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**	Litecoin (LTC)
S.4	**Consensus mechanism**	Litecoin employs a Proof of Work (PoW) consensus mechanism utilising the Scrypt hashing algorithm, which serves as a defining characteristic distinguishing it from Bitcoin's SHA-256 implementation. Originally designed by Charlie Lee in 2011 as a "lite version of Bitcoin," this consensus approach was specifically developed to democratize mining participation by reducing the effectiveness of specialised hardware, though this advantage has diminished over time with the development of Scrypt-compatible ASIC miners. The consensus mechanism functions through a competitive mining process where participants solve complex mathematical puzzles, with successful miners receiving block rewards and transaction fees as economic incentives for securing the network. The Scrypt algorithm represents a deliberate design choice to create a more memory-intensive hashing function. This increased memory requirement was initially intended to make mining more accessible to ordinary users with standard computing equipment, potentially fostering greater network decentralisation. During the mining process, nodes collect unconfirmed transactions from the network mempool, organise them into blocks, and then compete to find a nonce value that, when combined with the block header and passed through the Scrypt function, produces a hash value below the target difficulty threshold. Litecoin's difficulty adjustment mechanism dynamically calibrates to maintain a consistent average block time. The network achieves consensus through the longest chain rule,

		where nodes automatically follow the blockchain with the greatest accumulated proof of work, representing the network's canonical transaction history. This approach effectively guards against double-spending attempts and ensures the integrity of the ledger across all participants. Litecoin's PoW consensus offers significant security benefits through its energy-intensive validation process, making attacks computationally expensive and economically irrational. However, this security comes with environmental considerations, as mining operations consume substantial electricity.
S.5	**Incentive mechanisms and applicable fees**	Litecoin's incentive structure employs a Proof of Work (PoW) consensus mechanism utilising the Scrypt hashing algorithm. This creates an economic framework where miners compete to validate transactions and create new blocks, receiving rewards in two forms: newly minted LTC as block rewards and transaction fees from users. This dual incentive system ensures network security by making attacks economically unfeasible, as potential attackers would need to control more computational power than honest miners. The primary economic incentive for miners comes through block rewards, which follow a predetermined halving schedule. The halving mechanism serves as a balance between sufficient miner incentives in the early years and long-term supply control, encouraging miners to optimize operations for efficiency to maintain profitability as rewards decrease. Transaction fees represent the second component of Litecoin's incentive model, becoming increasingly important as block rewards diminish over time. Fees are primarily determined by transaction size (in bytes) rather than the value being transferred, making the fee structure proportional to the computational and storage resources consumed by each transaction. During periods of network congestion, users can optionally increase their fee rates to prioritise transaction inclusion, creating a market-based fee system where urgent transactions can pay premium rates for faster confirmation. This fee market efficiency is enhanced by Litecoin's faster block time and larger maximum supply compared to Bitcoin, generally resulting in lower average transaction costs while still providing sufficient incentives for miners.
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)**	959130591.42887
	Sources and methodologies	
S.9	**Energy consumption sources and methodologies**	The methodology for assessing Litecoin's energy consumption employs a bottom-up approach that begins with network hashrate analysis derived from block time and mining difficulty parameters, which are continuously monitored through the network's publicly available blockchain data. This hashrate data is then mapped against a comprehensive database of Scrypt ASIC mining hardware specifications, with devices filtered based on their profitability threshold reflecting industry standards adopted by organisations, including the International Energy Agency. The energy consumption calculation incorporates a Power Usage Effectiveness (PUE) factor, representing the energy overhead required for cooling and auxiliary systems beyond the direct hardware consumption, aligned with data center efficiency standards recognized by the European Commission's Code of Conduct for Data Centres. Geographical distribution data for mining operations is obtained through analysis of mining pool telemetry, public company filings from listed mining entities, and IP-based geolocation, collectively covering approximately 35% of the network with high statistical confidence. The methodology explicitly accounts for both the direct energy requirements of transaction validation (variable component) and the baseline energy needed for maintaining network security and integrity (fixed component), reflecting the dual-purpose nature of Proof of Work systems.

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)**	16.91202
S.11	**Energy intensity (energy used per validated transaction in kWh)**	0.04259
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)**	388747.08613
S.14	**GHG intensity (emissions per validated transaction in kg CO2eq)**	0.01570
	Sources and methodologies	
S.15	**Key energy sources and methodologies**	The methodology for determining Litecoin's energy sources follows a location-based accounting approach that maps mining activity to regional electricity grid compositions using data from the International Renewable Energy Agency (IRENA) and national energy authorities. The methodology captures seasonal variations in renewable energy availability across different regions and reflecting the dynamic nature of global electricity grids as documented by the World Resources Institute's greenhouse gas accounting standards. Geographic distribution data for Litecoin mining operations is developed through multiple complementary methods, including analysis of mining pool server locations, publicly disclosed operational data from listed mining companies, IP-based geolocation techniques for nodes, and cross-referencing with Bitcoin mining distribution as a proxy where appropriate, given the similar economic incentives and occasional co-location patterns. For jurisdictions with substantial mining presence, country-specific grid composition data is supplemented with regional or state-level information where available, such as data from the Environmental Protection Agency for U.S. states or the European Environment Agency for European countries, providing more granular insight into the actual energy sources powering mining operations in these areas. The final energy source classification system aligns with international energy reporting standards while providing sufficient detail to distinguish between renewable, nuclear,

		and fossil fuel sources for comprehensive environmental impact assessment.
S.16	**Key GHG sources and methodologies**	The greenhouse gas emissions methodology for Litecoin follows a location-based accounting approach aligned with the World Resources Institute's GHG Protocol, calculating emissions by multiplying energy consumption at each mining location by its corresponding grid emission factor. These emission factors are sourced from authoritative bodies, including the Environmental Protection Agency for U.S. states, the European Environment Agency for European countries, and Climate Transparency for G20 nations, with monthly resolution where available to capture seasonal variations in grid carbon intensity. For regions with significant mining activity but limited public emission factor data, custom grid emission factors are constructed using primary energy source information from the International Energy Agency and emissions characteristics from the Intergovernmental Panel on Climate Change's emissions factor database. This approach avoids reliance on global averages that could misrepresent the actual emissions profile of mining. The GHG accounting framework applies conservative estimation principles when handling data gaps or uncertainties, ensuring the final emissions profile does not understate potential environmental impacts while maintaining methodological rigour. Scope 1 DLT GHG emissions for Litecoin can be considered negligible because mining operations typically do not generate their own electricity but rather purchase it from the grid or third-party providers, classifying their emissions under Scope 2 rather than Scope 1.