

Blockchain4ESG

Blockchain-powered platform for ESG data
and risk management



Smart AgriFood, Sustainable Value Chains, Green Finance

Blockchain4ESG: blockchain-powered platform for ESG data and risk management

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Challenge & Context

The imminent challenge: our climate is in crisis.

From corner offices to living rooms, the world stands at an epochal moment, feeling the very ground shift beneath due to climate change. It isn't just about melting glaciers or the rising tides; it's about an ecosystem deeply intertwined with our socio-economic fabric that's unraveling. The price tag for inaction? An astonishing \$54 to \$69 trillion of potential climate-related damage ([IPCC report](#), p. 264).

The call to arms has never been clearer. Pioneering initiatives like the [EU Green Deal](#) shine a torchlight on our collective path forward, envisioning a climate-neutral Europe by 2050. Similar commitments reverberate globally, evidenced by national Green Plans and Strategies. Yet, the scale and complexity of climate-related risks threaten to overshadow our good intentions, especially in critical sectors like the Food and Agriculture industry.

The significance of the Food and Agriculture sector.

The Food and Agriculture sector contributes [4% to the global GDP](#), [1.3% to the EU's GDP](#), and creates about [44 million jobs](#) in the EU. The industry now faces challenges from extreme weather events, impacting crop yields and increasing production costs. Alongside these, other concerns include changing precipitation patterns, water scarcity, and soil erosion.

However, these challenges also pave the way for innovations. With the rise in demand for sustainable products and advancements in technology like AI and Blockchain, there is potential for the industry to evolve and enhance its sustainability.

The importance of reliable ESG data.

To make informed decisions, transparent and reliable Environmental, Social, and Governance (ESG) data, particularly related to climate, is essential. The current lack of consistent ESG disclosures limits understanding and decision-making. These disclosures are crucial for stakeholders and financial institutions to manage ESG risks and to channel investments towards a sustainable future.

Introducing Blockchain4ESG.

The “Blockchain4ESG” experiment aims to bridge this data gap. Through the development of ESG.Electrodo, we aim to create a reliable ESG data management and matchmaking platform, supporting the Agri-Food Industry's transition to a more sustainable future. The choices made now are crucial for future resilience and sustainability. Through collaboration, innovation, and data-driven insights, we can chart a sustainable course.

Solution

ESG.Electrodo: bridging the information gap.

In response to this pressing need, under the Blockchain4ESG experiment we have developed [ESG.Electrodo](#). ESG.Electrodo is a data brokerage platform for ESG data management and reporting that drives and accelerates the transition of industrial SMEs in Agri-food to a low-carbon economy, as well as creating and fostering an ESG data market. ESG.Electrodo solves the problem of ESG data availability, completeness, integrity, and reliability for climate-related risk assessment and management, as well as contributes to the resilience and sustainability of the Agri-food industry.

1. For industrial SMEs. It acts as a data management and matchmaking platform. SMEs can access ESG data management tools, providing insights for enhanced decision-making and risk management. Furthermore, it elevates their visibility amongst ESG investors, positioning them better to attract sustainable capital. The platform also empowers SMEs to benchmark their ESG performance against industry standards, facilitating continuous growth and compliance.

2. For ESG Investors and Funds. ESG.Electrodo transforms into an asset management marketplace. Investors are presented with a streamlined portal

where they can access a range of ESG data and insights, crucial for making informed investment decisions. It also aids in matchmaking, connecting investors with vetted industrial SMEs that align with their investment criteria and risk profiles. This ensures that the investment is not just profitable, but also sustainable in the long run.

By serving as a bridge between industrial SMEs and ESG investors, ESG.Electrodo is "sewing" the two vital threads of industrial and investment capital into a single, cohesive fabric.

ESG.Electrodo Innovation.

Harnessing the power of Blockchain technology, the platform provides ESG data security, integrity, and reliability. This becomes even more paramount as ESG.Electrodo integrates both internal and external data sources. Everything from corporate documents, public ESG reports, benchmarks, and guidelines are meticulously curated, offering a comprehensive overview of ESG data.

Furthermore, ESG.Electrodo is not just a standalone platform, but includes the tools for collaboration. Expansion plans focusing on building ecosystem with industrial clusters, amplifying the platform's reach and impact.

Aligning with the EU's Corporate Sustainability Reporting Directive (CSRD).

A key advantage of ESG.Electrodo is its alignment with the European Union's [Corporate Sustainability Reporting Directive](#) (CSRD). The CSRD is poised to reshape how sustainability information is reported by companies within the European Union. It emphasizes the need for more detailed ESG reporting, extending these obligations to a broader range of companies, including SMEs.

For SMEs, ESG.Electrodo simplifies this process. By providing access to comprehensive ESG data, it enables SMEs to adhere seamlessly to CSRD mandates, streamlining the often-intricate process of sustainability reporting. This is invaluable, ensuring compliance while also enhancing their appeal to ESG-centric investors.

The solution aligns with the central objectives of the [European Green Deal](#), specifically the strategy for financing the transition to a sustainable economy. Additionally, it supports the [COP26 goals](#), with a particular focus on [Goal 3: Mobilising Finance](#) and the associated Taskforce on Access to Climate Finance.

ESG.Electrodo Collaboration.

Our key industrial partners are the [Ukrainian Cluster Alliance](#), which includes 60 clusters and cluster-type associations, and [NOSC-UA DIH](#), the Virtual Center for Digital Innovation of Kyiv Academic University of the National Academy of Sciences of Ukraine. Within the framework of our partnership, we plan to collaborate in the implementation and scaling of ESG.Electrodo platform solutions for industrial clusters as ESG Data Hub, establishing ESG data exchange chains, and developing Climatech solutions for industrial clusters and SMEs in the Agri-food and other industries.

Our product is a participant in the Microsoft for Startups program, and we collaborate with the Microsoft Innovation Center for Sustainability Solutions after Electrodo became a semi-finalist in the Singapore GreenTech Challenge.

How it works

Technical overview of ESG.Electrodo.

The aim of the experiment is to develop a blockchain-powered context broker and the ESG.Electrodo application for ESG data processing and management. This will serve as the core of a trusted digital ecosystem for ESG data exchange between stakeholders in the sustainable Agri-Food value chain (refer to the simplified version of the value chain in Fig. 1). Within this ecosystem, value is created and shared, with careful attention to ESG (environmental, social, and governance) considerations.

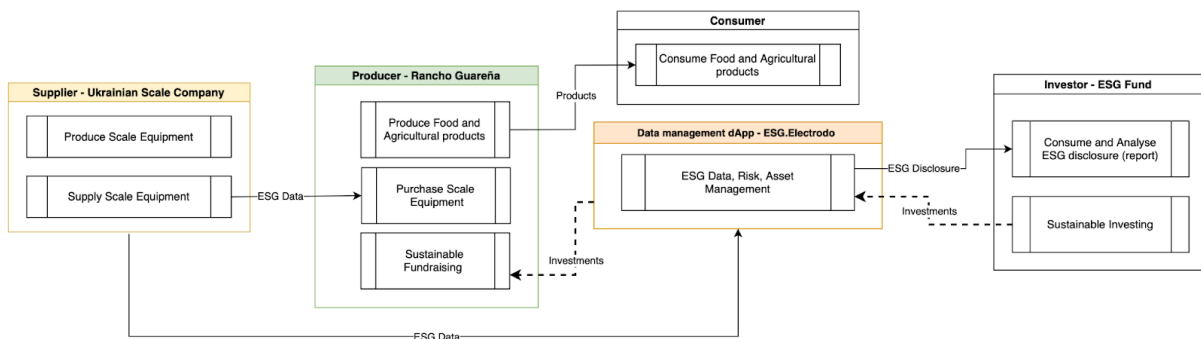


Figure 1: Participants (stakeholders) of Agri-Food value chain

ESG.Electrodo is a platform that bridges the data gap between SMEs and ESG-focused investors. It is underpinned by an intricate infrastructure that is designed for scalability, security, and accuracy.

Incorporation of FIWARE technologies.

In the Blockchain4ESG experiment (Fig. 2), FIW Consulting introduced the FIW IoT Hub, a telemetry data management application utilizing FIWARE technologies for connection to smart devices. This application, which processes telemetry data like smart meter readings, leverages the iSHARE component for data verification, ensuring trusted and secure data exchanges, and incorporates the ESG.Electrodo data notarization service.

Using the FIW IoT Hub, FIW Consulting collates data from various sources, such as Rancho Guareña's internal ERP. This data is then forwarded to the ESG.Electrodo app via the FIWARE Orion-LD Context Broker. Secure communication between ESG.Electrodo and FIW IoT Hub is facilitated by Keyrock's IdM services.

Similarly, Smart Power Engineering uses the SPE IoT Hub to monitor resources and share this data with the ESG.Electrodo app, aiding Ukrainian Scale Company in evaluating Scope 3 GHG emissions.

With ESG.Electrodo, Rancho Guareña can:

1. Examine and evaluate ESG data, inclusive of datasets from the supplier Ukrainian Scale Company.
2. Share this data for ESG risk evaluations.

ESG.Electrodo then provides Rancho Guareña with an ESG risk assessment and a comprehensive report in accordance with TCFD standards. Rancho Guareña can then share this with the ESG Fund.

Furthermore, the ESG Fund employs ESG.Electrodo for processing ESG disclosures from its industrial clientele. The ESG Fund also uses the tool for its own ESG disclosures, aligning with PRI policies.

Regarding i4Trust Marketplace, ESG.Electrodo acts as a dependable ESG data provider. All components related to identity and authorization management are combined in Keyrock. Separate instances of this identity manager are essential for each participating entity.

Blockchain implementation with Hyperledger Fabric.

A critical challenge with ESG reporting is ensuring its authenticity. Each ESG report, once uploaded onto ESG.Electrodo, undergoes notarisation using the blockchain-module Electrodo.Docs (based on Hyperledger Fabric and IPFS) to establish an added layer of trust for all platform users so: once a ESG report is notarised, it cannot be altered without leaving an auditable trail; investors and other stakeholders can verify the authenticity of the ESG report, knowing it hasn't been tampered with post-notarisation.

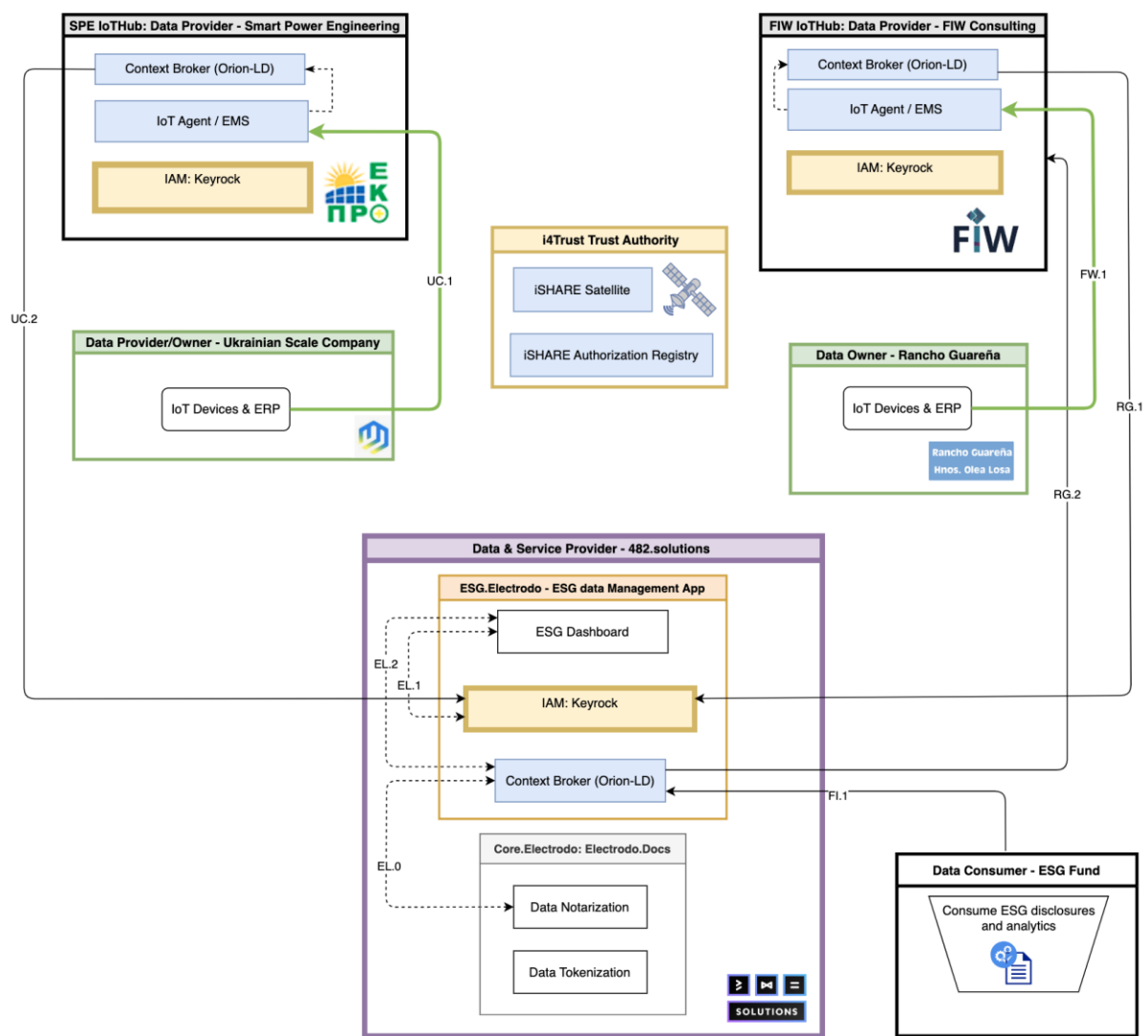


Figure 2: Data space for ESG data and risk management.

Architecture of Blockchain4ESG experiment

The Data Space of Blockchain4ESG (Fig.2) can accelerate the development of new services for ESG climate-related data and risk management in the Sustainable Agri-food sector. This is achieved by promoting ESG data sharing, collaboration, standardization, and innovation. We view industrial clusters, which include ESG data providers, SMEs, and investors, as key members of the ESG Data Space.

Throughout the development and deployment phases, a few crucial key findings emerged.

1. Interoperability is crucial. Building a data-management platform that integrates several technologies and data sources taught us the importance of ensuring seamless interoperability. Every component, from FIWARE tools to Hyperledger Fabric, needed to operate in tandem and orchestrate various data sources.
2. Security and privacy are paramount. Managing sensitive ESG data meant that every possible security loophole needed to be addressed. Keyrock and iSHARE played an indispensable role here, but custom security infrastructure-level protocols were also developed to enhance trusted data management.
3. Continuous evolution. The ESG landscape and, coupled with technological and regulation advancements, is always evolving. The platform, hence, should be built with adaptability in mind, ensuring that future iterations can easily incorporate new functionalities.

Benefits & Impact

In the modern age, where the tangible effects of climate change are becoming increasingly prevalent, the role of industrial SMEs, especially in the Agri-Food sector, has never been more significant. The ESG.Electrodo service creates the collaborative synergy to redefine sustainable practices across industrial value chains.

1. User growth. Considering the growing emphasis on sustainable business practices and the looming importance of ESG compliance, the platform expects to quadruple its user base within the next few years.

2. Customer acquisition. Within the next six months, we'll plan to onboard 3 industrial clusters with dozens of SMEs and a few ESG investors/funds. So, we're not just expanding our user base but fostering a more comprehensive ESG data space and ecosystem.
3. Economic impact. A crucial outcome of the ESG.Electrodo service is its potential to significantly bolster sales and revenues of involved SMEs. By aligning their operations with ESG benchmarks and showcasing their commitment to sustainability, SMEs can tap into the growing market of conscious consumers and responsible investors. Their ESG compliance can serve as a differentiator, allowing them to command premium pricing, expand into newer markets, and appeal to a broader audience. This alignment, combined with operational efficiencies, can lead to an estimated sales and revenue growth of up to 40%. As a proof of the experiment's scaling success, the Ukrainian Scale Company conducted its first Ukraine-Spain export of industrial scaling equipment to Rancho Guareña, a mixed dairy farm and agricultural crop supplier in Spain.
4. Societal and macro-economic impact. The ESG.Electrodo service's relevance can't be overstated. For SMEs, it translates into a framework that optimizes processes, aligns with ESG mandates, and offers a competitive edge in the ESG-centric consumer and capital markets. On a macro level, cities and regions stand to cultivate a progressive, sustainable industrial environment, resulting in economic stabilization and growth.

Added value through i4Trust

i4Trust, as a technological ecosystem has:

- 1) Provided new knowledge and high-level expert support in the field of engineering the data management applications and Data Spaces;
- 2) Offered coaching on building data-driven business models through mentorship sessions using DDI Canvas and Business Model Canvas;

3) Created opportunities for the development of technological solution ESG.Electrodo, in collaboration with consortium members and in partnership with DIHs.

One of the landmark achievements of this experiment has been the first Ukraine-Spain export of customised industrial scaling equipment from Ukrainian Scale Company to Rancho Guareña. This outcome illustrates the tangible value generated through data-driven ESG innovations - specifically in fostering sustainable value chains and launching value-added products.

i4Trust technologies have proven to be a lynchpin for the development of our solutions. i4Trust tech stack including FIWARE and iSHARE offers a comprehensive set of functionalities, ranging from architectural blueprints to data lifecycle management protocols. This gives i4Trust the unique capability of supporting standardized and flexible mechanisms, such as IAM, Standard Data Models, and Data Exchange APIs. Moreover, the alignment of i4Trust technologies with the digital infrastructure of CEF (Connecting Europe Facility) amplifies its value as the technology standard for data-driven digital innovations.

Next steps

Building on the success of the Blockchain4ESG experiment and the ESG.Electrodo solution, our next steps are multi-faceted and focus on scaling both vertically within targeted sectors and horizontally across new markets and regions.

1. ESG Data Hub for Industrial clusters. The next phase will see ESG.Electrodo functioning as an ESG data hub for industrial clusters. The platform will assist in the seamless implementation of ESG strategies, data management, performance tracking, and target-setting.
2. Marketplace and asset management platform for ESG Investors and Funds. We aim to enhance ESG.Electrodo to serve ESG investors and funds more effectively. The next version of platform will offer streamlined access to comprehensive ESG data, enabling informed investment decisions including.
 - a. Matchmaking capabilities. Connect investors with pre-qualified industrial SMEs that align with their investment criteria and risk profiles.

- b. Portfolio oversight. Tools for real-time monitoring and management of ESG performance and associated risks.
 - c. Investment discovery. A curated pipeline of high-impact, high-potential ESG investment opportunities.
3. Cross-sector and international scaling. Our cross-sector scaling plans include venturing into Smart Transportation sectors such as Food Delivery and Agriculture e-Mobility. The geographical scope will extend to Europe, Singapore, and other ASEAN countries.

References

- [Building the European Cluster Economy with i4Trust technology.](#)
- [Guideline on Trusted ESG Data Management for Agri-Food.](#)

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Categories

Users:

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Founding Partners



iSHARE



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