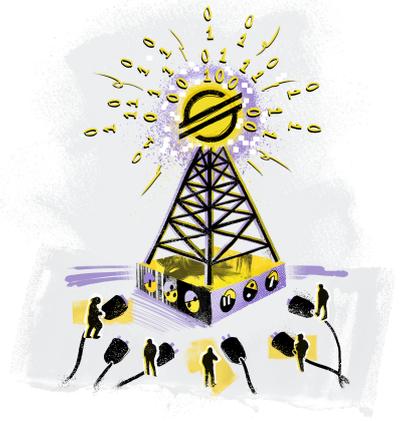


EFFICIENT BY DESIGN

Since its launch, the Stellar network has processed billions of operations and millions of payments, aiming to reflect real demand for blockchain technology from fintechs, financial institutions, and developers around the world. If blockchain can help power a more inclusive, equitable future of finance, it is essential that the underlying technology is also sustainable. Sustainability and efficiency are integral to the Stellar network by design. Via the Stellar Consensus Protocol (SCP), a consensus mechanism achieved through Proof-of-Agreement (PoA), the network is designed to connect financial systems so they can work together seamlessly.

POWERING THE NETWORK

The Stellar Development Foundation enlisted PwC US to develop a framework to assess the electricity consumption and greenhouse gas emissions of blockchain protocols. The first of-its-kind assessment framework provides a holistic view to inform and enable blockchain and financial services organizations to consider further measurement of their environmental footprints. The figures below were calculated using this assessment framework.



The following breaks down key metrics for Stellar network electricity use:

0.1731¹ (Wh/txn)

Electricity consumed per transaction

261,4352² (kWh)

Estimated yearly electricity use for Stellar Core (program that runs SCP)

481,3243³ (kWh)

Estimated yearly electricity use for Stellar Core + (API layer)

In addition, the Stellar network generates:

0.0621¹ g CO₂/txn

Emissions per transaction

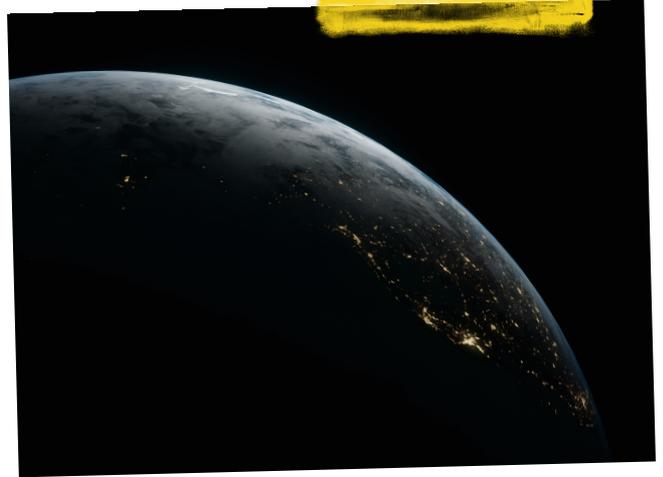
94,0984⁴ kg CO₂/yr

Estimated yearly emissions for Stellar Core

173,2435⁵ kg CO₂/yr

Estimated yearly emissions for Stellar Core + Horizon

The Stellar network's energy consumption has been minimal. True to the hierarchy of sustainability, Stellar Development Foundation has focused mainly on refusal and reduction of resources as a first priority – but there's opportunity for continued progress. With these numbers as the baseline for the network's electricity consumption, the Stellar Development Foundation and Stellar ecosystem can use this data to chart a path forward; to better understand and identify opportunities to refine the technology, further helping reduce environmental impacts, and commit to removing any carbon emissions it cannot avoid.



Learn more at stellar.org/foundation/sustainability

References

¹ As of March 2022

² The equivalent to CO₂ electricity emissions of 224.4 US households' electricity usage per year / EPA.gov/EIA.gov/Calculations & References

³ The equivalent to CO₂ electricity emissions of 40.54.9 US households' electricity usage per year / EPA.gov/EIA.gov/Calculations & References

⁴ The equivalent to greenhouse gas emissions from 1820.3 gasoline-driven passenger vehicles per year / EPA.gov/Calculations & References

⁵ The equivalent to greenhouse gas emissions from 33.7 homes' electricity use for one year / EPA.gov/Calculations & References