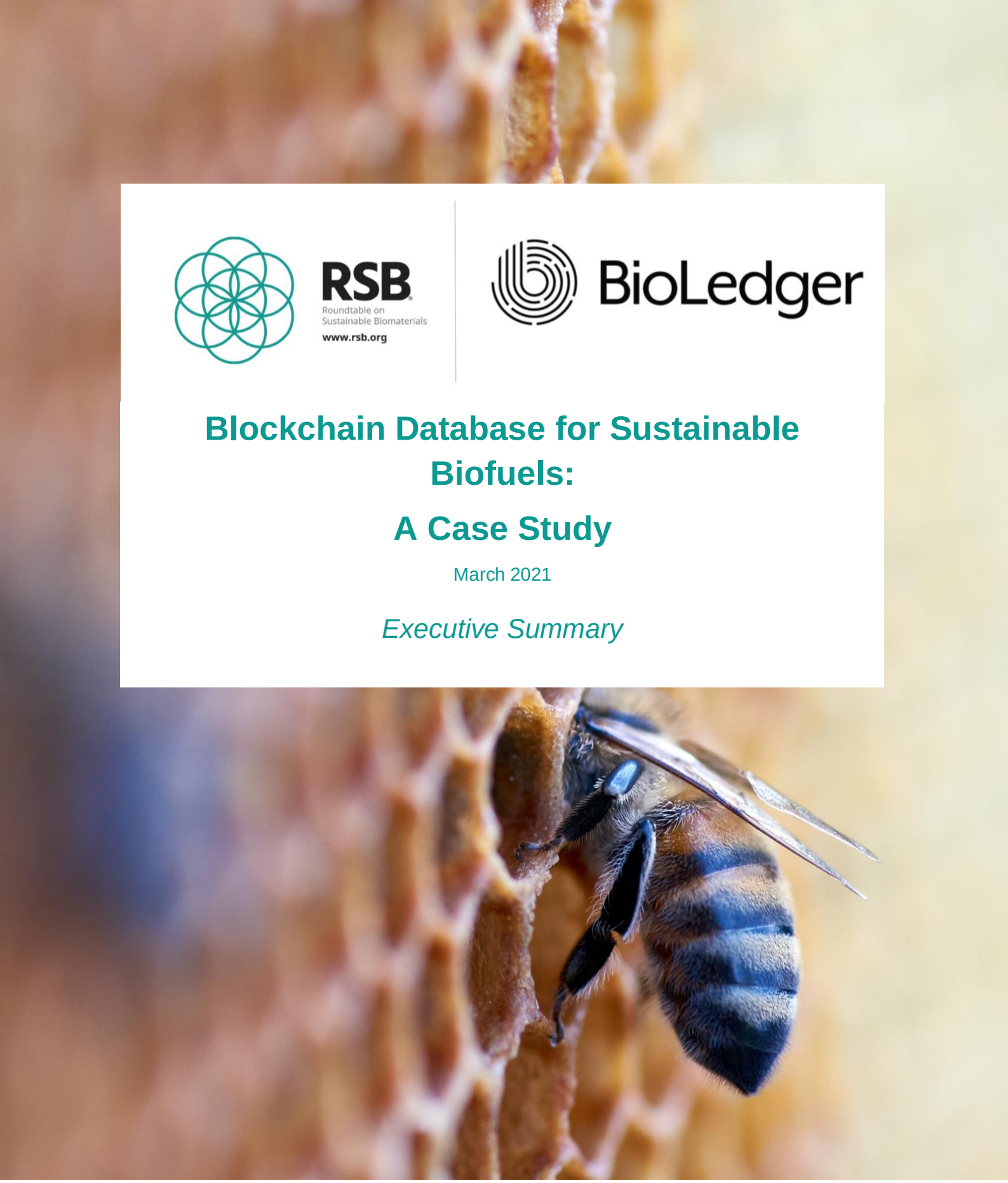

RSB
Roundtable on Sustainable Biomaterials
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BioLedger

Blockchain Database for Sustainable Biofuels:

A Case Study

March 2021

Executive Summary

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Executive Summary

The growth and integrity of the sustainable biofuels industry, as well as the interests it seeks to protect, are in jeopardy due to the vulnerabilities in methods it currently uses for tracking transaction claims and verifying their authenticity — as identified by recent biofuel fraud investigations in the Netherlands.

Bioledger and the Roundtable on Sustainable Biomaterials (RSB) explored a solution to this risk, leading to the development of a highly innovative, simple, and secure centralised database for tracking the data generated by biofuels transactions, utilising the powerful and incorruptible capabilities offered by blockchain technology.

The results generated and lessons learnt from the project are shared in the accompanying case study document and are summarised below.

The parameters for building and running the database were identified through consultations with stakeholders, including used cooking oil (UCO) collectors, biodiesel producers, traders, EU policymakers, industry associations, certification bodies, and auditors, and are summarised under the following three themes:

1. Improvement of data integrity and security.
2. Execution of business processes and compliance.
3. Governance method and business model for the database.

To evaluate the efficiency and applicability of the database, a prototype was piloted by four partners: Greenergy (UK), Europe's largest waste-based diesel producer; Rexon Energy (Singapore), an exporter of UCO to the EU; Bensons Products (UK), a UCO collector; and Valley Proteins (USA), a UCO collector and exporter.

The database application enabled three distinct user roles — namely 'first collector driver', 'first collector administrator', and 'trader' — to process a total of 1,927,906 litres of feedstock, accurately representing real-life commercial and operational processes.

During the piloting of the database, it was demonstrated that a significant number of transparency and accountability issues in the UCO biofuel market can be resolved by the technical solutions that a blockchain database offers — either exclusively or in a far superior manner to the typical data management methods currently used in the supply chain, such as paper and digital transactional documents, spreadsheet programmes, and relational databases.

New solutions, such as verifiable proof of origin, secure consignment creation, process simplification, audit efficiency, data integrity, and central governance were developed through this blockchain prototype, and the following recommendations and observations were made:

- A full blockchain database solution ensures true decentralisation and transparent governance of trades with blockchain nodes hosted by trusted regulators and stakeholders.
- The system should be designed to enable stakeholders to easily integrate data using new digital interfaces or existing data systems, while these interfaces need to be carefully managed to control data quality.

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- This solution had business rules developed in line with the specific use case (biofuel markets using the EU RED Voluntary Scheme), but a scalable solution should include the development of a configurable business logic layer to account for different markets.
- To increase the strength of evidence and minimise the risk of errors and fraud at data point of entry, the blockchain solution should include the use of biometric authentication, photos, signatures, and geolocation.
- A full blockchain solution should record all mandatory data points from EU RED requirements within its data architecture, in order to replace the currently ubiquitous paper-based chain of custody documents.
- Existing legal agreements between supply chain companies and their auditors, certification bodies, and voluntary schemes already provide the necessary protections to allow private disclosure of sensitive commercial data within the blockchain database.

The project recommendations are made with acknowledgement of the fact that a major hurdle in the development of a blockchain database for sustainable biofuels will be the cost involved in building a solution which captures the complex requirements of the biofuel regulations and their international supply chains. However, these same legal frameworks provide a firm foundation to define digitised compliance logic, governance roles, actions and responses that are permitted within the blockchain database. The pilot project is an example of how blockchain technology can be used to develop a commercially viable solution to meet industry and regulatory requirements on scalability and security within a limited time period and budget.

The database initiative and the recommended features for improving transparency and control in certified sustainable biofuel supply chains were welcomed during presentations to several European Union member state biofuels regulatory agencies, including the EU Renewable Fuels Regulators Club (REFUREC), the UK Department for Transport Renewable Transport Fuel Unit, the Dutch National Emissions Authority (NEA), and the Irish National Oil Reserves Agency (NORA).

The blockchain database prototype was also included in a scoping study conducted by Navigant on behalf of the European Commission Directorate-General for Energy (DG Energy).

RSB and Bioledger continue to engage with industry and regulatory stakeholders towards ensuring that the technical capabilities to mitigate fraud, restore trust, and build transparency — as outlined in this report — are integrated into industry standards and digital platforms such as the RED II database for renewable road transport fuel or international sustainable aviation fuel.

Bioledger is further developing the lessons gained from the pilot project to provide a new blockchain database for the biofuels market.

RSB and Bioledger are committed to building upon the lessons learnt through this project and making such a database — based on the principles of transparency, sustainability, and good governance — a reality. In particular, the project partners acknowledge the need to maintain dialogue and consideration of the global waste biofuel feedstock supply chain when developing technical solutions intended for every day, manual use. The integrity and liquidity of any biofuels database depends on adoption by the diverse upstream supply chain.

Find the full study here.

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