Blockchain in the Energy Industry – Comprehensive Analysis of Potential Use Cases

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Overview

In recent years, the application of blockchain technology to the energy industry has been widely discussed. Several use cases have been proposed by different stakeholders, which utilize the key features of the technology to varying extent. In order to identify promising use cases for further evaluation and implementation, a comprehensive overview, analysis and evaluation of potential blockchain applications in the energy sector is presented.

Methods

The applied methodology consists of 4 steps. Firstly, the underlying technology was thoroughly analyzed regarding its specific features, value propositions and potential future improvement with special regard to the requirements of the energy industry [1]. Afterwards, potential use cases were collected from both a literature review and from 11 workshops with in total 161 experts of partner companies [2]. These use cases were subsequently clustered and evaluated regarding their potential impact to the affected stakeholders, to their individual business model,to the energy market [3] and energy industry in general. The evaluation also included chances and risks, regulatory compliance and adjustment requirements, further legal implications like data protection and general contract law, possible options for practical implementation and as a conclusion the overall disruptive potential. As a last step, the most promising use cases according to these criteria were selected and further elaborated in cooperation with the project partners.

Results

The presented methodology proves useful for collection and evaluation of use cases. 91 potential blockchain applications were identified that affect virtually all stages of the value chain. The evaluation criteria allow selecting use cases, which utilize the main advantages of blockchain systems like decentralization, transparency, security, availability, immutability and automation and at the same time evince considerable potential regarding both implementability and impact. This yields the following clusters for further analysis: labeling, the blockchain-based recording of generation and consumption data in order to track for example renewable energy or geographic origin [4], asset logging, the immutable storage and automated processing of operation and maintenance data of specific assets, improved market communication based on blockchain infrastructure [5] and verification of ancillary services.

Conclusions

The selected clusters of use cases which appeared to be most promising for closer examination and practical implementation show that all of them use the underlying blockchain system as communication infrastructure or data exchange platform. Moreover, they partially depend on the same data, leading to the conclusion that synergy effects of a platform designed for a variety of use cases could potentially make the system viable.

References

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