



A Smart Grid is a system that enables **two-way communication** between the **end user** (private or industrial users) and **utilities** so that the information provided by consumers is used by companies to allow **more efficient operation of the grid**. In addition, all this information will offer **new services to customers** as a complement to the electricity itself.

That is, a smart grid that is able to integrate the actions of all stakeholders, be they producers, consumers or both at the same time, to distribute **energy-efficient, sustainable, profitable and safe**.

ORIGIN OF THE INVESTMENT OPPORTUNITY



In response to the challenge of the more efficient use of energy in modern economies, it has emerged the concept of "Smart Grids". In line with this challenge, the **Europe 2020** strategy proposes, as one of the five major objectives for the European Union, known as **20-20-20 that has three goals: reducing emissions of greenhouse gases by 20%** compared to 1990 with a commitment under international agreement to raise the target to 30%, reaching **20% of renewable sources** in EU energy consumption by 2020 and 10% in the transport sector and **increase energy efficiency** in to save 20% of energy consumption in the EU regarding projections for 2020.

The role played by the user in the Smart Grids, is taking a radical change. Surge in demand for new and improved services, in order to adjust pricing in real time and the freedom to choose the energy suppliers.

Finally, the role of power companies, which are forced to change the way of provision of services to suit the needs of society are also highlighted.

LOCATION OF THE INVESTMENT OPPORTUNITY IN THE SECTOR VALUE CHAIN



The Smart Grids are related to information technology and computers that get energy saving or, in other words, increasing energy efficiency in the distribution network services. In addition, this opportunity also includes **manufacturers of electronic components and technology providers** that enable the development of new services.

DIFFERENTIATING FACTORS OF THE INVESTMENT OPPORTUNITY

Table with 3 columns: CONSUMER/USER, COMPANY/INNOVATION, SOCIETY. Each column lists factors with corresponding dot indicators and descriptive bullet points.

INVESTMENT OPPORTUNITY LIFE CYCLE

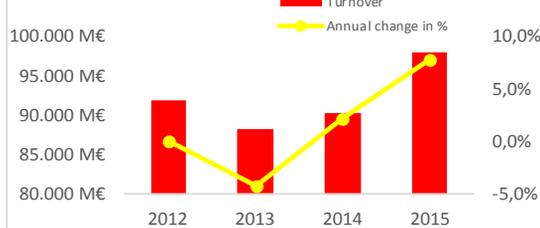


Smart grid technology begins with attempts to use controls of consumption through metering and monitoring systems. In 1980, automatic meters were used to monitor the loads of millions of customers, resulting in an advanced infrastructure in 1990. In 2000, Italy created the first smart grid project that spanned nearly 27 million households using smart meters connected through a communication line. In April 2006, the Advisory Council of the Technology Platform for the electricity networks of the future of Europe presented its vision of Smart Grids. This is driven by the combined effects of market liberalisation, changing existing technologies for the next generation to meet the environmental objectives and future uses of electricity. Currently, we are experiencing the transformation of the energy environment and associations such as AMETIC are already working on indicators that measure the quality of these services (Telemetry consumption in homes and offices; Smart Meters- checking the alignment of consumption bills;- holistic management of the electricity distribution network...)

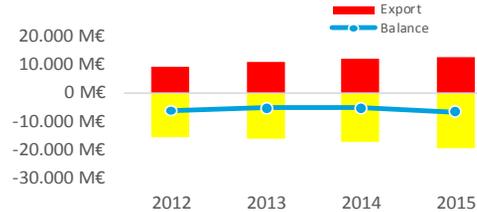
Sources: (1): Smart Grids. The future of electricity network Industrial observation of the Electronics, Information Technologies and Telecommunications Sector

CHARACTERISTICS OF THE ICT SECTOR <sup>(2)</sup>

## Turnover



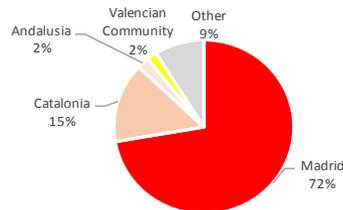
## Trade balance



## Employment



## Territorial distribution of turnover (2014)



## SUPPLY

## TOP 5 COMPETITORS

#	Company	Net sales	Last available data
1	Endesa	€28,916 M	2014
2	Sierra Wireless*	N. avai.	-
3	Cinterion*	N. avai.	-
4	SIMCom*	N. avai.	-
5	Jasper Wireless*	N. avai.	-

\* Data not available in the queried database. SABI.

## DEMAND

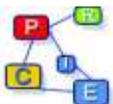
## GROWTH

- Investments in smart grids will require a collective effort of the country (both companies and public administration) and will cost 10 billion over the next ten years and **will generate a value between 2 and 3.5 times the investment**. Their applications will improve the efficiency of the electricity system and provide a **profit** of between **1.1 and 1.8 billion euros**. This increased efficiency will reduce the energy dependence of Spain by 5.3 percent in 2020, or avoid fossil fuel imports of worth 4 billion euros a year. CO2 emissions will fall 3.7% (15 million tons) in 2020. <sup>(3)</sup>

## SUCCESS STORIES



**Smart Grids Project Malaga: A sustainable energy management model for cities of the future**, led by Endesa. This project responds to the European guidelines for the energy sector to drive efficiency, **use of renewable energy and advanced network storage capacity**. The main objectives of the project are: **automated meter reading, changing consumer habits**, providing online data consumption, rates and effects on the environment, technology research V2G (vehicle to grid) for **energy efficiency in public and private buildings**, efficient management of public lighting, battery management and storage facility in generators and installation, management and control of producers of alternative energy (photovoltaic, small wind, biogas, hydrogen cell, CHP...) among others.



**Intelligent Network Project in the Henares Corridor (PRICE)**: the largest joint demonstration project of smart grids in Spain and one of the most ambitious in the European Union. It allows the distribution networks **Gas Natural Fenosa** and **Iberdrola** to be turned into smart ones, in the Henares Corridor (Madrid and eastern part of the province of Guadalajara). It involves the installation of **200,000 smart meters** and other smart **devices oriented towards power management**, and modification of **1,600 transformation centres** to adapt to this new model of distribution.



Iberdrola has driven the **PRIME project**, with the intention of **developing an infrastructure of remote meter management that is public, open and standard in nature**. This project was started by the most prominent industry leaders in the areas of **measurement, telecommunications and silicon manufacturers** such as Advanced Digital Design, CURRENT Group, Landis + Gyr, STMicroelectronics, Usyscom and VIZ. A number of electricity companies have already joined and others continue to join the project. All these companies have teamed up to launch a new model of public architecture, open and non-proprietary communications that supports the new features of remote meter, and to progress in the construction of electricity networks of the future SmartGrids.



POSITIVE FACTORS FOR INVESTING IN SPAIN

Favourable factors in Spain for the development of the opportunity

- Counters Replacement Plan
- Commitment to new energy models
- FutureRed platform Spain
- Social factors and habits

The Royal Decree 1110/2007, dated 24 August, approving the unified measurement points of the electrical system Council Regulation, **requires that new domestic meters** (type 5, P ≤ 15kW) have **timers and capacity for remote management**, which entails undertaking a plan to replace all equipment already installed.

The **commitment of large companies for energy models** respectful of the environment is increasingly important, **investing over the last 10 years in clean technologies**, which has led companies like Iberdrola to be the only Spanish electricity company and the second European utility included within the 100 Most Sustainable Corporations in the World Global index.

Created with the mission of **promoting the technological development of Spanish electric transmission** and distribution networks, propelling technological leadership, sustainable development and enhancing competitiveness of the company. It attempts to **give a better response to the needs that electricity networks have within the country**.

Spain is in a good position for the development of Smart Grids due to its **high use of renewable energy and distributed generation**. Renewable energy (wind, hydro, solar) has an important role in the global energy production in the electricity system of Spain, covering approximately **43% of total production**.<sup>(4)</sup>

Favourable factors for the sector in Spain

- Macroeconomic situation
- Labour market
- Incentives
- I+D+i
- Talent
- Geographic location

**The Added Value of the information technology and communications sector** in 2015 was 45,296 million euros, representing 4.9% of the added value of the Spanish economy.

Sector exports totalled **13,032 million euros**.<sup>(2)</sup>

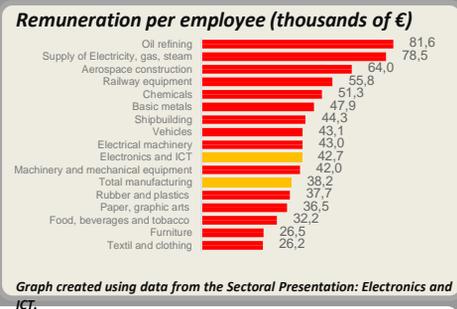
The **average productivity per employee** in the ICT sector is **52,100 euros per year**. Their **average individual remuneration is 42,700 euros per year**. The **Unit Labour Cost** accounts for **81.8%** of the ratio between the remuneration per employee and the individual productivity (productivity defined as value added per employee).<sup>(5)</sup>

The Ministry of Energy, Tourism and Digital Agenda allocated **80 million euros to R&D in the ICT sector in 2016 to promote high value technologies** in industries of the future (Components and Systems, Internet of the future, High Performance Computing (supercomputing), robots and autonomous systems, Internet of Things, cloud computing solutions for mass data processing...), Cybersecurity and digital trust, agrifood and environmental management, energy efficiency, transport and logistics, and digital content.

There are 15,736 **innovative companies** and the **percentage of innovative companies** is roughly **28.5%**, spending a total of **13,6747 million euros** on innovation.<sup>(6)</sup>

Installs in Spain Google Campus to the world's largest entrepreneurs, ahead of London, Seoul and Tel Aviv, demonstrating confidence in the creativity and talent in the country by leading companies the sector. These facilities provide work areas and technical advice for the implementation of new projects. TechHub is involved in this project which manages a **global community of digital entrepreneurs**.

Spain is **within reach of three main regions**: the **European region**, the **Mediterranean region** and the **Atlantic region**. Spain is considered to be the gateway between North Africa and Europe, and a key link to Latin America, not only because of its geographical location but also because of its strong historical and cultural ties with the region. In Spain the **Canary Islands** play a key role with regards to **maritime traffic with West Africa**.



Graph created using data from the Sectoral Presentation: Electronics and ICT.

- Technological and research infrastructure
- Transport infrastructure and logistics networks

Spain has a very advanced technological infrastructure as shown in areas such as: the presence of **84 technology parks** that house more than 5,000 technology companies and a **broadband coverage of 96.5%**, one of the few OECD countries that has had included in its legislation since 2012 the **universal obligation of 100 Mbps broadband supply**. In the **business arena**, broadband penetration exceeds that achieved in the European Union. In 2016 **99% of companies in Spain** that access the Internet do so by broadband<sup>(7)</sup>.

There are **250 airlines** operating in Spain in its 47 airports; its high-speed rail network is the 2nd best in the world and the best in Europe; it is ranked **1st in the EU for its motorway network**; and it has excellent sea connections to its **46 ports** distributed along the Atlantic and Mediterranean coasts.



Graph created using data from Spanish Foundation for Science and Technology, 2015.

Sources: (4) Report 2014-Spanish electricity system (REE) Spanish electricity system (5) Electronics and ICT Sectoral Presentation. April 2015. Ministry of Energy, Tourism and Digital Agenda (6) Innovation Survey in companies 2016 (7) ONTSI