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Mitsui Chemicals, Inc.

## **Physical Internet Realization Council's Chemicals Working Group Runs Demonstration Test to Find Effects of Joint Logistics Pursuing the creation of a DX-based joint logistics platform**

The Chemicals Working Group (Chairman: Professor Yano Yuji, Ryutsu Keizai University) of the Physical Internet Realization Council led by the Ministry of Economy, Trade and Industry and the Ministry of Land, Infrastructure, Transport and Tourism has conducted a demonstration test of joint logistics over September–December 2024, looking at routes from Yokkaichi to Ichihara, Nagoya to Hokuriku and Ichihara to Tohoku. Released on December 23, the results of this demonstration test indicate positive effects on truck fill rate, CO<sub>2</sub> emissions and more.

The Chemicals Working Group currently includes 78 members, most of them consignors and logistics providers, and sees participation from the Japan Chemical Industry Association, the Japan Petrochemical Industry Association, and several relevant divisions from the Ministry of Economy, Trade and Industry and the Ministry of Land, Infrastructure, Transport and Tourism, among other bodies. Mitsui Chemicals, Inc., the Mitsubishi Chemical Group, Tosoh Corporation and Toray Industries, Inc. serve as the joint secretariat.

For further information, please see the following materials.

### ■ References

June 11, 2024: "Physical Internet Realization Council's Chemicals Working Group to Conduct Demonstration Test for Joint Logistics in the Kanto–Tokai Region"  
[https://jp.mitsuichemicals.com/jp/release/2024/2024\\_0611/index.htm](https://jp.mitsuichemicals.com/jp/release/2024/2024_0611/index.htm) (Japanese only)

June 13, 2023: "Establishment of a Chemicals Working Group in the Physical Internet Realization Council"  
[https://jp.mitsuichemicals.com/en/release/2023/2023\\_0613/index.htm](https://jp.mitsuichemicals.com/en/release/2023/2023_0613/index.htm)

**Demonstration Test Shows Impact of Joint Logistics,**  
**Highlighting Potential to Solve Logistics Issues in the Chemical Industry**  
**Pursuing the creation of a DX-based joint logistics platform**

The Physical Internet Realization Council<sup>\*1</sup> led by the Ministry of Economy, Trade and Industry (METI) and the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) is having its Chemicals Working Group<sup>\*2</sup> tackle issues emblematic of the “2024 problem” in logistics, such as shortages of transport and storage capacity – these being difficult for individual companies to solve themselves. These efforts involve both Working Group members and the chemical industry as a whole.

For the Chemicals Working Group’s latest endeavor, several member companies – the Mitsubishi Chemical Group, Mitsui Chemicals, Tosoh, Toray and Prime Polymer – made use of subsidies from METI and MLIT<sup>\*3</sup> to carry out a demonstration test over September–December 2024. This demonstration test employed a logistics data platform and logistics information standards promoted by the government via the Physical Internet Realization Council.

In addition to an on-site trial involving real freight and real vehicles between chemical complexes spanning Yokkaichi to Ichihara, the demonstration test incorporated a simulation of joint logistics between Nagoya and the Hokuriku region, as well as an analysis of transport efficiency between Ichihara and the Tohoku region, to demonstrate the effects of joint transport and the usefulness of a joint logistics platform. The on-site trial in particular found striking results, including a 20 percentage point improvement in truck fill rate and a 28 percent reduction in CO<sub>2</sub> emissions.

■ Aims of the demonstration test

1. Demonstrate the **feasibility of joint logistics involving multiple consignors and multiple logistics providers**, which is unprecedented in the chemical industry
2. Confirm and assess the **effectiveness of a joint transport model – including joint delivery – centered on regular, main-route services**
3. **Confirm the usefulness of a joint logistics platform – as well as of a standardized logistics information format for the chemical industry based on logistics information standards<sup>\*4</sup>** – in achieving the multifaceted exchange of various data between multiple consignors and logistics providers
4. Demonstrate the feasibility and impact of joint logistics by way of simulations based on real transport data from several consignors

■ Results of the demonstration test (quantitative assessment)

On-site trial (Yokkaichi–Ichiهارا)	Truck fill rate	69% → 89% (up 20 percentage points)
	CO <sub>2</sub> emissions	Down 28%
Theoretical trial (Nagoya–Hokuriku)	Truck fill rate	67% → 80% (up 13 percentage points)
	CO <sub>2</sub> emissions	Down 16%
Theoretical trial (Ichiهارا–Tohoku)	Total mileage	29% reduction (vs. current logistics setup)
	Driver work hours	17% reduction (vs. current logistics setup)
	CO <sub>2</sub> emissions	17% reduction (vs. current logistics setup)

■ Future plans

As the participants in this demonstration test were able to confirm the feasibility of joint logistics and resulting logistics optimization, aims in future are to gradually expand the scope of these efforts and increase the economies of scale provided by digitalization. The test also found that in order to make joint logistics a reality, it will be important to standardize logistics operations between various consignors and logistics operators, as well as to revise business practices. Participants will use the knowledge gained through this demonstration test as a framework to follow the voluntary action plan released through the Chemicals Working Group as they strive to put said plan into motion.

Going forward, it is hoped that – by pursuing the creation of a transport model that can be deployed throughout Japan – participants will be able to contribute to the sustainability of the Japanese chemical industry through achieving sustainable logistics and reducing GHG emissions from logistics.

\*1 Physical Internet Realization Council

An organization established by METI and MLIT in October 2021 to formulate a roadmap for achieving a physical internet in Japan.

[https://www.meti.go.jp/shingikai/mono\\_info\\_service/physical\\_internet/index.html](https://www.meti.go.jp/shingikai/mono_info_service/physical_internet/index.html) (Japanese only)

\*2 Chemicals Working Group

Established in June 2023 as the fourth working group under the Physical Internet Realization Council. As of December 2024, this working group includes 78 members (77 companies and one university), most of them consignors and logistics providers.

- Chairman: Professor Yano Yuji, Ryutsu Keizai University (Dean, Faculty of Distribution and Logistics Systems; President, Japan Logistics Society)
- Secretariat: Mitsubishi Chemical Group, Mitsui Chemicals, Tosoh, Toray
- Observers: Several relevant divisions under the Ministry of Economy, Trade and Industry (METI), the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), and the Ministry of Health, Labour and Welfare (MHLW), as well as the Japan Chemical Industry

Association and the Japan Petrochemical Industry Association. This demonstration test also saw participation from Deloitte Tohmatsu Consulting and Fujitsu

- December 12, 2023 release: Voluntary action plan to optimize logistics and improve chemical productivity:  
[https://www.cas.go.jp/jp/seisaku/buturyu\\_kakushin/jk\\_pdf/28.pdf](https://www.cas.go.jp/jp/seisaku/buturyu_kakushin/jk_pdf/28.pdf) (Japanese only)

### <sup>\*3</sup> Government subsidies

- 1) METI's Agency for Natural Resources and Energy: 2024 business expense subsidy for transport sector energy efficiency and transition to non-fossil energy (efforts to improve the energy efficiency of transport by truck)
- 2) MLIT: Business expense subsidy for the pursuit of logistics standardization (efforts to support the creation of an open platform that aims to standardize data in logistics)

### <sup>\*4</sup> Logistics information standards

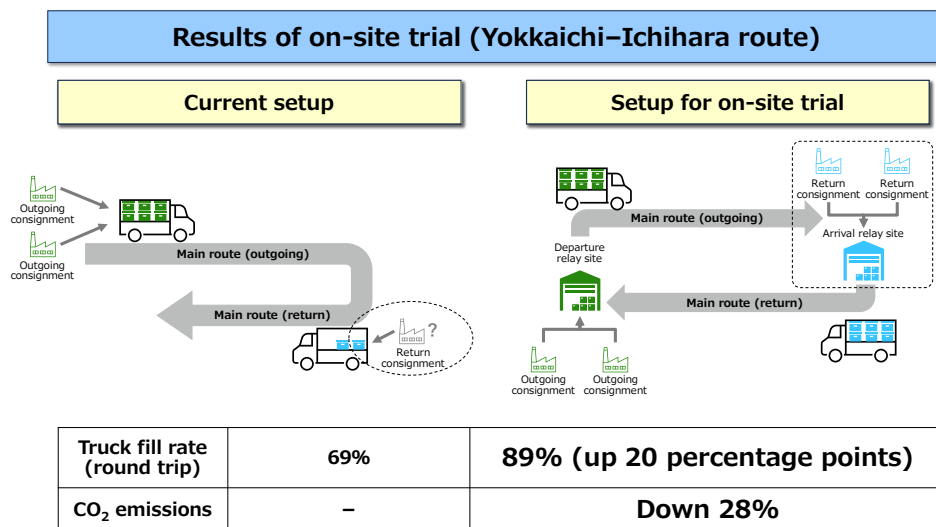
The Smart Logistics Service, part of the second term of the Cabinet Office's Strategic Innovation Promotion Program (SIP), was formed and announced in October 2021 following discussions with industry players. The application of logistics information standards (<https://www.lisc.or.jp/>) is also included as part of the Physical Internet Roadmap put together in March 2022 by METI and MLIT. The application of these standards is expected to minimize the need for complex adjustments, running costs and systems-related costs stemming from each company having different data, as well as to simplify the rollout of services such as joint transport and joint storage through the pursuit of more uniform data, contributing in turn to the optimization of logistics.

Addendum 1:

■ Results of the on-site trial

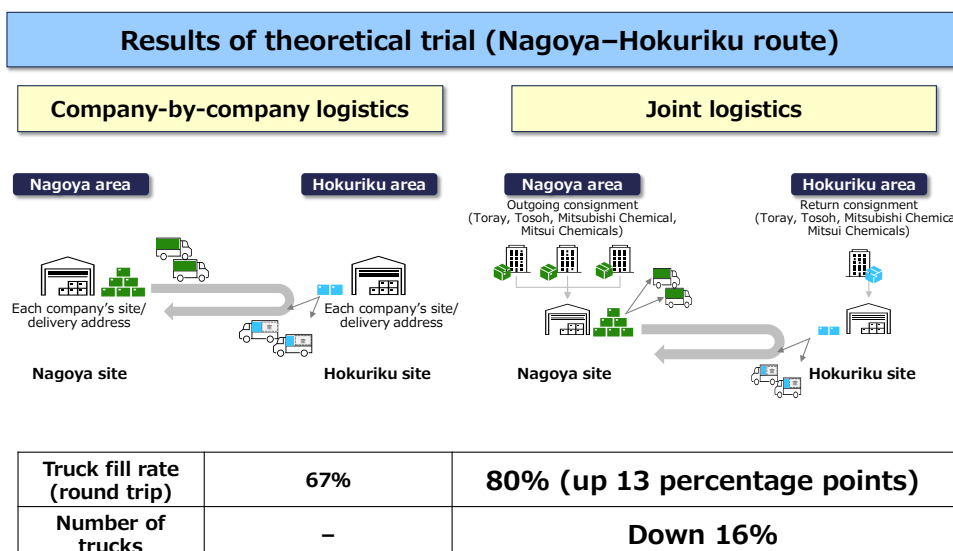
The on-site trial found that joint logistics increased truck fill rate to 89 percent, up 20 percentage points from current practices, while CO<sub>2</sub> emissions were reduced by 28 percent. In this way, the demonstration test has shown impacts such as improved truck fill rate, as well as reductions to CO<sub>2</sub> emissions, number of trucks required and driver work hours.

Further, the on-site trial of joint transport resulted in no incidents such as misdeliveries or delays, and all consignors' goods were able to be delivered to their destinations, indicating that joint transport is feasible and showing the usefulness of a joint logistics platform.



■ Results of the theoretical trials

With help from Ryutsu Keizai University, a theoretical trial was conducted for the Nagoya–Hokuriku route, including the use of past transport data for transport efficiency simulations and an analysis of transport efficiency. Joint transport simulations based on transport data from multiple consignors found the potential for a 13 percentage point improvement in truck fill rate and a 16 percent reduction in truck numbers.



For the Ichihara–Tohoku route, meanwhile, one year of transport data from logistics providers that have already implemented consolidated transport was analyzed to calculate what sort of positive impact these providers would have missed out on had they not been using consolidated transport. This analysis found that the adoption of a joint logistics model combining direct delivery and consolidated transport reduced total mileage by up to 34 percent, driver work hours by up to 22 percent and CO2 emissions by up to 24 percent.

With the path to achieving such a setup now clearer, plans going forward are to use the results from these theoretical trials as a basis for further accelerating efforts for joint logistics.

