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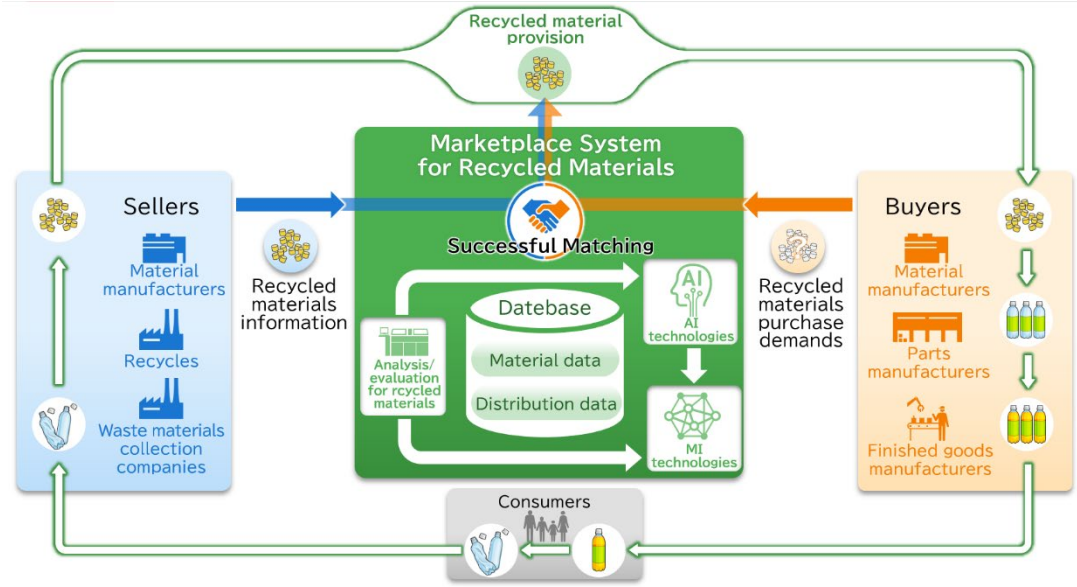
Hitachi and SEKISUI CHEMICAL Completed Proof of Concept for "Marketplace System for Recycled Materials" Which Accelerate the Use of Recycled Materials

Contributing to achieving a circular economy
through advanced digital technologies such as MI Solutions and generative AI



Overview of the "Marketplace System for Recycled Materials"

Tokyo, June 5, 2024 – Hitachi High-Tech Corporation ("Hitachi High-Tech"), Hitachi, Ltd. ("Hitachi") and SEKISUI CHEMICAL CO., LTD. ("SEKISUI CHEMICAL") completed the proof of concept (“PoC”) using a prototype of the "Marketplace System for Recycled Materials" ("the system") which accelerate the use of recycled materials such as recycled plastics, and have successfully confirmed its effectiveness. We will work to promote initiatives towards commercialization.

The system provides an online service that matches buyers looking to purchase recycled materials as raw materials and sellers looking to circulate waste as recycled materials, and enables a series of transaction processes. Hitachi High-Tech and Hitachi are developing the system by using Hitachi High-Tech’s core technologies in measurement and analysis, extensive knowledge of plastic materials cultivated over many years, and Hitachi's advanced digital technologies such as Materials Informatics ("MI") and generative AI. SEKISUI CHEMICAL provided waste materials generated in its own manufacturing processes to this PoC, and has made a significant contribution to the development of the system by proposing requirements and improvement points as a system user.

This PoC successfully proved that the prototype of the system could be used to smoothly establish a series of processes allowing product manufacturers (buyers) to consider adopting recycled materials processed from waste materials as raw materials. Based on these results, the three companies will work together with the aim of commercializing a service that utilizes the system to promote active use of recycled materials in FY2025, and they will continue to accelerate their efforts toward resource recycling to contribute to achieving a circular economy and a sustainable society.

Background to the PoC

The circular economy has been attracting attention in recent years as one of the solutions to address social issues such as climate change, biodiversity loss, increased wastes and a lack of resources. Against this background, the demand for product and material manufacturers to use recycled materials and recycle waste materials generated during manufacturing processes is increasing. However, the quality of recycled materials from waste materials lacks stability compared to virgin materials*1 and the amounts produced are variable. Therefore, it requires much expertise and a great deal of effort, also it can be challenging to match buyers of recycled materials with sellers. For example, buyers require information to locate and select a suitable recycler*2 and check the quality of recycled materials at risk of being contaminated with impurities, but such information can be difficult to gather. Also, there are cases where sellers are unable to find a suitable buyer to use their recycled materials and eventually end up disposing of them.

*1 Materials manufactured entirely from new resources.

*2 A company responsible for processing waste produced by factories and ordinary homes into materials which can be used as a raw material, such as recycled plastic or chemical products.

Company Roles and the Details of the PoC

To combat these challenges, Hitachi High-Tech and Hitachi are working together to develop the system to accelerate the use of recycled materials. Hitachi High-Tech is leveraging its extensive knowledge and network cultivated over many years as a specialized trading company, alongside products and services that utilize their core measurement and analysis technologies. In this way, Hitachi High-Tech provides expertise that contributes to solving the challenges of using recycled materials, such as material data, proposals for optimal conditions for recycled material formation processes and recycled material quality control. Hitachi has been developing the system using advanced digital technologies such as AI alongside knowledge and expertise gained through providing over 100 cases of MI solutions to more than 50 material manufacturers and other companies. Hitachi has previously collaborated with SEKISUI CHEMICAL to drive advancements in MI, also in this PoC we are working together for aiming to develop the system.

SEKISUI CHEMICAL Group aims to contribute to realizing a sustainable society and has set the target of achieving a circular economy by 2050. SEKISUI CHEMICAL has been promoting various initiatives, such as internal recycling to reuse waste materials generated in its production processes, and implemented processing for reuse of resources including energy when disposing of materials as waste. With the aim of further improvement of resource recovery, SEKISUI CHEMICAL provided waste materials generated in its own manufacturing processes for this PoC, and is playing a major role in validating the System's usefulness from the perspective of both its associated buyers and sellers, including those purchasing recycled materials, recyclers and waste materials collection companies.

In this PoC, the quality and performance of recycled materials processed from SEKISUI CHEMICAL waste were evaluated using equipment such as Hitachi High-Tech analyzers. Hitachi then completed the PoC by uploading the quality and performance data of the recycled materials onto the system and verifying that a series of processes, such as using this data to evaluate whether buyers (product manufacturers) could adopt them as materials for their own products, were completed without a hitch, thus confirming the system's usefulness.

Main Features of the System

We are currently developing a variety of services to support the recycling of materials between system users (buyers and sellers). In particular, the following matching support features and quality controls enable safe and reliable transactions involving recycled materials.

(1) Beginner-friendly matching support features that utilize recycled material expertise and generative AI.
This feature (patent pending) supports practical matching by recommending and providing information on making the most of recycled materials, with Hitachi's expertise in making full use of recycled materials alongside generative AI to clarify the specifications and practical applications desired by users in a Q&A format. This makes the matching simple even for the uninitiated person, such as procurement and manufacturing departments with no previous practical experience of using recycled materials.

(2) Matching support features for professionals that utilize MI solutions
This feature (patent pending) supports customization of recycled material that satisfy users' ideal material performance by leveraging Hitachi's own collected measurement data on the material composition and performance of recycled plastics alongside expertise gained through providing MI Solution which is one of Hitachi's Lumada*3 solutions. The feasibility of recycled materials can also be verified prior to their development, making practical matching possible without precedent. In addition, this feature can predict what the physical properties will be if additives are mixed in with recycled materials, or what characteristics there will be if the recycled materials are mixed with a certain percentage of virgin materials, thereby contributing to efficient development of R&D divisions, etc.
*3 A general term for solutions, services and technologies that leverage Hitachi's advanced digital technologies to create value from customer data and accelerate digital innovation (https://www.hitachi.com/products/it/lumada/global/en/index.html).

(3) Recycled material molding support and quality control, utilizing sensing, measurement and analysis technologies
In the case of molding recycled materials, there was often a lack of knowledge in areas such as material compounds and molding methods, which then required significant time for investigation and trial runs. By extracting feature values*4 from the recycled material quality through Hitachi High-Tech and Hitachi's sensing technologies, this feature helps to propose optimal conditions and reduce barriers to entry. We will also provide a service that uses Hitachi High-Tech Group’s analyzers to support recycled material quality checks, such as identifying chemicals subject to regulations and materials that have an impact on the performance of recycled materials.
*4 A numerical value that quantitatively expresses the features and characteristics of data and objects being analyzed.

Future Outlook
Based on the results of this PoC, Hitachi High-Tech and Hitachi will work with various stakeholders, including material manufacturers such as SEKISUI CHEMICAL, to create a more customer-friendly system, and aims to launch services that utilize the system to market in FY2025 and take on challenges as One Hitachi. Hitachi High-Tech will look for companies (buyers and sellers) interested in getting involved with the service, also expand this system for product and material manufacturers in Japan and overseas to utilize its broad sales networks, after the service is launched. Hitachi will push forward by working with Hitachi High-Tech and SEKISUI CHEMICAL to develop the system for commercialization. SEKISUI CHEMICAL will continue to work with Hitachi High-Tech and Hitachi to promote proactive initiatives aimed at achieving a circular economy by 2050.

In the future ahead, we will help to resolve social issues through our businesses and contribute to achieve sustainable society.

Related Link
- Hitachi High-Tech's MI Solutions
- Hitachi's MI Solutions
- SEKISUI CHEMICAL's initiatives to realize a circular economy

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