EPIA market outlook until 2013: a promising future for the PV industry

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ABSTRACT

In 2008, the global PV market reached 5.6GW and the cumulative PV power installed totalled almost 15GW compared to 9GW in 2007. Spain represented almost half of the new installations in 2008 with about 2.5GW, followed by Germany with 1.5GW additional connected systems. USA confirmed its trend with 342MW newly installed PV systems, followed by South Korea which registered 274MW of PV installations over the year. Italy connected almost 260MW while France, Portugal, Belgium and the Czech Republic made good scores confirming Europe's global leadership in the deployment of solar PV energy. A diversification of the market is taking place with countries adopting appropriate support policies.

EPIA's market forecast to 2013

Given the current crisis context, high uncertainties exist regarding the 2009 market. This year, experts believe the market could reach up to 7GW, with each individual country's development influencing the final figure. Spain, in particular, recently changed its support scheme, setting up a cap which will limit the development of the global market in 2009. The PV sector is hoping other markets such as the US, Germany, France and Italy will pull the demand. Favourable policy frameworks are expected to further accelerate PV deployment in these countries. In 2013, the global PV market could reach 22GW if appropriate policies, such as feed-in tariffs, are in place.

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Global historical PV market development

The solar PV market has been booming over the last decade and is forecast to confirm this trend in the coming years. By the end of 2008, the global cumulative PV power installed was approaching 15GW. Today, Europe is leading the way with more than 9GW representing over 65% of the global cumulative PV power installed. Japan (2.1GW) and the US (1.2 GW) are following behind, representing 15% and 8%, respectively.

Global PV market outlook

PV market deployment is, to a large extent, dependent on the political framework of any given country. Support mechanisms are defined in national laws. The introduction, modification or fading out of such support

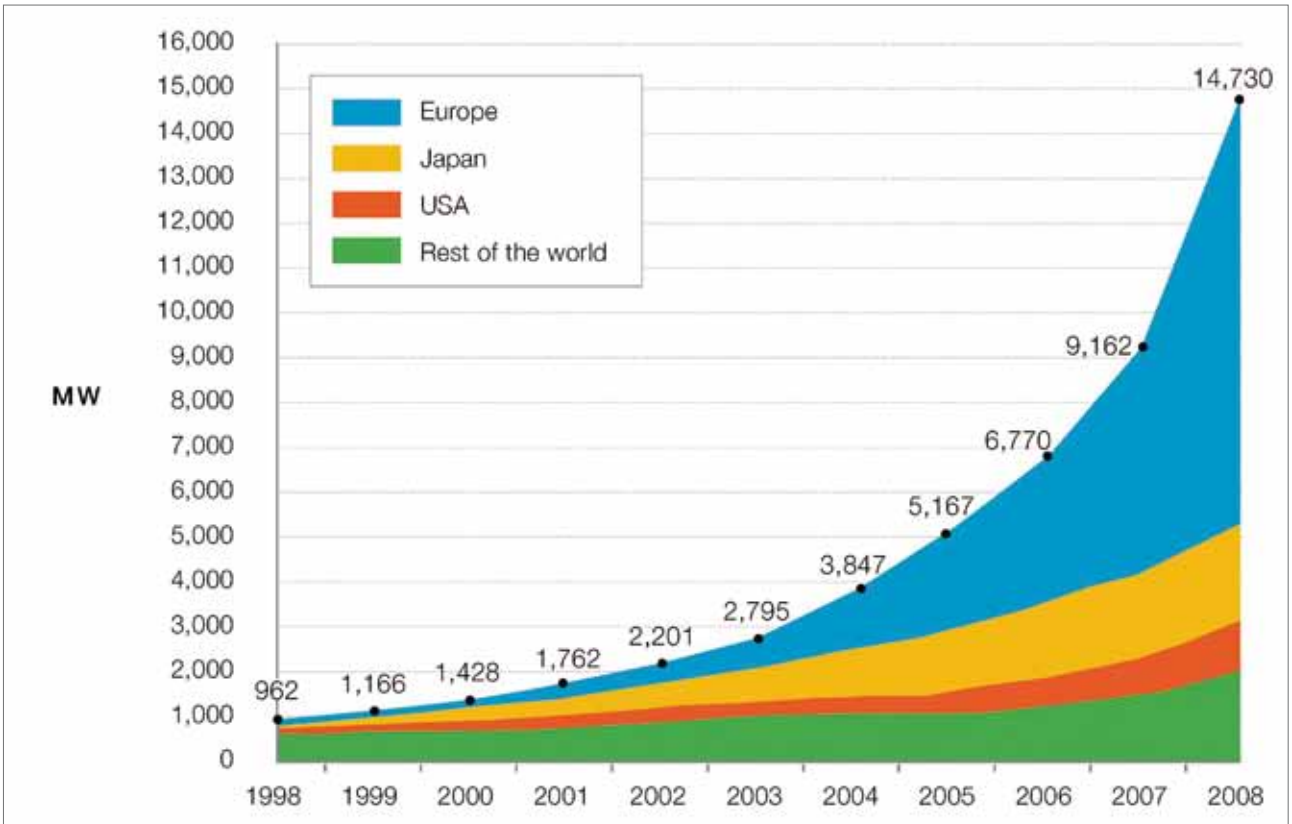


Figure 1. Historical development of global cumulative PV power installed per region.

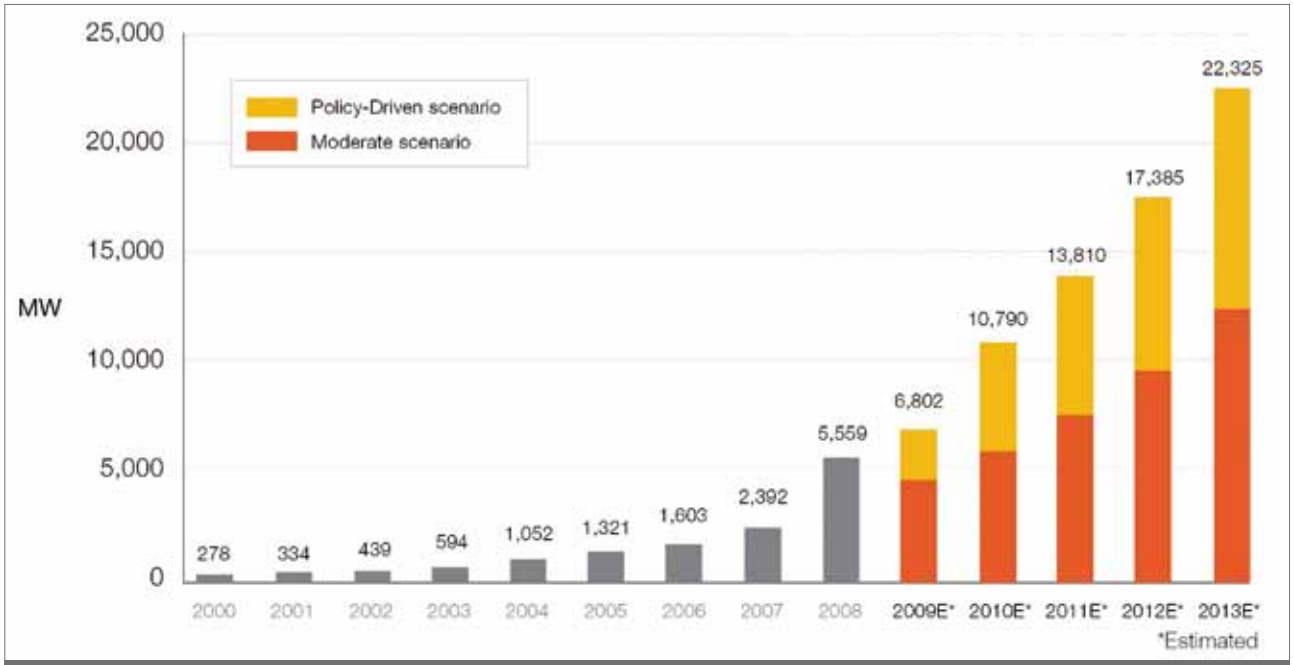


Figure 2. Global annual PV market outlook to 2013.

schemes can have profound consequences on PV industries, requiring that PV market forecasts have a deep understanding of the political framework. EPIA puts a great deal of effort into analysing PV markets. Due to its close contact with key players in the industry, with national PV associations and its knowledge of PV policy and support schemes, EPIA market scenarios are a credible and well-known source of short-term market forecasts as well as long-term scenarios.

In March 2009, EPIA went through an extensive data-gathering exercise among a highly representative sample of the PV industry, national associations and energy agencies. Based on the cross-checking of data and the consolidation of complementary market projection methods, EPIA has derived two representative scenarios for the future development of the PV industry.

The **Moderate scenario** is based on the assumption of a 'business as usual' situation that does not assume any major enforcement of existing support mechanisms.

The **Policy-Driven scenario** is based on the assumption of the follow-up and introduction of support mechanisms, namely feed-in tariffs, in a large number of countries.

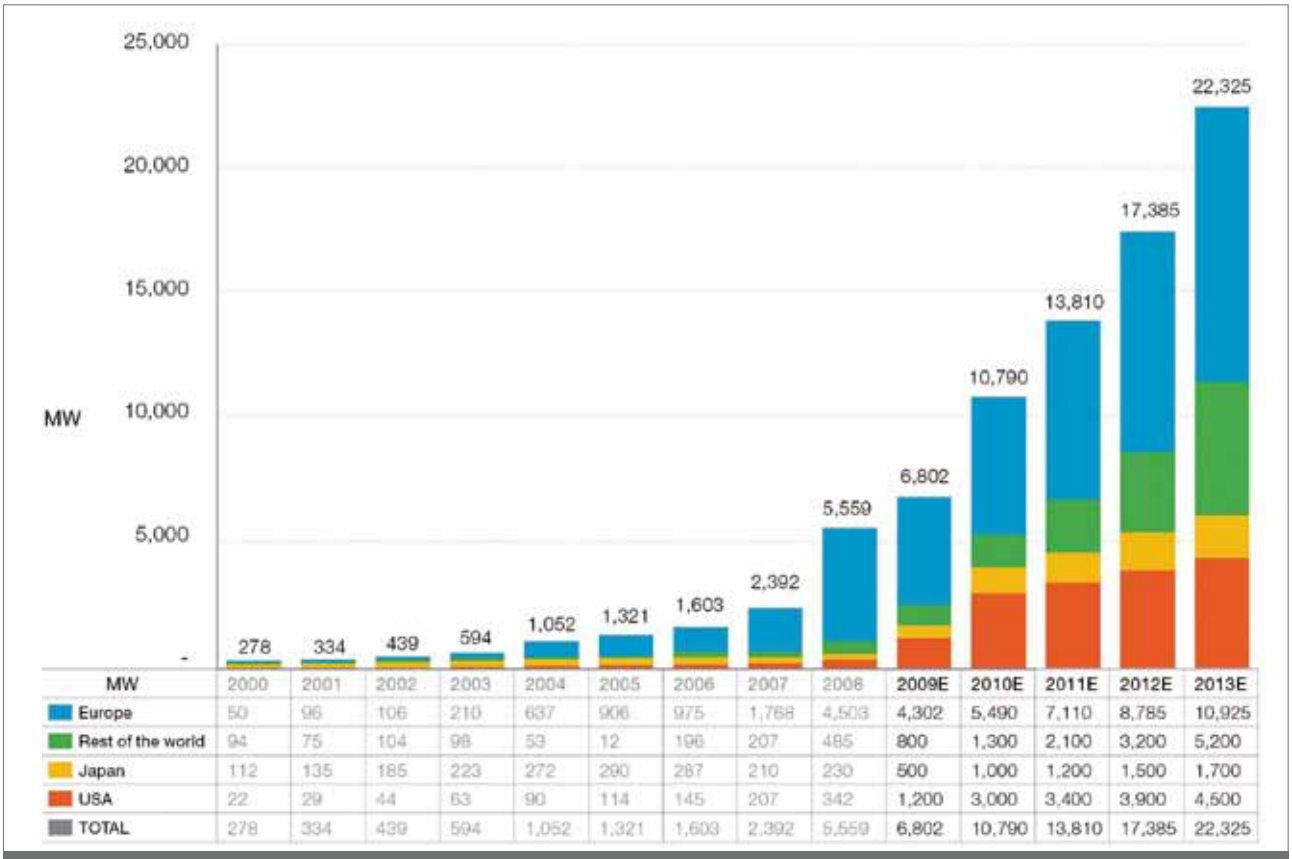
These two scenarios analyse, on a country basis, the historical development of the PV market, existing support policies, their attractiveness and expected developments, administrative procedures in place, national renewable energy objectives and the potential for solar PV.

For 2009, EPIA expects the global PV market to grow to around 6.8GW under the Policy-Driven scenario. Under the Moderate scenario, the anticipation is that the global PV market will stagnate at around 4.6GW.

By 2013, EPIA foresees the market reaching 22GW under the Policy-Driven scenario, which would mean a Compound Annual Growth Rate (CAGR) of 32% from 2008 to 2013. For the Moderate scenario, the annual market is expected to reach just above 12GW with a CAGR of 17% over the period from 2008 to 2013.

Country	Type	2006	2007	2008	2009E	2010E	2011E	2012E	2013E
Belgium	EPIA Moderate	2	18	48	100	70	80	90	100
	EPIA Policy-Driven				175	125	130	140	160
Czech Republic	EPIA Moderate	0	3	51	80	90	110	140	170
	EPIA Policy-Driven				100	160	200	220	240
France	EPIA Moderate	6	11	46	250	340	600	900	1,000
	EPIA Policy-Driven				300	500	650	1,200	1,400
Germany	EPIA Moderate	850	1,100	1,500	2,000	2,000	2,300	2,600	3,000
	EPIA Policy-Driven				2,500	2,600	3,200	3,600	4,000
Greece	EPIA Moderate	1	2	11	35	100	100	100	100
	EPIA Policy-Driven				52	200	450	700	900
Italy	EPIA Moderate	13	42	258	400	600	750	950	1,250
	EPIA Policy-Driven				500	800	1,100	1,400	1,600
Portugal	EPIA Moderate	0	14	50	40	50	100	160	230
	EPIA Policy-Driven				50	80	180	350	500
Spain	EPIA Moderate	88	560	2,511	375	500	500	650	800
	EPIA Policy-Driven				375	500	600	650	1,500
Rest of Europe	EPIA Moderate	12	17	28	120	140	200	300	450
	EPIA Policy-Driven				250	325	400	525	625
Japan	EPIA Moderate	287	210	230	400	500	700	1,000	1,100
	EPIA Policy-Driven				500	1,000	1,200	1,500	1,700
USA	EPIA Moderate	145	207	342	340	1,000	1,200	1,500	2,000
	EPIA Policy-Driven				1,200	3,000	3,400	3,900	4,500
China	EPIA Moderate	12	20	45	80	100	300	600	1,000
	EPIA Policy-Driven				100	150	600	1,200	2,000
India	EPIA Moderate	12	20	40	50	60	80	120	300
	EPIA Policy-Driven				100	200	250	300	600
South Korea	EPIA Moderate	20	43	274	100	150	220	300	400
	EPIA Policy-Driven				200	350	450	700	1,000
Rest of the world	EPIA Moderate	153	125	126	250	300	300	300	350
	EPIA Policy-Driven				400	600	900	1,000	1,600
TOTAL	EPIA Moderate	1,603	2,392	5,559	4,620	6,000	7,540	9,610	12,250
	EPIA Policy-Driven				6,802	10,790	13,810	17,385	22,325

Table 1. Global annual PV market outlook to 2013 (MW).



MW	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009E	2010E	2011E	2012E	2013E
Europe	50	96	106	210	637	906	975	1,768	4,503	4,302	5,490	7,110	8,785	10,925
Rest of the world	94	75	104	98	53	12	196	207	485	800	1,300	2,100	3,200	5,200
Japan	112	135	185	223	272	290	287	210	230	500	1,000	1,200	1,500	1,700
USA	22	29	44	63	90	114	145	207	342	1,200	3,000	3,400	3,900	4,500
TOTAL	278	334	439	594	1,052	1,321	1,603	2,392	5,559	6,802	10,790	13,810	17,385	22,325

Figure 3. Global annual PV market outlook by region (Policy-Driven scenario).

Regional distribution of global PV markets

Considering the regional distribution of the global market outlook under the Policy-Driven scenario, EPIA foresees the EU PV market to grow from 4.5GW in 2008 to 11GW by 2013; US from 0.3GW to 4.5GW; Japan from 0.23GW to 1.7GW and the rest of the world (including China and South Korea) to grow from 0.5GW to more than 5GW by 2013.

Europe: the global PV market leader

Since 2004, Europe has been leading the global market for PV applications. In 2008, Europe represented over 80% of the global PV market. Among European countries, Germany has been leading the way for several years, but 2008 saw Spain take over the number one position worldwide with around 45% of the global market and 56% of the EU market.

Numerous countries are developing excellent support schemes for PV, of which Italy and France are emerging as the new high-potential markets. Some, such as the Czech Republic, Belgium, Bulgaria, Portugal and Greece, are following with promising support schemes.

In its Policy-Driven forecast for Europe, EPIA expects Germany to remain as the major PV market in Europe with increasing participation from France and Italy. If the cap is removed in Spain, EPIA expects these four countries to represent more than 75% of the European market by 2013.

Production capacity outlook

According to a survey conducted among EPIA members, production capacities along the PV value chain are expected to grow with a CAGR of 20% to 30% in the short-term (during the period 2009-2013).

> "Over the last three years, established polysilicon producers have more than doubled their total production capacity."

It is important to note that 'end-of-year production capacities' along the value chain (from silicon to modules) are always larger than actual production and much larger than installed systems in the field. This is because, firstly, a considerable part of the capacity is added during the year while capacities are always stated as end-of-year capacities. Secondly, as capacities are often stated by assuming a 365-day 24-hour operation, maintenance periods and periods of lower capacity usage have to be considered when comparing actual production and capacity figures. Thirdly, one should consider the delay (up to several weeks) between the production of the modules and their effective installation in the field.

Due to a strong continuous growth of the global PV market, as well as the slower process for establishing new silicon production facilities than for downstream processes in the supply chain, polysilicon supply has represented the main bottleneck of the PV industry since 2005. Over the last three years, established polysilicon producers have more than doubled their total production capacity and many new players have entered the polysilicon business. Due to this impressive increase in polysilicon production, EPIA expects the silicon shortage to end most probably by the end of 2009 or beginning of 2010.

Ramping-up processes for wafer, cell and module production is much faster than for polysilicon, which explains why the difference between cell and polysilicon capacities was relatively high in the past and is expected to narrow in the near future. Upstream processes like polysilicon production are characterised by a higher concentration of actors due to the high level of investments, and by a lower flexibility of equipment than downstream processes (cell or module production), characterised by a large number of actors due to the limited level of investment and a higher flexibility to adapt to the demand. As a result, utilisation rates in upstream processes are generally higher than in downstream processes.

This polysilicon shortage, which has limited the growth of crystalline technologies in the last few years, has offered a great opportunity for the PV thin-film industry to grow and establish

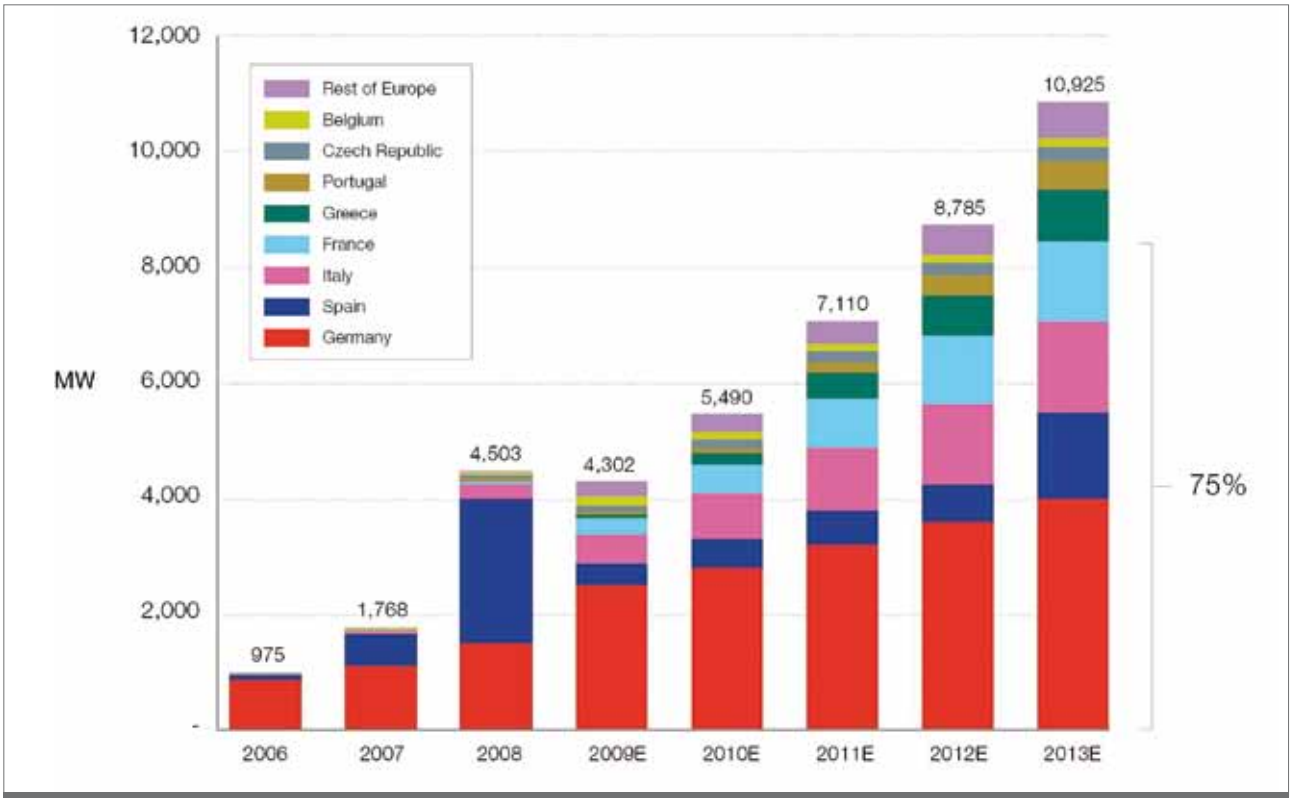


Figure 4. European annual PV market outlook to 2013 (Policy-Driven scenario).

thin film as a major PV technology solution. Whereas thin-film shares represented less than 5% of the total production capacity in 2005 with around 90MW, these shares will reach more than 20% in 2010 with little more than 4GW, and will represent around 25% in 2013 with about 9GW.

Global outlook: production capacity meets demand

As outlined earlier, effective module production during the year is lower than the module production capacity expressed at the end of the year. Comparing the expected module production with the expected demand, EPIA foresees that the PV industry is prepared to deliver large quantities (GW-scale) of modules and to follow the future PV demand in the short-term.

Nevertheless, these results should be handled with care as investments in new production capacities will only take place if the PV demand increases as expected by the industry. This supposes, among others factors, the putting in place of appropriate policy frameworks for PV, low administrative barriers and easy procedures to connect PV to the grid.

With an end to the polysilicon shortage in sight, EPIA expects that module prices will fall back on their historical learning curve which showed over the last three decades a 20% module price reduction each time the cumulative PV power installed was doubled. The first signs of this price decrease have become visible during the first quarter of 2009. If the module price decrease is passed on to the final customer and leads to a decrease in PV system prices (which is not always the case today in every market), the generation cost (€/kWh) of PV electricity will compete sooner with conventional retail electricity prices from the grid. If grid parity (the point at which the generation cost of PV electricity equals the retail price of electricity) is reached sooner, EPIA believes that the global PV market will grow even faster than expected in its Policy-Driven scenario and that the PV industry will be able to grow accordingly.

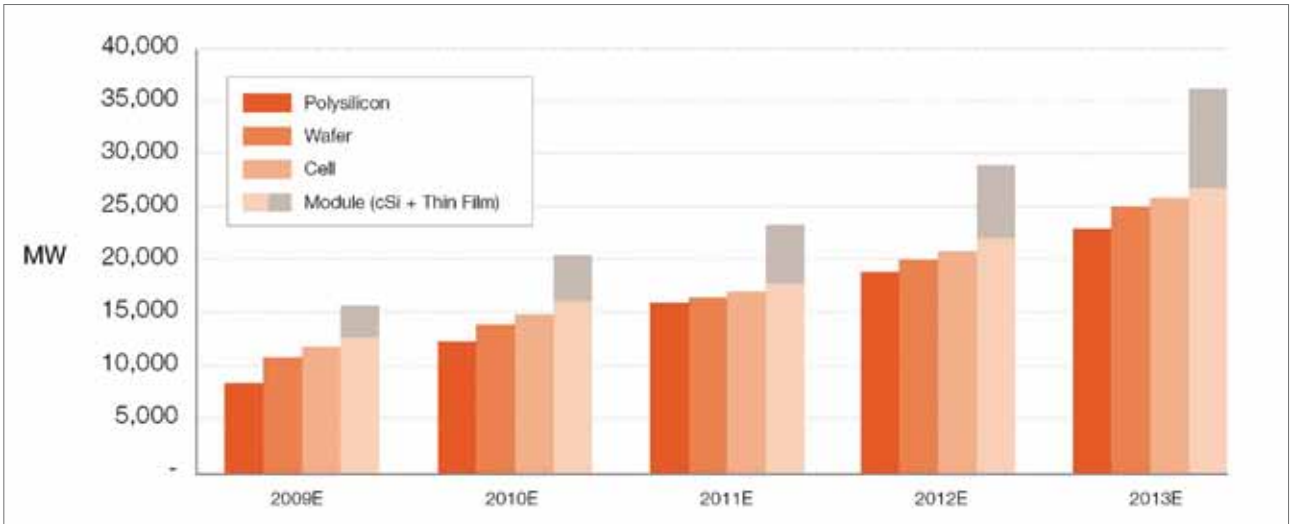


Figure 5. Production capacity outlook to 2013.

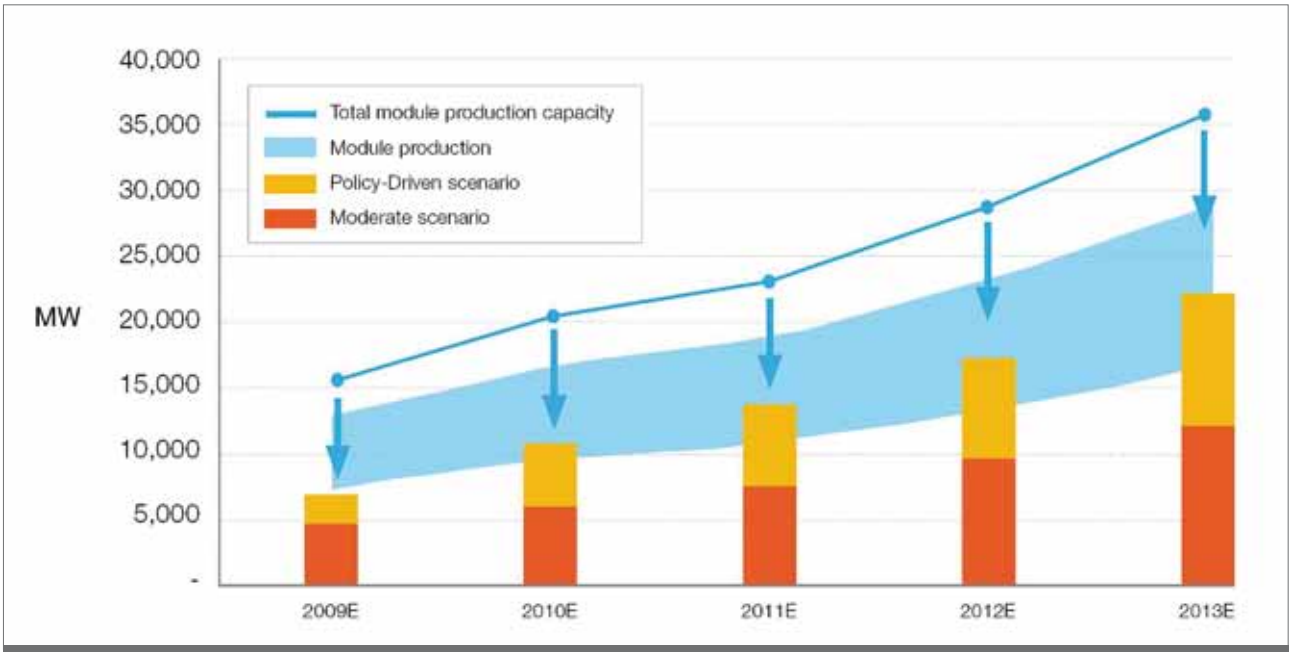


Figure 6. Global outlook – production capacity vs. market.

Further growth for the PV industry

Like all industries, the solar PV sector has not been spared by the credit crunch. Medium- to large-scale PV plants are taking longer to be financed than ever before. However, the fundamentals of the PV sector remain intact, if not better than before, considering the price decrease of PV modules of between 10% and 20% since the beginning of 2009.

Finance availability – a major growth factor

Given the current world uncertainties, all banks have strongly reduced their credit loans and the solar PV sector is no exception to this trend. Project financing thus appears as a challenge for the industry; while obtaining debt financing in 2008 required about a four-week wait, today it takes eight to 10 weeks, on average.

The perceived risk is higher, fewer banks are engaged and these lenders prefer to consider smaller projects (less than €50 million), if any. PV pricing is crucial, as the lending situation differs in most countries. Technology leaders and companies that are capable of reducing their prices will likely be the most successful in this situation. Experts also confirm that high-quality PV projects meeting all legal requirements, from the planning to the operating phase, will be financed.

Financing is possible, but project promoters need to be realistic. Investors are very selective due to the low finance availability, but they still see PV as an excellent sector for investment, both in PV projects and PV companies.

A reliable, calculable and low-risk investment

Given the government support programmes (mainly in the form of feed-in tariffs) providing investor security in the long-term and warranties from module manufacturers, solar PV represents a low-risk investment. It is a proven technology with a module lifetime well above thirty years, based on the 20-25-year warranty given, whereas the economic payback time of the investment is generally from eight to twelve years. As we know how much energy we produce for at least a 25-year period, we know how much we will receive from the feed-in tariff and can calculate our revenues over this period.

PV modules back on the learning curve

Due to the polysilicon shortage, PV has been above its historical price experience curve over the last three to four years. Seeing a major increase in polysilicon production, average polysilicon prices have decreased significantly and are driving general costs for silicon-based technologies downward.

In addition to this, the industry has unanimously recognised the module oversupply situation in today's PV market. As a result, module prices have dropped by 10% to 20% since the beginning of the year – very good news for the PV sector in general, and an indicator that PV technology is now back on its learning curve.

Conclusion: a strong commitment from the industry

The PV industry hopes finance availability will improve in the coming months. In any case, PV fundamentals remain strong and the industry is committed to accelerating price decreases. We can also look forward to further penetration of the existing PV markets and an accelerated market development in new and emerging PV markets. In this context, the European PV industry has unanimously agreed that photovoltaic energy could provide up to 12% of European electricity demand by 2020 if important boundary conditions in the way electricity is used in households and effective storage can be provided, and is strongly committed to becoming a significant energy supplier in Europe.

With this commitment and under the right framework conditions, it is possible to reduce PV generation costs by 8% every year, or a decrease of 50% every eight years. Investors can easily keep confidence with the solar photovoltaic technology.

About the Author

Denis Thomas is the Economist for the European Photovoltaic Industry Association in Brussels, Belgium. Before joining the association in September 2008, he worked for two years for Energie Facteur 4 as a photovoltaic expert for the Walloon Region (Belgium). He holds an M.B.A. from HEC Liège (Belgium) and a European Master's degree in renewable energy from the Carl von Ossietzky University of Oldenburg, Germany and from the University of Zaragoza, Spain.

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