

**White paper drafted under the
European Markets in Crypto-
Assets Regulation (EU)
2023/1114 for FFG X70FVW3GT**

Preamble

00. Table of Content

Preamble	2
01. Date of notification	8
02. Statement in accordance with Article 6(3) of Regulation (EU) 2023/1114	8
03. Compliance statement in accordance with Article 6(6) of Regulation (EU) 2023/1114	8
04. Statement in accordance with Article 6(5), points (a), (b), (c), of Regulation (EU) 2023/1114	8
05. Statement in accordance with Article 6(5), point (d), of Regulation (EU) 2023/1114	8
06. Statement in accordance with Article 6(5), points (e) and (f), of Regulation (EU) 2023/1114	8
Summary	8
07. Warning in accordance with Article 6(7), second subparagraph, of Regulation (EU) 2023/1114	8
08. Characteristics of the crypto-asset	8
09. Information about the quality and quantity of goods or services to which the utility tokens give access and restrictions on the transferability	9
10. Key information about the offer to the public or admission to trading	9
Part A – Information about the offeror or the person seeking admission to trading	10
A.1 Name	10
A.2 Legal form	10
A.3 Registered address	10
A.4 Head office	10
A.5 Registration date	10
A.6 Legal entity identifier	10
A.7 Another identifier required pursuant to applicable national law	10
A.8 Contact telephone number	10
A.9 E-mail address	10
A.10 Response time (Days)	10
A.11 Parent company	11
A.12 Members of the management body	11
A.13 Business activity	11
A.14 Parent company business activity	11
A.15 Newly established	11
A.16 Financial condition for the past three years	11
A.17 Financial condition since registration	12

Part B – Information about the issuer, if different from the offeror or person seeking admission to trading	12
B.1 Issuer different from offeror or person seeking admission to trading	12
B.2 Name	12
B.3 Legal form	12
B.4 Registered address	13
B.5 Head office	13
B.6 Registration date	13
B.7 Legal entity identifier	13
B.8 Another identifier required pursuant to applicable national law	13
B.9 Parent company	13
B.10 Members of the management body	13
B.11 Business activity	13
B.12 Parent company business activity	13
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	13
C.1 Name	13
C.2 Legal form	14
C.3 Registered address	14
C.4 Head office	14
C.5 Registration date	14
C.6 Legal entity identifier	14
C.7 Another identifier required pursuant to applicable national law	14
C.8 Parent company	14
C.9 Reason for crypto-Asset white paper Preparation	14
C.10 Members of the Management body	14
C.11 Operator business activity	14
C.12 Parent company business activity	14
C.13 Other persons drawing up the crypto-asset white paper according to Article 6(1), second subparagraph, of Regulation (EU) 2023/1114	14
C.14 Reason for drawing the white paper by persons referred to in Article 6(1), second subparagraph, of Regulation (EU) 2023/1114	14
Part D – Information about the crypto-asset project	15
D.1 Crypto-asset project name	15
D.2 Crypto-assets name	15
D.3 Abbreviation	15

D.4 Crypto-asset project description	15
D.5 Details of all natural or legal persons involved in the implementation of the crypto-asset project	16
D.6 Utility Token Classification	16
D.7 Key Features of Goods/Services for Utility Token Projects	16
D.8 Plans for the token	16
D.9 Resource allocation	18
D.10 Planned use of Collected funds or crypto-Assets	18
Part E – Information about the offer to the public of crypto-assets or their admission to trading	18
E.1 Public offering or admission to trading	18
E.2 Reasons for public offer or admission to trading	19
E.3 Fundraising target	19
E.4 Minimum subscription goals	19
E.5 Maximum subscription goals	19
E.6 Oversubscription acceptance	19
E.7 Oversubscription allocation	19
E.8 Issue price	19
E.9 Official currency or any other crypto-assets determining the issue price	19
E.10 Subscription fee	19
E.11 Offer price determination method	19
E.12 Total number of offered/traded crypto-assets	20
E.13 Targeted holders	20
E.14 Holder restrictions	20
E.15 Reimbursement notice	20
E.16 Refund mechanism	20
E.17 Refund timeline	20
E.18 Offer phases	20
E.19 Early purchase discount	20
E.20 Time-limited offer	20
E.21 Subscription period beginning	20
E.22 Subscription period end	21
E.23 Safeguarding arrangements for offered funds/crypto- Assets	21
E.24 Payment methods for crypto-asset purchase	21
E.25 Value transfer methods for reimbursement	21
E.26 Right of withdrawal	21
E.27 Transfer of purchased crypto-assets	21

E.28 Transfer time schedule	21
E.29 Purchaser's technical requirements	21
E.30 Crypto-asset service provider (CASP) name	21
E.31 CASP identifier	21
E.32 Placement form	21
E.33 Trading platforms name	22
E.34 Trading platforms Market identifier code (MIC)	22
E.35 Trading platforms access	22
E.36 Involved costs	22
E.37 Offer expenses	22
E.38 Conflicts of interest	22
E.39 Applicable law	22
E.40 Competent court	22
Part F – Information about the crypto-assets	23
F.1 Crypto-asset type	23
F.2 Crypto-asset functionality	23
F.3 Planned application of functionalities	24
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	24
F.4 Type of crypto-asset white paper	24
F.5 The type of submission	24
F.6 Crypto-asset characteristics	24
F.7 Commercial name or trading name	24
F.8 Website of the issuer	25
F.9 Starting date of offer to the public or admission to trading	25
F.10 Publication date	25
F.11 Any other services provided by the issuer	25
F.12 Language or languages of the crypto-asset white paper	25
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	25
F.14 Functionally fungible group digital token identifier	25
F.15 Voluntary data flag	25
F.16 Personal data flag	25
F.17 LEI eligibility	25
F.18 Home Member State	25
F.19 Host Member States	25

Part G – Information on the rights and obligations attached to the crypto-assets	26
G.1 Purchaser rights and obligations	26
G.2 Exercise of rights and obligations	26
G.3 Conditions for modifications of rights and obligations	26
G.4 Future public offers	26
G.5 Issuer retained crypto-assets	26
G.6 Utility token classification	27
G.7 Key features of goods/services of utility tokens	27
G.8 Utility tokens redemption	27
G.9 Non-trading request	27
G.10 Crypto-assets purchase or sale modalities	27
G.11 Crypto-assets transfer restrictions	27
G.12 Supply adjustment protocols	27
G.13 Supply adjustment mechanisms	27
G.14 Token value protection schemes	27
G.15 Token value protection schemes description	27
G.16 Compensation schemes	28
G.17 Compensation schemes description	28
G.18 Applicable law	28
G.19 Competent court	28
Part H – information on the underlying technology	28
H.1 Distributed ledger technology (DTL)	28
H.2 Protocols and technical standards	28
H.3 Technology used	30
H.4 Consensus mechanism	32
H.5 Incentive mechanisms and applicable fees	36
H.6 Use of distributed ledger technology	40
H.7 DLT functionality description	40
H.8 Audit	40
H.9 Audit outcome	40
Part I – Information on risks	40
I.1 Offer-related risks	40
I.2 Issuer-related risks	42
I.3 Crypto-assets-related risks	43
I.4 Project implementation-related risks	45
I.5 Technology-related risks	46

I.6 Mitigation measures	48
Part J – Information on the sustainability indicators in relation to adverse impact on the climate and other environment-related adverse impacts	48
J.1 Adverse impacts on climate and other environment-related adverse impacts	48
S.1 Name	48
S.2 Relevant legal entity identifier	48
S.3 Name of the cryptoasset	48
S.4 Consensus Mechanism	48
S.5 Incentive Mechanisms and Applicable Fees	51
S.6 Beginning of the period to which the disclosure relates	55
S.7 End of the period to which the disclosure relates	55
S.8 Energy consumption	55
S.9 Energy consumption sources and methodologies	55
S.10 Renewable energy consumption	56
S.11 Energy intensity	56
S.12 Scope 1 DLT GHG emissions – Controlled	56
S.13 Scope 2 DLT GHG emissions – Purchased	56
S.14 GHG intensity	56
S.15 Key energy sources and methodologies	56
S.16 Key GHG sources and methodologies	56

01. Date of notification

This white paper was notified on 2026-01-30.

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 Beam (BEAM) referred to in this white paper is a crypto-asset other than EMTs and ARTs, and is issued on multiple blockchain networks, namely Beam L1 (native), Ethereum, Binance Smart Chain and Avalanche C-Chain, as of 2026-01-26 and according to DTI FFG shown in F.14. While the original intended supply of BEAM was set at a maximum of 100,000,000,000 units, due to previous BEAM token migration events and significant token burns, the maximum supply was reduced to approximately 58,000,000,000 units according to official sources (<https://token.onbeam.com/>, accessed 2026-01-26). The first activity on BEAM L1 can be viewed on 2023-08-14 (block hash: 0x9e3b130f2b1ae7bba81149b4697d3fbe7b4652e48e1819da8ae6b49b524199ce, source: <https://subnets.avax.network/beam/block/1>, accessed 2026-01-26). The first activity on Ethereum can be viewed on 2023-10-16 (transaction hash: 0xba823abc07fb8875dcbf01e9443fdf371fe4e002dd41d4bf2306f09e38fcc600, source: <https://etherscan.io/tx/0xba823abc07fb8875dcbf01e9443fdf371fe4e002dd41d4bf2306f09e38fcc600>, accessed 2026-01-26). The first activity on Binance Smart Chain can be viewed on 2023-10-22 (transaction hash: 0x11139cc86989a66e5338b301301d8e17a1462c1a5a2528ae4396dcccac34041e, source: <https://bscscan.com/tx/0x11139cc86989a66e5338b301301d8e17a1462c1a5a2528ae4396dcccac34041e>, accessed 2026-01-26). The first activity on Avalanche C-Chain can be viewed on 2023-12-12 (transaction hash: 0x573100beb974e4c33d5d218217465f66d6d346d435d5a4b175b808b13a1001c1, source: <https://subnets.avax.network/c-chain/tx/0x573100beb974e4c33d5d218217465f66d6d346d435d5a4b175b808b13a1001c1>, accessed 2026-01-26).

Beam is a community-driven crypto-asset project focused on building and accelerating applications across gaming and other frontier technology sectors. The BEAM crypto-asset is natively issued on Beam L1, a blockchain network built using the Avalanche technology stack. Beam L1 operates as an Avalanche-based chain with its own validator set and execution environment and is compatible with the Ethereum Virtual Machine (EVM). As the native crypto-asset of Beam L1, BEAM is required to pay transaction fees and is used within protocol-defined mechanisms related to network operation and validation. Because the network is EVM-compatible, smart contracts can be deployed using standard Ethereum development tools and Solidity-based code.

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 of 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 that 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 Articles 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 MiCA 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 or 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 MiCA 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 finalised 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 materialise 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 with 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

The crypto-asset does not appear to be issued by a formal company or foundation as a legal entity. Instead, it follows a decentralised approach.

B.3 Legal form

Not applicable.

B.4 Registered address

Not applicable.

Not applicable.

Not applicable.

B.5 Head office

Not applicable.

Not applicable.

Not applicable.

B.6 Registration date

Not applicable, as the project follows a decentralised approach.

B.7 Legal entity identifier

Not applicable, as the project follows a decentralised approach.

B.8 Another identifier required pursuant to applicable national law

Not applicable.

B.9 Parent company

Not applicable.

B.10 Members of the management body

Identity	Function	Business Address
Not applicable	Not applicable	Not applicable

B.11 Business activity

Not applicable.

B.12 Parent company business activity

Not applicable.

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, as Crypto Risk Metrics GmbH is not a trading platform.

C.2 Legal form

Not applicable, as Crypto Risk Metrics GmbH is not a trading platform.

C.3 Registered address

Not applicable, as Crypto Risk Metrics GmbH is not a trading platform.

C.4 Head office

Not applicable, as Crypto Risk Metrics GmbH is not a trading platform.

C.5 Registration date

Not applicable, as Crypto Risk Metrics GmbH is not a trading platform.

C.6 Legal entity identifier

Not applicable, as Crypto Risk Metrics GmbH is not a trading platform.

C.7 Another identifier required pursuant to applicable national law

Not applicable, as Crypto Risk Metrics GmbH is not a trading platform.

C.8 Parent company

Not applicable, as Crypto Risk Metrics GmbH is not a trading platform.

C.9 Reason for crypto-Asset white paper Preparation

Not applicable, as Crypto Risk Metrics GmbH is not a trading platform.

C.10 Members of the Management body

Not applicable, as Crypto Risk Metrics GmbH is not a trading platform.

C.11 Operator business activity

Not applicable, as Crypto Risk Metrics GmbH is not a trading platform.

C.12 Parent company business activity

Not applicable, as Crypto Risk Metrics GmbH is not a trading platform.

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, as Crypto Risk Metrics GmbH is not a trading platform.

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, as Crypto Risk Metrics GmbH is not a trading platform.

Part D – Information about the crypto-asset project

D.1 Crypto-asset project name

Long Name: "Beam", Short Name: "BEAM" according to the Digital Token Identifier Foundation (www.dtif.org, DTI see F.13, FFG DTI see F.14 as of 2026-01-26).

D.2 Crypto-assets name

Long Name: "Beam" according to the Digital Token Identifier Foundation (www.dtif.org, DTI see F.13, FFG DTI see F.14 as of 2026-01-26).

D.3 Abbreviation

Short Name: "BEAM" according to the Digital Token Identifier Foundation (www.dtif.org, DTI see F.13, FFG DTI see F.14 as of 2026-01-26).

D.4 Crypto-asset project description

According to public information (source: <https://docs.onbeam.com/>, accessed 2026-01-26), the Beam project is a crypto-asset initiative concerned with the development and operation of a sovereign blockchain network and a broader ecosystem focused on the incubation, deployment, and coordination of decentralised applications across multiple technology domains. While the project originated in the gaming sector, its scope has expanded to include activities related to artificial intelligence, decentralised finance, trading infrastructure, real-world asset experimentation, venture initiatives, and interactive digital applications. The project represents the continuation and evolution of the ecosystem formerly operated under the Merit Circle DAO brand, following a governance-approved transition to the Beam identity.

The technical core of the project is the Beam Network, a sovereign blockchain built using the Avalanche technology stack and designed to operate as an independent Layer-1 distributed-ledger network. The network supports EVM-compatible smart contracts and is intended to enable high-throughput transaction processing with rapid finality, subject to network conditions and technical constraints. The Beam Network employs a proof-of-stake consensus model following its transition from an earlier permissioned architecture, allowing network participants to contribute to validation and network security through staking mechanisms, where and when such functionality is made available.

The BEAM crypto-asset functions as an element within this broader technical framework. It is intended to interact with specific components of the network's internal logic, including transaction fee payment, protocol-level governance processes, validator participation mechanisms, and selected on-chain coordination functions. In addition, BEAM may be used within certain ecosystem applications, such as digital asset marketplaces or protocol-specific systems, depending on implementation status and governance decisions. Certain functionalities, including staking configurations, validator requirements, fee-distribution parameters and token-burn mechanisms, remain subject to ongoing technical development and future governance determinations.

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 BEAM crypto-asset may serve as a governance and utility input for certain protocol processes. The long-term evolution of the Beam 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	Marco van den Heuvel	Can not be found	Can not be found
Other person involved in implementation	Tommy Quite	Can not be found	Can not be found
Other person involved in implementation	Thale Sonnemans	24, Al Sila Tower, Abu Dhabi Global Market Square, Al Maryah Island, Abu Dhabi, United Arab Emirates	United Arab Emirates
Other person involved in implementation	Beam Ventures Ltd.	24, Al Sila Tower, Abu Dhabi Global Market Square, Al Maryah Island, Abu Dhabi, United Arab Emirates	United Arab Emirates
Other person involved in implementation	Beam Interface	Can not be found	Cayman Islands
Other person involved in implementation	Beam Foundation	Harbour Place, 2nd Floor, 103 South Church Street, P.O. Box 472, George Town, Grand Cayman, KY1-1106, Cayman Islands	Cayman Islands

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 BEAM 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 multi-year roadmap for the BEAM crypto-asset. Based on public information (source: <https://medium.com/@onbeam>, accessed 2026-01-26), several protocol upgrades, ecosystem initiatives, and token-related developments have been communicated that affect the evolution of the Beam interoperability infrastructure and the role of the BEAM token.

Past milestones:

- Merit Circle DAO Foundation (September 2021): The Merit Circle DAO was founded following the rebranding of the Axie 420 Scholarship programme, establishing the initial organisational and governance framework.
- MC Token Issuance (November 2021): The original governance crypto-asset MC was issued following a seed funding round, supporting early ecosystem activities.
- Gaming and Scholarship Expansion (2021–2022): The project focused on play-to-earn scholarship programmes and strategic gaming-related partnerships.
- BEAM Token Migration Commencement (26-10-2023): The migration from MC to BEAM commenced following the approval of governance proposals MIP-28 and MIP-29.
- Beam Brand Adoption (December 2023): The community approved the transition from the Merit Circle name to the Beam brand.
- BEAM Migration Completion (26-10-2024): The 12-month migration period concluded, with approximately 98 percent of MC tokens converted to BEAM.
- Beam Foundation Establishment (31-10-2024): The Beam Foundation registered its governing documents, formalising governance, accountability, and oversight structures.
- Beam Ventures Structuring (Late 2025): Beam Ventures is expected to finalise its operational structure in Abu Dhabi and prepare for licensing.

Future milestones:

- Beam Ventures Accelerator Launch (2026): The Beam Ventures accelerator is expected to onboard its first participants and distribute initial funding.

- Strategic Roadmap Update (May 2026): A further update with more detailed action points for the year is expected to be released.

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 implementation or performance outcomes do not constitute an indication of future results, and any such changes may materially affect the characteristics, availability, or perceived value of the BEAM crypto-asset for its holders.

D.9 Resource allocation

Based on information from various third-party and industry sources, it is reported that the crypto-asset project associated with the BEAM token (formerly known as Merit Circle) has conducted multiple funding rounds involving private investors and venture capital firms.

According to publicly available announcements, on or around 7 October 2021, the project is reported to have completed an undisclosed private funding round, with an indicated amount of approximately USD 175,000. In addition, on or around 20 December 2023, DWF Labs announced an investment of approximately USD 250,000 in Beam Nodes, which is publicly described as an investment related to the Beam ecosystem.

Further third-party sources indicate that, under its former name Merit Circle, the project attracted multiple institutional and angel investors over time. Institutional investors referenced in public materials include, among others, DeFiance Capital, Maven 11, Framework Ventures, Inception Capital, and Digital Currency Group. Publicly available information further suggests that several angel investors also participated, although specific amounts and allocation details are not consistently disclosed.

However, all such information is derived exclusively from public announcements, portfolio disclosures, press releases, and third-party publications. The issuer, foundation, or entities associated with the BEAM crypto-asset have not independently confirmed the occurrence, precise amounts, valuation, legal structure, or contractual terms of these reported financing rounds. As a result, the referenced investment amounts, investor participation, and any implied cumulative funding figures cannot be independently verified and should be considered indicative only.

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

While the original intended supply of BEAM was set at a maximum of 100,000,000,000 units, due to previous BEAM token migration events and significant token burns, the maximum supply was reduced to approximately 58,000,000,000 units according to official sources (<https://token.onbeam.com/>, accessed 2026-01-26). 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

MiCA-compliant crypto-asset service providers shall have strong measures in place in order to manage conflicts of interest. 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 (MiCA) but is neither classified as an electronic money token (EMT) nor 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 governed by a stabilisation mechanism. It is neither pegged to any fiat currency nor backed by any external assets, thereby clearly distinguishing it from EMTs and ARTs.

Furthermore, the crypto-asset is not categorised 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

According to public information available in the official Beam project documentation (<https://docs.onbeam.com/>, accessed 2026-01-26), BEAM is the native crypto-asset of the BEAM blockchain and is intended to function as the primary on-chain economic and coordination mechanism within the BEAM ecosystem.

The BEAM crypto-asset functions as a technical component within the Beam Network and its associated protocol environment. It is used to support core network operations and interactions at the protocol level. BEAM is required for the payment of transaction fees on the Beam blockchain, including value transfers and smart-contract interactions. It may also be used in connection with staking mechanisms that contribute to network security and validator operations, subject to the technical rules and configurations of the protocol.

In addition, BEAM may be used to participate in protocol-level governance processes, such as proposing and voting on changes to technical parameters, validator configurations, or protocol upgrades. Any governance-related functionalities are limited to the technical operation and evolution of the protocol and do not confer rights related to the ownership, management, or assets of any legal entity.

The BEAM crypto-asset does not confer ownership, profit participation, governance rights in or over the issuer or any related entity, or any form of economic entitlement. All functionalities are technical in nature and relate exclusively to interactions within the Beam protocol environment. The actual usability of BEAM depends on factors such as system stability, smart-contract execution, development progress, governance decisions, and the operational conditions of the BEAM blockchain, which are outside the control of token holders.

F.3 Planned application of functionalities

Future milestones:

- Beam Ventures Accelerator Launch (2026): The Beam Ventures accelerator is expected to onboard its first participants and distribute initial funding.
- Strategic Roadmap Update (May 2026): A further update with more detailed action points for the year is expected to be released.

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 implementation or performance outcomes do not constitute an indication of future results, and any such changes may materially affect the characteristics, availability, or perceived value of the BEAM crypto-asset for its holders.

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 multiple networks. The crypto-asset is fungible up to 18 digits after the decimal point on Beam L1, Ethereum, Binance Smart Chain and Avalanche C-Chain. The crypto-asset constitutes a digital representation recorded on distributed-ledger technology and does not confer ownership, governance, profit participation, or any other legally enforceable rights. Any functionalities associated with the token are limited to potential technical features within the relevant platform environment. These functionalities do not represent contractual entitlements and may depend on future development decisions, technical design choices, and operational conditions. The crypto-asset does not embody intrinsic economic value; instead, its value, if any, is determined exclusively by market dynamics such as supply, demand, and liquidity in secondary markets.

F.7 Commercial name or trading name

Long Name: "Beam" according to the Digital Token Identifier Foundation (www.dtif.org, DTI see F.13, FFG DTI see F.14 as of 2026-01-26).

F.8 Website of the issuer

As no issuer is identified for the crypto-asset, there is no website of an issuer within the meaning of Regulation (EU) 2023/1114 (MiCA).

General, non-issuer-related information about the underlying project is made publicly available at: <https://onbeam.com/>.

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

2026-03-03

F.10 Publication date

2026-03-03

F.11 Any other services provided by the issuer

As no issuer is identified for the crypto-asset, it cannot be excluded that additional services exist or may be offered in the future outside the scope of Regulation (EU) 2023/1114.

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

LMHCZKNGJ, DKL80HPK3, HSFLNXG3J, PCM57R0JT

F.14 Functionally fungible group digital token identifier

X70FWW3GT

F.15 Voluntary data flag

This white paper has been submitted as mandatory under Regulation (EU) 2023/1114.

F.16 Personal data flag

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

F.17 LEI eligibility

LEI eligibility cannot be assessed, as the issuer cannot be identified as a legal person.

F.18 Home Member State

Germany

F.19 Host Member States

Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Greece, Hungary, Iceland, Ireland, 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 future offers to the public of crypto-assets was not available at the time of writing this white paper (2026-01-26).

G.5 Issuer retained crypto-assets

The crypto-asset does not appear to be issued by a formal company or foundation in the traditional sense. Instead, it follows a decentralised approach.

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 2026-01-26.

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 approximately 58,000,000,000 units according to official sources (<https://token.onbeam.com/>, accessed 2026-01-26). 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 Beam L1 blockchain, Avalanche C-Chain, Ethereum and Binance Smart Chain networks following the standards described below.

H.2 Protocols and technical standards

The crypto-asset in scope is implemented on the Beam L1 blockchain, Avalanche C-Chain, Ethereum and Binance Smart Chain networks following the standards described below.

The following applies to Beam L1:

Beam Network is an open-source, permissionless and sovereign blockchain network built using the Avalanche tech stack and designed to be fully EVM-compatible.

1. Core network protocols and node software

Peer-to-peer validator network: Beam is operated by a distributed set of validator nodes (“Beam Nodes”) that collectively process transactions and add blocks to the ledger.

Avalanche/Snowman foundation: Beam leverages the Avalanche-family consensus stack (Snowman for linear chains).

2. Smart contract execution and developer standards

Execution environment: Beam uses the Ethereum Virtual Machine (EVM), enabling Solidity-based smart contracts and compatibility with mainstream Ethereum tooling (wallets, libraries, deployment tooling, etc.).

Account abstraction (smart accounts): Beam supports account abstraction aligned with EIP-4337, enabling smart contract wallets and advanced user flows.

3. Upgrades and improvement processes

Governance proposals and voting: Beam documents a formal governance proposal lifecycle that includes a discussion period on the Governance Forum and voting.

The following applies to Avalanche C-Chain:

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 Ethereum:

The crypto-asset operates on a well-defined set of protocols and technical standards that are intended to ensure its security, decentralization, and functionality. Below are some of the key ones:

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 Binance Smart Chain:

Binance Smart Chain (BSC) is a Layer-1 blockchain that utilizes a Proof-of-Staked Authority (PoSA) consensus mechanism. This mechanism combines elements of Proof-of-Authority (PoA) and Proof-of-Stake (PoS) and is intended to secure the network and validate transactions. In PoSA, validators are selected based on their stake and authority, with the goal of providing fast transaction times and low fees while maintaining network security through staking.

H.3 Technology used

The crypto-asset in scope is implemented on the Beam L1 blockchain, Avalanche C-Chain, Ethereum and Binance Smart Chain networks following the standards described below.

The following applies to Beam L1:

Beam Network provides an EVM-compatible, account-based distributed ledger for recording transactions and smart contract state transitions, intended to provide an auditable and tamper-resistant record of on-chain activity.

1. Decentralized ledger and on-chain recordkeeping

Ledger model: Beam follows the EVM account/state model (similar to Ethereum), where balances, smart contracts, and storage are maintained as part of the chain's evolving state.

Block production and validation: Transactions are included in blocks produced and validated by Beam Nodes operating under the network's proof-of-stake security model introduced via the Horizon upgrade.

2. Wallet support and user custody expectations

EVM wallet compatibility: Users can connect using standard Ethereum-compatible wallets.

Smart accounts / account abstraction options: Beam highlights account abstraction (EIP-4337-aligned) and smart contract wallet patterns that can enable features like social recovery and configurable user/developer control models for account management.

3. Transaction integrity and network access infrastructure

Transaction authorization: Transactions are authorized by cryptographic signatures (EOAs) or smart-contract validation logic (smart accounts), and are then executed in the EVM once included by the validator set.

The following applies to Avalanche C-Chain:

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 Ethereum:

1. 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 Binance Smart Chain:

1. BSC-Compatible Wallets

Tokens on BSC are supported by wallets compatible with the Ethereum Virtual Machine (EVM), such as MetaMask. These wallets can be configured to connect to the BSC network and are designed to interact with BSC using standard Web3 interfaces.

2. Ledger

BSC maintains its own decentralized ledger for recording token transactions. This ledger is intended to ensure transparency and security, providing a verifiable record of all activities on the network.

3. BEP-20 Token Standard

BSC supports tokens implemented under the BEP-20 standard, which is tailored for the BSC ecosystem. This standard is designed to facilitate the creation and management of tokens on the network.

4. Scalability and Transaction Efficiency

BSC is designed to handle high volumes of transactions with low fees. It leverages its PoSA consensus mechanism to achieve fast transaction times and efficient network performance, making it suitable for applications requiring high throughput.

H.4 Consensus mechanism

The crypto-asset in scope is implemented on the Beam L1 blockchain, Avalanche C-Chain, Ethereum and Binance Smart Chain networks following the standards described below.

The following applies to Beam L1:

Beam Network's consensus is designed to combine Avalanche-family fast-finality consensus (Snowman) with a permissionless proof-of-stake validator set (Beam Nodes) introduced through the Horizon upgrade.

1. Consensus algorithm and finality model

Snowman (Avalanche-family) consensus: Snowman is a linear-chain consensus protocol intended to deliver high throughput, low latency and sub-second immutable finality, using repeated randomized sub-sampled voting among validators (configurable quorum/decision thresholds).

2. Validator roles (Beam Nodes) and permissionless participation

Validators: Beam Nodes are validator nodes that process transactions, validate and add new blocks, and are intended to ensure data availability and network security under proof-of-stake.

Permissionless validation after Horizon: Beam documentation describes Horizon as transforming the network into a permissionless PoS Layer 1, enabling broader participation in validation through staking and delegation.

3. Staking requirements, delegation, and node token mechanics

Validator requirements: To run a Beam Node, validators must stake at least 20,000 BEAM and hold/stake at least 1 Node Token (ERC-721).

Delegation: Users who do not operate infrastructure can delegate stake to validators and participate indirectly in network security and rewards. Beam documentation states that the validator does not have custody of delegated tokens and that they can be unstaked.

Node Token specifics: Node Tokens are ERC-721 NFTs with an unlimited supply, and Beam documentation allows staking up to 1,000 Node Tokens per Beam Node.

4. Operational coordination, quorum, and penalties

Quorum-driven validator measurements: Beam's reward calculation process includes querying validators for uptime and reaching agreement via a 67%+ quorum of nodes before rewards are finalized.

Slashing concept (reward-based): Beam's "slashing" documentation focuses on reward reductions if a validator fails uptime requirements or is flagged as malicious/dishonest; the key metric is uptime over an epoch, with full rewards at $\geq 80\%$ uptime and a linear reduction below 80%.

The following applies to Avalanche C-Chain:

The Avalanche blockchain network employs a unique Proof-of-Stake consensus mechanism called Avalanche Consensus, which involves three interconnected protocols: Snowball, Snowflake, and Avalanche.

Avalanche Consensus Process:

1. Snowball Protocol:

- Random Sampling: Each validator randomly samples a small, constant-sized subset of other validators.
- Repeated Polling: Validators repeatedly poll the sampled validators to determine the preferred transaction.
- Confidence Counters: Validators maintain confidence counters for each transaction, incrementing them each time a sampled validator supports their preferred transaction.
- Decision Threshold: Once the confidence counter exceeds a pre-defined threshold, the transaction is considered accepted.

2. Snowflake Protocol:

- Binary Decision: Enhances the Snowball protocol by incorporating a binary decision process. Validators decide between two conflicting transactions.
- Binary Confidence: Confidence counters are used to track the preferred binary decision.
- Finality: When a binary decision reaches a certain confidence level, it becomes final.

3. Avalanche Protocol:

- DAG Structure: Uses a Directed Acyclic Graph (DAG) structure to organize transactions, allowing for parallel processing and higher throughput.
- Transaction Ordering: Transactions are added to the DAG based on their dependencies, ensuring a consistent order.
- Consensus on DAG: While most Proof-of-Stake Protocols use a Byzantine Fault Tolerant (BFT) consensus, Avalanche uses the Avalanche Consensus, Validators reach consensus on the structure and contents of the DAG through repeated Snowball and Snowflake.

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 Binance Smart Chain:

Binance Smart Chain (BSC) uses a hybrid consensus mechanism called Proof of Staked Authority (PoSA), which combines elements of Delegated Proof of Stake (DPoS) and Proof of Authority (PoA). This method ensures fast block times and low fees while maintaining a level of decentralization and security.

Core Components

1. Validators (so-called "Cabinet Members"): Validators on BSC are responsible for producing new blocks, validating transactions, and maintaining the network's security. To become a validator, an entity must stake a significant amount of BNB (Binance Coin). Validators are selected through staking and voting by token holders. There are 21 active validators at any given time, rotating to ensure decentralization and security.

2. Delegators: Token holders who do not wish to run validator nodes can delegate their BNB tokens to validators. This delegation helps validators increase their stake and improves their chances of being selected to produce blocks. Delegators earn a share of the rewards that validators receive, incentivizing broad participation in network security.

3. Candidates: Candidates are nodes that have staked the required amount of BNB and are in the pool waiting to become validators. They are essentially potential validators who are not currently active but can be elected to the validator set through community voting. Candidates play a crucial role in ensuring there is always a sufficient pool of nodes ready to take on validation tasks, thus maintaining network resilience and decentralization.

Consensus Process

4. Validator Selection: Validators are chosen based on the amount of BNB staked and votes received from delegators. The more BNB staked and votes received, the higher the chance of being selected to validate transactions and produce new blocks. The selection process involves both the current validators and the pool of candidates, ensuring a dynamic and secure rotation of nodes.

5. Block Production: The selected validators take turns producing blocks in a PoA-like manner, ensuring that blocks are generated quickly and efficiently. Validators validate transactions, add them to new blocks, and broadcast these blocks to the network.

6. Transaction Finality: BSC achieves fast block times of around 3 seconds and quick transaction finality. This is achieved through the efficient PoSA mechanism that allows validators to rapidly reach consensus. Security and Economic Incentives

7. Staking: Validators are required to stake a substantial amount of BNB, which acts as collateral to ensure their honest behavior. This staked amount can be slashed if validators act maliciously. Staking incentivizes validators to act in the network's best interest to avoid losing their staked BNB.

8. Delegation and Rewards: Delegators earn rewards proportional to their stake in validators. This incentivizes them to choose reliable validators and participate in the network's security. Validators and delegators share transaction fees as rewards, which provides continuous economic incentives to maintain network security and performance.

9. Transaction Fees: BSC employs low transaction fees, paid in BNB, making it cost-effective for users. These fees are collected by validators as part of their rewards, further incentivizing them to validate transactions accurately and efficiently.

H.5 Incentive mechanisms and applicable fees

The crypto-asset in scope is implemented on the Beam L1 blockchain, Avalanche C-Chain, Ethereum and Binance Smart Chain networks following the standards described below.

The following applies to Beam L1:

BEAM is the ecosystem's native token and is used as the network gas token, for validation/delegation, and for governance. Token supply and incentive design are intended to align network security (validators/delegators) with ecosystem activity (transaction fees and broader protocol incentives).

1. Transaction fees (gas) and who can pay them

Gas fees paid in BEAM: Transactions and smart contract interactions require gas fees paid in BEAM.

Gas management via account abstraction: With account abstraction (EIP-4337-aligned), applications can implement flows where the developer (via infrastructure such as paymasters) can manage or sponsor gas to create smoother user experiences.

2. Validator and delegator reward streams

Source and collection: Primary rewards are derived from network gas fees, which are collected into a rewards contract.

Distribution logic: Rewards are allocated based on (i) achieving quorum agreement on uptime, (ii) stake weight (validator + delegators), and (iii) validator commission settings (validator share vs delegator share).

3. Reward timing, epochs, and claimability

Epoch schedule: Rewards are distributed in epochs of exactly 2,629,746 seconds (~30.44 days)

Verification buffer: After each epoch, Beam documents a 7-day period for uptime proof submission, reward calculation, and distribution; rewards then become claimable via the delegation dashboard.

4. Deflationary mechanisms and fee burns

General burn capability: Beam documents that BEAM can be burned by sending it to burn contracts, reducing circulating and maximum total supply; protocol fees may be configured to direct a portion to burn contracts.

Node Token-related burns: All BEAM used for Node Token minting is sent to a burner contract.

5. Performance penalties: Uptime is queried and agreed via quorum; nodes with 80%+ uptime receive full rewards, and nodes below 80% face a linear reduction in rewards.

The following applies to Avalanche C-Chain:

Avalanche uses a consensus mechanism known as Avalanche Consensus, which relies on a combination of validators, staking, and a novel approach to consensus to ensure the network's security and integrity.

1. Validators:

- Staking: Validators on the Avalanche network are required to stake AVAX tokens. The amount staked influences their probability of being selected to propose or validate new blocks.

- Rewards: Validators earn rewards for their participation in the consensus process. These rewards are proportional to the amount of AVAX staked and their uptime and performance in validating transactions.

- Delegation: Validators can also accept delegations from other token holders. Delegators share in the rewards based on the amount they delegate, which incentivizes smaller holders to participate indirectly in securing the network.

2. Economic Incentives:

- Block Rewards: Validators receive block rewards for proposing and validating blocks. These rewards are distributed from the network's inflationary issuance of AVAX tokens.

- Transaction Fees: Validators also earn a portion of the transaction fees paid by users. This includes fees for simple transactions, smart contract interactions, and the creation of new assets on the network.

3. Penalties:

- Slashing: Unlike some other PoS systems, Avalanche does not employ slashing (i.e., the confiscation of staked tokens) as a penalty for misbehavior. Instead, the network relies on the

financial disincentive of lost future rewards for validators who are not consistently online or act maliciously.

- Uptime Requirements: Validators must maintain a high level of uptime and correctly validate transactions to continue earning rewards. Poor performance or malicious actions result in missed rewards, providing a strong economic incentive to act honestly.

Fees on the Avalanche Blockchain

1. Transaction Fees:

- Dynamic Fees: Transaction fees on Avalanche are dynamic, varying based on network demand and the complexity of the transactions. This ensures that fees remain fair and proportional to the network's usage.

- Fee Burning: A portion of the transaction fees is burned, permanently removing them from circulation. This deflationary mechanism helps to balance the inflation from block rewards and incentivizes token holders by potentially increasing the value of AVAX over time.

2. Smart Contract Fees:

- Execution Costs: Fees for deploying and interacting with smart contracts are determined by the computational resources required. These fees ensure that the network remains efficient and that resources are used responsibly.

3. Asset Creation Fees:

- New Asset Creation: There are fees associated with creating new assets (tokens) on the Avalanche network. These fees help to prevent spam and ensure that only serious projects use the network's resources.

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 Binance Smart Chain:

Binance Smart Chain (BSC) uses the Proof of Staked Authority (PoSA) consensus mechanism to ensure network security and incentivize participation from validators and delegators.

Incentive Mechanisms

1. Validators: Staking Rewards: Validators must stake a significant amount of BNB to participate in the consensus process. They earn rewards in the form of transaction fees and block rewards. Selection Process: Validators are selected based on the amount of BNB staked and the votes received from delegators. The more BNB staked and votes received, the higher the chances of being selected to validate transactions and produce new blocks.

2. Delegators: Delegated Staking: Token holders can delegate their BNB to validators. This delegation increases the validator's total stake and improves their chances of being selected to produce blocks. Shared Rewards: Delegators earn a portion of the rewards that validators receive. This incentivizes token holders to participate in the network's security and decentralization by choosing reliable validators.

3. Candidates: Pool of Potential Validators: Candidates are nodes that have staked the required amount of BNB and are waiting to become active validators. They ensure that there is always a sufficient pool of nodes ready to take on validation tasks, maintaining network resilience.

4. Economic Security: Slashing: Validators can be penalized for malicious behavior or failure to perform their duties. Penalties include slashing a portion of their staked tokens, ensuring that validators act in the best interest of the network. Opportunity Cost: Staking requires validators and delegators to lock up their BNB tokens, providing an economic incentive to act honestly to avoid losing their staked assets. Fees on the Binance Smart Chain

5. Transaction Fees: Low Fees: BSC is known for its low transaction fees compared to other blockchain networks. These fees are paid in BNB and are essential for maintaining network operations and compensating validators. Dynamic Fee Structure: Transaction fees can vary based on network congestion and the complexity of the transactions. However, BSC ensures that fees remain significantly lower than those on the Ethereum mainnet.

6. Block Rewards: Incentivizing Validators: Validators earn block rewards in addition to transaction fees. These rewards are distributed to validators for their role in maintaining the network and processing transactions.

7. Cross-Chain Fees: Interoperability Costs: BSC supports cross-chain compatibility, allowing assets to be transferred between Binance Chain and Binance Smart Chain. These cross-chain operations incur minimal fees, facilitating seamless asset transfers and improving user experience.

8. Smart Contract Fees: Deployment and Execution Costs: Deploying and interacting with smart contracts on BSC involves paying fees based on the computational resources required. These fees are also paid in BNB and are designed to be cost-effective, encouraging developers to build on the BSC platform.

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 centralised exchanges (CEXs) or decentralised 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 favourable 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 centralised or decentralised 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 recognised 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.

Centralisation 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

Beam

S.4 Consensus Mechanism

The crypto-asset in scope is implemented on the Beam L1 blockchain, Avalanche C-Chain, Ethereum and Binance Smart Chain networks following the standards described below.

The following applies to Beam L1:

Beam Network's consensus is designed to combine Avalanche-family fast-finality consensus (Snowman) with a permissionless proof-of-stake validator set (Beam Nodes) introduced through the Horizon upgrade.

1. Consensus algorithm and finality model

Snowman (Avalanche-family) consensus: Snowman is a linear-chain consensus protocol intended to deliver high throughput, low latency and sub-second immutable finality, using repeated randomized sub-sampled voting among validators (configurable quorum/decision thresholds).

2. Validator roles (Beam Nodes) and permissionless participation

Validators: Beam Nodes are validator nodes that process transactions, validate and add new blocks, and are intended to ensure data availability and network security under proof-of-stake.

Permissionless validation after Horizon: Beam documentation describes Horizon as transforming the network into a permissionless PoS Layer 1, enabling broader participation in validation through staking and delegation.

3. Staking requirements, delegation, and node token mechanics

Validator requirements: To run a Beam Node, validators must stake at least 20,000 BEAM and hold/stake at least 1 Node Token (ERC-721).

Delegation: Users who do not operate infrastructure can delegate stake to validators and participate indirectly in network security and rewards. Beam documentation states that the validator does not have custody of delegated tokens and that they can be unstaked.

Node Token specifics: Node Tokens are ERC-721 NFTs with an unlimited supply, and Beam documentation allows staking up to 1,000 Node Tokens per Beam Node.

4. Operational coordination, quorum, and penalties

Quorum-driven validator measurements: Beam's reward calculation process includes querying validators for uptime and reaching agreement via a 67%+ quorum of nodes before rewards are finalized.

Slashing concept (reward-based): Beam's "slashing" documentation focuses on reward reductions if a validator fails uptime requirements or is flagged as malicious/dishonest; the key metric is uptime over an epoch, with full rewards at $\geq 80\%$ uptime and a linear reduction below 80%.

The following applies to Avalanche C-Chain:

The Avalanche blockchain network employs a unique Proof-of-Stake consensus mechanism called Avalanche Consensus, which involves three interconnected protocols: Snowball, Snowflake, and Avalanche.

Avalanche Consensus Process:

1. Snowball Protocol:

- Random Sampling: Each validator randomly samples a small, constant-sized subset of other validators.
- Repeated Polling: Validators repeatedly poll the sampled validators to determine the preferred transaction.
- Confidence Counters: Validators maintain confidence counters for each transaction, incrementing them each time a sampled validator supports their preferred transaction.
- Decision Threshold: Once the confidence counter exceeds a pre-defined threshold, the transaction is considered accepted.

2. Snowflake Protocol:

- Binary Decision: Enhances the Snowball protocol by incorporating a binary decision process. Validators decide between two conflicting transactions.

- Binary Confidence: Confidence counters are used to track the preferred binary decision.

- Finality: When a binary decision reaches a certain confidence level, it becomes final.

3. Avalanche Protocol:

- DAG Structure: Uses a Directed Acyclic Graph (DAG) structure to organize transactions, allowing for parallel processing and higher throughput.

- Transaction Ordering: Transactions are added to the DAG based on their dependencies, ensuring a consistent order.

- Consensus on DAG: While most Proof-of-Stake Protocols use a Byzantine Fault Tolerant (BFT) consensus, Avalanche uses the Avalanche Consensus, Validators reach consensus on the structure and contents of the DAG through repeated Snowball and Snowflake.

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 Binance Smart Chain:

Binance Smart Chain (BSC) uses a hybrid consensus mechanism called Proof of Staked Authority (PoSA), which combines elements of Delegated Proof of Stake (DPoS) and Proof of Authority (PoA). This method ensures fast block times and low fees while maintaining a level of decentralization and security.

Core Components

1. Validators (so-called "Cabinet Members"): Validators on BSC are responsible for producing new blocks, validating transactions, and maintaining the network's security. To become a validator, an entity must stake a significant amount of BNB (Binance Coin). Validators are selected through staking and voting by token holders. There are 21 active validators at any given time, rotating to ensure decentralization and security.

2. Delegates: Token holders who do not wish to run validator nodes can delegate their BNB tokens to validators. This delegation helps validators increase their stake and improves their chances of being selected to produce blocks. Delegates earn a share of the rewards that validators receive, incentivizing broad participation in network security.

3. Candidates: Candidates are nodes that have staked the required amount of BNB and are in the pool waiting to become validators. They are essentially potential validators who are not currently active but can be elected to the validator set through community voting. Candidates play a crucial role in ensuring there is always a sufficient pool of nodes ready to take on validation tasks, thus maintaining network resilience and decentralization.

Consensus Process

4. Validator Selection: Validators are chosen based on the amount of BNB staked and votes received from delegates. The more BNB staked and votes received, the higher the chance of being selected to validate transactions and produce new blocks. The selection process involves both the current validators and the pool of candidates, ensuring a dynamic and secure rotation of nodes.

5. Block Production: The selected validators take turns producing blocks in a PoA-like manner, ensuring that blocks are generated quickly and efficiently. Validators validate transactions, add them to new blocks, and broadcast these blocks to the network.

6. Transaction Finality: BSC achieves fast block times of around 3 seconds and quick transaction finality. This is achieved through the efficient PoSA mechanism that allows validators to rapidly reach consensus. Security and Economic Incentives

7. Staking: Validators are required to stake a substantial amount of BNB, which acts as collateral to ensure their honest behavior. This staked amount can be slashed if validators act maliciously. Staking incentivizes validators to act in the network's best interest to avoid losing their staked BNB.

8. Delegation and Rewards: Delegates earn rewards proportional to their stake in validators. This incentivizes them to choose reliable validators and participate in the network's security. Validators and delegates share transaction fees as rewards, which provides continuous economic incentives to maintain network security and performance.

9. Transaction Fees: BSC employs low transaction fees, paid in BNB, making it cost-effective for users. These fees are collected by validators as part of their rewards, further incentivizing them to validate transactions accurately and efficiently.

S.5 Incentive Mechanisms and Applicable Fees

The crypto-asset in scope is implemented on the Beam L1 blockchain, Avalanche C-Chain, Ethereum and Binance Smart Chain networks following the standards described below.

The following applies to Beam L1:

BEAM is the ecosystem's native token and is used as the network gas token, for validation/delegation, and for governance. Token supply and incentive design are intended to align network security (validators/delegators) with ecosystem activity (transaction fees and broader protocol incentives).

1. Transaction fees (gas) and who can pay them

Gas fees paid in BEAM: Transactions and smart contract interactions require gas fees paid in BEAM.

Gas management via account abstraction: With account abstraction (EIP-4337-aligned), applications can implement flows where the developer (via infrastructure such as paymasters) can manage or sponsor gas to create smoother user experiences.

2. Validator and delegator reward streams

Source and collection: Primary rewards are derived from network gas fees, which are collected into a rewards contract.

Distribution logic: Rewards are allocated based on (i) achieving quorum agreement on uptime, (ii) stake weight (validator + delegators), and (iii) validator commission settings (validator share vs delegator share).

3. Reward timing, epochs, and claimability

Epoch schedule: Rewards are distributed in epochs of exactly 2,629,746 seconds (~30.44 days)

Verification buffer: After each epoch, Beam documents a 7-day period for uptime proof submission, reward calculation, and distribution; rewards then become claimable via the delegation dashboard.

4. Deflationary mechanisms and fee burns

General burn capability: Beam documents that BEAM can be burned by sending it to burn contracts, reducing circulating and maximum total supply; protocol fees may be configured to direct a portion to burn contracts.

Node Token-related burns: All BEAM used for Node Token minting is sent to a burner contract.

5. Performance penalties: Uptime is queried and agreed via quorum; nodes with 80%+ uptime receive full rewards, and nodes below 80% face a linear reduction in rewards.

The following applies to Avalanche C-Chain:

Avalanche uses a consensus mechanism known as Avalanche Consensus, which relies on a combination of validators, staking, and a novel approach to consensus to ensure the network's security and integrity.

1. Validators:

- Staking: Validators on the Avalanche network are required to stake AVAX tokens. The amount staked influences their probability of being selected to propose or validate new blocks.
- Rewards: Validators earn rewards for their participation in the consensus process. These rewards are proportional to the amount of AVAX staked and their uptime and performance in validating transactions.
- Delegation: Validators can also accept delegations from other token holders. Delegators share in the rewards based on the amount they delegate, which incentivizes smaller holders to participate indirectly in securing the network.

2. Economic Incentives:

- Block Rewards: Validators receive block rewards for proposing and validating blocks. These rewards are distributed from the network's inflationary issuance of AVAX tokens.
- Transaction Fees: Validators also earn a portion of the transaction fees paid by users. This includes fees for simple transactions, smart contract interactions, and the creation of new assets on the network.

3. Penalties:

- Slashing: Unlike some other PoS systems, Avalanche does not employ slashing (i.e., the confiscation of staked tokens) as a penalty for misbehavior. Instead, the network relies on the financial disincentive of lost future rewards for validators who are not consistently online or act maliciously.
- Uptime Requirements: Validators must maintain a high level of uptime and correctly validate transactions to continue earning rewards. Poor performance or malicious actions result in missed rewards, providing a strong economic incentive to act honestly.

Fees on the Avalanche Blockchain

1. Transaction Fees:

- Dynamic Fees: Transaction fees on Avalanche are dynamic, varying based on network demand and the complexity of the transactions. This ensures that fees remain fair and proportional to the network's usage.

- Fee Burning: A portion of the transaction fees is burned, permanently removing them from circulation. This deflationary mechanism helps to balance the inflation from block rewards and incentivizes token holders by potentially increasing the value of AVAX over time.

2. Smart Contract Fees:

- Execution Costs: Fees for deploying and interacting with smart contracts are determined by the computational resources required. These fees ensure that the network remains efficient and that resources are used responsibly.

3. Asset Creation Fees:

- New Asset Creation: There are fees associated with creating new assets (tokens) on the Avalanche network. These fees help to prevent spam and ensure that only serious projects use the network's resources.

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 Binance Smart Chain:

Binance Smart Chain (BSC) uses the Proof of Staked Authority (PoSA) consensus mechanism to ensure network security and incentivize participation from validators and delegators.

Incentive Mechanisms

1. Validators: Staking Rewards: Validators must stake a significant amount of BNB to participate in the consensus process. They earn rewards in the form of transaction fees and block rewards. Selection Process: Validators are selected based on the amount of BNB staked and the votes received from delegators. The more BNB staked and votes received, the higher the chances of being selected to validate transactions and produce new blocks.

2. Delegators: Delegated Staking: Token holders can delegate their BNB to validators. This delegation increases the validator's total stake and improves their chances of being selected to produce blocks. Shared Rewards: Delegators earn a portion of the rewards that validators receive. This incentivizes token holders to participate in the network's security and decentralization by choosing reliable validators.

3. Candidates: Pool of Potential Validators: Candidates are nodes that have staked the required amount of BNB and are waiting to become active validators. They ensure that there is always a sufficient pool of nodes ready to take on validation tasks, maintaining network resilience.

4. Economic Security: Slashing: Validators can be penalized for malicious behavior or failure to perform their duties. Penalties include slashing a portion of their staked tokens, ensuring that validators act in the best interest of the network. Opportunity Cost: Staking requires validators and delegators to lock up their BNB tokens, providing an economic incentive to act honestly to avoid losing their staked assets. Fees on the Binance Smart Chain

5. Transaction Fees: Low Fees: BSC is known for its low transaction fees compared to other blockchain networks. These fees are paid in BNB and are essential for maintaining network operations and compensating validators. Dynamic Fee Structure: Transaction fees can vary based on network congestion and the complexity of the transactions. However, BSC ensures that fees remain significantly lower than those on the Ethereum mainnet.

6. Block Rewards: Incentivizing Validators: Validators earn block rewards in addition to transaction fees. These rewards are distributed to validators for their role in maintaining the network and processing transactions.

7. Cross-Chain Fees: Interoperability Costs: BSC supports cross-chain compatibility, allowing assets to be transferred between Binance Chain and Binance Smart Chain. These cross-chain operations incur minimal fees, facilitating seamless asset transfers and improving user experience.

8. Smart Contract Fees: Deployment and Execution Costs: Deploying and interacting with smart contracts on BSC involves paying fees based on the computational resources required. These fees are also paid in BNB and are designed to be cost-effective, encouraging developers to build on the BSC platform.

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

2025-01-26

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

2026-01-26

S.8 Energy consumption

14585.40701 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 Beam L1 blockchain, Avalanche C-Chain, Ethereum and Binance Smart Chain 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

33.1264358381 %

S.11 Energy intensity

0.00014 kWh

S.12 Scope 1 DLT GHG emissions – Controlled

0.00000 tCO₂e/a

S.13 Scope 2 DLT GHG emissions – Purchased

4.85042 tCO₂e/a

S.14 GHG intensity

0.00005 kgCO₂e

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.

