Blockchain Technologies for Local Energy Trading

Proposal for student research project in sustainable energy

Objectives

1. investigate and compare open source blockchain platforms (e.g., Ethereum, Hyperledger etc), with the aim of assessing their suitability as a basis for Peer-to-Peer (P2P) energy trading.
2. investigate and assess optimization techniques for optimal pairing of energy bids and explore the principles of the blockchain technologies and the potential role of the concept of smart contracts in this context

Project description and scope of work

A smart power grid is a modernized grid that proactively uses state-of-the-art technologies in the areas of sensing, communications, control, and computing technologies to dramatically improve efficiency, sustainability, stability, and security. With the development of distributed microgrid architectures, renewable energy resources and widespread penetration of electric vehicles, smart grids are facing many unprecedented challenges for the smart energy management and operation. The first problem is related to the reliable and efficient integration of renewable energy sources. The other challenge is related to the secure energy exchange and transactions among distributed energy producers and electric vehicles. Blockchain is a highly promising information technology that may be able to tackle the aforementioned challenges and may eventually transform the whole energy sector. One typical example is to use Blockchain to help protect energy transactions for efficient and secure smart energy management. In this project, we will mainly study Blockchain as an enabling technology for local energy trading.

Project deliverables

The project deliverables will encompass a research report in the Dept of Informatics Technical Report series, and software artifacts, developed as part of the research. We also aim at publishing an article at a suitable publication outlet (conference or journal) depending on the quality of the results. The latter task will naturally be undertaken after the end of the summer project.

Project execution

Preferred duration: 6 weeks (longer if students work part time)
Number of students: 2
Expected start-up date: 1 July

Supervisors

Professor Frank Eliassen, Professor Yan Zhang, Professor Hans-Arno Jacobsen, stipendiat Min Zhang, stipendiat Hwei-Ming Chung

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We also aim to involve a supervisor from IFE in this project.