

Research on Optimization Approaches of Blockchain Technology in New Energy under the Background of Double Reduction

-- Taking Anhui Province as an Example

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Abstract

This article analyzes the combination of blockchain technology and energy-saving and carbon reduction work in Anhui Province based on theories such as blockchain technology, "carbon index", and energy trading. Based on literature review, a conceptual model is established to achieve the systematic construction of blockchain technology applied in energy-saving and carbon reduction.

Keywords

Double Reduction; Blockchain; New Energy.

1. Introduction

Blockchain technology is a non variable, traceable, scalable, decentralized, cross industry application technology. To develop energy blockchain technology, we will further promote the development of China's energy Internet, promote carbon neutrality carbon peak, and combine it with carbon neutrality development to help improve energy efficiency, reduce energy costs, optimize energy use, reduce carbon emissions as much as possible, and achieve China's carbon neutrality goal by 2060, To achieve the goal of a beautiful Anhui Province with realistic significance and harmonious coexistence between human and nature.

2. Development Status of Digital Carbon Neutrality in Anhui Province

2.1. Ecological and Environmental Protection, Carbon Reduction and Governance Process

At present, the industrial sector in Anhui Province accounts for about 70% of the total carbon emissions, and promoting the development of green and low-carbon industries is crucial for achieving the "dual carbon" goal. The Provincial Bureau of Statistics fully utilizes the fundamental role of statistical monitoring in energy management and energy conservation and carbon reduction work, providing enterprises with more diversified and personalized energy conservation and carbon reduction information services, guiding them to focus on carbon reduction, strive to improve production efficiency, expand market space, and accelerate the construction of an energy-saving, low-carbon, and green production system.

2.2. Current Development Dtatus of Blockchain

The Anhui Provincial Department of Economy and Information Technology stated that in order to overcome blockchain bottleneck technology, build demonstration application scenarios, develop innovative leading enterprises, cultivate a group of new composite talents in blockchain technology, and further promote the formation and development of the value chain, in order to initially form a reliable ecosystem and fully apply blockchain technology to enhance its security and resource enrichment.

2.3. Carbon Emission Control Plan

Actively grasp the dual carbon development goals, understanding the inherent logic behind them, accelerating the formation of a resource-saving industrial environment, and guiding and optimizing the economic development of Anhui Province play a significant role in promoting environmental protection, lifestyle, and spatial structure.

Grasping the basic and essential requirements of the dual carbon policy, the quality of the ecological environment in Anhui Province has been significantly improved and improved. This is the result of comprehensive strengthening of construction throughout the province, and the entire process has developed. In August 2021, the "Carbon Index" service was officially launched in Anhui Province, serving as a reference indicator for online reporting by the Provincial Department of Statistics and enterprises. This innovation is the first in China, We will also provide services to industrial enterprises across the country.

Accurately understanding the practical significance behind the dual carbon policy, Anhui Province has accurately grasped the frequent highlights in promoting the dual carbon goals, promoting the rapid transformation of the green economy and ushering in greater economic development.

Fully apply new technologies such as blockchain, combine technology with industrial transformation, keenly grasp the development opportunities of the new round of technological revolution, promote the deep integration of blockchain and green low-carbon industries, big data and green economy development, artificial intelligence and industrial innovation, and actively participate in national carbon emission related activities and work, explore development mechanisms, build ecological protection compensation mechanisms, and enrich multi scenario applications, Promote better integration between government and effective markets.

3. Analysis of Favorable Conditions for Technology Empowering Energy-Saving and Carbon Reduction Actions in Anhui Province

3.1. Take the Lead in Launching the "Carbon Index" Service

Starting from September, Anhui Province has been conducting online "diagnosis" of energy conservation and emission reduction for industrial enterprises above designated size, and timely warning has been given to enterprises with corresponding green emission reduction measures. This service in Anhui Province, pioneered nationwide, not only establishes a clear record of carbon emissions, but also provides assistance for national production and operation, promoting the achievement of the dual carbon strategy goal. The "carbon index" system uses four dimensions of coal, electricity, oil and natural gas to calculate the enterprise's carbon emission related index through formula, so as to display the energy situation of each enterprise, record the carbon emission level, and enable enterprises to visually view the enterprise's carbon emission index through the bar chart, so as to better complete the carbon emission green economy development indicators, This provides favorable conditions for the successful promotion of blockchain technology and energy-saving and carbon reduction actions to quantify carbon emissions.

3.2. Pilot Application of Demand Response System

The system is developed by the State Grid Zhejiang Electric Power Co., Ltd., and uses the "blockchain+5G" technology to establish a trust chain for load aggregators, users, and power supply companies, realizing reliable sharing of demand response data. Low grid is a service enterprise born to meet demand. Provide information query services to users when they have relevant needs, and benefit from methods such as agency and aggregation. Unlike power supply companies that directly connect to a large number of small and medium-sized enterprises for unified demand response, load aggregators play the role of "intermediary" and "agent", aggregating decentralized users into adjustable loads, deeply understanding each user's needs and response potential, and customizing personalized demand response strategies, which not only improve users' power efficiency management, but also reduce peak shaving pressure for power supply companies and power generation enterprises, Effectively reducing carbon emissions. The pilot application work in Yiwu, Zhejiang Province facilitates the practical application of blockchain in Anhui Province, providing a basis for the successful promotion of the conceptual model of combining blockchain technology with energy-saving and carbon reduction actions in this project.

4. Path Optimization Analysis of Energy Blockchain and Digital Carbon Neutrality

4.1. Development Plan and Stage Objectives of Anhui Energy Blockchain

In 2018, the Ministry of Industry and Information Technology released the "2018 China Blockchain Industry White Paper". According to the content, blockchain has become an important tool for green development to promote the green transformation and development of the energy industry. Considering the unique characteristics of Anhui Province and the current situation of local industry development, this article proposes a three stage development framework.

The first goal of the first stage of energy blockchain development is technology integration, solving trust issues, especially in the case of multi unit collaboration, and gradually conducting small-scale project testing. The second stage focuses on optimization as the main development planning objective, meeting the demand for improving green development efficiency to a certain extent, and gradually increasing the scale and quantity of project optimization and improvement. In the final stage, it will take three years to elaborate on the development goals and implementation methods of the energy blockchain in stages, with autonomous development as the main development planning goal. At this stage, it is necessary to learn from the experience and inspiration of the previous stage of development, better develop corresponding and suitable blockchain technologies for enterprises in Anhui Province, better adapt to industrial development, form an adaptive core system, and achieve rapid and widespread deployment.

4.2. Application Scenarios and Implementation Approaches of Energy Blockchain Assisting Anhui Industrial Enterprises in Energy Conservation and Carbon Reduction

In terms of the application of energy blockchain, Anhui Province conducts research from four aspects: security monitoring, energy trading, asset management, and green certification. Combined with the "carbon index" service launched by industrial enterprises in Anhui Province, this project combines blockchain technology with the four major energy sources of coal, electricity, oil, and gas in Anhui Province's industrial enterprises. In the initial stage, it will select individual cities with good development momentum to establish experimental sites, Continuously improving the blockchain application model while expanding the number of

industrial enterprises in the province applying this technology. The following explains its implementation approach based on different application scenarios:

(1) Energy asset management. With access to the Internet of Things as the core, intelligent analysis and management of data are carried out to manage the assets of the energy blockchain, and ultimately automatically allocate energy resources according to user needs.

(2) Energy trading. Producers can use the development tools provided by blockchain to build an electricity sales platform. Users can purchase electricity from nearby power stations according to their needs. The system verifies legality through smart contracts, automatically settles after verification, and performs forwarding operations.

(3) Green energy certification. Energy blockchain can encrypt storage resource scheduling and transaction information in distributed books, and with the cooperation of relevant facilities, it can better address the pricing and measurement of green benefits, especially in solving the environmental benefit evaluation of green certification.

(4) Energy security monitoring. Blockchain can determine the space and time of faults based on different response requirements, and quickly collaborate with different legal entities to optimize control and scheduling, which has certain advantages. It plays an important role in energy security monitoring and guarantee.

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