PSG

PSG
CRYPTONOMICS FUND
DIGITAL ASSET ALPHA CAPTURE

RESEARCH BRIEFING: ETH Merge – The Birth of a New Narrative

What is The Merge?

Put simply, The Merge refers to the long-awaited change in ETH's consensus mechanism from Proof-of-Work (PoW) to Proof-of-Stake (PoS). PoW is currently used by both Ethereum and Bitcoin. PoW requires miners to solve computational puzzles which secures the network by adding valid blocks to the chain. Miners are incentivised by mining rewards which are distributed when a puzzle is successfully solved. Currently, miners who successfully create a block get rewarded with 2 freshly minted ETH. In a PoS system, users will instead stake their ETH to become a validator of the network. Validators play the same role as miners do in PoW; such as ordering transactions and creating new blocks which all nodes can agree on. Validators in a PoS consensus are incentivised to uphold the network by earning staking rewards. Additionally, bad behaviour by a validator could result in losing a portion of their stake or in extreme cases, their entire stake. In ETH's case, validator status can only be achieved once the user has staked 32 ETH.

In Ethereum's current form, there is both a Beacon Chain and Ethereum's Mainnet running in parallel. Ethereum's Mainnet is currently running on PoW, whilst the Beacon Chain is running on PoS. The Merge refers to the convergence of both the Beacon Chain and the Mainnet whereby PoS will be officially adopted as the new consensus mechanism moving forward.

The Merge is likely to be taking place in Q3-Q4 2022. Therefore, the goal of this piece is to break-down the key differences between PoW and PoS for ETH and analyse the potential implications of this shift.

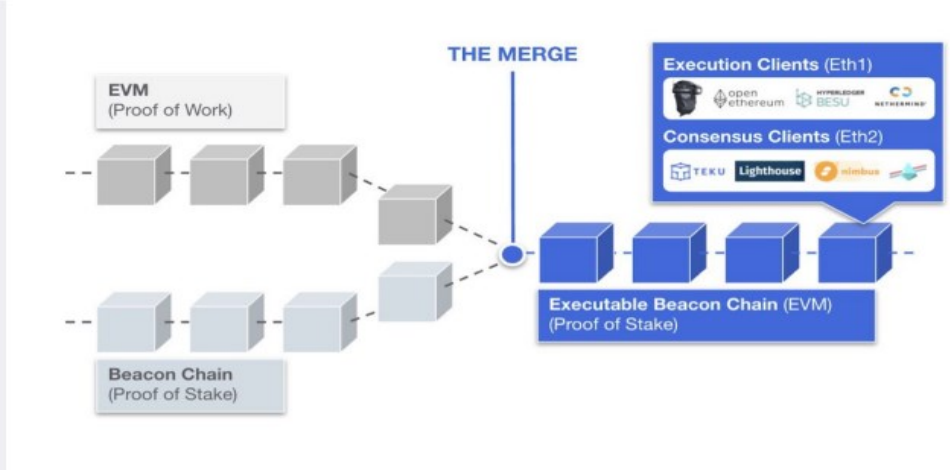

Figure 1: The Merge Visualised – CoinCodeCap.com

PSG

PSG
CRYPTONOMICS FUND

DIGITAL ASSET ALPHA CAPTURE

PoW Vs. PoS for Ethereum:

This debate has existed in crypto since 2012 when Sunny King and Scott Nadal published a paper outlining the PoS methodology in response to Bitcoin's high energy consumption. Even today, the main criticism of PoW consensus is the energy consumption expended, given the core ESG focus that has shaken up the financial industry. However, it is important to evaluate the advantages and disadvantages of both systems in totality to determine the trade-offs that occur when choosing one over the other.

Long Term Value Alignment & Barriers to Entry:

Firstly, PoW is a neutral system. There is no requirement to hold the base asset (ETH) in order to secure the network or earn ETH itself. Some view this as a positive, as it encourages more people to secure the network who may not want to rely on the future price appreciation of ETH. On the other hand, in a PoS system, validators are required to buy 32 ETH initially and then be willing to lock it up via staking. Therefore, PoS encourages longer-term thinking by aligning validators with a belief in long-term price appreciation of ETH. Most would argue that aligning those securing the network with a long-term fundamental belief in the asset is much more favourable than encouraging short-term distribution through the mining function. Furthermore, miners have a larger barrier to entry than validators. Validators only have an initial sunk cost which is the purchase of ETH, whereas miners will have a sunk cost due to the hardware, but also have significant running costs as long as they continued mining. It is important to consider the maintenance of technical hardware as well as depreciation of the machines. These running costs are further exacerbated by fluctuating energy prices which can impact the profitability of miners by increasing risk and ultimately reducing competition.

Security:

The next contentious topic is security, with the literature debating whether PoW systems maintain higher levels of security compared to PoS. In favour of PoW, a nefarious actor would fail in broadcasting counterfeit transactions unless the actor controlled over 50% of the entire network (a majority of both hashrate and nodes). Given the size of ETH's network, it would be almost impossible to control this majority and therefore the network would recognise false transactions instantly. In contrast, PoS security is maintained by disincentivising validators from acting nefariously by punishing bad actors with a loss of staked ether. Considering the larger financial cost incurred by miners rather than validators through both sunk and running costs, we can assume nefarious miners are significantly less likely to expend the financial resources required to take down the network, compared to just the initial sunk cost involved with attacking a PoS system. PoW has been tried and tested over a significant period of time and has so far proven to be extremely secure in the case of both BTC and ETH, whereas PoS systems have yet to be proven at a scale the size of ETH or BTC.

Energy Consumption & Efficiency:

The most significant talking point which tends to haunt PoW systems is the environmental impact of mining. In ETH's current PoW state, its annual energy consumption is 73.2 TWh, the equivalent of a medium-sized country like Austria. Although there is great debate about the positive and negative externalities generated via mining and the nuances involved, it is clear that PoW systems consume a large amount of energy which is likely to put off many institutions who have to follow strict ESG guidelines throughout their investment activities. In contrast to this significant energy expenditure, as shown in *Figure 2,* ETH's PoS implementation will consume 99.95% less electricity than PoW, making it 2000x more energy efficient as a result.

In addition, PoS enables secure sharding. This allows Ethereum to create multiple blocks at the same time which can significantly increase transaction throughput. Contrastingly, PoW consensus does not support secure sharding, causing a ceiling on transaction per second (tps). These gains in efficiency and throughput via PoS ultimately allows ETH to scale much further than under PoW. Ultimately, the huge improvements in energy efficiency, as well as the ability to achieve a much larger amount of tps will remove the glass ceiling that would have capped ETH's potential.

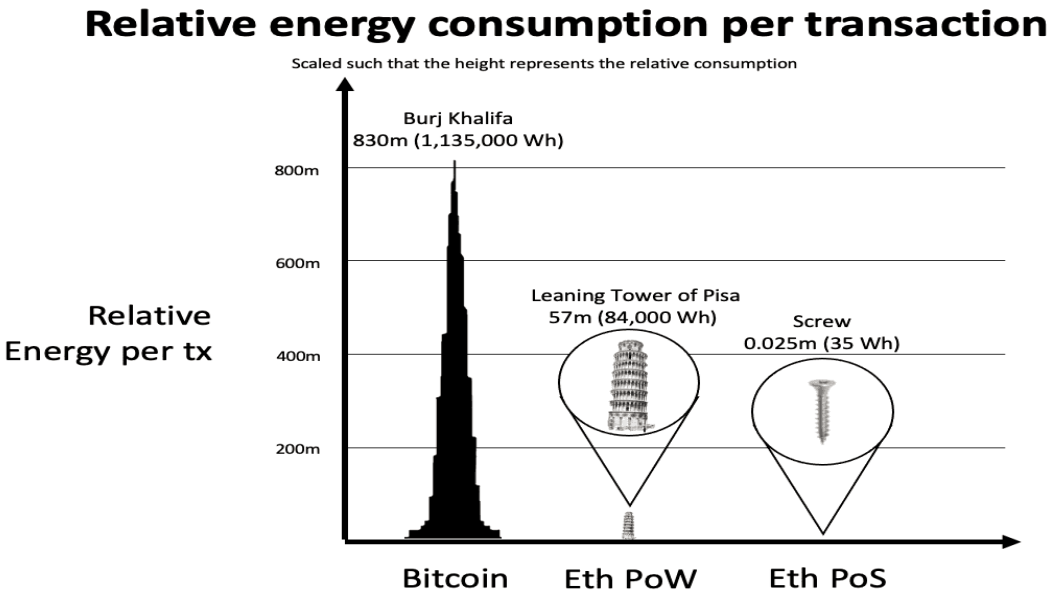

Figure 2: Relative Energy Consumption per Transaction – Ethereum.org

Merge Implications:

The Merge is going to have a material impact on the fundamental makeup of ETH as an asset. Significant changes will arise as a result of The Merge and understanding these differences is imperative when forming a long-term view on price.

Supply Shock

There is a significant supply shock at play once ETH successfully completes The Merge. Firstly, at its core foundation, PoW can be seen to encourage selling given that miners have to keep up with perpetual running costs. A lot of these costs are reimbursed by distributing at market, given the immediate need for liquidity generated by running a mining business. In contrast, PoS encourages holding because the more ETH you have staked, the more you make as a result. Therefore, the shift from miners to validators in itself will bring about a fundamental change in supply and alter the willingness of new emissions to be distributed at market.

Researchers argue that ETH is about to experience a "Triple Halving" which is a combination of EIP-1559 and The Merge. Firstly, EIP-1559 introduced a fee-burning mechanism into Ethereum which did not exist beforehand. Burning ETH is a function of network activity and therefore during spikes in network usage, more ETH may be burned than issued. During these periods, ETH becomes deflationary as more ETH is removed from circulation than is added. According to WatchTheBurn.com, since EIP-1559 launched, 2.1m ETH have been burned, with a net issuance of 1.26m ETH. This has led to a net reduction of 62.45% in the emissions generated by mining new blocks since it launched in August 2021. As the net issuance is still positive across the period, we should not expect it to have a large impact on price. However, once The Merge takes place, the daily emissions generated via block creation will reduce 90%, from 12,800 ETH to just 1280 ETH. Inflation will also reduce from 4.3% to 0.43%. Therefore, by combining the fee burning mechanism via EIP-1559 with the 90% reduction in daily emissions, the expectation is that ETH will become totally deflationary. In addition to these supply changes, once The Merge is live, staking rewards will be increasing, which further exacerbates the incentive for holders to lock up their ETH, removing more unstaked ETH supply from circulation. Combining these material supply changes has led many to deem this event a "Triple Halving," due to the expectation that the supply shock will be 3x larger than a BTC halving event.

Cryptonomics View:

There are multiple flows that could be observed as a result of The Merge, with the most significant changes being driven by the demand-side in response to changing supply parameters.

Firstly, at present, around 10% of all ETH is currently locked up on the Beacon Chain, amounting to 9.3m ETH as shown in *Figure 3*. Once The Merge is live and a follow-up upgrade is initiated, the staked ETH becomes unlocked and can be withdrawn, meaning there could be some initial

distribution. Challenging this view, APY is going to increase by an estimated 3x with an expected yield in/above the high single digits once The Merge occurs, therefore incentivising locked stakers to roll-over their holdings.

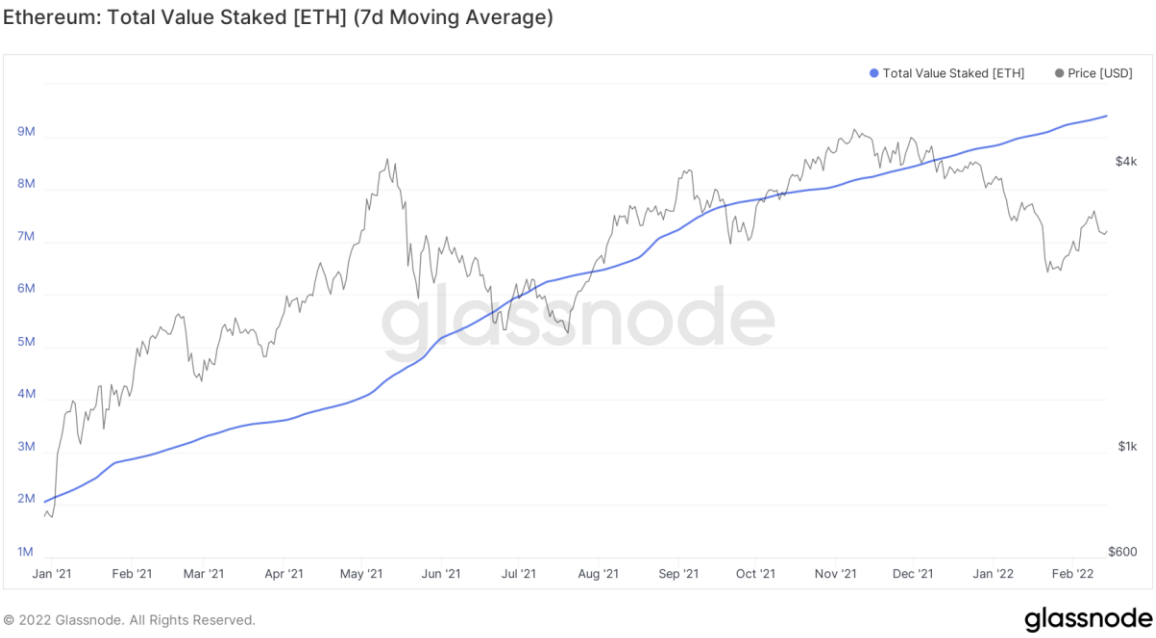

Figure 3: Total Value Staked (ETH) - Glassnode

If we consider the 9.3m ETH already being staked, participants were willing to accept uncertainty surrounding the unlock date as well as the low rewards preceding The Merge. Therefore, we can infer that these early participants have long-term conviction and are most likely the strongest ETH holders. This is because there is a large opportunity cost involved in locking-up holdings with no determinable unlock date. In light of this, the expectation should be that the unlock should not cause too much sell pressure given the makeup of the investors who may have a predisposition to hold. Additionally, when stakers roll-over their ETH, their risk will be reduced due to the removal of time uncertainty.

Demand for staking ETH should outpace the supply unlock as new entrants such as institutions consider staking due to new demand-pull factors including ESG improvements and competitive staking yield. However, it is important to consider the length of time it can take certain institutions and larger entities to fulfil its due diligence and open a position in ETH, given there are many aspects to consider such as access, custody, timing, regulatory filings and position sizing.

Another key objective of The Merge is to fulfil ETH's vision in enhancing scalability beyond what PoW can achieve. By moving to a PoS model, ETH is becoming more similar to alternative L1s such as Cardano and Avalanche. As The Merge allows ETH to scale its throughput, it is possible that ETH dominance rises against its competition in the long-term, cannibalising the L1 trade due to ETH's potential to scale whilst retaining the strong security benefits it offers over alternatives. The offer of

attractive yield at the protocol level is also likely to spur investors to consider holding and staking ETH instead of holding and staking an alternative Layer 1 offering similar yields. Ultimately, the new fundamental structure of ETH greatly enhances its appeal to regulated entities. This appeal will only grow over time as more access becomes available to them such as sophisticated derivatives and a spot ETF.

Lastly, an important dynamic to consider is the ETH/BTC trade. Given that ETH is on the path to becoming a deflationary asset, it has the potential to challenge BTC's core narratives. BTC is described by proponents as a strong store-of-value given its disinflationary characteristics and pre-determined supply. Emissions are reduced every halving which causes a BTC supply shock and typically precedes a new BTC cycle. However, if ETH manages to become deflationary, a narrative may develop in which ETH is viewed as an even better store-of-value than BTC, as well as being a productive asset (via gas fees and staking yield). As this occurs, speculation will drive the ETH/BTC trade and talk of a 'Flippening' will occur. This references ETH overtaking BTC's market cap and becoming the #1 cryptocurrency. *Figure 4* shows the current comparison between BTC and ETH's market caps, with a higher value for ETH confirming the Flippening. Currently, ETH has only achieved 47.4% of BTC's current market cap with around $400b separating them. It is possible that the institutional demand which previously favoured BTC may instead flow to ETH following PoS implementation, given that the offering for ETH becomes significantly more attractive. However, it is important to note that the Flippening is likely to be driven by heavy speculation which will be unsustainable. Therefore, as ETH approaches BTC's market cap in the future, extreme caution is advised.

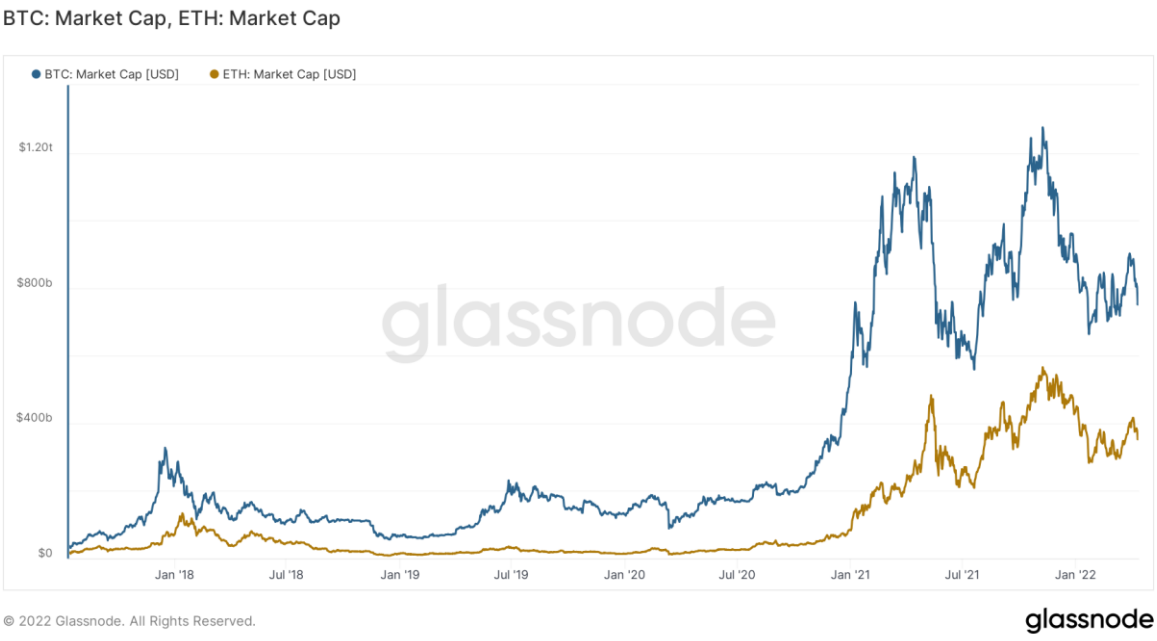

Figure 4: BTC Market Capitalisation vs ETH Market Capitalisation – Glassnode

In conclusion, the Cryptonomics team's view on the The Merge has been derived from significant research efforts surrounding the key drivers of flows relating to this seismic change, as well as our external contributors. It is clear that Ethereum is about to experience a significant supply shock which theoretically should lead to long-term price appreciation if demand follows. In the case of BTC, halving events precede large price rises as a result of the supply shock, which could translate to higher expectations for ETH to follow suit once The Merge occurs. The Merge is likely to bring about new demand-pull factors, which include ESG requirements now being met, strong staking rewards in a low-rate environment and ETH becoming the lowest risk PoS protocol within the crypto market.

Although it is very difficult to predict what the immediate price action might be for ETH when The Merge occurs, we should expect large volatility as a result of the significant build-up of speculation leading up to the event. However, it is clear that the overall impact will be positive as becoming deflationary actively removes supply from circulation, turning ETH into a scarce asset and ultimately impacting price as a result. When this supply shock is combined with additional demand factors coming from the transformation, price appreciation should clearly be expected in the next few years due to simple demand and supply dynamics.

To conclude, ETH is likely to seriously challenge BTC's market cap in the future as the 'Flippening' narrative takes hold (a narrative in which ETH's market cap will 'flip' BTC's market cap). The move will be driven by high levels of speculation so investors should be cautious as we enter the tail end of the narrative.

IMPORTANT **DISCLOSURES**

PSG
CRYPTONOMICS FUND

DIGITAL ASSET ALPHA CAPTURE

This document, which is being provided on a confidential basis and is not intended for public use or distribution, has been issued by Cryptonomics LLP and PSG Capital LLC on behalf of Falcon Investment Management Limited which is authorized and regulated by the UK Financial Conduct Authority (FRN673552). Please note that the contents of this document have not been and will not be approved by the Fund or any other regulatory authority.

No Offer of Sale

The information in this document does not constitute, or form part of, any offer to sell or issue, or any offer to purchase or subscribe for interests in any fund or company, nor shall this document or any part of it or the fact of its distribution form the basis of or be relied on in connection with any contract Interests in the Fund or any other investment funds managed by Falcon Investment Management Limited will be offered and sold only pursuant to the private placement or offering memorandum relating to such funds (the "Offering Document") which contains important information (including investment objective, policies, risk factors, fees, tax implications and relevant qualifications) and only in those jurisdictions where permitted by law In the case of any inconsistency between the descriptions or terms in this document and any Offering Document, the Offering Document shall control Interests described in this document shall not be offered or sold in any jurisdiction in which such offer, solicitation or sale would be unlawful until the requirements of the laws of such jurisdiction have been satisfied An investment in the Fund or any other fund or investment vehicle is speculative and carries a high degree of risk and is not suitable for retail investors. None of Cryptonomics LLP, PSG Capital LLC or Falcon Investment Management Limited has taken any steps to ensure that the interests in the Fund are suitable for any particular investor and no assurance can be given that the stated investment objectives will be achieved.

No representation is made or assurance given that such statements, opinions, projections or forecasts in this document are complete or correct or that the objectives set out in this document will be achieved. None of Cryptonomics LLP, PSG Capital LLC or Falcon Investment Management Limited can accept responsibility for errors appearing in this document. Opportunities for redemption and transferability of the interests described herein may be restricted so investors may not have access to capital when it is needed There is no secondary market for the Fund's interests and none is expected to develop. The Fund, which is under the sole investment authority of the investment manager may not be diversified which may result in higher risk Leverage may be employed in the portfolio, which can make investment performance volatile. An investor should not make an investment unless it is prepared to lose all or a substantial portion of its investment The fees and expenses charged in connection with an investment in the Fund may be higher than the fees and expenses of other investment alternatives and may offset profits.

Past performance (if any) of the investment team should not be construed as an indicator of future performance. Any projections, market outlooks or estimates in this document are forward looking statements and are based upon certain assumptions and should not be construed to be indicative of the actual events that will occur. Other events which were not taken into account may occur and may significantly affect the returns or performance of the Fund.

The law may restrict distribution of this document in certain jurisdictions therefore, persons into whose possession this document comes should inform themselves about and observe any such restrictions. The interests described herein may not be marketed, offered, sold or delivered, directly or indirectly, unless in accordance with all laws applicable to such marketing, offer, sale or delivery of the interests in any relevant jurisdiction. Interests described herein may be marketed pursuant to the Offering Document as an unregulated collective investment scheme for the purposes of the UK Financial Services and Markets Act 2000 (and the promotion of such a fund and the distribution of this document and the Offering Document is restricted by law.

This document is being issued only to and/or is directed only at persons who are "Professional Clients" or "Eligible Counterparties" for the purposes of the FCA rules. This document and any Offering Document are exempt from the scheme promotion restriction (in Section 238 of FSMA)on the communication of invitations or inducements to participate in unregulated collective investment schemes on the grounds that it is being issued only to and/or directed only at Professional Clients and Eligible Counterparties.

The interests pursuant to any Offering Document have not been approved or disapproved by any securities regulatory authority of any state in the US or by the US Securities and Exchange Commission, nor has any such authority or commission passed on the accuracy or adequacy of this document. Any representation to the contrary is unlawful The interests have not been and will not be registered under the US Securities Act of 1933 as amended (the " or any state securities laws or the laws of any foreign jurisdiction, and except in a transaction that is exempt from registration under the Act and under any applicable state securities laws, such interest may not be offered or sold in the US (as defined in Regulation Sunder the Act).

The interests will be offered and sold in the US under the exemption provided by Section 4 (2 of the Act and Regulation D promulgated thereunder and other exemptions of similar import in the laws of the states and other jurisdictions where the offering will be made The interests will be offered outside the US in reliance on the exemption for offers and sales of securities outside the US contained in Regulation Sunder the Act Any fund offering the interests described herein will not be registered as an investment company under the US Investment Company Act of 1940 as amended (the "Investment Company Act"). Consequently, investors will not be afforded the protections of the Investment Company Act.

March 2022

PSG
CRYPTONOMICS FUND

DIGITAL ASSET ALPHA CAPTURE