المؤتمر الدولي العلمي الحادي عشر للهندسة الكيميائية الخضراء حول "أثر تحولات الطاقة على حماية البيئة في ظل تحقيق أهداف التنمية المستدامة"

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القاهرة – جمهورية مصر العربية

Carbon Footprint Management with Blockchain Technology

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Carbon Footprint Management with Blockchain Technology

Agenda

- Overview
- Opportunities
- Use Cases
- Challenges
- Conclusion

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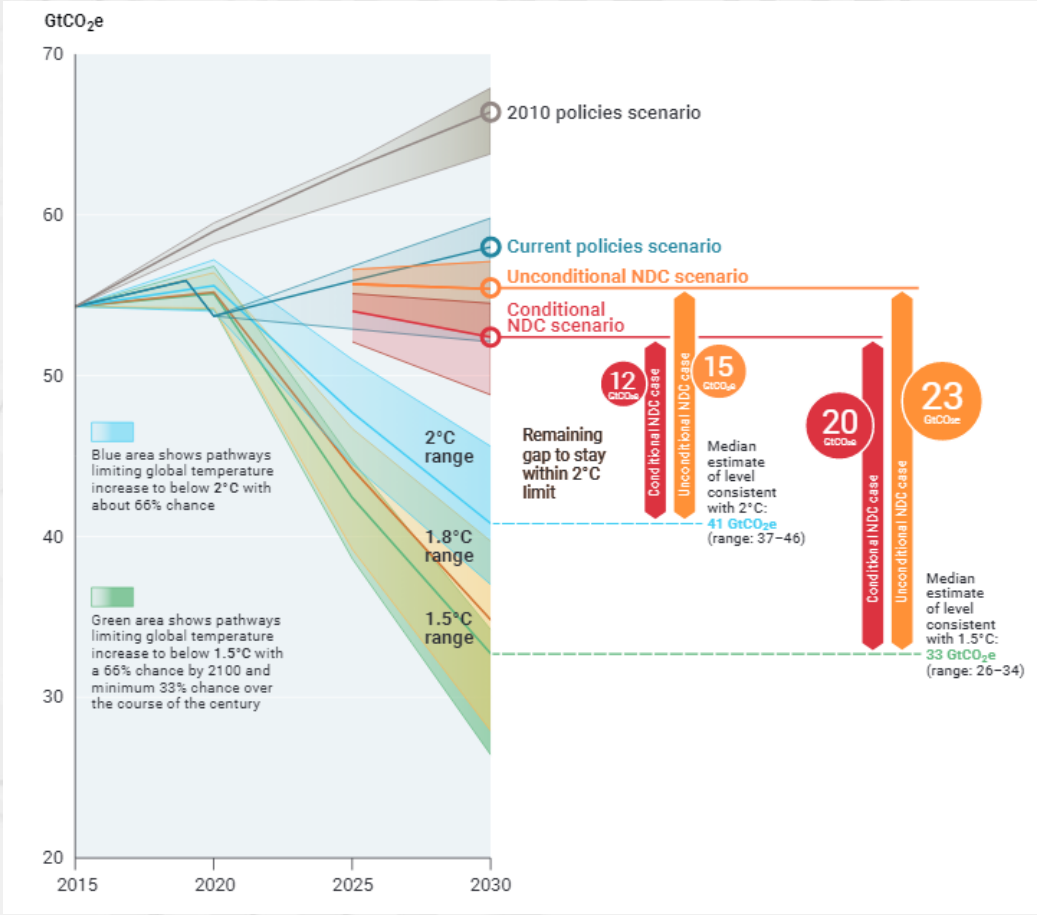
Emission Gap for 2030

"We are the first generation to feel the impact of climate change and the last generation that can do something about it."

Barack Obama

- Current measures set the world for 2.8 degC
- The world needs to reduce annual GHG emissions by 45% by 2030.



Source: unep.org/Emissions Gap Report 2022

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- Climate action requires a wholesale transformation of economies, businesses, and societies.

*"Accelerating, encouraging, and enabling **innovation** is critical for an effective, long-term global response to climate change and promoting economic growth and sustainable development."*

Article 10, the Paris Agreement

- Emerging technologies, such as Blockchain, have the potential to boost global action toward the Paris Agreement goals.

Source: unep.org/Emissions Gap Report 2022

Blockchain Technology

Blockchain: Bitcoin Brings New Concepts

- The underlying technology beyond Bitcoin
- ‘Establishes trust between two mutually unrelated parties’, by European Commission
- The rise of “trustless trust” concept
- A series of possibilities for blockchain-based innovative applications in all industries

Blockchain Technology

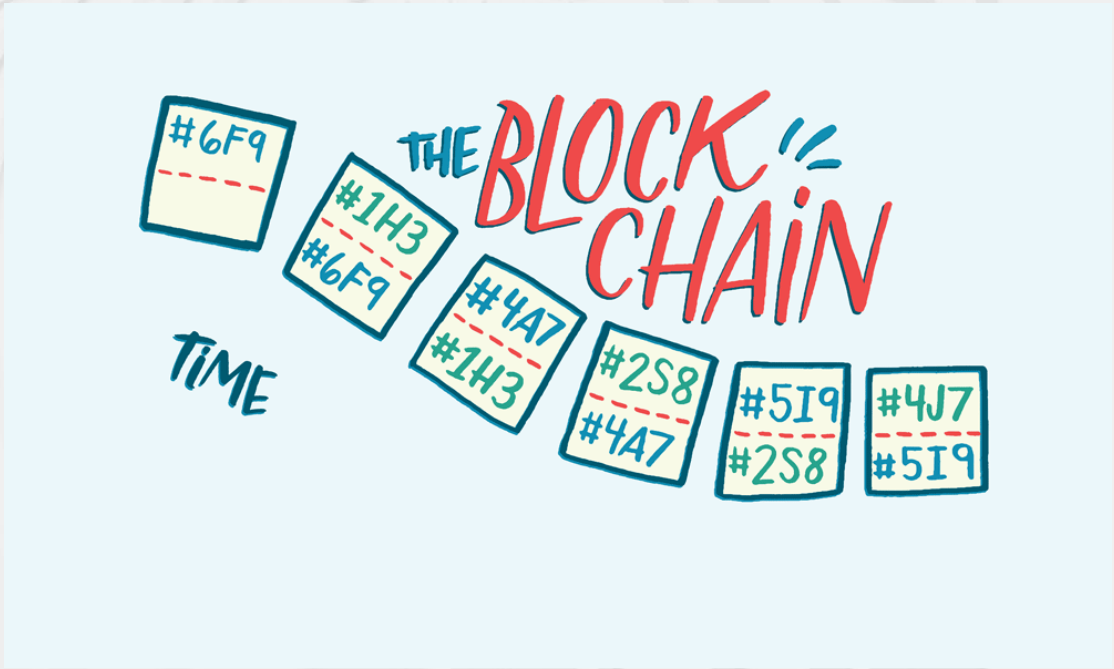
Blockchain Features

- A distributed electronic ledger
- Data are stored in the form of blocks
- No centralized node or authority
- No single point of failure
- No trusted third party
- No intermediary costs

Blockchain Technology

Blockchain Ledger

- An expanding chronologically ordered list
- Cryptographically signed, irrevocable transactional records
- Miners perform block verification
- Contains simple transaction data to a software code - called a smart contract



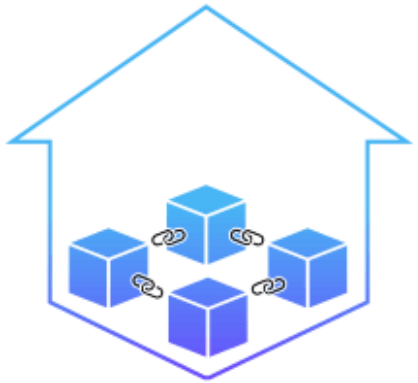
Smart Contract: An executable code triggers an automatic action when predefined conditions are met

Blockchain Technology

Blockchain Network Types

Public Blockchain

Anyone can participate in the network such as Bitcoin and Ethereum



Private Blockchain

One institution exclusively owns the network

Consortium Blockchain

Pre-selected group of participants establish a consortium and control the consensus process

Carbon Footprint Management

Carbon Footprint Management

Total GHG emissions produced directly and indirectly by an individual, product, event, or organization.

- Helps organizations forecast future emissions, calculate the actual output, manage market transactions and ensure compliance with regulations.
- Carbon reduction management strategy is extended to the value chain level rather than the organization level.

Source: carbonfootprint.com

Carbon Footprint Management

Life Cycle Assessment

- Involves the assessment of a product's impact on carbon emissions during all the stages of its life cycle (i.e., from extraction to disposal).

Source: ihsmarkit.com

Share of Emission for Refined Products Life Cycle

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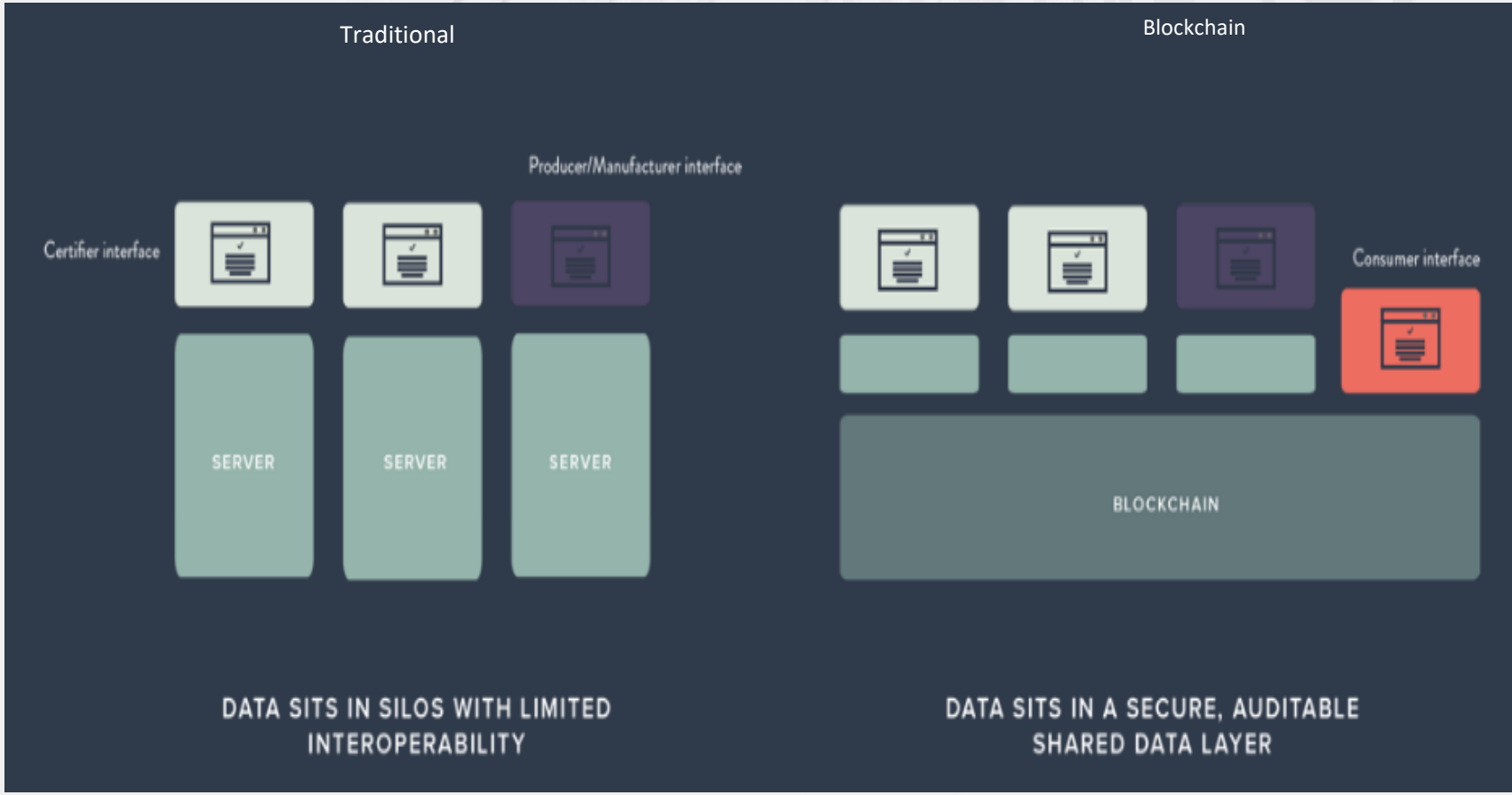
Blockchain-enabled Platform for Carbon Management

- Decentralization
- Tamper-proof
- Transparency
- Immutable audit trail



Source: provenance.org

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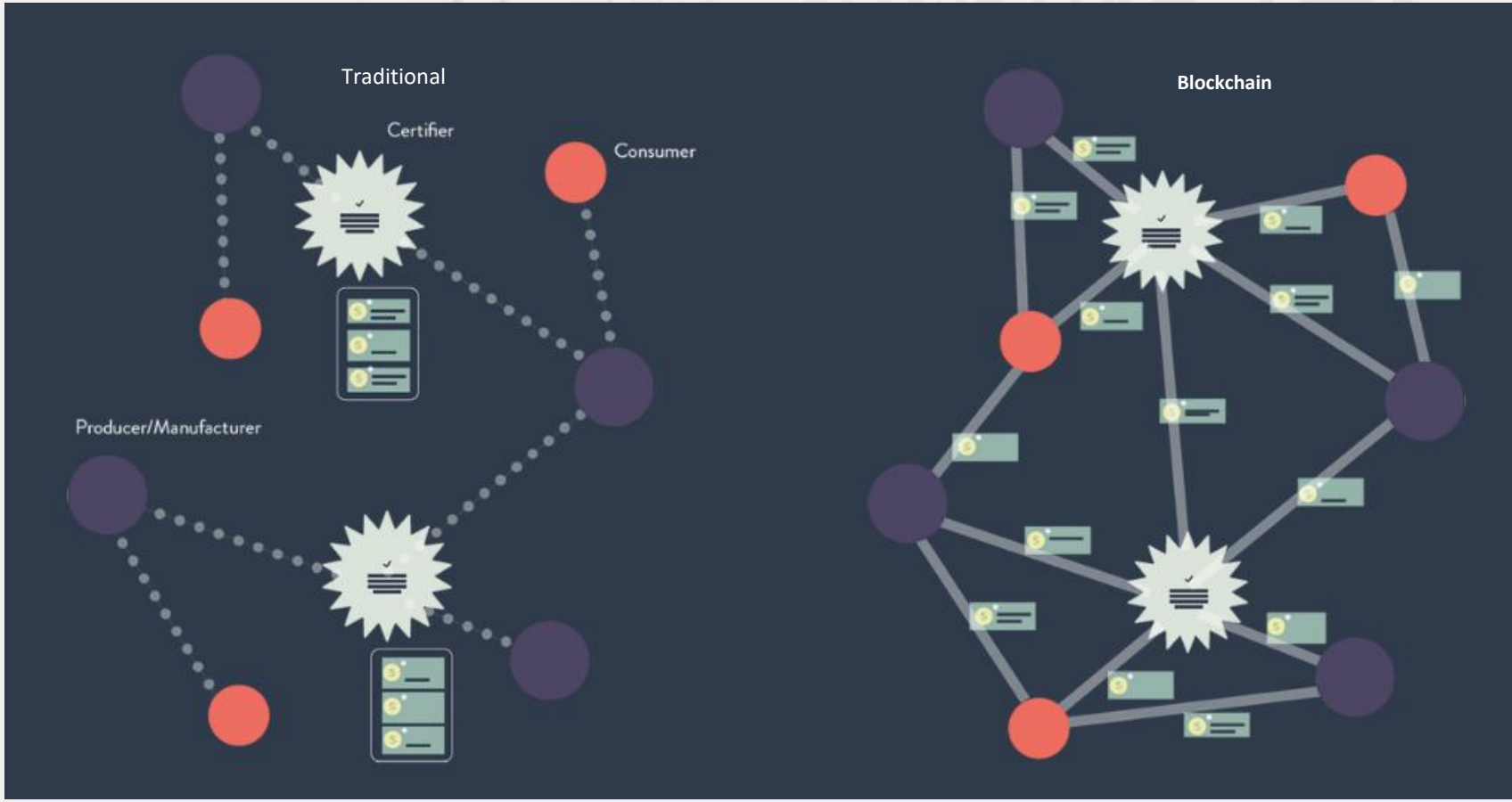
Blockchain-enabled Platform for Carbon Management: Major Roles

- Regulatory Authority
- Actors
- Certifiers
- Registrars



Source: provenance.org

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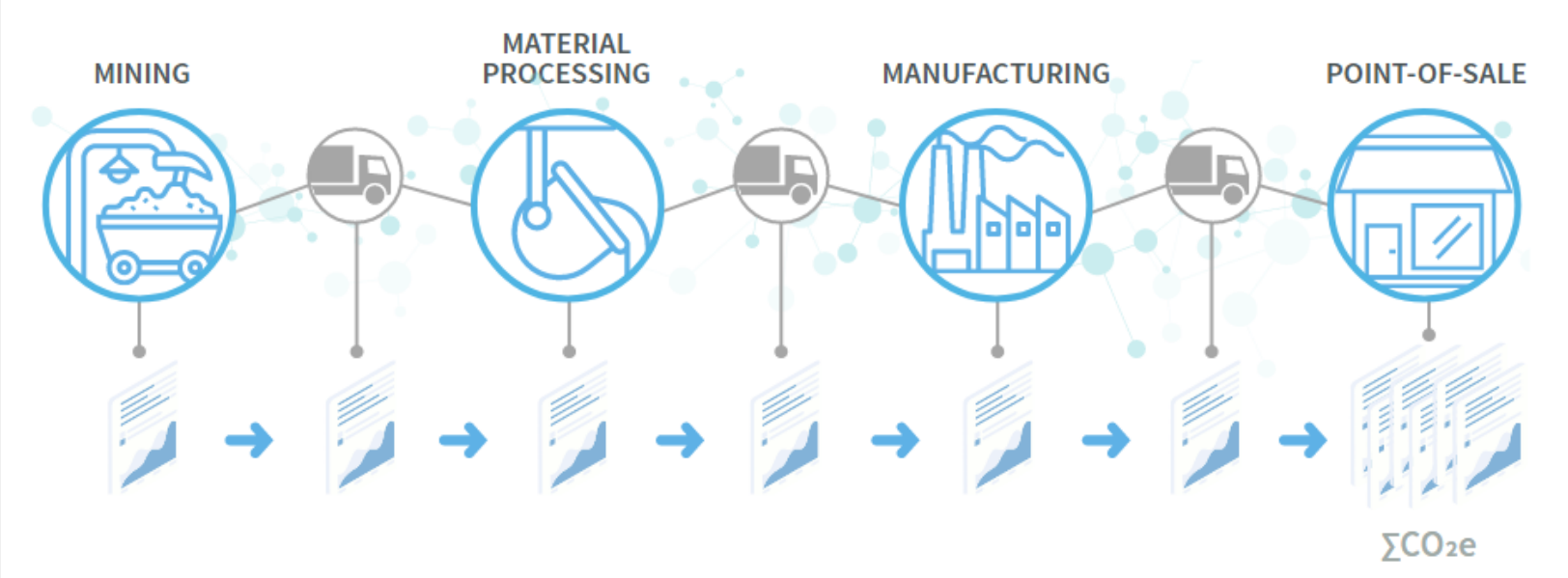
Opportunities: Blockchain-based Value Chain

- Product data:
  - Ownership data
  - Time stamping
  - Location data
  - Product specific data
  - Environmental impact data



Source: rmi.org

- Smart contracts authenticate the exchange of a product between two parties in the value chain

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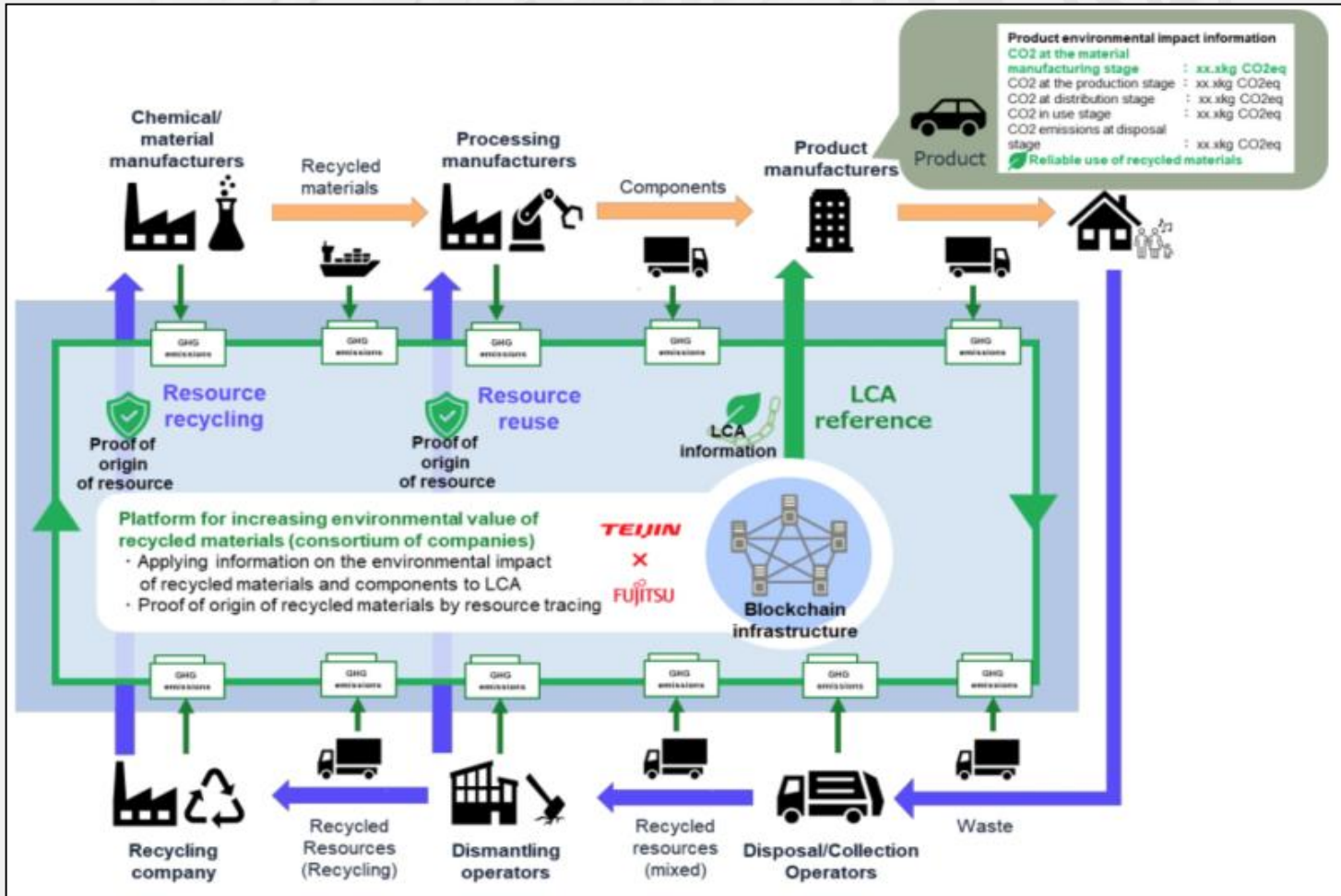
Use Cases: Value Chain Management Platform

- Launched by Teijin and Fujitsu to promote manufacturers' environmental value of recycled materials and enhance environmentally conscious designs



Use Cases (cont.): Carbon Markets in China

- Energy Blockchain Labs, based in Beijing, China, is implementing a distributed energy ledger, using IBM Blockchain technology. It bridges the data gap between the finance and green economy, including the emission enterprises, certification bodies, third-party inspections, carbon asset exchanges, and governments.

Use Cases (cont.): Carbon Markets in Egypt

- ZeroCOP27 a pilot project to encourage individuals and companies to offset the carbon footprint of their travel and stay at the conference.
- By buying EoL agricultural carbon credits through the Zero Fund blockchain-powered platform, visitors will not only be offsetting their travels but also directly investing in the green transition of local Egyptian smallholder farmers.

Carbon Footprint Management with Blockchain Technology

Challenges

- Lack of awareness of the technology
- Limited technical expertise
- Lack of new organizational policies
- Regulation and governance
- Preserving Security and Privacy

Summary & Conclusions

Achieving net-zero by 2050 is nothing short of a momentous endeavor

Enabling innovation is critical for an effective global response to climate change

Blockchain is a game changing technology capable of accelerating actions that reduce carbon emissions