

A trusted energy trading framework by marrying blockchain and optimization.

Abstract-Trading based on distributed optimization is becoming a world-wide trend in energy markets. Without proper trading mechanism design, however, participants might act dishonestly, which further leads to potential trust crisis and even market failures. This trust issue has been overlooked in state-of-the-art trading mechanism design. Blockchain, known as the enabler of trust, is promising to address this challenge. However, current studies have not detailed how blockchain can disable dishonest participants in energy trading, and primarily give qualitative rather than quantitative analysis of blockchain value in energy trading. Here, we propose an energy trading framework by marrying blockchain and distributed optimization, where blockchain enables check and balance among participants and disables dishonesty. Our results on a multi-energy district demonstrate in a quantitative way how our proposed framework can help prevent energy market failures caused by dishonest participants.