J-POWER, Industry One, NSW and Scalar Begin Co-Development of Environmental Value Platform That Assigns Time Value to Renewable Energy
Development of Tracking System Using Distributed Ledger Technology

Four companies—Electric Power Development Co., Ltd. (headquartered in Chuo-ku, Tokyo; President and CEO: Hitoshi Kanno; "J-POWER"), Industry One, Inc. (headquartered in Chuo-ku, Tokyo; President and CEO: Tsubasa Endo; "Industry One"), NSW Inc. (headquartered in Shibuya-ku, Tokyo; President and Representative Director: Shoji Tada; "NSW") and Scalar Inc. (headquartered in Shinjuku-ku, Tokyo; CEO: Wataru Fukatsu, CTO: Hiroyuki Yamada; "Scalar")—have begun co-development of an environmental value platform aimed at the efficient use of renewable energy and reduction of fossil fuel usage. The goal of this project is to solve challenges in the renewable energy field and assign time value.

Current Issues and Development Background

Electric power from renewable energy sources is not generated uniformly throughout the day as it is highly dependent on weather and climate conditions. Under current business practices, in which transactions rely solely on non-fossil certificates without any time-period verification, it is difficult for users to prove the electricity they are procuring comes from only simultaneous renewable energy sources.

For example, the problem with the supply of electricity solely from solar power generation is that it means the percentage of CO_2-intensive thermal power sources is high during nighttime hours. To promote the use of renewable energy at night, utilization of environmental value in line with electricity supply and demand by time period is becoming increasingly important.

Examples of Initiatives

- 24/7 Carbon-free Energy (CFE): A program that assures the use of 100% non-fossil fuel power sources, every hour of every day

- Shifting solar power generated during daytime to nighttime: A trial program aimed at increasing the added value of renewable energy power by using storage batteries and other technologies to shift electricity generated during daytime to nighttime

Differences in Supply Volume of Renewable Energy Sources by Time (Illustration)
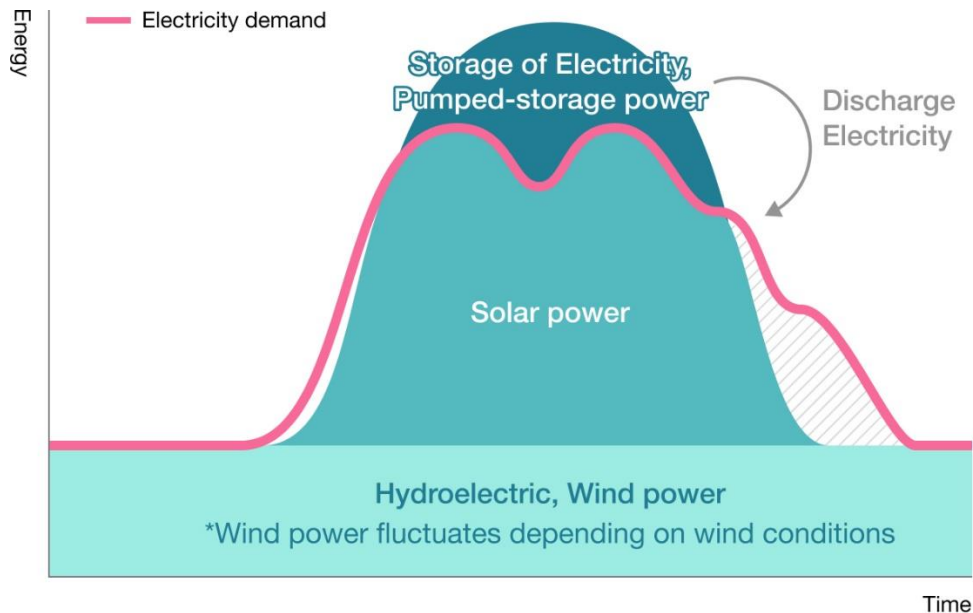
Against this backdrop, four companies—J-POWER, an integrated energy company that provides stable supplies of electricity; Industry One, the core company in the digital solution business of Mitsubishi Corporation; NSW, an IT solutions provider; and Scalar, a startup that develops database middleware—conducted proof-of-concept (POC) testing using ScalarDL, which is Scalar's database tampering detection middleware. The testing confirmed that it is possible to both ensure tampering detection and safeguard power generation data. The four companies have now established a method of building the infrastructure for an environmental value platform that can handle high-volume transaction processing. The aim is to establish a platform that is reliable and verifiable by a third party, while ensuring data integrity and authenticity in the distribution of environmental value data, a field that will grow in the future.

Overview of Environmental Value Platform

This platform will accurately record the time that non-fossil power sources generate power and link that data with demand data to provide a mechanism for revealing the environmental value of each time period.

- Tampering detection function
  - Through distributed ledger technology using ScalarDL, the platform will ensure that power generation data and environmental value data have not been tampered with.
  - The function will ensure that data within the platform matches data obtained from smart meters and other instruments, ensuring its accuracy and reliability.

- Non-fossil fuel value pooling and matching
  - Rather than linking the amount of power generated and the amount of power used in a direct one-to-one ratio, this method separates and pools environmental value from non-fossil energy sources. It employs a design that assigns a non-fossil fuel ratio to each user. This method also enables the system to handle the calculation of the CO_2 emission factor.
  - It will be possible to conduct rational environmental value trading while rapidly processing large amounts of data.
- Visualization of non-fossil fuel ratio using time-based information and other data
  - The platform will reflect the different energy mixes in each time period to accurately calculate the non-fossil fuel ratio.
  - As a result, it can visualize electricity demand in time periods in which a large amount of CO_2 is actually emitted, and contribute to the reduction of CO_2 emissions.
  - In the future, the platform will be able to provide information on the place of origin, thus helping to promote the introduction of locally produced and consumed energy sources.

Environmental Value Platform That Assigns Time Value (Illustration)
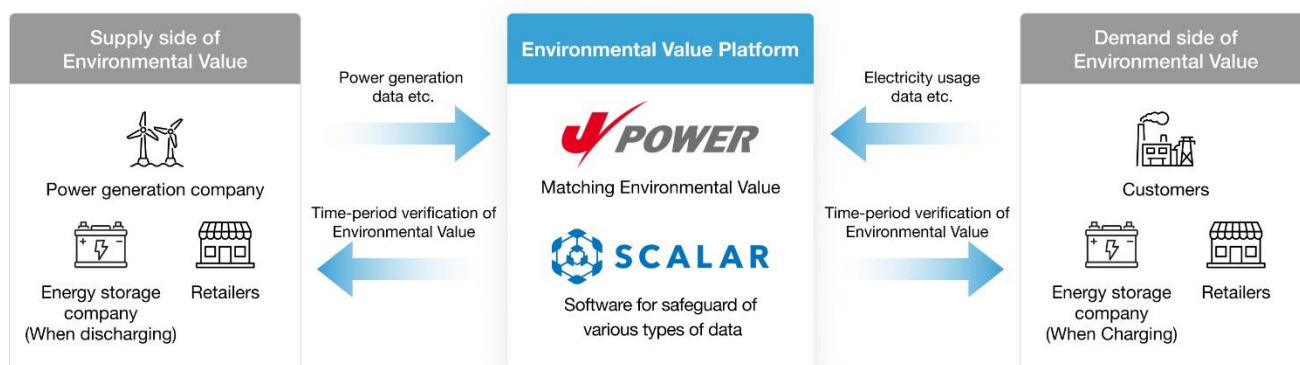
Role of Each Company in POC

J-POWER
- POC planning and implementation
- Business planning for optimization of renewable energy supply and reduction of CO_2 emissions
- Provision of power generation data from diverse power source portfolio (including data on renewable energy and pumped-storage power generation)

Industry One
- POC project support (organization of POC operational requirements and system requirement support)
- Feasibility study support according to market needs (business strategy, business model design, roadmap formulation)

- UIUX design to efficiently manage and visualize electricity usage data of customers (including UI prototype development)

NSW

- Development and construction of tampering detection system for power generation data
- Data collection from smart meters and establishment of a data processing system based on loss rate
- Establishment of a system for efficiently managing and visualizing customer electricity usage data

Scalar

- Provision of and technical support for ScalarDB, a transaction manager/HTAP engine that virtually integrates multiple heterogeneous databases, and ScalarDL database tampering detection middleware

Expected Benefits and Future Outlook

The following benefits are expected from this platform.

- Maximization of non-fossil fuel value
  - o Improvement of the non-fossil fuel ratio of users and retail suppliers will be easily achievable
  - o Will help promote the introduction of locally produced and consumed energy sources by providing proof of place of origin in the future
- Reduction of fossil fuel usage
  - o Will create incentives to utilize non-fossil fuel energy sources, enabling reduction of fossil fuel usage
- Response to systems
  - o Will flexibly respond to trends such a 24/7 CFE and the GX League[1] and carbon credit[2] markets
    1. GX League: A forum for participating companies to cooperate with government and academia on initiatives for green transformation (GX)
    2. Carbon credits: A mechanism that enables offsetting of greenhouse gas emissions, mainly between companies

The introduction of the environmental value platform will promote the efficient GX at companies by combining a diverse energy source portfolio, including storage batteries, to increase the supply of renewable energy during hours when CO_2 emissions are high, and optimize the operating patterns of renewable energy and storage batteries.

Going forward, we will work to make the platform expandable to include distribution of environmental value other than electric power (e.g., carbon credits) and enable it to function as a "GX Bank" (tentative name).

The J-POWER Group is committed to expanding its renewable energy portfolio, which includes diverse power sources, such as hydroelectric, wind (onshore and offshore), geothermal, and solar power, to achieve carbon neutrality as stated in J-POWER BLUE MISSION 2050.