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**	Dogecoin (DOGE)
S.4	**Consensus mechanism**	Dogecoin (DOGE) operates on a Proof-of-Work (PoW) consensus mechanism, utilising the Scrypt hashing algorithm. Unlike Bitcoin's SHA-256, Scrypt is memory-intensive, leading to increased computational efficiency but maintaining energy-intensive operations inherent to PoW systems. The network incorporates merged mining (auxiliary PoW) with Litecoin (LTC), allowing miners to simultaneously validate blocks on both chains without additional computational effort. This interoperability enhances security by leveraging Litecoin's larger mining ecosystem, but does not reduce Dogecoin's standalone energy consumption. Miners compete to solve cryptographic puzzles, with the first to succeed earning block rewards and transaction fees. Dogecoin's block time is approximately 1 minute, which increases transaction throughput but necessitates frequent block validation. The PoW design inherently requires substantial electricity consumption proportional to network security and hash rate. Mining activities typically rely on energy-intensive hardware, with environmental impacts tied to both direct operational energy use and indirect lifecycle effects, including hardware manufacturing, disposal, and electronic waste.
S.5	**Incentive mechanisms and applicable fees**	The Dogecoin network operates on a Proof-of-Work (PoW) consensus mechanism, where miners secure the network by solving cryptographic puzzles to validate transactions and create new blocks. Miners receive block rewards consisting of newly minted DOGE, with a fixed reward of 10,000 DOGE per block, and collect transaction fees paid by users to prioritise their transactions.

		Dogecoin does not undergo halving events, ensuring consistent miner incentives over time. Transaction fees on the Dogecoin network are intentionally kept low to promote accessibility and high throughput, typically averaging less than $0.01 per transaction. These fees are determined by transaction size and network demand, incentivising miners to prioritise transactions while maintaining cost efficiency for users.
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)**	7786225440.00000
	Sources and methodologies	
S.9	**Energy consumption sources and methodologies**	**Methodology Overview** The methodology employs a top-down economic approach based on mining revenue dynamics whereby miners direct a significant portion of mining revenue toward electricity costs. The calculation framework incorporates several key parameters specific to the Dogecoin network. We account for the memory-intensive Scrypt hashing algorithm utilised by Dogecoin, which differs from the SHA-256 algorithm used by Bitcoin. The network maintains a consistent block time of 1 minute with a fixed block reward. The calculations further incorporate transaction fee structures, network hashrate fluctuations, difficulty adjustments over time, and the unique merged mining dynamics that characterise the Dogecoin network. **Data Sources and Collection** The data for the calculations are sourced from multiple authoritative channels. Network statistics are obtained from blockchain explorers that provide actual transaction volumes and hashrate information. Hardware efficiency data comes from publicly available technical specifications of mining equipment. Electricity price data is sourced from international agencies and regulatory bodies including the International Energy Agency (IEA) and European Environment Agency (EEA). The geographic distribution of mining operations is estimated using public node information,

		providing insight into the regional energy profiles relevant to mining activities. **Key Assumptions** The methodology incorporates several key assumptions based on industry standards and economic principles. We assume that approximately 70% of mining revenue is allocated to electricity costs, which represents a standard benchmark in economic models of mining operations across the cryptocurrency industry. The average electricity cost for mining operations is derived from global mining industry benchmarks. Mining hardware is considered to follow a 5-year depreciation schedule, reflecting standard capital expenditure patterns in the industry. Additionally, we assume mining operations are geographically distributed in a pattern that can be approximated through node location data, allowing for more accurate energy source attribution. **Merged Mining Adjustment** Dogecoin supports merged mining with Litecoin, meaning miners can mine both cryptocurrencies simultaneously without additional energy expenditure. An attribution factor is applied to adjust for this shared energy consumption. This adjustment prevents overestimation of energy usage by accounting for the energy-sharing efficiency inherent in merged mining operations, resulting in a more accurate representation of Dogecoin's specific energy footprint.

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

	Supplementary key indicators on energy and GHG emissions	
N	**Field**	**Content**
S.10	**Renewable energy consumption (percentage of the total amount of energy used per calendar year)**	29.46037
S.11	**Energy intensity (energy used per validated transaction in kWh)**	0.62978
S.12	**Scope 1 DLT GHG emissions – Controlled (in t CO2eq per year)**	0.00000

S.13	**Scope 2 DLT GHG emissions – Purchased (in t CO2eq per year)**	3181698.13382
S.14	**GHG intensity (emissions per validated transaction in kg CO2eq)**	0.26363
	Sources and methodologies	
S.15	**Key energy sources and methodologies**	For determining renewable energy consumption the methodology centers on a comprehensive geographic distribution assessment. The process begins with mining location identification through multiple channels: analysis of public regulatory filings from mining companies, voluntary disclosures from mining pools, network node geographical analysis using IP-based geolocation, and industry surveys conducted through mining associations. Once locations are identified, each is mapped to its respective regional grid's renewable energy percentage using authoritative sources including International Renewable Energy Agency (IRENA) annual statistics on electricity generation mix, national energy regulatory authorities' official data on grid composition, EU Energy Statistical Pocketbook and similar governmental publications, and International Energy Agency (IEA) country-specific renewable energy statistics. The renewable energy percentage is then calculated as a weighted average, with weights proportional to the estimated hashrate contribution of each region. Several key assumptions underpin this approach. For miners whose locations cannot be precisely determined, regional averages are applied based on known distribution patterns. Grid-level renewable energy percentages are used rather than miner-specific energy sourcing arrangements, with the understanding that mining distribution remains relatively stable throughout the reporting period. The methodology also assumes miners predominantly use electricity from local grids rather than generating their own power. The energy intensity calculation follows a transaction-based assessment methodology. Total network energy consumption is calculated using hardware profiling of mining equipment specific to the Scrypt algorithm, profitability threshold modelling based on the network's current difficulty, network hashrate data from public blockchain explorers, and typical operational parameters of mining facilities. Transaction data is sourced from public blockchain explorers tracking DOGE transactions, node operator statistics on transaction processing, and historical blockchain data

		maintained by academic research institutions. The energy intensity calculation incorporates differentiation between baseline network maintenance energy and transaction processing energy, consideration of merged mining effects where DOGE is mined alongside other compatible cryptocurrencies, and analysis of block rewards and transaction fee structures as drivers of energy consumption. Key assumptions in the energy intensity methodology include hardware selection based on economic viability for Scrypt mining during the reporting period, continuous network operation with consistent hashrate distribution, consistent energy requirements for transaction processing throughout the reporting period, and proper accounting for merged mining dynamics with compatible cryptocurrencies in the total energy attribution. Data quality management is integrated throughout the methodology. Uncertainty ranges are calculated for all estimates, and multiple data sources are cross-verified where possible. Conservative estimates are applied when precise data is unavailable, and transparent documentation of all assumptions is maintained to ensure reproducibility of results.
S.16	**Key GHG sources and methodologies**	To determine greenhouse gas (GHG) emissions associated with the Dogecoin network, we employ a comprehensive geographic distribution analysis of mining operations combined with regional electricity grid emission factors. Our methodology begins with identifying the geographical distribution of Dogecoin miners through network propagation analysis, IP geolocation data, and mining pool disclosures, where available. For regions where direct observation data is limited, we apply statistical modelling based on economic factors, including regional electricity data, regulatory environments, and infrastructure availability, which influence miner location decisions. The emission factors for electricity grids are sourced primarily from the International Energy Agency (IEA) and supplemented with data from the European Environment Agency (EEA) for the European region, the U.S. Energy Information Administration (EIA) for the U.S., and respective national environmental agencies for other significant mining jurisdictions. These sources provide standardised carbon intensity metrics that reflect the unique generation mix of each regional grid. We account for Dogecoin's unique attributes, particularly its Scrypt hashing algorithm, which creates different hardware requirements and energy consumption patterns compared to

		SHA-256 based networks. The methodology also incorporates the effects of merged mining with Litecoin, which impacts the energy attribution calculation - we apportion energy use between these networks based on the relative economic value of mining rewards during the reporting period, preventing double-counting of emissions while ensuring complete coverage. For each identified mining region, we calculate emissions by multiplying the estimated regional energy consumption by the corresponding grid emission factor. The marginal emission intensity is determined by analyzing the relationship between transaction volume fluctuations and corresponding energy demand changes, providing a measure of the emissions attributable to each additional transaction. Our methodology includes sensitivity analysis to account for uncertainty in geographical distribution and periodic updates to emission factors. We transparently acknowledge limitations in data availability, particularly regarding the precise location of all mining operations, and compensate through conservative estimation approaches that prevent underrepresentation of emissions. This framework aligns with international standards for GHG accounting while addressing the specific characteristics of Dogecoin's Scrypt-based Proof of Work consensus mechanism.