

# NAVIGATING THE ENERGY TRANSFORMATION

HOW BLOCKCHAIN WILL ACCELERATE THE ENERGY TRANSFORMATION AND THE EMERGING ENERGY CLOUD

POWER & ENERGY BLOCKCHAIN CONFERENCE

NOVEMBER 1<sup>ST</sup>, 2018



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NAVIGANT

# ENERGY TRANSFORMATION

*TOWARD A CLEAN, DECENTRALIZED, INTELLIGENT & MOBILE GRID*

## PAST: Traditional Power Grid

Central, One-Way Power System



Market  
Demand

Technology  
Innovation

Policy &  
Regulation

## TODAY: The Energy Cloud

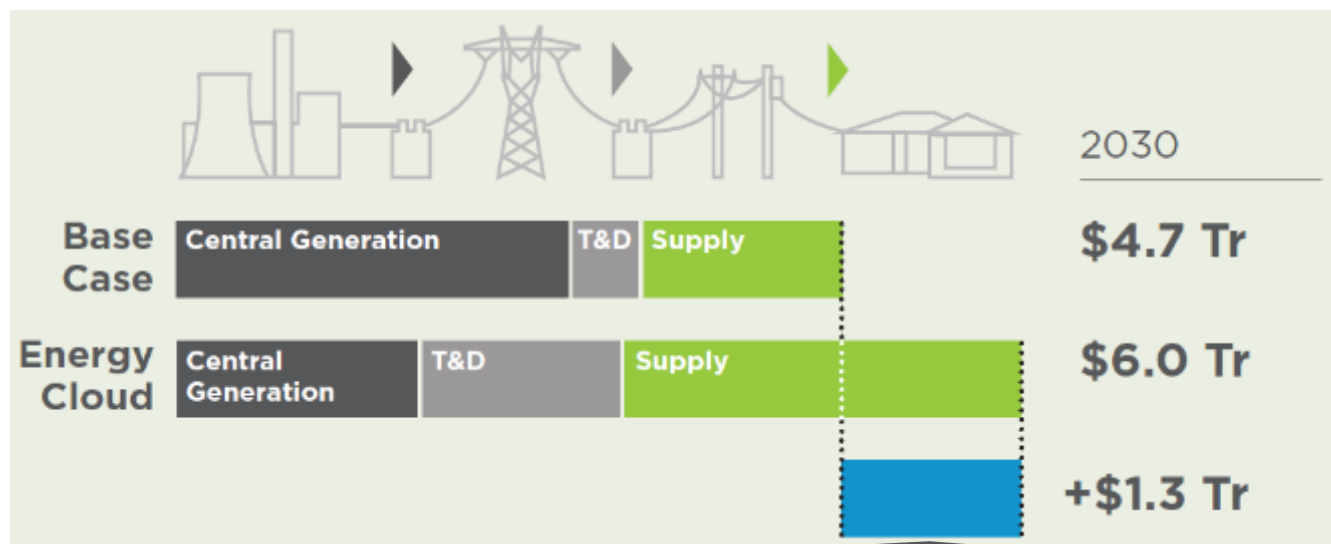
Distributed, Cleaner, Two-Way Power Flows



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# THE ENERGY CLOUD

VALUE SHIFTS TO DISTRIBUTION AND BEHIND-THE-METER



- **Less asset-based**, central power generation
- **Increased investment in grid** modernization and intelligence
- **Energy Cloud platforms** with energy & non-energy services

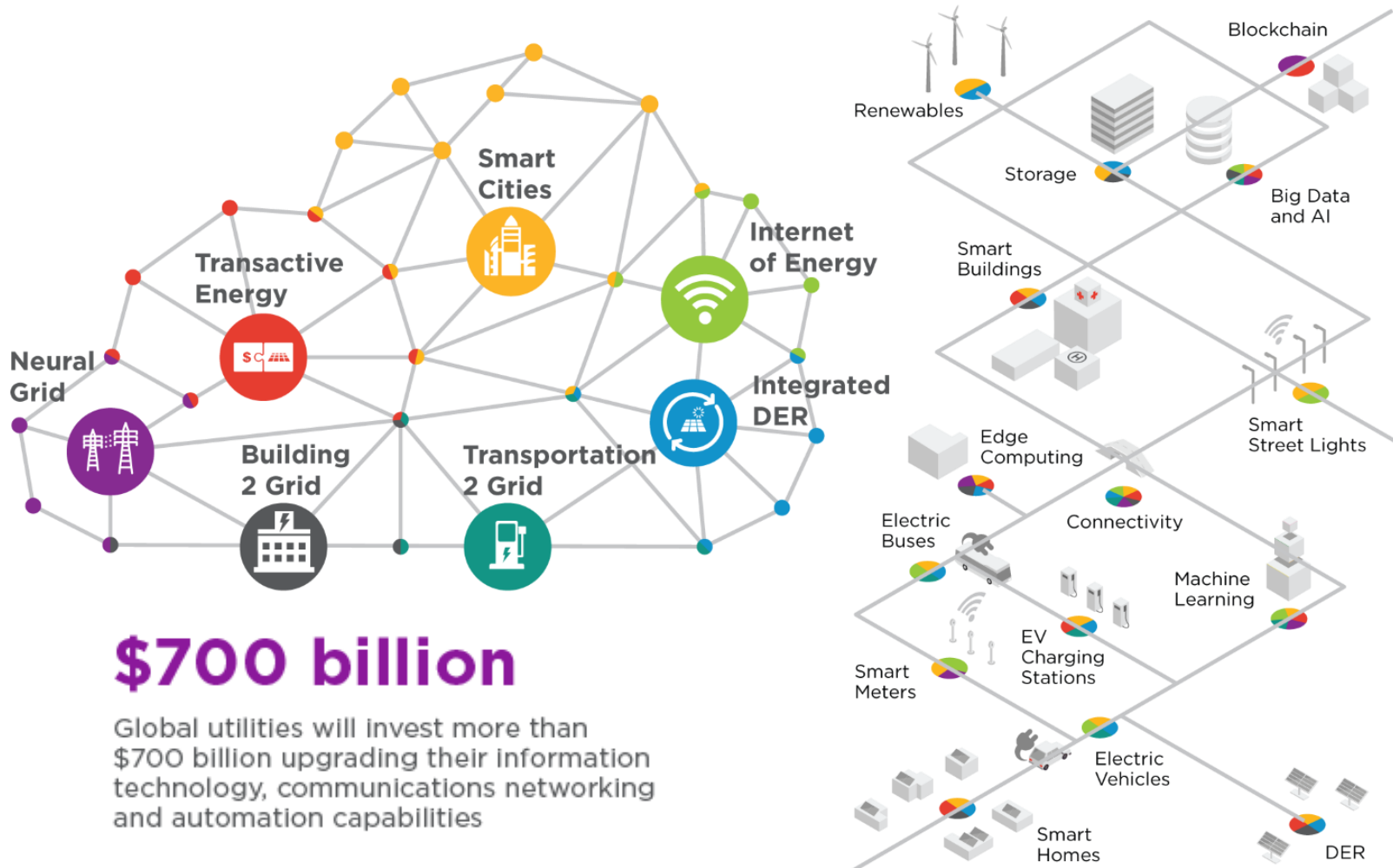


**DISRUPTORS ARE CASH-HEAVY**, with in-house R&D engines and a keen focus on customer relationships.

Sources: Navigant, global figures

# THE ENERGY CLOUD: A PLATFORM OF PLATFORMS

*BLOCKCHAIN WILL UNLOCK ADDITIONAL VALUE FOR ALL THESE PLATFORMS*



[Energy Cloud Video](#)

# ENERGY BLOCKCHAIN USE CASES AND VALUE PROPOSITIONS

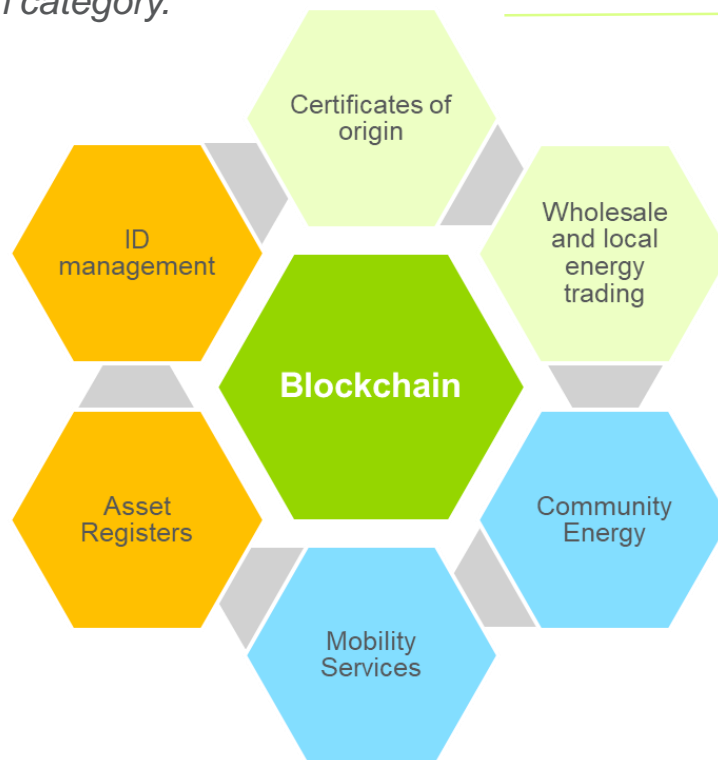
*Percentages are rough fraction of companies pursuing at least one energy blockchain use case in a given category.*

**15%** Visibility into complex networks, device-level trust

- **IBM & Hyperledger:** Supply chain and enterprise processes
- **Guardtime:** Grid cybersecurity and threat detection
- **Electron:** Meter registration and supplier switching

**\$508 million in annual utility spend by 2026**

Source: Navigant Research



Decrease transaction times and costs, combat fraud

**20%**

- **Energy Web Foundation:** Green certificates, demand response ...
- **TenneT:** Value and trade flexibility services
- **BTL Group:** Energy commodities trading

**\$242 million in annual utility spend by 2026**

Consumer choice, support for service ecosystems

**40%**

- **Power Ledger:** community energy trading and finance
- **MotionWerk:** AirBnB for your EV
- **Car eWallet:** Common platform for tolls, charging, ride-sharing, package delivery...

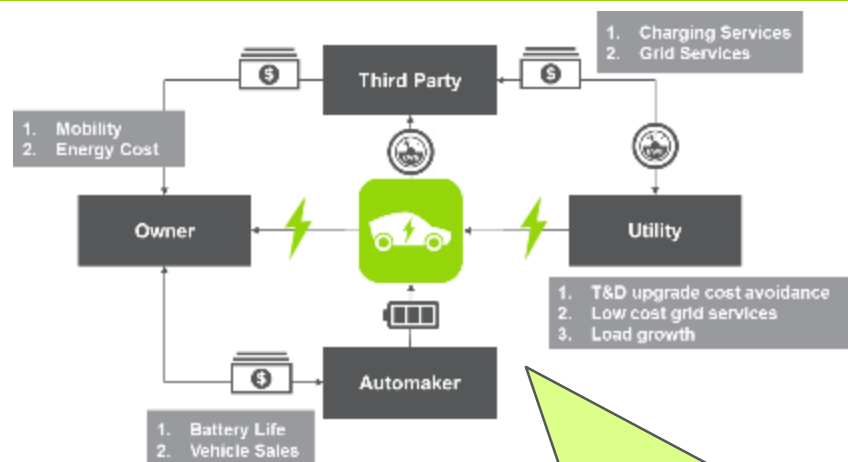
**\$2.9 billion in annual utility spend by 2026**

# THE VALUE THAT BLOCKCHAIN CAN UNLOCK: AN EXAMPLE

## TRANSPORTATION TO GRID SUCCESS STORY AND POTENTIAL BC USE CASE

*Capture grid related value streams on top of load growth and car & fleet mgt services.*

### Value streams



- Real-time energy balancing
- Peak-shaving load shift
- Distribution peak capacity support
- TOU energy management
- Power quality
- Backup power
- Supply firming
- Frequency regulation
- + Car and fleet management services

### Example - Vehicle-to-grid system



Enable drivers and energy users to operate as individual energy hubs with the ability to use, store, and return excess energy to the grid. EV owners get paid up to 1500 Euro a year for parking their vehicle in dedicated parking spots so that the DSO has access to the battery. First trials in Denmark, followed by Germany and the UK. Enel just acquired eMotorWorks to go after V2G market in NA.



# TRANSPORTATION TO GRID PLATFORM

## EV PROGRAM VALUE IN A BC ENABLED PLATFORM

Market actors exploring diverse range of focus areas within overall EV programs, including:

1. Workplace Charging
2. Make-Ready/Smart Charging Service
3. Public Corridor Fast Charging (DCFC)
4. Public Corridor Islandable Charging
5. EV Awareness Advisor
6. Rideshare Fleet Conversion
7. Carshare Fleet Conversion
8. Utility Fleet Conversion
9. Non-Utility Fleet Conversion
10. Municipal/Public Transit Fleet Conversion

### 1-8. EV Infrastructure & Services

1. Workplace Charging

2. Make Ready/Smart Charging Service

3. Public Corridor Fast Charging

4. Public Corridor Islandable Charging

5. EV Awareness Advisor



### 6/7. Ride-Hail & Carshare Fleet Conversion



### 8/9. Utility & Non-Utility Fleet Conversion



### 10. Muni / Public Transit Fleet Conversion





# SUCCESS STORIES SO FAR

## ***Business Model Innovation***

- [LO3 Energy](#) and [Power Ledger](#): two different approaches to transactive energy. Each began as small-scale pilots, now have multiple active residential and commercial trials in countries around the world (US, Europe, Australia, Asia Pacific).

## ***Use Case Innovation***

- [Electron](#): Blockchain-based flexibility trading. Has also gained traction after initial pilots, now [running trials](#) in South Korea and Switzerland.
- [WePower](#): delivery of a nationwide energy tokenisation pilot project that supports smart, multi-year energy trading contracts in Estonia in partnership with the local TSO.

## ***Technology Innovation and Blockchain knowledge platforms***

- [Energy Web Foundation](#): 2 years old, has grown to over 80 affiliates from around the energy sector. Rapid improvements in transaction throughput/scalability and information privacy.
- [Energy Blockchain Consortium](#): brand-new, is developing an open energy blockchain framework (named Catena™) with use cases, interoperability standards and reference architecture.

***More than 50 utilities*** are currently involved in energy blockchain initiatives  
(source: Navigant's Blockchain project tracker)



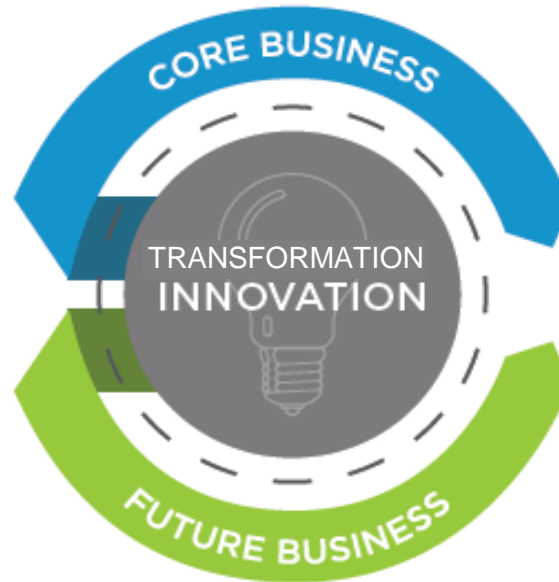
# HOW UTILITIES WILL INNOVATE THEIR BUSINESS MODELS USING BLOCKCHAIN TECHNOLOGY

*Technology and Business model evolution is key for utilities to continue to create customer and share-holder value – balancing today's business with tomorrow's opportunities is critical.*

## ***“Defense”***

### REQUIRES RELIABILITY

- Operational efficiency improvement
- Customer service enhancement
- Increase profits
- Free up capital for reinvestment



## ***“Offense”***

### REQUIRES AGILITY

- New product and service development
- New business models
- New revenue streams

### ***Organizational Transformation and use of Blockchain Technology***

**Track 1 – Optimize  
the Current Business Model**

**Track 2: Develop the Next  
Business Model(s)**

**Time** →

# CHALLENGES AND THE FUTURE

## Challenges

- Need for standards in the energy blockchain industry to facilitate cross-sector collaboration (energy, technology, manufacturing, telecom, infrastructure etc.)
- Balance innovation versus regulations: industry has to find the right balance!
- Solve information privacy

Three **future pathways** forward for the blockchain industry in utilities:

1. Many service providers offering proprietary blockchain platforms, highly fragmented or use-case specific energy blockchain market
2. Blockchain finds a few niche, largely invisible back-end applications in the energy sector (back office processes, asset management, supply chain) but never gains traction as a transformative tool
3. Cross-industry collaboration leads to ecosystems of energy service providers offering proprietary services on top of a common blockchain platform optimized for the energy industry

# CONTACT

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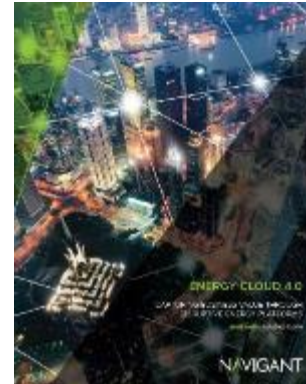
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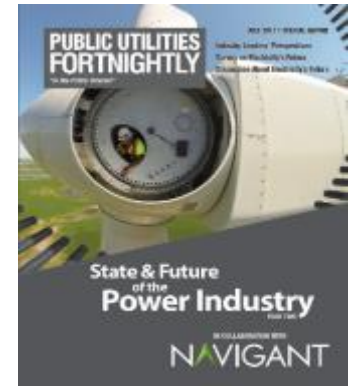
## RELEVANT THOUGHT LEADERSHIP

### Business Value through Disruptive Energy Platforms



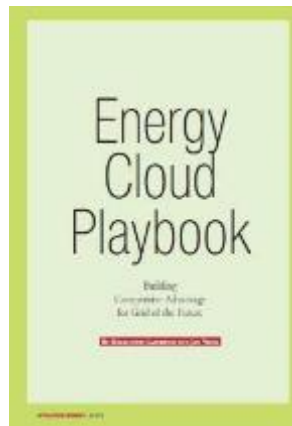
March 2018

### State & Future of the Power Industry



July 5, 2017

### Energy Cloud Playbook



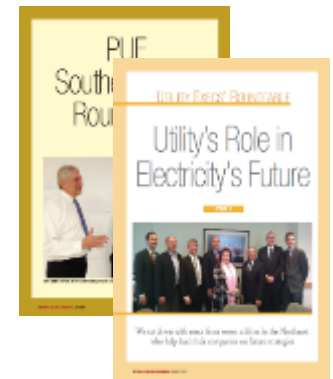
July 2016

### Defining the Digital Future of Utilities



April 2017

### Utility's Role in Electricity's Future



Q1 & Q2 2017