NTT to Study Hydrogen Transportation Through Existing Pipelines

Study to Advance the Implementation of Practical, Stable Transportation of Hydrogen as a Clean Energy Source Across the Globe

Tokyo – July 25, 2022 – NTT Anode Energy Corporation (President and CEO: Teruyuki Kishimoto, Head Office: Minato-ku, Tokyo, NTT Anode Energy) announced a joint research and development project to study safety measures for the mass transportation of hydrogen through existing pipeline infrastructure. The study, being performed in collaboration with the National Institute of Advanced Industrial Science and Technology (President: Kazuhiko Ishimura, Chiyoda-ku, Tokyo AIST) and Toyota Tsusho Co., Ltd. (Representative Director: Ichiro Kashitani, Minato-ku, Tokyo, Toyota Tsusho), is expected to contribute to the realization of a pipeline transportation model for hydrogen that could be implemented globally.

According to a paper published by the International Renewable Energy Agency, "Hydrogen has emerged as an important part of the clean energy mix needed to ensure a sustainable future." However, the large-scale, stable transportation of hydrogen through new pipeline infrastructure faces issues including land acquisition construction costs and building time. Utilizing existing pipeline infrastructure can solve these issues, and this new study represents the next step in this model's proof-of-concept process.

The study will examine a double-piping system in which a hydrogen pipeline is placed in an existing pipe (the "sheath pipe") buried underground. Factors to be measured and contributed to the formulation of technical standards include:

1. On-site investigation of hydrogen leakage detection
2. Verification of detection of signs of abnormality
3. Establishment of a control sequence to ensure safety
4. Performance evaluation of various hydrogen sensors in a real-world environment

Safety measures will be investigated under the assumption of unsteady conditions including rupture accidents and natural disasters during pipeline operation. In addition to examining the safety measures necessary for such use of existing pipelines, the study will verify the profitability of such projects, including cost analysis of transportation; energy input; and economic efficiency, as compared to other hydrogen transportation means.

Based on the knowledge and data gained through this project, NTT Anode Energy and its collaborators will promote and establish technical studies on safety measures for practical use. Ultimately, the project will also support the future supply of hydrogen to urban areas (e.g., public and commercial facilities, data centers and communications buildings; fuel cell vehicles; hydrogen stations, etc.), supply through pipelines utilizing communication pipelines (e.g., cable tunnels) and will contribute to the development of smart cities and the establishment of hydrogen supply means through pipelines in regions with a view to a society that consumes a large amount of hydrogen through the development of CO2-free hydrogen.

This project is being conducted in accordance with the "Research and development for the full-scale popularization of ultra-high pressure hydrogen infrastructure/Research and development for international development, international standardization, etc./Research and study for the examination of technical standards for hydrogen supply infrastructure, etc." of the New Energy and Industrial Technology Development Organization.

Primary Areas of Research by Collaborator

NTT Anode Energy

- Hydrogen leakage detection;
- Abnormal sign detection;
- Hydrogen sensors investigation;
- Investigation of residual hydrogen concentration at the time of hydrogen leakage; and
- Investigation of explosion effect of manhole cover

AIST

- Investigation of fire flame behavior caused by the ignition of leaked hydrogen in a simulated double piping system

Toyota Tsusho

- Clarification of unit costs through verification of equipment, installation and safety costs; and
- Verification of advantageous conditions and business establishment requirements of pipeline transportation

About NTT Anode Energy Group

As a company focused on leveraging the information communications technology and DC power supply technologies of the NTT Group in pursuit of "smart energy" business opportunities, NTT Anode Energy is working to develop and deliver energy solutions that make more sophisticated and efficient use of distributed energy resources such as renewable power generation facilities and storage batteries. In this way, it can fully express the unique synergies of the NTT Group. Through these efforts, we aim to work with partner companies to create new energy distribution mechanisms to help to revitalize industries and shape a more sustainable society.

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