

**White paper drafted under the  
European Markets in Crypto-  
Assets Regulation (EU)  
2023/1114 for FFG HX56HH1ZX**

## Preamble

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## **01. Date of notification**

This white paper was notified at 2026-01-16.

## **02. Statement in accordance with Article 6(3) of Regulation (EU) 2023/1114**

This crypto-asset white paper has not been approved by any competent authority in any Member State of the European Union. The person seeking admission to trading of the crypto-asset is solely responsible for the content of this crypto-asset white paper.

## **03. Compliance statement in accordance with Article 6(6) of Regulation (EU) 2023/1114**

This crypto-asset white paper complies with Title II of Regulation (EU) 2023/1114 of the European Parliament and of the Council and, to the best of the knowledge of the management body, the information presented in the crypto-asset white paper is fair, clear and not misleading and the crypto-asset white paper makes no omission likely to affect its import.

## **04. Statement in accordance with Article 6(5), points (a), (b), (c), of Regulation (EU) 2023/1114**

The crypto-asset referred to in this crypto-asset white paper may lose its value in part or in full, may not always be transferable and may not be liquid.

## **05. Statement in accordance with Article 6(5), point (d), of Regulation (EU) 2023/1114**

As defined in Article 3(9) of Regulation (EU) 2023/1114 of the European Parliament and of the Council of 31 May 2023 on Markets in Crypto-Assets – amending Regulations (EU) No 1093/2010 and (EU) No 1095/2010 and Directives 2013/36/EU and (EU) 2019/1937 – a utility token is “a type of crypto-asset that is only intended to provide access to a good or a service supplied by its issuer”. This crypto-asset does not qualify as a utility token, as its intended use goes beyond providing access to a good or service supplied solely by the issuer.

## **06. Statement in accordance with Article 6(5), points (e) and (f), of Regulation (EU) 2023/1114**

The crypto-asset referred to in this white paper is not covered by the investor compensation schemes under Directive 97/9/EC of the European Parliament and of the Council or the deposit guarantee schemes under Directive 2014/49/EU of the European Parliament and of the Council.

## **Summary**

## **07. Warning in accordance with Article 6(7), second subparagraph, of Regulation (EU) 2023/1114**

Warning: This summary should be read as an introduction to the crypto-asset white paper. The prospective holder should base any decision to purchase this crypto-asset on the content of the crypto-asset white paper as a whole and not on the summary alone. The offer to the public of this crypto-asset does not constitute an offer or solicitation to purchase financial instruments and any such offer or solicitation can be made only by means of a prospectus or other offer documents pursuant to the applicable national law. This crypto-asset white paper does not constitute a prospectus as referred to in Regulation (EU) 2017/1129 of the European Parliament and of the Council or any other offer document pursuant to Union or national law.

## **08. Characteristics of the crypto-asset**



The crypto-asset 0x Protocol Token (ZRX) referred to in this white paper is a crypto-asset other than e-money tokens (EMTs) or asset-referenced tokens (ARTs). It is issued on the Ethereum, Gnosis Chain, Avalanche and Solana networks as of 2025-11-16 and according to DTI FFG shown in F.14. The supply of the crypto-asset is limited to 1,000,000,000 units. The first on-chain activity of the crypto-asset occurred on 2017-08-11 on the Ethereum network (transaction hash: 0x053d78c7bd69bb5bcbd6c74944878b3c2007bde5fd159900df37de797373b994, source: <https://etherscan.io/tx/0x053d78c7bd69bb5bcbd6c74944878b3c2007bde5fd159900df37de797373b994>, accessed on 2026-01-14). The first activity on Gnosis Chain can be viewed on 2021-02-07 (transaction hash: 0xae0c74ec1686929184df97330fb9feb5829f0c3027e8dcd61d0ce602aaa4d278, source: <https://gnosis.blockscout.com/tx/0xae0c74ec1686929184df97330fb9feb5829f0c3027e8dcd61d0ce602aaa4d278>, accessed 2026-01-14). The first activity on Avalanche C Chain can be viewed on 2021-07-23 (transaction hash: 0x693db1e0a6edf2ba7e4a804a3100c4f11bde5191dd49fd8ae077ebe9a0d97aac, source: <https://snowscan.xyz/tx/0x693db1e0a6edf2ba7e4a804a3100c4f11bde5191dd49fd8ae077ebe9a0d97aac>, accessed 2026-01-14). The first activity on Solana can be viewed on 2021-09-21 (transaction hash: 51UiWgioNAe4cQbWKmY3TNzDjDXRHRNRhKkdt58V6PqCGQA3Pux28iudQqSCdNtZVDk87MThgSexC7t8AVDaDYr, source: <https://solscan.io/tx/51UiWgioNAe4cQbWKmY3TNzDjDXRHRNRhKkdt58V6PqCGQA3Pux28iudQqSCdNtZVDk87MThgSexC7t8AVDaDYr>, accessed 2026-01-14).

According to public information available at <https://www.0xprotocol.org/>, 0x is an open, non-custodial protocol for decentralised exchange that provides shared liquidity infrastructure for decentralised applications. ZRX is an ERC-20 crypto-asset issued on the Ethereum blockchain as the native governance token of the 0x protocol, an open, non-custodial infrastructure for the decentralized exchange and settlement of tokenized assets.

The crypto-asset does not grant any legally enforceable or contractual rights or obligations to its holders or purchasers. Any functionalities accessible through the underlying technology are purely technical or operational in nature and do not confer rights comparable to ownership, profit participation, governance, or similar entitlements known from traditional financial instruments.

## **09. Information about the quality and quantity of goods or services to which the utility tokens give access and restrictions on the transferability**

As defined in Article 3(9) of Regulation (EU) 2023/1114 of the European Parliament and of the Council of 31 May 2023 on Markets in Crypto-Assets – amending Regulations (EU) No 1093/2010 and (EU) No 1095/2010 and Directives 2013/36/EU and (EU) 2019/1937 – a utility token is “a type of crypto-asset that is only intended to provide access to a good or a service supplied by its issuer”. This crypto-asset does not qualify as a utility token, as its intended use goes beyond providing access to a good or service supplied solely by the issuer.

## **10. Key information about the offer to the public or admission to trading**

Crypto Risk Metrics GmbH is seeking admission to trading on Payward Global Solutions LTD ("Kraken") platform in the European Union in accordance with Article 5 of Regulation (EU) 2023/1114 of the European Parliament and of the Council of 31 May 2023 on Markets in Crypto-Assets, and amending Regulations (EU) No 1093/2010 and (EU) No 1095/2010 and Directives 2013/36/EU and (EU) 2019/1937. The admission to trading is not accompanied by a public offer of the crypto-asset.

## Part A – Information about the offeror or the person seeking admission to trading

### A.1 Name

Crypto Risk Metrics GmbH is the person seeking admission to trading.

### A.2 Legal form

The legal form of Crypto Risk Metrics GmbH is 2HBR, which corresponds to "Gesellschaft mit beschränkter Haftung".

### A.3 Registered address

The registered address of Crypto Risk Metrics GmbH is Lange Reihe 73, 20099 Hamburg, Germany,  
federal state Hamburg.

### A.4 Head office

Crypto Risk Metrics GmbH has no head office.

### A.5 Registration date

Crypto Risk Metrics GmbH was registered on 2018-12-03.

### A.6 Legal entity identifier

The Legal Entity Identifier (LEI) of Crypto Risk Metrics GmbH is 39120077M9TG001FE242.

### A.7 Another identifier required pursuant to applicable national law

The national identifier of Crypto Risk Metrics GmbH is HRB 154488.

### A.8 Contact telephone number

+4915144974120

### A.9 E-mail address

info@crypto-risk-metrics.com

### A.10 Response time (Days)

Crypto Risk Metrics GmbH will respond to investor enquiries within 30 calendar days.

### A.11 Parent company

Crypto Risk Metrics GmbH has no parent company.

### A.12 Members of the management body

Identity	Function	Business Address
Tim Zölitz	Chairman	Lange Reihe 73, 20099 Hamburg, Germany

### **A.13 Business activity**

Crypto Risk Metrics GmbH is a technical service provider, which supports regulated entities in the fulfilment of their regulatory requirements. In this regard, Crypto Risk Metrics GmbH, among other services, acts as a data-provider for ESG data according to article 66 (5). Due to the regulations laid out in article 4 (7), 5 (4) and 66 (3) of the Regulation (EU) 2023/1114 of the European Parliament and of the Council of 31 May 2023 on markets in crypto-assets, and amending Regulations (EU) No 1093/2010 and (EU) No 1095/2010 and Directives 2013/36/EU and (EU) 2019/1937, Crypto Risk Metrics GmbH aims to provide central services for crypto-asset white papers.

### **A.14 Parent company business activity**

Crypto Risk Metrics GmbH does not have a parent company. Accordingly, no business activity of a parent company is to be reported in this section.

### **A.15 Newly established**

Crypto Risk Metrics GmbH has been established since 2018-12-03 and is therefore not newly established (i. e. more than three years).

### **A.16 Financial condition for the past three years**

Crypto Risk Metrics GmbH, founded in 2018 and based in Hamburg (HRB 154488), has undergone several strategic shifts in its business focus since incorporation. Due to these changes in business model and operational direction over time, the financial figures from earlier years are only comparable to a limited extent with the company's current commercial activities. The present business model – centred around regulatory technology and risk analytics in the context of the MiCAR framework – has been established progressively and can be realistically considered fully operational since approximately 2024.

The company's financial trajectory over the past three years reflects the transition from exploratory development toward market-ready product delivery. The profit and loss after tax for the last three financial years is as follows:

2024 (unaudited): negative EUR 50.891,81

2023 (unaudited): negative EUR 27.665,32

2022: EUR 104.283,00.

The profit in 2022 resulted primarily from legacy consulting activities, which were discontinued in the course of the company's repositioning.

The losses in 2023 and 2024 result from strategic investments in the development of proprietary software infrastructure, regulatory frameworks, and compliance technology for the MiCAR ecosystem. During those periods, no substantial commercial revenues were expected, as resources were directed toward preparing the platform for regulated market entry.

A fundamental repositioning of the company occurred in 2023 and especially in 2024, when the focus shifted toward providing risk management, regulatory reporting, and supervisory compliance solutions for financial institutions and crypto-asset service providers. This marked a material shift in business operations and monetisation strategy.

Based on the current business development in Q4 2025, revenues exceeding EUR 550,000 are expected for the fiscal year 2025, with an anticipated net profit of approximately EUR 100,000. These figures are neither audited nor based on a finalized annual financial statement; they are derived from the company's current pipeline, client development, and active commercial engagements. Accordingly, they are subject to future risks and market fluctuations.

With the regulatory environment now taking shape and the platform commercially validated, it is assumed that the effects of the strategic developments will continue to materialize in 2026. The company foresees further scalability of its technology and growing market demand for regulatory compliance tools in the European crypto-asset sector.

No public subsidies or governmental grants have been received to date; all operations have been financed through shareholder contributions and internally generated resources. Crypto Risk Metrics has never accepted any payments via Tokens from projects it has worked for and – due to the internal Conflicts of Interest Policy – never will.

#### **A.17 Financial condition since registration**

Not applicable. The company has been established for more than three years and its financial condition over the past three years is provided in Part A.16 above.

## **Part B – Information about the issuer, if different from the offeror or person seeking admission to trading**

### **B.1 Issuer different from offeror or person seeking admission to trading**

Yes, the issuer is different from the person seeking admission to trading.

### **B.2 Name**

Based on publicly available information (<https://www.0xprotocol.org/privacy-notice>, accessed on 2026-01-14) and the findings in the administrative order issued by the U.S. Commodity Futures Trading Commission (CFTC) (CFTC Docket No. 23-41), it is reasonable to conclude that ZeroEx, Inc. is the legal entity standing behind the 0x platform and, by extension, the ZRX crypto-asset. In the CFTC order, ZeroEx, Inc. is described as the developer and deployer of the 0x Protocol, the operator of the Matcha front-end, and the entity conducting the relevant business activity. Further support for identifying ZeroEx, Inc. as the entity behind the ZRX crypto-asset arises from the company's own employment and compensation disclosures. In current job postings (<http://archive.today/2025.11.12-180417/https://jobs.ashbyhq.com/0x/d886a556-4ff6-452a-a0b5-408d703ee7d6>, accessed 2026-01-14) published by 0x, the company explicitly states that compensation for employees may include ZRX tokens in addition to salary, equity, and benefits.

### **B.3 Legal form**

The legal form of ZeroEx, Inc. is XTIQ which corresponds to "Corporation".

**B4. Registered address**

c/o Incorporating Services, Ltd., 3500 S DuPont Hwy, Dover, DE 19901

United States,

Delaware

**B.5 Head office**

575 Market St Ste 2650, San Francisco, CA 94105

United States,

California

**B.6 Registration date**

ZeroEx, Inc. was registered on 2017-03-07.

**B.7 Legal entity identifier**

ZeroEx, Inc. has no Legal Entity Identifier (LEI).

**B.8 Another identifier required pursuant to applicable national law**

Delaware File Number: 6310999, California Document Number: 4002481

**B.9 Parent company**

ZeroEx, Inc. has no parent company. ZeroEx, Inc. appears to operate as an independent corporate entity.

**B.10 Members of the management body**

Identity	Function	Business Address
Will Warren	Chief Executive Officer	575 Market St Ste 2650, San Francisco, CA 94105

**B.11 Business activity**

According to public information, including the administrative order of the U.S. Commodity Futures Trading Commission (CFTC), ZeroEx, Inc. develops and operates the 0x Protocol, a blockchain-based digital asset trading infrastructure that enables users to trade digital assets on a peer-to-peer basis. The company also created and operated "Matcha" (<https://matcha.xyz/>), a front-end interface and decentralized-exchange aggregator that sources liquidity from market makers and unaffiliated third-party DEXs to facilitate token swaps. These activities position ZeroEx, Inc. as a technology provider offering decentralized-exchange infrastructure and related digital-asset trading services.

**B.12 Parent company business activity**

ZeroEx, Inc. does not have a parent company.

## **Part C – Information about the operator of the trading platform in cases where it draws up the crypto-asset white paper and information about other persons drawing the crypto-asset white paper pursuant to Article 6(1), second subparagraph, of Regulation (EU) 2023/1114**

### **C.1 Name**

Not applicable.

### **C.2 Legal form**

Not applicable.

### **C.3 Registered address**

Not applicable.

### **C.4 Head office**

Not applicable.

### **C.5 Registration date**

Not applicable.

### **C.6 Legal entity identifier**

Not applicable.

### **C.7 Another identifier required pursuant to applicable national law**

Not applicable.

### **C.8 Parent company**

Not applicable.

### **C.9 Reason for crypto-Asset white paper Preparation**

Not applicable.

### **C.10 Members of the Management body**

Not applicable.

### **C.11 Operator business activity**

Not applicable.

### **C.12 Parent company business activity**

Not applicable.

### **C.13 Other persons drawing up the crypto-asset white paper according to Article 6(1), second subparagraph, of Regulation (EU) 2023/1114**

Not applicable.

### **C.14 Reason for drawing the white paper by persons referred to in Article 6(1), second subparagraph, of Regulation (EU) 2023/1114**

Not applicable.

## **Part D – Information about the crypto-asset project**

### **D.1 Crypto-asset project name**

Long Name: "0x Protocol Token", Short Name: "ZRX" according to the Digital Token Identifier Foundation ([www.dtif.org](http://www.dtif.org), DTI see F.13, FFG DTI see F.14 as of 2026-01-14).

### **D.2 Crypto-assets name**

Long Name: "0x Protocol Token" according to the Digital Token Identifier Foundation ([www.dtif.org](http://www.dtif.org), DTI see F.13, FFG DTI see F.14 as of 2026-01-14).

### **D.3 Abbreviation**

Short Name: "ZRX" according to the Digital Token Identifier Foundation ([www.dtif.org](http://www.dtif.org), DTI see F.13, FFG DTI see F.14 as of 2026-01-14).

### **D.4 Crypto-asset project description**

According to public information available on the official websites (<https://0x.org>, <https://0xprotocol.org>) and third-party protocol descriptions, ZRX is an ERC-20 crypto-asset first issued on the Ethereum blockchain as the native governance token of the 0x protocol, an open, non-custodial infrastructure for the decentralized exchange and settlement of tokenized assets.

The protocol uses an “off-chain order relay, on-chain settlement” model: makers and takers create and sign trade orders off-chain, which are then broadcast and aggregated by independent third-party infrastructure providers (“relayers”). Only when a trade is actually executed is the corresponding transaction submitted to the blockchain, where the 0x smart contracts verify the signatures, enforce the terms of the order and atomically transfer the relevant crypto-assets between the counterparties.

In addition to the underlying protocol, 0x has created and operated “Matcha,” a web-based front end (<https://matcha.xyz/>) that uses the 0x Protocol to allow users to exchange digital assets. Matcha is presented as a decentralized exchange and DEX aggregator that aggregates price and liquidity information from multiple decentralized exchanges and market makers.

The project does not involve the granting of ownership, profit-participation rights, or legal claims against the project entity or its contributors. Instead, it centres on the creation of a technical environment in which the ZRX crypto-asset may serve as a governance and utility input for certain protocol processes. The long-term evolution of the 0x system, including the scope of available features, the decentralisation roadmap, validator-selection mechanisms, and the operational continuity of the infrastructure, may vary based on technical, economic, and regulatory considerations. All future developments remain subject to change.

## D.5 Details of all natural or legal persons involved in the implementation of the crypto-asset project

Type of person	Name of person	Business address of person	Domicile of company
Other person involved in implementation	Will Warren	Can not be found	Can not be found
Other person involved in implementation	Amir Bandeali	Can not be found	Can not be found
Other person involved in implementation	ZeroEx International Ltd	Floor 4, Willow House, Cricket Square, Grand Cayman, KY1-9010, KY	Cayman Islands
Other person involved in implementation	Zeroex Holdings, Inc.	300 Beale St, San Francisco, CA 94105	United States
Other person involved in implementation	ZeroEx Inc.	575 Market St Ste 2650, San Francisco, CA 94105	United States

## D.6 Utility Token Classification

As defined in Article 3(9) of Regulation (EU) 2023/1114 of the European Parliament and of the Council of 31 May 2023 on Markets in Crypto-Assets – amending Regulations (EU) No 1093/2010 and (EU) No 1095/2010 and Directives 2013/36/EU and (EU) 2019/1937 – a utility token is “a type of crypto-asset that is only intended to provide access to a good or a service supplied by its issuer”. This crypto-asset does not qualify as a utility token, as its intended use goes beyond providing access to a good or service supplied solely by the issuer.

## D.7 Key Features of Goods/Services for Utility Token Projects

As defined in Article 3(9) of Regulation (EU) 2023/1114 of the European Parliament and of the Council of 31 May 2023 on Markets in Crypto-Assets – amending Regulations (EU) No 1093/2010 and (EU) No 1095/2010 and Directives 2013/36/EU and (EU) 2019/1937 – a utility token is “a type of crypto-asset that is only intended to provide access to a good or a service supplied by its issuer”. This crypto-asset does not qualify as a utility token, as its intended use goes beyond providing access to a good or service supplied solely by the issuer.

## D.8 Plans for the token

This section provides an overview of the historical developments related to the ZRX crypto-asset and a description of planned or anticipated project milestones as publicly communicated. All forward-looking elements are subject to significant uncertainty. They do not constitute commitments, assurances, or guarantees, and may be modified, delayed, or discontinued at any time. The implementation of past milestones cannot be assumed to continue in the future, and future changes may have adverse effects for token holders.



There is no formally published fixed roadmap for the ZRX crypto-asset. Based on public information (source: <https://0x.org/> and <https://www.0xprotocol.org/>, accessed 2026-01-14) some changes to protocol were announced which had impact on the ZRX crypto-asset.

Past milestones:

- 0x Protocol v4 governance approval (2023-01-23): The 0x v4 governance vote was completed on 23 January 2023, with 2,362 ZRX holders using 11.6 million ZRX to approve v4 as the canonical 0x protocol, replacing v2 and v3 for ERC-20 trades and introducing improvements in gas efficiency, composability, and upgradability. (source: <https://paragraph.com/@zeroexprotocol/say-hello-to-0x-v4-2>, accessed 2026-01-14)

- On 22 July 2021, the first governance vote was initiated on Snapshot (source: <https://snapshot.org/#s:0xgov.eth/proposal/QmdcZAAcmNgM3R6CVY586G4sSoPwm6T3CS39DCQ4gPDPB4>, accessed 2026-01-14), marking the DAO's transition into community decision-making. This stage represented the first operational step toward progressive decentralisation of governance responsibilities within the 0x ecosystem.

- On 12 February 2021, 0x Labs announced (source: <https://forum.0xprotocol.org/t/introducing-the-0x-dao/731>, accessed 2026-01-14) the creation of the 0x DAO, establishing a community-governed treasury and introducing the initial bootstrap-delegate structure.

Future milestones:

- The 0x DAO is expected to advance beyond its initial treasury-only governance model toward broader responsibilities, including protocol-level parameter management and upgrade oversight. Planned improvements include updated governance tooling, more structured proposal processes, and potential adjustments to delegate participation. As these developments have not yet materialised, the transition toward a fully decentralised and consistently active governance framework remains a prospective objective.

Note: All future milestones are subject to significant uncertainty, including but not limited to technical feasibility, regulatory developments, market adoption, and community governance decisions. The project may modify, delay, or discontinue any of these initiatives at any time. Past performance or implementation does not guarantee future success, and changes may materially affect the value or utility of the ZRX token for holders.

## **D.9 Resource allocation**

Not applicable – no specific project-level resources beyond the issuer's general operations as described under D.4 have been identified or disclosed. This limits investors' ability to assess the funding and staffing dedicated specifically to this project.

## **D.10 Planned use of Collected funds or crypto-Assets**

Not applicable, as this white paper serves the purpose of admission to trading and is not associated with any fundraising activity for the crypto-asset project.

## **Part E – Information about the offer to the public of crypto-assets or their admission to trading**

### **E.1 Public offering or admission to trading**

Crypto Risk Metrics GmbH is the person seeking admission to trading.

### **E.2 Reasons for public offer or admission to trading**

The purpose of seeking admission to trading is to enable the crypto-asset to be listed on a regulated platform in accordance with the applicable provisions of Regulation (EU) 2023/1114 and Commission Implementing Regulation (EU) 2024/2984. The white paper has been drawn up to comply with the transparency requirements applicable to trading venues.

### **E.3 Fundraising target**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

### **E.4 Minimum subscription goals**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

### **E.5 Maximum subscription goals**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

### **E.6 Oversubscription acceptance**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

### **E.7 Oversubscription allocation**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

### **E.8 Issue price**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

### **E.9 Official currency or any other crypto-assets determining the issue price**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

### **E.10 Subscription fee**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

### **E.11 Offer price determination method**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

### **E.12 Total number of offered/traded crypto-assets**

The maximum supply of the crypto-asset is set at 1,000,000,000 ZRX units. Investors should note that changes in the effective supply – including sudden increases in circulating units or unexpected burns – may affect the token's price and liquidity. The effective amount of units available on the market depends on the number of units released by the issuer or other parties at any given time, as well as potential reductions through "burning." As a result, the circulating supply may differ from the total supply.

### **E.13 Targeted holders**

The admission of the crypto-asset to trading is open to all types of investors.

### **E.14 Holder restrictions**

Holder restrictions are subject to the rules applicable to the Crypto-Asset Service Provider, as well as to any additional restrictions such provider may impose.

### **E.15 Reimbursement notice**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

### **E.16 Refund mechanism**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

### **E.17 Refund timeline**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

### **E.18 Offer phases**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

### **E.19 Early purchase discount**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

## **E.20 Time-limited offer**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

## **E.21 Subscription period beginning**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

## **E.22 Subscription period end**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

## **E.23 Safeguarding arrangements for offered funds/crypto- Assets**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

## **E.24 Payment methods for crypto-asset purchase**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

## **E.25 Value transfer methods for reimbursement**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

## **E.26 Right of withdrawal**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

## **E.27 Transfer of purchased crypto-assets**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

## **E.28 Transfer time schedule**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

## **E.29 Purchaser's technical requirements**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

## **E.30 Crypto-asset service provider (CASP) name**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

### **E.31 CASP identifier**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

### **E.32 Placement form**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

### **E.33 Trading platforms name**

The admission to trading is sought on Payward Global Solutions LTD ("Kraken").

### **E.34 Trading platforms Market identifier code (MIC)**

The Market Identifier Code (MIC) of Payward Global Solutions LTD ("Kraken") is PGSL.

### **E.35 Trading platforms access**

The token is intended to be listed on the trading platform operated by Payward Global Solutions LTD ("Kraken"). Access to this platform depends on regional availability and user eligibility under Kraken's terms and conditions. Investors should consult Kraken's official documentation to determine whether they meet the requirements for account creation and token trading.

### **E.36 Involved costs**

The costs involved in accessing the trading platform depend on the specific fee structure and terms of the respective crypto-asset service provider. These may include trading fees, deposit or withdrawal charges, and network-related gas fees. Investors are advised to consult the applicable fee schedule of the chosen platform before engaging in trading activities.

### **E.37 Offer expenses**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

### **E.38 Conflicts of interest**

MiCAR-compliant crypto-asset service providers shall have strong measures in place in order to manage conflicts of interests. Due to the broad audience this white paper is addressing, potential investors should always check the conflicts-of-interest policy of their respective counterparty.

Crypto Risk Metrics GmbH has established, implemented, and documented comprehensive internal policies and procedures for the identification, prevention, management, and documentation of conflicts of interest in accordance with applicable regulatory requirements. These internal measures are actively applied within the organisation. For the purposes of this specific assessment and the crypto-asset covered by this white paper, a token-specific review has been conducted by Crypto Risk Metrics GmbH. Based on this individual review, no conflicts of interest relevant to this crypto-asset have been identified at the time of preparation of this white paper.

### **E.39 Applicable law**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

### **E.40 Competent court**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

## **Part F – Information about the crypto-assets**

### **F.1 Crypto-asset type**

The crypto-asset described in the white paper is classified as a crypto-asset under the Markets in Crypto-Assets Regulation (MiCAR) but does not qualify as an electronic money token (EMT) or an asset-referenced token (ART). It is a digital representation of value that can be stored and transferred using distributed ledger technology (DLT) or similar technology, without embodying or conferring any rights to its holder. The asset does not aim to maintain a stable value by referencing an official currency, a basket of assets, or any other underlying rights. Instead, its valuation is entirely market-driven, based on supply and demand dynamics, and not supported by a stabilization mechanism. It is neither pegged to any fiat currency nor backed by any external assets, distinguishing it clearly from EMTs and ARTs. Furthermore, the crypto-asset is not categorized as a financial instrument, deposit, insurance product, pension product, or any other regulated financial product under EU law. It does not grant financial rights, voting rights, or any contractual claims to its holders, ensuring that it remains outside the scope of regulatory frameworks applicable to traditional financial instruments.

### **F.2 Crypto-asset functionality**

The ZRX token is an ERC-20-compatible crypto-asset first issued on the Ethereum blockchain and designed as the native token of the 0x Protocol. ZRX provides holders with governance rights. According to the original protocol documentation, ZRX can also be used to pay protocol-level transaction fees to “relayers,” which host off-chain order books and facilitate liquidity discovery within the 0x ecosystem. No automatic rebasing, redemption mechanism, or claims on underlying assets exist, and the token does not grant rights to dividends, yields, or ownership interests. Beyond governance participation and optional fee payments within integrated applications, no additional on-chain functionalities are defined in the publicly available 0x documentation.

### **F.3 Planned application of functionalities**

Future milestones:

- The 0x DAO is expected to advance beyond its initial treasury-only governance model toward broader responsibilities, including protocol-level parameter management and upgrade oversight. Planned improvements include updated governance tooling, more structured proposal processes, and potential adjustments to delegate participation. As these developments have not yet materialised, the transition toward a fully decentralised and consistently active governance framework remains a prospective objective.

**A description of the characteristics of the crypto asset, including the data necessary for classification of the crypto-asset white paper in the register referred to in Article 109 of Regulation (EU) 2023/1114, as specified in accordance with paragraph 8 of that Article**

#### **F.4 Type of crypto-asset white paper**

The white paper type is "other crypto-assets" (i. e. "OTHR").

#### **F.5 The type of submission**

The type of submission is NEWT (New white paper).

#### **F.6 Crypto-asset characteristics**

The crypto-asset referred to herein is a crypto-asset other than EMTs and ARTs, and is available on the Ethereum, Gnosis Chain, Avalanche and Solana networks. The crypto-asset is fungible up to 18 digits after the decimal point and 8 digits on Solana after the decimal point. The tokens are a digital representation of value, and have neither inherent rights attached nor any intrinsic utility.

#### **F.7 Commercial name or trading name**

Long Name: "0x Protocol Token" according to the Digital Token Identifier Foundation ([www.dtif.org](http://www.dtif.org), DTI see F.13, FFG DTI see F.14 as of 2025-11-16).

#### **F.8 Website of the issuer**

<https://www.0xprotocol.org/>

#### **F.9 Starting date of offer to the public or admission to trading**

2026-02-17

#### **F.10 Publication date**

2026-02-17

#### **F.11 Any other services provided by the issuer**

It is not possible to exclude a possibility that the issuer of the crypto-asset provides or will provide other services not covered by Regulation (EU) 2023/1114 (i.e. MiCA).

#### **F.12 Language or languages of the crypto-asset white paper**

EN

#### **F.13 Digital token identifier code used to uniquely identify the crypto-asset or each of the several crypto assets to which the white paper relates**

J00HX4V8D, 35GRTLSHL, GRQRQJ7H6, GTQXFBH4H

#### **F.14 Functionally fungible group digital token identifier**

HX56HH1ZX

#### **F.15 Voluntary data flag**

Mandatory.

## **F.16 Personal data flag**

This white paper contains personal data as defined in Regulation (EU) 2016/679 (GDPR).

## **F.17 LEI eligibility**

The issuer should be eligible for a Legal Entity Identifier (LEI).

## **F.18 Home Member State**

Ireland

## **F.19 Host Member States**

Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden

# **Part G – Information on the rights and obligations attached to the crypto-assets**

## **G.1 Purchaser rights and obligations**

The crypto-asset does not grant any legally enforceable or contractual rights or obligations to its holders or purchasers.

Any functionalities accessible through the underlying technology are of a purely technical or operational nature and do not constitute rights comparable to ownership, profit participation, governance, or similar entitlements known from traditional financial instruments.

Accordingly, holders do not acquire any claim capable of legal enforcement against the issuer or any third party.

## **G.2 Exercise of rights and obligations**

As the crypto-asset does not establish any legally enforceable rights or obligations, there are no applicable procedures or conditions for their exercise.

Any interaction or functionality that may be available within the technical infrastructure of the project – such as participation mechanisms or protocol-level features – serves operational purposes only and does not create or constitute evidence of any contractual or statutory entitlement.

## **G.3 Conditions for modifications of rights and obligations**

As the crypto-asset does not confer any legally enforceable rights or obligations, there are no conditions or mechanisms under which such rights could be modified.

Adjustments to the technical protocol, smart contract logic, or related systems may occur in the ordinary course of development or maintenance.



Such changes do not alter the legal position of holders, as no contractual or regulatory rights exist. Holders should not interpret technical updates or governance-related changes as amendments to legally binding entitlements.

#### **G.4 Future public offers**

Information on the future offers to the public of crypto-assets were not available at the time of writing this white paper (2026-01-14).

#### **G.5 Issuer retained crypto-assets**

Publicly available but non-official historical sources (<https://www.bitstamp.net/en-gb/learn/cryptocurrency-guide/what-is-0x-zrx/>, accessed 2026-01-14) suggest that the ZRX token launched with a maximum supply of 1 billion tokens. Approximately 500 million ZRX (50%) were reportedly sold during the 2017 token sale. The remaining 50% is described in these unverified sources as follows: 15% for operational and development expenses, 15% for the 0x developer fund, 10% for the founding team, and 10% for early advisors and investors.

If the operational and development allocation (15%) and the founding-team allocation (10%) were considered issuer-related for the purpose of this section, this would represent 25% of the total supply, corresponding to 250 million ZRX out of 1 billion. However, this categorisation is hypothetical and not supported by official issuer disclosures.

No authoritative documents confirm these allocations or the actual balances held by any entity involved in the 0x project. All figures should therefore be treated as unconfirmed. The current token distribution can be traced on-chain: <https://etherscan.io/token/0xe41d2489571d322189246dafa5ebde1f4699f498#balances>

#### **G.6 Utility token classification**

No – the crypto-asset project does not concern utility tokens as defined in Article 3(9) of Regulation (EU) 2023/1114.

#### **G.7 Key features of goods/services of utility tokens**

Not applicable, as the crypto-asset described herein is not a utility token.

#### **G.8 Utility tokens redemption**

Not applicable, as the crypto-asset described herein is not a utility token.

#### **G.9 Non-trading request**

The admission to trading is sought.

#### **G.10 Crypto-assets purchase or sale modalities**

Not applicable, as this white paper is written to seek admission to trading, not for the initial offer to the public.

#### **G.11 Crypto-assets transfer restrictions**

The crypto-assets themselves are not subject to any technical or contractual transfer restrictions and are generally freely transferable. However, Crypto-Asset Service Providers may impose restrictions on buyers or sellers in accordance with applicable laws, internal policies or contractual terms agreed with their clients.

### **G.12 Supply adjustment protocols**

No – there are no fixed protocols that can increase or decrease the supply of the crypto-asset in response to changes in demand as of 2026-01-14.

However, it is possible to decrease the circulating supply by transferring crypto-assets to so-called "burn addresses". These are addresses from which the tokens are no longer intended to be transferred or accessed, effectively removing them from circulation.

### **G.13 Supply adjustment mechanisms**

For the crypto-asset in scope, the supply is limited to 1,000,000,000 units according to public information (Source: <https://etherscan.io/token/0xe41d2489571d322189246dafa5ebde1f4699f498>, accessed 2026-01-14). Investors should note that changes in the supply of the crypto-asset can have a negative impact.

### **G.14 Token value protection schemes**

No – the crypto-asset does not have any mechanisms or schemes in place that aim to stabilise or protect its market value. Its value is determined solely by market supply and demand, and may be subject to significant volatility.

### **G.15 Token value protection schemes description**

Not applicable, as the crypto-asset in scope does not have any value protection scheme in place.

### **G.16 Compensation schemes**

No – the crypto-asset does not have any compensation scheme.

### **G.17 Compensation schemes description**

Not applicable, as the crypto-asset in scope does not have any compensation scheme in place.

### **G.18 Applicable law**

This white paper is submitted in the context of an application for admission to trading on a trading platform established in the European Union. Accordingly, this white paper shall be governed by the laws of the Federal Republic of Germany.

### **G.19 Competent court**

Any disputes arising in relation to this white paper or the admission to trading may fall under the jurisdiction of the competent courts in Hamburg, Germany.

## Part H – information on the underlying technology

### H.1 Distributed ledger technology (DTL)

The crypto-asset in scope is implemented on the Ethereum, Gnosis Chain, Avalanche and Solana networks following the standards described below.

### H.2 Protocols and technical standards

The crypto-asset that is the subject of this white paper is available on multiple DLT networks. These include: Ethereum, Gnosis Chain, Avalanche and Solana. In general, when evaluating crypto-assets, all implementations across different networks must always be taken into account, as spillover effects can be adverse for investors.

The following applies to Ethereum:

#### 1. Network Protocols

The crypto-asset follows a decentralized, peer-to-peer (P2P) protocol where nodes communicate over the crypto-asset's DevP2P protocol using RLPx for data encoding.

- Transactions and smart contract execution are secured through Proof-of-Stake (PoS) consensus.
- Validators propose and attest blocks in Ethereum's Beacon Chain, finalized through Casper FFG.
- The Ethereum Virtual Machine (EVM) executes smart contracts using Turing-complete bytecode.

#### 2. Transaction and Address Standards

crypto-asset Address Format: 20-byte addresses derived from Keccak-256 hashing of public keys.

Transaction Types:

- Legacy Transactions (pre-EIP-1559)
- Type 0 (Pre-EIP-1559 transactions)
- Type 1 (EIP-2930: Access list transactions)
- Type 2 (EIP-1559: Dynamic fee transactions with base fee burning)

The Pectra upgrade introduces EIP-7702, a transformative improvement to account abstraction. This allows externally owned accounts (EOAs) to temporarily act as smart contract wallets during a

transaction. It provides significant flexibility, enabling functionality such as sponsored gas payments and batched operations without changing the underlying account model permanently.

### 3. Blockchain Data Structure & Block Standards

- the crypto-asset's blockchain consists of accounts, smart contracts, and storage states, maintained through Merkle Patricia Trees for efficient verification.

Each block contains:

- Block Header: Parent hash, state root, transactions root, receipts root, timestamp, gas limit, gas used, proposer signature.

- Transactions: Smart contract executions and token transfers.

- Block Size: No fixed limit; constrained by the gas limit per block (variable over time). In line with Ethereum's scalability roadmap, Pectra includes EIP-7691, which increases the maximum number of "blobs" (data chunks introduced with EIP-4844) per block. This change significantly boosts the data availability layer used by rollups, supporting cheaper and more efficient Layer 2 scalability.

### 4. Upgrade & Improvement Standards

Ethereum follows the Ethereum Improvement Proposal (EIP) process for upgrades.

The following applies to Gnosis Chain:

Gnosis is built on the Ethereum Virtual Machine (EVM) standard and supports standards like ERC-20 and ERC-721 token protocols. Smart contracts follow widely adopted Ethereum standards, ensuring interoperability with existing tools and dApps

The following applies to Avalanche:

Avalanche supports the Ethereum Virtual Machine on its C-Chain and implements standard token protocols such as ERC-20 and ERC-721 for compatibility. Its architecture also allows custom virtual machines via the Subnet framework.

The following applies to Solana:

The tokens were created with Solana's Token Program, a smart contract that is part of the Solana Program Library (SPL). Such tokens are commonly referred to as SPL-token. The token itself is not an additional smart contract, but what is called a data account on Solana. As the name suggests data accounts store data on the blockchain. However, unlike smart contracts, they cannot be executed and cannot perform any operations. Since one cannot interact with data accounts directly,

any interaction with an SPL-token is done via Solana's Token Program. The source code of this smart contract can be found here <https://github.com/solana-program/token>.

The Token Program is developed in Rust, a memory-safe, high-performance programming language designed for secure and efficient development. On Solana, Rust is said to be the primary language used for developing on-chain programs (smart contracts), intended to ensure safety and reliability in decentralized applications (dApps).

Core functions of the Token Program:

`initialize_mint()` → Create a new type of token, called a mint

`mint_to()` → Mints new tokens of a specific type to a specified account

`burn()` → Burns tokens from a specified account, reducing total supply

`transfer()` → Transfers tokens between accounts

`approve()` → Approves a delegate to spend tokens on behalf of the owner

`set_authority()` → Updates authorities (mint, freeze, or transfer authority)

These functions ensure basic operations like transfers, and minting/burning can be performed within the Solana ecosystem.

In addition to the Token Program, another smart contract, the Metaplex Token Metadata Program is commonly used to store name, symbol, and URI information for better ecosystem compatibility. This additional metadata has no effect on the token's functionality.

### **H.3 Technology used**

The crypto-asset that is the subject of this white paper is available on multiple DLT networks. These include: Ethereum, Gnosis Chain, Avalanche and Solana. In general, when evaluating crypto-assets, all implementations across different networks must always be taken into account, as spillover effects can be adverse for investors.

The following applies to Ethereum:

**Decentralized Ledger:** The Ethereum blockchain acts as a decentralized ledger for all token transactions, with the intention to preserving an unalterable record of token transfers and ownership to ensure both transparency and security.

**2. Private Key Management:** To safeguard their token holdings, users must securely store their wallet's private keys and recovery phrases.

3. Cryptographic Integrity: Ethereum employs elliptic curve cryptography to validate and execute transactions securely, intended to ensure the integrity of all transfers. The Keccak-256 (SHA-3 variant) Hashing Algorithm is used for hashing and address generation. The crypto-asset uses ECDSA with secp256k1 curve for key generation and digital signatures. Next to that, BLS (Boneh-Lynn-Shacham) signatures are used for validator aggregation in PoS.

The following applies to Gnosis:

Gnosis uses an Ethereum-compatible architecture focused on efficient governance and DAO applications. By employing Rollups and an energy-efficient infrastructure, scalability and transaction performance are enhanced.

The following applies to Avalanche:

Avalanche features a modular, multi-chain design enabling the creation of custom subnets, each with its own blockchain and rules, while intending to maintain high throughput and low latency.

The following applies to Solana:

1. Solana-Compatible Wallets: The tokens are supported by all wallets compatible with Solana's Token Program

2. Decentralized Ledger: The Solana blockchain acts as a decentralized ledger for all token transactions, with the intention to preserving an unalterable record of token transfers and ownership to ensure both transparency and security.

3. SPL Token Program: The SPL (Solana Program Library) Token Program is an inherent Solana smart contract built to create and manage new types of tokens (so called mints). This is significantly different from ERC-20 on Ethereum, because a single smart contract that is part of Solana's core functionality and as such is open source, is responsible for all the tokens. This ensures a high uniformity across tokens at the cost of flexibility.

4. Blockchain Scalability: With its intended capacity for processing a lot of transactions per second and in most cases low fees, Solana is intended to enable efficient token transactions, maintaining high performance even during peak network usage.

Security Protocols for Asset Custody and Transactions:

1. Private Key Management: To safeguard their token holdings, users must securely store their wallet's private keys and recovery phrases.

2. Cryptographic Integrity: Solana employs elliptic curve cryptography to validate and execute transactions securely, intended to ensure the integrity of all transfers.

## H.4 Consensus mechanism

The crypto-asset that is the subject of this white paper is available on multiple DLT networks. These include: Ethereum, Gnosis Chain, Avalanche and Solana. In general, when evaluating crypto-assets, all implementations across different networks must always be taken into account, as spillover effects can be adverse for investors.

The following applies to Ethereum:

The crypto-asset's Proof-of-Stake (PoS) consensus mechanism, introduced with The Merge in 2022, replaces mining with validator staking. Validators must stake at least 32 ETH every block a validator is randomly chosen to propose the next block. Once proposed the other validators verify the blocks integrity. The network operates on a slot and epoch system, where a new block is proposed every 12 seconds, and finalization occurs after two epochs (~12.8 minutes) using Casper-FFG. The Beacon Chain coordinates validators, while the fork-choice rule (LMD-GHOST) ensures the chain follows the heaviest accumulated validator votes. Validators earn rewards for proposing and verifying blocks, but face slashing for malicious behavior or inactivity. PoS aims to improve energy efficiency, security, and scalability, with future upgrades like Proto-Danksharding enhancing transaction efficiency.

The following applies to Gnosis:

Gnosis Chain employs a dual-layer structure to balance scalability and security, using Proof of Stake (PoS) for its core consensus and transaction finality. Core Components:

Two-Layer Structure Layer 1: Gnosis Beacon Chain The Gnosis Beacon Chain operates on a Proof of Stake (PoS) mechanism, acting as the security and consensus backbone. Validators stake GNO tokens on the Beacon Chain and validate transactions, ensuring network security and finality.

Layer 2: Gnosis xDai Chain Gnosis xDai Chain processes transactions and dApp interactions, providing high-speed, low-cost transactions. Layer 2 transaction data is finalized on the Gnosis Beacon Chain, creating an integrated framework where Layer 1 ensures security and finality, and Layer 2 enhances scalability. Validator Role and Staking Validators on the Gnosis Beacon Chain stake GNO tokens and participate in consensus by validating blocks. This setup ensures that validators have an economic interest in maintaining the security and integrity of both the Beacon Chain (Layer 1) and the xDai Chain (Layer 2). Cross-Layer Security Transactions on Layer 2 are ultimately finalized on Layer 1, providing security and finality to all activities on the Gnosis Chain. This architecture allows Gnosis Chain to combine the speed and cost efficiency of Layer 2 with the security guarantees of a PoS-secured Layer 1, making it suitable for both high-frequency applications and secure asset management.

The following applies to Avalanche:

Avalanche uses a Proof-of-Stake consensus mechanism built on the Snowball/Avalanche family of repeated sub-sampled voting protocols. Validators stake AVAX to participate and are queried in proportion to their stake. When evaluating a transaction or block, a validator samples a small subset of validators ( $k=20$ ), and if a quorum ( $\alpha=14$ ) returns the same preference, it updates its local preference. After receiving consistent quorum results for  $\beta=20$  consecutive rounds, the validator

finalizes the decision. This process provides fast and irreversible finality without relying on a longest-chain rule. Validators earn rewards for correct, responsive participation; Avalanche does not employ slashing, but unresponsive or incorrect validators lose eligibility for rewards.

The following applies to Solana:

Solana uses a combination of Proof of History (PoH) and Proof of Stake (PoS). The core concepts of the mechanism are intended to work as follows:

### Core Concepts

#### 1. Proof of History (PoH):

**Time-Stamped Transactions:** PoH is a cryptographic technique that timestamps transactions, intended to creating a historical record that proves that an event has occurred at a specific moment in time.

**Verifiable Delay Function:** PoH uses a Verifiable Delay Function (VDF) to generate a unique hash that includes the transaction and the time it was processed. This sequence of hashes provides a verifiable order of events, intended to enabling the network to efficiently agree on the sequence of transactions.

#### 2. Proof of Stake (PoS):

**Validator Selection:** Validators are chosen to produce new blocks based on the number of SOL tokens they have staked. The more tokens staked, the higher the chance of being

selected to validate transactions and produce new blocks.

**Delegation:** Token holders can delegate their SOL tokens to validators, earning rewards proportional to their stake while intended to enhancing the network's security.

### Consensus Process

#### 1. Transaction Validation:

Transactions are broadcasted to the network and collected by validators. Each transaction is validated to ensure it meets the network's criteria, such as having correct signatures and sufficient funds.

#### 2. PoH Sequence Generation:

A validator generates a sequence of hashes using PoH, each containing a timestamp and the previous hash. This process creates a historical record of transactions, establishing a



cryptographic clock for the network.

### 3. Block Production:

The network uses PoS to select a leader validator based on their stake. The leader is responsible for bundling the validated transactions into a block. The leader validator uses the PoH sequence to order transactions within the block, ensuring that all transactions are processed in the correct order.

### 4. Consensus and Finalization:

Other validators verify the block produced by the leader validator. They check the correctness of the PoH sequence and validate the transactions within the block. Once the block is verified, it is added to the blockchain. Validators sign off on the block, and it is considered finalized.

## Security and Economic Incentives

### 1. Incentives for Validators:

**Block Rewards:** Validators earn rewards for producing and validating blocks. These rewards are distributed in SOL tokens and are proportional to the validator's stake and performance.

**Transaction Fees:** Validators also earn transaction fees from the transactions included in the blocks they produce. These fees provide an additional incentive for validators to process transactions efficiently.

### 2. Security:

**Staking:** Validators must stake SOL tokens to participate in the consensus process. This staking acts as collateral, incentivizing validators to act honestly. If a validator behaves maliciously or fails to perform, they risk losing their staked tokens.

**Delegated Staking:** Token holders can delegate their SOL tokens to validators, intended to enhance network security and decentralization. Delegators share in the rewards and are incentivized to choose reliable validators.

### 3. Economic Penalties:

**Slashing:** Validators can be penalized for malicious behavior, such as double-signing or producing invalid blocks. This penalty, known as slashing, results in the loss of a portion of the staked tokens, discouraging dishonest actions.

## **H.5 Incentive mechanisms and applicable fees**

The crypto-asset that is the subject of this white paper is available on multiple DLT networks. These include: Ethereum, Gnosis Chain, Avalanche and Solana. In general, when evaluating crypto-assets, all implementations across different networks must always be taken into account, as spillover effects can be adverse for investors.

The following applies to Ethereum:

The crypto-asset's PoS system secures transactions through validator incentives and economic penalties. Validators stake at least 32 ETH and earn rewards for proposing blocks, attesting to valid ones, and participating in sync committees. Rewards are paid in newly issued ETH and transaction fees. Under EIP-1559, transaction fees consist of a base fee, which is burned to reduce supply, and an optional priority fee (tip) paid to validators. Validators face slashing if they act maliciously and incur penalties for inactivity. This system aims to increase security by aligning incentives while making the crypto-asset's fee structure more predictable and deflationary during high network activity.

The following applies to Gnosis:

Validators on Gnosis earn GNO rewards for validating transactions and securing the network. Transaction fees are used to compensate for network resources and maintain stability.

The following applies to Avalanche:

Avalanche rewards validators with AVAX tokens for staking and validation. Transaction fees vary across subnets and are partially burned to maintain scarcity.

The following applies to Solana:

#### 1. Validators:

**Staking Rewards:** Validators are chosen based on the number of SOL tokens they have staked. They earn rewards for producing and validating blocks, which are distributed in SOL. The more tokens staked, the higher the chances of being selected to validate transactions and produce new blocks.

**Transaction Fees:** Validators earn a portion of the transaction fees paid by users for the transactions they include in the blocks. This is intended to provide an additional financial incentive for validators to process transactions efficiently and maintain the network's integrity.

#### 2. Delegators:

**Delegated Staking:** Token holders who do not wish to run a validator node can delegate their SOL tokens to a validator. In return, delegators share the rewards earned by the validators. This is intended to encourage widespread participation in securing the network and ensures decentralization.

### 3. Economic Security:

**Slashing:** Validators can be penalized for malicious behavior, such as producing invalid blocks or being frequently offline. This penalty, known as slashing, involves the loss of a portion of their staked tokens. Slashing is intended to deter dishonest actions and ensures that validators act in the best interest of the network.

**Opportunity Cost:** By staking SOL tokens, validators and delegators lock up their tokens, which could otherwise be used or sold. This opportunity cost is intended to incentivize participants to act honestly to earn rewards and avoid penalties.

#### Fees Applicable on the Solana Blockchain

##### 1. Transaction Fees:

Solana is designed to handle a high throughput of transactions, which is intended to keep the fees low and predictable.

**Fee Structure:** Fees are paid in SOL and are used to compensate validators for the resources they expend to process transactions. This includes computational power and network bandwidth.

##### 2. Rent Fees:

**State Storage:** Solana charges so called "rent fees" for storing data on the blockchain. These fees are designed to discourage inefficient use of state storage and encourage developers to clean up unused state. Rent fees are intended to help maintain the efficiency and performance of the network.

##### 3. Smart Contract Fees:

**Execution Costs:** Similar to transaction fees, fees for deploying and interacting with smart contracts on Solana are based on the computational resources required. This is intended to ensure that users are charged proportionally for the resources they consume.

## **H.6 Use of distributed ledger technology**

No – DLT is not operated by the issuer, the offeror, the person seeking admission to trading, or any third-party acting on their behalf.

## **H.7 DLT functionality description**

Not applicable, as the DLT is not operated by the issuer, the offeror, the person seeking admission to trading, or any third-party acting on their behalf.

## H.8 Audit

As the term “technology” encompasses a broad range of components, it cannot be confirmed that all elements or aspects of the technology employed have undergone a comprehensive and systematic technical examination. Accordingly, the answer to whether an audit of the technology used has been conducted must be no. This white paper focuses primarily on risk-related aspects and therefore does not imply, nor should it be interpreted as implying, that a full assessment or audit of all technological elements has been conducted.

## H.9 Audit outcome

Not applicable, as no comprehensive audit of the technology used has been conducted or can be confirmed.

# Part I – Information on risks

## I.1 Offer-related risks

### 1. Regulatory and Compliance

Regulatory frameworks applicable to crypto-asset services in the European Union and in third countries are evolving. Supervisory authorities may introduce, interpret, or enforce rules that affect (i) the eligibility of this crypto-asset for admission to trading, (ii) the conditions under which a crypto-asset service provider may offer trading, custody, or transfer services for it, or (iii) the persons or jurisdictions to which such services may be provided. As a result, the crypto-asset service provider admitting this crypto-asset to trading may be required to suspend, restrict, or terminate trading or withdrawals for regulatory reasons, even if the crypto-asset itself continues to function on its underlying network.

### 2. Trading venue and connection risk

Trading in the crypto-asset depends on the uninterrupted operation of the trading platform admitting it and, where applicable, on its technical connections to external liquidity sources or venues. Interruptions such as system downtime, maintenance, faulty integrations, API changes, or failures at an external venue can temporarily prevent order placement, execution, deposits, or withdrawals, even when the underlying blockchain is functioning. In addition, trading platforms in emerging markets may operate under differing governance, compliance, and oversight standards, which can increase the risk of operational failures or disorderly market conditions.

### 3. Market formation and liquidity conditions

The price and tradability of the crypto-asset depend on actual trading activity on the venues to which the service provider is connected, whether centralized exchanges (CEXs) or decentralized exchanges (DEXs). Trading volumes may at times be low, order books thin, or liquidity concentrated on a single venue. In such conditions, buy or sell orders may not be executed in full or may be executed only at a less favorable price, resulting in slippage.

**Volatility:** The market price of the crypto-asset may fluctuate significantly over short periods, including for reasons that are not linked to changes in the underlying project or protocol. Periods of limited liquidity, shifts in overall market sentiment, or trading on only a small number of CEXs or DEXs can amplify these movements and lead to higher slippage when orders are executed. As a result, investors may be unable to sell the crypto-asset at or close to a previously observed price, even though no negative project-specific event has occurred.

#### 4. Counterparty and service-provider dependence

The admission of the crypto-asset to trading may rely on several external parties, such as connected centralized or decentralized trading venues, liquidity providers, brokers, custodians, or technical integrators. If any of these counterparties fail to perform, suspend their services, or apply internal restrictions, the trading, deposit, or withdrawal of the crypto-asset on the admitting service provider can be interrupted or halted.

**Quality of counterparties:** Trading venues and service providers in certain jurisdictions may operate under regulatory or supervisory standards that are lower or differently enforced than those applicable in the European Union. In such environments, deficiencies in governance, risk management, or compliance may remain undetected, which increases the probability of abrupt service interruptions, investigations, or forced wind-downs.

**Delisting and service suspension:** The crypto-asset's availability may depend on the internal listing decisions of these counterparties. A delisting or suspension on a key connected venue can materially reduce liquidity or make trading temporarily impossible on the admitting service provider, even if the underlying crypto-asset continues to function.

**Insolvency of counterparties:** If a counterparty involved in holding, routing, or settling the crypto-asset becomes insolvent, enters restructuring, or is otherwise subject to resolution-type measures, assets held or processed by that counterparty may be frozen, become temporarily unavailable, or be recoverable only in part or not at all, which can result in losses for clients whose positions were maintained through that counterparty. This risk applies in particular where client assets are held on an omnibus basis or where segregation is not fully recognized in the counterparty's jurisdiction.

#### 5. Operational and information risks

Due to the irrevocability of blockchain transactions, incorrect approvals or the use of wrong networks or addresses will typically make the transferred funds irrecoverable. Because trading may also rely on technical connections to other venues or service providers, downtime or faulty code in these connections can temporarily block trading, deposits, or withdrawals even when the underlying blockchain is functioning. In addition, different groups of market participants may have unequal access to technical, governance, or project-related information, which can lead to information asymmetry and place less informed investors at a disadvantage when making trading decisions.

#### 6. Market access and liquidity concentration risk

If the crypto-asset is only available on a limited number of trading platforms or through a single market-making entity, this may result in reduced liquidity, greater price volatility, or periods of inaccessibility for retail holders.

## **I.2 Issuer-related risks**

### **1. Insolvency of the issuer**

As with any commercial entity, the issuer may face insolvency risks. These may result from insufficient funding, low market interest, mismanagement, or external shocks (e.g. pandemics, wars). In such a case, ongoing development, support, and governance of the project may cease, potentially affecting the viability and tradability of the crypto-asset.

### **2. Legal and regulatory risks**

The issuer operates in a dynamic and evolving regulatory environment. Failure to comply with applicable laws or regulations in relevant jurisdictions may result in enforcement actions, penalties, or restrictions on the project's operations. These may negatively impact the crypto-asset's availability, market acceptance, or legal status.

### **3. Operational risks**

The issuer may fail to implement adequate internal controls, risk management, or governance processes. This can result in operational disruptions, financial losses, delays in updating the white paper, or reputational damage.

### **4. Governance and decision-making**

The issuer's management body is responsible for key strategic, operational, and disclosure decisions. Ineffective governance, delays in decision-making, or lack of resources may compromise the stability of the project and its compliance with MiCA requirements. High concentration of decision-making authority or changes in ownership/control can amplify these risks.

### **5. Reputational risks**

The issuer's reputation may be harmed by internal failures, external accusations, or association with illicit activity. Negative publicity can reduce trust in the issuer and impact the perceived legitimacy or value of the crypto-asset.

### **6. Counterparty dependence**

The issuer may depend on third-party providers for certain core functions, such as technology development, marketing, legal advice, or infrastructure. If these partners discontinue their services, change ownership, or underperform, the issuer's ability to operate the project or maintain investor

communication may be impaired. This could disrupt project continuity or undermine market confidence, ultimately affecting the crypto-asset's value.

### **I.3 Crypto-assets-related risks**

#### **1. Valuation risk**

The crypto-asset does not represent a claim, nor is it backed by physical assets or legal entitlements. Its market value is driven solely by supply and demand dynamics and may fluctuate significantly. In the absence of fundamental value anchors, such assets can lose their entire market value within a very short time. Historical market behaviour has shown that some types of crypto-assets – such as meme coins or purely speculative tokens – have become worthless. Investors should be aware that this crypto-asset may lose all of its value.

#### **2. Market volatility risk**

Crypto-asset prices can fluctuate sharply due to changes in market sentiment, macroeconomic conditions, regulatory developments, or technology trends. Such volatility may result in rapid and significant losses. Holders should be prepared for the possibility of losing the full amount invested.

#### **3. Liquidity and price-determination risk**

Low trading volumes, fragmented trading across venues, or the absence of active market makers can restrict the ability to buy or sell the crypto-asset. In such situations, it is not guaranteed that an observable market price will exist at all times. Spreads may widen materially, and orders may only be executable under unfavourable conditions, which can make liquidation costly or temporarily impossible.

#### **4. Asset security risk**

Loss or theft of private keys, unauthorised access to wallets, or failures of custodial or exchange service providers can result in the irreversible loss of assets. Because blockchain transactions are final, recovery of funds after a compromise is generally impossible.

#### **5. Fraud and scam risk**

The pseudonymous and irreversible nature of blockchain transactions can attract fraudulent schemes. Typical forms include fake or unauthorised crypto-assets imitating established ones, phishing attempts, deceptive airdrops, or social-engineering attacks. Investors should exercise caution and verify the authenticity of counterparties and information sources.

#### **6. Legal and regulatory reclassification risk**

Legislative or regulatory changes in the European Union or in the Member State where the crypto-asset is admitted to trading may alter its legal classification, permitted uses, or tradability. In third

countries, the crypto-asset may be treated as a financial instrument or security, which can restrict its offering, trading, or custody.

#### 7. Absence of investor protection

The crypto-asset is not covered by investor-compensation or deposit-guarantee schemes. In the event of loss, fraud, or insolvency of a service provider, holders may have no access to recourse mechanisms typically available in regulated financial markets.

#### 8. Counterparty risk

Reliance on third-party exchanges, custodians, or intermediaries exposes holders to operational failures, insolvency, or fraud of these parties. Investors should conduct due diligence on service providers, as their failure may lead to the partial or total loss of held assets.

#### 9. Reputational risk

Negative publicity related to security incidents, misuse of blockchain technology, or associations with illicit activity can damage public confidence and reduce the crypto-asset's market value.

#### 10. Community and sentiment risk

Because the crypto-asset's perceived relevance and expected future use depend largely on community engagement and the prevailing sentiment, a loss of public interest, negative coverage or reduced activity of key contributors can materially reduce market demand.

#### 11. Macroeconomic and interest-rate risk

Fluctuations in interest rates, exchange rates, general market conditions, or overall market volatility can influence investor sentiment towards digital assets and affect the crypto-asset's market value.

#### 12. Taxation risk

Tax treatment varies across jurisdictions. Holders are individually responsible for complying with all applicable tax laws, including the reporting and payment of taxes arising from the acquisition, holding, or disposal of the crypto-asset.

#### 13. Anti-money-laundering and counter-terrorist-financing risk

Wallet addresses or transactions connected to the crypto-asset may be linked to sanctioned or illicit activity. Regulatory responses to such findings may include transfer restrictions, report obligations, or the freezing of assets on certain venues.

#### 14. Market-abuse risk



Due to limited oversight and transparency, crypto-assets may be vulnerable to market-abuse practices such as spoofing, pump-and-dump schemes, or insider trading. Such activities can distort prices and expose holders to sudden losses.

#### 15. Legal ownership and jurisdictional risk

Depending on the applicable law, holders of the crypto-asset may not have enforceable ownership rights or effective legal remedies in cases of disputes, fraud, or service failure. In certain jurisdictions, access to exchanges or interfaces may be restricted by regulatory measures, even if on-chain transfer remains technically possible.

#### 16. Concentration risk

A large proportion of the total supply may be held by a small number of holders. This can enable market manipulation, governance dominance, or sudden large-scale liquidations that adversely affect market stability, price levels, and investor confidence.

### **I.4 Project implementation-related risks**

As this white paper relates to the admission to trading of the crypto-asset, the following risk description reflects general implementation risks on the crypto-asset service provider's side typically associated with crypto-asset projects. The party admitting the asset to trading is not involved in the project's implementation and does not assume responsibility for its governance, funding, or execution.

Delays, failures, or changes in the implementation of the project as outlined in its public roadmap or technical documentation may negatively impact the perceived credibility or usability of the crypto-asset. This includes risks related to project governance, resource allocation, technical delivery, and team continuity.

Key-person risk: The project may rely on a limited number of individuals for development, maintenance, or strategic direction. The departure, incapacity, or misalignment of these individuals may delay or derail the implementation.

Timeline and milestone risk: Project milestones may not be met as announced. Delays in feature releases, protocol upgrades, or external integrations can undermine market confidence and affect the adoption, use, or value of the crypto-asset.

Delivery risk: Even if implemented on time, certain functionalities or integrations may not perform as intended or may be scaled back during execution, limiting the token's practical utility.

### **I.5 Technology-related risks**

As this white paper relates to the admission to trading of the crypto-asset, the following risks concern the underlying distributed ledger technology (DLT), its supporting infrastructure, and

related technical dependencies. Failures or vulnerabilities in these systems may affect the availability, integrity, or transferability of the crypto-asset.

### 1. Blockchain dependency risk

The functionality of the crypto-asset depends on the continuous and stable operation of the blockchain(s) on which it is issued. Network congestion, outages, or protocol errors may temporarily or permanently disrupt on-chain transactions. Extended downtime or degradation in network performance can affect trading, settlement, or usability of the crypto-asset.

### 2. Smart contract vulnerability risk

The smart contract that defines the crypto-asset's parameters or governs its transfers may contain coding errors or security vulnerabilities. Exploitation of such weaknesses can result in unintended token minting, permanent loss of funds, or disruption of token functionality. Even after external audits, undetected vulnerabilities may persist due to the immutable nature of deployed code.

### 3. Wallet and key-management risk

The custody of crypto-assets relies on secure private key management. Loss, theft, or compromise of private keys results in irreversible loss of access. Custodians, trading venues, or wallet providers may be targeted by cyberattacks. Compatibility issues between wallet software and changes to the blockchain protocol (e.g. network upgrades) can further limit user access or the ability to transfer the crypto-asset.

Outdated or vulnerable wallet software:

Users relying on outdated, unaudited, or unsupported wallet software may face compatibility issues, security vulnerabilities, or failures when interacting with the blockchain. Failure to update wallet software in line with protocol developments can result in transaction errors, loss of access, or exposure to known exploits.

### 4. Network security risks

Attack Risks: Blockchains may be subject to denial-of-service (DoS) attacks, 51% attacks, or other exploits targeting the consensus mechanism. These can delay transactions, compromise finality, or disrupt the accurate recording of transfers.

Centralization Concerns: Despite claims of decentralisation, a relatively small number of validators or a high concentration of stake may increase the risk of collusion, censorship, or coordinated network downtime, which can affect the resilience and operational reliability of the crypto-asset.

### 5. Bridge and interoperability risk

Where tokens can be bridged or wrapped across multiple blockchains, vulnerabilities in bridge protocols, validator sets, or locking mechanisms may result in loss, duplication, or misrepresentation of assets. Exploits or technical failures in these systems can instantly impact circulating supply, ownership claims, or token fungibility across chains.

#### 6. Forking and protocol-upgrade risk

Network upgrades or disagreements among node operators or validators can result in blockchain “forks”, where the blockchain splits into two or more incompatible versions that continue separately from a shared past. This may lead to duplicate token representations or incompatibilities between exchanges and wallets. Until consensus stabilises, trading or transfers may be disrupted or misaligned. Such situations may be difficult for retail holders to navigate, particularly when trading platforms or wallets display inconsistent token information.

#### 7. Economic-layer and abstraction risk

Mechanisms such as gas relayers, wrapped tokens, or synthetic representations may alter the transaction economics of the underlying token. Changes in transaction costs, token demand, or utility may reduce its usage and weaken both its economic function and perceived value within its ecosystem.

#### 8. Spam and network-efficiency risk

High volumes of low-value (“dust”) or automated transactions may congest the network, slow validation times, inflate ledger size, and raise transaction costs. This can impair performance, reduce throughput, and expose address patterns to analysis, thereby reducing network efficiency and privacy.

#### 9. Front-end and access-interface risk

If users rely on centralised web interfaces or hosted wallets to interact with the blockchain, service outages, malicious compromises, or domain expiries affecting these interfaces may block access to the crypto-asset, even while the blockchain itself remains fully functional. Dependence on single web portals introduces a critical point of failure outside the DLT layer.

#### 10. Decentralisation claim risk

While the technical infrastructure may appear distributed, the actual governance or economic control of the project may lie with a small set of actors. This disconnect between marketing claims and structural reality can lead to regulatory scrutiny, reputational damage, or legal uncertainty – especially if the project is presented as ‘community-governed’ without substantiation.

### **I.6 Mitigation measures**

None.

## Part J – Information on the sustainability indicators in relation to adverse impact on the climate and other environment-related adverse impacts

### J.1 Adverse impacts on climate and other environment-related adverse impacts

#### S.1 Name

Crypto Risk Metrics GmbH

#### S.2 Relevant legal entity identifier

39120077M9TG001FE242

#### S.3 Name of the cryptoasset

0x Protocol Token

#### S.4 Consensus Mechanism

The crypto-asset that is the subject of this white paper is available on multiple DLT networks. These include: Ethereum, Gnosis Chain, Avalanche and Solana. In general, when evaluating crypto-assets, all implementations across different networks must always be taken into account, as spillover effects can be adverse for investors.

The following applies to Ethereum:

The crypto-asset's Proof-of-Stake (PoS) consensus mechanism, introduced with The Merge in 2022, replaces mining with validator staking. Validators must stake at least 32 ETH every block a validator is randomly chosen to propose the next block. Once proposed the other validators verify the blocks integrity. The network operates on a slot and epoch system, where a new block is proposed every 12 seconds, and finalization occurs after two epochs (~12.8 minutes) using Casper-FFG. The Beacon Chain coordinates validators, while the fork-choice rule (LMD-GHOST) ensures the chain follows the heaviest accumulated validator votes. Validators earn rewards for proposing and verifying blocks, but face slashing for malicious behavior or inactivity. PoS aims to improve energy efficiency, security, and scalability, with future upgrades like Proto-Danksharding enhancing transaction efficiency.

The following applies to Gnosis:

Gnosis Chain employs a dual-layer structure to balance scalability and security, using Proof of Stake (PoS) for its core consensus and transaction finality. Core Components:

Two-Layer Structure Layer 1: Gnosis Beacon Chain The Gnosis Beacon Chain operates on a Proof of Stake (PoS) mechanism, acting as the security and consensus backbone. Validators stake GNO tokens on the Beacon Chain and validate transactions, ensuring network security and finality.

Layer 2: Gnosis xDai Chain Gnosis xDai Chain processes transactions and dApp interactions, providing high-speed, low-cost transactions. Layer 2 transaction data is finalized on the Gnosis Beacon Chain, creating an integrated framework where Layer 1 ensures security and finality, and Layer 2 enhances scalability. Validator Role and Staking Validators on the Gnosis Beacon Chain stake GNO tokens and participate in consensus by validating blocks. This setup ensures that

validators have an economic interest in maintaining the security and integrity of both the Beacon Chain (Layer 1) and the xDai Chain (Layer 2). Cross-Layer Security Transactions on Layer 2 are ultimately finalized on Layer 1, providing security and finality to all activities on the Gnosis Chain. This architecture allows Gnosis Chain to combine the speed and cost efficiency of Layer 2 with the security guarantees of a PoS-secured Layer 1, making it suitable for both high-frequency applications and secure asset management.

The following applies to Avalanche:

Avalanche uses a Proof-of-Stake consensus mechanism built on the Snowball/Avalanche family of repeated sub-sampled voting protocols. Validators stake AVAX to participate and are queried in proportion to their stake. When evaluating a transaction or block, a validator samples a small subset of validators ( $k=20$ ), and if a quorum ( $\alpha=14$ ) returns the same preference, it updates its local preference. After receiving consistent quorum results for  $\beta=20$  consecutive rounds, the validator finalizes the decision. This process provides fast and irreversible finality without relying on a longest-chain rule. Validators earn rewards for correct, responsive participation; Avalanche does not employ slashing, but unresponsive or incorrect validators lose eligibility for rewards.

The following applies to Solana:

Solana uses a combination of Proof of History (PoH) and Proof of Stake (PoS). The core concepts of the mechanism are intended to work as follows:

#### Core Concepts

##### 1. Proof of History (PoH):

**Time-Stamped Transactions:** PoH is a cryptographic technique that timestamps transactions, intended to creating a historical record that proves that an event has occurred at a specific moment in time.

**Verifiable Delay Function:** PoH uses a Verifiable Delay Function (VDF) to generate a unique hash that includes the transaction and the time it was processed. This sequence of hashes provides a verifiable order of events, intended to enabling the network to efficiently agree on the sequence of transactions.

##### 2. Proof of Stake (PoS):

**Validator Selection:** Validators are chosen to produce new blocks based on the number of SOL tokens they have staked. The more tokens staked, the higher the chance of being

selected to validate transactions and produce new blocks.

**Delegation:** Token holders can delegate their SOL tokens to validators, earning rewards proportional to their stake while intended to enhancing the network's security.

## Consensus Process

### 1. Transaction Validation:

Transactions are broadcasted to the network and collected by validators. Each transaction is validated to ensure it meets the network's criteria, such as having correct signatures and sufficient funds.

### 2. PoH Sequence Generation:

A validator generates a sequence of hashes using PoH, each containing a timestamp and the previous hash. This process creates a historical record of transactions, establishing a

cryptographic clock for the network.

### 3. Block Production:

The network uses PoS to select a leader validator based on their stake. The leader is responsible for bundling the validated transactions into a block. The leader validator uses the PoH sequence to order transactions within the block, ensuring that all transactions are processed in the correct order.

### 4. Consensus and Finalization:

Other validators verify the block produced by the leader validator. They check the correctness of the PoH sequence and validate the transactions within the block. Once the block is verified, it is added to the blockchain. Validators sign off on the block, and it is considered finalized.

## Security and Economic Incentives

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**Block Rewards:** Validators earn rewards for producing and validating blocks. These rewards are distributed in SOL tokens and are proportional to the validator's stake and performance.

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**Staking:** Validators must stake SOL tokens to participate in the consensus process. This staking acts as collateral, incentivizing validators to act honestly. If a validator behaves maliciously or fails to perform, they risk losing their staked tokens.

Delegated Staking: Token holders can delegate their SOL tokens to validators, intended to enhance network security and decentralization. Delegators share in the rewards and are incentivized to choose reliable validators.

### 3. Economic Penalties:

Slashing: Validators can be penalized for malicious behavior, such as double-signing or producing invalid blocks. This penalty, known as slashing, results in the loss of a portion of the staked tokens, discouraging dishonest actions.

## **S.5 Incentive Mechanisms and Applicable Fees**

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The following applies to Gnosis:

Validators on Gnosis earn GNO rewards for validating transactions and securing the network. Transaction fees are used to compensate for network resources and maintain stability.

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Avalanche rewards validators with AVAX tokens for staking and validation. Transaction fees vary across subnets and are partially burned to maintain scarcity.

The following applies to Solana:

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**Staking Rewards:** Validators are chosen based on the number of SOL tokens they have staked. They earn rewards for producing and validating blocks, which are distributed in SOL. The more tokens staked, the higher the chances of being selected to validate transactions and produce new blocks.

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**Delegated Staking:** Token holders who do not wish to run a validator node can delegate their SOL tokens to a validator. In return, delegators share the rewards earned by the validators. This is intended to encourage widespread participation in securing the network and ensures decentralization.

## 3. Economic Security:

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**Opportunity Cost:** By staking SOL tokens, validators and delegators lock up their tokens, which could otherwise be used or sold. This opportunity cost is intended to incentivize participants to act honestly to earn rewards and avoid penalties.

## Fees Applicable on the Solana Blockchain

### 1. Transaction Fees:

Solana is designed to handle a high throughput of transactions, which is intended to keep the fees low and predictable.

**Fee Structure:** Fees are paid in SOL and are used to compensate validators for the resources they expend to process transactions. This includes computational power and network bandwidth.

### 2. Rent Fees:

**State Storage:** Solana charges so called "rent fees" for storing data on the blockchain. These fees are designed to discourage inefficient use of state storage and encourage developers to clean up unused state. Rent fees are intended to help maintain the efficiency and performance of the network.

### 3. Smart Contract Fees:



Execution Costs: Similar to transaction fees, fees for deploying and interacting with smart contracts on Solana are based on the computational resources required. This is intended to ensure that users are charged proportionally for the resources they consume.

## **S.6 Beginning of the period to which the disclosure relates**

2024-11-12

## **S.7 End of the period to which the disclosure relates**

2025-11-12

## **S.8 Energy consumption**

342.16493 kWh/a

## **S.9 Energy consumption sources and methodologies**

The energy consumption associated with this crypto-asset is aggregated of multiple contributing components, primarily the underlying blockchain network and the execution of token-specific operations. To determine the energy consumption of a token, the energy consumption of the underlying blockchain network Ethereum, Gnosis Chain, Avalanche and Solana is calculated first. A proportionate share of that energy use is then attributed to the token based on its activity level within the network (e.g. transaction volume, contract execution).

The Functionally Fungible Group Digital Token Identifier (FFG DTI) is used to determine all technically equivalent implementations of the crypto-asset in scope.

Estimates regarding hardware types, node distribution, and the number of network participants are based on informed assumptions, supported by best-effort verification against available empirical data. Unless robust evidence suggests otherwise, participants are assumed to act in an economically rational manner. In line with the precautionary principle, conservative estimates are applied where uncertainty exists – that is, estimates tend towards the higher end of potential environmental impact.

## **S.10 Renewable energy consumption**

29.6482907315 %

## **S.11 Energy intensity**

0.00004 kWh

## **S.12 Scope 1 DLT GHG emissions – Controlled**

0.00000 tCO<sub>2</sub>e/a

## **S.13 Scope 2 DLT GHG emissions – Purchased**

0.11388 tCO<sub>2</sub>e/a

## **S.14 GHG intensity**

0.00001 kgCO<sub>2</sub>e

## 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.

