gaia-x Hub Germany

Applying Data Spaces

Use Cases in Health, Industry and Energy

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Reiberg et al.

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About the series

This paper contains the content of the free online course “Applying Data Spaces: Use Cases in Health, Industry and Energy” organised by the Gaia-X Hub Germany. It provides interested parties with a basic understanding of the data economy and promotes discourse and the exchange of ideas.

Authors

Gaia-X Hub Deutschland c/o acatech – National Academy of Science and Engineering
Reiberg, Abel, Coordinator
Dreier, Silvia, Scientific Officer
Ebner, Rebecca, Scientific Officer
Kappert, Felix, Scientific Officer
Klee, Joanna, Scientific Officer
Schöngut, Winnie, Scientific Officer
Winterhalter, Elsa, Scientific Officer

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Gaia-X Hub Germany c/o acatech - National Academy of Science and Engineering
Karolinenplatz 4
80333 Munich

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1. Use Case "Secondary Use of Health Data"

1.1. Introduction

We are facing a major challenge in healthcare: Every day, huge amounts of health data are generated – for example, through hospital stays, diagnostic imaging, laboratory values, prescription data, digital health diaries, and applications such as fitness trackers or telemedicine solutions. This highly sensitive information is stored in a decentralized manner by a wide variety of actors (hospitals, private practices, laboratories, app operators, health insurance companies) and often remains unused, even though it could greatly advance research, innovation, and public health.

Used sensibly, combined data analyses could, for example, enable the development of new therapies, improve the early detection of diseases, or tailor healthcare services more precisely. However, the reality is often that, for data protection reasons, technical hurdles, and legal uncertainties, data from health apps or wearables in particular do not find their way into clinical and scientific contexts.

This is precisely where the HEALTH-X dataLOFT project comes in with its use case "secondary use of data." It is embedded as a flagship project in the European Gaia-X initiative and was funded by the German Federal Ministry for Economic Affairs and Climate Protection from 2022 to 2025 as one of eleven funded projects. It pursues the vision of a federated health data space, an infrastructure for the exchange of health data and data-based services, to which various players from the health domain are connected (e.g., hospitals, registered doctors, laboratories, app operators, health insurance companies, etc.) and in which health data can be shared with a high degree of control and security: for research, innovative therapies, and new digital health services. The use of data is always voluntary, controlled, and subject to the highest data protection and security standards.

The solution enabled by HEALTH-X dataLOFT is therefore more than just a technical system—it is a social offering: users can use an app to "donate" their own health data for medical studies or innovation projects in a targeted and informed manner. Processes such as pseudonymization, secure management, and transparency are integrated as standard.

This makes the complex and time-consuming "secondary use" a clearly regulated process that is beneficial for all sides: Researchers and companies gain access to valuable data, while all parties involved can rely on reliable digital and organizational security mechanisms.

1.2. Use Case: Secondary Use of Health Data

A strong network of research, healthcare, business, and technology

The HEALTH-X dataLOFT project brings together the expertise of over a dozen partners from various disciplines: *Charité – Universitätsmedizin Berlin* heads the consortium, which also

includes research institutes such as the *Fraunhofer Institute for Software and Systems Engineering ISST* and the *Fraunhofer Institute for Digital Medicine MEVIS,* the *Hasso Plattner Institute, OFFIS e.V.*, *Freie Universität Berlin*, and *TMF – Technology and Method Platform for Networked Medical Research e.V.* Companies such as *Siemens Healthineers, Bundesdruckerei*, and *IONOS SE*, as well as *IT consultancies, eHealth start-ups*, and *International Data Spaces e.V.* are also among the project partners.

The data space is being developed and operated in partnership. Tasks such as technical platform development, the design of user-friendly apps, and the negotiation of rules and governance are being implemented on a collaborative basis. One focus is on connecting to existing telematics infrastructures and European standards in order to ensure future readiness and interoperability.

What is the telematics infrastructure?

The telematics infrastructure is the digital networking platform for the German healthcare system. It connects doctors, hospitals, pharmacies, care facilities, health insurance companies, and other stakeholders via a secure network and enables the protected exchange of health data and documents. The telematics infrastructure is based on binding legal and technical requirements, is centrally coordinated, and ensures that data protection and information security are always guaranteed.

Focus on citizens

A key feature of this use case: it puts citizens first. They decide independently whether or not they want to release their data for research. Data trustees – often independent healthcare providers – guarantee the secure, data protection-compliant transfer of sensitive information.

Data space architecture and functionality for end users – step by step

In line with the principles from Course 2 of the Campus, this use case is also implemented in a modern, decentralized data space. The use of the HEALTH-X dataLOFT data space follows a clearly structured process, using the example of Jane Doe, who regularly collects health data such as heart rate, exercise, and sleep habits via wearables and apps:

1. **Information phase:**

   Jane Doe uses the dataLOFT app and learns that the "Heart Health in Central Europe" study is specifically looking for data on activity and heart rate. The app provides transparent information about the study's objectives, procedure, and benefits.

2. **Consent management and control:**
   Jane Doe can use the app to consent to this specific data being transmitted to the study. She gives her consent knowingly – it can be revoked at any time, ensuring that Maxima retains full control over her data.

3. **Matching and transparency:**
   Before any data is transferred, the platform automatically checks whether Jane's data actually meets the study requirements, e.g., whether there are sufficient data points for heart rate. Only if she is eligible will Jane receive a notification and can then give her informed consent.

4. **Data protection, pseudonymization, and the trustee principle:**
   Before data can be used for research or commercial purposes, it undergoes strict anonymization or pseudonymization. The data cannot be linked back to her later on. An independent data trustee is responsible for the administration and technical security of the data.

5. ***Secure data transfer to research and business:***
   The researchers involved in the study project are granted clearly limited, documented access to the pseudonymized data of Jane Doe and other participants. Every "movement" of the data is documented in a traceable manner to ensure transparency.

Benefits for research, business, and society

- **How does Jane Doe benefit?**

  Jane Doe can use the app to find out at any time what personal data of hers is currently being used and for what purpose. After the study is completed, she is informed about the results in a clear and accessible format – e.g., how everyday exercise affects heart health, or whether individual recommendations have been derived. In the best case scenario, Jane Doe and other participants will benefit in the future from prevention services tailored to their needs or advanced digital health services.

- **How do researchers and companies benefit?**

  Researchers gain access to comprehensive, realistic health data. This makes it easier to plan meaningful, large-scale studies and develop new approaches to diagnostics or prevention. Companies, especially innovative start-ups, can develop and test new products, practical services, and analysis solutions on a secure and legally compliant basis.

- **How does society benefit?**

  The secondary use of such data gives the healthcare system and society new impetus for making prevention and therapy more targeted and effective. The availability of high-quality data makes it possible to identify gaps in care more quickly, better assess individual risks, and accelerate medical progress overall.

1.3. Summary & Outlook

HEALTH-X dataLOFT finally turns the abstract promise of "secondary use of health data" into everyday reality: the platform enables citizens to make their data available for research and innovation in a secure and traceable manner – voluntarily and transparently. Researchers and companies benefit from easy access to valuable data, while data protection and digital sovereignty are maintained.

The platform itself is open and modular in design. It continuously integrates additional technical modules, partners, and new fields of application—such as prevention studies, AI development, and healthcare research. The results and technologies from HEALTH-X are specifically incorporated into larger initiatives such as the **European Health Data Space (EHDA e.V.)**. In this way, Health-X contributes to promoting and establishing the sovereign, efficient, and secure handling of health data throughout Europe.

If you would like further information or to get involved:

- The official project website provides up-to-date information, use cases, and contact details: health-x.org
- The Gaia-X Hub Germany offers events, networking, and further publications.
- The results and approaches of Health-X dataLOFT flow directly into the European Health Data Space (EHDA e.V.), which also offers networks, working groups, and opportunities for participation for industry, researchers, and the interested public: https://ehda-ev.eu/

Conclusion

The Health-X dataLOFT use case combines digital sovereignty, efficient data protection, and economic innovation in healthcare in a decentralized data space. It creates a model that benefits citizens, research, and business alike – transparent, legally secure, and future-oriented.

2. Use case: "CO_2 footprint in production engineering and manufacturing"

2.1 EuProGigant

The EuProGigant lighthouse project represents a new generation of digital cooperation in the European industry. It aims to simplify data exchange across national and industry boundaries while consistently implementing the principles of Gaia-X – decentralization, data sovereignty, and trust. The manufacturing industry is becoming increasingly connected, automated, and data-driven – the use of artificial intelligence in particular will play an increasingly important role. Although an enormous amount of data is already being collected in production processes today, the exchange and effective use of this data is still insufficient. However, challenges such as increasing complexity, product customization, and global supply chains require comprehensive data exchange. EuProGigant shows how targeted and secure data exchange along the entire value chain can be used to develop innovative solutions that increase both efficiency and sustainability and enable new business models. The project, funded by Austria and Germany, has created a dynamic ecosystem in which companies, research institutions, and technology providers work together on solutions that have an impact on everyday production and development.

How can this be applied in practice?

The project shows how a data space functions as a secure bridge between the parties involved. Each participant determines for themselves what data they share. EuProGigant is thus setting a standard that works beyond manufacturing, for example in logistics, energy, or aviation. Data is exchanged directly, without a third party, which minimizes administrative effort and significantly strengthens control over one's own data. The philosophy is clear: decentralization and simplicity are the basis for sustainable cooperation and value creation in digital networks.

EuProGigant has two goals in the manufacturing industry: First, EuProGigant is further developing the Gaia-X architecture to adapt it to the specific requirements of the manufacturing industry. Second, the project uses concrete use cases to demonstrate how added value is created in real-world operations through the use and exchange of data. This not only creates technical added value, such as data security or interoperability between different IT systems. The economic dimension is also central: as data providers, companies can tap into new revenue potential by, for example, monetizing data that previously remained unused. Conversely, data consumers benefit from efficiency gains – for example, through optimized material selection or improved processes based on real-time data from the network.

The development of the technical infrastructure is based on practical requirements and goes beyond the Gaia-X framework. EuProGigant focuses on four use cases that address key challenges in everyday production:

- The use case "**CO_2 footprint in production engineering and manufacturing**" enables companies to transparently evaluate and optimize the climate-relevant footprint of their products as early as the design phase.
- The "**Mobile processing machines**" use case shows how machines and robot systems can be used flexibly and independently of location for maintenance, repair, or production, and how large amounts of data can be transmitted securely and wirelessly to different locations in real time, enabling new digital services and autonomous processes.
- The "**Component matching**" use case automates the precise matching of components by securely exchanging and intelligently evaluating measurement data from different companies, significantly reducing assembly costs, rework, scrap, and resource waste in production.
- The "**Validation Platform**" use case enables the secure and sovereign exchange of real-time production and test bench data via digital twins within the EuProGigant project, allowing deviations in production and products to be detected at an early stage and efficiently validated together with partners along the value chain.

2.2 Use Case "CO_2 footprint in production engineering and manufacturing"

Let's take a closer look at the use case "CO_2 footprint in production engineering and manufacturing". Here, the focus is on climate protection and the transition to sustainable supply chains. Pressure is growing on companies to make their CO_2 emissions transparent and to reduce them. This is not only due to new legal requirements, but also to the increasing demands and expectations of customers and partners. Many traditional approaches to reducing emissions focus on energy supply or machine optimization. However, the greatest leverage often lies unrecognized directly in product development: up to 80 percent of a product's total emissions are determined as early as the design phase. The challenge is to capture this data at an early stage and integrate it meaningfully into the development process.

EuProGigant is specifically addressing this challenge. An intelligent, digitally networked production ecosystem will enable engineers and developers to select and compare suitable materials and processes based on their carbon footprint as early as the concept stage of product development. A web-based application allows users to simulate various alternatives even before production begins. Complex algorithms check each component variant and automatically calculate the predicted greenhouse gas emissions. This means that design decisions are directly linked to ecological criteria without losing sight of everyday practicality.

Solution approach and components

At the heart of the approach is a decentralized, sovereign data ecosystem that can be used to provide material and process data as well as calculation data for industry and research. This enables both SMEs and large corporations to exchange sensitive data in a controlled and secure manner. Material and laboratory suppliers make their characteristic values available for licensed use, thereby opening up new, data-based business models. The knowledge database also shows how knowledge can be traded along the value chain: standardized interfaces allow suppliers to provide their material data for a fee, while manufacturers and users of machines gain direct access to relevant information for green production processes.

Consortium partners and their roles in the use case

The leading role in the coordination and implementation of the EuProGigant project is assigned to the European Institute of Innovation and Technology (EIT) Manufacturing, which, as the consortium leader, ensures the connection between research and industry as well as strategic management. EIT Manufacturing brings together the large European network in the field of production and contributes expertise to the development of sustainable, data-driven business models.

Key partners include the *Vienna University of Technology (TU Wien)* and the *Technical University of Darmstadt*, which are leading the scientific and technical development of emission prediction models. As a software company, *concircle Österreich GmbH* provides important digital platforms and interfaces that enable the secure integration of different data sources and ensure interoperability in the data space in accordance with Gaia-X standards. This also includes the technical implementation of data connectors and ensuring compliance with the Gaia-X Trust Framework. In addition, *Haidlmair GmbH*, as an industrial partner, provides process-related data from manufacturing, thereby supporting the practical relevance and applicability of the solutions developed. *Voestalpine High Performance Metals GmbH* contributes material data that is essential for the precise assessment of the carbon footprint of various materials and manufacturing processes. Other partners such as *Arburg GmbH + Co KG* and *SIMCON* kunststofftechnische Software GmbH complement the project's value chain with their expertise in plastics processing and simulation.

Together, these consortium partners form an interdisciplinary network that combines industrial practice with technological and scientific development. Through this strong collaboration, they ensure that the use case is not only implemented on a sound technical basis but also creates real added value for SMEs and large companies by giving them access to valid CO_2 data and efficient tools for sustainable product development.

Benefits for SMEs

SMEs in particular benefit from this solution. They gain access to validated CO_2 and energy data without having to invest in their own expensive IT development. The solution increases transparency and trust along the entire supply chain. It helps companies to effectively meet

regulatory requirements such as the Supply Chain Act. Standardized interfaces ensure that control remains with the data owners, while new services, such as automated CO_2 accounting, are standardized for the first time in accordance with Gaia-X. For many companies, this opens up the option of not only making their own production more efficient and sustainable, but also of credibly documenting this progress to clients, customers, and partners.

2.3 Outlook

The EuProGigant project was successfully completed in February 2025 after four years and is now being gradually expanded to other areas of industrial research and new materials. The current state of research includes the development of industry standards for high-frequency and cost-effective data collection, the rollout of so-called smart integrated devices for tapping into new data sources, and the further transfer of the Gaia-X architecture to real production environments.

Further information and opportunities to participate

Companies can get involved in EuProGigant in a variety of ways, for example as active participants in the industry committee, as technology providers, or by helping to shape business models. There is also the opportunity to showcase products and deepen cooperation with existing projects. Interested parties are invited to contact the project team to find the right form of participation and contribute to the development of the production of the future.

All important information, studies, and guidelines can be found on the EuProGigant website and in the consortium's publications.

Conclusion

EuProGigant impressively demonstrates how digital cooperation in European industry can succeed through secure and sovereign data spaces. The project demonstrates the practical advantages of Gaia-X principles such as decentralization and data sovereignty for networked, sustainable, and efficient production. Real-world use cases, such as CO_2 accounting and component matching, create technical and economic added value that enables new business models. The integration of research, industry, and technology providers is creating a dynamic ecosystem for the industry of the future.

3. Project Energy Data-X and the Use Case "FleX"

3.1 Introducing the energy data-X project

A stable and sustainable energy supply forms the foundation of our modern society. However, the energy transition is fundamentally changing the energy sector. More and more decentralized systems such as photovoltaic and wind power plants, electric vehicles, storage facilities, and heat pumps are shaping the energy sector. This presents energy suppliers with new challenges: they must coordinate power generation and consumption more flexibly, as renewable energies are not constantly available. In order to manage bottlenecks or surpluses in a sensible way, all parties involved need to work together intelligently – especially at the municipal level in the areas of energy, industry, real estate, and mobility. This requires cross-sector, standardized data exchange, which enables efficient and reliable control. Energy data-X serves as a lighthouse-project within Gaia-X, the European initiative for a secure and sovereign data infrastructure. It aims to standardize the exchange of energy industry data across sectors, thereby promoting flexible, sustainable, and efficient energy use. As a pioneer, energy data-X shows how trustworthy data spaces can create innovative solutions for the energy transition – with a particular focus on municipalities, industry, mobility, and real estate.

What does this mean in practice?

The energy transition and the increasing sector coupling of electricity, transport, and heating are increasing the complexity of the energy system, leading to fluctuating loads and increasing storage requirements. At the same time, new demands are being placed on grid stability, flexibility, and regulatory control. Efficient data exchange between many decentralized players is necessary to meet these requirements and ensure a stable supply. However, there is currently a lack of standardized, secure procedures for the sovereign and data protection-compliant exchange of energy data. In addition, billing and grid optimization are often significantly delayed, resulting in expensive compensation measures.

What are the challenges for this project?

To meet these challenges, Energy data-X is developing a decentralized data space in which energy data can be exchanged securely and according to clear rules. The data remains with the owner and is only passed on via protected connectors when necessary and with the owner's consent. Identity and trust mechanisms as well as federated services guarantee secure use. The data space will be available to all market participants on a prototype basis, enabling data-centric business models, accelerating energy industry processes, and supporting climate and energy goals. The effectiveness of this approach is evident in the following use cases:

Use case 1: Optimization of balancing group management

The balancing group management controls the energy flows within a virtual account (balancing group) to bring injections and consumptions into equilibrium. This central task of the energy industry ensures that the energy flow in the electricity or gas grid remains stable.

In real-time, balancing group management data from renewable energy plants and consumers is transmitted to balancing group managers in near real time with the help of smart meter gateways. This allows deviations between planned and actual feed-in or withdrawal to be detected immediately and compensatory measures to be initiated in good time. In contrast, allocation in previous systems often takes weeks, resulting in unnecessarily high stand-by energy consumption.

To better understand the terminology, a smart meter gateway is a central, secure communication module of an intelligent metering system (iMSys). It encrypts digital consumption data from meters for electricity, gas, or water and automatically transmits it to authorized recipients such as grid operators. Control energy, also called balancing power, serves as a reserve to compensate for fluctuations in the power grid—more precisely, in the grid frequency. When control energy is used, electricity can be both fed into and drawn from the grid.

Use Case 2: Decentralized cross-sectoral flexibility development

This use case addresses how small, distributed systems such as charging stations, battery storage systems, or heat pumps can be efficiently integrated into grid control. These systems can flexibly adjust their power consumption or feed-in. The data space allows this flexibility to be recorded and controlled in real time. Surplus renewable energy can thus be stored or used in a targeted manner, while bottlenecks in the grid are automatically balanced. This makes the grid more stable, weather-dependent energies are better integrated, and automated flexibility services create sustainable solutions for energy supply.

Both use cases show how energy data-X can advance the energy industry: through faster, more efficient grid processes and the use of decentralized flexibilities for the energy supply of the future.

3.2 Use Case "FleX"

A central component of the project is the "flexibilitiy development" (FleX) use case. It aims to optimally integrate central, controllable systems such as photovoltaic systems, battery storage, charging stations, heat pumps, and electric vehicles into grid control. This use case is examined in more detail below – from the underlying problem to the solution and the resulting benefits.

Description of the problem

The growing expansion of renewable energies is leading to a decline in the number of large central power plants, while more and more decentralized generation and consumption units

are being connected to the grid. In 2024, these included around 3.1 million photovoltaic and wind power plants and around 7 million electric vehicles, storage facilities, and heat pumps. This development is making control and balancing in the energy system significantly more complex. Although systems such as batteries, charging stations, and heat pumps have considerable flexibility potential, this potential has only been exploited to a limited extent so far. This is particularly problematic because renewable energies are significantly more volatile than conventional power plants and therefore require the targeted use of flexibility to balance energy surpluses and shortages. This requires cross-sector data provision, as individual flexibility offerings can hardly be coordinated and used for grid stability without uniform and reliable data flows.

Solution approach and components

energy data-X enables these uniform and reliable data flows by connecting flexibility units[1] securely and in a standardized manner to the data ecosystem via their respective energy management systems. Automated machine-to-machine data exchange allows data on reserves and consumption to be transferred efficiently. Common standards ensure that players and plants can be integrated across sector boundaries.

In this way, aggregators can market bundled flexibility, balance group managers and grid operators have a technical basis for calling up flexibility in a targeted and secure manner for grid stabilization, and end consumers or prosumers[2] can use their plants both on the energy market and for local grid optimization and generate additional income. This increases security of supply, reduces long-term grid expansion costs, and promotes the integration of renewable energies.

Presentation of the consortium partners and their roles in the use case

The energy data-X project involves 14 partners from the energy industry, information and communication technology, science, and standardization. As consortium leader, *TenneT* assumes the role of the orchestrator and coordinates the processes in the data space. *Fraunhofer IOSB-AST* acts as technical federator. As such, it provides federated services and ensures secure, interoperable operation in accordance with Gaia-X standards. Together, they ensure trustworthy, sovereign, and smooth data exchange. The consortium is complemented by partners such as *Amprion, PPC, Spherity, DKE, Fraunhofer IEE*, and others, while associated partners such as *50Hertz, TransnetBW, E.ON, EWE Netz, ARGE Netz, Eviden Germany, Microsoft*, and the *International Data Spaces Association* contribute additional expertise and

[1] Flexibility means that the electricity demand – for example from a company or a plant – can be adapted to the electricity supply to a certain degree and in a flexible manner, without violating production requirements. This is particularly relevant for electricity from renewable energy sources, as fluctuations due to weather, time of day, or season are possible.

[2] Prosumers in the energy industry: They generate electricity with their own systems, e.g., with a photovoltaic system on the roof, consume it themselves, and feed surplus electricity into the grid.

sector connections. The project thus combines expertise from network operation, digitalization, standardization, and research to build a sustainable, sovereign data ecosystem for the energy industry.

Benefits for SMEs

All market players benefit from standardized and secure data exchange, which enables new business models and makes processes more efficient. While large companies can handle complex data exchange more quickly, the data space gives small and medium-sized enterprises (SMEs) low-threshold access to relevant energy data. Intermediaries take on technical and regulatory tasks, significantly lowering barriers to entry, especially for SMEs. On this basis, they can develop their own innovations—such as data-based services for energy efficiency, for marketing flexibility, or for new data products.

Users also benefit from the data space

They can develop data-centric business models and design and market their own data products – for example, for forecasts, flexibility services, or the optimization of energy consumption. At the same time, they retain control over their data, determine how it is used, and comply with data protection requirements. The data space also enables networking with other sectors, for example via platforms such as Catena-X[3], which allow cross-sector applications such as forecasting services with automotive data. Real-time data and automated processes also enable efficiency gains and cost reductions.

In this way, energy data-X makes the digitalization of the energy industry accessible, strengthens the innovative power of SMEs, and offers all users secure, scalable access to valuable energy and process data.

3.3 Outlook

After the end of the project period in October 2026, the plan is to establish energy data-X as a new standard and open ecosystem for the energy industry and to scale it further.

Once the project is complete, the developed data space will be open to all players in the energy industry and related sectors and will be ready for productive use. The focus will be on integrating further use cases and cross-sector networking with other Gaia-X data ecosystems such as Catena-X (automotive industry) and Manufacturing-X (manufacturing industry). The provision of the data space is to be financed by the transmission system operators' network charges, thereby leveraging network-related effects and avoiding costly billing processes. The use cases are generally developed and operated by commercial providers.

In the long term, Europe-wide and international interoperability is planned so that business models and innovations can be implemented across borders. Artificial intelligence and advanced data analysis are to further automate processes in real time, for example for

[3] https://catena-x.net/

forecasts or flexibility services. energy data-X will thus accelerate digitalization and sector coupling and contribute to the climate and innovation goals of Germany and Europe.

Requirements and challenges

For this to succeed, regulatory decisions and further support from politicians and the market are necessary for the nationwide and European rollout. Data protection, data sovereignty, and cyber resilience remain key prerequisites for acceptance and integration into practice. energy data-X will thus become the core of the digitalization of the energy industry and create the basis for joint, data-centric innovations by companies, science, and society.

How can I get involved?

Participation in energy data-X is possible because the project explicitly aims to create an open and interoperable data ecosystem for all market partners in the energy industry. Participation as an external party is therefore possible and welcome, but requires registration and technical and organizational compliance with the data ecosystem specifications. Contact details and further information are available on the official project website.

Where can I find further information?

Energy data-X integrates various players, including companies outside the consortium, to enable data-centric innovation and data-sovereign exchange in the energy sector. External interested parties usually need a digital identity and must establish secure access to the data room, for example via a so-called connector. Compliance with the governance and data protection requirements of the Energy Data Space is also a prerequisite. For identification and assignment in the data room, there is a central identity and trust procedure that ensures that only known and trustworthy actors are allowed to participate. Direct registration as an external participant is possible via the project website https://www.energydata-x.eu. There you will find current information, contact persons, and details on pilot projects and open calls in which municipalities, companies, and other external market players are specifically invited to contribute their expertise, data, or use cases. Fraunhofer Institutes also provide information on contact points for external partners. These can participate as associated partners, data providers, or use case providers. Integration usually takes place via specific application projects or pilot measures, with particular emphasis on interoperability with other European initiatives such as Gaia-X. The exact design depends on the respective use case, the data provided, and the technical infrastructure.

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