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Study on Standardization of Renewable Energy Asset Transaction

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Abstract：With the rapid development of the renewable energy industry, the traditional renewable energy asset transaction mode is facing great challenges in terms of the transaction cycle, security, work efficiency, and so on. This report analyzes the current situation of renewable energy asset transactions and system platforms. The purpose of this paper is to show the study of renewable energy asset transaction standard framework and standard content. Furthermore, this paper presents the concept of market-oriented renewable energy asset transaction, explains the basic framework of renewable energy asset transaction standards, and proposes a series of renewable energy asset transaction standards. Finally, it analyses the elements that need to be paid attention to promote the standardization of renewable energy asset transactions. The work pushes forward the coordinated development of science and technology, industry and finance of the renewable energy industry chain, and provides standardized support for convenient circulation and high-quality development in the renewable energy field.

Keywords-component：Renewable energy asset; Business process; standardization

1. Introduction

Asset circulation is the basis for the flourishing of industry, and also guarantees the survival and development of enterprises. In the background of digital waves, the renewable energy assets circulation is not only promoting renewable energy enterprises resolving cash flow, and activating the renewable energy industry chain, but also promoting digital transformation and high-quality development of the renewable energy industry. The current market is in the early stage of development, with insufficient and unreliable renewable energy asset transaction data, unsatisfaction transaction platforms, imperfect transaction mechanisms, and high transaction risks that cause long transaction cycles, obtain evidence difficulties and low work efficiency. All kinds of problems affect the investor's enthusiasm and industrial development with high quality.

Digital technologies such as blockchain, IoT, Big Data, and AI provide new ideas and approaches [1-5]. By applying digital construction, renewable energy assets can accelerate the circulation of high-quality assets in the renewable energy industrial chain, excavate the data value, and improve enterprise operation efficiency. Through renewable energy, asset transaction business integrating with newly-developed technologies, such as blockchain, Big Data, and AI, people explore and practice digital right confirmation, value credit enhancement, intelligent transaction, and digital equity credentialization of renewable energy assets [6] actively. Therefore, it is necessary to research on standardization of renewable energy asset transaction systems and online transaction businesses that can ensure renewable energy development, improve work efficiency, reduce transaction costs, reduce transaction cycle, increase credibility, and promote the development of renewable energy.

2. Renewable energy asset transaction business

The objects of renewable energy asset transactions are renewable energy assets, such as solar power stations, wind power stations, and energy storage power stations. The main business includes project listing, matchmaking tradeoffs, fund settlement, and supervision. Normalization and standardization of business can promote the rational flow of renewable energy asset, renewable

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energy mergers and acquisitions, and asset restructuring, and make the market plays a decisive role in the allocation of resources.

In the process of the transaction between buyer and seller, asset evaluation agencies, financial agencies, government regulators, internet courts and tax bureaus should participate together. The renewable energy asset transaction system platform will connect all parties, restructure the business with digital technology, and establish multi-node ecological connectivity. Building a renewable energy asset transaction ecosystem with high credit, flexible circulation, recordable traceability, and intelligent interconnection, information sharing and free circulation of industrial chain value would have a good impact on asset transaction, financing, and cooperation for the upstream and downstream of the industrial chain.

Classification of renewable energy asset

Renewable energy asset includes system equipment asset, equity asset, and data asset.

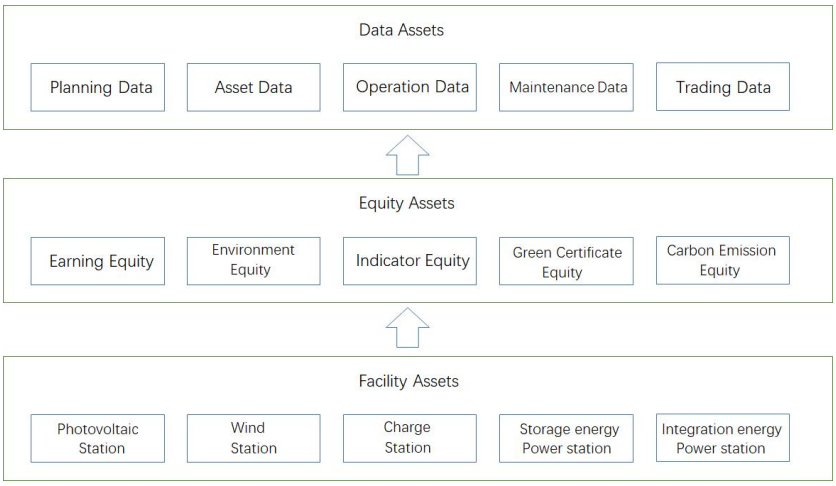

Figure 1. Classification of renewable energy asset.

2.1 Equipment asset

Equipment assets refer to the infrastructure to generate energy, including energy infrastructures such as solar power stations, wind power stations, charging stations, comprehensive energy stations, and assets composed of automatic monitoring systems and communication systems. The bottom of Figure 1 shows the scale and quality to determine the market value, which is the basis of other derivative values.

2.2 Equity asset

Equity asset includes green certificates, carbon emissions, renewable energy development license, indicators, etc. The second level of Figure 1 shows equity assets with different attributes and different values, which is important for activating a green economic system.

2.3 Data asset

Data asset refer to the data generated in the whole life cycle of renewable energy that includes the basic data accumulated in process of planning, construction, operation, maintenance, and transaction, as well as the data with market value formed by analysis and mining. The top of Figure 1 shows data asset can promote lean operation, business model innovation, and cross-border integration of enterprises, which is an important guarantee for the intelligent construction of renewable energy enterprises.

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3. The framework of renewable energy asset tradition standard

According to the business requirement and technical characteristics of renewable energy asset tradition, the basic framework of renewable energy asset tradition standard is analyzed as shown in Figure 2.

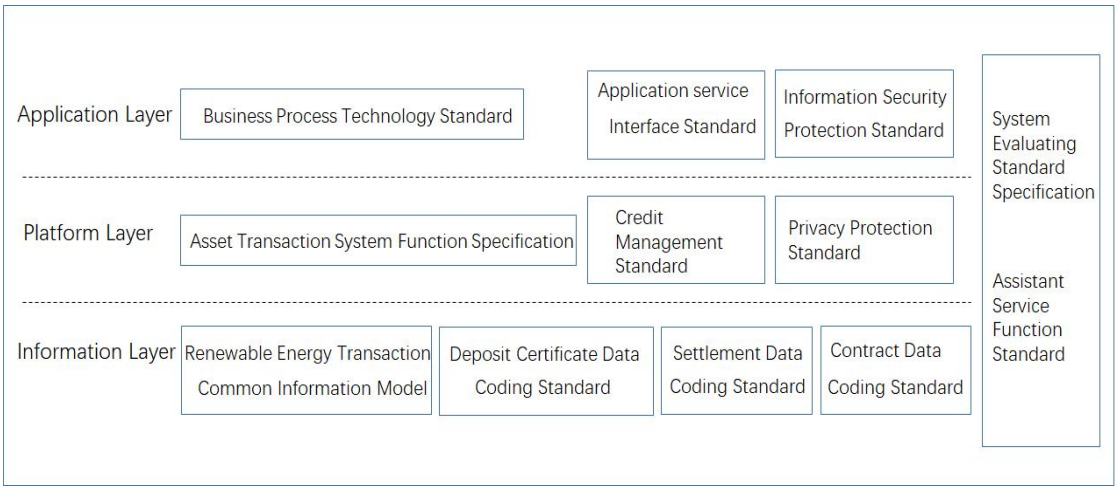

Figure 2. The framework of renewable energy asset tradition standard.

3.1 Information layer

The first is the information layer which includes the renewable energy asset transaction common information model standard, renewable energy transaction contract data coding standard, renewable energy asset transaction settlement data coding standard, renewable energy asset judicial deposit certificate data coding standard, etc.

3.2 Platform layer

The second is the platform layer which includes functional specifications of the renewable energy asset tradition system, credit management specifications of the renewable energy tradition subject, and the technical specifications for the privacy protection of renewable energy asset transaction information.

3.3 Application layer

The third layer is the application layer which includes renewable energy asset transaction business process technical specification, application service interface standard, information security protection standard, etc.

3.4 Evaluation and assistant service

Evaluation and assistant service includes technical specification of renewable energy asset transaction assistant service and system evaluation standard, which are through three levels.

4. The main content of renewable energy asset transaction standard

4.1 Common information model standard

The Common information model defines renewable energy as common data and information exchange which includes basic concepts， common classes, and attributes of all typical asset objects, as well as the relation between them. The model specifies function requirements of interfaces, components, functions, or methods of accessing common information.

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4.2 Coding standard of renewable energy asset transaction

The data needs to be classified including contract, deposit, and settlement of renewable energy asset. The coding principles, coding methods, and code structure should be specified. The first thing is to establish the regulation of object naming and attribute definition. Then, according to the requirement of the construction renewable energy asset transaction platform, data categories are established that cover deposit data coding, contract data coding, settlement data coding, and so on. At last, the encoding method and code structure are specified.

4.3 Technical specification of transaction business process

Firstly, for solving business credibility, transaction settlement, asset transfer, and other works, technical specifications and standards should be provided. Secondly, the roles of participants, smart contracts, and transaction mechanisms need to be standardized. Thirdly, the roles of participants, specify the registration, right confirmation, evidence collection, and deposit of renewable energy assets should be defined. The last process is to specify business content, process, steps of the transaction, matchmaking, circulation, traceability, and so on.

4.4 Functional specifications of renewable energy asset transaction system

Firstly, the functions of renewable energy asset transaction systems, including user management, transaction matchmaking, settlement management, information management, and assistant service management should be specified. Secondly, functions of user registration, basic information, project details information, privacy information, and attachment information need to be stipulated. Thirdly, the user credit investigation report, right confirmation certificate, evaluation report, and diligence report of third-party service provider need to be stipulated. Fourthly, feedback information should be stipulated. Lastly, relative information on transaction signing, settlement management, invoice uploading, and transaction result publicity must be specified.

4.5 Credit management specification of renewable energy asset transaction

Credit management, credit granting management, and credit files of transaction participants need to be specified. According to the credit risk model, confirming the risk coefficient of the counterparty, the credit line is regulated, standardizing operation requirements to guarantee and mortgage, overdue account collection, account receivable management, credit file management, and updating user credit timely.

4.6 Privacy protection of renewable energy asset transaction

All kinds of private information involved in the transaction platform of renewable energy assets shall be regulated, including the principles and requirements for collection, preservation, and public disclosure. Privacy protection principles must be established. Privacy information including user information, business information, and asset information is classified differently. Establishing a data list of various privacy information and specifying the content of privacy protection should be done. Furthermore, warning privacy about processing rules violations should be established.

4.7 Function specification of transaction assistant service

Assistant services and other functions of renewable energy asset transactions should be specified, such as on-site video tours or drone tour services, virtual reality services, etc.

4.8 Application service interface and communication protocol

Various application service interfaces and communication protocols should be specified, such as information exchange interface, system evaluation, and other contents.

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5. Matters need attention

The renewable energy asset transaction standard framework is a part of the Energy Internet that should be coordinated with the Energy Internet standard framework. At present, the renewable energy asset transaction system is still in its infancy and the standard framework is not perfect which needs to be constantly corrected and improved later. In addition, the system needs experts from enterprises and scientific research institutions widely to push and support the progress together.

6. Conclusion

This paper presents the basic concept of renewable energy asset transaction and analyses the basic framework of renewable energy asset transaction standards. It proposes a series of standards. The paper shows clear direction and roadmap in detail. In the process of practice exploration, renewable energy asset transactions will face the challenges of weak digital foundation, immature digital technology, and digital business model with a lack of innovation, and cross-border barriers, but the new ecological network and huge industry prospects of renewable energy asset transaction are immeasurable. A large amount of standard work needs to be done in the further.

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