A blockchain consensus mechanism that optimizes energy dispatch and trading

Given that a large number of participates such as distributed energy resources are entering the power system, blockchain is a promising solution to ensure trust among participants. However, due to the low computing efficiency, high operating cost, and limited functions, existing blockchain technologies are not fully compatible with the need of optimization of high-dimensional and large-scale power systems. Given that power system operation usually includes solving optimization problems which are difficult to be solved but easy to be verified, this paper proposed a novel energy blockchain technology based on proof-of-optimization consensus algorithm. This consensus algorithm overcame the challenge of applying blockchain to complex optimization scenarios in the power system. Then, the proposed energy blockchain technology was demonstrated by taking the transactive distribution network with high penetration of renewable energy as an example. Simulation tests show that the proposed energy blockchain technology can meet the requirements of security, openness, and throughput in the distributed energy transaction scenario.