



# Use of „Blockchain“ in the Energy Market

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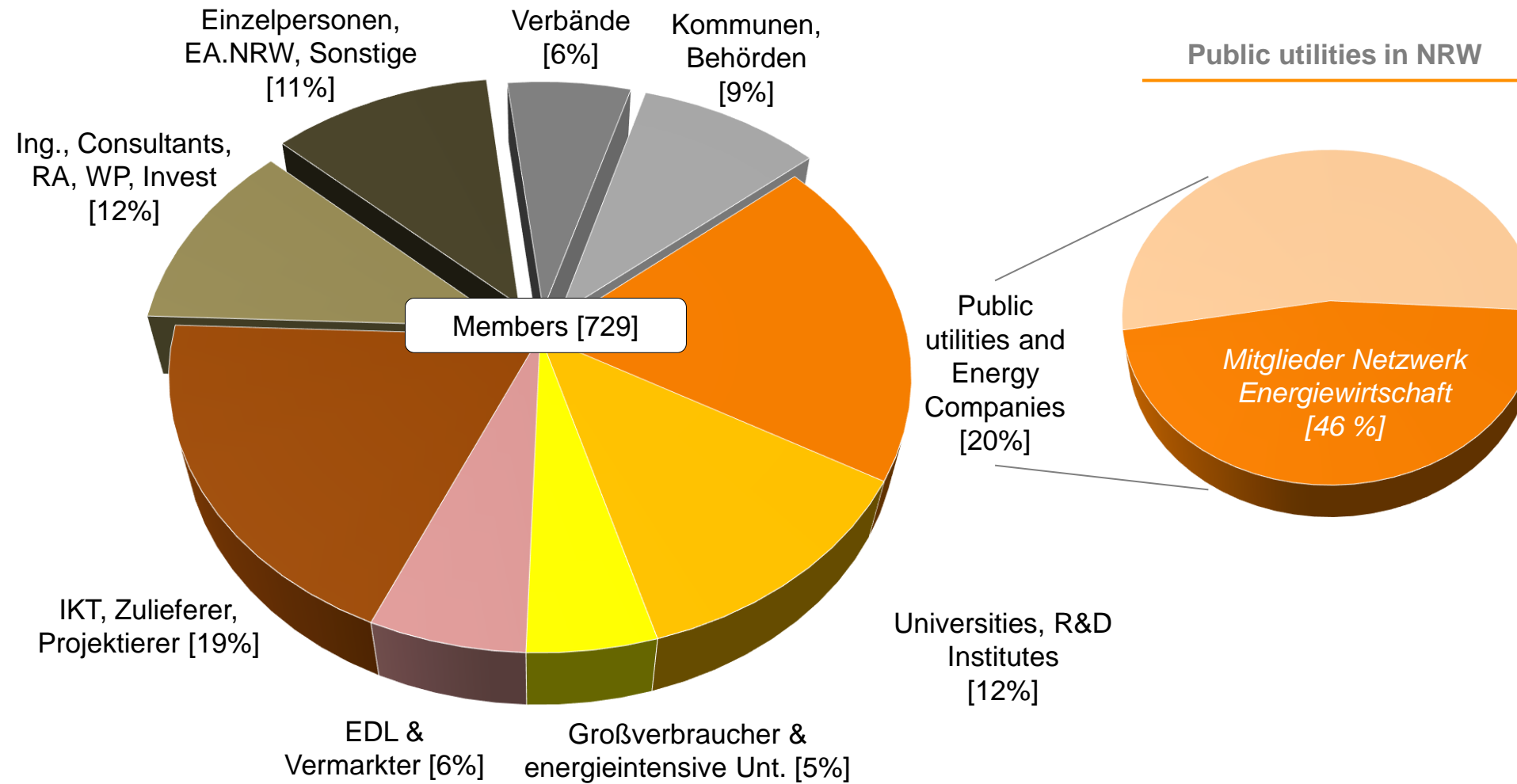
Operational platform for the state of NRW with broad competence in all fields of energy



- Initial consultancy service
- Transfer of know-how
- Networks and expert forums
- Energy research
- Technical development
- Demonstration to market launch
- Public relations

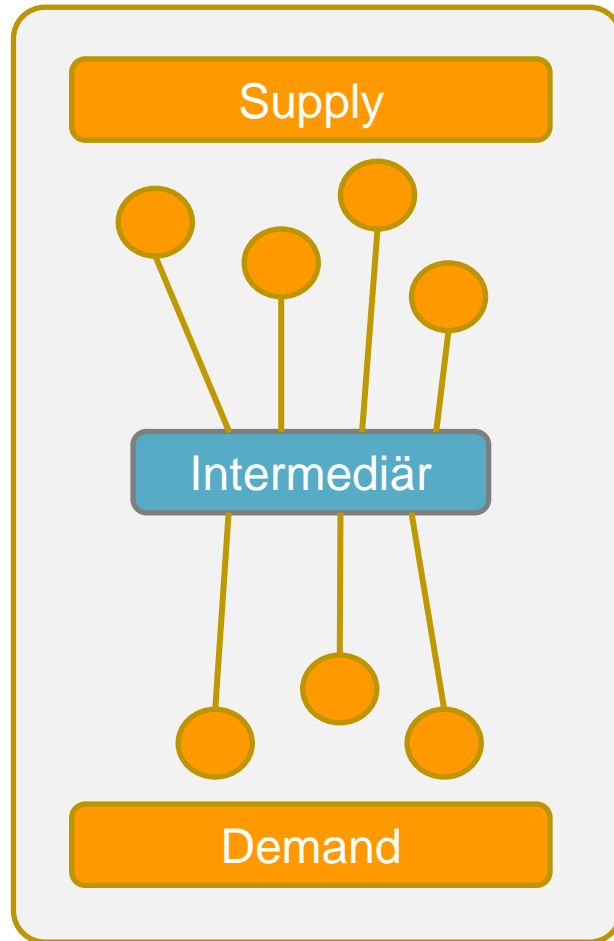
# Network Energy Supply – Smart Energy

## Members structure



# P2P transactions make intermediary unnecessary

## Classic



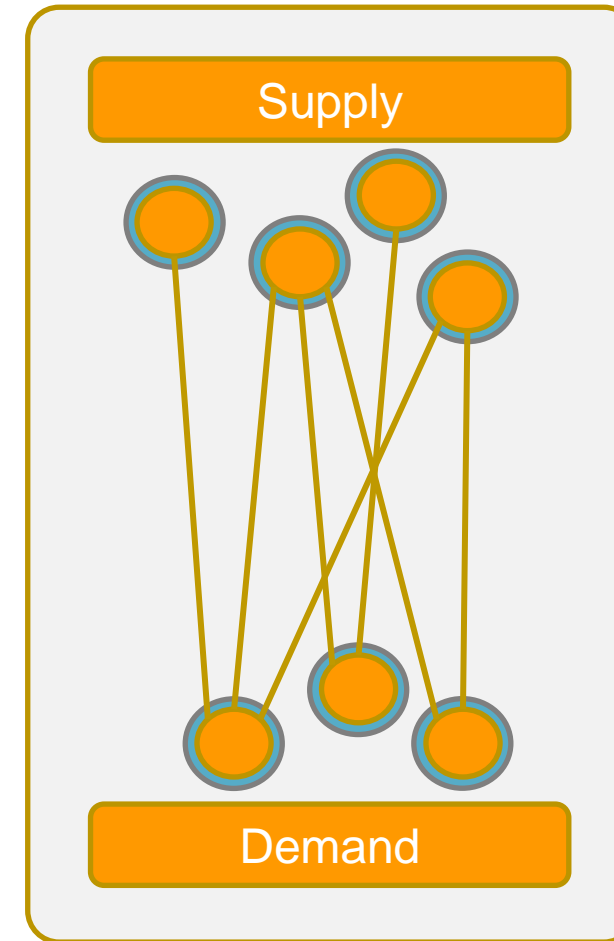
● Entity      ■ Bank, Market Energy provider

Lenders  
merchant  
energy producer



Borrowers  
dealers  
energy consumers

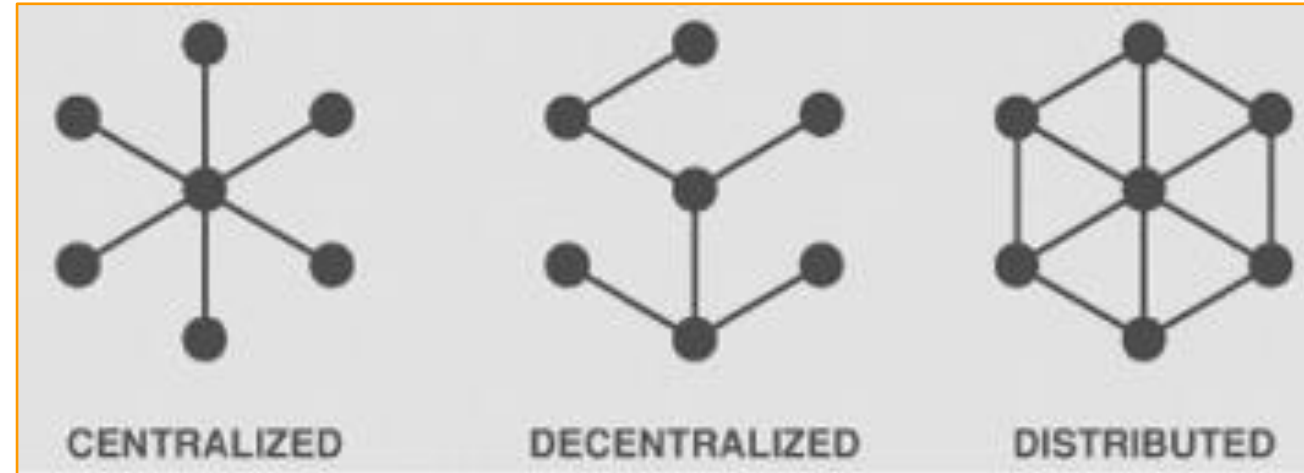
## Blockchain



● Entity      ● Connection to Blockchain

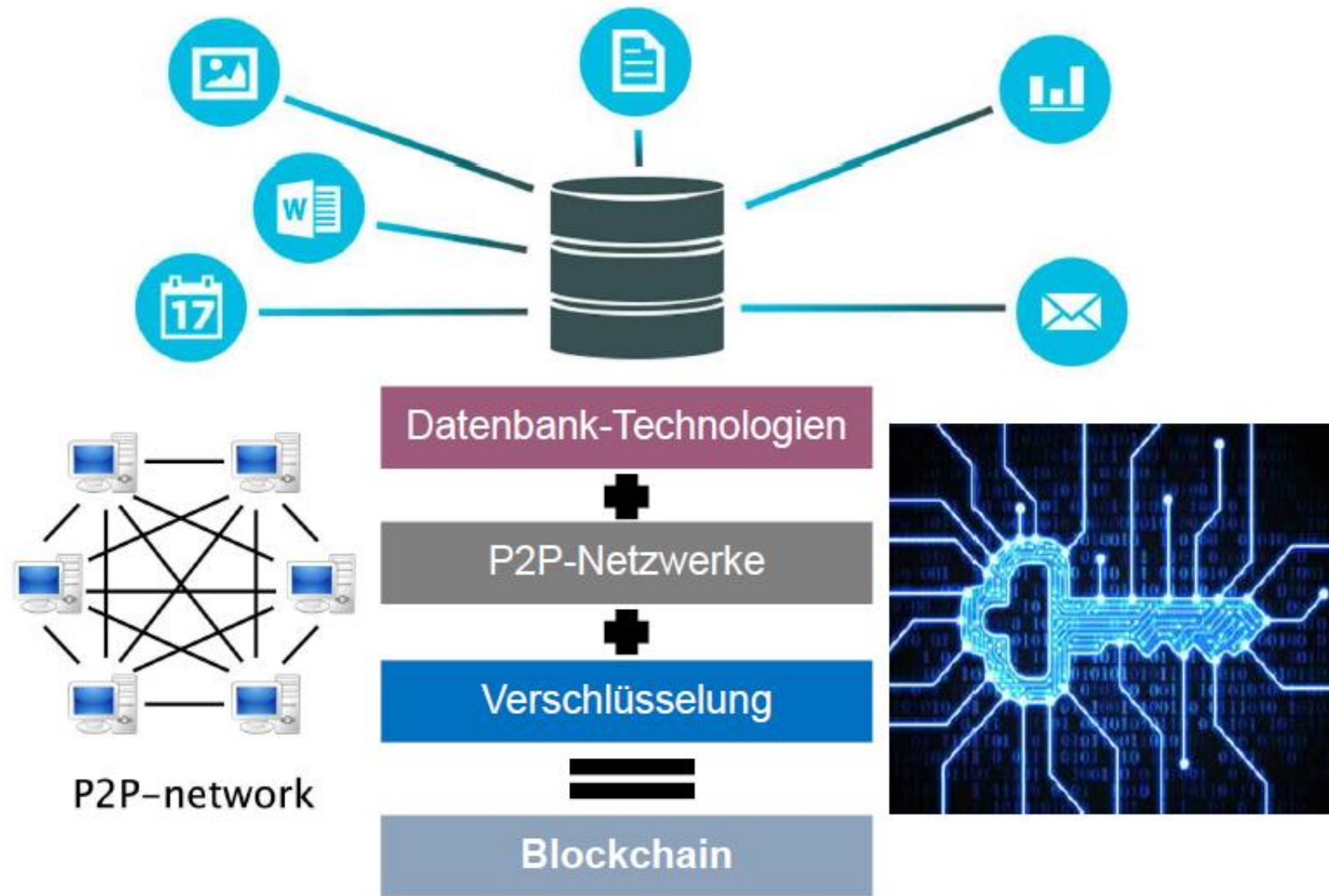
Quelle: Blockchain, Kurzstudie Verbraucherzentrale NRW, Juli 2016

# What is Blockchain?



- Data Protocol for transactions between users
- Distributed computer network takes over the tasks of the intermediary
- Testing, validation and storage of all transaction data
- manipulation safety through immutability of data
- transparency of all data / pseudonymity

# What's behind Blockchain?



[bdew.2017]

## Central Promise of Transactions in the Blockchain

- Data sovereignty
- security and resilience disintermediation (unless a broker instance)
- transparency
- pseudonymity

[bdew.2017]

## Applications of the Blockchain or DLT (Distributed-Ledger-Technology)

1. Smart Contracts (computer-controlled contract solutions)
2. Establishment of decentralized, autonomous organizations (DAO), so computer-controlled businesses, which are a combination of smart contracts
3. Integration of new methods of artificial intelligence on BC in the industry

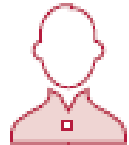


## Which industries use Blockchain?

- Travel - virtual B2B marketplaces
- IoT and sharing economy - marketing unused apartments, machines, movable property and real estate,
- manufacturing, logistics and trade - food trust, transparency and confidence building; Universal car, taxi or airplane tickets
- music industry - M2C, eliminating the record labels or music portals
- insurances
- banks - elimination of manual interfaces E.g. in promissory note transactions
- energy - "Talmarkt", transparency in local Power products
- ...

# Stakeholder of Bitcoin Blockchain

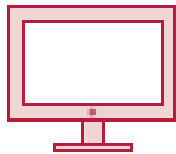
## Teilnehmer



15 Mio

Participant, transaction authorised with a wallet

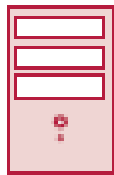
## Node



10.000

Computer with the entire transaction history, check the transactions and calculations of the blocks

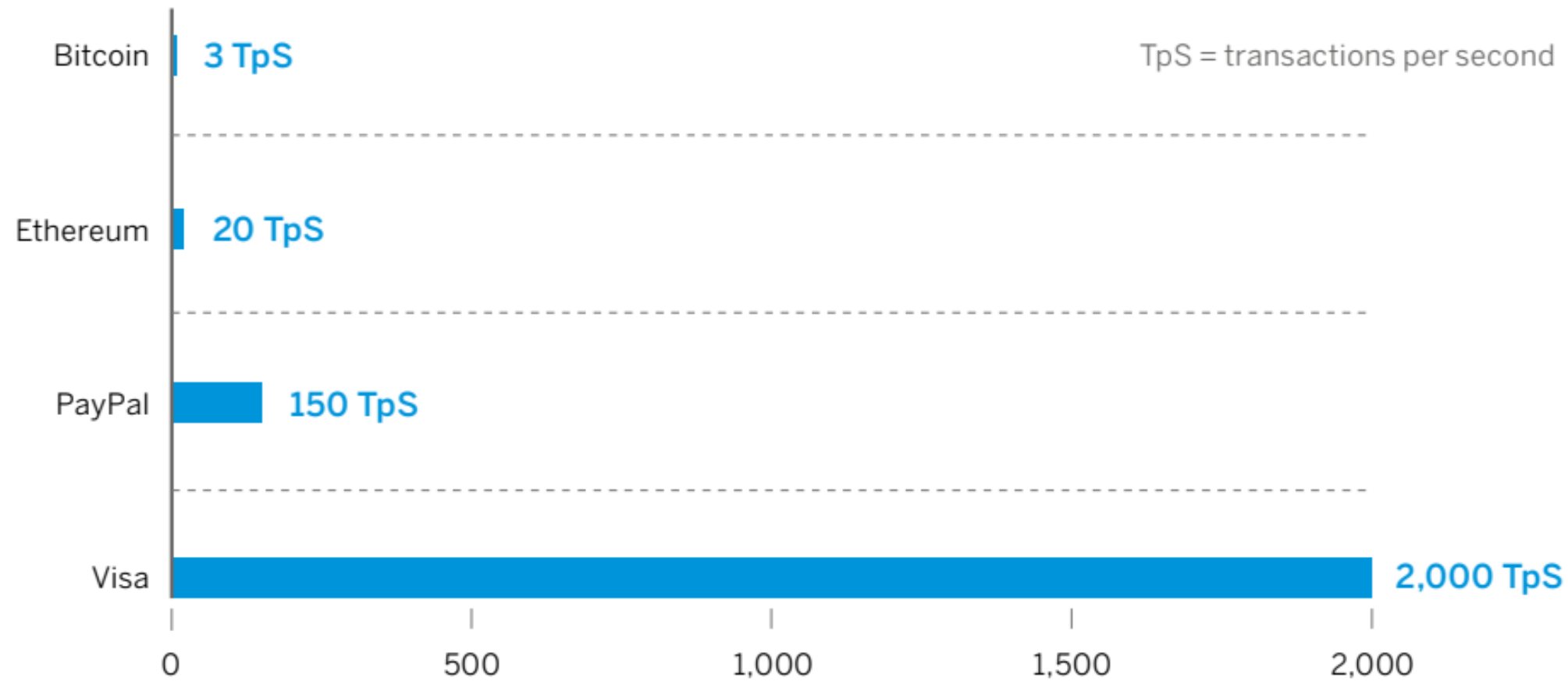
## Miner



1000.000

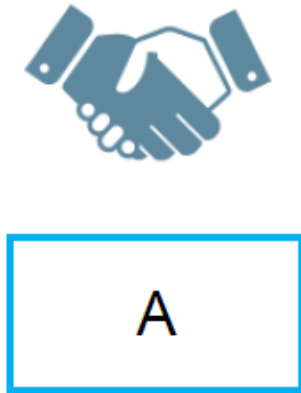
Powerful computers, by the proof-of-work (cryptographic) to perform calculations and create blocks, calculate transactions  
They are paid for.

## Transaction Speeds of Public Blockchains and Established Transaction Systems



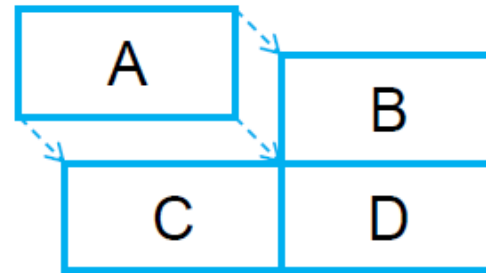
BDEW: Blockchain in the Energy Sector, 2018

# How does a Blockchain – Transactionsprocess work? (a)



Thomas kauft für 50€ einen Fernseher bei Andreas.

**Transaktion A = 50€ von Thomas an Andreas**

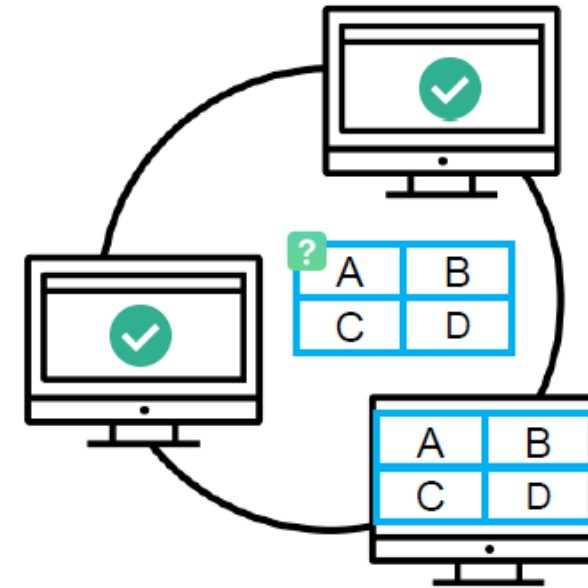


**Transaktion A** „Thomas zahlt Andreas 50 Euro“

Transaktion B „Britta zahlt Anton 10 Euro“

Transaktion C „Horst zahlt Alexander 17 Euro“

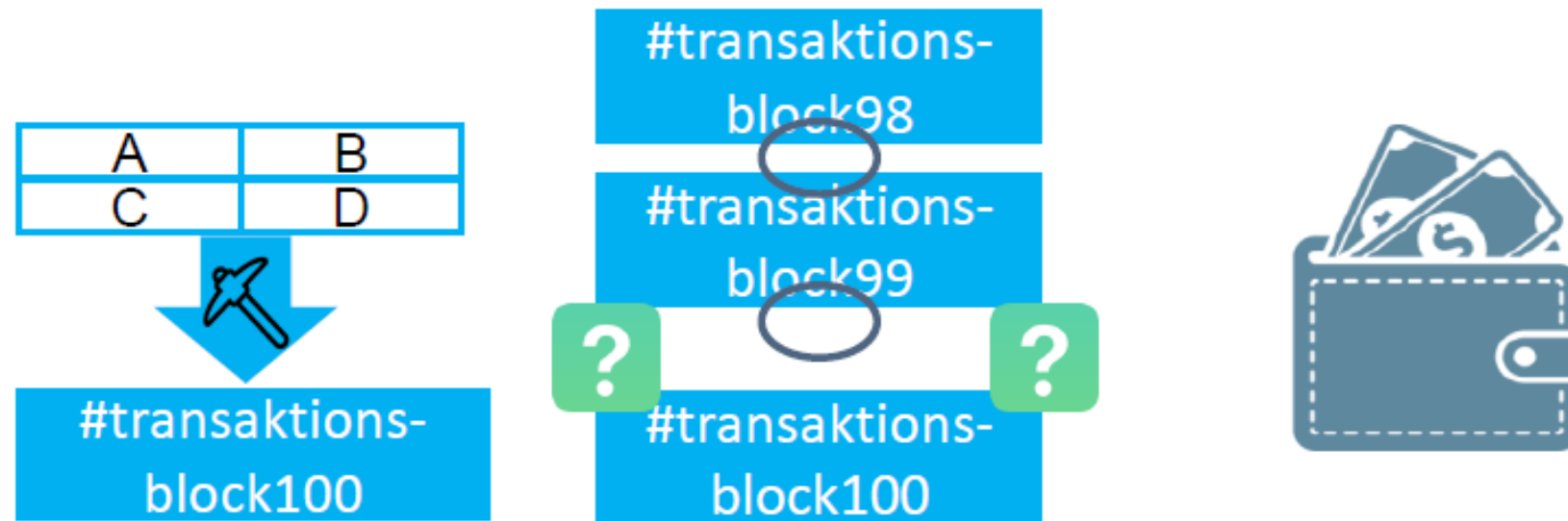
Transaktion D „Paul zahlt Fine 85,30 Euro“



„**Hat Thomas überhaupt 50 Euro** auf seinem Konto, um sie Andreas zu geben?“

[bdew.2017]

## How does a Blockchain – Transactionsprocess work? (b)



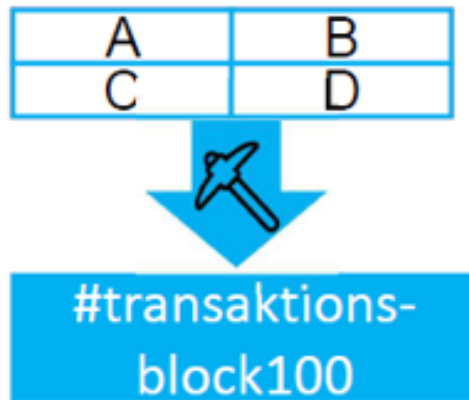
Alle Transaktionen im Block sind richtig. Der Block braucht nun einen **einzigartigen Namen (Hash)**. Teilnehmer (Miner) im Netzwerk versuchen diesen Namen zu erraten. Das erfordert Arbeit.

Computer im Netzwerk prüfen, ob dieser Name (Hash) zu den Namen der vorigen Blocks passt. Der Block wird an andere Blöcke gehängt. Somit ist der Block nun Teil der Kette. **Chain of Blocks = Blockchain.**

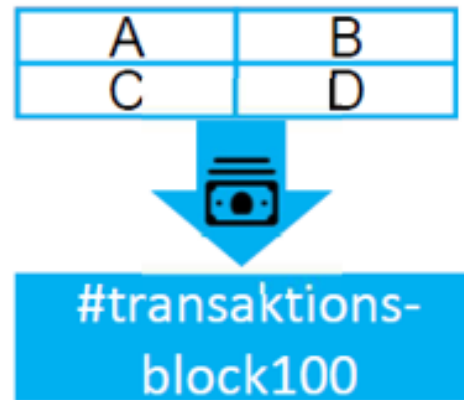
Andreas sieht auf seiner **Wallet 50€**. Er schickt den Fernseher an Thomas.

[bdew.2017]

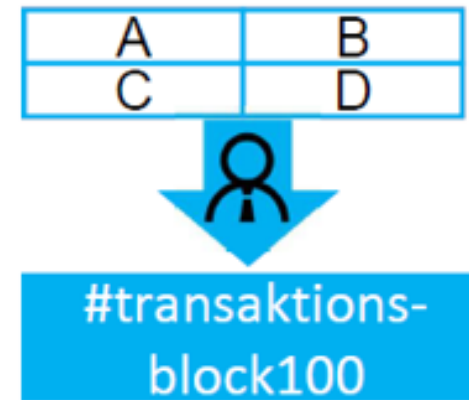
# Consensus Mechanism in Blockchain



Proof of Work



Proof of Stake



Proof of Authority

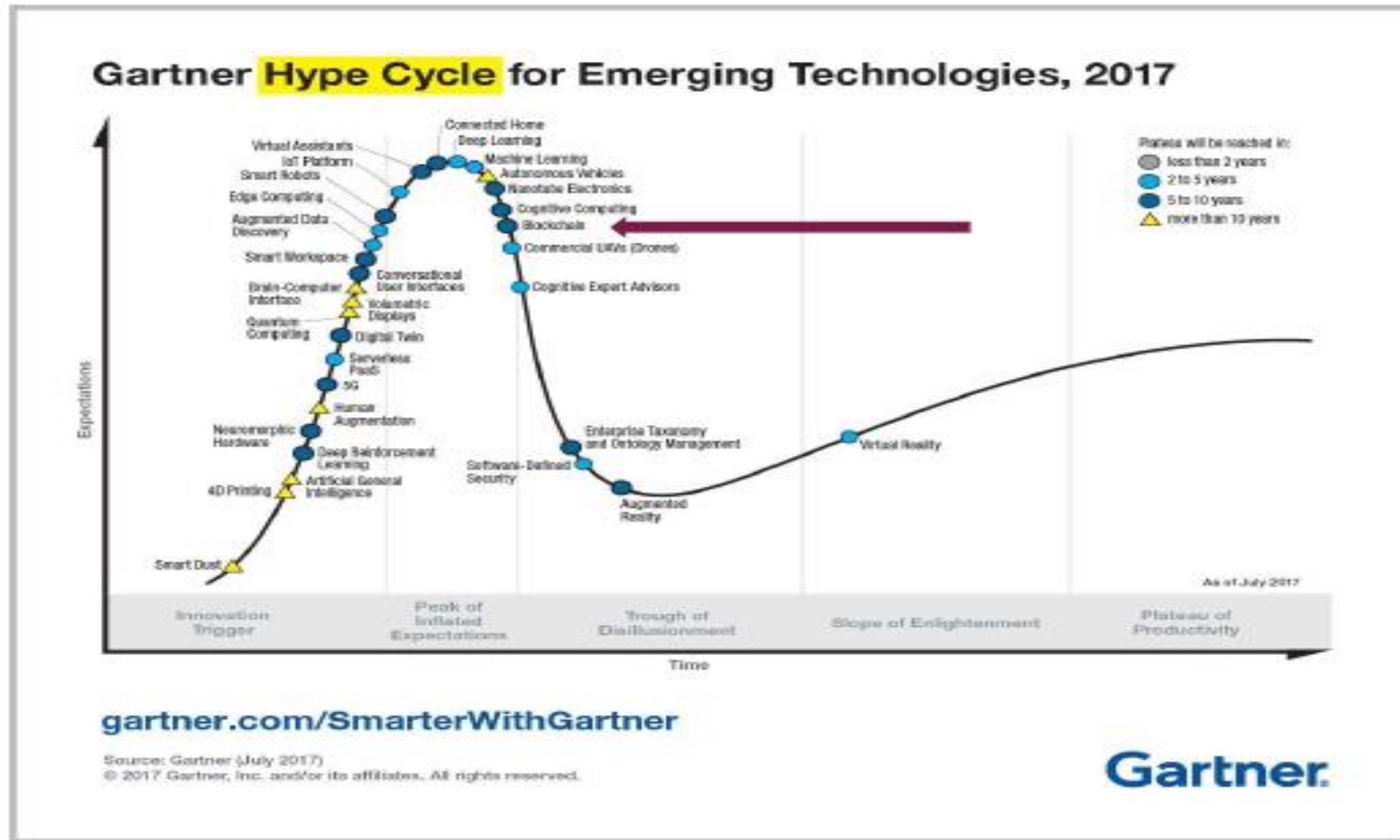
[bdew.2017]

## Blockchain 2.0 und 3.0

"Bring intelligence, applications and automation in the Blockchain"

- not only presentation of financial information, but counter readings, documents...
- Smart contracts: If-then relationships, which are recorded in the Blockchain
- Allows automated processes in the context of the IoT
- Develops smart contract to decentral autonomous units

# Hype or Future Technology?



## Success depends on many factors:

- speed and cost
- integration in energy industry standard processes
- classification into the German legal framework



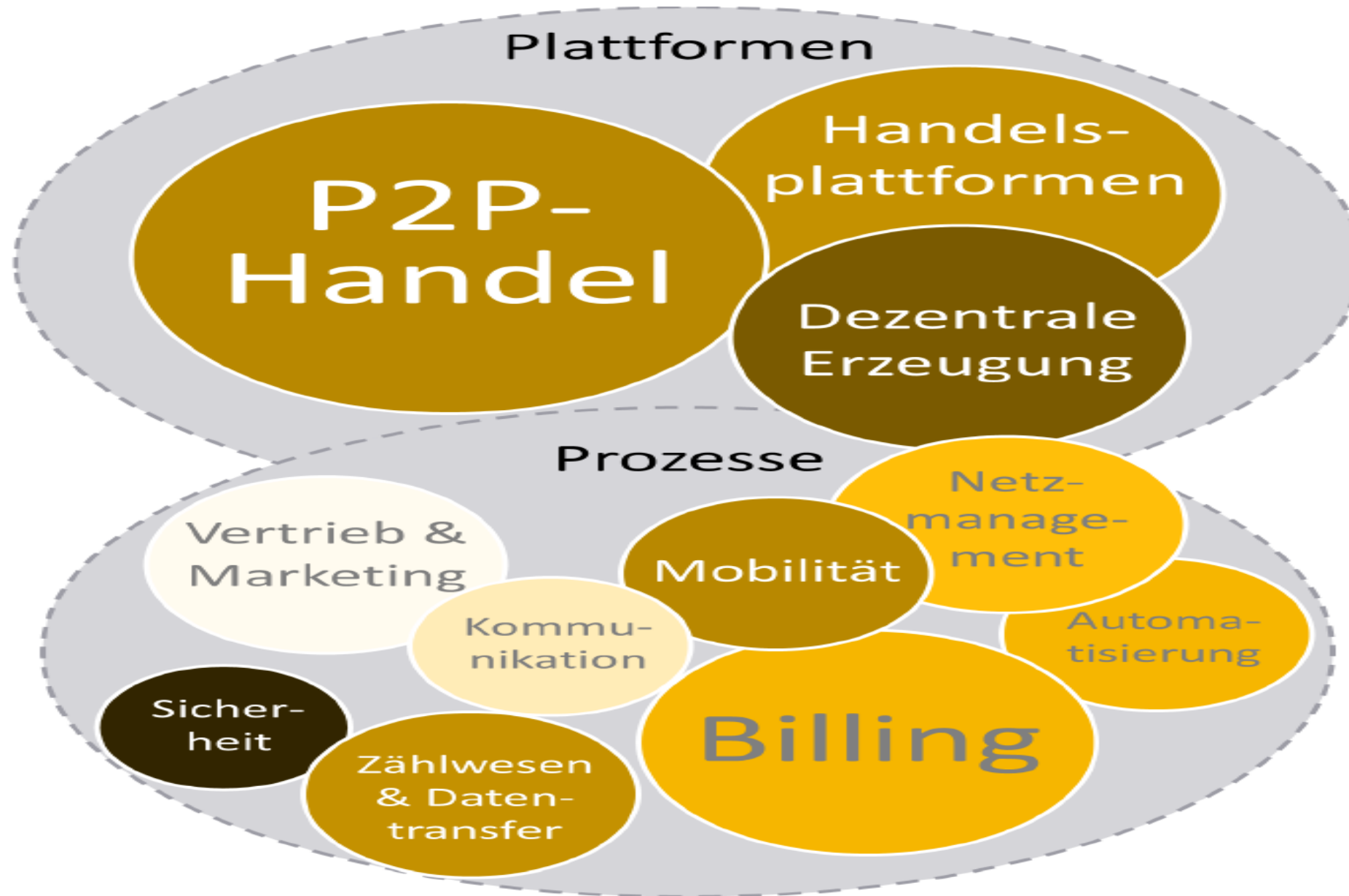
# Applications for Blockchain in the Energy Sector

- **Economic design of even the smallest transactions current**
- commercial tenants
- Electrical neighborhood models
- marketing of renewable electricity
- smart meter applications and flexibility marketing
- > current limitation by speed, cost and power consumption of the transactions

**Conclusion: Future technological and regulatory developments will decide about wide applications of blockchain technology**

**...and of course the applications themselves...**

# Potential use cases in the energy sector



Quelle: "Blockchain in der Energiewende.", dena

# Direct Marketing According to the EEG

## Increasing Direct Marketing of „GRÜNSTROM“

### End of Promotion

- EEG-Förderung seit 1. April 2000
- Förderung (Marktprämien, Einspeisevergütungen und Mieterstromzuschläge) begrenzt auf 20 Jahre (zzgl. Inbetriebnahmejahr)
- Förderbeginn: Grds. Inbetriebnahme der Anlage

**EEG-Förderung für Altanlagen läuft mit Ende 2020 sukzessive aus**

### Obligatory Direct Marketing

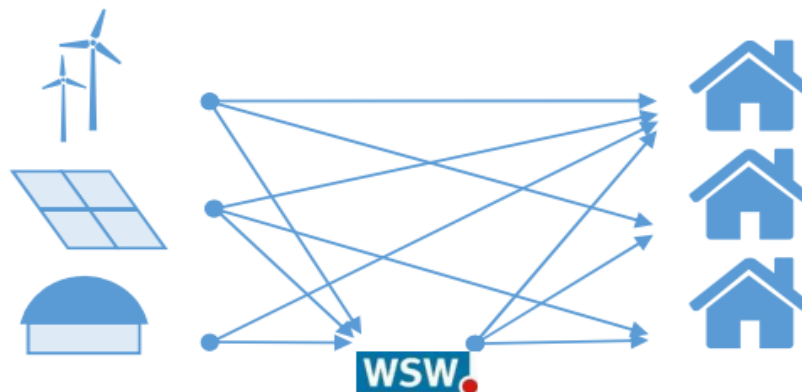
- Ab EEG 2000: Umfassende Abnahmepflicht der Netzbetreiber gegen Einspeisevergütung
- EEG 2012: Optionale Direktvermarktung unter Förderung durch Marktprämie
- EEG 2014: Seit 1. Januar 2016 verpflichtende Direktvermarktung für Anlagen über 100kW

**Größere Neuanlagen unterliegen stets der Direktvermarktung**

# Revolution of Green Electricity Sales

„Blockwerk“/WSW as peer

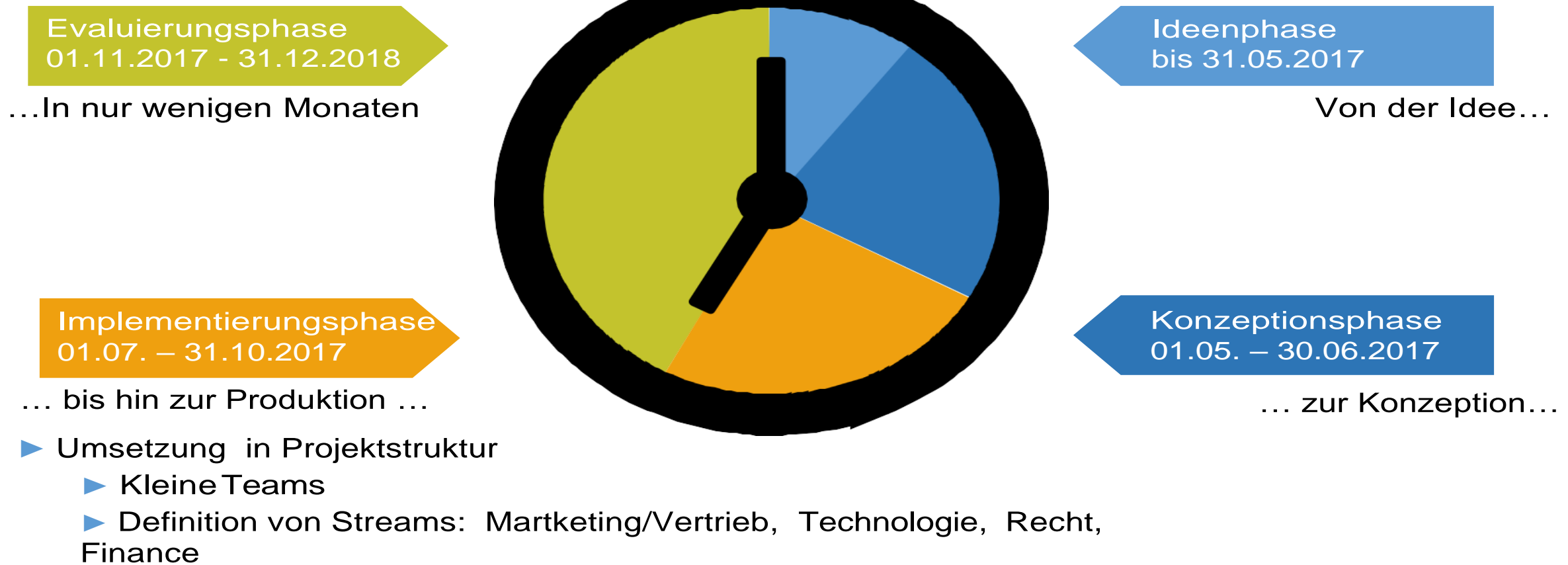
- Commercialization of regional green electricity
- Commercialization of other providers
- Commercialization of own renewable plants
- Commercialization of alternative tariff models



„Blockwerk“/WSW as enabler

- Clear allocation of RE reference on a 15 minutes base
- Change of RE source all 15 minutes possible
- RE insurance for loss and non-action
- Direct marketing of RE (out of feed-in tariffs)
- Energy services
- Accounting services

## From Vision to Reality – „Talmarkt“ in Wuppertal



## Stabilization of the power network

Pilot project of TenneT and power storage manufacturer Sonnen networking distributed home storage using blockchain to stabilize network

Pilot phase from November 2017 until the second quarter of 2018

Blockchainlösung IBM networked distributed battery storage by Sonnen to the integration in the grid of TenneT

Systemrelated use of flexibility of 24 MW capacity of battery-related redispatch to reduce wind turbines feed in management

Blockchain serves as a transparent register of on and off quantities of feed in electricity for the (possible future) remuneration



## B2B: P2P Trading via Enerchain

Enerchain trading tool

Anonym

Trading Screen

Peer-to-peer trading without central marketplace of a third instance  
(intermediary)

tradable products:

Day-ahead, months, quarter years, years baseload

Power and gas

Live Trading since Q4 2017

<https://enerchain.ponton.de>



## B2B: P2P Trading via Enerchain

Für über dreißig der wichtigsten Player ist Enerchain die Plattform der Wahl für Energiehandel mittels Blockchain:



Quelle: <https://enerchain.ponton.de>





# ENERGIE TEAM



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Wir sehen uns...

z.B. bei der Blockchain-Konferenz am 10.07. in Essen