Mandatory information on principal adverse impacts on the climate and other environment-related adverse impacts of the consensus mechanism

N	Field	Content
General Information		
S.1	**Name**	Zillion Bits Ltd
S.2	**Relevant legal entity identifier**	254900FESD7AF56FOQ37
S.3	**Name of the crypto-asset**	Binance Coin (BNB)
S.4	**Consensus Mechanism**	BNB Chain employs a Delegated Proof of Stake (DPoS) consensus protocol, which offers significant environmental advantages over energy-intensive Proof of Work mechanisms used by some other blockchains. In the DPoS system implemented by BNB Chain, token holders participate in a democratic process by voting for validator candidates who will be responsible for block generation and transaction validation. This delegation-based approach substantially reduces the network's overall energy consumption as it restricts the resource-intensive validation process to a limited number of elected nodes rather than requiring widespread computational competition. The consensus mechanism functions similarly to an electoral system where BNB token holders cast votes using their tokens to select validator candidates. Once elected, these validators assume responsibility for block production and receive block generation rewards in return for their service to the network. To prevent centralisation of power and promote a more distributed validator network, BNB Chain has implemented a specialised levelling mechanism designed to discourage the concentration of votes on a small subset of validators. This mechanism helps maintain network resilience while supporting a more equitable distribution of resources.
S.5	**Incentive Mechanisms and Applicable Fees**	The BNB token operates within the Binance Smart Chain (BSC) ecosystem, which enables fast block processing times while maintaining network security through economic incentives structured around the BNB token. At the foundation of this incentive structure are the validators, who must stake

		substantial amounts of BNB tokens to participate in the consensus process. The network maintains a dynamic validator selection process where active validators rotate to ensure decentralisation. These validators receive compensation through both transaction fees and block rewards, creating direct financial incentives for accurate transaction validation and efficient block production. This economic model extends beyond validators to include delegators-BNB token holders who may not operate nodes themselves but contribute to network security by delegating their tokens to trusted validators. Through this delegation mechanism, these participants increase validators' staking power while earning proportional shares of the rewards. To maintain network resilience, the system incorporates a candidate pool comprising nodes that have met staking requirements and await validation duties. The economic security of the network is further reinforced through slashing mechanisms, where validators face penalties-including the loss of staked tokens-for malicious behaviour or operational failures. Additionally, the opportunity cost of committing BNB tokens to staking rather than other uses serves as an inherent incentive for honest participation. Transaction fees on BSC are notably lower than many competing networks, making the platform cost-effective for users while still generating sufficient compensation for validators. Smart contract deployment and interaction incur additional fees based on computational resource requirements, all paid in BNB tokens, which encourages developer activity through cost-effectiveness.
S.6	**Beginning of the period to which the disclosure relates**	2024-01-01
S.7	**End of the period to which the disclosure relates**	2024-12-31
	Mandatory key indicator on energy consumption	
S.8	**Energy consumption (kWh/year)**	101846.57000
	Sources and methodologies	
S.9	**Energy consumption sources and Methodologies**	The methodology for assessing energy consumption associated with the BNB token’s consensus mechanism follows a multi-layered framework aligned with the European Union’s Markets in Crypto-Assets Regulation (MiCA)

		requirements and internationally recognized environmental reporting principles. This approach prioritizes transparency, reproducibility, and alignment with the European Securities and Markets Authority's (ESMA) draft regulatory technical standards on sustainability indicators, while incorporating guidance from the Greenhouse Gas Protocol's Scope 2 emissions accounting framework. The foundational data collection process begins with identifying the geographical distribution of validator nodes participating in the Delegated Proof of Stake (DPoS) consensus mechanism. Validator operators are required to provide verified energy consumption data through standardized reporting templates that capture electricity usage patterns, power source mix, and hardware specifications. These inputs are cross-referenced with regional energy grid emission factors published by intergovernmental organisations such as the International Energy Agency (IEA) and the United Nations Framework Convention on Climate Change (UNFCCC)514. For nodes utilising renewable energy sources, procurement is substantiated through renewable energy certificates (RECs) or guarantees of origin validated under the European Union's Renewable Energy Directive. Energy consumption modelling employs a bottom-up methodology that calculates per-node electricity usage based on hardware specifications, network participation intensity, and cooling infrastructure requirements7. This granular approach avoids generalised industry averages in favour of device-specific power profiles validated against manufacturer specifications and third-party benchmarking studies. The model incorporates temporal variations in network activity through analysis of on-chain transaction volume patterns and block production schedules, ensuring alignment between computational load and energy demand. A critical assumption underpinning the methodology is the proportional allocation of energy consumption across network participants based on their staking activity and validation responsibilities. This follows ESMA's principle of attributional accounting, where environmental impacts are distributed according to each validator's contribution to network security and transaction processing. The methodology assumes linear scalability of energy use relative to network size, supported by empirical analysis of historical energy consumption patterns in proof-of-stake networks.