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Distributed Energy Resources Parameter Monitoring in Microgrids Using Blockchain and Edge Computing

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Abstract

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Abstract:

An increased share of distributed renewable energy sources requires flexible tools for providing reliable and cheap electricity. Smart meters provide information at the consumer level, which could be used as the main source for real-time energy micro-transactions, however, one of the main concerns about direct transactions is information security. Conventional electricity markets rely on centralized information exchange, nevertheless, when intra-day, distributed, electricity consumption and production exchanges are required between customers, this approach might not be enough. This paper presents a proof-of-concept for using Blockchain as a tool for managing the operational transactions in a DC microgrid. The distributed nature of this technology provides an inherently safer approach, by providing an immutable database for transaction history. One of the challenges of using this technology, however, is the required computing power at the nodes and the limited capacity available in the smart meter. To overcome these issues, the authors used a distributed computing technology, -edge computing-, where computation and storage are located closer to the customer, to improve response times by handling the required computational tasks of the

Blockchain tool. This approach proved not only to be practically viable but also, offers important insights about the scalability and capabilities of the technology.

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