Economic and Social Commission for Western Asia

Role of Blockchain in the Sustainable Energy Transition in the Arab Region

14th ESCWA Committee on Energy

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ESCWA

Shared Prosperity **Dignified Life**

Presentation outline

- What is blockchain?

- What role can it play?

- Select use cases

- Challenges to adoption and implementation

- Conclusions and recommendations

- ESCWA's work on blockchain
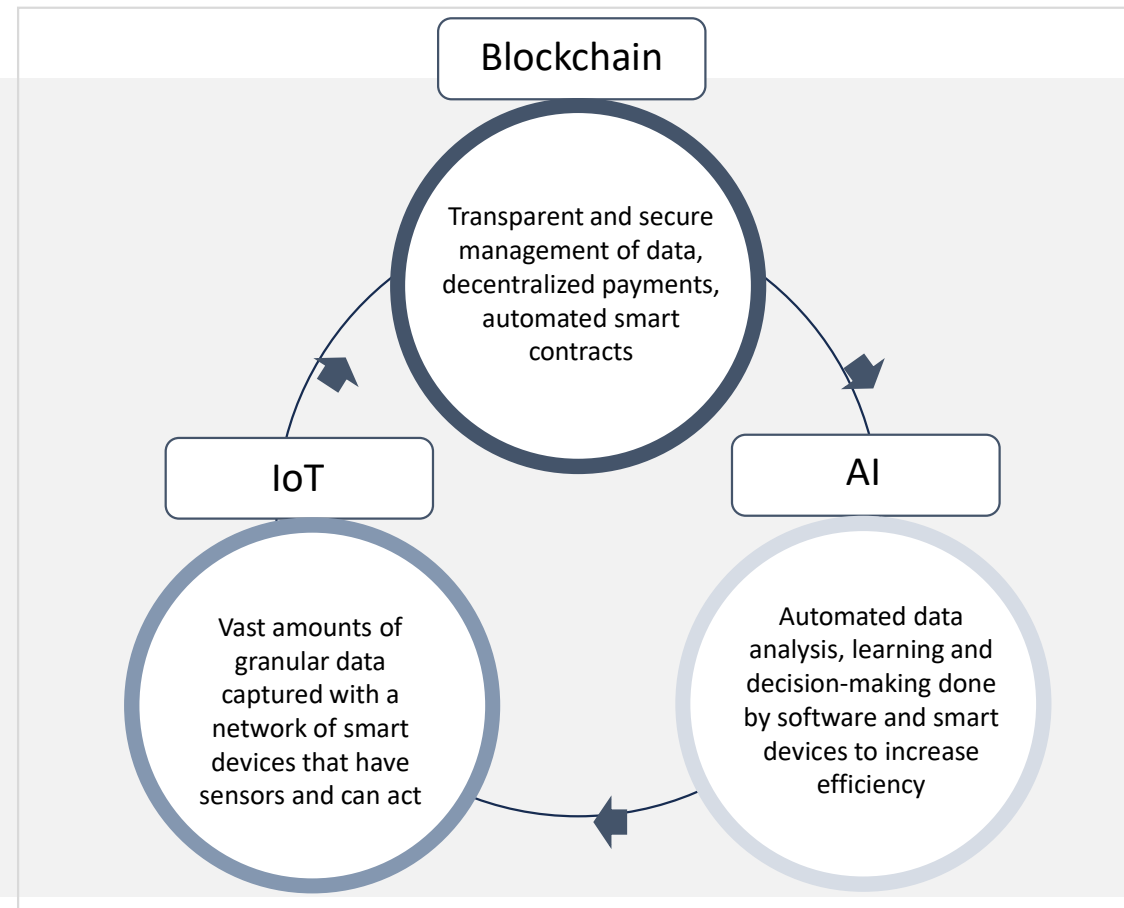
What is blockchain?

- A blockchain is a decentralized, immutable database that securely records transactions.

- It enables fast, reliable, and transparent information exchange among participants and can be used to virtually store almost anything of value in digital form.

- It also enables multiple parties to independently verify the state of a particular record, data point, or event, and includes a built-in audit trail.

- Blockchain also offers the ability to create and enforce digital scarcity or "uniqueness", in contrast to conventional digital systems.

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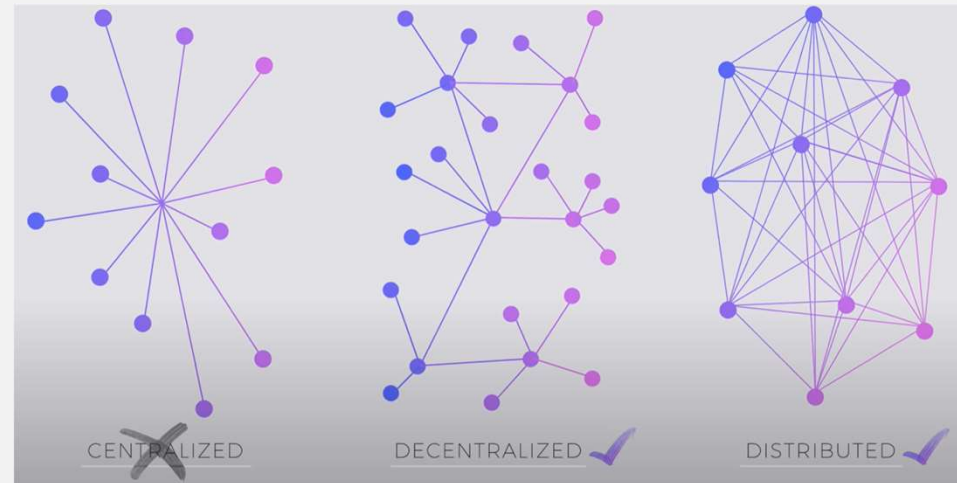
Source: Consensys

Increased power sector complexity requires a combination of digital innovations

- Increasing shares of distributed, variable RE are making power grids more complex and difficult to manage

- From a top-down grid model to a decentralized model where power and payments flow both ways

- New digital solutions are helping to manage this complexity

- Innovations should be implemented holistically to increase access to modern energy services and accelerate the adoption of variable renewable energy

Blockchain

Transparent and secure management of data, decentralized payments, automated smart contracts

IoT

Vast amounts of granular data captured with a network of smart devices that have sensors and can act

AI

Automated data analysis, learning and decision-making done by software and smart devices to increase efficiency
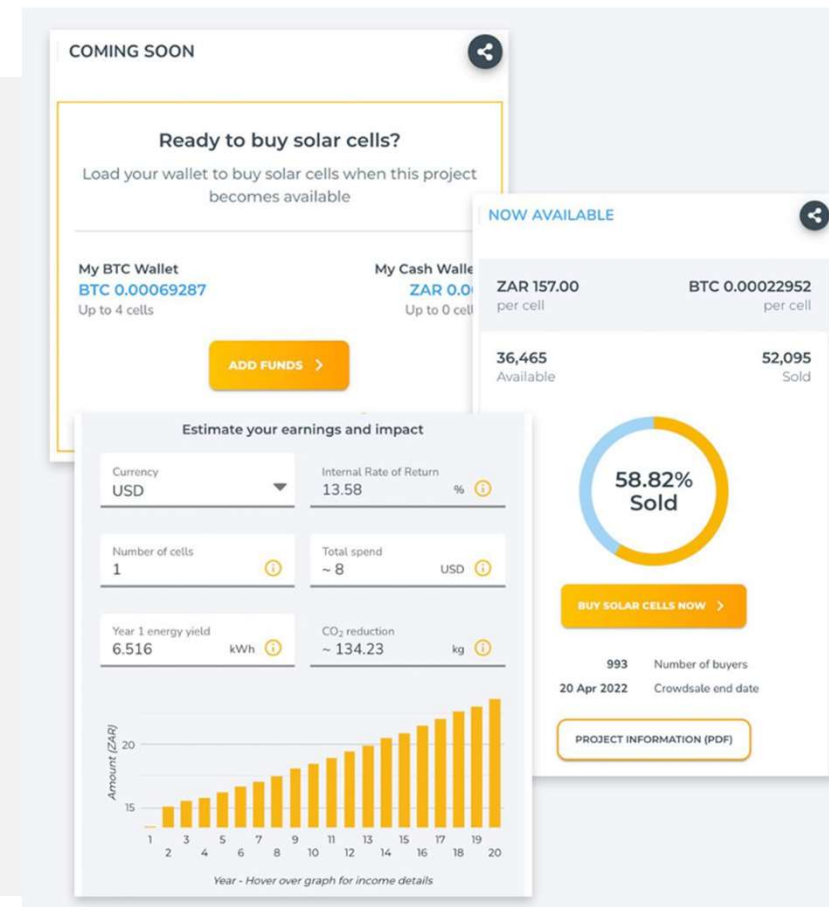
Blockchain use cases

- **Hybrid approaches:** Improving scalability, security and cost without fully replacing traditional tools in the energy sector

- **Decentralized project finance:** Project crowdfunding across borders

- **Renewable energy provenance:** Real-time matching of demand with RE supply (EV charging)

- **Smart contracts:** Automating processes to reduce cost/time

- **Renewable energy certificates:** Increased trust, transparent and verifiable

- **Decentralized energy markets:** Reducing the need for costly intermediaries

Source: The Sun Exchange

Case study – Decentralized project finance

- Ex. Sun Exchange is a peer-to-peer solar leasing platform in South Africa.

- Via the platform, anyone, anywhere in the world, can own solar panels and generate income by leasing those panels to orgs in emerging markets, with installation and maintenance handled by local partners.

- The company identifies schools, businesses and organizations that want to go solar.

- Once solar projects have been accepted as viable and responsible, a crowd sale is run for the panels that will power the project.

- 66 solar project crowd sales complete. Investors across 180 countries. Over 18 GWh of clean energy generated so far.

Case study – Dubai Electricity and Water Authority's digital transaction strategy

- Ex. DEWA's blockchain platform, established in 2017, automates processes with the aim to make them faster, safer, and more efficient.

- These efforts align with the Emirates Blockchain Strategy 2021 and Dubai Blockchain Strategy, which aim to streamline and digitize government processes and reduce carbon emissions.

- DEWA also collaborates with organizations like Smart Dubai and the Roads and Transport Authority to establish a unified national EV charging blockchain network.

Source: DEWA

Case study – Renewable EV charging

- Volkswagen, Energy Web, and Elli are testing blockchain decarbonize EV charging.

- The purpose was to demonstrate a green charging app built on blockchain can enable granular matching between EV consumption and renewable generation.

- EV owners could match their EV's charging schedule with locally sourced clean energy.

- Blockchain provides the trusted audit trail.

Energy Web - Adapted their open-source 24/7 matching SDK to track the provenance of every EV charging event, powered by their Switchboard solution, resulting in the 24/7 Green E-Mobility platform.

Elli - A part of the Volkswagen group Innovation, Elli provided their existing smart charging app, and assisted with integrating 24/7 green charging functionality.

EV.Energy - App development partner of Volkswagen Group Innovation, provided the development work for integrating 24/7 Green E-Mobility Platform with the Elli smart charging app.

Volkswagen Group Innovation - Provided the real-world renewable energy generators connectivity to their on-board smart-charging backend and use of the corporate electric vehicle fleet.
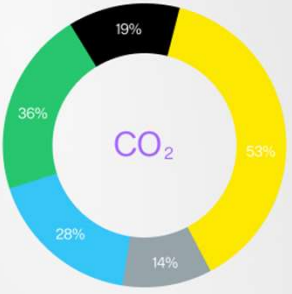
Case study – Carbon certification

- In Nov 2022, Adnoc and Siemens Energy announced plans to jointly develop blockchain-based technology to certify the carbon intensity of a range of products and securely store the data.

- Specialists from both companies will also jointly create technology to hasten the pace of decarbonization and the transition to clean energy.

- This transparency will allow independent regulators to certify the carbon intensity of products and will give customers greater confidence and clarity over the carbon footprint of their purchases, according to Adnoc.

Challenges to adoption of blockchain in the energy sector in the Arab region

- Insufficient policy and regulatory frameworks

- Infrastructure challenges

- Interoperability and compatibility with legacy systems

- Scalability, security, and cost

- Limited technical expertise and shortage of skilled workers

- Limited public awareness and acceptance

- Cross-cutting challenges, such as political and economic instability

Conclusions and recommendations

Blockchain technology has a role to play as part of a toolbox of digital technologies to manage increasing energy sector complexity while pursuing a just, inclusive, and sustainable energy transition in the Arab region.

- Create a roadmap for the implementation of digital technologies, including blockchain, in the energy and related sectors to encourage private sector participation and investment

- Invest in digital infrastructure and technology and promote digital skills and education through training

- Identify, adapt, and adopt best practices (including, policy, regulation, and technologies) from around the region and the world

- Restructure energy markets and empower consumers to become prosumers by enabling smart metering

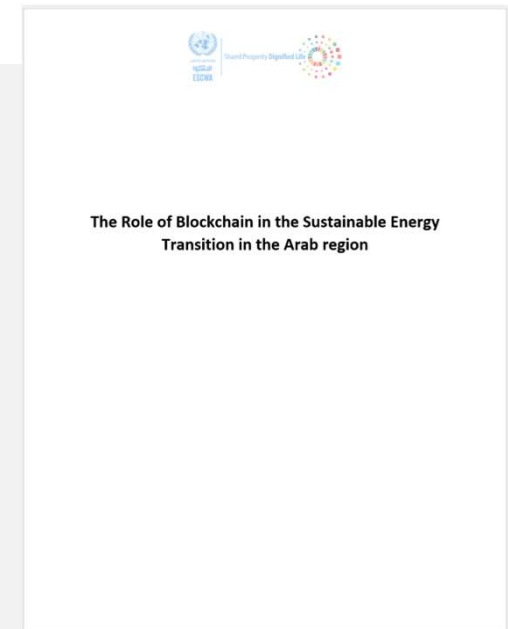- Increase public investment in clean energy and accelerate progress on renewable energy and regional integration

ESCWA's work on blockchain
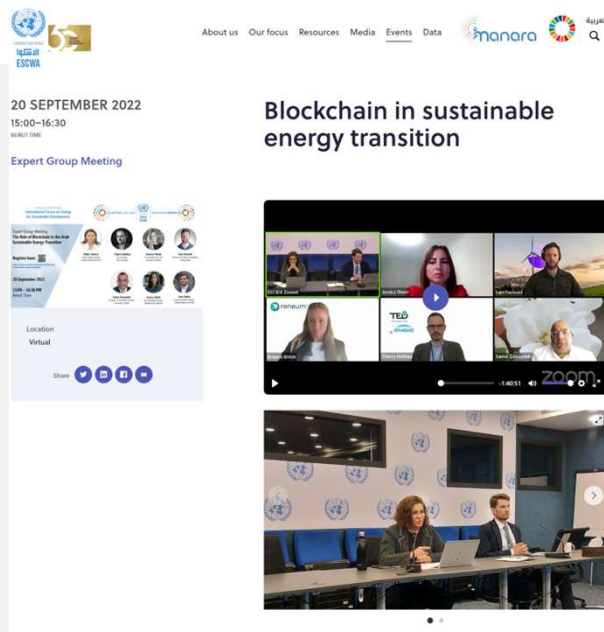
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