



Executive Summary

2016 UNEF Annual Report
“The era of solar energy”

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- In the past years the international PV market has increased by around 20-25%. In 2015, 50 GW of PV were installed, increasing global PV cumulated capacity up to 230 GW globally. China and Japan have significantly increased their PV installed capacity with a total of 15.2 GW and 11 GW in 2015, respectively. The US was the third country in the world that installed more PV capacity in 2015; 7.3 GW reaching 27.4 GW in total.
- In 2015 Europe represented a 16% share of global PV capacity decreasing from 29% in 2013. The continent achieved the milestone of 100 GW of cumulative capacity in 2015, having installed 8 GW that year. The energy generated by PV plants supplied 4% of total European demand. The UK installed 3.5 GW, while Germany and France installed 1.5 GW and 0.9 GW respectively. Contrary to these figures, Spain installed 49 MW in 2015, increasing from 22 MW of 2014, but still an insignificant figure compared with other countries with less solar resource.
- Globally, solar PV technology has experienced a great evolution in the past years, reducing costs and increasing efficiency. PV modules have already overcome the learning curve and can be considered a mature technology. The current Levelized Cost of Energy (LCOE) of solar energy is under 10 c€/kWh in many places in the world. In 2030, the LCOE is expected to decrease to 4 c€/kWh for large plants, a lower price compared to electricity spot price. The efficiency of the modules has increased to 22.5% in the best cases since 1997.
- In terms of R&D, the EU enforced the Strategic Energy Technology Plan (SET-Plan) in 2011, dedicated to foster and promote innovation and development of clean technologies. This framework is key for the EU to enable the achievement of the energy and climate 20-20-20 targets in 2020 and the 40-27-27 targets in 2030. The objectives of the Set-Plan section dedicated to PV pursue the main drivers sought by the sector: increase system performance, reduce costs and improve regulatory aspects and business models. The nZEB (near Zero Energy Buildings) and PEB (Positive Energy Buildings) play a key role in integration of PV in buildings, a promising segment that will be perfectly combined with energy storage, self-consumption and demand response.
- The SET-Plan for the PV sector also aims to meet the following targets: increase of module efficiency by 20% from 2015 levels by 2020, and by 35% by 2030; reduction of the cost of the PV turnkey projects by 20% by 2020 and by 50% by 2030, while the module life should be increased to 30 years by 2035. Improve the automation of the plants and elements of PV integration in buildings are also concrete objectives of the SET-Plan.
- In the period 2014-2015, no additional capacity was connected to the grid in Spain, although several self-consumption installations were registered. On

October 9th, 2015, Royal Decree (RD) 900/2015 was approved, regulating PV self-consumption installations. The main aspects of the RD are the following:

- Maximum capacity of the self-consumption installation must be equal or below the contracted capacity.
 - There are two types of self-consumers:
 - Type 1: maximum capacity installed of 100 kW – there is no compensation for the electricity surplus fed in the grid.
 - Type 2: not limit to the allowed capacity – the surplus can be sold in the wholesale market directly or through an intermediary. A specific grid tax of 0.5 EUR/MWh must be paid together with a 7% tax on the electricity produced.
 - Self-generated power above 10 kW is charged with a fee per kWh consumed as a “grid backup toll”, also known as the “sun tax”.
 - Adding battery storage implies also an additional tax.
 - Geographical compensation is not allowed, and self-consumption for several end-customers or a community is not allowed.
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- This RD has not introduced any support to the development of self-consumption in Spain, but the sector hopes that future amendments would introduce improvements to foster self-consumption.
 - In 2010 the Spanish PV industrial sector was focused on manufacturing and distribution of PV modules, systems of structures and solar trackers. This has evolved to another type of companies involved in the promotion and management of PV projects abroad. Currently Spanish companies are world leaders in the development of projects of large capacities.
 - The current R&D activity in Spain is focused on research centers and universities, since the private initiative lacks the former momentum the sector had. The public administration promotes the forum *Transfiere*, an annual gathering that connects research centers and companies. Additionally, in order to channel new initiatives, the Spanish PV Technological Platform (FOTOPLAT) was created with the main objective of strengthening Spanish R&D on PV and the internationalization of the sector.
 - The uncertain situation caused by the current legal framework has forced Spanish companies to expand their markets to foreign countries. They have been awarded with projects in the last tenders organized globally, such as in Chile or Mexico.
 - In 2015, the number of jobs in the sector was the same as in 2014, being approximately 5,000 direct and indirect positions. Even if the number of PV installations slightly increased in 2015, this has not been enough to produce a significant increase of job opportunities in the sector.