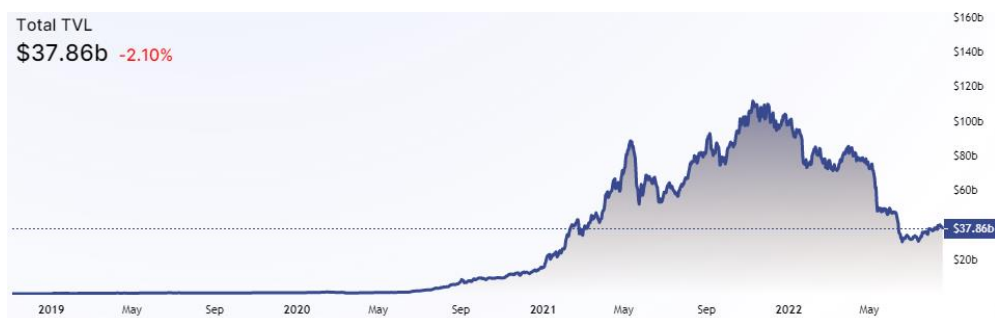### Exhibit 9. Total Value Locked in Ethereum Defi Protocols

Exhibit 10. Ethereum Monthly Total Revenue vs. Protocol Revenue (Fees earned for token holders)

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IV.   *Description of Network / Ecosystem – Before the Merge*

Ethereum expanded on Bitcoin's decentralized blockchain with the innovation of smart contracts that enforce trust-less transactions, building a global computer network that supports decentralized applications (dApps). Being the first to add use cases for cryptocurrencies besides "store of value" has allowed Ethereum to become by far the largest and most robust ecosystem in crypto. With a current market cap of over US$200bn, and many more billions worth of applications based on top of this network, Ethereum has been so far able to withstand challenges from other Layer-1 competitors who offer faster speed and lower fees.

Ethereum, like Bitcoin, currently uses a Proof-of-Work (POW) consensus protocol, which allows the nodes of the Ethereum network to agree on the state of all information recorded on the Ethereum blockchain by validating the block proposed by the specific miner who solves the underlying algorithm first.

Network Elements

- **Miners**: In its current form, miners use specialized equipment to go through a race of trial and error to find the nonce for a block. Miners who successfully confirm a transaction and upload it to the blockchain receive block rewards for their effort, providing an incentive and contributing to the exponential increase in network usage.

- **Nodes:** Nodes are any instance of Ethereum client software that is connected to other computers also running Ethereum software, thus forming a network. A client is an implementation of Ethereum that verifies data against the protocol rules and keeps the network secure**.**

- **Blocks:** Blocks are batches of transactions with a hash of the previous block in the chain. The hash links blocks together in a chain because hashes are cryptographically derived from the block data. This prevents fraud because one change in any block in history would invalidate all the following blocks as all subsequent hashes would change and everyone running the blockchain would notice.

- **Smart Contracts**: The Ethereum blockchain is powered by its native cryptocurrency Ether (ETH) and enables developers to create new types of ETH-based tokens that power dApps using smart contracts. Ethereum smart contracts are self-executing contracts that facilitate, verify, and enforce transactions on the blockchain. ETH is the primary capital source for applications built on top of Ethereum. These applications have now grown to include stablecoins, lending and borrowing platforms, decentralized exchanges, non-fungible tokens (NFTs), derivatives and more. Anytime a user deploys a smart contract on the Ethereum network, provides liquidity to an application, or makes a trade on a decentralized exchange, ETH is used to pay network fees for recording transactions on the blockchain ledger.

- **dApps**: Decentralized applications are blockchain-based, smart contract-powered versions of the applications that we use today. In a paper titled "The General Theory of Decentralized Applications, dApps," they are defined as entities that must have open-source code and work without third-party intervention, be user-controlled with all information held in a publicly accessible blockchain network, have some sort of cryptographic token for access and reward contributors in the token, and have a consensus method that generates tokens.

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V.   *Current State of Ecosystem*

User Trends

Daily Active Ethereum Addresses (*Exhibit 2)* had been declining throughout 2022 after having peaked at roughly 800k twice in 2021. Daily active addresses had fallen to as low as 365k in late June 2022 before rebounding to 500k to 1.0m per day. On a monthly basis, YTD average active addresses has been at the 14-15m level (*Exhibit 11*), with new users averaging around 2m per month (*Exhibit 12*). The YTD decline in activity was likely due to decreased speculation as the prices of digital assets and tokens have been under pressure. However, with 204m cumulative unique addresses and ~15m active per month despite prohibitively high gas fees, we are actually quite optimistic regarding Ethereum's prospects in the coming years—these figures for the dominant blockchain network are small relative to, for example, the 6.6bn smartphone users in 2022 (7.3bn phones). We believe blockchain adoption will increase with additional use cases, and a reduction in transaction costs should help Ethereum maintain or even regain market share.
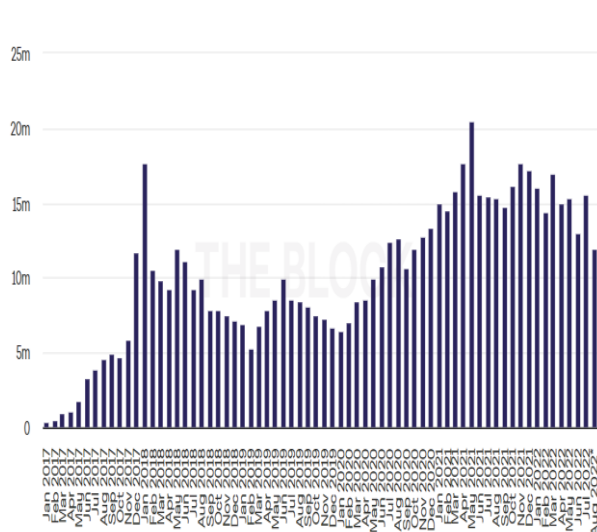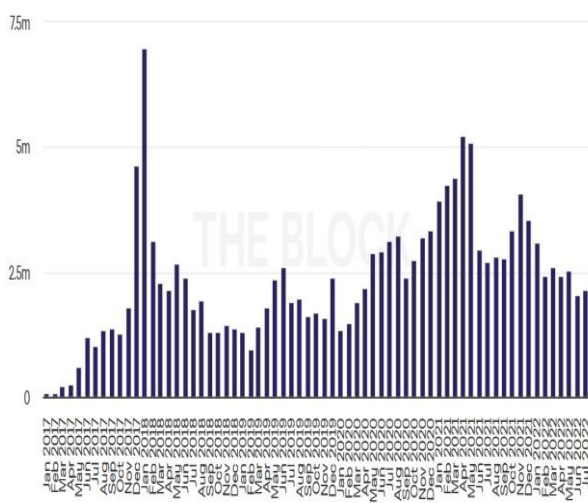

Exhibit 11: Monthly Active Address

Exhibit 12: Monthly New Active Addresses

Activity

Ethereum Daily Transactions (*Exhibit 1)* activity has exhibited a similar trajectory as Active Addresses, ranging between 1.0-1.2 million for most of 2022. The all-time high was set on May 11, 2021, at 1.7 million transactions (Otherside minting). As with Active Addresses, this decline is likely due to the decreased speculative activity among investors due to the bearish environment.

Value Staked

The total amount of Ethereum staked (*Exhibit 6)* has reached just under 13.3 million ETH. The rate at which new value staked has grown though has declined steadily throughout this year. The end of Q1 and large parts of Q2 saw periods of increased growth, with days reaching as high as 200k ETH being added onto the network. But beginning in May, the average amount of new ETH staked has been in the range of only 5-10k per day.

Revenue

Ethereum has generated US$14.6bn in total revenue (*Exhibit 13)* throughout its existence. Its one-month peak in revenue generated was November 2021 at US$1.8bn, followed by January 2022 at US$1.3bn. However, in recent months, we've seen revenue levels fall to just US$300m in June and July 2022 combined. Market weakness during the quarter is likely causing decreased demand for blockspace on Ethereum, thus dampening speculative activity.

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Exhibit 13: Ethereum Monthly Total Revenue vs. Protocol Revenue (Fees earned for token holders)

Validators

The number of Active Validators (*Exhibit 5)* of the Ethereum network is currently at 411,890, having increased from a total of 275k at the beginning of this year. This makes Ethereum the most distributed network. However, we've seen a marked decrease in the rate of new validators being added since the beginning of June, where the total number was just under 400k.

VI. Competitors

Feature	Ethereum	Solana	Binance Smart Chain	Avalanche
Year of Foundation	2013	2017	2020	2020
TPS (Transactions per second)	13–15	2,700	60	4,500
Avg. gas fee per trx	US$5.00	US$0.00025	US$0.35	US$0.23
Block Times	15 seconds	1 second	3 seconds	Less than 1 second
Consensus Mechanism	Proof-of-Work > Proof-of-Stake	Proof-of-History / Delegated Proof-of-Stake	Proof-of-Staked Authority	Snow Proof-of-Stake
Programming Language	Solidity	Rust, C, C++	GO, Java, C++, Python	Go, TypeScript, JavaScript, Python, Vue
Advantages	• Established • Large developer community • Huge DeFi and NFT ecosystem	• Fast transactions and low fees • High scalability • Low environmental impact	• Fast transactions and low fees • Cross-chain compatibility • Deflationary token (BNB)	• Fast transactions and low fees • Cross-chain compatibility
Disadvantages	• High transaction costs • Slow transactions • New programming language	• Fewer projects • More centralized • Lack of transparency	• Mainly scam projects • Only 21 validators • Lack of transparency	• Fewer projects • More centralized • Lack of transparency

Exhibit 14: Ethereum and its competitors

Solana

Solana was developed with the goal of addressing Ethereum's scalability problems. Solana does this with a consensus mechanism that combines Proof-of-Stake (POS) with Proof-of-History (PoH). PoH seeks to solve the issue of timestamping transactions that occur on a blockchain, which determines the order in which validators confirm those transactions. While other blockchains rely on outside infrastructure for time stamping, Solana's PoH mechanism allows timestamping to be built into the blockchain itself, which enables faster block validation and therefore faster transaction times. However, Solana has suffered from frequent outages in the past, and its network is often criticized for not being sufficiently decentralized.

Binance Smart Chain

BSC is a blockchain launched by Binance, with BNB being its native token. BSC's high growth can be attributed to several reasons, including its capability of supporting new tokens and dApps without the high fees of Ethereum, and its access to the customer base of Binance, the largest cryptocurrency exchange in the world. However, there are potential downsides to that as well. BNB Chain can't be said to be fully trust-less, as it's maintained by a centralized, legally incorporated business entity.

Avalanche

Avalanche touts itself on three key attributes: customizability to build a variety of dApps and tokens, scalability due to low fees, and interoperability to interact with other blockchains. Avalanche is compatible with the Ethereum Virtual Machine (EVM), meaning that dApps and tokens built on the Ethereum blockchain can be migrated to the Avalanche blockchain with minimal extra effort from developers. Its compatibility with Ethereum has enabled it to integrate with several Ethereum-based DeFi projects. Meanwhile, its Proof-of-Stake consensus mechanism has enabled low fees and a high throughput of 4,500 transactions per second.

VII.   Ethereum's Future Roadmap

Roadmap

The upcoming Merge in September is essentially a switch in the consensus mechanism, which is the way the nodes of the Ethereum network reach an agreement on the state of all information recorded on the blockchain, such as account balances and the order of transactions. This switch to a Proof-of-Stake (POS) consensus is an important step in Ethereum's evolution toward becoming faster, cheaper, and more secure. The next major upgrade after the Merge has been dubbed the Surge, where the splitting of blockchain data across several chains or shards will allow Ethereum to scale up to ~100,000 transactions per second (TPS), eventually.
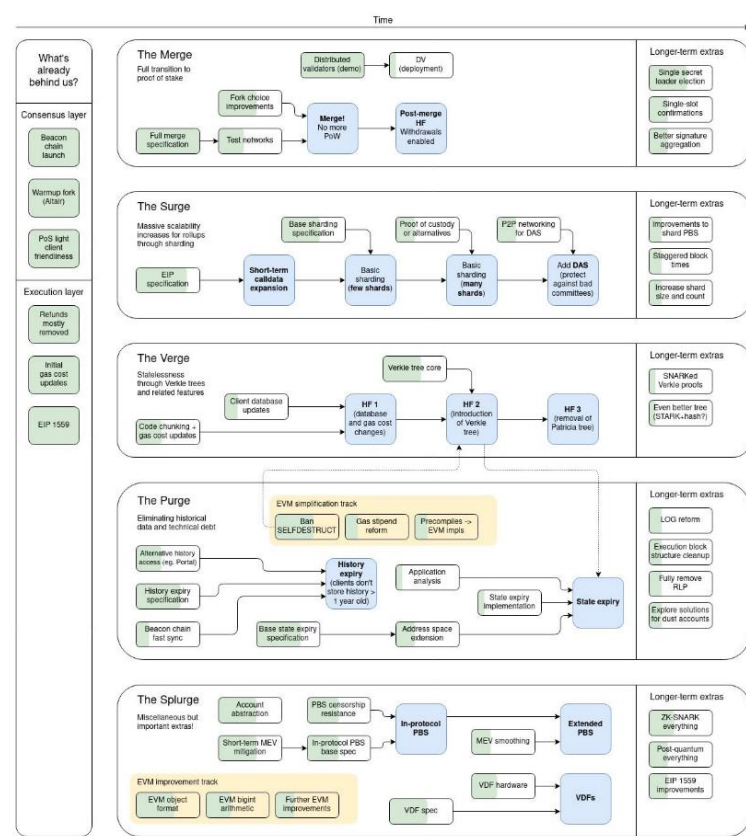

Exhibit 15: Ethereum's Roadmap

- "**The Merge**" is currently scheduled for mid-September, upgrading the network to **ETH 2.0**. The objective is to unlock blockchain accessibility at scale. At its core, the merge transitions Ethereum from a Proof-of-Work (POW) consensus mechanism to Proof-of-Stake (POS).

- "The Surge" will increase scalability and enable faster, cheaper transactions via a process called "sharding," which essentially divides large pieces of data into smaller shards, making it easier for layer-2 chains to operate more efficiently on top of the Ethereum blockchain.

- "The Verge" refers to technical upgrades that will allow users to become network validators without having to store massive amounts of data; introduces Verkle Trees, powerful upgrades to Merkle proofs, that allow for smaller proof sizes, thus optimizing storage size and reducing node sizes.

- "The Purge" is a phase that aims to remove old network history to ease network bottlenecks and reduce the amount of hard drive space required for validators to streamline storage on the network.

- "The Splurge" includes final tweaks, fine-tuning to previous steps, and smaller upgrades to increase network efficiency that will make Ethereum into a much more powerful system.

The Merge

Currently, there are two networks running in parallel, the main Ethereum POW chain and the empty POS Beacon Chain. After years of planning and delays, the estimated time of the merge is between **September 15-16, 2022**.

Once these two chains merge, the POW validation will be replaced by the new POS consensus mechanism, and POW miners will no longer be needed. In this POS model, each key-pair associated with a validator requires locking up 32 ETH to be activated, and for now, this ETH cannot be withdrawn until a major upgrade in mid-2023. Validators are then rewarded for proposing and/or attesting to blocks that are included in the chain, as well as for processing transactions. Block rewards are calculated using a sliding scale based on the total amount of ETH staked; as the total stake amount rises, the reward paid out to each validator falls while the total block rewards increase. Separately, validators are also entitled to unburned gas fees associated with transactions in the blocks that they propose.

One common misconception regarding the Merge is that this upgrade will make Ethereum faster and cheaper. The switch to POS will NOT increase network capacity substantially, with only a slight increase from 4.6 blocks per minute to 5.0 blocks per minute. Therefore, bidding dynamics on available blocks will not change much, and gas fees will not fall dramatically other than as a result of falling network/transaction demand. The capacity and speed upgrade will depend on the implementation of Ethereum shards to either work with Layer-2 scaling solutions or, with an advanced version of shards, to execute transactions and smart contracts directly on shards. The current target timing is to start implementation in 2023. A recent EIP-4844 upgrade proposal suggests an interim solution ("proto-danksharding"), which may or may not suggest that actual Surge sharding could still be some ways off. We keep in mind that the switch to POS consensus mechanism had been delayed by a few years.

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IX.　　*Description of ETH Token*

Ether (ETH) is the native cryptocurrency used on the Ethereum network. Its utility includes:

- Currency used to pay gas fees: ETH is needed to transact on the Ethereum network, with every transaction that occurs on the network requiring a set amount of gas, the unit used to measure the computational power required to process a transaction.

- Staking in the new POS mechanism: users will be able to become a validator and help secure the network by providing computational resources and locking up 32 ETH/validator

- Staking reward: block rewards will be automatically paid to stakers in the form of ETH tokens, along with the validator's share of the priority fee portion of the gas fee.

- No governance rights: One thing to note is that ETH token holders cannot vote on proposed changes to the core protocol of Ethereum (such as the change in consensus mechanism to POS, or the split of gas fees into base fee and priority fee). Ethereum governance is conducted off-chain through a process of proposals (EIP) to be discussed and iterated among developers before being approved.

ETH token as a currency also derives its value by being used within the Ethereum network to perform a range of functions: as collateral for decentralized finance applications, a medium of exchange to purchase Ethereum-based tokens and/or NFTs, and a store of value for investors speculating on Ethereum's future use cases. Furthermore, as ETH will be paid as block and fee rewards to stakers under the new POS mechanism, ETH tokens in the future can earn a stable yield (please note that this is paid-in-kind, so while the yield is stable in ETH terms, it is not necessarily stable in USD terms).

Token Economics

ETH 2.0 with POS will reduce token supply growth by about 4.1m tokens per year, which is worth roughly US$7.6bn at the current ETHUSD price. The annual block reward is currently worth US$1.1bn per year, but can fluctuate depending on the total amount of ETH staked (currently 13.3m ETH). Furthermore, the activity level and the amount of gas fee earned by the protocol also will influence the amount of base fee that is burned. So, there could be situations where the amount of tokens burned is greater than the amount of tokens issued—thus shrinking the total outstanding number of tokens.

- Pre-Merge Token Emissions

Pre-Merge, the bulk of new issuance happens on Ethereum's existing POW blockchain, also called the execution layer (EL). On the EL, miners earn a fixed amount of 2 ETH/block, which comes out to roughly **13,372 ETH per day**. In addition, small amounts of ETH are issued on the Beacon Chain (Ethereum's Proof-of-Stake network), also called the consensus layer (CL). The amount of ETH issued on the Beacon Chain varies depending on how many active validators are online and participating in network consensus. The more validators and therefore the more ETH that is staked on the Beacon Chain, the more rewards are issued on the CL (although the increase is not linear).

- Post-Merge Token Emissions / Removal of Sell Pressure

With The Merge approaching, miners will be phased out and it is important to note the implementation will benefit ETH holders and stakers. The Merge does so by simultaneously reducing ETH issuance and increasing stakers' rewards. Based on the current amount of ETH staked, ETH issuance required to secure the network post-merge is expected to fall 90% from ~5M ETH to 0.6M ETH annually, with a total ETH supply peak of around 120 million. **On a daily basis, the emission of new ETH will drop from over 13,000 new ETH per day to ~1,750 new ETH per day.**

In terms of ETH token price performance, we expect the removal of sell pressure from miners will represent a significant improvement to the long-term value proposition of ETH. POW miners need to sell a portion of their pre-Merge block rewards to fund their overhead costs. With POS, the overhead costs of being a validator are likely a negligible figure, so validators do not have the need to sell the ETH they receive as

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staking rewards. **Based on a time value of money analysis, we think the reduction of annual token supply increase by 3-4% is worth a 20-30% boost to ETH market value[1].**
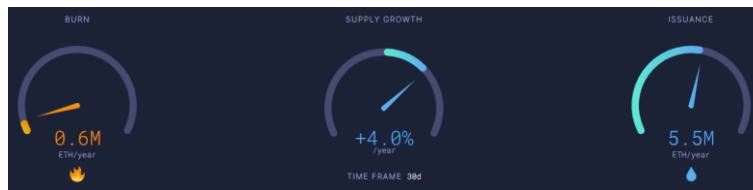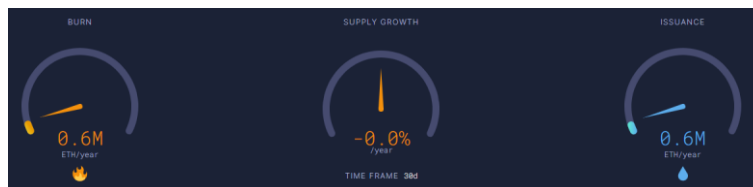

Exhibit 16: Pre-Merge ETH Token Emissions

Exhibit 17: Post-Merge ETH Token Emissions

Even in the scenario where the amount of ETH staked triples from today, max daily issuance only stands to increase to roughly 3,250 new ETH per day, still a significant decrease relative to the current POW issuance today.

- Post-Merge Token Burns

The other factor impacting supply growth on Ethereum is token burns. As part of the code change known as **EIP-1559**, minimum payments of ETH for transactions on the network are permanently removed from circulating supply. EIP-1559 introduced the base fee, which removes ETH from circulation as the Ethereum blockchain is increasingly used. Instead of paying the entire transaction fees to miners, the majority would instead be burned. Following the implementation of EIP-1559, anywhere from **60-85%** of transaction fees have been burned from each transaction, which could lead to times when more ETH gets burned than issued. The current burn rate can be seen below, which equates to a yearly burn of roughly **2.6 million ETH/yr.**
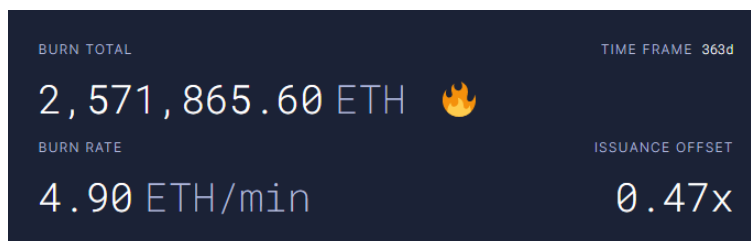

Exhibit 18: Post-Merge ETH Token Burn

- Post-Merge Staked ETH Lock-up Periods

As previously mentioned, users will be able to become a validator and help secure the network by providing computational resources and locking up 32 ETH per validator while receiving rewards for their work in the form of additional ETH. Due to this, it is expected that Proof-of-Stake will lock a substantial amount of the circulating supply of ETH. There is currently ~US$25bn worth of ETH being staked to earn yield. This US$25b, and anything further that is added, will be locked for 6-12 months after the Merge, meaning that ETH cannot be withdrawn and sold.

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[1] Annual incremental reduction of 3.5-4.0% at discount rates of 10-20%, over 20 years.

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<u>"Triple Halving"</u>

These three factors (reduced issuance, burning, and staked ETH) are the foundation of a widely debated topic in the crypto industry known as the "Triple Halving." The term's origins begin with Bitcoin, which experiences a period every four years when the BTC rewards are cut in half ("halving"). The most recent Bitcoin halving was on May 11, 2020, when BTC rewards decreased from 12.5 BTC to 6.25 BTC. On that day, the price of Bitcoin was US$8,800. Over the next six months, it nearly doubled in price.

Since Bitcoin has mostly reacted positively to its halving periods, it is being predicted that Ethereum's value will also surge instantly, and in defense of this argument, we must note that the confirmation of the Merge schedule has already impacted the price of ETH—in the week after the July 14th announcement, ETH rallied from US$1000 to US$1600 within a week.

Now the debate surrounds just how far the Triple Halving will drive up the price of ETH going forward. Some predictions are calling for ETH to challenge its all-time high of US$4,800 soon after The Merge. However, the argument for "deflationary ETH" and other predictions are purely speculation for now. To put into round number context:

- Reduced emission: ~5 million ETH per year @ US$2000 = US$10bn per year, or US$27 million per day. While over time the cumulative amount is significant, it really is only <2% of daily trading volume for ETH over the past month (US$15-18bn a day)

- Staking reduces circulation: 4 million ETH has been staked (and therefore locked up) on the Beacon Chain from January 1st to June 1st of this year. However, this did not prevent ETH price from dropping ~50% during this timeframe.

We think that the near-term impact on token prices post-Merge should be more about network usage and development narratives. The improvement of monetary policy should be 20-30% accretive to ETH value, but we believe that this is at least partially priced in.

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XI. Other Considerations

Proof-of-Work Fork Token – ETHPOW

The Merge has also caused speculation around the emergence of a Proof-of-Work Ethereum fork. With the transition to Proof-of-Stake, the practice of Ethereum mining will end, leaving ETH miners stranded with costly and potentially useless hardware on their hands. Several miners are now discussing the possibility of forking Ethereum to preserve the old Proof-of-Work network so miners can continue to generate cryptocurrency with their existing equipment, with some calling it ETHPOW. Such a move would not be without precedent, as Ethereum Classic and Bitcoin Cash / Bitcoin SV were also forked assets from their original chain. Additionally, we're seeing signs of support in the market, as exchanges like Poloniex, Huobi, and BitMex have begun supporting IOU markets for ETHPOW. Historically, forked assets have been profitable for holders of the original token, as anyone who held tokens on the original blockchain instantly came into possession of an equal number of new tokens that were worth a significant sum.

It should be noted that this scenario playing out with The Merge could cause some issues because the Ethereum ecosystem has a rich on-chain ecosystem of protocols, dApps, and tokens. A fork of the current Ethereum network will bring duplicate instances of the entire ecosystem, which could present meaningful challenges to developers and market participants. The potential of an issue arising in Ethereum's Proof-of-Stake environment due to the ETHPOW emergence is a risk that will need to be considered.

As for the potential value of the ETHPOW token, the forked ecosystem will face significant challenges. Major Ethereum protocols and participants, such as Tether and Circle, have signaled support for ETH Proof-of-Stake as the canonical chain, and that only the tokens on the Proof-of-Stake network will be redeemable post-fork. This means all the variants on ETHPOW are likely to become worthless, in addition to other asset-backed tokens like wBTC and stETH. Additionally, we could see a rush of ETH holders selling the free ETHPOW tokens they potentially receive, causing significant selling pressure on the forked asset once The Merge takes place. Nevertheless, the market has begun pricing in the possible value of this token at roughly US$60 at the time of writing.

Gas Fees

Gas fees on Ethereum have been a subject of controversy in the past, but with blockchain activity levels having dropped since the peak of the market, costs to transact on Ethereum have fallen currently to near lows. Historically, average gas fees peaked at US$200 in May 2022 due to the Bored Ape NFT sale hysteria that consumed the market at a time when block space was already sparse. However, average fees tended to range between US$20 and US$50 throughout the recent bull run. Since then, we've seen activity levels decrease to where we are experiencing average transactions on Ethereum costing under US$3. Although much lower than the inordinately high levels we witnessed last year, Ethereum gas fees still do not compare favorably with network transaction fees of competitors such as Avalanche at US$0.001 and Solana at US$0.00001.

Ethereum gas fees will not be noticeably reduced until the Surge, which will divide the entire Ethereum blockchain database into multiple portions ("shards"), thus splitting up the burden of handling the large amount of data needed by rollups over the entire network.

- Currently envisioned for "sometime in 2023, depending on how quickly work progresses after The Merge", shards will initially just provide extra data to the network and better facilitate Layer 2 roll-ups.

- However, the timing is currently uncertain, as the plans for sharding have been evolving as more efficient paths to scaling have been developed. "Danksharding" is the latest/new approach to sharding, which does not utilize the concept of shard "chains" but instead uses shard "blobs" to split up the data, along with "data availability sampling" to confirm all data has been made available.

- A second generation of shards that can handle transactions and smart contracts (and therefore compete with Layer 2 solutions) is being debated, but will depend on the development of roll-up and sharding techniques over the next few years.

Post-Merge announcements from the core development team will hopefully provide clarity on the future roadmap, including steps and timing for upgrading Ethereum into an even more competitive network. In the meantime, parallel development of Layer 2 blockchains such as Arbitrum and Optimism for cheaper execution of transactions in the Ethereum-compatible ecosystem will continue. Layer-2 blockchains are independent chains built on top of layer-1 blockchains, in this case Ethereum, as an extension to the base layer, and inherit the features of the layer-1 blockchain to improve the efficiency of the network.

Average Transaction Fee Chart
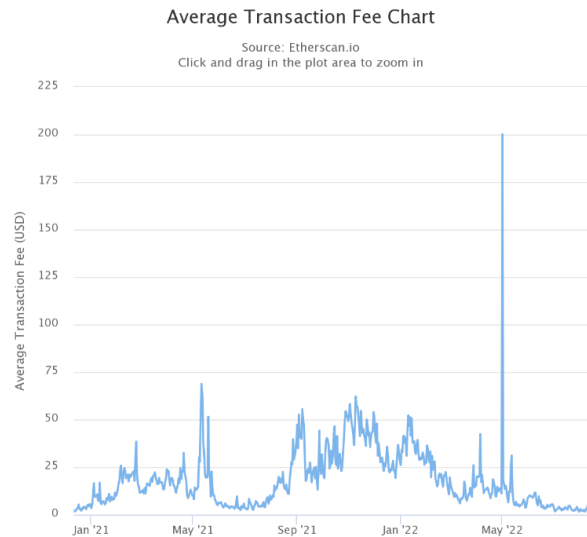Source: Etherscan.io
Click and drag in the plot area to zoom in

Exhibit 19: Ethereum's Average Gas Fees

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XII. Token Impact

The transition to Ethereum becoming an ecosystem with minimal or negative token inflation (decreased emissions) is anticipated to create upwards price pressure as its supply will decrease if/when demand increases (token burns). According to crypto-economic researcher Hasu, when gas fees on Ethereum are 7 gwei or higher, the rate of ETH being burned is higher than the rate of ETH being issued, making the supply of ETH decrease. During the peak of the bull market, gas prices sustained 200 gwei or higher for long periods, making the 7 gwei threshold a rather easily achievable level.

Furthermore, the unburned portion of gas fees will go to validators staking their ETH, boosting staking rewards APR. These returns vary based on the amount of ETH staked, the fees being processed, and the percentage of these being burned. With that said, staking APR is estimated to increase from 4.9% currently to 6-8% following the Merge, with upside to 10%+ if network activity rebounds to peak levels. While the market expectation is for this attractive yield to increase demand for staking (which requires buying the token and removing it from circulation given the lock-up), we highlight that this yield is paid in-kind (more ETH), so the decision to buy and lock-up should very much depend on the USD price of ETH.

staked total		Current			20 million			30 million		
activity level		Low	Mid	High	Low	Mid	High	Low	Mid	High
assumptions (long-term)										
ETH staked	ETH	13,300,000	13,300,000	13,300,000	20,000,000	20,000,000	20,000,000	30,000,000	30,000,000	30,000,000
average daily EVM fees (without MEV bribes)	ETH	2,000	5,000	15,000	2,000	5,000	15,000	2,000	5,000	15,000
annual fee @ ETH spot price (US$M)	1850	1,351	2,468	13,522	9,878	18,039	98,832	72,196	131,849	722,366
fee burn percentage		90%	80%	70%	90%	80%	70%	90%	80%	70%
average daily Flashbots bribes	ETH	300	625	1,500	300	625	1,500	300	625	1,500
calculations (long-term)										
yearly fee burn (base fee)	ETH	657,450	1,461,000	3,835,125	657,450	1,461,000	3,835,125	657,450	1,461,000	3,835,125
max daily PoS issuance	ETH	1756.5	1756.5	1756.5	2140.9	2140.9	2140.9	2714.5	2714.5	2714.5
max yearly PoS issuance	ETH	641,576	641,576	641,576	781,958	781,958	781,958	991,483	991,483	991,483
staking APR (issuance only)		4.8%	4.8%	4.8%	3.9%	3.9%	3.9%	3.3%	3.3%	3.3%
yearly fee rewards	ETH	182,625	593,531	2,191,500	182,625	593,531	2,191,500	182,625	593,531	2,191,500
staking APR (fees only)		1.4%	4.5%	16.5%	0.9%	3.0%	11.0%	0.6%	2.0%	7.3%
total staking APR		6.20%	9.29%	21.30%	4.82%	6.88%	14.87%	3.91%	5.28%	10.61%
net yearly sell pressure reduction vs POW	ETH	5,003,644	5,898,506	8,729,194	4,933,453	5,828,315	8,659,003	4,828,690	5,723,553	8,554,240

Exhibit 20: ETH Assumptions and Calculations based on Estimated Staking APR

XIII.   Valuation

In this section, we look to outline considerations for how to value ETH but admit that it is difficult to value a currency.

As with other protocols, we examine ETH market value versus the transaction fee ("revenue") generated. While the protocol currently does not receive any of this revenue, nor does any revenue get distributed to token holders, the demand for currency is based on how much goods and services needs to be paid for—in Ethereum's case, this would be the gas fee. The chart below shows the Price to Sales ratio over the past year—the current ratio of 172x indicates that ETH is both i) over-valued relative to its current depressed revenues and ii) buoyed by expectations for increased bandwidth and increased activities in the future.
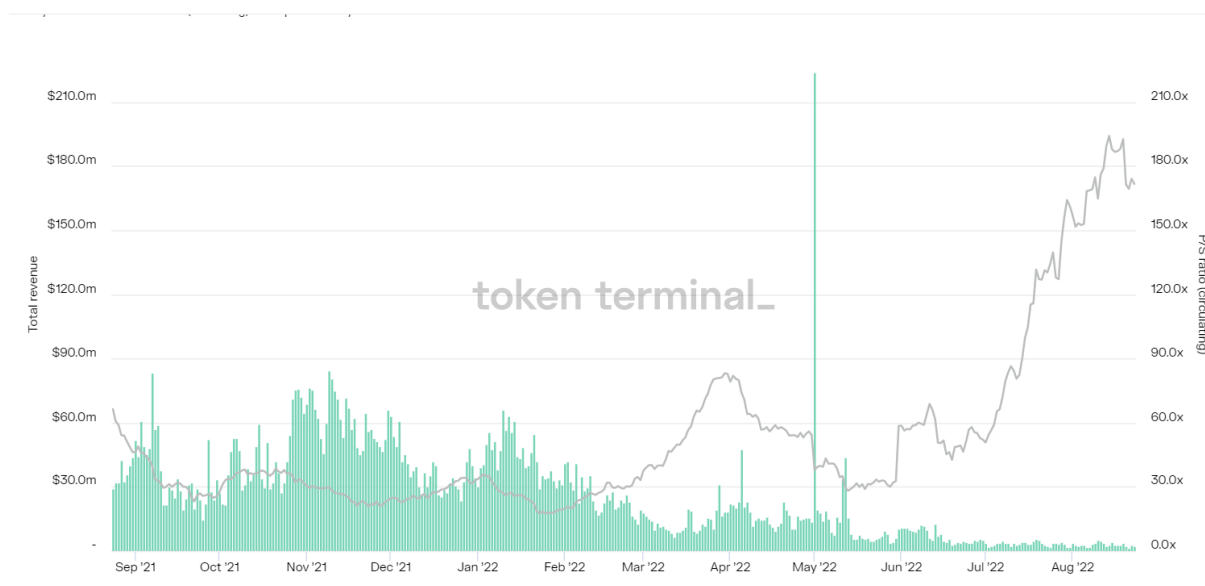

Exhibit 21: Ethereum's Price to Sales ratio

Additionally, Active Addresses is useful to assess network growth, as the more activity on a network and the more users, the higher demand for the currency that is needed to transact on the blockchain. Below, we see a healthy surge recently in the number of daily active users, which is attributed to growing interest in Ethereum as the scheduled date for The Merge was announced in the past few weeks. The monthly active user count is approximately 15-16m for Ethereum, which also suggests ample room to grow in the future.
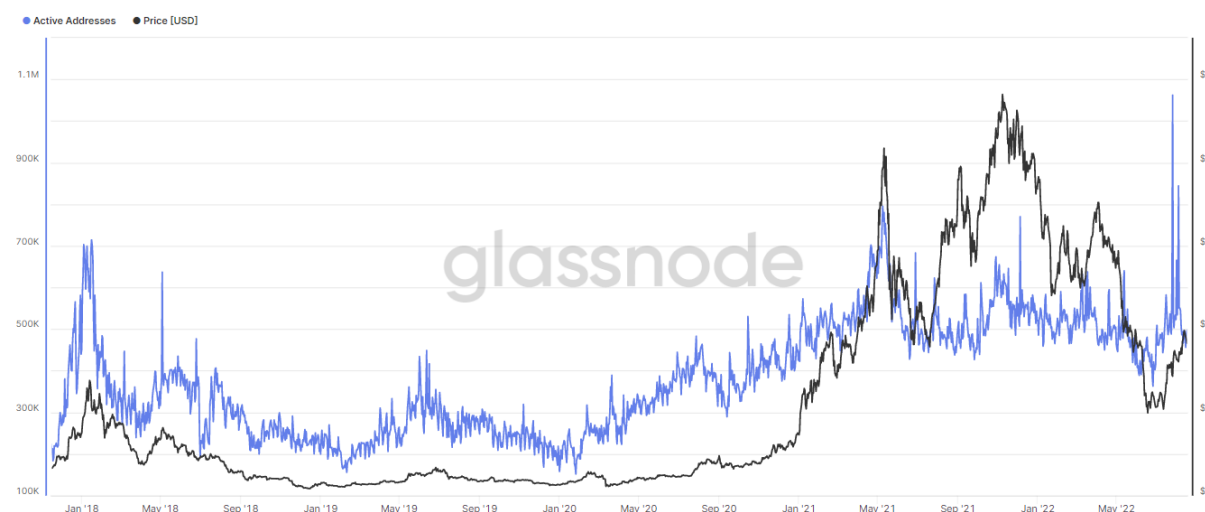

Exhibit 22: Token Price Correlated to Active Addresses

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XIV.   Technical Analysis

Technical pattern observed: A trading range between US$1,300 and US$2,000. After breaking below a previous support level at US$1,750 (30-day moving average), ETH is now being supported by the 100-day moving average as well as the lower Bollinger band. We are monitoring if ETH holds this support level.

Levels of Importance

Current price	US$1700
Key Support	100-day moving average at US$1,552
Upside	US$2,000 at the top of Bollinger band and mid-August peak
Bottom of Range	US$1,300 at the previous resistance level during June-July
Catalysts / Risks	US Fed Chairman speech on Friday August 26th
	US August CPI inflation data on Tuesday September 13th
	The Merge on or around Thursday September 15th

Exhibit 23: 12-Month ETH/USD chart

XV.   *Outlook for ETH*

We have discussed in this report the state of the Ethereum network and how it will evolve over the next 1-2 years, as well as the impact on ETH token use cases and supply/demand. Here, we lay out our outlook for how we think ETH will trade in the next three months.

We believe that doubling from its June lows, and outperforming BTC by over 40% from mid-July to mid-August, ETH had mostly priced in the successful implementation of the POS Merge, and further upside requires either an increase in spot transaction volume or improved visibility regarding next year's implementation of shards (Surge) or Layer 2 scaling solutions. The recent 20%+ pull back certainly helps deflate some of the misplaced optimism regarding the upcoming Merge.

Besides our Base Case price target of US$1850, we also present both a Bull scenario if accelerated sharding / Layer-2 development (or hype) exceeds our expectations, as well as a Bear scenario should the market discount the timing and impact of further network upgrades or if macro conditions deteriorate. We consider these lower likelihood scenarios, but feel it is important to pay attention to the full range of possibilities.

Scenarios	*Thesis*
Bullish	
Target US$2,250 Probability 15%	• Smooth execution of the Mainnet POS merge on time (9/16) • Smooth transition of dApps upon the hard fork • Timely follow-on announcement regarding network capacity increase (the Surge, targeting mid-2023), leading to expectations of a large transaction volume increase • A large increase in ETH 2.0 staking, locking up 30M+ tokens for the next 6-9 months • Macro: US inflation rate continues to decelerate from July's 8.5% YoY • ETHBTC breaks above the July peak of 0.081
<mark>**Base Case (mostly likely)**</mark>	
Target US$**1,850** Probability 60**%**	• Upside expected going into the Merge, with another rally from current levels, but risks of a sell-off post event. • Smooth execution of the Mainnet POS merge on time (9/16) • Slight transition issues with select dApps upon the hard fork • Only general information regarding network capacity increase (the Surge) or when gas fees will decline substantially • Some increase in ETH 2.0 staking, locking up 20-25M+ tokens for the next 6-9 months • Macro: US inflation rate continues to decelerate from July's 8.5% YoY • ETHBTC stays above 0.080
Bearish	
Target US$1,350 Probability 25%	• Execution issues delay Mainnet POS merge (post 9/20) • Significant transition issues with select dApps upon the hard fork • Disappointment regarding the lack of gas fee reduction upon the Merge, and therefore no jump in transaction volume anticipated • No immediate increase in ETH 2.0 staking • Macro: US inflation rate stays stubbornly high >8%, raising expectations for more aggressive Fed rate hikes • Profit taking knocks ETH down to a level reached immediately after renewed Merge speculation (post 7/14 developer call)

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