Blockchain in Energy Industry

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趣链科技
HYPERCHAIN

Agenda

01
Qulian Tech

Milestones

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Tech	Hyperchain		Filoop	BitXHub BitXMesh	BFS	
	2016	**2017**	**2018**	**2019**	**2020**	**2021**
Ecosystem	FINANCE	SUPPLY CHAIN	Series B	ENERGY	Government Affairs	Series C
Standard	FG DLT			SG16 Q22 DLT and E-Service		

Mandate items for TBI testing   Optional items for TBI testing

ITU 751.1	9.3 Data storage sustainability	8.4.1 Secure transmission	7.4.1 Data consistency	7.4.1 Data consistency	7.7 Security of cryptography	7.4.1 Data consistency	9.2 Risk management and mitigation	7.6.2 Lifecycle management of smart contract	8.5.2 User interface for smart contract	7.6.4 Smart contract data access control 1	8.2.1 Stability for manage	7.2 Transaction Processing	7.1 Account Creation	8.1 User authentication	7.5.1 Software wallet	8.5.3 Multi-language software development kits (SDKs)	9.1.1 Node status monitoring	9.1.2 Multi type nodes	9.1.1 Node status monitoring	7.6..1 Monitor ability of participants' status	7.4.2 BFT/CFT	9.1.3 Node configuration modification	9.3 Data storage sustainability	7.7 Security of cryptography	7.6.3 Security of smart contract	9.1.3 Node configuration modification	8.2 System stability	9.1.4 Network fairness	8.2.6 Stability for concurrency	8.4.3/8.4.2 Information privacy/Restricted data access	8.2.2 Stability for cross-chain operation	9.2.3 Avoid single point of failure	7.5.2 Hardware wallet
SUT A																					CFT	hot											
SUT B																					CFT	cold											
SUT C																					CFT	cold											
SUT D																					BFT	hot											
SUT E																					BFT	hot											
SUT F																					BFT	hot											
SUT G																					BFT	hot											
SUT H																					BFT	hot											
SUT I																					CFT	hot											
SUT J																					CFT	cold											
SUT K																					CFT	hot											
SUT L																					CFT	hot											
SUT M																					CFT	cold											
SUT N																					BFT												
SUT O																					CFT												
SUT P																					BFT												
SUT Q																					BFT	cold											
SUT R																					CFT	hot											
SUT W																					CFT	hot											
SUT T																					CFT	hot											
SUT U																					BFT	hot											
SUT V																					CFT	hot											
SUT W																					BFT	hot											
SUT X																					CFT	cold											
SUT Y																					BFT	cold											
SUT Z																					CFT	hot											
SUT AB																					BFT	cold											
SUT AC																					CFT	cold											

Hyperchain (row SUT F highlighted)

02
Challenges

Problems

Data

Data islands are formed due to many parties involve, and thus the value of information is severely limited.
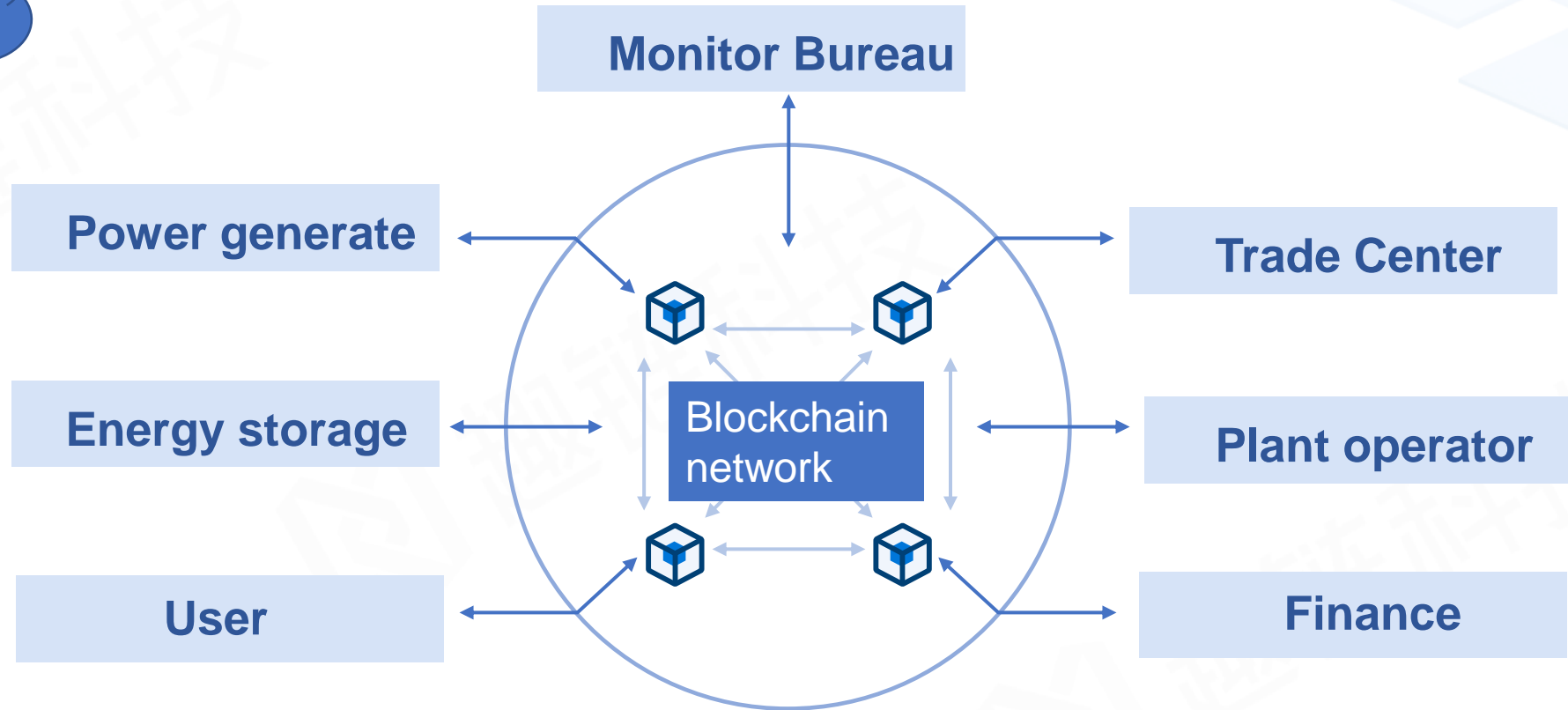
Supply chain

Information barriers in the upstream and downstream of the supply chain can bring many challenges to the coordination of each supply chain party in the energy industry.
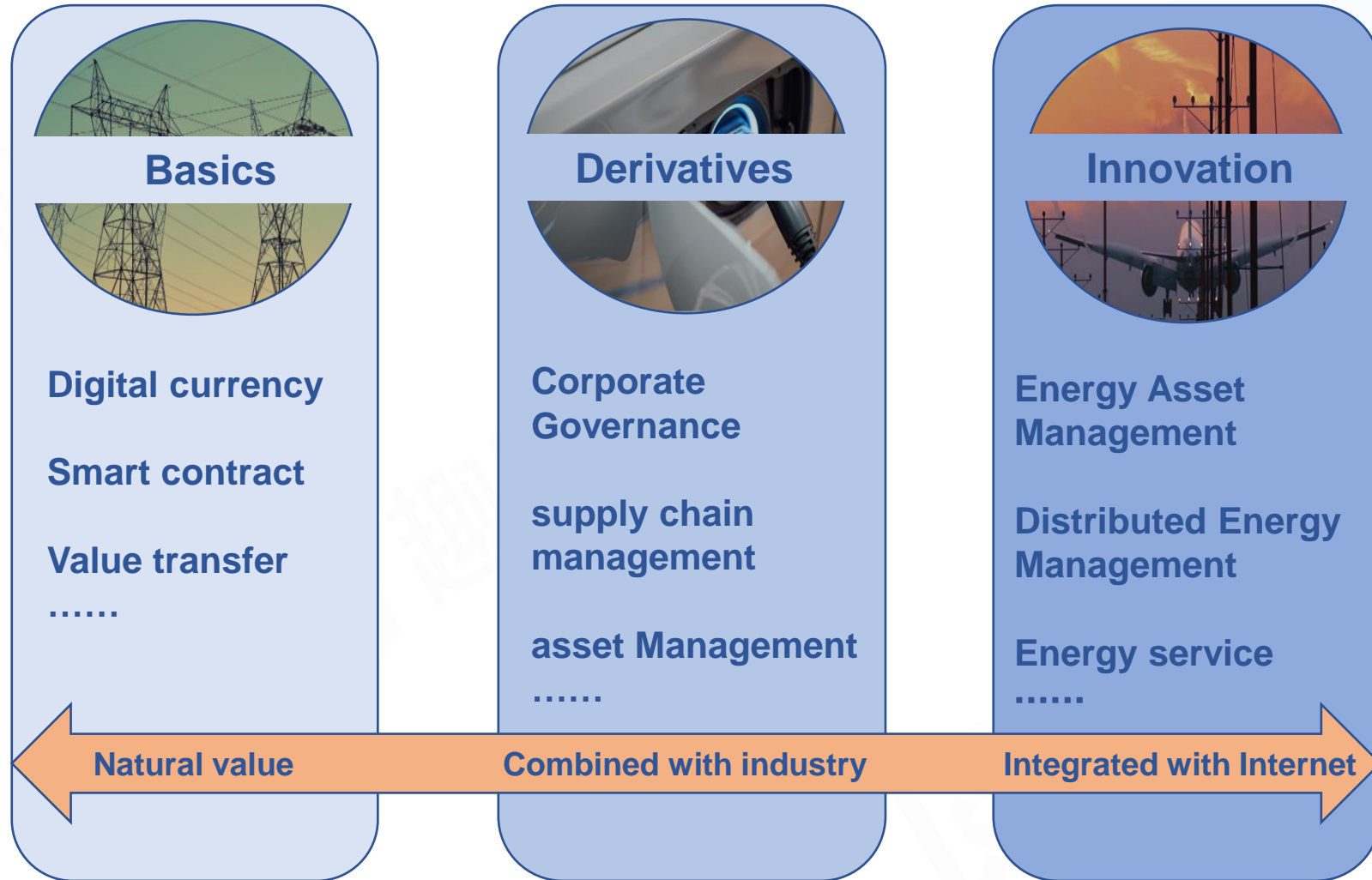
Trust

When interacting and integrating with other industries, there're challenges in breaking down the trust barriers between enterprises to build a unified multilateral trust system.
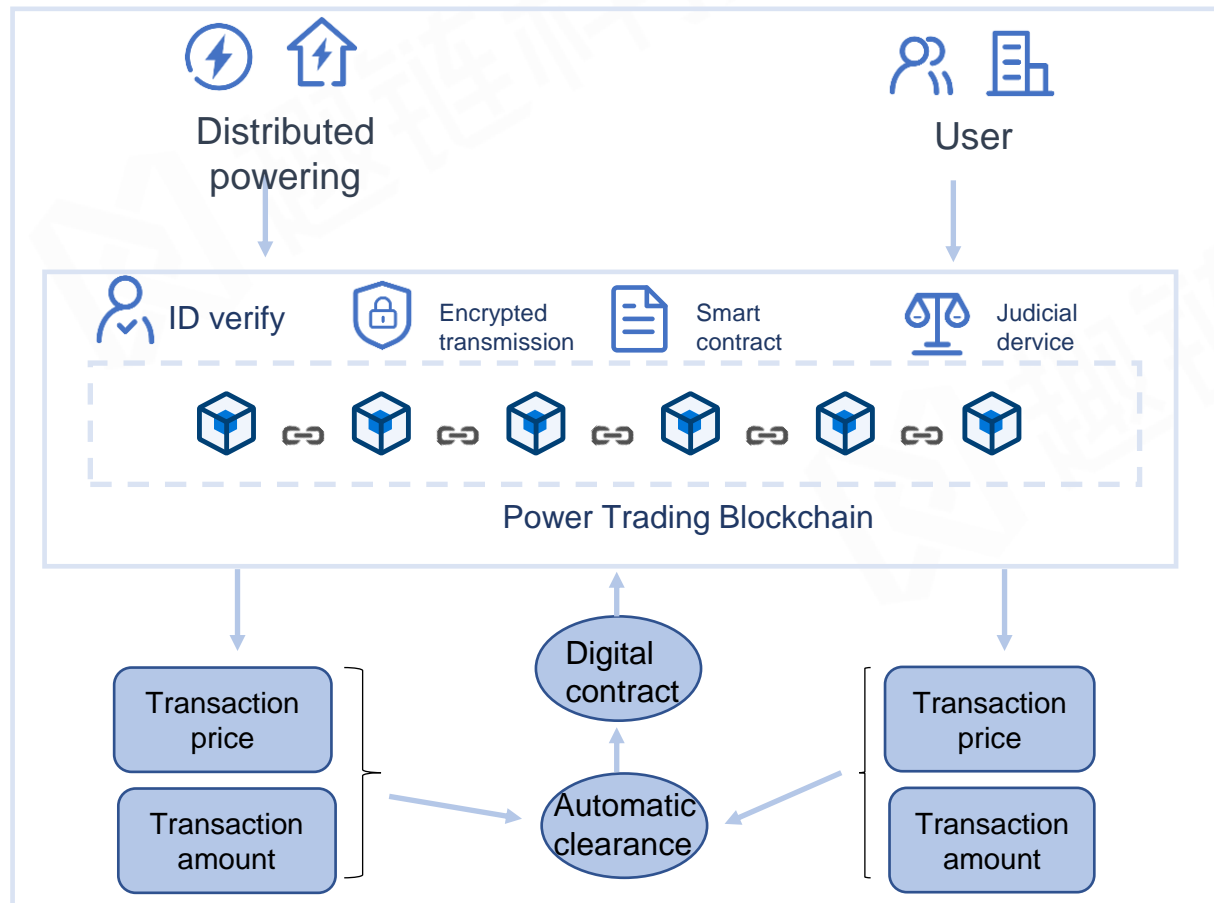
WHY?

Monitor Bureau

Power generate

Trade Center

Energy storage

Blockchain network

Plant operator

User

Finance

HOW?

Basics

Digital currency

Smart contract

Value transfer

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Derivatives

Corporate Governance

supply chain management

asset Management

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Innovation

Energy Asset Management

Distributed Energy Management

Energy service

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Natural value | **Combined with industry** | **Integrated with Internet**

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03
Use cases

Distributed Power Trading

CURRENT SITUASTION

- Information is **not transparent**.
- The interests of users, power grids, and generators are **not equal**.
- The process is **complicated**.

Distributed powering

User

ID verify | Encrypted transmission | Smart contract | Judicial dervice

Power Trading Blockchain

Transaction price

Transaction amount

Digital contract

Automatic clearance

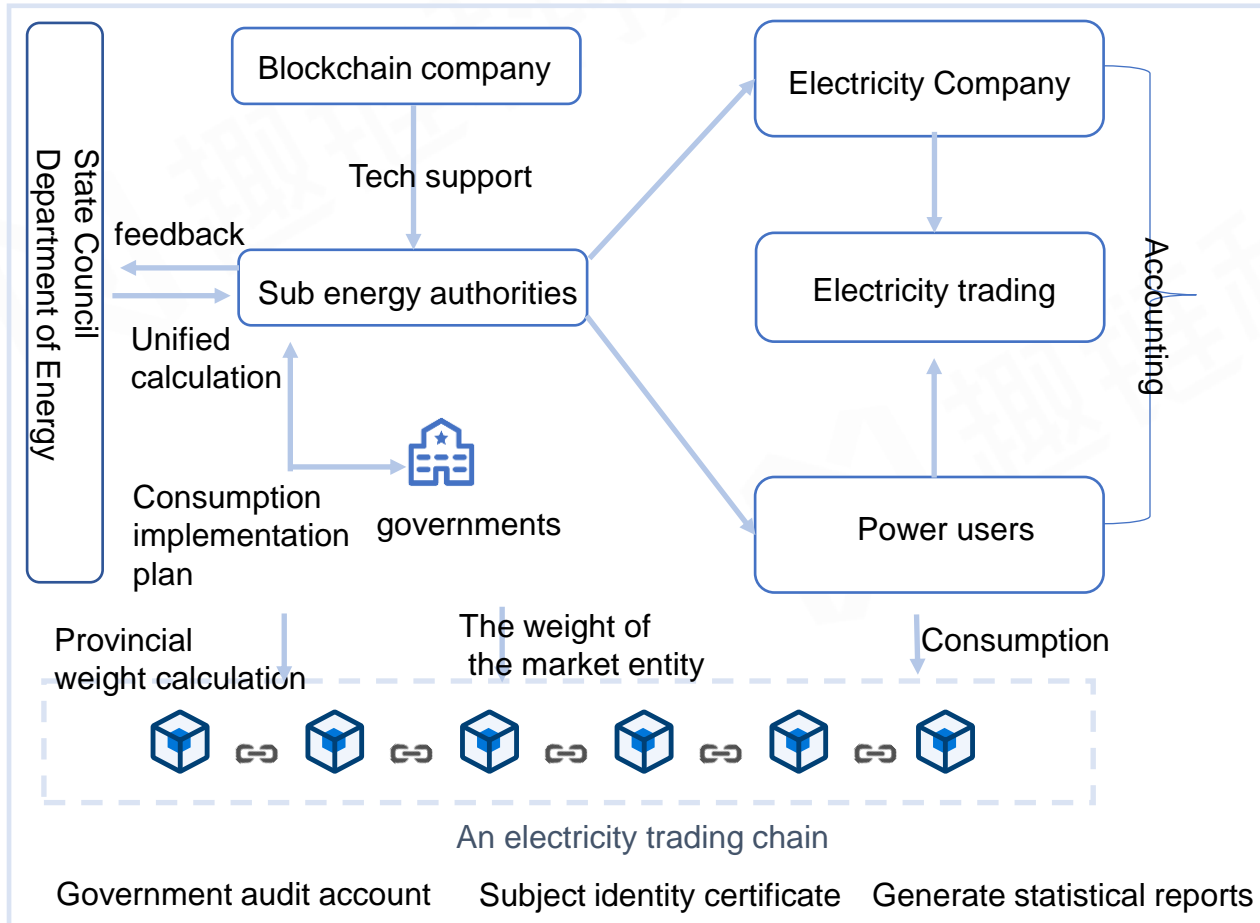Transaction price

Transaction amount

Solutions

1. The verification of user identities can be achieved to ensure transaction security, openness and transparency, and data reliability.

2. The user and the distributed energy service provider encrypt the quotation to the blockchain platform before the start of the transaction cycle and complete the transaction by matching the quotation of the buyer and seller.

3. The transaction contract takes effect after being signed by both the buyer and the seller and the power grid company, and the smart contract transaction execution fee is automatically settled.

4. Key data can be stored on the chain, and it can also provide an effective supervision method for supervising transactions.

Renewable Energy Consumption

CURRENT SITUATION

The renewable energy power supply and demand is still **based on the balance and local consumption**.

The cost includes the backup cost such as **new reserve capacity and peak shaving**.

Lack of incentives for the consumption of renewable energy power and insufficient market mechanisms.

State Council Department of Energy

Blockchain company

Tech support

feedback

Sub energy authorities

Unified calculation

Consumption implementation plan

governments

Electricity Company

Electricity trading

Accounting

Power users

Consumption

Provincial weight calculation

The weight of the market entity

An electricity trading chain

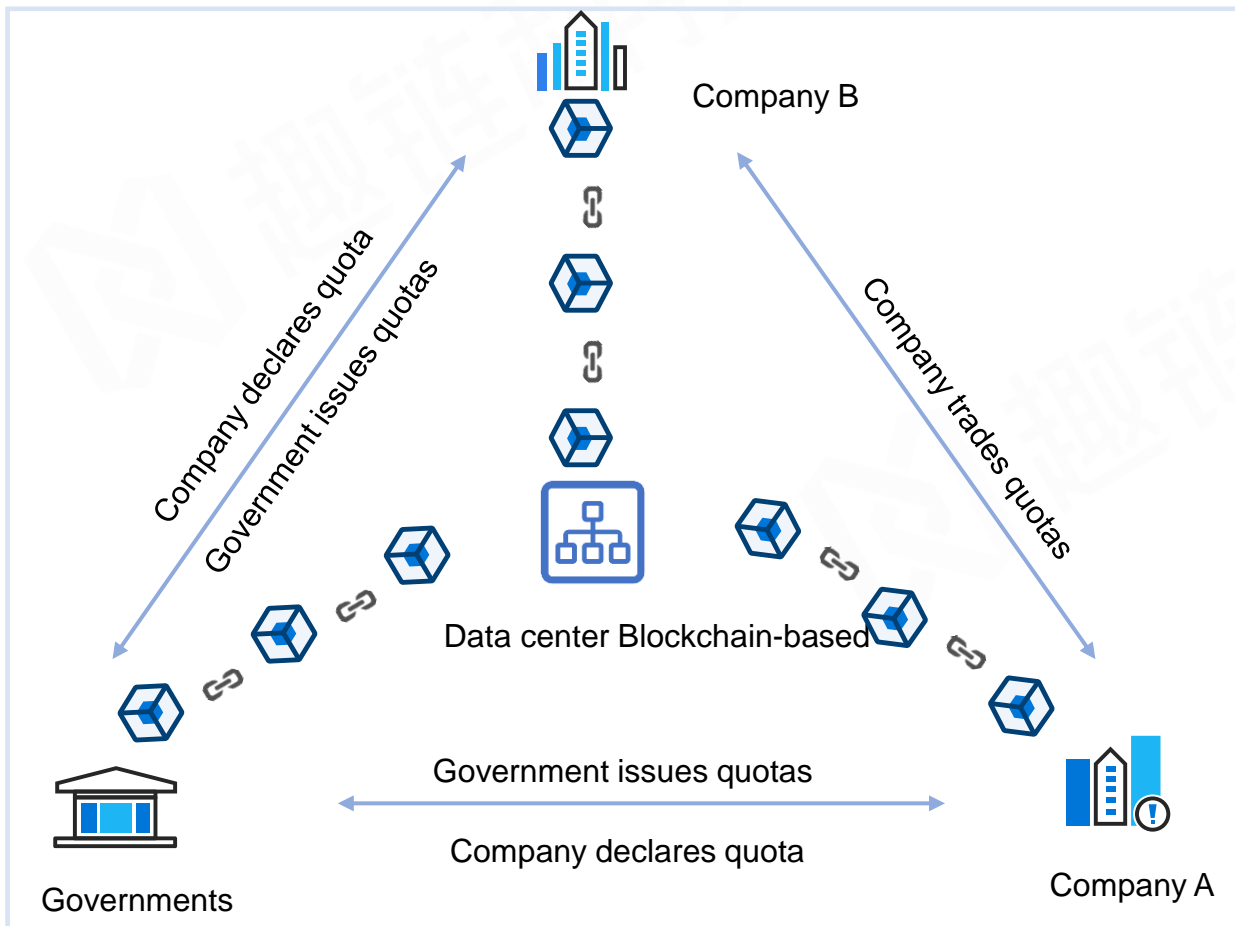Government audit account   Subject identity certificate   Generate statistical reports

Solutions

1. The authenticity of the data can be effectively guaranteed and cannot be tampered with by uploading information such as the calculation formula of the weighting responsibility weight, weighting responsibility weight, and vouchers to the chain.

2. The issuance and transaction of renewable energy power consumption certificates are automatically executed through smart contracts.

3. Renewable energy consumption certificates can be stored on chain, which can support the transaction process in a peer-to-peer network and achieve full traceability.

CURRENT SITUATION

There is a **lack of standards** for carbon emission data collection.

The issuance and trading of carbon indicators **cannot be traced**.

There is a **lack of a unified supervision system** for carbon indicators and carbon emissions.

Company B

Company declares quota

Government issues quotas

Company trades quotas

Data center Blockchain-based

Government issues quotas

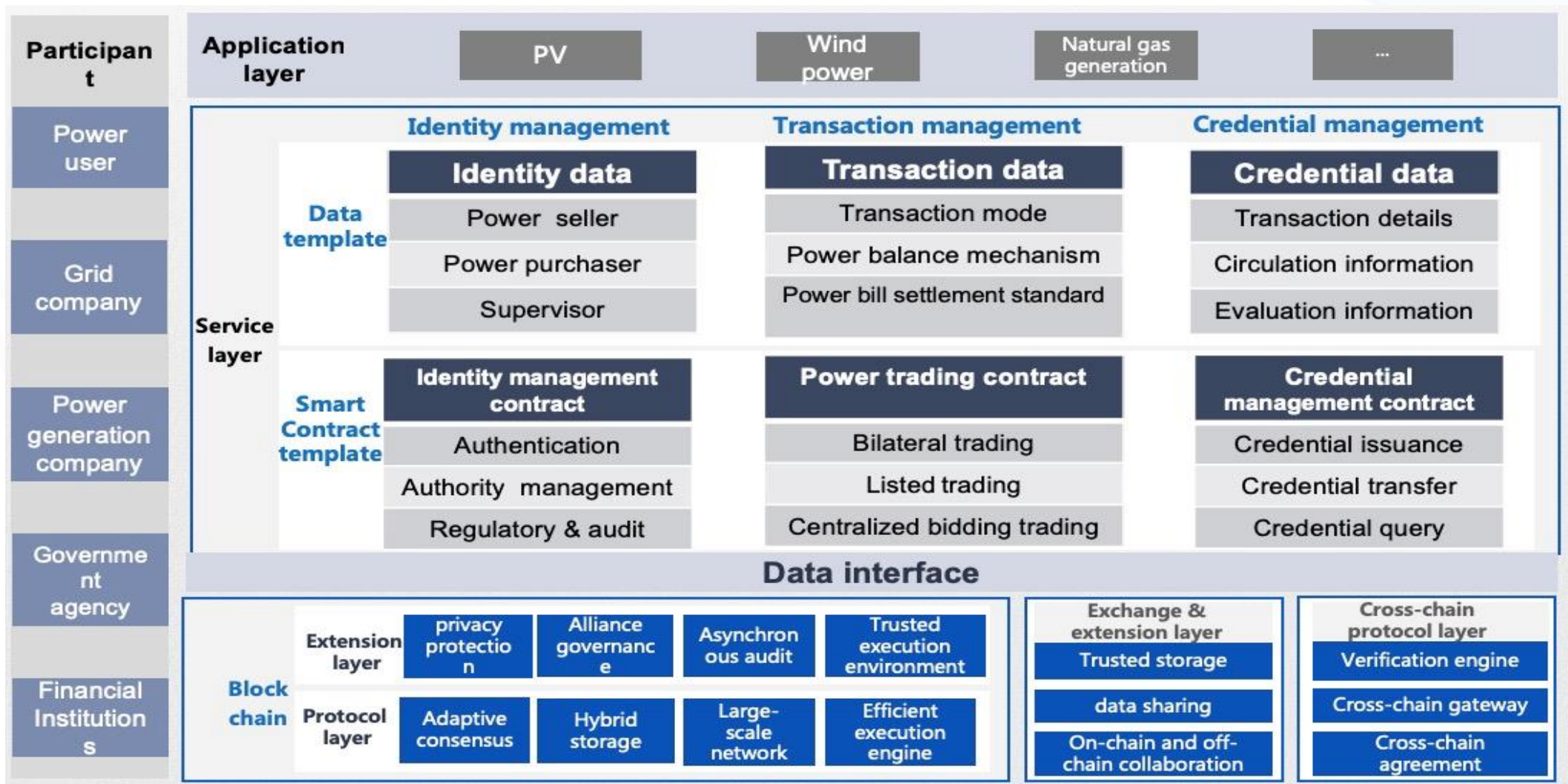Company declares quota

Governments

Company A

Solutions

1. Applying blockchain technology to carbon trading solutions can realize real-time tracking and recording of the entire process data of carbon trading allowance allocation, trading, and consumption.

2. The relevant data of carbon emission companies at all levels are all on chain, and the data center tracks and records the energy consumption data of each company in real time, the information about quota applications and allocations between the government and the carbon emission companies, and the information about the quota transactions between different companies, etc., The data of the entire transaction process is safe, transparent and traceable.

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04
Standards

Institute	Committee	Standards
IEEE	CS	**P2418.5**: Standard for Blockchain in Energy
	PES	**P3218**: Standard for Using Blockchain for Carbon Trading Application
ITU-T	SG5 Q11	**L.Energy_Crypto_currency**: Energy Consumption of Crypto Currency
	SG5 Q6	**L.1317**: Guidelines on Energy Efficient Blockchain Systems
	SG16 Q22	**F.DLT-DPT: Application Guideline for DLT-based Distributed Power Trading**
		F.DLT-DMPG: Requirements for DLT-based Data Management for Power Grid

F.DLT-DPL"Application Guideline for DLT-based Distributed Power Trading"

F.DLT-DMPG"Requirements for DLT-based Data Management for Power Grid"

Application	Power design	Power design	Power design	Power design	Power design	Power design	Power design	Power design
Server	Data read	Data protection	Data analysis		Data sharing	Data transaction	Blockchain synergy	

Data API

Data	Data production	Data collection	Data released	Data transmission	Data storage	Data disposal

Network	Network communication		Network transmission		Network computing	

Carrier	Smart Contract	Encryption algorithm	Consensus algorithm	Identity Management Contract	Electricity Trading contract	Certificate Management Contract

Management	Collaboration	Monitoring	Controls	Assessment	Adaptation	Regulation

Participants

Power generation company

Power grid company

Power equipment manufacturer

Electricity consumer

Government agencies

Regulators

Financial institutions

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