

The market outlook for PV until 2016

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ABSTRACT

Solar photovoltaic (PV) electricity continued its remarkable growth trend in 2011, even in the midst of a financial and economic crisis and despite the PV industry going through a difficult period. Once again PV markets grew faster than anyone had expected, just as they have done for the past decade, especially in Europe but also around the world. While such a rapid growth rate cannot be expected to last forever in Europe, prospects for growth around the world remain high. The results of 2011 – and indeed the outlook for the next several years – show that under the right policy conditions, PV can continue its progress towards competitiveness in key electricity markets and be a mainstream energy source. The major system-price decrease that was experienced in 2011, combined with measures taken in Germany and Italy after the Fukushima nuclear disaster, allowed the market to further develop in 2011, particularly in these two countries. However, the price decrease also helped weaken the policy support in many countries, with policymakers facing growing discontent with regard to the perceived cost of PV and the ailing PV industry in Europe.

Introduction

EPIA's new report "Global Market Outlook for Photovoltaics until 2016" assesses the European and global markets for PV in 2011, and makes forecasts for the next five years. It is based on an internal analysis of data from industry members, national associations, government agencies and electric utilities. The figures presented in the report were discussed and analyzed by key players from the PV industry at the 7th EPIA Market Workshop in Brussels (March 2012).

The major findings for 2011 include:

- **29.7GW of PV systems were connected to the grid in 2011**, up from 16.8GW in 2010; PV is now the third most important renewable energy source (after hydro and wind power) in the European Union in terms of globally installed capacity.
- **21.9GW were connected in Europe in 2011**, compared to 13.4 in 2010; Europe still accounts for the predominant share

of the global PV market, with 75% of all new capacity in 2011.

- **Italy, with 9.3GW connected, was the top market for the year**, followed by Germany with 7.5GW (out of which probably 1GW was not yet connected); Italy and Germany accounted for nearly 60% of global market growth during the year.
- **China, with 2.2GW installed, was the top non-European PV market in 2011**, followed by the USA with 1.85GW and Japan with 1.3GW.
- **The number of markets achieving close to or above 1GW of additional PV capacity during 2011 rose from three to seven:** Italy, Germany, France, China, Japan, USA and Belgium.

2011 in a nutshell

Forecasting the PV market is a difficult

exercise for at least one reason: energy has always been a policy-driven field, and PV is no exception. On the contrary, the market for PV systems exists in most cases because of the commitment of policymakers to making it possible. The necessary fine-tuning of feed-in tariffs (FiTs) requires a strong political commitment to ensure the development of a sustainable market growth for PV systems. And this fine-tuning was put under significant pressure in several key markets throughout 2011.

The Fukushima disaster clearly led to a revision of policies in Germany and Italy that contributed to helping achieve the incredibly high level of new systems connected to the grid in these two countries in 2011. A closer look at market evolution reveals that the first half of the year was affected by FiT changes and the market fell during an overproduction situation. The rapid price decrease that followed triggered a market growth in the second part of the year, but at a level that was not high enough to cope with high-level production capacities. This led to the prices remaining quite low until the end of the year and into 2012.

"The growth rate of PV during 2011 reached almost 70% – an outstanding level among all renewable technologies."

The consequences are still visible today, with the industry in several parts of the world, and especially in Europe and the USA, battling to remain profitable in that environment of low prices. In addition, an awareness that these low prices could be normal has spread in the minds of policymakers. This frame of mind, combined with the rapid market growth in some countries, is pushing several administrations to drastically reduce the

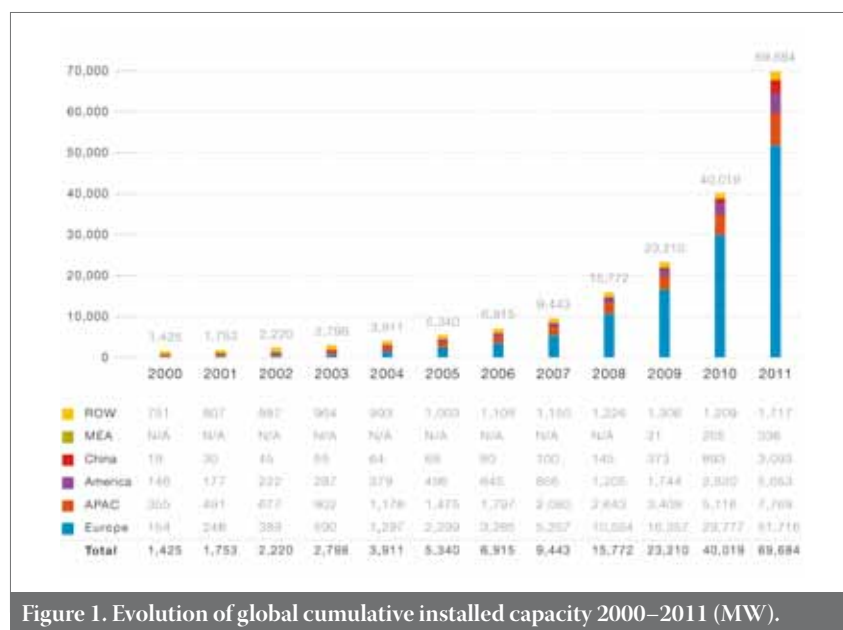


Figure 1. Evolution of global cumulative installed capacity 2000–2011 (MW).

level of the incentives – too much and too quickly. Should the price rise again, this could become a serious issue for market development in several EU countries.

Market growth in Europe and globally

Until now, growth has continued to accelerate, fuelled by the European market development and, in 2011, by development of the markets in China, USA, Japan and Australia. Towards the end of 2009 the world's cumulative installed PV capacity was approaching 23GW (Fig. 1). One year later it exceeded 40GW. By the end of 2011 a cumulative capacity of more than 69GW had been installed globally, which will produce at least 85TWh of electricity every year. This energy volume is sufficient to cover the annual power supply needs of over 20 million European-style households. In terms of globally installed capacity, PV is currently the third most important renewable energy source in Europe, after hydro and wind power. The growth rate of PV during 2011 reached almost 70% – an outstanding level among all renewable technologies.

In terms of global cumulative installed capacity, the EU still leads the way, with more than 51GW installed as of 2011: this represents about 75% of the world's total cumulative PV capacity. Next in the ranking are Japan (5GW) and the USA (4.4GW), followed by China (3.1GW), which reached its first GW during 2011. Many of the markets outside the EU – in particular China, the USA and Japan, but also Australia (1.3GW) and India (0.46GW) – have addressed only a very small part of their enormous potential; several countries from large sunbelt regions such as Africa, the Middle East, Asia and South America are on the brink of starting their PV development. Even so, the cumulative installed capacity outside Europe almost doubled between 2010 and 2011, demonstrating the ongoing rebalancing between the EU and the rest of the world, and reflecting more closely the patterns in electricity consumption.

Growing connections but stable demand in 2011 in Europe

The EU has developed from an annual market of less than 1GW in 2003 to one of over 13GW in 2010 and 21.9GW in 2011 (Fig. 2). Given the difficult economic circumstances and varying levels of opposition to PV in some countries, many expected at best a stabilization of PV markets in 2011 compared to 2010. Looking at the newly connected capacity in 2011, one can consider that the PV market has again exceeded all expectations. However, due to variable delays (depending on the country) in

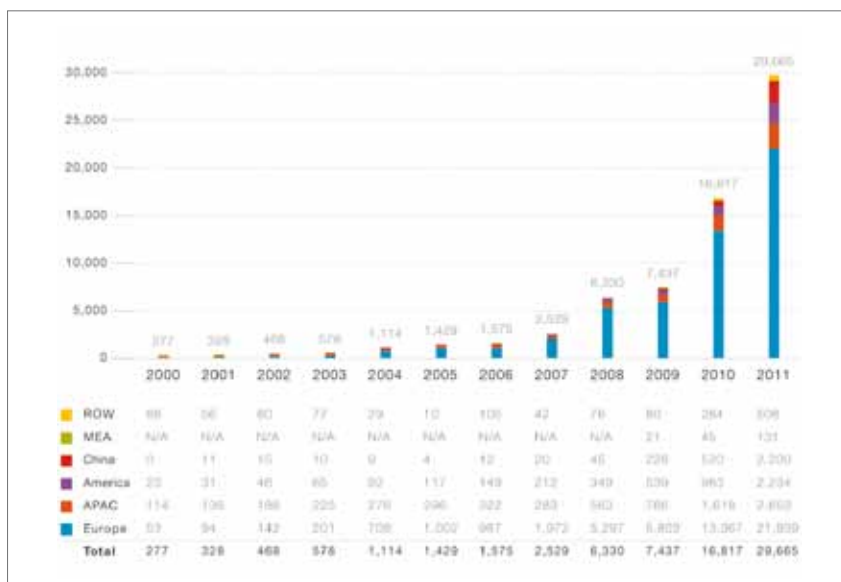


Figure 2. Evolution of global annual installations 2000–2011 (MW).

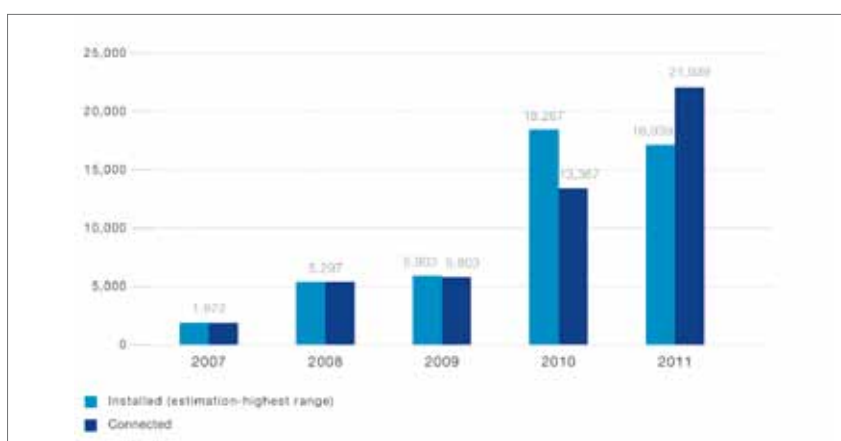


Figure 3. Annual differences between installations and grid-connected systems in Europe (MW).

connecting PV systems to the grid, some installations from 2010 were only connected in 2011. This will be discussed in detail next.

“Italy, in 2011, became the top PV market for the first time, with 9.3GW of newly connected systems.”

As regards systems newly connected to the grid, Italy, in 2011, became the top PV market for the first time, with 9.3GW of newly connected systems after several years of Germany's having led the market (excluding the Spanish episode in 2008). Together, Italy and Germany (7.5GW) accounted for nearly 60% of global market growth during 2011. These two markets were followed by France (1.7GW), Belgium (974MW) and the UK (784MW); the last two countries both showed surprisingly strong growth in 2011. Many other markets have begun to show significant

development: Greece (426MW, despite difficult economic conditions), Slovakia (reaching 321MW), and Bulgaria and Switzerland (with around 100MW each). As a result of constraining policies, Spain disappointed again with 372MW connected.

For several years now, the EU has continued to retain its leadership share of the global PV market, with four markets close to or above the GW mark. Europe's market development is the result of a few countries that have taken the lead year after year, with Germany showing a constant commitment from policymakers to supporting the development of PV.

Installations and connections

While most market reports give installation figures, EPIA reports quote newly grid-connected capacities. The reason for this is simple: there is no reliable methodology for counting installations, and most official bodies report systems connected to the grid. Installation figures are interesting for the PV industry (they describe the demand for PV systems), but

Promising global growth

Outside the EU, China has joined Japan and the USA in the group of countries with more than 1GW of newly installed PV capacity in 2011. India and Thailand could also quickly reach that threshold, but it will take several years before other medium-sized markets achieve the same level of development. There was rapid development in Australia, though its future growth over the short term remains constrained by political decisions.

Regionally, the EU is followed by the Asia-Pacific (APAC) region, which – in addition to Japan and China – includes Korea, Australia, Taiwan and Thailand as existing markets. The third leading region is North America, with Canada developing steadily alongside the USA. Elsewhere, the Middle East and North Africa (MENA) region represents untapped potential for the medium term, with some initiatives in Morocco, Saudi Arabia and the Emirates. PV also shows great potential in South America and Africa, where electricity demands will grow significantly in the coming years.

With 7.7GW installed outside Europe, compared to 3GW in 2010, the expected rebalancing still has some way to go before it will be clearly visible. China, with 2.2GW, took first place among the countries outside of the EU, followed by the USA with 1.8GW and Japan with 1.3GW; all are expected to see continued growth in 2012. Australia expanded rapidly in 2011, with 771MW installed last year. Canada has expanded more slowly than some have expected, achieving 364MW. The potentially strong market in India seems to have finally taken off, with 300MW installed in 2011.

An examination of the total installed capacity reveals greater contrasts. The development of the market outside Europe in recent years has not yet caught up with the existing installations in China, USA, Japan and Australia, but the time is near. Outside Europe, the market is well balanced: three countries with a huge potential lead the pack, followed by an emerging secondary market. Except for the Australian boom in 2011, the market remains under control in most countries. With that potential progressively unleashed, the share of PV installations outside Europe can only increase, rebalancing in the right direction.

Where will new growth occur?

With close to 30GW of PV systems having been added in 2011, the PV market is at the crossroads of its development. The expected growth of markets outside Europe will not compensate for a slowed-down market in Europe before 2016 in the pessimistic 'moderate' scenario. This assumes a negative perspective in most markets in the next five years, especially in Europe.

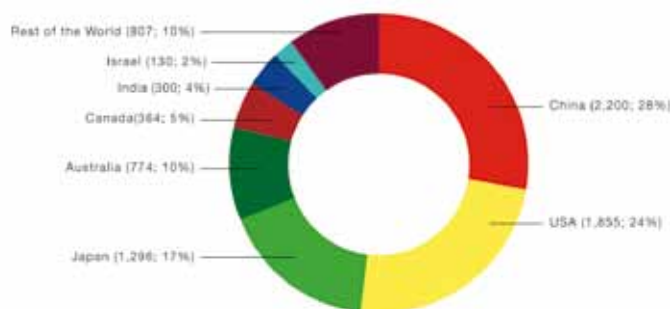


Figure 4. Market share outside Europe for 2011 (MW; %).

grid-connection data are more relevant when considering the increasing share of PV in the electricity mix (and the expenditures in FiTs).

The gap between installations and connections is not new; discrepancies have been noted in France and Belgium in recent years. However, the gap increased significantly in 2010 because of two country-specific situations. The first was in Italy, where the so-called 'Salva Alcoa' decree allowed system owners to receive the 2010 FiT if a system installed in 2010 was connected by June 2011; this led to a rush of installations of nearly 3.5GW by the end of 2010. The second situation occurred in France, where very long delays observed between the end of a project's commissioning and its actual connection by the main grid operator (ERDF) amounted to more than 18 months in some cases. Had those numbers been confirmed, the European demand for PV systems would have shifted up by 5GW in 2010: instead of some 13GW connected in 2010 in Europe, there would have therefore been around 18GW of installations (reflecting the demand for PV systems). In 2011, however, there would then have been only 16.7GW

instead of 21.9GW – completely changing the interpretation of the market evolution during those two years.

In reality the situation is more complex, since installation numbers are difficult to obtain. For example, reports from Italy indicate that a part of those 3.5GW was not really *installed* in 2010, but *reported* as having been installed. And, in Germany, the concept of 'commercial commissioning' of PV systems – which can allow the reporting of systems that are not yet installed or connected – creates another complication in the counting of PV systems. It could be argued that part of the 3GW reported in Germany in December 2011 was not really connected, again lowering the 2011 installation count. The final numbers for 2010 and 2011, then, probably lie somewhere between the number of GWs shipped and the 18GW that were installed in 2010, and (due to the German situation) between 15 and 21.7GW installed in 2011. So, while grid-connected PV capacity rose in 2011, the actual demand for PV remained essentially flat between 2010 and 2011. This explains the reality of the PV market in 2011 better than the growth of connected systems.



Figure 5. Evolution of global annual market scenarios per region (MW).

But what is the likelihood of such a negative evolution in the coming years? Two main drivers must be considered here: 1) the existence of open markets that could absorb a part of the excess supply of PV systems; and 2) the evolution of PV module and system prices. The acceleration of PV module price decreases that were experienced in 2011 comes from a huge imbalance between the high demand (close to 30GW) and an even higher supply (around 50GW). The inability of existing markets to absorb more GWs pushed prices even lower in the early months of 2012. A slower market should trigger new price decreases, at least in the short term, favouring development in markets without regulatory restraints.

Yet for most of the industry, lowering costs is becoming less of an option. Moreover, the number of established markets with growth potential is limited, with more and more of them becoming constrained by registries or caps imposed by policymakers. Further rapid price drops could lead to production plant closures all over the world; in that case, prices would stabilize, with markets progressing less rapidly in Europe than they are today. So this evolution will depend mainly on the evolution of markets in Europe and the ability of policymakers to maintain market conditions at an acceptable level. In the policy-driven scenario, the European market would stabilize at around 20–25GW in the coming years, accompanying the development of markets outside Europe. In that respect, the market could top more than 75GW in 2016, with two-thirds of this coming from new markets outside Europe. These new markets could help ensure a major growth even in 2012, and drive market development in the following years.

Ensuring growth with a declining European market

European markets in which the PV market developed tremendously in the past have reached – at least for the time being – a level that will not be easy to replicate in the

next two years. In addition, the rebalancing of market growth outside Europe that has started will not immediately offset the fading growth within Europe itself. The consequence of this will be that, in the case of a confirmed market decline in Europe, new markets around the world will have to be opened up to drive PV development in the coming decade, just as Europe accounted for it until now.

Many existing markets – in particular China, the USA and Japan, but also India – have addressed only a very small part of their enormous potential for PV development. Moreover, several countries from large sunbelt regions such as Africa, the Middle East, Southeast Asia and South America are on the brink of starting their development, impelled by an increasing awareness of the potential of solar PV. As a whole, the global PV market will be more balanced in the coming years, and will grow more sustainably, driven by competitiveness of PV solutions rather than just by financial support schemes. But this paradigm shift will not happen overnight.

“Sudden, stop-and-start policies can create a boom-and-bust cycle that threatens PV’s growth momentum and moves the competitiveness goal further away.”

Finally, in Europe, the game is not over yet. For now, as long as the Spanish and Czech markets are not growing at all, there are no outstanding contenders to replace Germany and Italy as the two leading European markets. Germany, Belgium, Greece, Italy and the UK will, to varying extents, continue to draw investors. In all, with the right policies in place, there is the potential for around 20 to 25GW in Europe in the coming years. Without these policies, however, the market will collapse to possibly less than 10GW a year. The effects of this

will be felt globally: low demand, companies suffering from low prices, and a negative effect on the global PV industry.

Conclusion

If any general lesson can be learned from the various market analyses, it is this: sudden, stop-and-start policies (making harsh and/or frequent changes in the FiTs, for example) can create a boom-and-bust cycle that threatens PV’s growth momentum and moves the competitiveness goal further away. What is needed is a more measured response to market developments. This balanced approach will lead PV out of the FiT era and into one in which the technology is competitive with all electricity sources, and in which governments continue to support market development in other ways – for example by removing bureaucratic barriers, encouraging innovation and ensuring grid access.

About the Author



Gaëtan Masson is head of EPIA’s business intelligence unit, which is dedicated to studying the market and industry development, and the technology and sustainability impacts of PV. The unit also deals with short- and long-term PV scenarios, grid parity, competitiveness with conventional energy sources and integration of all renewable energies in the electricity sector, as well as contributing to IEA-PVPS task 1. Having a broad experience in the financial sector, including financing tools and markets, Gaëtan holds a master’s degree in engineering from the Université Libre de Bruxelles in Belgium. He also holds master’s degrees in political sciences, in management (from the Solvay Business School) and in environment studies.

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