Digitalization of an utility: digital initiatives

International Energy Agency 2017
According to the World Economic Forum White paper there are four digital themes for value creation:

<table>
<thead>
<tr>
<th>Digital Theme</th>
<th>Description</th>
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<tbody>
<tr>
<td>Asset life cycle management</td>
<td>Technology solutions can enable real-time, remote-control or predictive maintenance to extend the life cycle or operating efficiency of the generation, transmission or distribution assets and infrastructure.</td>
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<tr>
<td>Grid optimization and aggregation</td>
<td>Grid optimization is possible through real-time load balancing, network controls and end-to-end connected markets, enabled by connected assets, machines, devices and advanced monitoring capability.</td>
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<tr>
<td>Integrated customer services</td>
<td>Innovative digitally enabled products and services relating to energy generation and energy management are bundled into an integrated customer service.</td>
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<tr>
<td>Beyond the electron</td>
<td>Hyper-personalized connected services beyond the electricity value chain, that adapt to the consumer. Electricity moves from being a commodity to becoming an experience.</td>
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WEF - Digital Transformation of Industries: Digital initiatives

Digital Themes | Digital Initiatives
---|---
Asset Lifecycle Management | Asset performance management
Digital field worker
Smart asset planning
Grid Optimization & Aggregation | Energy aggregation platforms
Real-time supply & demand platform
Real-time network controls
Integrated Customer Services | Energy storage integration
Energy management
Digital customer model
Energy solution integration
Beyond the Electron | Living services
Industrial services
Municipal services

- Increased asset life
- Improved productivity
- Optimized site decisions
- Real-time optimization
- Demand aggregation
- System flexibility
- Reduction of loss
- Real-time pricing
- Trust & transparency
- Enhanced experience
- Hyper-personalization
- Data monetization
- Gateway to other services

Source: Accenture research for the Digital Transformation of Industries project
Digital transformation—potential benefit to industry and society

There is immense opportunity for the electricity industry to unlock new value from digital initiatives….

… managing the performance of assets, real-time platforms, integration of energy storage and customer solutions
Digitalization in IBERDROLA

Pioneers in bringing communications and information technologies to generation and networks assets

- **Asset life cycle management**
  - Hydro
  - Renewables
  - Thermal
- **Grid optimization and aggregation**
  - Substations
  - Smart Meters
- **Integrated customer services**
  - Web Users
  - New digital products and services
- **Beyond the electron**
  - 4 Remote Operation Centers for 8,000 MW
  - Remote Operation Centers in UK, US and Spain: 14,000 MW (11,000 wind turbines)
  - More than 17,000 MW monitored
  - 100% automated primary substations
  - 35,000 automated secondary substations
  - 7M deployed in 2015
  - 5m web users
  - 500k app downloads
Digitalization of an utility: digital initiatives

Additional information

International Energy Agency 2017
WEF - Digital Transformation of Industries: Electricity

- Asset life cycle management
- Grid optimization and aggregation
- Integrated customer services
- Beyond the electron
In 2003, IBERDROLA deployed in Spain a real-time remote control, management and maintenance centre for all electric power generation facilities using renewable energy sources.

- Optimize efficiency and maximize the profitability of the facilities

- Reduction of Operation and Maintenance costs
- Maximize production through improved availability
- Centralized management of information in real time
- Centralized communication with other energy management centers
- Control of energy delivered to the network
Renewable Energies Operation Center (CORE)

7,000 MW in centralized operation 24h/365D en 9 países: Spain, Portugal, Italy, Greece, Chipre, Hungary, Rumania, México y Brasil

- 227 Wind farms
- 68 small hydro
- 1 Thermosolar
- 5,925 wind turbines (Gamesa, GEWE, Alstom, Vestas, Enercon, Siemens)
- 192 electrical stations

...with ability to monitor large amounts of information
Asset life cycle management

Grid optimization and aggregation

Integrated customer services

Beyond the electron
The STAR project encompasses the deployment of the IBERDROLA smartgrids in all its areas of distribution throughout Spain.

STAR project reflects our commitment with digitisation:

- Commitment with **digitisation** encompassing deployment of **smart energy networks**
- Highly **innovative project** with relevant R&D investments
- This initiative will boost the pull effect on the business sector **creating employment**
- Progress toward the **integration of renewable** energy sources
- **Social advantages**: Improvement of power supply quality, energy efficiency, safety…
Digitisation in Iberdrola: STAR project

The STAR project encompasses the deployment of the IBERDROLA smart grid in all its areas of distribution throughout Spain.

Project progress:

- **61%**
  - Up to 2015
- **39%**
  - 2016 - 2018

**Project Milestones**

- Installation and remote management of 10.7 M meters
- Automation of 74,000 TCs

**Current Situation**

- Automation 100% STs
- Automation 35,000 TCs
- 7 M meters deployed

STAR project reflects our commitment with digitisation
Smart meters

Smart meters enable customized propositions & allow remote operations for better and faster services

Customized value propositions

1. Customized propositions – Time of Use Tariffs
2. Information on energy usage profile
3. Energy efficiency tools

Better and faster services

1. Better outage management
2. Improved voltage control
3. Remote de/re-energisation

7 Million smart meters already in operation
WEF - Digital Transformation of Industries: Electricity

- Asset life cycle management
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Portfolio of innovative solutions to serve new customer needs

**Smart Home**
- Remote Heating Control Product
  1. Allows to remote control heating
  2. Comfort and energy savings

**Smart Solar**
- Distributed Generation and Storage
  1. Personal feasibility study
  2. Turn-Key Installation, Maintenance
  3. Online Monitoring
  4. Power Supply back up

**Green-Mobility**
- Electrical Vehicle Smart Chargers
  1. Remote management system
  2. Charging point
  3. Technical assistance and repairs
WEF - Digital Transformation of Industries: Electricity

- Asset life cycle management
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ScottishPower Retail: Digital service improvements

Providing our customers with a simple and reliable online experience which reduces the customers effort and eliminates their need to contact us.

Web

- New Improved Navigation and Signposting
- Seasonal Bill and Consumption Graphs
- Google Site Search Support Centre
- Change of Tenancy & Online Refunds
ScottishPower Retail: Digital service improvements

Providing our customers with a simple and reliable online experience which reduces the customers' effort and eliminates their need to contact us.

Mobile

- Seasonal Bill and Consumption Graphs
- Apple Watch Meter Reads and Connect Control
- Change my Tariff
- Energy Service Product Sales
ScottishPower Retail

Our objective is to integrate our digital landscape with our traditional channels to become more personalised, responsive and intuitive

Rules Engine

- Real-time decision making with a 360 degree view of the customer
- Personalised online customer journeys based on behaviour
- Enrich customer propositions with external data
- Consistent messaging and engagement across all channels and devices

Social Media

- Social queries routed and prioritised based on account
- Social Interactions integrated into SAP CRM Call Centre
- Customers resolving each others queries (Peer to Peer /Self diagnosis)
- Advocacy platform for rewards and sales referrals

The next evolution of customer engagement enabling future innovation
In anticipation of the energy transition, Iberdrola has committed to sustainable solutions that require greater electrification of the global economy: more clean energy, more storage capacity, more backup power, more and smarter grids, and more digitisation.

Customer choice and technology innovation is driving increased digitalisation and decentralisation.

Iberdrola is ideally-positioned to meet its customers requirements with innovative value propositions.

Iberdrola is ideally-positioned to invest in networks to connect and aggregate new technology.