MAKER DAO ONCHAIN EMISSIONS

Methodology

Maker DAO is calculating its emissions on a per-transaction basis. Each transaction is contained within a block that is minted by the miners (networked computers).

Miners are the largest source of emissions attributed to transactions, yet it is impossible to know to what extent the miners are offsetting their carbon emissions due to the decentralized nature of the ethereum network. However, miners should be seen as a service provider for the protocols and part of their supply chain emissions: protocols give the ethereum network utility and therefore the ETH token value. While it would theoretically be possible to mine empty blocks, without transactions, that does not make sense from an economic perspective. The value of the tokens on the network are driven by its use case. It is therefore within the responsibility of the protocols to offset carbon emissions on a per transaction basis.

Thus, following that assumption, protocols are responsible for their direct transactions: A direct transaction is an interaction with the smart contracts of the protocol without it being used as a utility or service within another protocol. An example of a direct transaction would be the transfer of the protocol token from one wallet to another. We also categorize transactions with Multisignature Protocols or other Helper / Wrapper contracts as direct transactions.

An indirect transaction is a transaction that originated with another protocol and therefore does not count towards the carbon emissions of a Maker's protocol. For example, a trade of DAI within a Uniswap exchange is categorized as an indirect transaction. This transaction originates from the Uniswap Protocol and is using DAI as a means of exchange within its exchange, therefore Uniswap, and not DAI, is responsible for the emissions from that transaction.

This methodology makes assumptions that account for an exhaustive carbon emissions inventory and therefore an ambitious offsetting strategy: If each protocol would offset the emissions each transaction it is initiating, all transaction emissions would be offset by definition - except pure base currency (Ether) transactions, which would remain the responsibility of the miners or the ethereum foundation.

Maker DAO is facilitating its on-chain transactions through two tokens: the DAI stablecoin and the MKR governance token. All transactions related to the protocol are occurring on these contracts and direct transactions as defined above are counted with regards to these contracts.

Defining Emissions Origin

Maker DAO is on the ethereum blockchain, hence there are no other layers to take into account.

This methodology calculates the carbon emissions footprint on a per-transaction basis, such that the number of transactions of ethereum is divided by the total carbon footprint within a given timeframe, per year in this case, to calculate the carbon footprint per transaction.

Next, we categorized transactions as "protocol originated" if and only if an end user (that is a wallet address and not a smart contract) has initiated a transaction or if it is a raw transaction on the protocol token (e.g. a transfer).

If a different protocol is facilitating function calls on a smart contract of the protocol subject to calculation, the transaction is not considered as part of the footprint of the protocol. However, the downside to this is that quite a lot of protocols are only wrappers around wallets, multisignature wallets, transfer automation or plainly of unknown origin.

It is standard to overestimate emissions when calculating carbon emissions to ensure that we are safely accounting for carbon emissions and achieving the shared goal is to make the planet liveable for decades to come. Therefore we followed a simple principle: If in doubt: count towards our emissions. Thus, if the origin is not a known (verified) protocol, they are counted as part of the MakerDAOs emissions. If there is the slightest doubt about the origin, that is counted towards MakerDao's footprint as well.

How To Interpret the Dataset

We added two CSV files – one for the MKR token and one for the DAI token. Please refer to the respective Jupyter Notebook for a visual walkthrough.

The num_tx column is the total interactions with DAI/MKR over the respective timeframe by the address.

If smart_contract is true, the address is a smart-contract, meaning code has been deployed to that address. false indicates that it is a wallet.

origin can have the following:

MultiSigWalletWithDailyLimit, MultiSigWalletWithTimeLock, GnosisSafeProxy, multi_sig, DSProxy, Argent

These are multi signature wallets and they contribute to Maker's footprint.

market_maker

Bot, market maker or otherwise automated trades. If they are not a smart contract their interactions are contributing to Maker's footprint – because that means they interacted with Maker's Smart Contracts directly.
Smart Contracts are interacting with exchanges under the hood and are therefore not added if they are a smart contract.

exchange

Addresses that can be assigned to exchanges.

Since it could be argued that they are responsible for their own emissions, it's a direct interaction with our protocol, therefore we count it towards Maker's emissions.

not_verifiable

Manually double checked addresses where we couldn't verify the origin. The more tx are done, the more likely it is that this is a service or facilitating protocol. However, in the event of doubt we count Maker's emissions.

Therefore all within this category are counted.

unknown

Smart Contract of unknown and not manually checked origin. This only applies for addresses with less than 100tx.

Counted towards Maker's emissions.

wallet

Same as unknown, but for wallets. Again, this only applies for addresses with less than 100tx.

Counted towards Maker's emissions.

Bridge

Bridging wallet or smart contract. If this is a wallet it's a direct interaction and counts towards makers emissions. Smart Contracts are not taken into account.

Everything else.

All other transactions are known and verified smart contract protocols that are responsible for their own emissions.

They are not counted as Maker's emissions.

In consultation with:

The Carbon Accounting Company™