

BC-10

Cheaper, Smarter, Greener: How Distributed Ledgers Change The Way We Use Energy

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The Energy sector is rapidly changing



Past

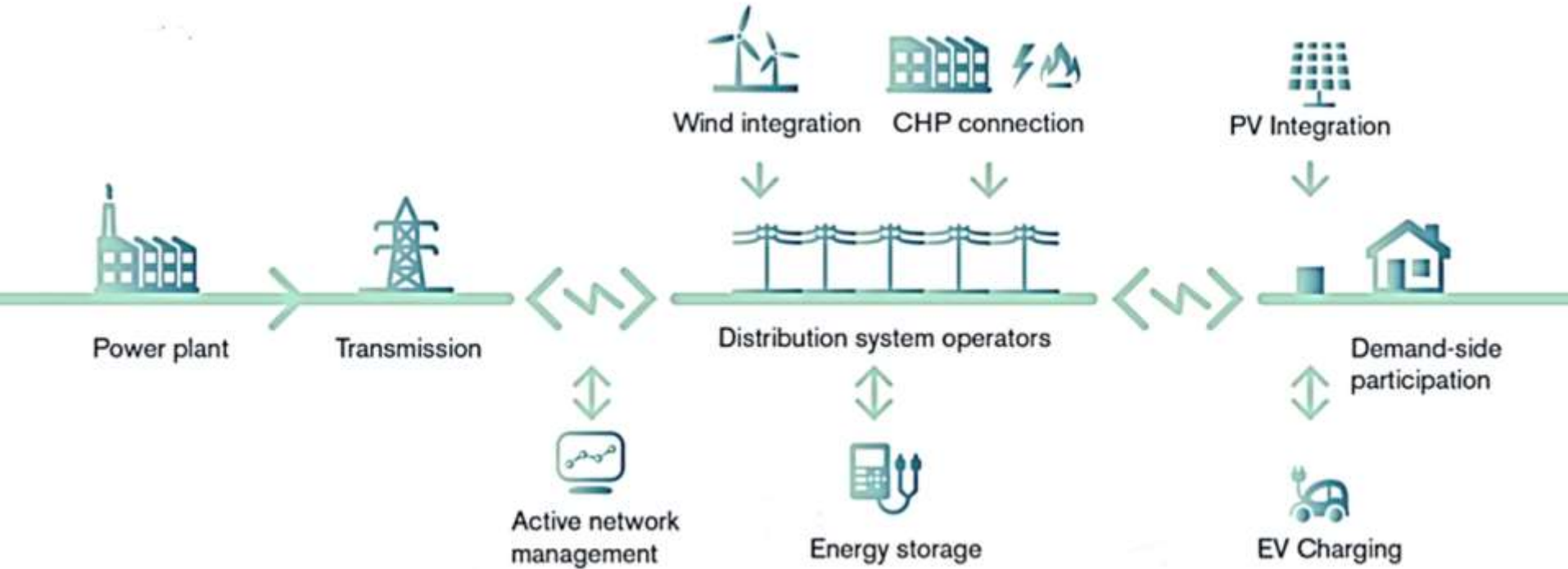


Multiparty production

Grids, a traditionally static industry, are facing increased complexity:

- Increased overall demand
- Residential renewables
- Commercial renewables
- Electric Vehicles





Now



UK: Almost one million without power in 9-hour blackout – Ofgem demands answers

August 10, 2019 · 0



Image credit: Stock



SUNSHINE STATE

California is getting so much power from solar that wholesale electricity prices are turning negative

By [Cassie Werber](#) • April 8, 2017



Wind farms are being taken to court over SA's blackout — how did we get here?

By [Nick Harmsen](#) and [Daniel Keane](#)

Posted 7 Aug 2019, 4:20am

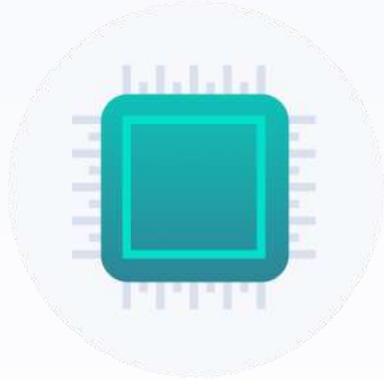


Distribute & Localise

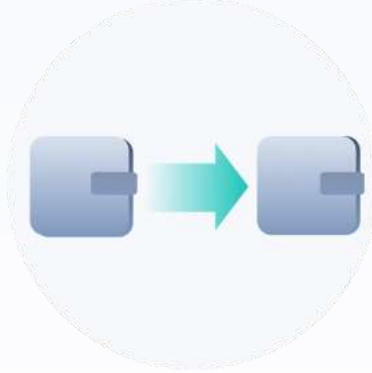


What do we need to enable this?

Data, Payments, Trust



Data



Payments

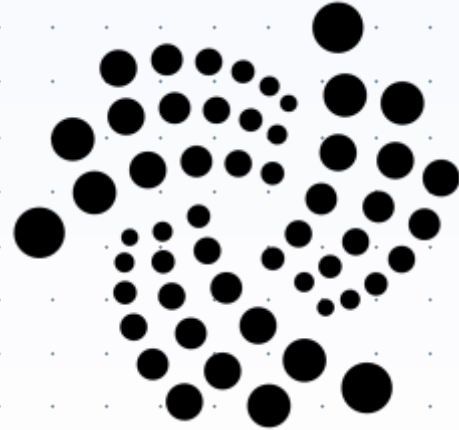


Trust



Distributed Ledger Technology

- Database of append only information
- Peer to Peer Network
- Each participant processes & verifies
- Network reaches consensus



IOTA Tangle Technology

Overcoming the limitations of Blockchain



Immutable
data transfer



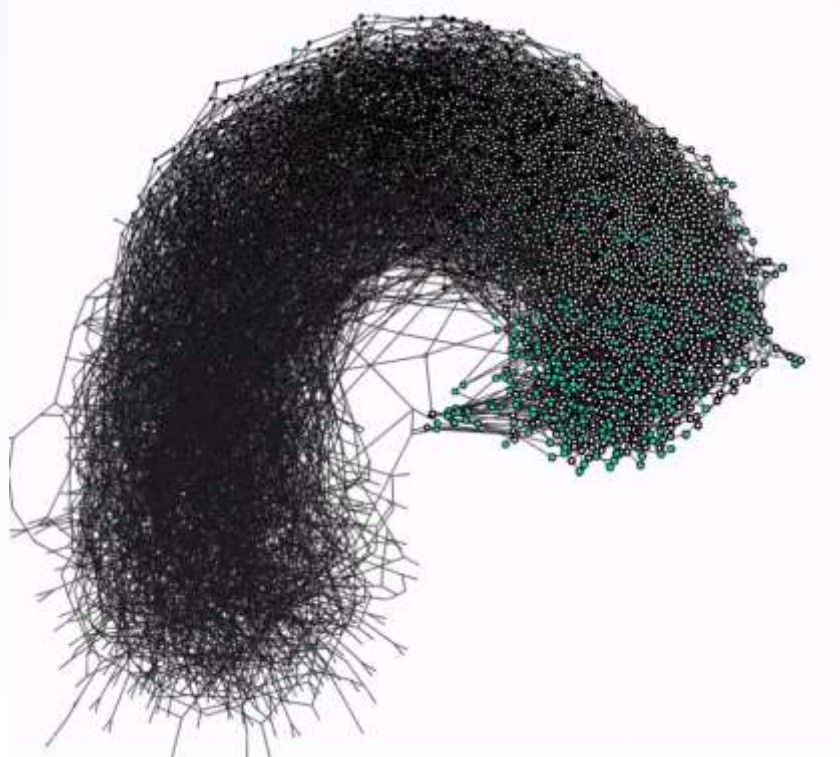
Highly
Scalable



Quantum
Resistant



Zero-fee
transactions



Feeless Transactions





Powering the Economy of Things



Dumb Decentralization

- “Dumb” devices
- No connectivity / sharing of data
- Human mediators



Smart Centralization

- Smart devices, dumb network
- Cloud as decision maker
- Clusters that are not interoperable



Smart Decentralization

- Local Data Sharing
- Real-time edge Decisions
- Adaptive & Resilient





The diagram illustrates a process for updating a drive to a network. At the center is a teal circle with a grid pattern, containing a car icon at the bottom. Above the car, text specifies trip details: 'DISTANCE 3.5KM', 'CAR ID DMGYX', and 'COSTS 567 KIOTA'. The main title 'Updating Drive to the Tangle' is prominently displayed in the center. A large teal arrow points upwards from the central circle towards a network of nodes at the top. A curved teal arrow on the right points from the bottom towards a 'TRANSPORT PROVIDER' icon, which shows three cars. On the left, a 'CUSTOMER' icon shows a person holding a device. The background is light gray with a subtle grid.

Updating Drive to the Tangle

DISTANCE 3.5KM

CAR ID DMGYX

COSTS 567 KIOTA



**TRANSPORT
PROVIDER**

Receives 567 Kiota



CUSTOMER

Pays 567 Kiota

Real World Usecases

Trucks Platooning

Trucks driving behind other trucks on highways pay lotas to the truck driving in front for using its slipstream and saving up on energy / fuel.





INDUSTRY
MARKETPLACE

The world's first autonomous and decentralized
INDUSTRY MARKETPLACE



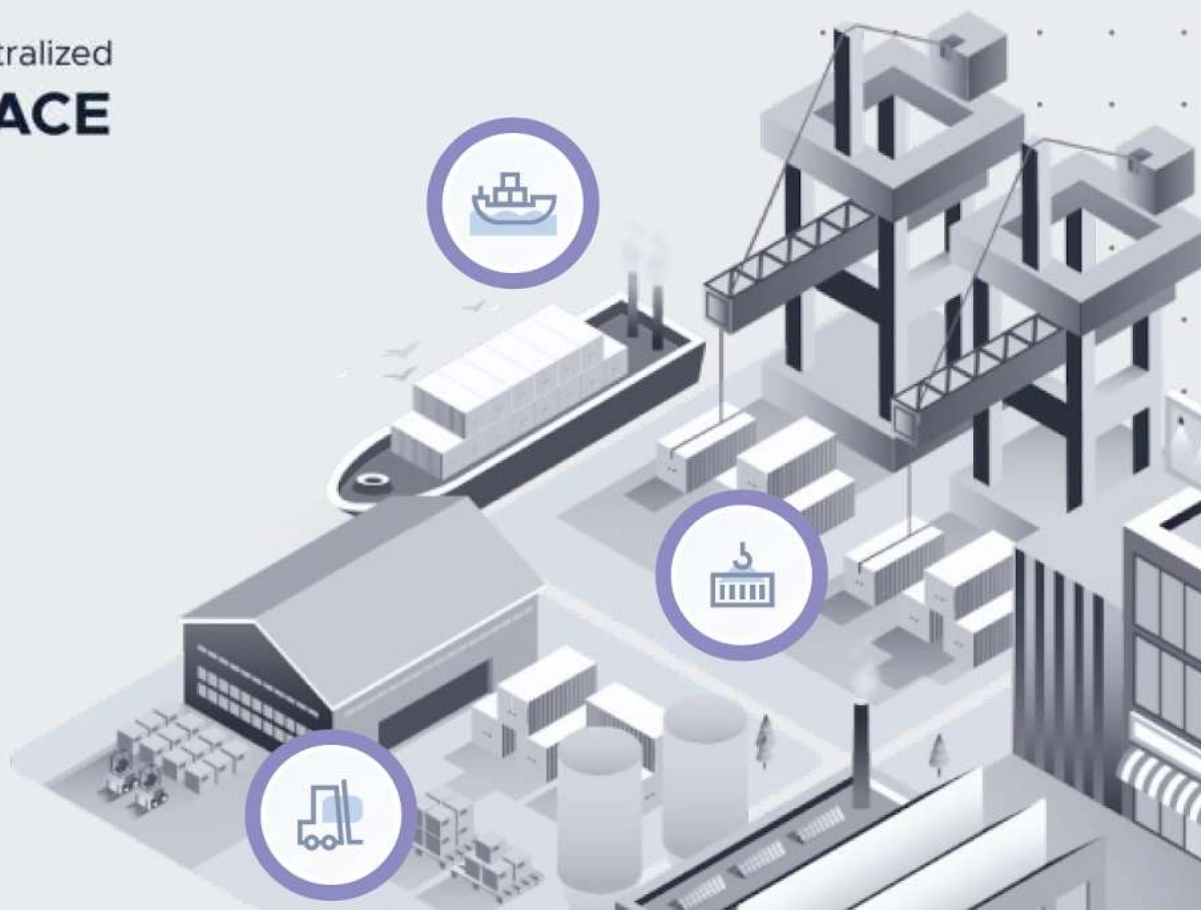
IOTA
FOUNDATION



HELMUT SCHMIDT
UNIVERSITÄT
Universität der Bundeswehr Hamburg



NEOCEPTION
A Pepperl+Fuchs Company



Use-Cases



Telecom

- Payments
- Settlement
- Data Sharing
- Data Integrity
- Identity Management



Mobility

- Smart Charging
- Over-the-Air Updates
- Car ID & Wallet
- Cars as Autonomous Economic Agents
- Usage Based Insurance
- Car Paying for Parking



Digital Economy

- M2M Economy
- MyData & GDPR
- Biometric Authentication & Digital ID
- IOTA Data Marketplace
- Smart Factory
- Digital Twin



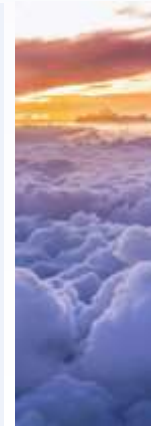
Smart City

- Digital ID
- Smart Energy Districts
- P2P Energy Grid
- Cross vertical
- Biometric Identification
- CityxChange Smart Cities



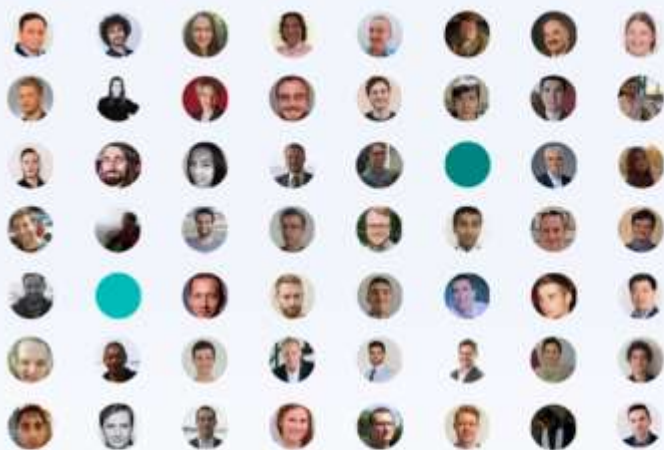
Supply Chain

- Asset Tracking
- Connected Supply Chains
- Global Trade Document Flow
- Product Authenticity and Provenance
- Ports Management
- New Insurance Models



Social Impact

- Digital ID & Citizen Services
- Humanitarian ID
- Real-time Environmental Monitoring
- Financial Inclusion



The IOTA Foundation

Non-profit Foundation
based and regulated in
Berlin, Germany



Growth from 4 to **100+**
full time employees
across 23 countries



\$40m+ in funding



Focused on Technical and
Regulatory Challenges of
Crypto-Currencies & DLT

The IOTA Foundation is working towards a big vision



Important Puzzle Pieces



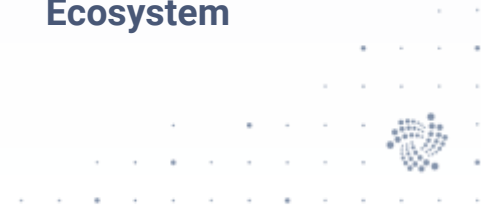
Technology



Governance



Ecosystem





Cheaper



25% of consumer electricity bills are for capacity in the system which is needed for less than 1% of time.

Peak Power

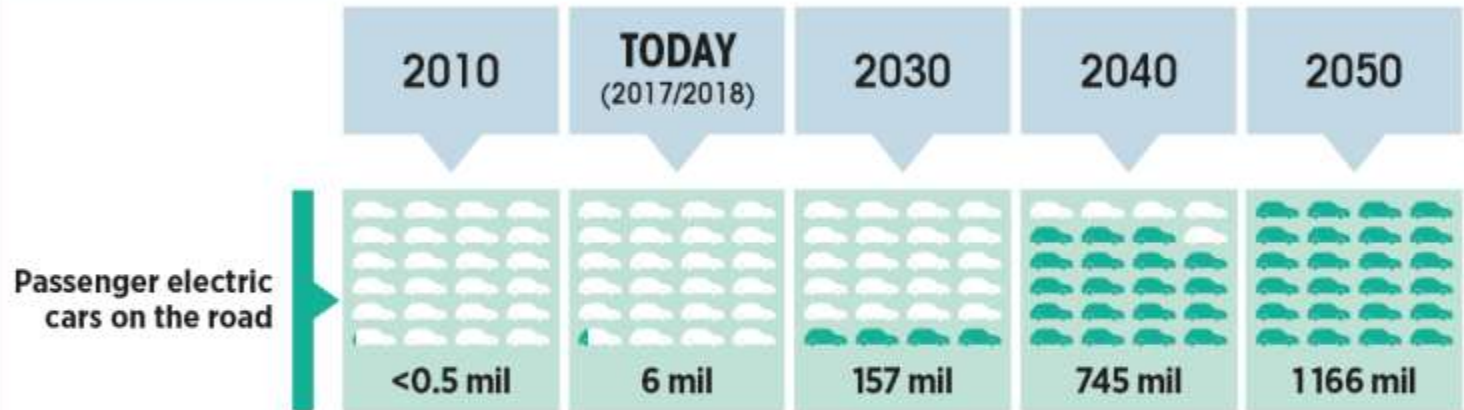
Reducing the peak consumption of your system by reducing usage or augmenting it.

- Requires energy to be immediately available in connected storage
- Current lack of dedicated storage prohibits this.



The rise Electric Vehicles

Figure S1: Growth in EV deployment between 2010 and 2050 in a Paris Agreement-aligned scenario



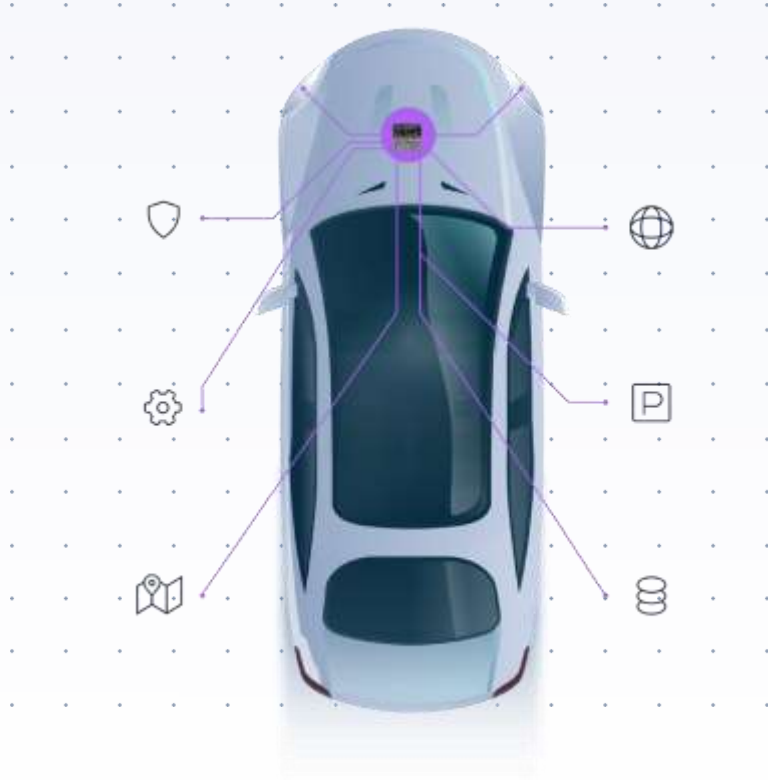
Source: IRENA, 2019b.



A battery on wheels

EVs usually hold enough power to keep a household going for multiple days.

DLTs can incentivize Vehicle to Grid (V2G) discharge of stored energy.,





IOTA Smart Charging station

Prototype EV charging station which communicates via the charging cable to negotiate and settle micropayments for electricity.

- Direct M2M payments
- ISO 15118 compliant (V2G)
- Micropayments



The background is a solid teal color. On the right side, there is a pattern of white dots of varying sizes, some of which are slightly blurred, creating a sense of depth and movement.

Smarter

Most grid technology is blind

Only recently have utilities started to install smart meters and various consumer end devices to better understand their customers.

- Hard to forecast
- Smart meters create granular usage data
- Time of Use tariffs



Energy Intelligence

PeerOS is focused on hardware enabling secure collection & transmission of consumer data.

- Improve forecasting
- Incentivised energy use
- Meet GDPR requirements



Instead of penalising, incentives can be used

Future self-balancing grids can incentivize users to reduce their usage with micropayments.

This could be off peak slow charging for EVs, reduced heating/cooling, etc.

Provides a alternative to load-shedding or other measures which could cause negative outcomes on the consumer side.



The background is a solid teal color. On the right side, there is a pattern of white dots of varying sizes, some of which are slightly blurred, creating a sense of depth and movement.

Greener

Positive Energy Districts

Localised districts that are a net positive for energy production rather than consumption.

- Renewable energy
- Balancing & optimisation
- Peak shaving
- Load shifting
- Demand response and
- Reduced curtailment



+CITYXCHANGE

CityExchange is a European Union's Horizon 2020 project. It's focused on framework and tools to enable a common energy market within communities

- Lighthouse cities: Trondheim & Limerick
- 30m EUR in funding
- 32 industry participants
- 11 testbeds across europe









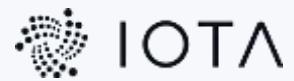
What's next?



Permissionless Innovation

- IOTA technologies are open-source and royalty free.
- Traditional ecosystems are owned by a single entity, leading to discrimination, exclusion and limitation of the innovation potential
- Permissionless Innovation gives everyone the ability to innovate and participate





Thank You!

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