

UNLOCKING CIRCULAR ECONOMY VALUE THROUGH TRUSTED AND DECENTRALISED DATA SHARING

Discover how the JIDEP project evidences unlocking circular economy value through trusted and decentralised industrial data sharing

Europe's transition to a greener and more digital economy depends on smarter, more efficient use of industrial data. The JIDEP project, completed in May 2025, showed how secure, decentralised data sharing can drive circular innovation across sectors like wind energy, automotive, and electronics.

With the Joint Industrial Data Exchange Pipeline (JIDEP) project now concluded, it leaves behind a powerful vision: enabling circular industry by making high-value material and product data accessible, secure, and shareable across sectors. Funded by Horizon Europe, the three-year initiative brought together 13 partners across seven countries to build and demonstrate a platform where manufacturers, recyclers, and technology providers could collaborate through trusted, decentralised data exchange.

Unlocking circular economy value

JIDEP set out to tackle a persistent problem. In a linear system, materials are extracted, used, and discarded, often due to a lack of visibility into their potential for reuse or recycling. While recycling technologies exist, the data needed to identify, assess, and recover valuable components is often locked within organisations or unavailable to those further down the value chain.

The platform created by JIDEP is built on principles of data sovereignty and decentralisation, giving organisations control over their data while enabling secure sharing through smart contracts and verifiable credentials. It incorporates key tools, including digital product passports, a circularity calculator, and environmental analytics, all aligned with FAIR data principles and EU circular economy goals.

Each tackled a critical waste and recovery challenge while showcasing how cross-sector collaboration, underpinned by secure data exchange, can lead to better outcomes.

Three industrial use cases demonstrate JIDEP's potential

In the wind energy sector, turbine blades represent a growing environmental burden as first-generation installations reach end-of-life. Their complex composite structures make recycling difficult, often resulting in landfills. JIDEP enabled wind farm operators, recyclers, and manufacturers to share critical data about blade composition and condition. This allowed recyclers to identify suitable materials for recovery and feed them back into production.

A key feature of this demonstration was using the platform's collaborative space

to match supply and demand: blades ready for disposal were listed and discovered by a recycling partner, who disassembled and treated the materials for reuse. The recycled fibres were then reintroduced into new blade production, with manufacturers and recyclers using JIDEP's tools to evaluate circularity metrics and environmental impact.

The automotive sector faces similar challenges, particularly using carbon-fibre-reinforced plastics (CFRPs). These materials are lightweight and strong but difficult and energy-intensive to recycle. Working with a car manufacturer and parts supplier, the project demonstrated how end-of-life vehicle components could be shared on the platform, enabling a recycling partner to recover carbon fibres using non-destructive chemical methods. The recovered material was validated for reuse and reintegrated into new components. Digital product passports track properties and provenance, with the circularity calculator enabling scenario testing to assess compliance and sustainability targets.

The third use case addressed printed circuit boards (PCBs) commonly found in electronic waste. While valuable, their complexity makes recycling inefficient. In this demonstration, JIDEP facilitated early-stage identification and separation of high-value components before disposal, using product passports and collaborative tools. The goal was to test technical capabilities and illustrate how data transparency could support more sustainable electronics lifecycle management.

At the heart of all three demonstrations was a core ambition: to create a neutral, secure digital space where different actors, manufacturers,

recyclers, and researchers could share data, find each other, and collaborate across traditionally siloed industries. The platform's collaborative features enabled recyclers to discover available end-of-life materials and feed them back into production networks, effectively closing the loop.

The JIDEP project's impact

JIDEP's technical innovations include using blockchain-based metadata control, self-sovereign identity systems, and a semantic infrastructure built using the iTelos methodology for ontology development. These capabilities ensure that data shared on the platform remains traceable, verifiable, and interoperable while maintaining the confidentiality required in industrial settings.

While the platform was specifically demonstrated within the project's defined use cases, it was designed with broader applicability in mind. The tools and architecture are modular and flexible, with attention to accessibility for organisations of varying sizes and digital maturity. Rather than proposing a one-size-fits-all solution, JIDEP provides a foundation that could be extended or tailored for future sector-specific data spaces.

The project also contributed to the evolving policy landscape, aligning with initiatives such as the Digital Product Passport, the Data Governance Act, and the Green Deal. Its open-source components, semantic models, and strategic recommendations offer valuable resources for both industry and policymakers aiming to advance digital circular economy infrastructure.

As the project concludes, its impact lies not just in the technology developed, but in the practical demonstration that circularity can be supported, and

accelerated, by trusted, data-driven collaboration. JIDEP has laid the groundwork for more resource-efficient industrial ecosystems by enabling better communication and interoperability between manufacturers and recyclers.

Europe's path to climate neutrality depends on rethinking how materials and products flow through the economy. Data is key to that transformation. JIDEP has shown what's possible when that data is unlocked, shared, and put to work.



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Project Information

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