



Energy, commodities and blockchain

North American Power Credit Organization
(NAPCO) conference

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Building a better
working world

Agenda

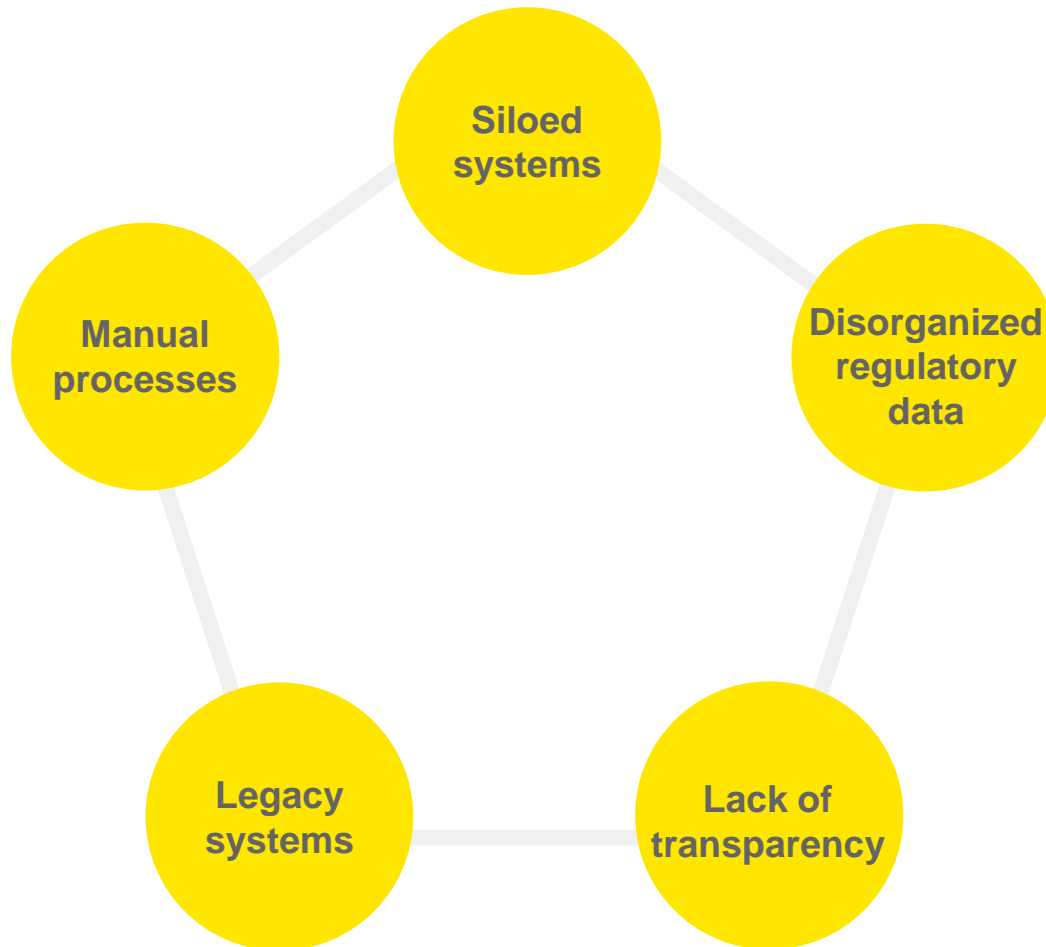
- ▶ Current state of energy trading and risk management
- ▶ Industry challenges
- ▶ Capabilities offered by blockchain technology
- ▶ Impact of blockchain on other market sectors
- ▶ What is blockchain?
- ▶ Blockchain illustrative example
- ▶ Industry use cases
- ▶ Blockchain technology capabilities
- ▶ Key issues and considerations
- ▶ The path forward for blockchain

Current state of energy trading and risk management activities today (illustrative example)



Industry challenges

Challenges with current processes



What capabilities does blockchain offer?

Blockchain technology has the potential to transform today's inefficient, time-consuming processes into a more **efficient, transparent framework**, while also offering the ability to **reduce costs**.

Access to
untapped
segments

New
products

Increased
speed and
efficiency

Data
reliability and
availability

How is blockchain impacting other industry sectors?

Blockchain investments **exceeded \$1b per year** since 2014.

Financial services

Payment processing
Cross-border payment
Back-office automation

Asset trading and settlement
Real estate and mortgages
Regulatory reporting and compliance

Audit and assurance
Syndicated loans
Corporate voting

Retail

Inventory management
Supply chain custody
Certificate of authenticity

Commodities

Commodities and futures exchanges
Precious material tracking
Commodity-backed digital currencies

Government

Land ownership records
Tamper-proof voting
Digital identification
Fraud-proof benefits

Technology

Internet of Things database
Mobile network infrastructure

Health and sciences

Patient records database
Prescription management

Transportation

Automotive property ownership
Self-driving cars

Utilities

Energy exchange
Smart utility metering systems

Media

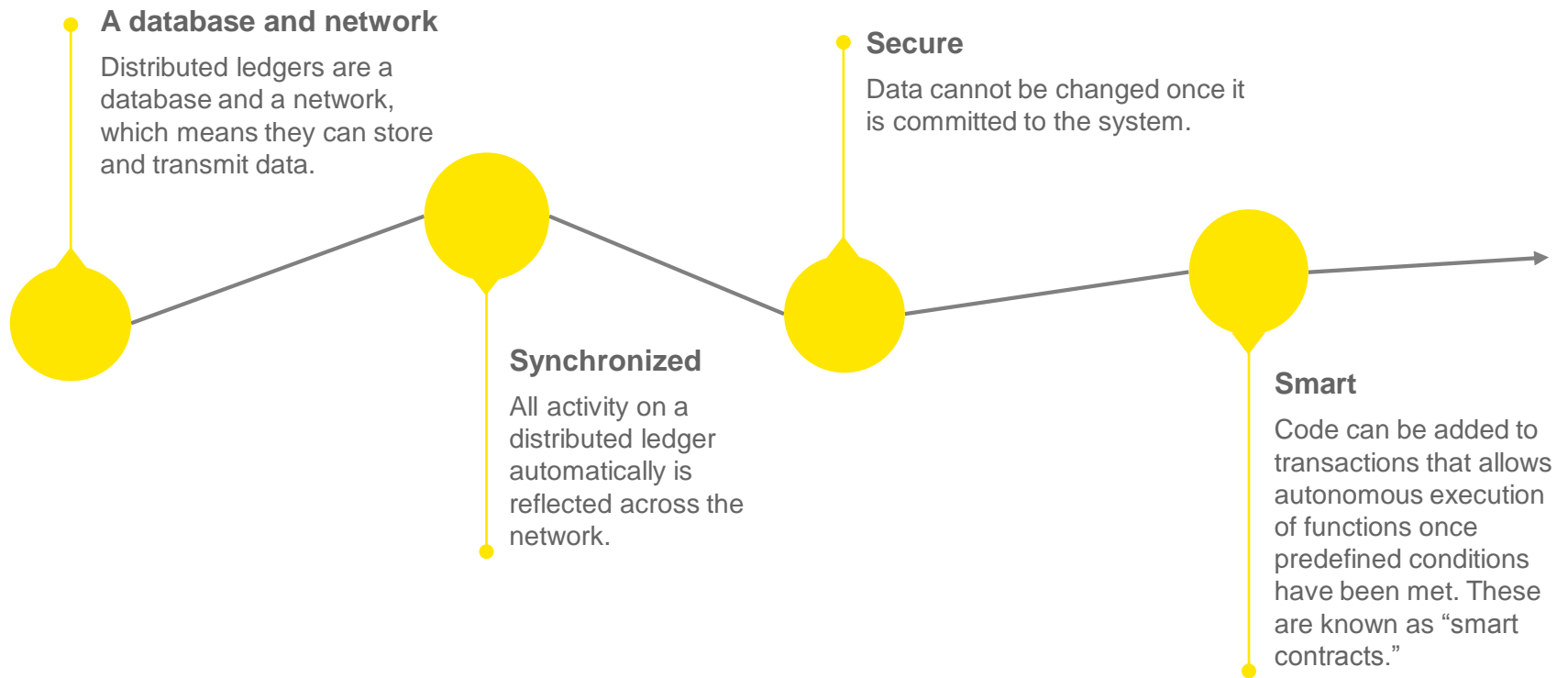
Digital rights management
Micropayments

Education

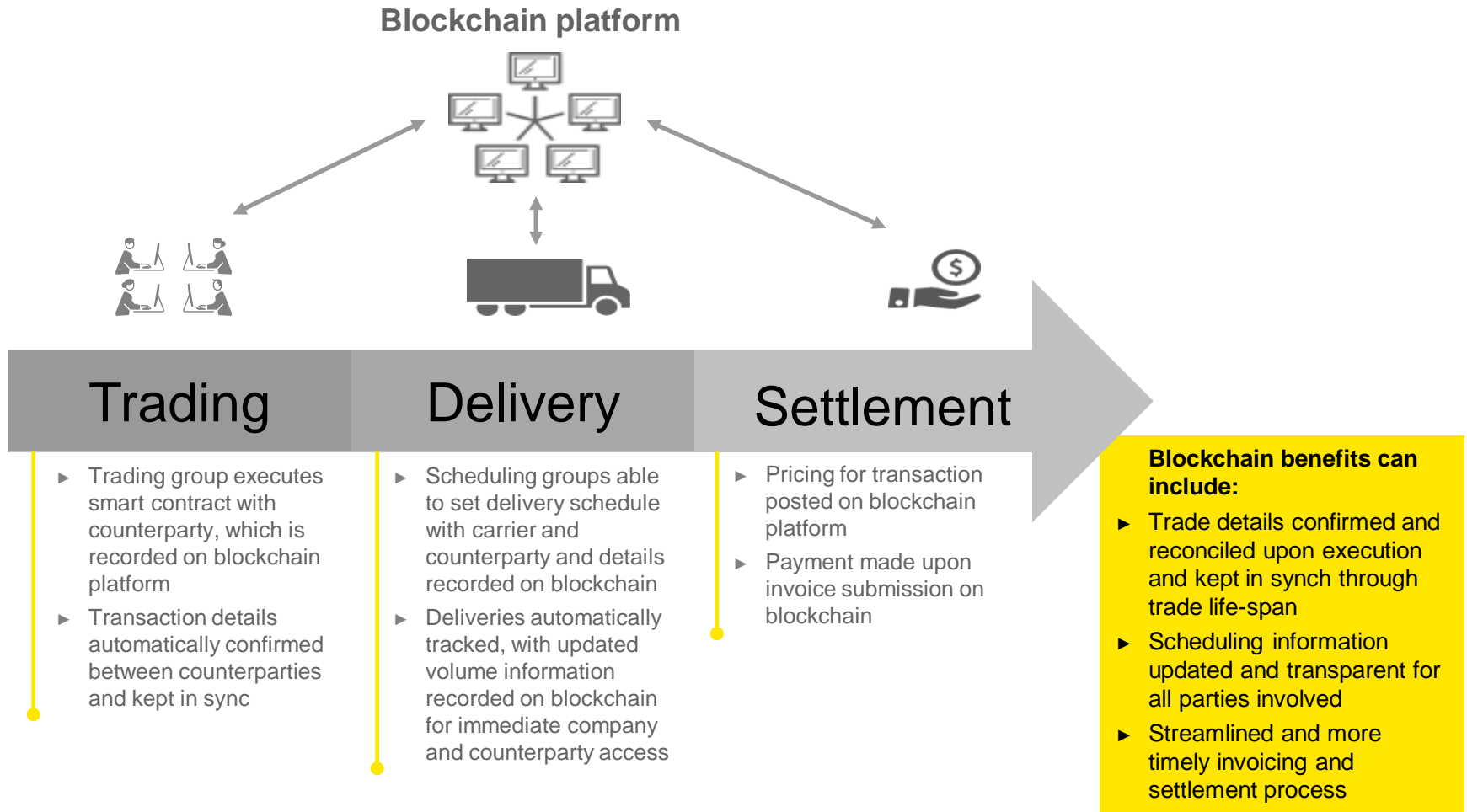
Student transcript management
Certificate management

What is blockchain?

Blockchain is a distributed ledger that is:



Blockchain illustrative example



Energy industry blockchain application

Use cases

1

Reconciliation

4

Scheduling

2

Settlements and
invoicing

5

Data privacy and
security

3

Contracts and
agreements

6

Identity
management

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Blockchain technology industry overview

- ▶ **Industry consortia:**

- ▶ R3CEV, Hyperledger, PTDL, ISITIC

- ▶ **Vendors:**

- ▶ Platforms and infrastructure: Ethereum, Kynetix, Axoni, itBit, Eris, BTL, Chain.com
- ▶ Invoicing: Tallysticks
- ▶ Data management: Factom
- ▶ Smart contracts: Symbiont, Adjoint
- ▶ Payment: Ripple, DASH, Abra
- ▶ Supply chain: Wave, Block Verify, Everledger
- ▶ Other: Digital Asset Holdings, IBM, Bitfury

Key challenges with blockchain

1

Unclear legal
and regulatory
framework

2

Immature
technology and
frameworks

3

Lack of formal
digital identity and
verification

4

Investment and
collaboration

5

Legacy integration

Way forward for blockchain in the energy trading and marketing industry

“A journey of a thousand miles begins with a single step.”

– Lao Tzu

The advent of blockchain technology, combined with the current state of industry processes, offers a great opportunity to effect major transformation in how the industry conducts business.

To move forward, companies may need to undertake several actions, including joining together to form a consortia, engage in focused pilot programs and create internal organizational innovation initiatives.

Questions?



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