



# Utility Industry Digital Transformation Initiative

The electricity industry: uncovering value through digital transformation

**KEMA Consulting** | June 2017

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# The traditionally stable electricity sector is being transformed by distributed and digital technologies and a push to decarbonize

Which of the following drivers of transformation has the greatest potential to affect the future of the electricity industry?

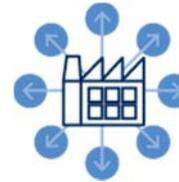
1. Increased penetration of clean and renewable technologies  
 34.8 %
2. Digitization and connection of assets across the value chain  
 21.7 %
3. End users increasingly becoming active decision makers  
 21.7 %
4. Adoption of decarbonisation policies  
 17.4 %
5. Growing competitiveness of distributed resources  
 4.3 %

Source: Annual Meeting in Davos; 2016; Governors meeting Survey of 35 CEOs from leading companies in the Electricity sector

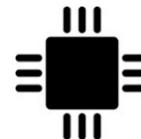
Three big trends disrupting the sector:



**Decarbonization**



**Decentralization**



**Digitalization**

# The convergence of physical and digital technologies across the value chain enable power and data to flow in multiple directions

**Technology trends:**



**1. Mass Personalization**



**2. Platforms**



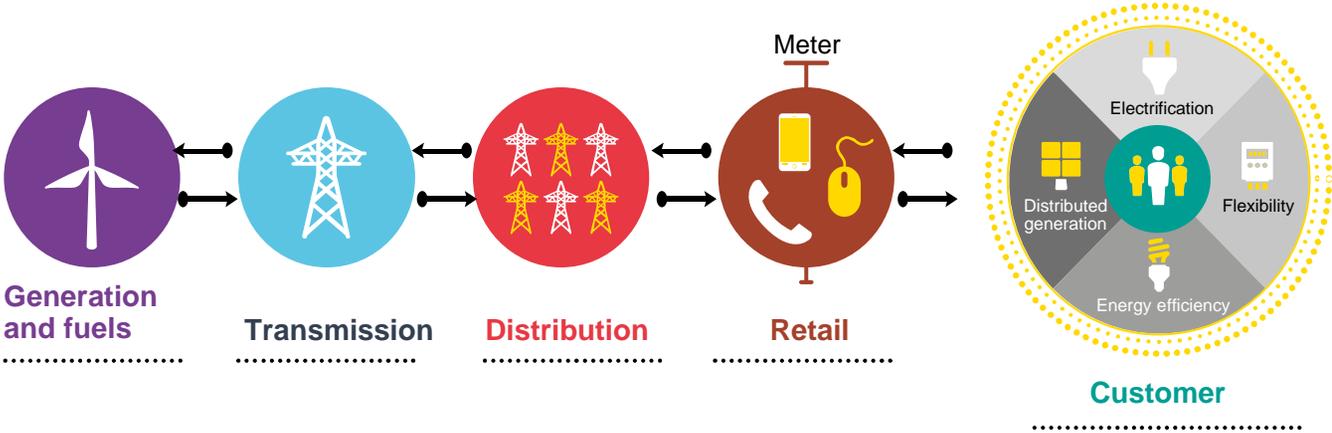
**3. Intelligent enterprise**

**Data Points:**

7.4 billion devices across the power value chain by 2020

Cost of bandwidth decreased x40 in past 10 years

Cost of processing decreased x60 in past 10 years



# Uncovering value in the electricity industry through digital transformation



## Digital Initiatives

Asset performance management		Energy management
Digital field worker		Digital customer model
Smart asset planning		Energy solution integration
Energy aggregation platforms	Real-time supply & demand platform	Interoperable devices
	Real-time network controls	

Digital transformation of the electricity system could deliver **\$ 3.3 trillion of value, in OECD markets** in the **2016-2025** time horizon:

- Value to industry: unlocking **\$1.3 trillion** of value for the electricity sector through digital initiatives
- Value to society: unlocking **\$2.0 trillion** by creating **5.3 million jobs** and reducing carbon dioxide emissions by **6.7 billion tons**

We assess four digital themes with great potential to unlock value and to transform the electricity sector:

- 1. Asset lifecycle management** (Icon: Power plant with arrows)
- 2. Grid optimization and aggregation** (Icon: Gauge)
- 3. Integrated customer services** (Icon: Computer monitor and smartphone)
- 4. Beyond the electron** (Icon: Atomic symbol)



# 1. Asset lifecycle management

## Optimizing asset life cycles: from generation to distribution

**What:** Technology solutions to enable real-time monitoring, remote-control or predictive maintenance.

**Impact:** Will increase operating efficiency of generation, transmission and distribution infrastructure.

### Digital Initiatives

- **Asset performance management**

Monitoring and predictive forecasting enabled by analytics and robotics. Lower repair & maintenance costs, lower assets downtime

- **Digital field worker**

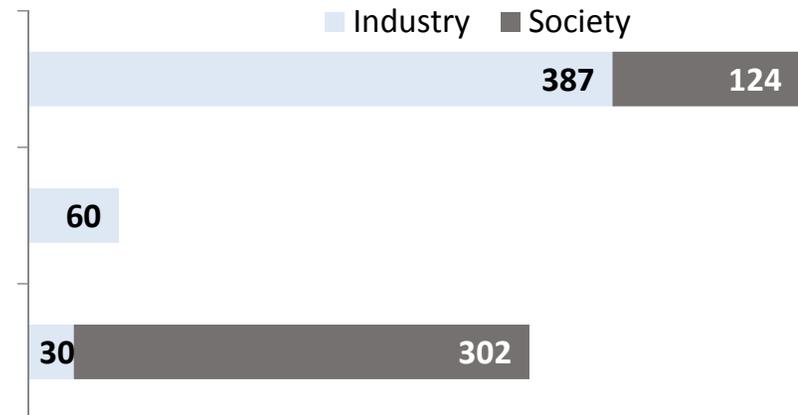
Digital technology to empower field workers with data and tools to drive operational efficiencies.

- **Smart asset planning**

Predictive analytics, machine learning and robotics to improve capital project execution, installation and decommissioning.



### Value at stake (\$ billion; 2016-2025)



### Case study: Iberdrola (asset performance management)



## 2. Grid optimization and aggregation

### How can digital help build a more flexible and resilient electricity grid?

**What:** Real-time load balancing, network controls and end-to-end connected assets, devices & advanced monitoring and V2G (vehicle-to-grid)

**Impact:** Real time info on energy usage (consumers) and production (utilities). The system can dispatch the most economic, reliable and sustainable sources to meet demand, delivering higher efficiency

#### Digital Initiatives

- **Energy aggregation platforms**

Bringing small-scale distributed resources onto a single platform, enabling clusters of end-users to act as one large power plant.

- **Real-time supply and demand platform**

Monitoring and communicating current load supply and demand, paired with a discriminatory pricing framework.

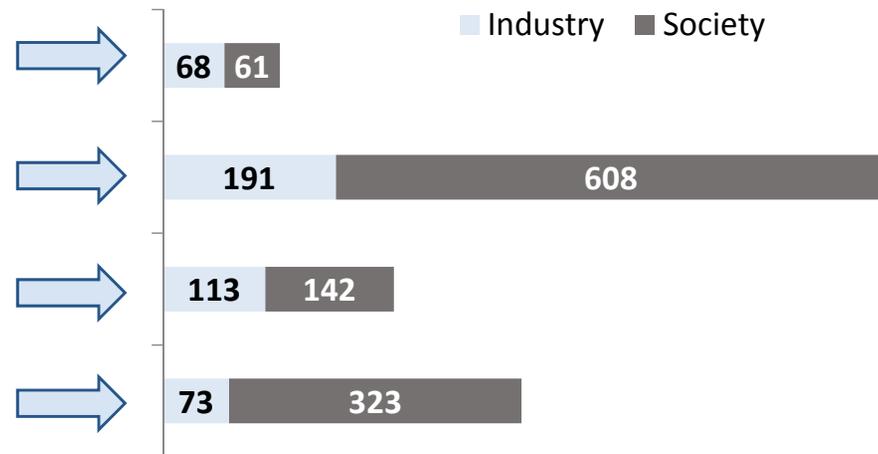
- **Real-time network controls**

Enabling real-time adjustments to changing loads.

- **Connected and interoperable devices**

Device-to-device connectivity, and the collection and display of energy consumption, linking devices to the distribution network.

#### Value at stake (\$ billion; 2016-2025)



#### Case study: Alliander (real-time supply & demand platform)



### 3. Integrated customer services

#### *Reinventing customer service through digital innovation*

**What:** Innovative, digitally enabled products and services relating to energy generation management and consumption, bundled into an integrated customer service.

**Impact:** Will empower consumers to manage their electricity, creating new revenue streams through add-on services. Electricity shifts from a being commodity to a service.

#### Digital Initiatives

- **Energy solution integration**

New services from integrators that help customers optimize energy production and use. Supports integration of renewable resources.

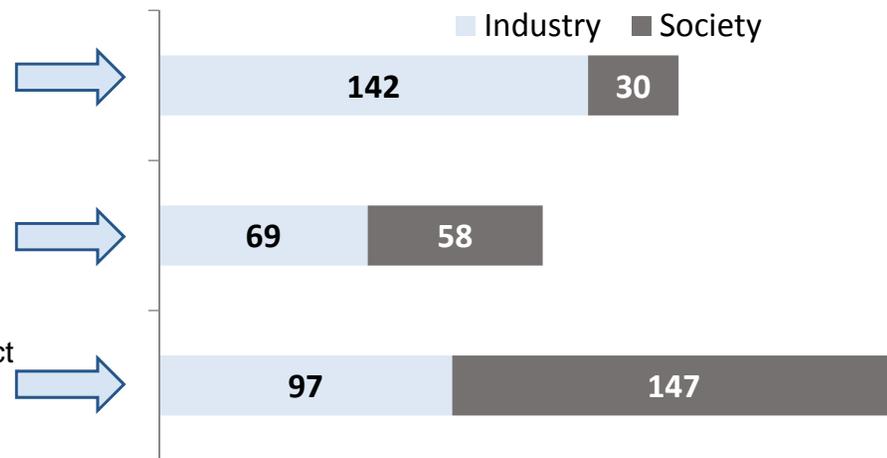
- **Energy management**

Energy information displays and controls to allow prosumers to manage generation, storage and flow of energy. Customers can benefit from lower costs and re-selling excess energy back to grid.

- **Digital customer model**

Multiple channels – web, mobile and social – for customers to interact with their electricity supplier, improving customer engagement.

#### Value at stake (\$ billion; 2016-2025)



#### Case study: PowerShop (energy solution integration)



## 4. Beyond the electron

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### *Creating new value through ultra-tailored non-energy services*

**What:** Sensor-rich objects, smarter devices, and seamless nature of connectivity – all of the above will create a wealth of consumer-related data. The use of cloud computing and analytics will allow for the creation of non-energy services tailored to the consumer needs.

**Impact:** Services that move beyond the electron will have a meaningful impact on consumers' quality of life. Developing an ecosystem of partnerships will be a critical success factor for electricity companies in 'beyond the electron' initiatives.

### Digital Initiatives

- **Living services**

A new integrated consumer experience can be delivered by combining sensors, the cloud, connected smart devices and real-time analytics. The connected home is a key location for the provision of living services.

- **Industrial services**

These services cover areas such as manufacturing and industrial processes, energy, power, data security, lighting and safety. All operate from a single platform and continually evolve using insights from data analytics.

- **Municipal services**

Citizens will experience real-time interactions with service providers and receive a tailored service (food, transportation, emergencies, sanitation, etc.).

### Case study: Singapore (municipal services)

8.

To find out more about the Digital Grid project, visit [KEMAConsulting.net](http://KEMAConsulting.net)

# How can electricity companies become digital champions?

## ‘Developing No regrets’ capabilities



Develop a digital strategy and roadmap



Capture, understand and leverage data



Build and maintain a high-quotient digital team



Build a digital talent strategy



“Data first mentality” - launch a change programme for corporate culture

## Bold plays



Accelerate the pace of digital innovation



Design a delightful customer experience



Partner and invest in the electricity ecosystem



Engage regulators around market redesign



Seek industry consortium to discuss interoperability, data privacy and cybersecurity

## Digitalization of the electricity industry – key messages

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1. **Digitalization** is impacting the electricity sector **across its value chain**, creating economic value, improving the system's resilience and supporting its decarbonization.
2. Along with digitalization, distributed resources that are digitally connected are giving rise to a **decentralized customer-centric model**.
3. This is having a **transformative action** of the power sector. We are witnessing a **shift of value creation** from centralized conventional generation towards the end of the value chain.
4. The industry alone cannot deliver the transition: new **cross-sectorial partnership** models will be needed to unlock the value (examples: Enel and Nissan, Tesla and SolarCity, Opower and Oracle, Philips and Ericsson)
5. Data as main value generator; hardware is commoditised

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# THANK YOU!!!

## **KEMA Consulting publications on the topic**

- Digital Transformation of the Electricity Industry (2017)
- The Future of Electricity in Fast-Growing Economies and mature markets (2016)
- Attracting investment to build tomorrow's electricity sector (2015)

## **References**

For a full list of sources and references, please refer to our in-depth report available at [KEMAConsulting.net](http://KEMAConsulting.net)