



BLOCKCHAIN BASED ENERGY TRADING: REGULATORY CHANGES PROPOSED AND NEEDED TO FACILITATE BLOCKCHAIN IN THE GB ENERGY MARKET

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Overview

- Introduction
- Background
- “Winds” of Change
- Current State of Play
- What is Blockchain?
- Regulatory Barriers & Concerns
- Elexon: Facilitating Key Market Changes- Proposed & Upcoming
- Conclusion



Elexon: a quick refresher on our role

We manage the Balancing and Settlement Code:

- Rules governing the 'meter to bank' process
- Imbalance prices calculated every half hour
- Market volumes and charges derived from our data

We also calculate, collect & distribute payments to CFD generators and Capacity Market providers

Elexon is highly transparent, not-for-profit, and independent



Code Administration

- Industry rules management and change
- Trusted critical friend
- Dedicated customer support (OSMs)
- Training and webinars



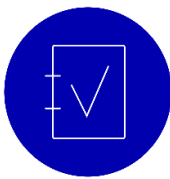
Policy Support

- Impartial, expert advice/ guidance
- Market scanning
- Providing support to BEIS/Ofgem to deliver policy outcomes



System Operation

- 24/7 Party Management
- 24/7 Settlement
- Technology Design/change implementation
- Data Analytics & Insights



Performance Assurance

- Monitor Settlement performance and compliance
- Hold Parties to account for their performance
- Assist Suppliers in creating plans to address performance issues

Elexon – trusted, reliable independent market experts

We serve

534

Market
Participants
including:

28 Distributors

114 Non-physical Traders

148 Generators

167 Suppliers

*Number of market
participants in July 2021*

Background

- Current regulatory framework is designed to fit a centralised dispatch model
- Regulation is complex and distributed across codes and acts
- Market participation threshold is therefore high
- There are multiple trading markets with different entry requirements



“Winds” of change

- Ever increasing amount of intermittent generation is leading to volatility in markets
- Volatile wholesale spot markets are leading to high system prices
- Increasing Network costs (particularly higher balancing costs)
- Higher costs are leading to higher consumer bills



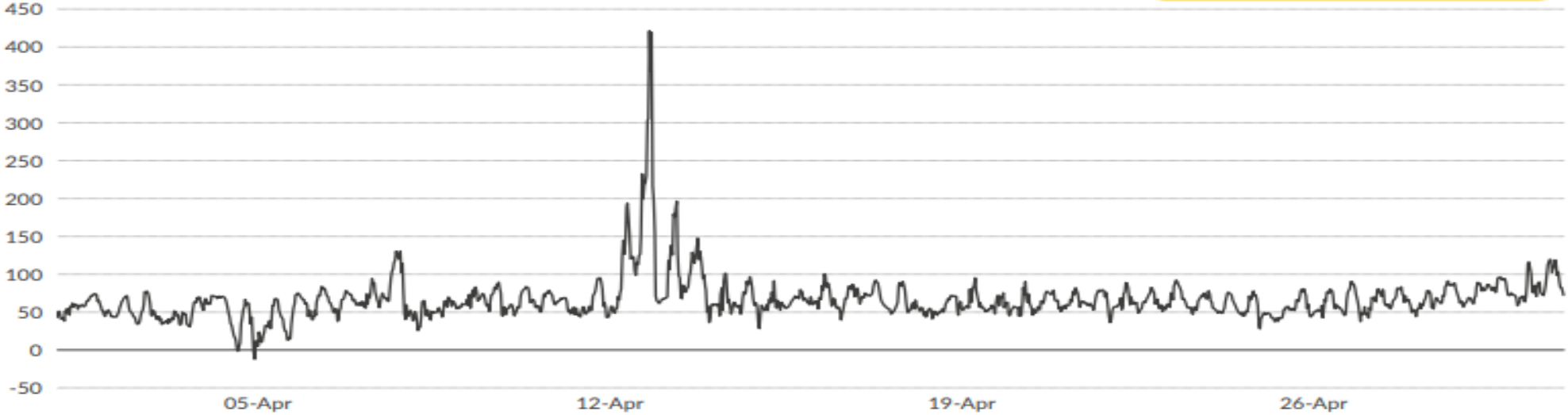
Increasing Wholesale Prices: Volatile Spot Markets

Half-hourly EPEX spot price for April

AURORA

EPEX spot price¹
€/MWh

Monthly average price in April 2021:
€66.57/MWh



1) Half-hourly EPEX is the volume-weighted reference price over that half-hour interval, as provided by EPEX Spot

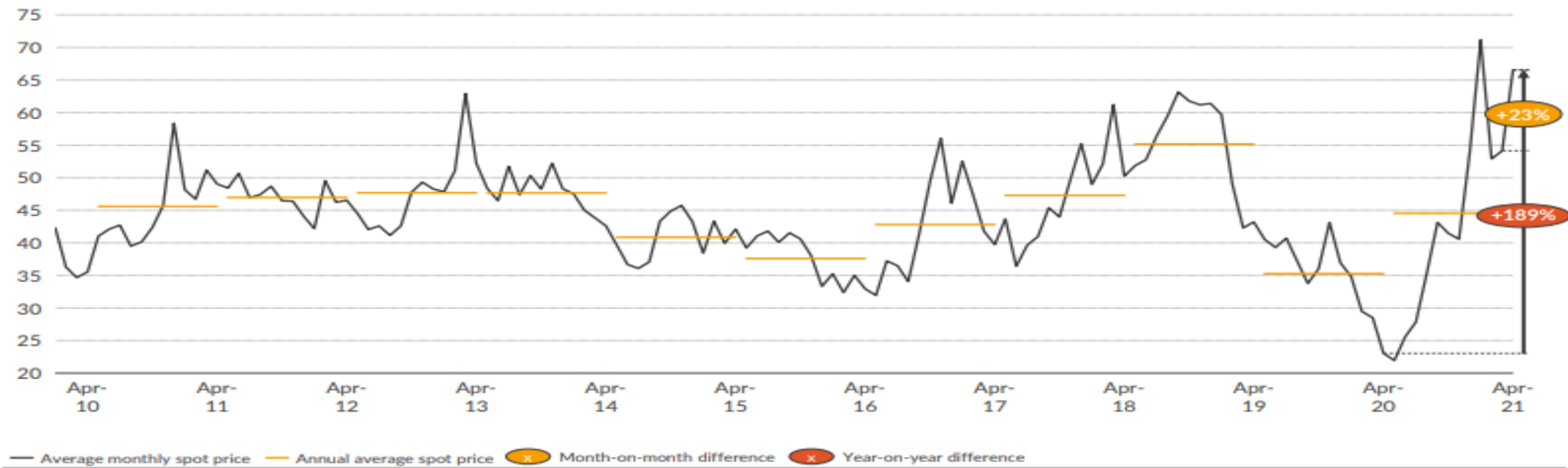
Source: Aurora Energy Research Thomson Reuters

Increasing Wholesale Prices: Volatile Spot Markets

Historic monthly average EPEX spot price

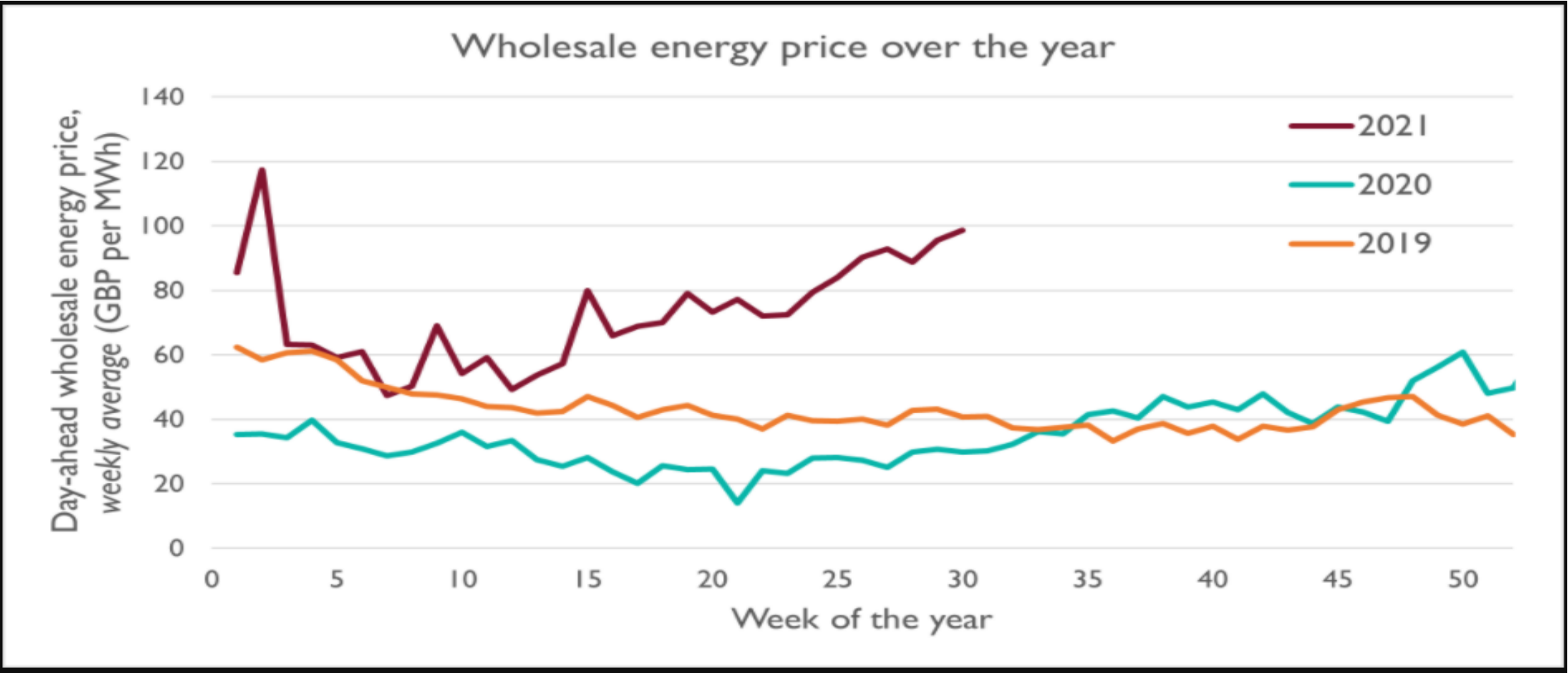
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Average EPEX spot price¹,
€/MWh



Source: Aurora Energy Research Thomson Reuters

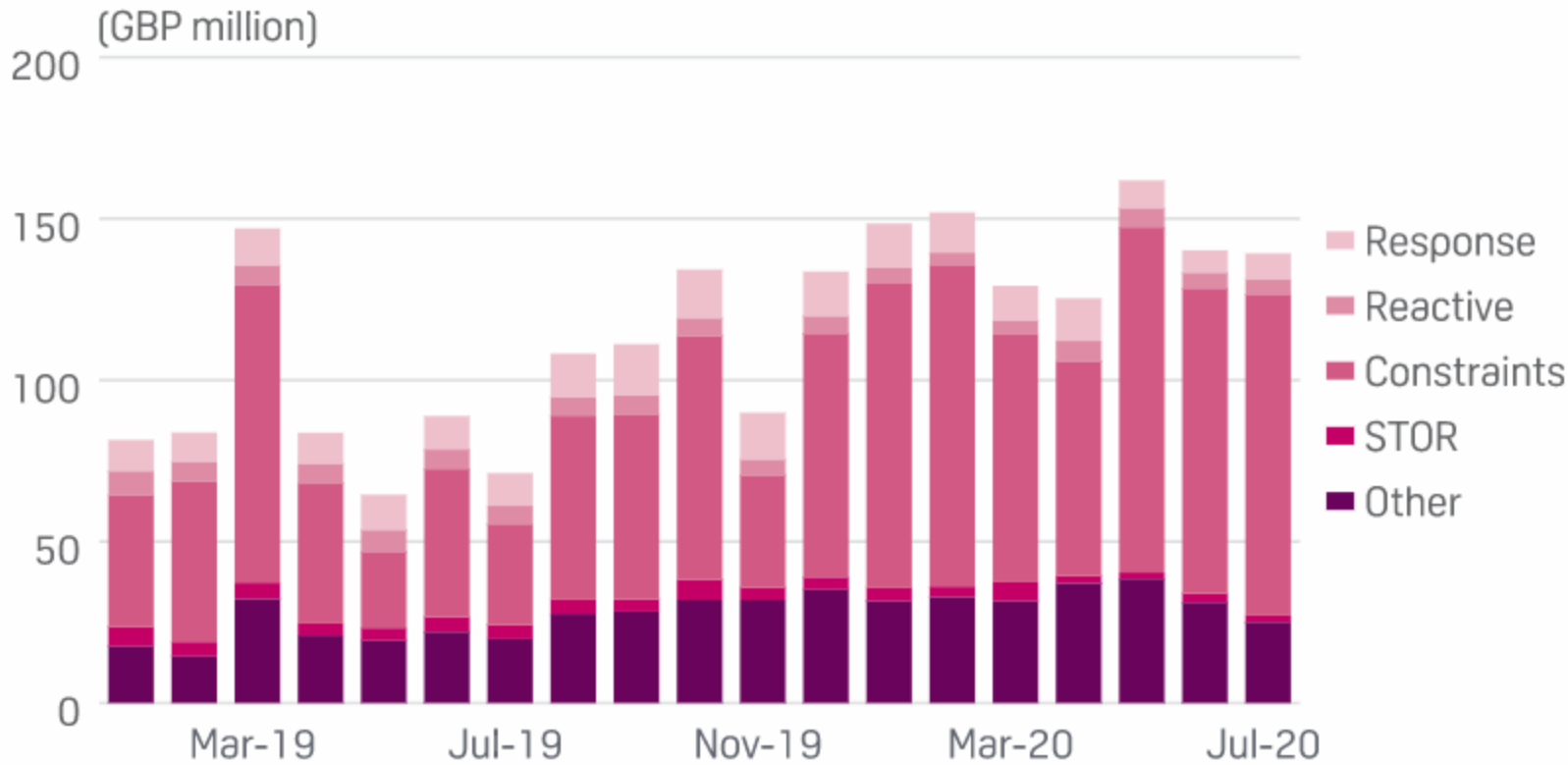
Increasing Wholesale Prices: Volatile Day-Ahead Market



Source: http://everoze.com/app/uploads/2021/08/2021-08-05-Energy_price.png

Increasing Balancing Costs: Volatile System prices

UK BALANCING COSTS UP 96% IN JULY Y-o-Y

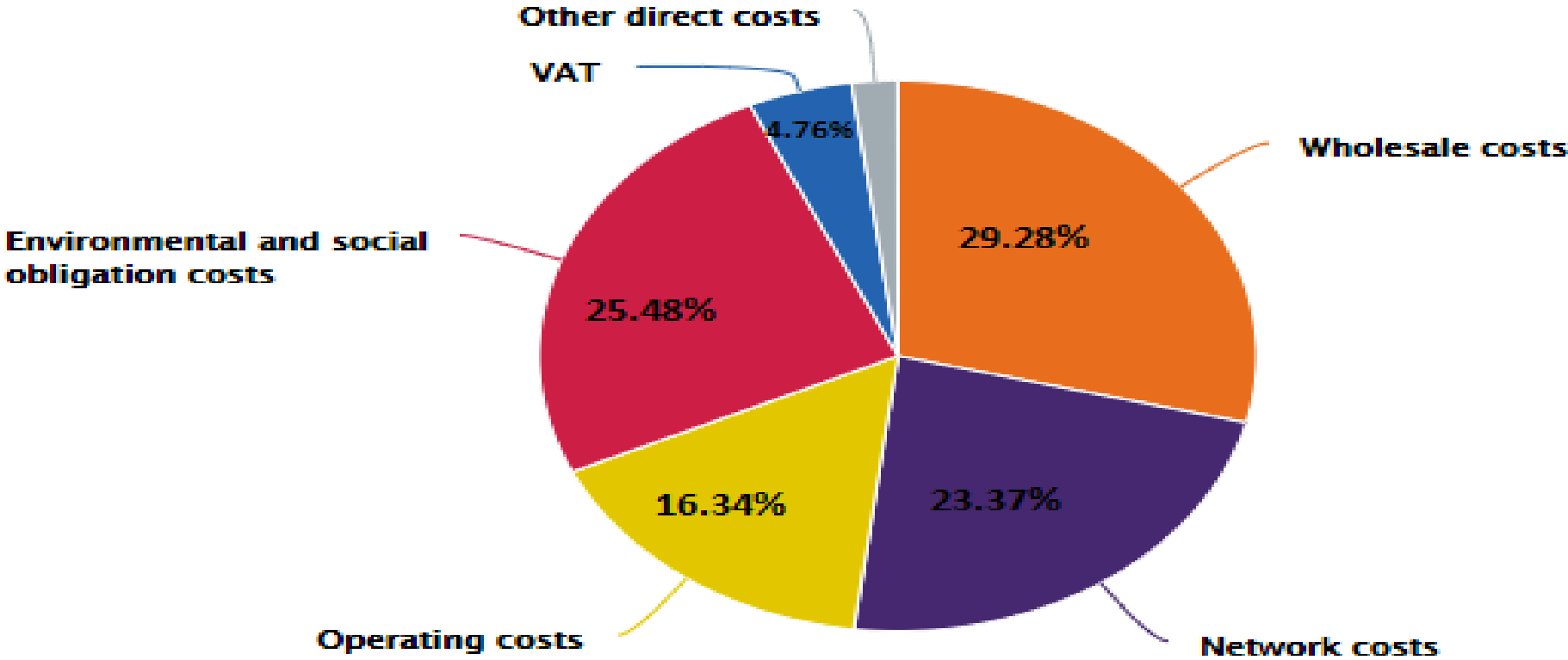


Source: National Grid ESO

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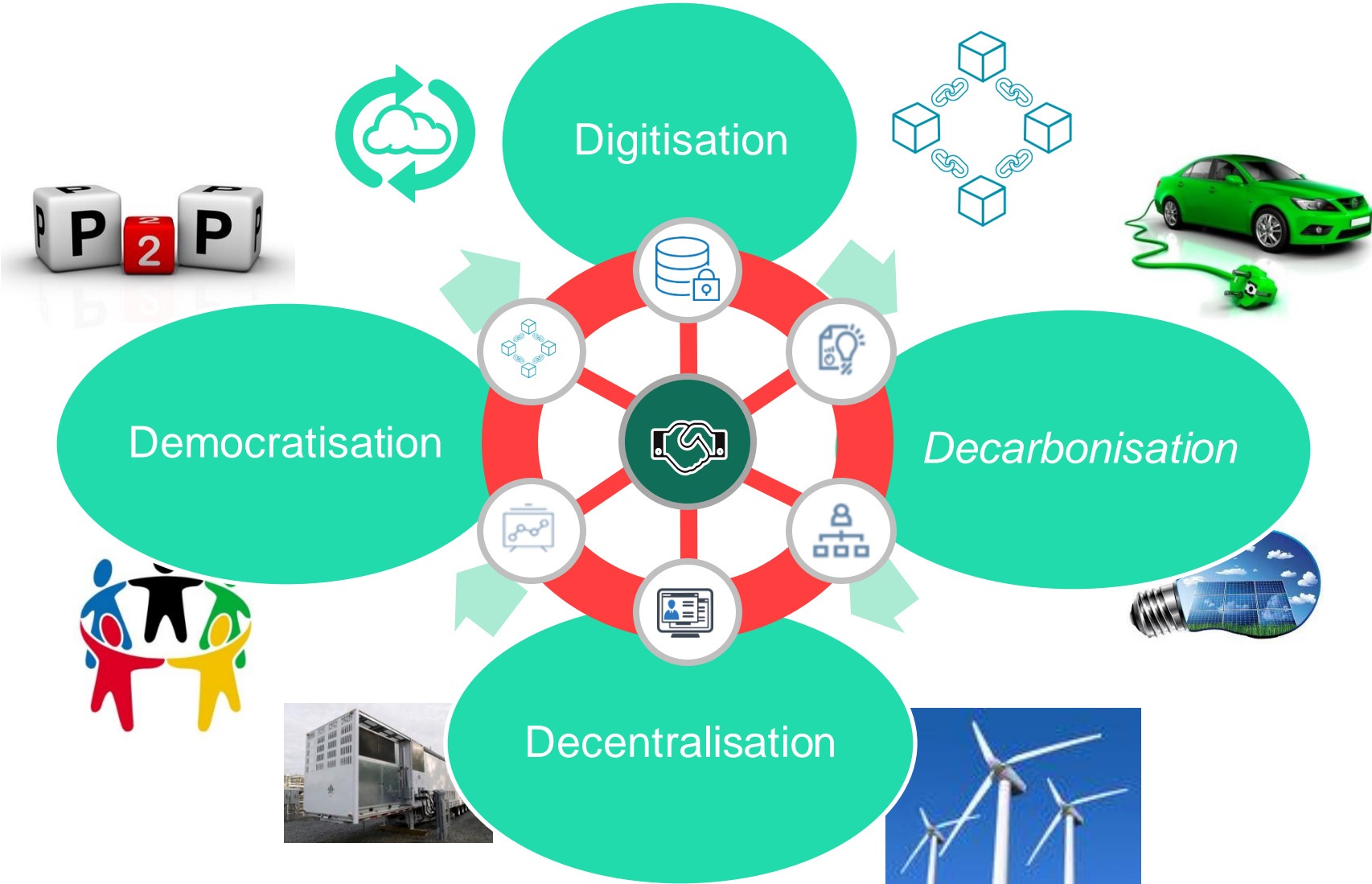
Breakdown of a typical consumer bill

Breakdown of an electricity bill



August 2021

Source: Companies' consolidated segmental statements

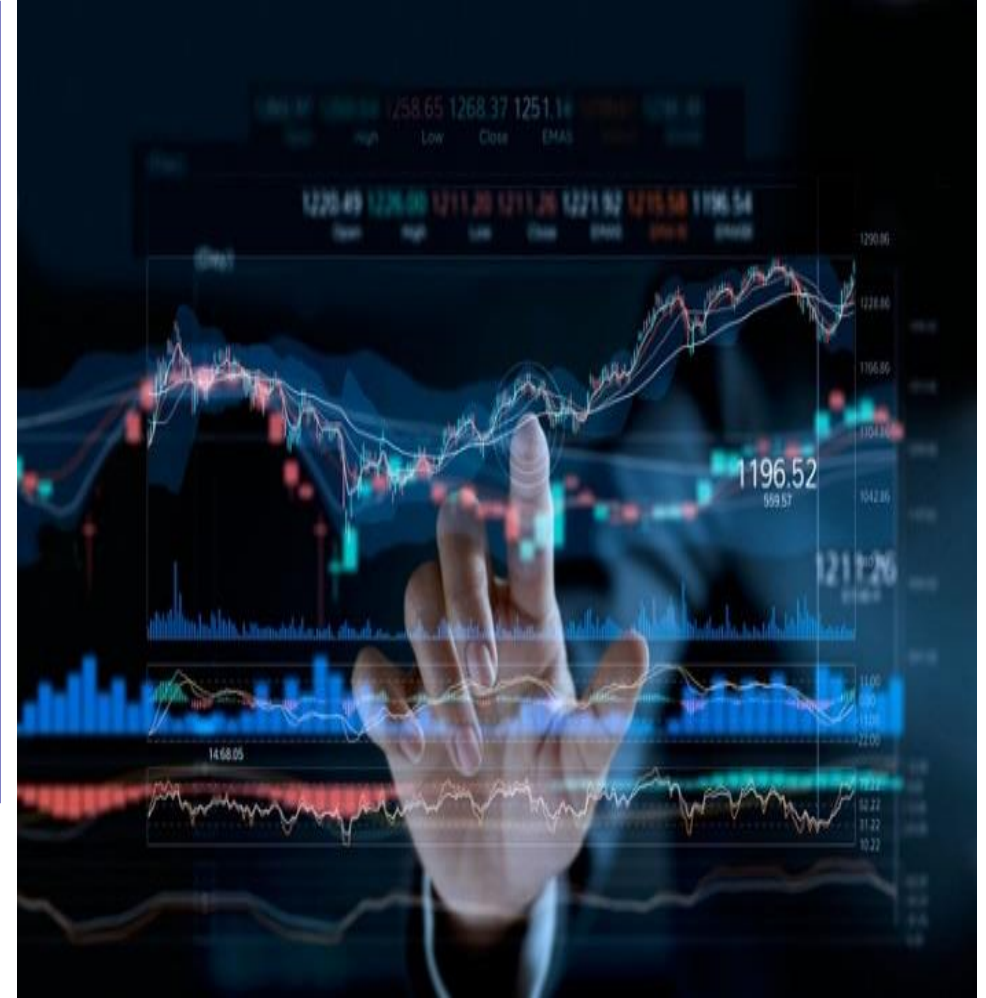


We need a solution: Could Blockchain be the answer?

Could DLT/Blockchain potentially solve the energy trilemma?

What DLT/Blockchain promises to ensure:

- Process optimisation and cost reduction
- Improved security of supply through tapping unused capacities
- Improve sustainability by facilitating renewable generation and low-carbon solutions

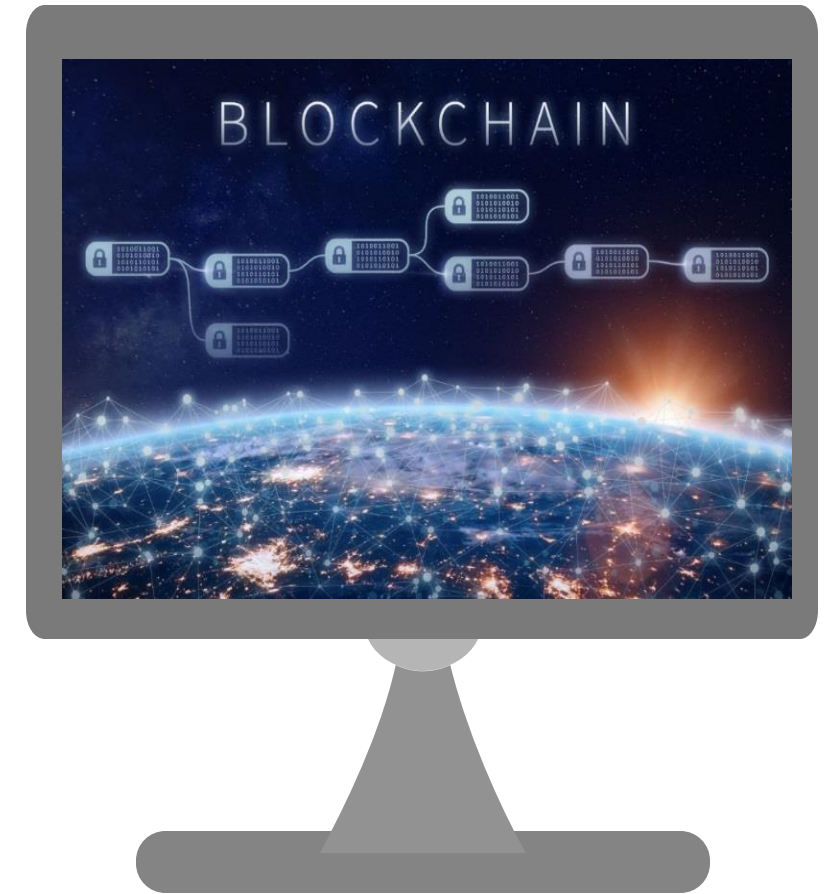


What is Blockchain?

- It is type of distributed ledger technology that consists of a chain of blocks.
- The blocks use consensus algorithms to validate and record transactions between peers without the need for a central authority
- Each block in the chain contains a number of transactions.
- Every time a new transaction occurs on the blockchain, a record of that transaction is added to every participant's ledger.
- The decentralised database managed by multiple participants is known as Distributed Ledger Technology (DLT).

Source: <https://www.blockchains.com/ordinary-ledger-vs-blockchain-ledger>

Blockchain is a type of DLT.



Benefits of Blockchain ledger over ordinary ledger

- **Better Transparency & Security**

a blockchain ledger offers full transparency for all users. Anyone can see the ledger whenever they want but they cannot edit it. A blockchain ledger is therefore a much more secured approach to the ledger system as it's immutable.

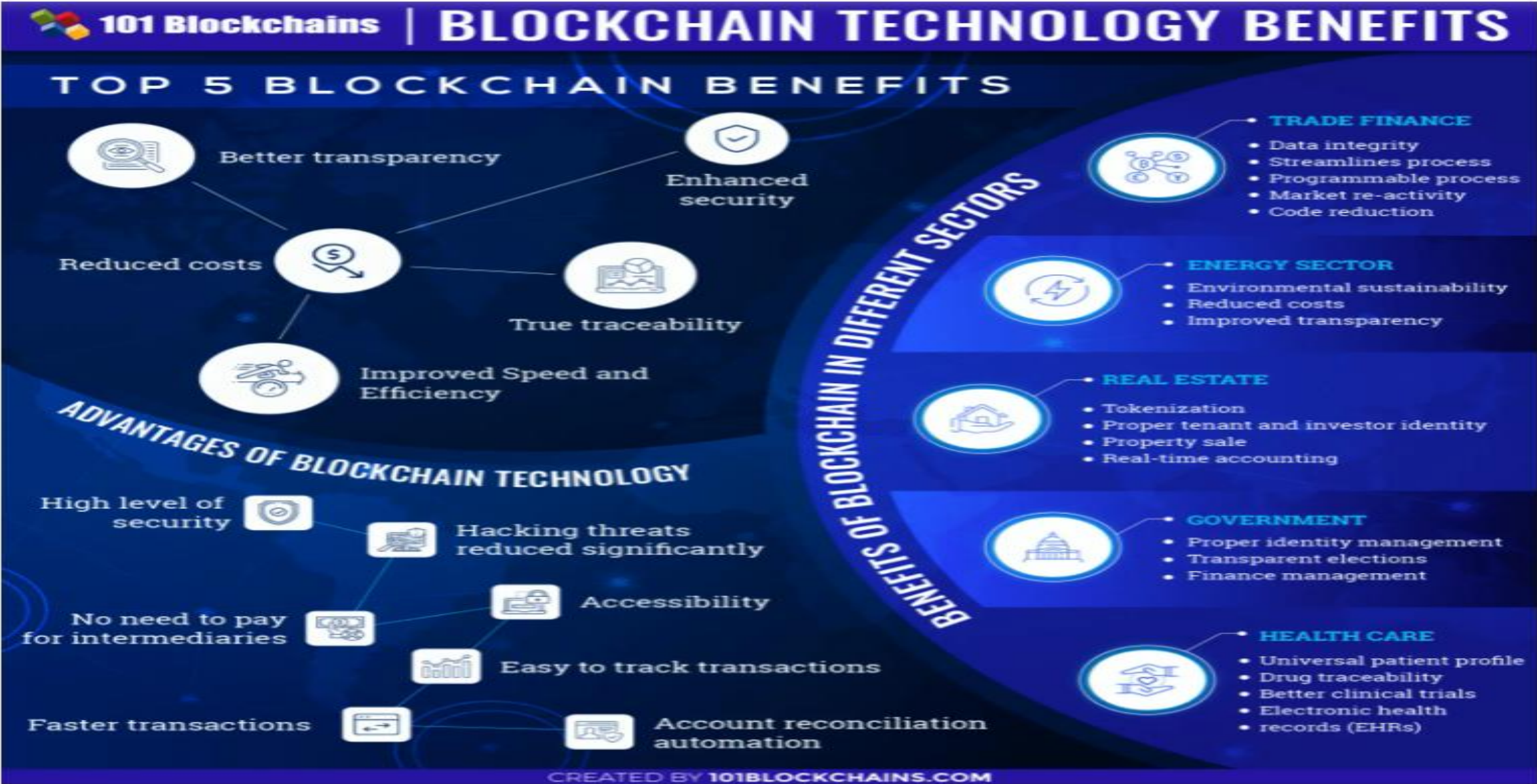
- **Distributed Ledgers**

Being distributed among multiple nodes, blockchain ledger is nearly impenetrable to cyber-criminals. Hackers wanting to corrupt a blockchain system would have to change every block in the chain, across all of the distributed versions of the chain

- **True Traceability**

Easier to track or trace any data as records are verified before a node adds them into the ledger. Blockchain for supply chain is widely popular and was recently used by the NHS to trace and track cold chain maintenance for Covid vaccines.

Blockchain: A Decentralised Digital Architecture



How could blockchain could be adopted in the energy sector?

- Facilitating Peer-to-peer (P2P) energy trading
- Internet of Things (IoT) applications
- Supporting the creation of decentralised marketplaces
- Enabling local balancing and supporting DSO's



Blockchain Based Trading: What would that mean?

Enabling blockchain based trading- what would that actually mean?

Enabling blockchain based digital energy platforms (DEP) to facilitate all P2P trades potentially including those between unlicensed parties (prosumers)

Enabling blockchain based DEP's to automate data collection and potentially also exercise control over generation and demand assets

Enabling full inter-operability at the metering level and allowing DEPs to intergrate with existing revenue metering infrastructure

Enabling fully automated trades with governing bodies and code managers interfacing directly with DEP's to provide required oversight and services

Barriers to entry: Traditional 'supplier hub' model

- Currently, licensed suppliers manage interactions with consumers and the wider market
- They are heavily regulated and are responsible for making forecasts and incur imbalance costs if they get their positions wrong



Regulatory Barriers and key concerns

- Access to data and interoperability
- Slower than anticipated roll-out of smart meters
- Lack of a level playing field
- P2P Trading only possible through licensed suppliers



Blockchain is a technology option, not a governance one – we still need rules!



Key Issues

Challenges from moving from our current system of regulation to a fully automated one?

Trust: Should we allow unlicensed Prosumers to trade with wider market? If so who will bear responsibility for Imbalance Costs?

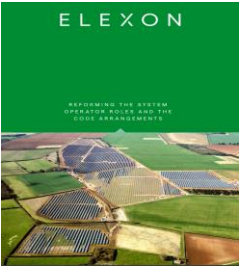
Data & Consumer Protection: How do we ensure accurate billing, data protection and protection consumer rights in case of negative outcomes?

Dispute Resolution: What happens in case of disputes and who should pay for the dispute resolution infrastructure costs?

Impact on existing market roles: complexity of billing scenarios and the costs this introduces, establishing the responsibility for problems, managing the imbalance risks that actors introduce to each other in more complex trading scenarios

So what is Elexon doing?

Elexon’s Purpose: Serving at the heart of the energy industry, building a path to net zero



The Clean Growth Strategy
Leading the way to a low carbon future



Supplier Hub

‘Allowing Virtual Lead Parties to trade in the wholesale market’ (P415)

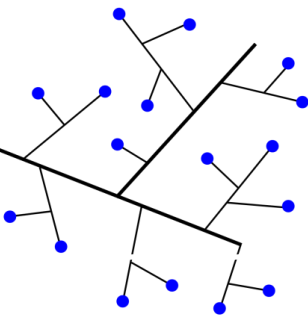


Balancing Mechanism

BSC ‘Sandbox’ for innovators to trial concepts – a first for any energy industry code body

‘Behind the Meter’ Participation (P375) a ground-breaking change allowing smaller asset activity to be visible in settlement

Baseline Methodology for DSR (P376)

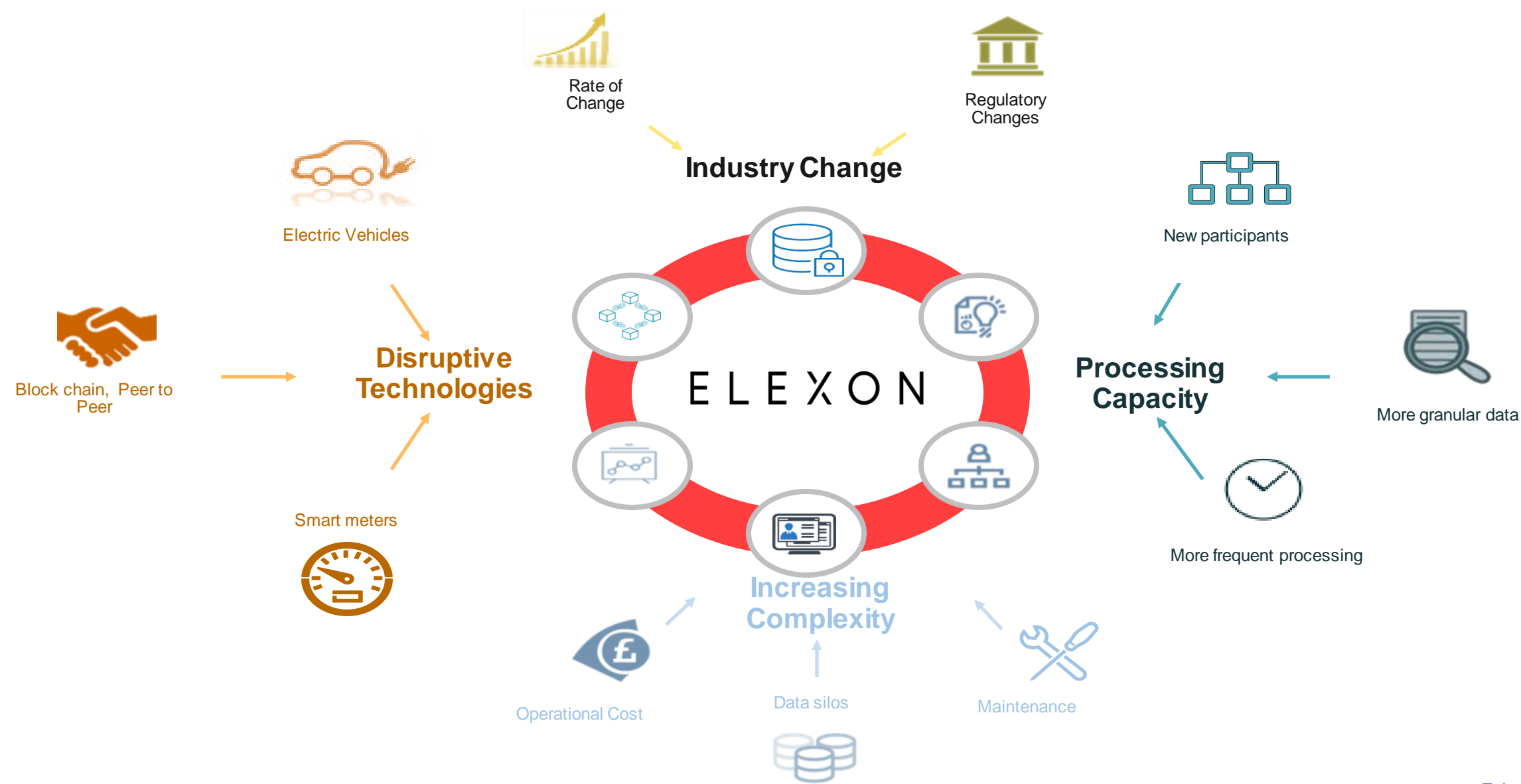


Networks

Calling for setting up of flexibility trading platforms and supporting trails of flexibility exchanges

Support to ENA Open Networks

How we see ourselves meeting change drivers



In conclusion

- Blockchain may be able to help the development of the future energy system supporting locally based energy, prosumers, and decarbonisation
- Regulation has traditionally lagged behind industry changes – going forward it must anticipate market developments so that rules don't inhibit innovative solutions
- The industry needs to work closely together with Ofgem and Government to ensure that regulation doesn't inhibit blockchain and other new technologies from providing solutions to challenges arising in an ever changing landscape.

