



Sustainability indicators for crypto-assets

Disclosures pursuant to Article 66(5) MiCA

This report was provided by:



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Preamble

About the Crypto-Asset Service Provider (CASP)

Name of the CASP: Deutsche WertpapierService Bank AG

Street and number: Wildunger Straße 14

City: Frankfurt am Main

Country: Germany

LEI: 529900EXG2PM316ISO63

About this report

This disclosure serves as evidence of compliance with the regulatory requirements of Article 66(5) MiCA. Under this provision, crypto-asset service providers are required to disclose information on the principal adverse impacts on the climate and the environment. In particular, this disclosure complies with "Commission Delegated Regulation (EU) 2025/422 of 17 December 2024 supplementing Regulation (EU) 2023/1114 of the European Parliament and of the Council with regard to regulatory technical standards specifying the content, methodologies and presentation of information in respect of sustainability indicators in relation to adverse impacts on the climate and other environment-related adverse impacts". The optional information referred to in Article 6(8), points (a) to (d), of Delegated Regulation (EU) 2025/422 is not included.

This report remains valid until material changes occur in the underlying data, in which case it will be updated promptly.

Overview

This is an overview of the core indicator "energy consumption" and does not constitute the disclosure required under Article 66(5) MiCA. The full disclosure is set out below.

#	Crypto-Asset Name	Crypto-Asset FFG	Energy consumption (kWh per calendar year)
1	Bitcoin	V15WLZJMF	166,333,234,475.62
2	Solana SOL	6QZ1LNC12	6,296,250.00
3	Ethereum Eth	D5RG2FHH0	2,197,008.00
4	Cardano ADA	76QS7QCXB	773,946.00
5	Ripple XRP	42PHJB2BS	456,270.71
6	ChainLink Token	3R3J70FDR	8,838.74

Sustainability indicators



Bitcoin

BTC | V15WLZJMF

Quantitative information

Quantitative sustainability indicators for Bitcoin

Field	Value	Unit
S.1 Name	Deutsche WertpapierService Bank AG	/
S.2 Relevant legal entity identifier	529900EXG2PM316ISO63	/
S.3 Name of the crypto-asset	Bitcoin	/
S.6 Beginning of the period to which the disclosure relates	2025-10-01	/
S.7 End of the period to which the disclosure relates	2026-10-01	/
S.8 Energy consumption	166333234475.61682	kWh/a
S.10 Renewable energy consumption	34.4781471084	%
S.11 Energy intensity	6.05476	kWh
S.12 Scope 1 DLT GHG emissions – Controlled	0.00000	tCO2e
S.13 Scope 2 DLT GHG emissions – Purchased	68528637.47238	tCO2e
S.14 GHG intensity	2.49454	kgCO2e

Qualitative information

S.4 Consensus Mechanism

Bitcoin is present on the following networks: Bitcoin, Lightning Network.

Bitcoin uses Proof-of-Work. Miners assemble valid transactions into candidate blocks and search for a block hash below the current target. Nodes verify the proof and transactions and follow the valid chain with the greatest accumulated proof-of-work.

S.5 Incentive Mechanisms and Applicable Fees

Bitcoin is present on the following networks: Bitcoin, Lightning Network.

The miner of an accepted block may receive newly issued BTC under the protocol's halving schedule and the transaction fees included in that block. Users choose BTC-denominated fees, generally by fee rate and transaction size, and miners select transactions for inclusion according to their policies.

S.9 Energy consumption sources and methodologies

The energy consumption of this asset is aggregated across multiple components:

For the calculation of energy consumptions, the so called 'top-down' approach is being used, within which an economic calculation of the miners is assumed. Miners are persons or devices that actively participate in the proof-of-work consensus mechanism. The miners are considered to be the central factor for the energy consumption of the network. Hardware is pre-selected based on the consensus mechanism's hash algorithm: SHA-256. A current profitability threshold is determined on the basis of the revenue and cost structure for mining operations. Only Hardware above the profitability threshold is considered for the network. The energy consumption of the network can be determined by taking into account the distribution for the hardware, the efficiency levels for operating the hardware and on-chain information regarding the miners' revenue opportunities. If significant use of merge mining is known, this is taken into account. When calculating the energy consumption, we used - if available - the Functionally Fungible Group Digital Token Identifier (FFG DTI) to determine all implementations of the asset of question in scope and we update the mappings regularly, based on data of the Digital Token Identifier Foundation. The information regarding the hardware used and the number of participants in the network is based on assumptions that are verified with best effort using empirical data. In general, participants are assumed to be largely economically rational. As a precautionary principle, we make assumptions on the conservative side when in doubt, i.e. making higher estimates for the adverse impacts.

To determine the energy consumption of a token, the energy consumption of the network(s) lightning_network is calculated first. For the energy consumption of the token, a fraction of the energy consumption of the network is attributed to the token, which is determined based on the activity of the crypto-asset within the network. When calculating the energy consumption, the Functionally Fungible Group Digital Token Identifier (FFG DTI) is used - if available - to determine all implementations of the asset in scope. The mappings are updated regularly, based on data of the Digital Token Identifier Foundation. The information regarding the hardware used and the number of participants in the network is based on assumptions that are verified with best effort using empirical data. In general, participants are assumed to be largely economically rational. As a precautionary principle, we make assumptions on the conservative side when in doubt, i.e. making higher estimates for the adverse impacts.

S.15 Key energy sources and methodologies

To determine the proportion of renewable energy usage, the locations of the nodes are to be determined using public information sites, open-source crawlers and crawlers developed in-house. If no information is available on the geographic distribution of the nodes, reference networks are used which are comparable in terms of their incentivization structure and consensus mechanism. This geo-information is merged with public information from Our World in Data, see citation. The intensity is calculated as the marginal energy cost wrt. one more transaction.

Ember (2025); Energy Institute - Statistical Review of World Energy (2024) - with major processing by Our World in Data. "Share of electricity generated by renewables - Ember and Energy Institute" [dataset]. Ember, "Yearly Electricity Data Europe"; Ember, "Yearly Electricity Data"; Energy Institute, "Statistical Review of World Energy" [original data]. Retrieved from <https://ourworldindata.org/grapher/share-electricity-renewables>.

S.16 Key GHG sources and methodologies

To determine the GHG Emissions, the locations of the nodes are to be determined using public information sites, open-source crawlers and crawlers developed in-house. If no information is available on the geographic distribution of the nodes, reference networks are used which are comparable in terms of their incentivization structure and consensus mechanism. This geo-information is merged with public information from Our World in Data, see citation. The intensity is calculated as the marginal emission wrt. one more transaction.

Ember (2025); Energy Institute - Statistical Review of World Energy (2024) - with major processing by Our World in Data. "Carbon intensity of electricity generation - Ember and Energy Institute" [dataset]. Ember, "Yearly Electricity Data Europe"; Ember, "Yearly Electricity Data"; Energy Institute, "Statistical Review of World Energy" [original data]. Retrieved from <https://ourworldindata.org/grapher/carbon-intensity-electricity> Licenced under CC BY 4.0.



Quantitative information

Quantitative sustainability indicators for Solana SOL

Field	Value	Unit
S.1 Name	Deutsche WertpapierService Bank AG	/
S.2 Relevant legal entity identifier	529900EXG2PM316ISO63	/
S.3 Name of the crypto-asset	Solana SOL	/
S.6 Beginning of the period to which the disclosure relates	2025-10-01	/
S.7 End of the period to which the disclosure relates	2026-10-01	/
S.8 Energy consumption	6296250.00000	kWh/a
S.10 Renewable energy consumption	38.5831139958	%
S.11 Energy intensity	0.00000	kWh
S.12 Scope 1 DLT GHG emissions – Controlled	0.00000	tCO2e
S.13 Scope 2 DLT GHG emissions – Purchased	2133.60452	tCO2e
S.14 GHG intensity	0.00000	kgCO2e

Qualitative information

S.4 Consensus Mechanism

Solana uses stake-weighted Proof of Stake with Tower BFT. A scheduled leader orders transactions and produces block entries using Proof of History as a cryptographic clock, while validators replay the entries and submit stake-weighted votes. Confirmed votes and lockout rules determine finality.

S.5 Incentive Mechanisms and Applicable Fees

Validators and delegators receive inflation-funded staking rewards after validator commission. Each transaction pays a base fee in SOL and may include a prioritization fee. Half of the base fee is burned and half is paid to the validator, while the prioritization fee is paid to the validator. Accounts may also require a refundable rent-exempt reserve.

S.9 Energy consumption sources and methodologies

For the calculation of energy consumptions, the so called 'bottom-up' approach is being used. The nodes are considered to be the central factor for the energy consumption of the network. These assumptions are made on the basis of empirical findings through the use of public information sites, open-source crawlers and crawlers developed in-house. The main determinants for estimating the hardware used within the network are the requirements for operating the client software. The energy consumption of the hardware devices was measured in certified test laboratories. When calculating the energy consumption, we used - if available - the Functionally Fungible Group Digital Token Identifier (FFG DTI) to determine all implementations of the asset of question in scope and we update the mappings regularly, based on data of the Digital Token Identifier Foundation. The information regarding the hardware used and the number of participants in the network is based on assumptions that are verified with best effort using empirical data. In general, participants are assumed to be largely economically rational. As a precautionary principle, we make assumptions on the conservative side when in doubt, i.e. making higher estimates for the adverse impacts.

S.15 Key energy sources and methodologies

To determine the proportion of renewable energy usage, the locations of the nodes are to be determined using public information sites, open-source crawlers and crawlers developed in-house. If no information is available on the geographic distribution of the nodes, reference networks are used which are comparable in terms of their incentivization structure and consensus mechanism. This geo-information is merged with public information from Our World in Data, see citation. The intensity is calculated as the marginal energy cost wrt. one more transaction.

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S.16 Key GHG sources and methodologies

To determine the GHG Emissions, the locations of the nodes are to be determined using public information sites, open-source crawlers and crawlers developed in-house. If no information is available on the geographic distribution of the nodes, reference networks are used which are comparable in terms of their incentivization structure and consensus mechanism. This geo-information is merged with public information from Our World in Data, see citation. The intensity is calculated as the marginal emission wrt. one more transaction.

Ember (2025); Energy Institute - Statistical Review of World Energy (2024) - with major processing by Our World in Data. "Carbon intensity of electricity generation - Ember and Energy Institute" [dataset]. Ember, "Yearly Electricity Data Europe"; Ember, "Yearly Electricity Data"; Energy Institute, "Statistical Review of World Energy" [original data]. Retrieved from <https://ourworldindata.org/grapher/carbon-intensity-electricity> Licenced under CC BY 4.0.



Ethereum Eth

ETH | D5RG2FHH0

Quantitative information

Quantitative sustainability indicators for Ethereum Eth

Field	Value	Unit
S.1 Name	Deutsche WertpapierService Bank AG	/
S.2 Relevant legal entity identifier	529900EXG2PM316ISO63	/
S.3 Name of the crypto-asset	Ethereum Eth	/
S.6 Beginning of the period to which the disclosure relates	2025-10-01	/
S.7 End of the period to which the disclosure relates	2026-10-01	/
S.8 Energy consumption	2197008.00000	kWh/a
S.10 Renewable energy consumption	37.9124101186	%
S.11 Energy intensity	0.00006	kWh
S.12 Scope 1 DLT GHG emissions – Controlled	0.00000	tCO ₂ e
S.13 Scope 2 DLT GHG emissions – Purchased	731.19298	tCO ₂ e
S.14 GHG intensity	0.00002	kgCO ₂ e

Qualitative information

S.4 Consensus Mechanism

Ethereum uses proof of stake through Gasper, which combines the LMD-GHOST fork-choice rule with Casper FFG finality. Validators stake ETH, propose blocks in assigned slots and attest to block validity. Weighted attestations determine the canonical chain and justify and finalize checkpoints. Defined consensus faults can result in slashing.

S.5 Incentive Mechanisms and Applicable Fees

Validators receive newly issued ETH for block proposals, attestations and other consensus duties and may receive priority fees and execution-layer value associated with proposed blocks. Each transaction pays gas in ETH. The EIP-1559 base fee is burned and an optional priority fee is paid to the block proposer. Missed duties reduce rewards, while defined misconduct can cause slashing.

S.9 Energy consumption sources and methodologies

For the calculation of energy consumptions, the so called 'bottom-up' approach is being used. The nodes are considered to be the central factor for the energy consumption of the network. These assumptions are made on the basis of empirical findings through the use of public information sites, open-source crawlers and crawlers developed in-house. The main determinants for estimating the hardware used within the network are the requirements for operating the client software. The energy consumption of the hardware devices was measured in certified test laboratories. When calculating the energy consumption, we used - if available - the Functionally Fungible Group Digital Token Identifier (FFG DTI) to determine all implementations of the asset of question in scope and we update the mappings regularly, based on data of the Digital Token Identifier Foundation. The information regarding the hardware used and the number of participants in the network is based on assumptions that are verified with best effort using empirical data. In general, participants are assumed to be largely economically rational. As a precautionary principle, we make assumptions on the conservative side when in doubt, i.e. making higher estimates for the adverse impacts.

S.15 Key energy sources and methodologies

To determine the proportion of renewable energy usage, the locations of the nodes are to be determined using public information sites, open-source crawlers and crawlers developed in-house. If no information is available on the geographic distribution of the nodes, reference networks are used which are comparable in terms of their incentivization structure and consensus mechanism. This geo-information is merged with public information from Our World in Data, see citation. The intensity is calculated as the marginal energy cost wrt. one more transaction.

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S.16 Key GHG sources and methodologies

To determine the GHG Emissions, the locations of the nodes are to be determined using public information sites, open-source crawlers and crawlers developed in-house. If no information is available on the geographic distribution of the nodes, reference networks are used which are comparable in terms of their incentivization structure and consensus mechanism. This geo-information is merged with public information from Our World in Data, see citation. The intensity is calculated as the marginal emission wrt. one more transaction.

Ember (2025); Energy Institute - Statistical Review of World Energy (2024) - with major processing by Our World in Data. "Carbon intensity of electricity generation - Ember and Energy Institute" [dataset]. Ember, "Yearly Electricity Data Europe"; Ember, "Yearly Electricity Data"; Energy Institute, "Statistical Review of World Energy" [original data]. Retrieved from <https://ourworldindata.org/grapher/carbon-intensity-electricity> Licenced under CC BY 4.0.



Cardano ADA

ADA | 76QS7QCXB

Quantitative information

Quantitative sustainability indicators for Cardano ADA

Field	Value	Unit
S.1 Name	Deutsche WertpapierService Bank AG	/
S.2 Relevant legal entity identifier	529900EXG2PM316ISO63	/
S.3 Name of the crypto-asset	Cardano ADA	/
S.6 Beginning of the period to which the disclosure relates	2025-10-01	/
S.7 End of the period to which the disclosure relates	2026-10-01	/
S.8 Energy consumption	773946.00000	kWh/a
S.10 Renewable energy consumption	37.4187578605	%
S.11 Energy intensity	0.00109	kWh
S.12 Scope 1 DLT GHG emissions – Controlled	0.00000	tCO2e
S.13 Scope 2 DLT GHG emissions – Purchased	260.63169	tCO2e
S.14 GHG intensity	0.00037	kgCO2e

Qualitative information

S.4 Consensus Mechanism

Cardano uses the Ouroboros Proof-of-Stake protocol. Time is divided into epochs and slots, and stake pools are selected to produce blocks with probability related to the active ADA delegated to them. Nodes apply the protocol's chain-selection rules when adopting the ledger history.

S.5 Incentive Mechanisms and Applicable Fees

Stake pool operators and delegators can receive ADA rewards from protocol issuance and pooled transaction fees, subject to pool operating costs, margins and performance. Transactions incur ADA-denominated fees calculated from protocol parameters and transaction size. Fees are pooled for epoch-level reward distribution rather than paid directly to the block producer.

S.9 Energy consumption sources and methodologies

For the calculation of energy consumptions, the so called 'bottom-up' approach is being used. The nodes are considered to be the central factor for the energy consumption of the network. These assumptions are made on the basis of empirical findings through the use of public information sites, open-source crawlers and crawlers developed in-house. The main determinants for estimating the hardware used within the network are the requirements for operating the client software. The energy consumption of the hardware devices was measured in certified test laboratories. When calculating the energy consumption, we used - if available - the Functionally Fungible Group Digital Token Identifier (FFG DTI) to determine all implementations of the asset of question in scope and we update the mappings regularly, based on data of the Digital Token Identifier Foundation. The information regarding the hardware used and the number of participants in the network is based on assumptions that are verified with best effort using empirical data. In general, participants are assumed to be largely economically rational. As a precautionary principle, we make assumptions on the conservative side when in doubt, i.e. making higher estimates for the adverse impacts.

S.15 Key energy sources and methodologies

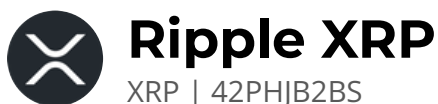
To determine the proportion of renewable energy usage, the locations of the nodes are to be determined using public information sites, open-source crawlers and crawlers developed in-house. If no information is available on the geographic distribution of the nodes, reference networks are used which are comparable in terms of their incentivization structure and consensus mechanism. This geo-information is merged with public information from Our World in Data, see citation. The intensity is calculated as the marginal energy cost wrt. one more transaction.

Ember (2025); Energy Institute - Statistical Review of World Energy (2024) - with major processing by Our World in Data. "Share of electricity generated by renewables - Ember and Energy Institute" [dataset]. Ember, "Yearly Electricity Data Europe"; Ember, "Yearly Electricity Data"; Energy Institute, "Statistical Review of World Energy" [original data]. Retrieved from <https://ourworldindata.org/grapher/share-electricity-renewables>.

S.16 Key GHG sources and methodologies

To determine the GHG Emissions, the locations of the nodes are to be determined using public information sites, open-source crawlers and crawlers developed in-house. If no information is available on the geographic distribution of the nodes, reference networks are used which are comparable in terms of their incentivization structure and consensus mechanism. This geo-information is merged with public information from Our World in Data, see citation. The intensity is calculated as the marginal emission wrt. one more transaction.

Ember (2025); Energy Institute - Statistical Review of World Energy (2024) - with major processing by Our World in Data. "Carbon intensity of electricity generation - Ember and Energy Institute" [dataset]. Ember, "Yearly Electricity Data Europe"; Ember, "Yearly Electricity Data"; Energy Institute, "Statistical Review of World Energy" [original data]. Retrieved from <https://ourworldindata.org/grapher/carbon-intensity-electricity> Licenced under CC BY 4.0.



Quantitative information

Quantitative sustainability indicators for Ripple XRP

Field	Value	Unit
S.1 Name	Deutsche WertpapierService Bank AG	/
S.2 Relevant legal entity identifier	529900EXG2PM316ISO63	/
S.3 Name of the crypto-asset	Ripple XRP	/
S.6 Beginning of the period to which the disclosure relates	2025-10-01	/
S.7 End of the period to which the disclosure relates	2026-10-01	/
S.8 Energy consumption	456270.71367	kWh/a

Qualitative information

S.4 Consensus Mechanism

Ripple XRP is present on the following networks: Binance Smart Chain, Klaytn, Ripple.

BNB Smart Chain uses Proof-of-Staked-Authority. Active validators selected according to bonded BNB take turns producing blocks and vote on finality, while BNB holders may delegate stake to validator candidates.

Klaytn used a modified Istanbul Byzantine Fault Tolerance mechanism in which Governance Council consensus nodes proposed and validated blocks. A block became final after signatures representing more than two thirds of the participating consensus nodes. The Klaytn mainnet transitioned to Kaia through a protocol upgrade on 29 August 2024.

The XRP Ledger uses the XRP Ledger Consensus Protocol. Each server selects a Unique Node List of validators whose proposals it evaluates. Validators iteratively agree on transaction ordering and results, and a ledger version is validated when the required threshold of trusted validators supports it.

S.5 Incentive Mechanisms and Applicable Fees

Ripple XRP is present on the following networks: Binance Smart Chain, Klaytn, Ripple.

Validators and delegators can receive BNB rewards derived from transaction fees, subject to validator commission and reward-distribution rules. Transfers and smart-contract execution incur gas fees in BNB. Protocol penalties may include loss of rewards, jailing or slashing of validator self-stake for specified violations.

Before the transition to Kaia, users paid gas fees in KLAY and consensus nodes received protocol rewards funded by issuance and transaction fees. Portions of rewards were also allocated to ecosystem funds under the applicable network parameters. KLAY was converted to KAIA as part of the Kaia transition, so the former Klaytn reward percentages are not presented as current terms.

The XRP Ledger does not pay protocol rewards to validators and does not use mining or staking. Each transaction specifies an XRP fee that is permanently destroyed rather than paid to a validator. The minimum fee can change through validator voting and rises temporarily under load. Separate XRP reserve requirements apply to accounts and ledger objects but are not transaction fees.

S.9 Energy consumption sources and methodologies

The energy consumption of this asset is aggregated across multiple components:

For the calculation of energy consumptions, the so called 'bottom-up' approach is being used. The nodes are considered to be the central factor for the energy consumption of the network. These assumptions are made on the basis of empirical findings through the use of public information sites, open-source crawlers and crawlers developed in-house. The main determinants for estimating the hardware used within the network are the requirements for operating the client software. The energy consumption of the hardware devices was measured in certified test laboratories. When calculating the energy consumption, we used - if available - the Functionally Fungible Group Digital Token Identifier (FFG DTI) to determine all implementations of the asset of question in scope and we update the mappings regularly, based on data of the Digital Token Identifier Foundation. The information regarding the hardware used and the number of participants in the network is based on assumptions that are verified with best effort using empirical data. In general, participants are assumed to be largely economically rational. As a precautionary principle, we make assumptions on the conservative side when in doubt, i.e. making higher estimates for the adverse impacts.

To determine the energy consumption of a token, the energy consumption of the network(s) binance_smart_chain, klaytn is calculated first. For the energy consumption of the token, a fraction of the energy consumption of the network is attributed to the token, which is determined based on the activity of the crypto-asset within the network. When calculating the energy consumption, the Functionally Fungible Group Digital Token Identifier (FFG DTI) is used - if available - to determine all implementations of the asset in scope. The mappings are updated regularly, based on data of the Digital Token Identifier Foundation. The information regarding the hardware used and the number of participants in the network is based on assumptions that are verified with best effort using empirical data. In general, participants are assumed to be largely economically rational. As a precautionary principle, we make assumptions on the conservative side when in doubt, i.e. making higher estimates for the adverse impacts.



ChainLink Token

LINK | 3R3J70FDR

Quantitative information

Quantitative sustainability indicators for ChainLink Token

Field	Value	Unit
S.1 Name	Deutsche WertpapierService Bank AG	/
S.2 Relevant legal entity identifier	529900EXG2PM316ISO63	/
S.3 Name of the crypto-asset	ChainLink Token	/
S.6 Beginning of the period to which the disclosure relates	2025-10-01	/
S.7 End of the period to which the disclosure relates	2026-10-01	/
S.8 Energy consumption	8838.74306	kWh/a

Qualitative information

S.4 Consensus Mechanism

ChainLink Token is present on the following networks: Arbitrum, Avalanche, Binance Smart Chain, Ethereum, Fantom, Gnosis Chain, Optimism, Polygon, Solana.

Arbitrum One is an optimistic Layer-2 rollup that settles on Ethereum. A sequencer orders transactions. ArbOS and the state transition function execute them and determine the resulting Layer-2 state. A batch poster publishes compressed transaction data to Ethereum. Validators submit state assertions to Ethereum and may challenge conflicting assertions under the BoLD dispute protocol. An assertion is confirmed after the applicable challenge period if no successful challenge remains.

The Avalanche C-Chain uses Snowman consensus with stake-weighted validators. Validators repeatedly sample subsets of other validators and update their preference until a block reaches the protocol confidence threshold. Accepted blocks form the C-Chain's linear history.

BNB Smart Chain uses Proof-of-Staked-Authority. Active validators selected according to bonded BNB take turns producing blocks and vote on finality, while BNB holders may delegate stake to validator candidates.

Ethereum uses proof of stake through Gasper, which combines the LMD-GHOST fork-choice rule with Casper FFG finality. Validators stake ETH, propose blocks in assigned slots and attest to block validity. Weighted attestations determine the canonical chain and justify and finalize checkpoints. Defined consensus faults can result in slashing.

Fantom Opera uses the Lachesis asynchronous Byzantine-fault-tolerant proof-of-stake protocol. Validators create and exchange event blocks in a directed acyclic graph, and stake-weighted agreement determines their ordering and finality. Following migration to Sonic, Opera remains live as legacy infrastructure through at least the end of 2026.

Gnosis Chain is an EVM-compatible sidechain using an Ethereum-derived proof-of-stake consensus layer. Validators stake GNO, propose blocks and submit attestations. Stake-weighted votes determine the canonical chain and finalize checkpoints under the network's consensus rules.

OP Mainnet is an optimistic Layer 2 rollup settled on Ethereum. Its sequencer orders transactions and produces Layer 2 blocks, then transaction batches are published to Ethereum. A transaction reaches finality when the Ethereum block containing its batch is finalized, while fault proofs are used to challenge invalid withdrawal claims.

Polygon PoS is an EVM-compatible sidechain with its own Proof-of-Stake validator set. Under the Rio architecture, validators elect a block producer for a span, Bor executes transactions and produces blocks, and Heimdall coordinates validator attestations and checkpoint submission to Ethereum.

Solana uses stake-weighted Proof of Stake with Tower BFT. A scheduled leader orders transactions and produces block entries using Proof of History as a cryptographic clock, while validators replay the entries and submit stake-weighted votes. Confirmed votes and lockout rules determine finality.

S.5 Incentive Mechanisms and Applicable Fees

ChainLink Token is present on the following networks: Arbitrum, Avalanche, Binance Smart Chain, Ethereum, Fantom, Gnosis Chain, Optimism, Polygon, Solana.

Arbitrum One transactions incur fees in ETH. The total fee consists of a Layer-2 execution component and a parent-chain data component reflecting the cost of publishing compressed transaction data to Ethereum. The amount depends on the computational resources used, the size and compressibility of the transaction data, the Layer-2 gas price and the applicable Ethereum data-posting costs. Validators that submit or challenge state assertions under BoLD must provide protocol-defined bonds. Bonds are returned or forfeited according to the applicable protocol rules and the outcome of a dispute. Withdrawals through the canonical bridge become executable after the relevant Layer-2 state has been confirmed and the applicable challenge period has elapsed.

Primary Network validators and delegators can receive AVAX staking rewards after satisfying protocol participation requirements. The protocol does not ordinarily slash bonded principal. Failure to meet validation requirements can result in loss of reward eligibility. C-Chain transactions incur AVAX gas fees, which are burned rather than paid to validators.

Validators and delegators can receive BNB rewards derived from transaction fees, subject to validator commission and reward-distribution rules. Transfers and smart-contract execution incur gas fees in BNB. Protocol penalties may include loss of rewards, jailing or slashing of validator self-stake for specified violations.

Validators receive newly issued ETH for block proposals, attestations and other consensus duties and may receive priority fees and execution-layer value associated with proposed blocks. Each transaction pays gas in ETH. The EIP-1559 base fee is burned and an optional priority fee is paid to the block proposer. Missed duties reduce rewards, while defined misconduct can cause slashing.

Fantom Opera transactions incur FTM-denominated gas fees. Opera staking emissions were reduced to zero when validator rewards migrated to Sonic, although the legacy network remains operational.

Current transaction fees are allocated among validators, the Ecosystem Vault, Gas Monetization participants and protocol burning under the network's fee rules.

Validators receive protocol-defined consensus rewards in GNO and may receive xDAI transaction fees when proposing blocks. Participants using staking pools receive rewards after applicable operator charges. Users pay xDAI-denominated gas fees for transfers and smart-contract execution.

Users pay OP Mainnet transaction fees in ETH. The total fee includes the Layer 2 execution fee, the cost of publishing transaction data to Ethereum, and an operator fee after the relevant network upgrade. Fee components are routed to protocol fee vaults, and OP Mainnet does not provide public validator or delegation rewards for Layer 2 consensus.

Validators stake POL and receive protocol rewards and transaction-fee allocations. Delegators may receive a share of a validator's rewards after commission. Users pay POL gas for transfers and smart-contract execution, and the Rio fee rules allocate block-related fees between the elected producer and the validator set.

Validators and delegators receive inflation-funded staking rewards after validator commission. Each transaction pays a base fee in SOL and may include a prioritization fee. Half of the base fee is burned and half is paid to the validator, while the prioritization fee is paid to the validator. Accounts may also require a refundable rent-exempt reserve.

S.9 Energy consumption sources and methodologies

The energy consumption of this asset is aggregated across multiple components:

To determine the energy consumption of a token, the energy consumption of the network(s) arbitrum, avalanche, binance_smart_chain, ethereum, fantom, gnosis_chain, optimism, polygon, solana is calculated first. For the energy consumption of the token, a fraction of the energy consumption of the network is attributed to the token, which is determined based on the activity of the crypto-asset within the network. When calculating the energy consumption, the Functionally Fungible Group Digital Token Identifier (FFG DTI) is used - if available - to determine all implementations of the asset in scope. The mappings are updated regularly, based on data of the Digital Token Identifier Foundation. The information regarding the hardware used and the number of participants in the network is based on assumptions that are verified with best effort using empirical data. In general, participants are assumed to be largely economically rational. As a precautionary principle, we make assumptions on the conservative side when in doubt, i.e. making higher estimates for the adverse impacts.

This report was provided by:

Crypto Risk Metrics

Our services

ESG data for crypto-assets

Provision of ESG data for crypto-assets in compliance with MiCA requirements. The data is based on ISO-certified measurements, is legally robust, can be easily integrated, and is trusted by leading regulated market participants operating in different regulatory environments.

Risk management

Crypto Risk Metrics provides a MaRisk- and BAIT-compliant SaaS solution that helps financial institutions manage risks in direct and indirect crypto-asset investments by reference to BSI standards and other recognised standards. Daily reports and a complete audit trail ensure transparent, audit-ready documentation of crypto-asset risks.

Market conformity check

The service ensures compliance with Circular 05/2023 (BA) through automated verification of the market conformity of crypto trades and by flagging potentially non-conforming transactions. Customers receive daily trade reports securely via SFTP or in CSV format, simplifying regulatory risk management.

White papers for crypto-assets

Crypto Risk Metrics supports CASPs in drafting and maintaining MiCA-compliant white papers, including ESG disclosures, or assumes responsibility for the entire process through its "White Glove Service", with transfer of liability. If the issuer of the crypto-asset does not provide a white paper, the trading platform may prepare and submit it to the competent authority.

Compliant price data

Crypto Risk Metrics delivers KARBV-compliant price data for native crypto-assets using a valuation model tailored to non-organised markets, such as Bitcoin and Ethereum. This ensures accurate asset valuation in line with Sections 27 and 28 of the German Investment Accounting and Valuation Ordinance (KARBV).

Contact

Crypto Risk Metrics GmbH

Lange Reihe 73
20099 Hamburg
Germany

Tel.: +49 251 981156-4070

Mail: info@crypto-risk-metrics.com