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# Intelligent data management: challenges and opportunities for incumbent energy companies in Europe



The electricity landscape is undergoing transformational changes driven by major trends in electricity distribution. Decentralization is driving growth in low-capacity generation sites and injecting an increasing share of renewable energy into the distribution grids. Bulk electricity prices are trending downward, as a result.

The proliferation of connected devices and application of predictive analytics on large volumes of data has led to digital capabilities moving front and center in decentralization, thus exploiting new sources of electricity while maintaining continuity of supply.

In addition, by playing a key role in this transformation, digitalization has not only shaken the industry status quo held by traditional players by paving the entry of new service providers, but also introduced a risk of disintermediation favoring newer players.

The major trends affecting the industry are:

- **Development of new distribution architectures** (smart grids, microgrids)
- Significant **boom in volume of data** generated
- **Development of new offerings and services targeting the end-user**

**Traditional players must now evolve beyond electricity management and move towards intelligent data management. To achieve this, a shift in the skills and competencies of these companies is recommended, as is a fundamental change in mindset.**

The role of the historical electricity majors is shifting rapidly from a specialized one to a more diversified model with the emergence of new areas centered around the end-user. This presents an unprecedented opportunity for these companies to get closer to the end-user and move beyond simply being a service provider, thanks mainly due to the onset of new digital technologies.

## THE CHALLENGES

### 1. New distribution architectures

Decentralization has led to an increase in the number of production sites linked to the grid which, when combined with the emergence of new technologies, has resulted in the development of new distribution architectures such as:

- **smart grids**, which are intelligent distribution grids at the core of digitalization; and
- **microgrids**, which are localized and autonomous architectures.

#### Smart grids and smart meters

Smart grids, dubbed as 'intelligent' distribution grids, allow the integration of decentralised energy distribution with existing traditional operations. According to Scalar Market Research, the global market for smart grid technologies (infrastructure, services) could reach more than \$85 billion in 2022 (compared to around \$40 billion in 2016).

The smart meters constitute a first step towards the operationalization of smart grids. These intelligent and bi-directional devices, installed at the end-user's premises,

are sophisticated technologies that allow real-time monitoring of a household's electricity consumption.

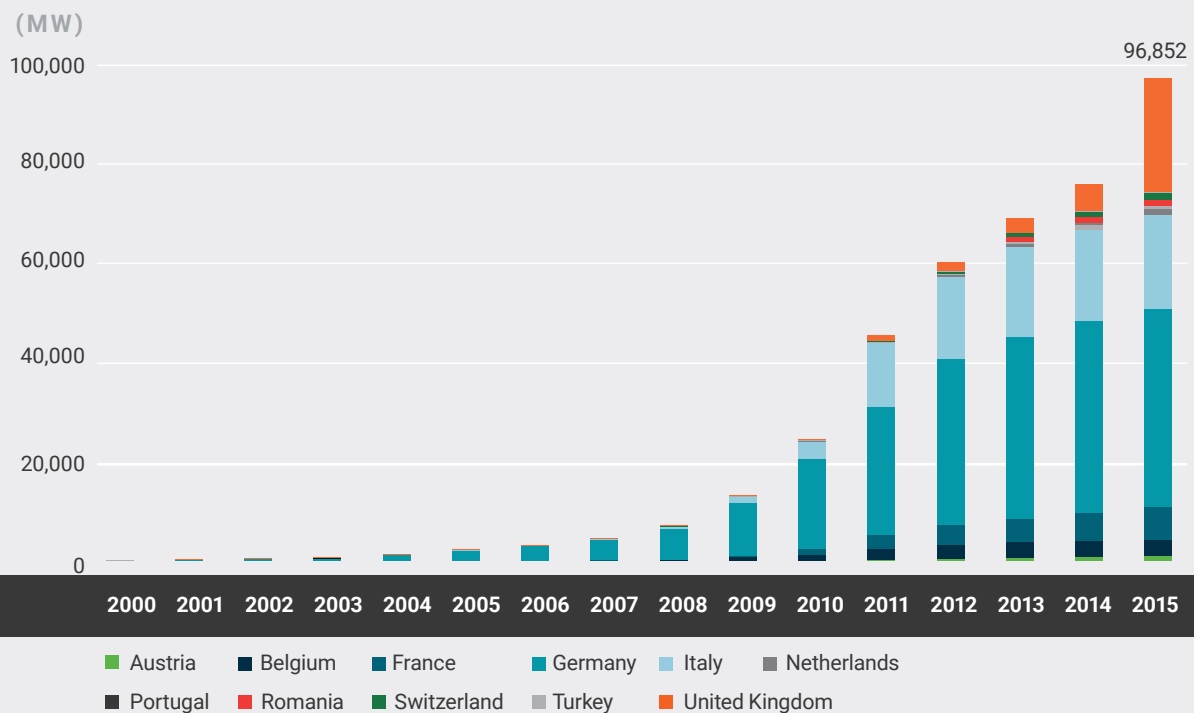
When combined together, the smart grids and smart meters constitute a means to not only attain **energy efficiency**, an important **cost optimization** lever, but also a tool to better **understand end-user behavior and preferences** that may eventually result in the development of innovative offerings and services.

Nevertheless, these architectures still face three primary obstacles:

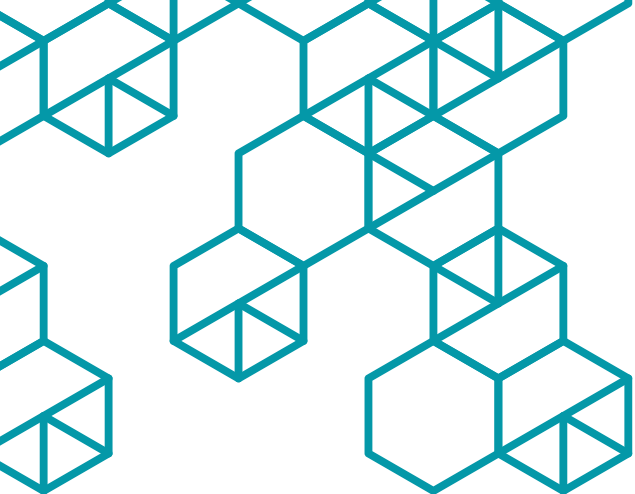
- **Technological challenges** driven by a lack of interoperability and standardized IT systems
- **High investment costs** of implementing the new architecture: for example, Enedis aims to deploy in France 35 million 'Linky' devices between now and 2021 at an estimated cost of €5 billion (source: ERDF)
- **Organizational challenges** to shift to this fundamentally different model from the current centralized distribution model

Smart grids and smart meters are also transforming the value chain with the **entry of numerous non-traditional players** in the electricity sector.

**FIGURE 1:** EVOLUTION OF EUROPEAN TOTAL SOLAR PHOTOVOLTAIC GRID-CONNECTED CAPACITY 2000 TO 2015



Source: 2016 Solar market report, SolarPower Europe



## Microgrids

The advent of microgrids—autonomous, localized, and low-cost grids that are able to operate reliably and independently from connected grids—present **an alternative model to traditional electricity distribution**, by utilizing an **intelligent, autonomous and localized** system. These micro-networks are connected to traditional centralized electrical grids to provide a continuous supply to end-users.

The fall of entry barriers has led to **rapid development of these innovative architectures** and **intensified competition** as new players enter the value chain.

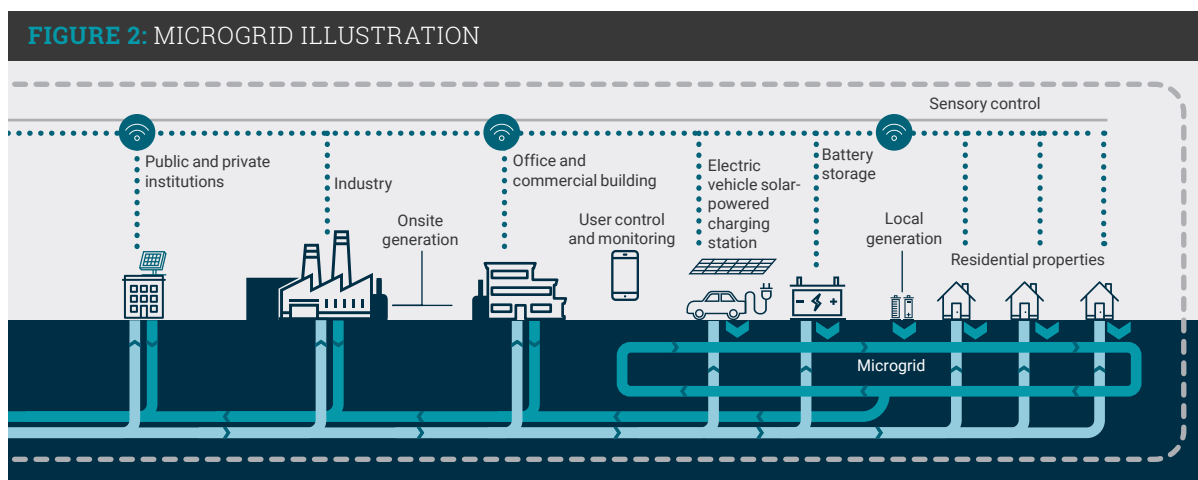
Such a fundamental shift in the model has also impacted the role of historical electricity providers from being **centralized** to an **insurance-like** role whereby they step in mainly in case of local failure. The slide towards this more secondary role both highlights and challenges the current pricing models offered to end-users.

## 2. Data boom

The traditional model is evolving to a more data-centric model through digitalization with an increasing amount of data being captured and analyzed. The distributors are reusing this information and monetizing this data mainly for:

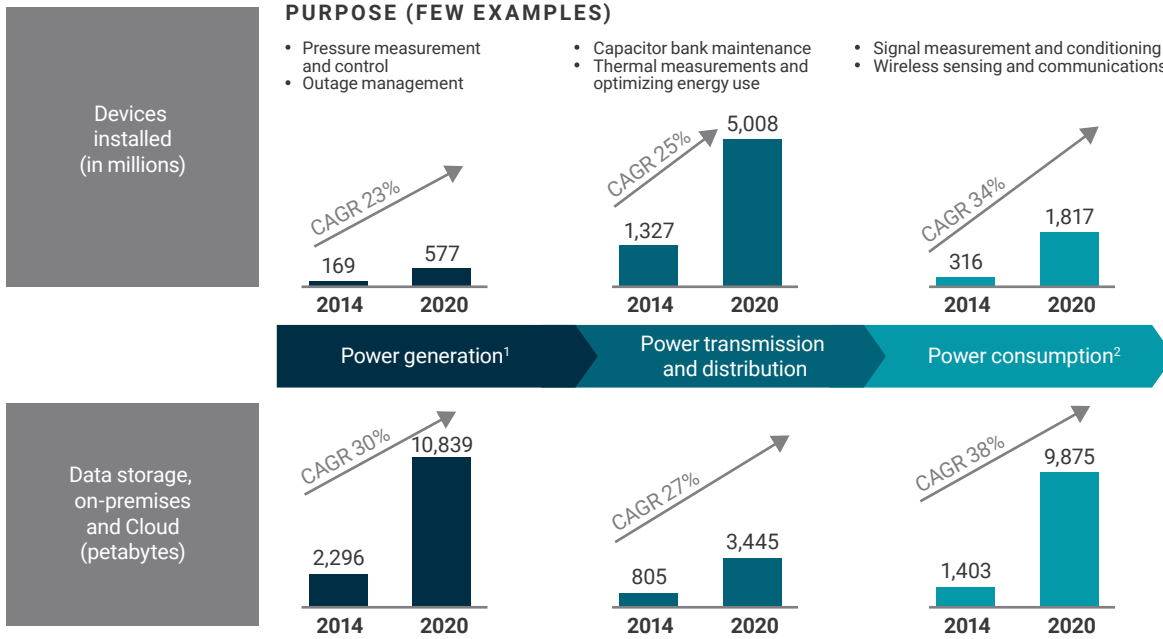
- improving predictive analytics and maintenance (generation and distribution); and
- discovering consumption patterns and preferences of their end-users.

There are significant new challenges posed by data gathering and analysis, a new field for traditional electricity providers, and these are manifested across different levels across the organization.



Source: White paper 'Reforming the Energy Vision', New York state

**FIGURE 3: EVOLUTION OF ACCESSIBLE DATA VOLUME ON THE ELECTRICITY VALUE CHAIN**



1. Fossil, nuclear, renewables etc 2. non-residential lighting, power distribution and management, HVAC and climate control  
 Source: 'Powering the future', September 2015, GE publication ; AlixPartners analysis

**3. Development of new offerings and services targeting the end-user**

The evolution of the customer-supplier relationship has resulted in the development of new services not limited to the electricity domain, such as:

- **Within electricity**, providers are focusing on offering bespoke and personalized services: online-based, mobile applications, and demand management. Despite end-users playing a more active role (so-called prosumers) with self-service and self-care tools, the challenge facing the distributors is the adoption rate of these services which is still deemed as being either too expensive or too complex to use.
- **Beyond electricity**, transitioning from an electricity-centric to a more customer-centric model. The distributors are therefore diversifying towards other services: connected home solutions, insurance, connected devices etc.

**THE OPPORTUNITIES: A WAY FORWARD FOR TRADITIONAL PLAYERS**

A decentralized architecture driven by these new technologies thus presents significant challenges for traditional energy companies. However, the opportunities are equally great. To move toward

a more intelligent data management model, companies should focus on the following three priorities:

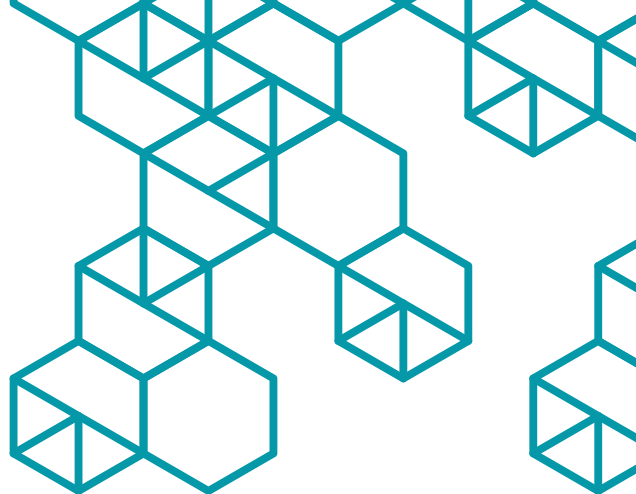
**1. Identify priority markets and diversify into other digital markets**

Faced with the challenges posed by new distribution architectures, traditional players are fighting back through:

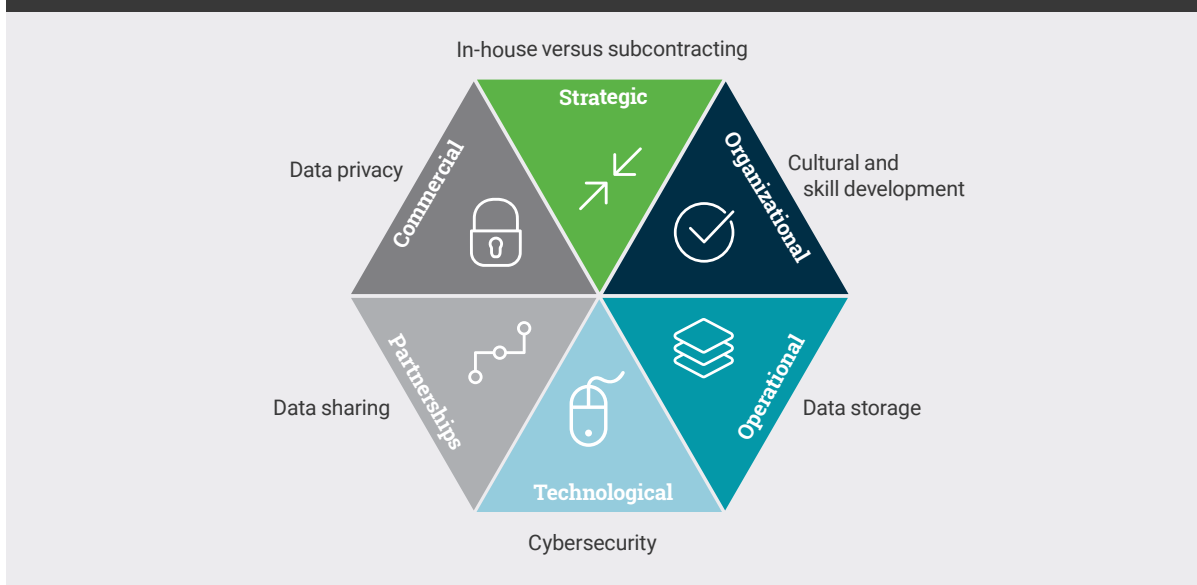
- **Diversification into renewable energies.**
- **Investments into decentralized architectures** to be leveraged as growth drivers notably through partnerships.
- **Investments into digital technologies and data analytics tools**, as well as recruiting data scientists and experts and partnering with big-data pure players.

Supporting these steps, traditional players must identify promising markets and opportunities that should be addressed in priority, with highest means and management focus.

In this regard, AlixPartners helps its clients accelerate their digital transformation and identify priority markets or opportunities.



**FIGURE 4:** CHALLENGES FOR TRADITIONAL ENERGY COMPANIES



Source: AlixPartners analysis

As an example, through extensive market research and company assessment, AlixPartners has been able to:

- Broadened segmentation of the addressable market, expanding from energy to the adjacent, high potential digital markets (not directly linked to energy) where the company could leverage its extensive capabilities.
- Assess gaps between the state of those markets and the company's current initiatives.
- Streamline and make consistent portfolios of digital initiatives to refocus and accelerate on a selection of highest-impact initiatives.

## 2. Translate ideas into a practical business case and then test

Secondly, each idea must be supported by a business case and be tested before any actual large-scale roll out and investment. This allows for either a quick stop or an acceleration once validated. The company should also assess which competencies are required and the way to acquire such skills whether internally or using M&A, all the more so when facing a disruptive business model.

In this type of situation, AlixPartners has a strong track record in helping companies define concrete and actionable business plans and roadmaps. The key for



these roadmaps is to consider all relevant strategic, operational, and financial realities and to develop concrete routes to market or developmental plans for competencies, partnerships, or acquisitions.

A robust business case and thorough experimentation are the conditions to accelerate the conversion of promising digital ideas into actual transformational projects, new businesses, and new business models.

### 3. Fully industrialized execution

Ultimately, the real test will be a company's ability to execute on these plans.

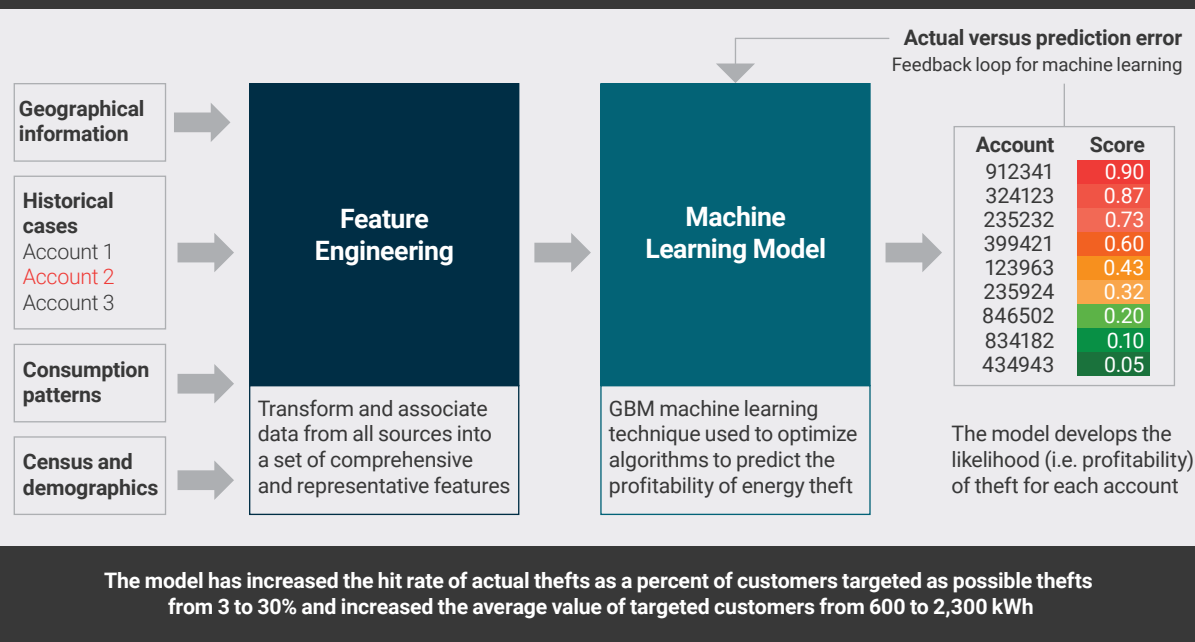
AlixPartners can help realize this vision. For example, we helped a utility company reduce losses due to electricity theft. Utilizing multiple data sources including consumer demographics, billing patterns, seasonal trends, and geography, we applied machine learning methods to train an algorithm to identify suspect patterns. The algorithm performed in a self-improving way in which new theft cases were fed back to continually improve the algorithm; and it also helped prioritize theft case suggestions by amount and geography over time. Within the first three months, the utility experience a significant increase in theft cases identified. The diagram on the following page (Figure 5) provides a simple overview of how the system worked.

This intensive, big-data analysis could help other clients to analyze consumer-pricing behavior, identifying which clients were most sensitive to price and at what levels. Similarly, such analysis could provide predictive analytics on what components are at highest risk of outage and suggest changes to maintenance priorities.

### **A major European utility had identified new digital services opportunities, including predictive maintenance and optimization of electricity consumption. AlixPartners was able to help the client to:**

- Determine the pricing of new digital services using value-based pricing principles.
- Develop the full bottom-up business plan including the necessary capabilities in IT platform and required internal skills to be able to collect and then analyze millions of data points.
- Support the experimental development between the client and one of its partners.
- Help the dissemination of the test to other clients.

**FIGURE 5:** APPLYING MACHINE LEARNING TO AN ENERGY THEFT PREDICTIVE MODEL



Source: AlixPartners

### KEY TAKEAWAYS

The decentralization of energy generation and distribution creates a unique set of challenges for incumbent utility companies. However, the digitization process that has arisen as a result of this has created a wealth of information for these companies, as well, and provides a significant opportunity to get closer to the end-user and transform their business model.

Whether in identifying these opportunities, developing and testing a practical business case, or in helping execute on a specific plan, AlixPartners has the experience and knowledge to help you navigate in this new environment. **A**



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