

Investment Thesis: Ethereum (ETH) December 2020

This document aims to highlight Ethereum as an investment opportunity. Even though ETH launched in July 2015, the assets have got little traction among institutional investors. One main challenge has been to understand what is ETH and how it can be valuable if it is not a scarce asset with a limited supply. The advent of ETH 2.0 is the catalyst that could see ETH becomes a productive asset with a limited supply. This document aims to highlight some of the background, current challenges and opportunities of the monetary updates of ETH 2.0.

Bitcoin, an inflation edge with a Tech stock kicker

“Bitcoin has a lot of the characteristics of being an early investor in a tech company...I’ve never had an inflation hedge where you have a kicker that you also have great intellectual capital behind it. I came to the conclusion that bitcoin was going to be the best of inflation trades, the defensive trades, that you would take.”

- **Paul Tudor Jones, May 2020**

Bitcoin has always been easy to describe, it is a digital currency. What has been more difficult to explain is that it is a decentralized digital currency; in other words, it is not controlled by governments and central bankers and that is based on faith in an algorithm and a network instead of the "full faith and credit" of a country.

As its technology mature and its adoption has gone from early adopters to mainstream users reaching today over 35m users only on Coinbase, Bitcoin is now accepted as an alternative asset, a sort of digital gold combining scarcity, portability, fungibility, divisibility, durability and broad acceptability.

The recent Covid-19 market turmoil has triggered a one-of-a-kind policy response globally. Investors such as Paul Tudor Jones have been vocal in their interest in investing in inflation hedges and described Bitcoin as potentially the best inflation edge.

Other features including digital, censorship-resistant, programmability and being universal are starting to be understood and seen as differentiators by the broader investor community.

With a \$500bn market cap (BTC: \$23.9k) and the narrative of being an inflation edge aka digital gold, most investors understand the significant upside potential if this is correct.

What seems to happen is that individuals, and increasingly institutions, purchase Bitcoin to start their crypto portfolios and journeys and then ask themselves what to do next.

As the second largest digital assets ranked by market capitalization with \$71bn, Ethereum is the next asset that investors are thinking to invest. However, very few institutional investors fully comprehend what Ethereum is and what is the value of investing in this asset.

If Bitcoin is investing a new monetary asset, then Ethereum is investing in the infrastructure of Web 3.0.

Bitcoin is a programmable asset meaning that within each Bitcoin transaction there is the ability to write a program. For instance, you can write a program saying that a transaction is not valid until a certain date. This feature is probably one of the least understood of Bitcoin but also one of the most powerful as it allows anyone to move money automatically with computer codes and rules that are transparent to anyone.

However, more than 10 years after being launched, the main use cases of Bitcoin are payment, store of value and speculation and all of this without much programs on top of Bitcoin. This is mainly because the scripting language in Bitcoin is intentionally extremely restrictive.

Ethereum was created as an alternative protocol to Bitcoin with the aim to make it easy to build decentralized applications. Ethereum's programming language is described as being Turing complete. In other words, it allows developers access to a fully programming functionality with a great ease of use.

Bitcoin is aimed to only be money, compared with Ethereum where its goal is to become the ultimate backbone for processing decentralized applications or so called Web 3.0.

Ethereum can be described as an open-source, public, blockchain-based distributed computing platform and operating system featuring smart contract functionality. An alternative is to describe it as a decentralised version of Amazon Elastic Compute Cloud (Amazon EC2).

In layman terms, Ethereum is a decentralised engine to run decentralised applications.

In Web 2.0, applications such as Spotify, Google and Facebook control access to disparate silos of information created by user's data. For instance, you cannot export your music history from Spotify to another music streaming service. Spotify owns your data even though you create this data.

Web 3.0 can be described as the next generation of the internet where user data is replicated and stored across an open and decentralized network rather than by individual application. In a web 3.0 music streaming service, you could control and transfer your music history to any providers.

In web 3.0, protocols issue utility protocol tokens that are used to access scarce network resources such as processing power, memory or bandwidth. These tokens are also very helpful to bootstrap early liquidity and strengthen the early adopter community.

For instance, Ether (ETH) is the native cryptocurrency of the platform Ethereum. In essence, it's a large pay-as-you-go computer, with ether – computational power – the currency that brings these computerised functions to life. The more you need the computer to do, the higher the fee. The miners responsible for maintaining the blockchain by providing computational services are remunerated for their services in ETH.

Ethereum, the pillar for Web 3.0 investing

Ethereum was proposed in 2013 by programmer Vitalik Buterin and in 2014 raised 31,529 BTC (\$18.4m at the time) via an initial coin offering. It officially launched in August 2015 trading at \$2.83 per token. Coinbase added Ethereum in May 2016 on GDAX.

As a smart contract platform, Ethereum allows entities to leverage blockchain technology to create numerous different digital ledgers and can be used to create additional cryptocurrencies that run on top of its blockchain.

For example, Ethereum can be used to create tokens that are pegged 1:1 with the value of the United States dollar (called a stablecoin) if a user wants to transfer or hold the value of dollars on the blockchain. If users want to transact this USD pegged currency on top of Ethereum, they would need to pay a gas fee. Note, Ether itself can also be sent, received and held as digital money.

The first product market fit for Ethereum was to be a crowdfunding platform, In 2017, the so-called ICO boom was made possible by Ethereum ERC20 smart contract, allowing anyone to launch a token in a few lines of code and to raise millions from users all around the world.

ETH is to Ethereum is what equity is to a corporation - ownership unit. You're purchasing a piece of an operating system for crypto applications that doesn't have a clear business model yet.

Right now network revenues go exclusively to miners. So ETH holders own the upside in the network but not the cash flows. ETH 2.0 redistributes revenue between miners and ETH holders. More on this in the later section.

Ethereum holds the crypto developer mindshare

The value of Ethereum and its token ETH is derived from the expectation that people will want to acquire ETH to use Ethereum to run applications built on top of Ethereum. Thus, having a vibrant developer ecosystem building applications used by a large number of users is what will drive value to the Ethereum network.

It is important to note that developers building open source applications on top of Ethereum are rarely employed by the Ethereum foundation but instead operate independently either in a small team or on their own. This is common for other open source projects.

What differentiates Ethereum from other protocols is its vibrant developer community. Let's look a bit further with some recent statistics first on the active developer community:

- There **8,739 monthly active crypto developers** of which **75% contribute only 10 days per month**.
 - These enthusiasts are the core of the open source community.
 - These are also the hardest to find and incentivize as they often do not seek monetary compensation but are interested in the technical challenges.
- **Ethereum** has seen its total monthly active developers **growing by 215% since 2018 reaching 2,325**.
- To put Ethereum total monthly active developer in perspective, **Ethereum represents 26% of all monthly active crypto developer**.

- This further highlights the fact that Ethereum is seen as a great platform to try and tinker new applications
- The second most active community is Bitcoin with 361 developers as of December 2020.
- Though the Bitcoin dev community has grown by 70% since 2018, Ethereum growth was 6x+ greater.
- Looking at the other communities, the third and fourth largest monthly active developer communities are Polkadot and Tezos, respectively with 390 and 240 monthly active developers
- 90%+ of the other protocols have less than 100 active monthly developers working on their project
- **Almost five years after Ethereum launched, there is no other fastest growing developer community in the crypto developer community. Ethereum is the clear leader**

Ethereum applications

Ethereum dominance in the developer community is further supported by the number of applications built on top of the protocol and total transaction volume.

The largest application built on top of Ethereum is USDT, a USD stablecoin, representing \$20bn of market capitalization. The DeFi ecosystem is still relatively small with a today total of \$18bn for all DeFi projects, however, it is the fastest growing segment and has produced multiple billion dollar protocols companies (e.g. Uniswap, Compound, etc..) . The total market cap of applications built on top of ethereum exceeds \$50bn.

The total transaction fees or gas fees of Ethereum reached an annualized revenue of \$1.1bn. Since the summer 2020, the gas fees have spiked 10x+ due to on-chain trading on derivatives exchanges such as Uniswap. Unlike 2017 where applications had no traction and produce no transaction fees, we see a number of applications today with annual revenue in excess of \$26m per month and with the largest being Uniswap with \$370m.

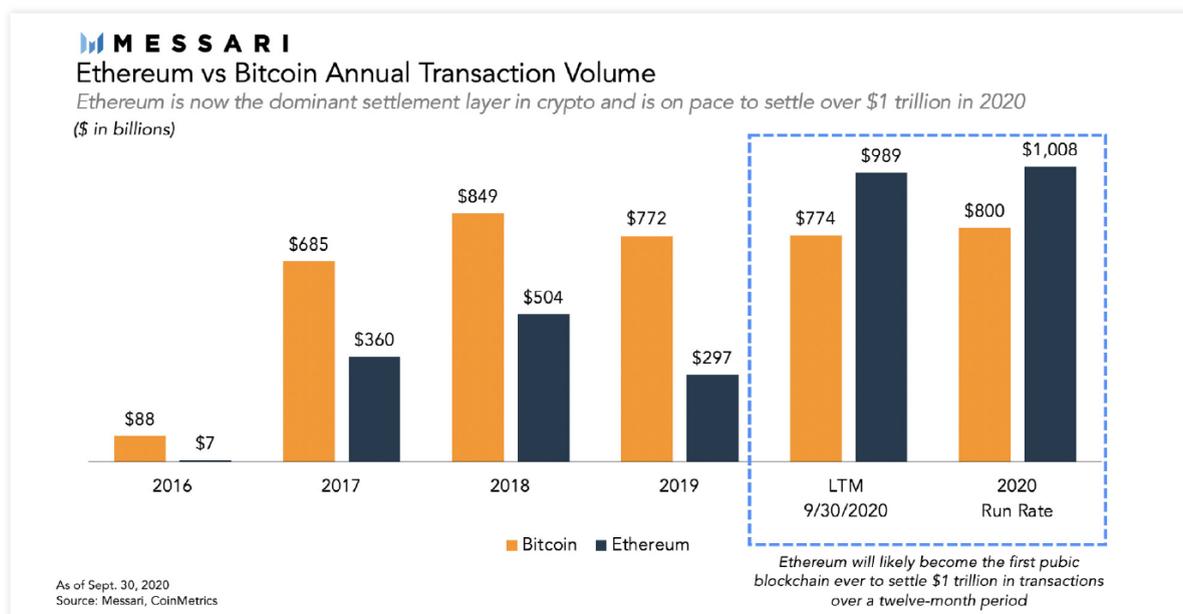
Top projects based on annualized revenue (total fees paid)



ETH 1.0.

	ETH	BTC
Market Cap	\$70k	\$450bn
24h Trading volume	\$13bn	\$46bn
Wallet Number	1m with 1 ETH (\$600)	3m with 0.1 BTC (\$2.4k)
Annualized Revenue	\$1.1bn	\$0.7m
Number dapps	3k+	-

In the previous points, we saw that Ethereum has the most active crypto monthly developer community, the largest applications built on top of its protocol and the largest transaction fees outpacing Bitcoin by almost twice. New applications such as decentralized finance are pushing the boundaries of the Ethereum network to the maximum due to on-chain transactions.



In 2020, Ethereum really found a product market fit as seen by the growth of its transaction volume. In 2020, it is estimated that Ethereum will become the first public blockchain ever to settle \$1 trillion in transactions over a twelve-month period. This further accentuated the point that developers are building applications on top of Ethereum that users are ready to pay for.

Despite all this, Ethereum is valued c. 15% of the Bitcoin valuation.

Let's look into some of the main challenges that potential investors may have currently with Ethereum:

A. Narrative Complexity

Digital asset is a niche asset class (\$680bn total market cap) and opaque for most investors.

It took about ten years for Bitcoin to go mainstream and accepted by institutional investors. Despite the fact that its mission, algorithm and narrative has not changed much since its creation.

Very few investors understand what is a smart contract and that Bitcoin is simply a very niche use case of smart contract for money and that Ethereum is a smart contract platform with the goal to power an entire decentralized economy and to become a world computer. In other words, Ethereum is the settlement layer for Web 3.0 applications, e.g. you want to create a decentralized lending platform? You settle the transaction on Ethereum!

When VCs shy away from Bitcoin, family offices, hedge funds and more recently pension funds appreciated the digital gold narrative and started to invest supporting Bitcoin in its path to become mainstream.

Ethereum lacks a clear narrative. The closest may be “oil to power the Ethereum computer”. This is not great.

The upcoming launch of ETH 2.0 may finally create a new narrative. More on this in the next section.

B. Lack of Institutional investors and wall street & SF evangelists

Institutional investors always start with the largest crypto asset, Bitcoin and then they look at what they should buy next.

Bitcoin has always had a group of evangelists that are not “crypto kids”, the most well known group is led by Wences Casares, an established Fintech entrepreneur. He is the one that first introduced Bitcoin to the Silicon Valley community at the famous Allen & Co conference and today sits on the board of Paypal.

Other well known investors include the Winklevoss Brothers, Reid Hoffman (founder of LinkedIn), Chamath Palihapitiya (Early Facebook) among others. Wall Street had Pete Briger and Michael Hourigan of Fortress Investment Group investing \$20m in 2013 in BTC.

The problem with Ethereum is that there has not been such an evangelist group outside of crypto kids or early ETH investors. The most well known evangelists are Vitalik Buterin and Joseph Lubin, founders of Ethereum.

The lack of prominent figures able to explain in plain English what Ethereum is and why it is a good investment has been a major hurdle.

To put this in perspective, neither Bakkt nor Fidelity support ETH in their custody. CME will launch a futures contract on ether in February 2021, almost 4 years after the BTC version. Grayscale BTC manages \$13bn while Grayscale ETH manages \$1.7bn.

C. Lack scarcity

As described in the first section, Bitcoin exhibits the seven properties of monetary assets (store and transfer value) ranging from scarcity, durability, divisibility, portability, fungibility, recognizability and programmability.

The one property ETH has lacked to date is the perception of scarcity.

Ethereum's monetary policy opts for perpetual issuance and an uncapped supply because it prioritizes security over monetary idealism. Unlike deterministically issued and fixed supply cryptocurrencies, whose security budgets have been arbitrarily set in pursuit of "perfect money", Ethereum aims to issue enough ETH to ensure Ethereum remains secure now and into the future.

At the time of the genesis (first) block, 72M ETH was distributed to initial contributors. Since genesis, 39.2M ETH has been distributed to ETH miners via a proof-of-work (PoW) consensus mechanism similar to that of Bitcoin. ETH inflation with PoW has been roughly 11.20% per year since July 2015, roughly double BTC's inflation of 5.58% per year over the same time period.

This is probably the most challenging feature of Ethereum as investors do not see a reason to own an asset with unlimited supply. However, this will change with ETH 2.0, more on this in a later section.

D. ETH 1.0 not a productive assets

ETH investors do not currently benefit from the increase of total transaction volume and related gas fees.

The table below highlights a basic profit and loss statement of the ETH 1.0 economy. In this current state, Revenue from gas fee / transaction fee are earned by the miners / node validators. Meanwhile, the inflation is paid by the token holders.

As ETH 1.0 uses a proof of work chain, ETH possesses more a store of value and commodity properties from its use as money and gas and lacks productive features - dividends. However, this will change with ETH 2.0, more on this in a later section.

	ETH 1.0
Revenue (Gas Fee)	Go to Miners
Expenses	Inflation = dilution paid for by token holders
Net loss	Paid for by token holders

E. Stablecoin, Wrapped Assets competing as a reserve currency

In 2017, ETH famously almost flipped the market cap of Bitcoin. This was short lived and driven by the ICO boom where investors needed ETH to invest in new projects.

ICOs are dead and stablecoins - cryptocurrencies peg to some external reference e.g. USD - have become the first product market fit for the Ethereum smart contract. The largest USD stablecoin is USDT - issued by unregulated exchange Bitfinex - and has a \$20bn market cap.

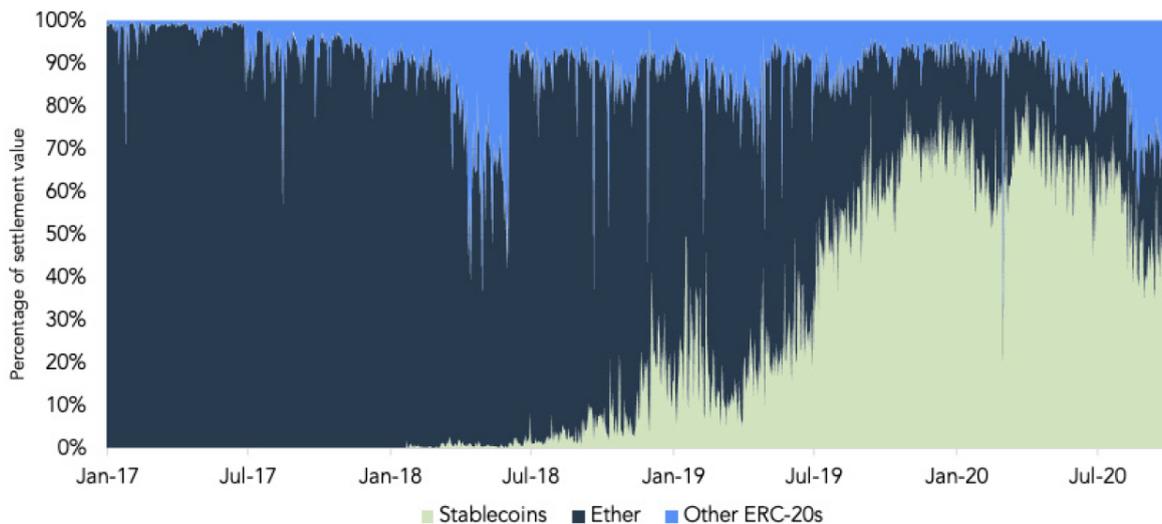
The success of stablecoin has impacted the narrative for ETH as a reserve currency - why owning a highly volatile asset like ETH when you can own a synthetic USD. In addition, the trend of wrapping synthetic Bitcoin (and other assets) on top of Ethereum is growing. This is likely to further impact ETH collateral demand.

Having said this, the recent DeFi trend with liquidity pools and need for collateral saw a rise in the demand of Ethereum. This trend is likely to continue with ETH 2.0, more on this in a later section.



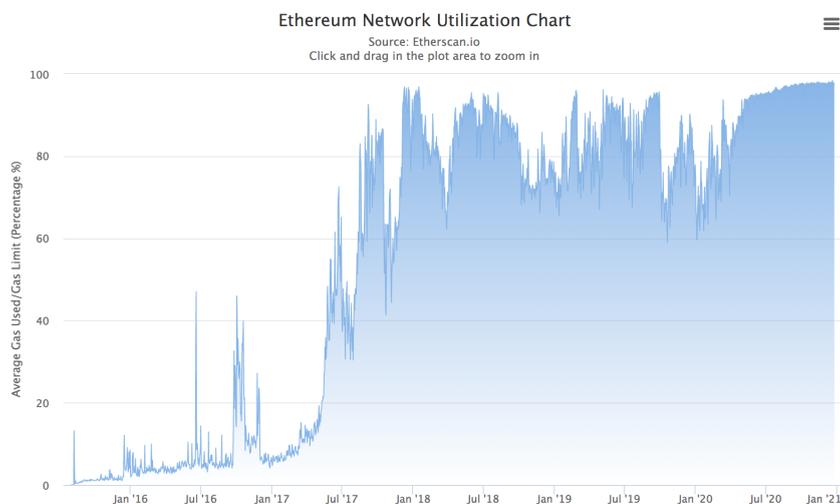
The Dollarization of Ethereum

Ethereum continues to dollarize, although other ERC-20s have started to gain ground as DEX volumes and yield farming rise



As of Sept. 30, 2020
Source: CoinMetrics

F. Scalability challenges and risk from Layer 2



Since 2017, the Ethereum network has been congested. Currently, Ethereum is only capable of handling a mere 15 transactions per second, making it unable to serve as globally scalable decentralized financial infrastructure. All it took was an uptick in on-chain activity spurred by the small scale speculative boom this past summer to push Ethereum to its limits.

Ethereum is not ready for mainstream adoption under its current architecture.

The solution to the scalability problem is Ethereum 2.0 or ETH 2.0. This is the most important upgrade since the launch of Ethereum and will impact scalability, security and energy efficiency without compromising on accessibility or decentralization. More on this in the later section.

However, Ethereum transition to ETH 2.0 will happen in stages including ETH 1.5 and rollups (layer 2). In other words, every transaction that moves to “layer 2” rollups essentially moves to new blockchains that could include new tokens.

The use of layer 2 protocols may lead to leakage of the Ethereum network while ETH 2.0 is launched. This is something that it is yet to be seen but important to monitor.

D. Competition from other smart contract platforms VS branding and switching cost.

In summer 2015, Ethereum was the first protocol to launch the idea of a smart contract platform. Since then many competitors appeared and most of them formally launched in 2020.

Most of these platforms were heavily funded by ICOs such as EOS: \$4bn, Tezos: \$2bn or by VCs such as Dfinity: \$200m, Polkadot: \$140m.

As described in the first section, none of the protocol competitors have the developer mindshares, developer tools nor infrastructure of Ethereum. Hence they do not represent real competitors at the moment.

It is possible that some platforms become leaders in niche use cases such as Gaming with Flow. However, it is unlikely that Ethereum loses its crown as the smart contract leading platform.

The main risk is that ETH 2.0 transition takes longer than expected and roll-ups or cross-chain gain product market fit in specific areas and start to compete against Ethereum.

However, one important feature that is very much underestimated is branding and the relative high switching costs.

Let's start with branding.

If you are developers you want to work on exciting technology, with other developers and applications. That's why when the Uniswap founder started iterating on the idea of Uniswap it chose Ethereum. The community and brand of Ethereum gave him the tools to build something that will be used.

The branding is similar to lindy effect. The longer you have a strong brand, the longer it will continue to be important.

Finally, most Financiers look at open source smart contracts as a commodity where developers and users will look for the smart contracts with the lowest fee associated with its platform and with low switching costs.

In reality, smart contracts have a high switching cost ranging from branding and other goodwill aspects but also developer tools, risk of switching to a new platform among others.

In addition, early adopters who benefit from token appreciation are less likely to switch to a competing platform as they often have a strong sense of community and will likely want to see their tokens increase in the long term.

There has been very few migration from ETH to a new smart contract platform by established applications. This is something that needs to be monitored but is likely not too much to be a risk.

ETH 2.0.

We have now discussed the current challenges of ETH 1.0 ranging from narrative complexity, lack of Institutional investors and wall street & SF evangelists, ETH lacking scarcity and productive assets features as well as the scalability challenges. In addition, to technical challenges ETH has seen competition from stablecoin and wrapped assets reducing the need of ETH as a reserve assets and smart contract and layer 2 platforms that may compete with ETH while it migrates to ETH 2.0.

ETH 2.0 is more than just a scalability upgrade; it will transform the monetary policy of ETH.

Staking Economics - ETH becomes a productive assets

	ETH 1.0	ETH 2.0
Gross Revenue		Network fees (validators + tokenholders)
Revenue	Gas fees Go to Miners	Network fees that go to tokenholders
Expenses	Inflation = dilution paid for by token holders	Fees paid to validators (gas fees and inflation)
Net loss	Paid for by token holders	total network fees - fees paid to validators

One major update in ETH 2.0 is the shift from PoW (proof of work) to PoS (Proof of Stake) architecture where validators are rewarded for ensuring the security of the Ethereum network.

The cost to become a validator included 32 ETH minimum and the infrastructure needed to run the staking service. In exchange, validators will receive interest rates depending on the level of participation from ETH holders (the more ETH stake, the less interest). In theory, validators will be compensated between 4 to 20% per year to stake their ETH.

In this new architecture, ETH will possess capital asset properties from its use in PoS. ETH will function as a hybrid-perpetual bond with debt and equity like characteristics.

The ETH yield will be derived from new issuance and transaction fees (gas fee) that used to be only rewarded to miners.

The above tables give a summary of the economics from ETH 1.0 to ETH 2.0. In the latter, ETH holders are rewarded with network fees including both staking reward from securing the network and gas fees. This is a major change from the current state. ETH will become a productive asset. transaction fee burns (EIP 1559).

Monetary policy - Reducing supply via PoS and burn fees

A major component of Ethereum's shift to PoS is about lowering its issuance while maintaining the same level of network security.

Monetary policy & staking

ETH 2.0's monetary policy will be dynamic, adjusting according to how much ETH is being staked and expected to be below 1%. Staking will also have the mutual benefit of making ETH a more productive asset, providing ETH with a native yield in addition to its store of value and commodity properties.

The combination of new monetary policy and staking will push ETH inflation from 4.5% to c. 1.8% in the first year (similar to Bitcoin inflation).

EIP 1599

EIP 1559 is a proposal to restructure how users bid for Ethereum blockspace. It is expected to go live in summer 2021.

It will burn ETH transaction fees which is expected to reduce issuance for ETH 1.x when implemented, and thus will offset the incremental issuance from staking.

Burning transaction fees could cause the inflation rate to approach 0 much sooner than 2140

At the moment, ETH miners capture all of the fees associated with Ethereum network transactions. This transaction activity is growing rapidly and has been in excess of \$120m+ per month last Fall 2020.

With this new update, most transaction fees will be burnt rather than paid directly to miners. Hence if transaction fees burnt exceed new issuance, the net inflation rate could be negative.

Inflation

The Bitcoin inflation rate will reach 0% post 2140 when reaching the total supply of 21M. Achieving scarcity in digital form has been Bitcoin's great technical breakthrough.

ETH lacks this fixed supply and scarcity which has been detrimental to ETH. However, ETH 2.0 will change this.

In summary, in ETH 2.0, ETH holders will be able to stake their ETH and receive yield from securing the Ethereum network. Furthermore, the combination of new supply schedule and EIP 1599 burning transaction fees will reduce the inflation rate and make ETH more scarce than ever. This is likely to improve ETH features as a monetary asset.