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AN INTRODUCTION TO BLOCKCHAIN & LEDGERS

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Agenda

- What Is a Blockchain?
- How Do Blockchains Work?
- Key Advantages of Blockchain Technology
- When Blockchain Might Not Be the Best Option
- Areas for Blockchain Implementation in Energy

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Blockchains by Definition

- A Store of ~~Value~~ Data
- The Distributed Ledger
- Coming to Consensus
- Immutable Records

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Key Advantages

- Transparency
- Security
- Decentralization
- Immutability
- Cost

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When to Say No

SCALABILITY

DATA PRIVACY

REGULATION

CENTRALIZATION

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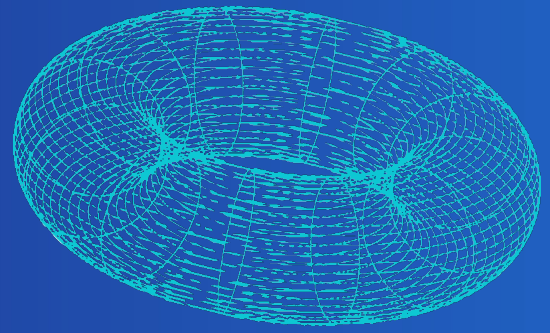
How Do They Work?

Transactions and Blocks

Who Is Sybil, anyway?

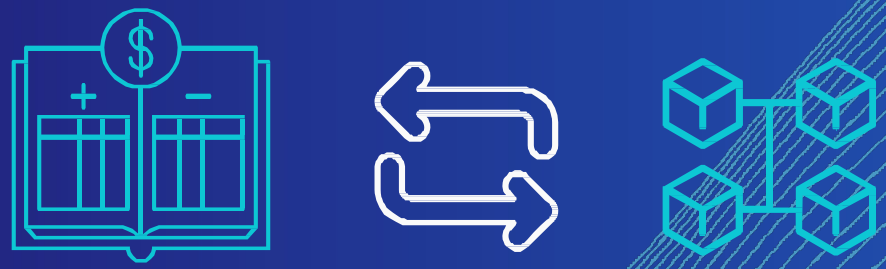
Cryptographic Hashing

Smart Contracts



Transactions & Blocks

- Double-Entry Ledgers
- Transactions
- Blocks



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Cryptographic Hashing

A one-way black box transforming data...

PIDX 46913d5edb85ce76e4ac852eb1d3102e

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Coming to Consensus

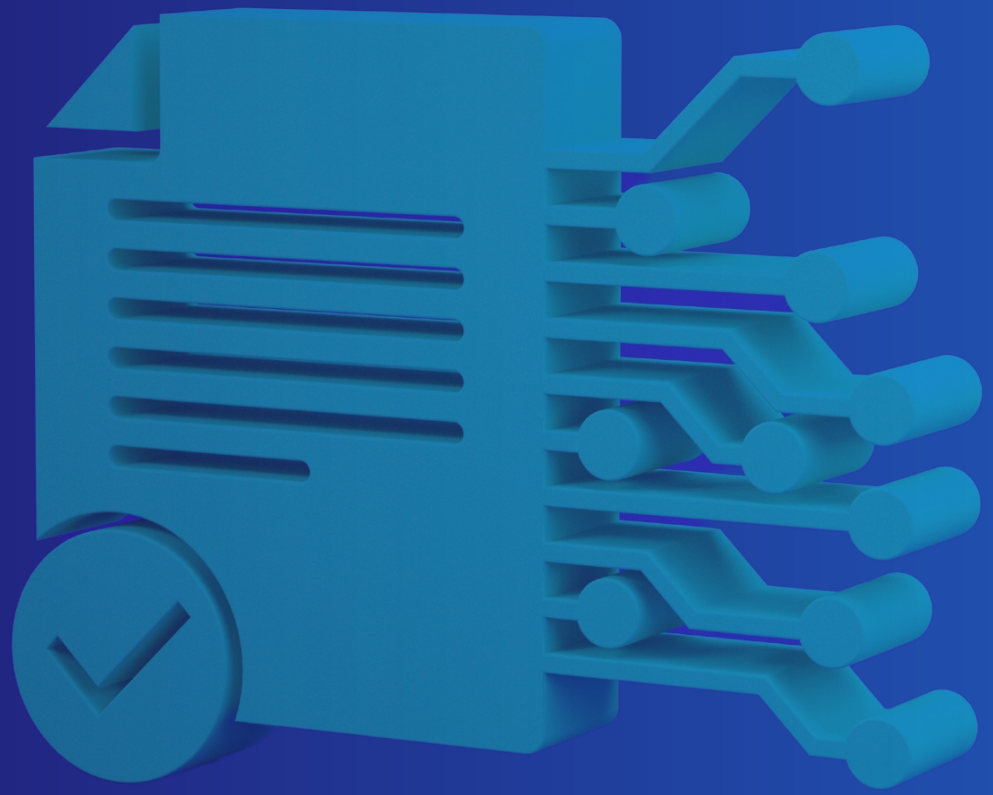
Leader Election

Dealing with Sybil

Universal Transparency

Following the rules

Smart Contracts



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Applications to Energy

- Supply Chain Automation
- Trading & Risk Management
- Environmental, Social, and Governance (ESG) Reporting
- Data Management & Analytics

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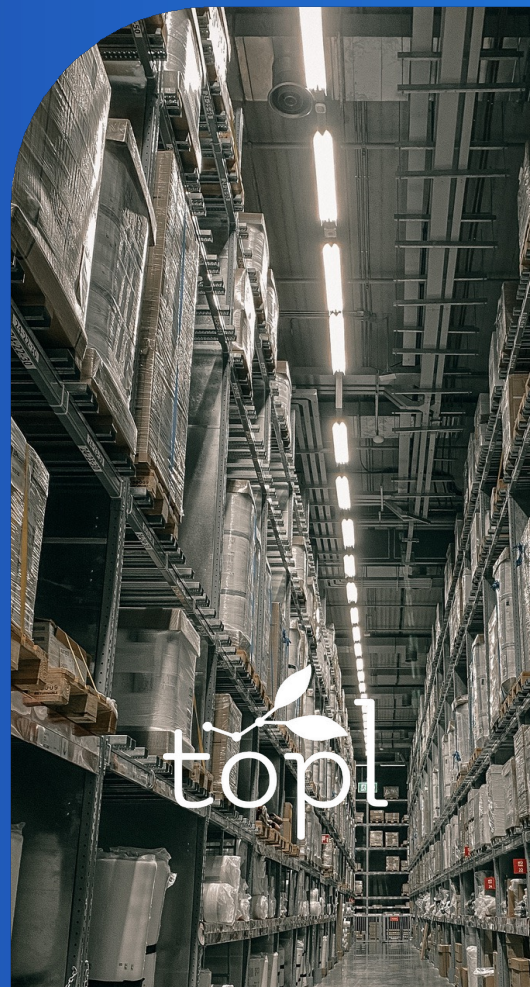
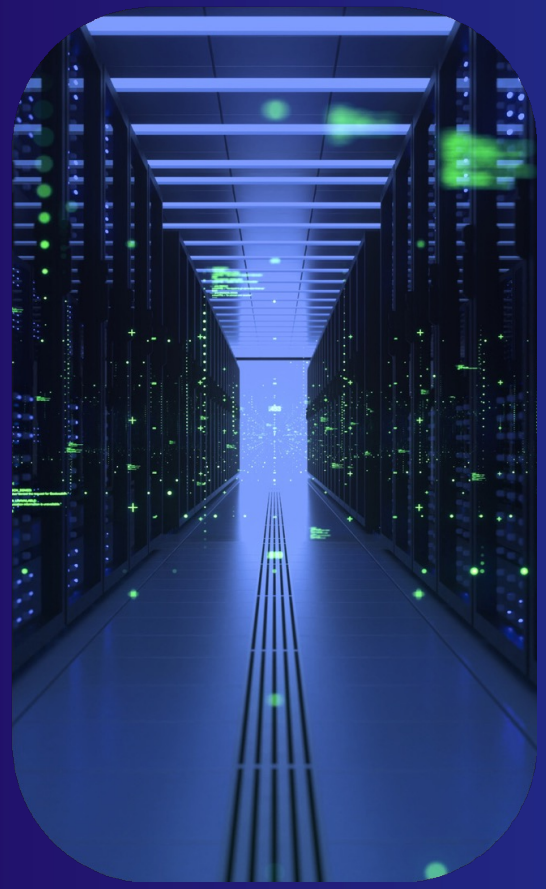
Supply Chain Automation

- Improved Efficiency
  - Ex: Shipment delivery receipt & payment
  - A tanker arrives with a water delivery: How manual is the process? Invoicing? Payment? Metering?
- Traceability
  - Ex: Turbine manufacturing
  - Confirming alloy composition, post-processing steps, quality control, and liability management





- Real-Time Analytics
  - "Data is the new oil" (value increases when processed and delivered)
  - Leasing data streams to traders, partners
- Secure Data Sharing
  - Blind auctions for drilling site data, even in extrajurisdictional areas

Data Management

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Trading & Risk Management

- Commodity Trading
  - Automated trades are table stakes
  - Universal data interface for easy integration
  - Roll your own exotic derivatives
- Smart Contract Execution
  - Automatic contractual enforcement

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ESG Reporting

- Environmental Impact Reporting
  - Publish compliance activities to boost internal impact initiatives
  - Ex: Methane management or water reuse policies backed up by real-time sensor data
- Provenance Tracking
  - Easily prove where and when resources were extracted to simplify compliance and level the playing field

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Questions?

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