The global PV market: fasten your seatbelts

Analyses of market demand to 2010

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This report, created by SolarPlaza, looks at the developments in the worldwide PV market. It is merely an attempt to comprehend the developments in the PV market and industry, to outline the likely consequences, and, where possible, to quantify what could happen if SolarPlaza's analysis is correct. If the source is quoted, extracts from this report may be used and copied.

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Introduction

Oversupply will start new and dynamic phase in rapidly growing solar industry

The worldwide market for solar (PV) energy and the PV industry itself have grown substantially in 2007 and early 2008. However, growth in the production of solar panels appears to have outpaced growth in the demand side of the market. This could lead to an oversupply situation. Growth in the worldwide demand for solar panels is still entirely dependent on, and limited by, local subsidy programmes. In various countries new subsidy programmes are commencing, but in the largest markets contributions are being cut back. 2008 could therefore be a turning point and a crucial year for the development of the international PV market and industry.

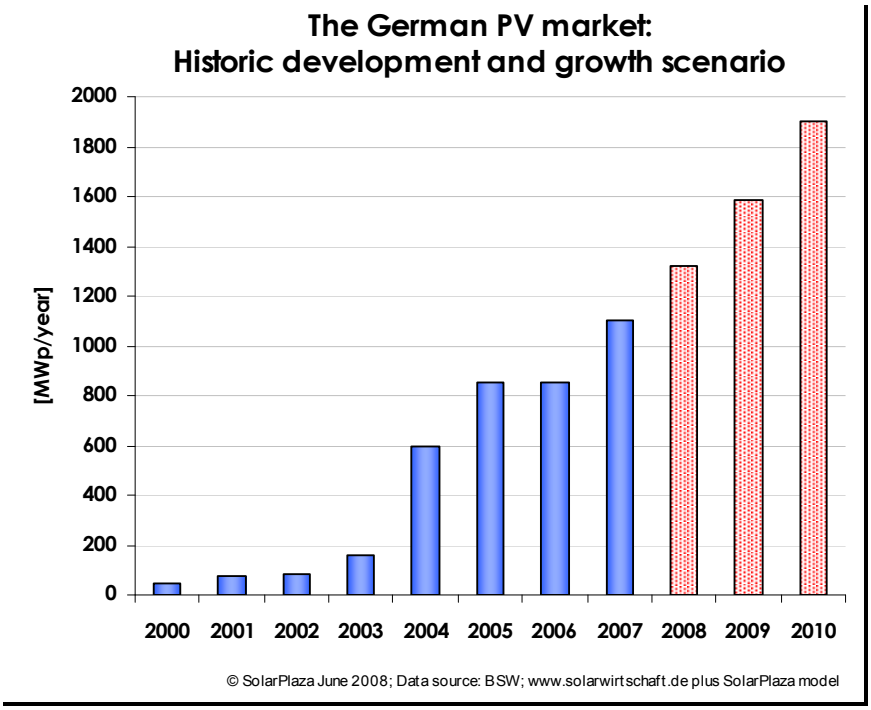
The current developments look like the famous 'hog cycle' scenario: the rapidly growing (world) market has attracted many new producers. This could create an oversupply situation, leading to falling prices and margins. This would lead to consolidation in the market and further expansion. Therefore, a surplus supply of solar panels in the next few years to 2010 could lead to considerable price reductions and a consolidation in the PV industry.

This makes the next few years a crucial period, but also a prelude to a new era after 2010, in which grid parity will be reached in a growing number of market segments. This means that the cost per kWh of solar power for private individuals, for example, will be competitive with kWh from the grid. From that moment on, the PV industry will be heading towards rapidly growing demand once again, which will no longer be dependent on and limited by subsidy programmes. This could lead to unprecedented growth opportunities for the PV industry and perhaps even an undersupply situation.

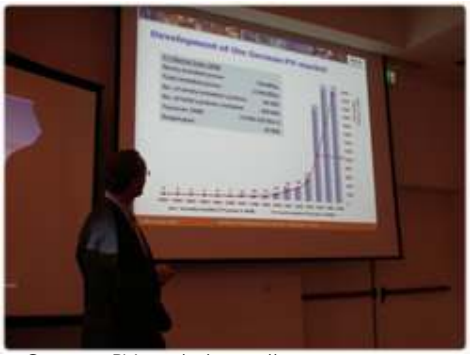
Chapter I. The demand side in the largest PV markets

The German PV market continues to grow

The German PV market, with a share of just under 50% in 2007, is still the largest market for solar panels. This success is a result of the German incentive model, based on the 'feed-in tariff' system. For every kilowatt hour produced by a solar power system, the energy company pays a cost-covering fee. The costs are covered by a small surcharge on the kilowatt hours that all German users buy from the energy company. This model has ensured continuous, strong growth in the German PV market and PV industry. Germany now has an infrastructure of more than 1500 companies involved in PV, from large industrial producers to specialised installers. Over the last few years the feed-in tariff level has been reduced by 5%. In spite of this, the market has continued to grow fairly steadily. In 2009 and beyond, the feed-in tariff will be reduced again, but this time by 8% to 9%. In the past, the steadily falling feed-in tariff has not been an obstacle to continued market growth. Cost reduction programmes by the industry have contributed to the expansion. The trend in Germany is that the industry has continued to counterbalance the reductions in the feed-in tariff with price adjustments, in a growing market.



The German solar energy industry association spoke at the SolarPlaza Global PV Demand Conference in Milan (September 2007) of an anticipated market growth of around 20% for the next few years. This means that the size of the German PV market in 2010 will come out at just under 2 Gigawatts per year. Other reputable sources predict even higher sales.

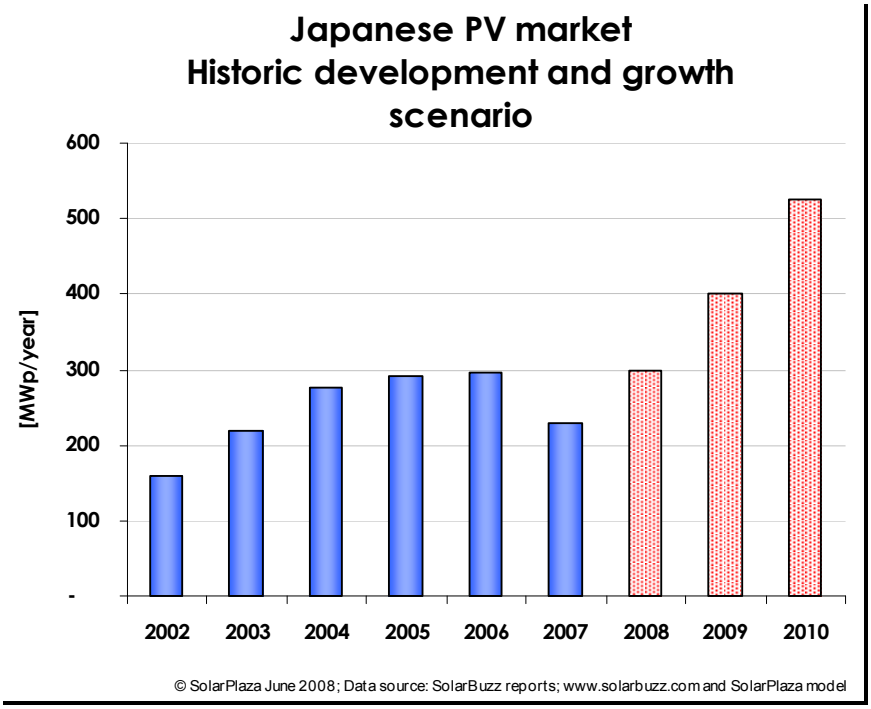


German PV market growth

The continuity of the feed-in tariff has led to trust among consumers and industry and resulted in an extensive infrastructure of producers, system houses, installers and knowledge institutes. Stable further growth may be expected because: 1) a continuation of the feed-in tariff system inspires considerable trust among investors and purchasers; 2) the infrastructure of businesses and knowledge continues to grow (also through growth outside Germany); and 3) German PV companies are still reporting healthy profits with room for price adjustments. Moreover, overseas producers and suppliers cannot ignore the relatively large German market. On the one hand, selling parties will want to protect their margins by not adjusting prices too much, and on the other hand potential purchasers will see the payback time increase. SolarPlaza therefore anticipates that the substantially reduced feed-in tariff will not deliver accelerated growth in 2008 and 2009 if the prices of modules and systems do not fall substantially.

Moderate growth market in Japan

According to the renowned consultants and market research analysts at the SolarBuzz corp. in America, in 2006 the PV market in Japan barely grew at all and even fell in 2007. Thus Japan represents approx. 8% of the world market.



On the one hand this is a result of the discontinuation of a national subsidy scheme, such as the successful programme that ended in 2005. On the other hand, the more profitable markets in Europe acted as a pull factor for the Japanese PV industry. The Japanese PV industry focused more on exports, compromising the availability of cheap modules for the home market. So long as there are more attractive markets elsewhere in the world and the supply of solar panels cannot keep pace with demand, the Japanese market will not experience major growth – particularly if it is difficult to import foreign products into the Japanese market. Japan depends on the importation of energy sources and therefore rising energy prices will stimulate market demand. The supply of solar panels will increase substantially (see further on in this report) through the strong growth in production capacity worldwide. There are also signs of a new incentive scheme for PV systems. SolarPlaza anticipates an improving PV market for the next few years, albeit with limited growth, despite the fact that in this market a relatively limited price reduction is needed to compete with the high electricity prices. A dramatic change in the unsubsidised Japanese market is not anticipated, but moderate growth of 20-30% is a possibility.

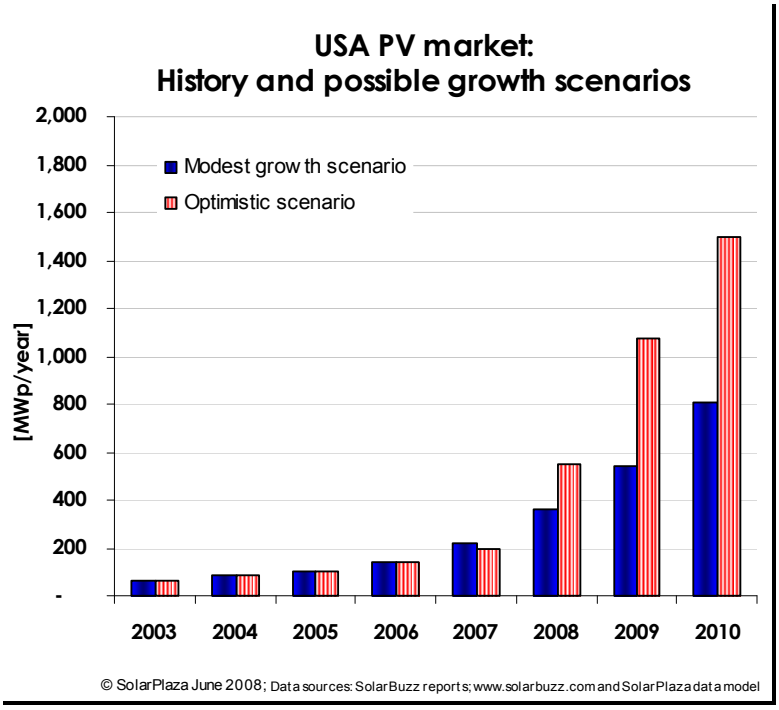
Roof integrated PV in Japan

The huge growth potential in America

Growth in the American market is dominated by subsidy programmes in New Jersey and California. Both programmes are limited in total scope and/or per year. In the other states, programmes have been commenced via obligations upon energy companies. They need to sustainably generate or purchase a percentage of the energy sold. In some states they have even incorporated a percentage specifically for solar energy. From the figures it appears that the market in California did indeed grow by around 50% in 2007, but in absolute terms this is still a market approximately five times smaller than the German market. Over the next few years the growth of the Californian market will be determined and limited by the stages in the California Solar Initiative (CSI Program) and the federal tax credit. The federal tax credit expires at the end of 2008. As yet there is still no clarity about 2009. At present, midway through 2008, this is already leading to restraint on the part of investors. With elections coming up as well, there is no certainty as to whether and how the tax credit system will be extended. The American Solar Industry Association is proposing an extension for several years, which would create a stable climate for investors and the industry. The PPA model (Power Purchase Agreements), which is popular in the USA, is particularly dependent on this tax credit for PV. Should the new government in 2009 decide upon an extension or expansion of the tax credit system, this will have a visible effect in mid to late 2009: a substantial increase in market demand.

San Francisco, California

In various states new incentive schemes are starting in 2008, but the result of this is a small absolute market size (<20 MW/year). Even relatively explosive growth in these states will lead, in absolute terms, to a negligible contribution to world market demand (<1%). In the absence of clarity on the short- and long-term support from government, Solarplaza does not anticipate spectacular growth in market demand in the USA as a whole. A forecast is presented in the graph below, based on growth of 50% a year between 2008 and 2010. This should result in an absolute market size of approx. 800 MWp per year before 2010. In more optimistic scenarios, based on almost 100% growth year on year, this figure could rise to approximately 1500 MWp in 2010.



Germany and Spain have shown that a stable and secure scheme leads to spectacular growth figures of more than 100% per year. The new government could, with a continuing tax credit or other scheme, if secured for several years, bring about accelerated growth in the American market. America could then become the world's largest market for PV panels and systems.

Spain plays crucial role in worldwide growth scenarios

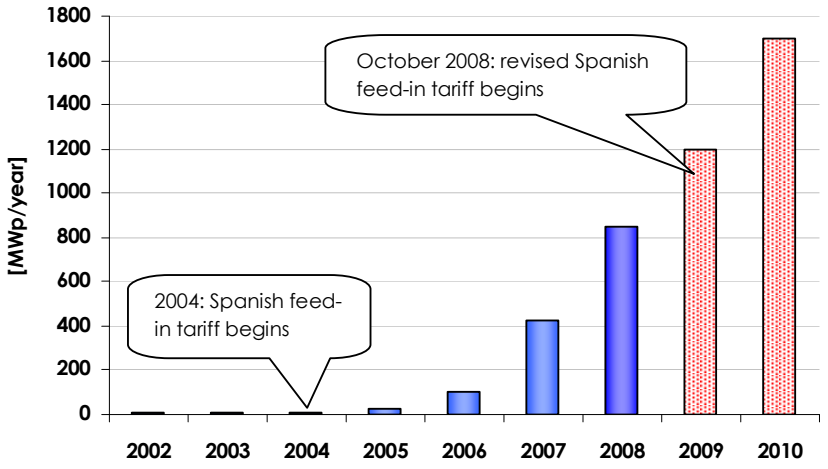
In 2007 the Spanish market experienced spectacular growth of approx. 300% to approx. 426 MWp of new installed PV capacity. The attractive feed-in tariff has enticed many large (international) investors to Spain and resulted in many new *huertas solares* – solar power parks of a few megawatts.

'Huertas solares' or solar power parks in Spain

Further strong growth is anticipated until 28 September 2008, when the current scheme ends. Up to that date, PV developers will be making every effort to continue connecting large ground-based PV projects to the grid, in order to obtain maximum benefit from the current favourable feed-in tariff. What will become of the new feed-in tariff after September is still uncertain. The elections on 9 March have provided support for the incumbent government, but have not yet led to clarity. Various sources mention figures ranging from €0.30 to the current level of €0.44/kWh. The drop to €0.30/kWh would mean a decline of 32%. Even more important than the amount of the feed-in tariff is the new ceiling for desired market growth. The most recent proposal under discussion even included a 300 MWp cap per year – a figure substantially below the installed power in 2008.

Since February 2008 Spanish banks have already been exercising restraint in granting credit for new PV projects. The current uncertainty about what is going to happen means that at present no new projects are being financed, or consequently built, in the period directly after 28 September 2008. Therefore, module orders for this period are also still being postponed. With the summer holidays around the corner, any announcement of the new scheme is highly unlikely. It is more likely that a new scheme will be announced in September. A new flow of project initiatives, as well as module orders, will therefore not be forthcoming until late 2008/early 2009. With possible price drops on the horizon, there could be limited new module orders in the short term.

The Spanish PV market: history and possible (optimistic) growth scenario



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This means that the Spanish government plays a crucial role in the development of the worldwide PV market: the Spanish market will account for approx. 22% of the world market in 2008. If this market falls temporarily 'quiet', or if an attractive new scheme does not follow for 2009-2010, this could have major consequences for the worldwide demand for modules. The new scheme in Spain is therefore also decisive for the worldwide price development of modules.

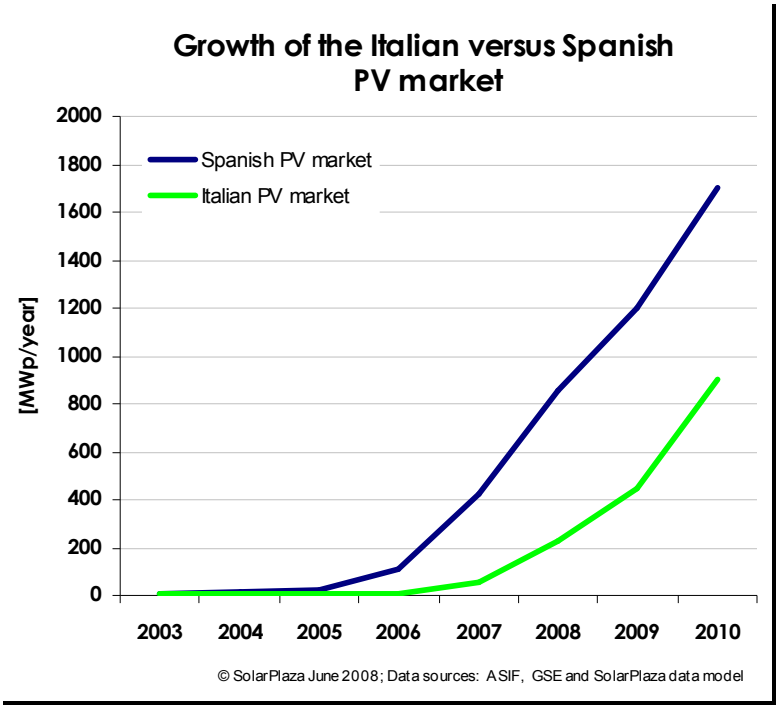
Italy: an important new market in Europe

A definite growth market for the next few years is Italy. Not only does the country have attractive feed-in tariffs for solar power, but the market cap has also been provisionally set at 1200 MWp. With approx. 60 MWp of new installed capacity in 2007 and a cumulative installed capacity of approx. 50 MWp, this market offers room for massive growth. The development of the Italian market appears to be very much like that of Spain, albeit with one to two years' 'delay'. Italy is therefore currently receiving plenty of attention from module producers and international investors. Explosive market growth of 100% or more, as happened in Spain in 2006 and 2007, is within the realms of expectation for 2008. Italian companies and stakeholder organisations are allowing for a growth in demand of up to 150-200 MWp in 2008, which translates into approx. 6% of the total anticipated worldwide market demand in 2008 of approx. 3,800 MWp.

The growth of the market in Italy could nevertheless turn out to be lower than the substantial growth Spain experienced in the early years. The feed-in tariff for large PV parks in Italy is lower than in Spain. Only in the south, therefore, is it truly financially attractive to develop large parks, where sunlight is comparable with larger parts of

solar power parks in Italy

Spain. In southern Italy, however, the problem of securing projects also plays a key role. The provinces are not all on a par when it comes to the granting of licences and the speed at which projects can be connected to the grid. At present the development of large-scale projects is particularly concentrated in the Puglia region, while in Spain a much larger area was and still is involved.



New emerging markets

Other markets with excellent growth perspectives are South Korea, France and Greece, and also relatively smaller markets like Belgium, the Czech Republic, the Netherlands and Portugal. The first three in particular may well experience 50-100% growth in 2008 and 2009. The Korean market could grow to 50 MWp in 2008, while France could even exceed this. The contribution of these markets to worldwide demand in 2008 will amount to 1-2% per country. The growth of these markets is limited or has to do with (substantially) falling feed-in tariffs in 2009.

There is still much uncertainty about the Greek market. However, a volume of 50 MWp in 2008 already seems difficult to achieve. This translates into a contribution of

just over 1% of global sales. The PV industry association HELAPCO anticipates that the market size in 2009 will grow in the direction of 100 MW.

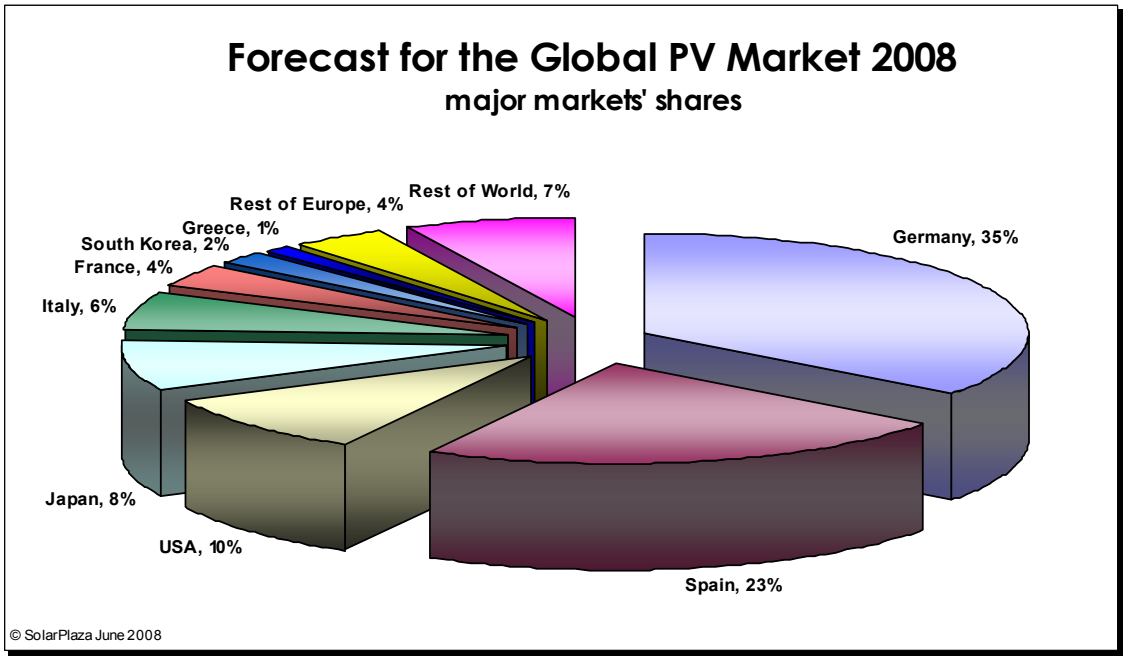
In South Korea the feed-in tariff for major projects will fall in 2009 by 30%. The budget of 100 MWp for the current high feed-in tariff has recently been exceeded and therefore, from October, a new reduced feed-in tariff will come into force for PV systems. Accordingly, for 2009 and the years thereafter, the Korean market is expected to see less spectacular growth.

And in the Czech Republic, which at present in 2008 is experiencing exceptional growth to 20 MWp or even more of new installed PV capacity, this year the tariff for 2009 is being adjusted downwards.

Emerging markets: solar power parks in France, South Korea, Czech Republic, Canada, ….

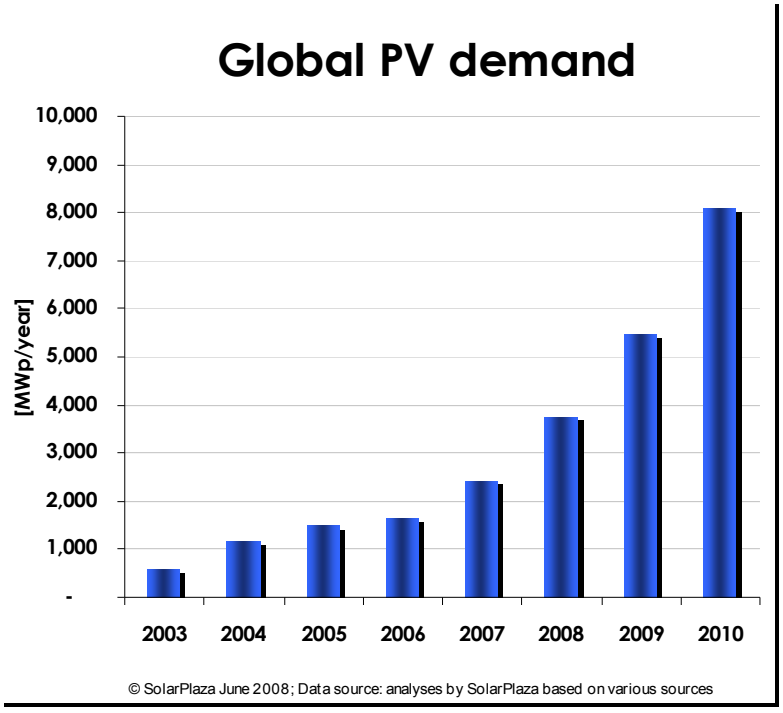
The feed-in tariff for large solar parks in France is, at €0.30/kWh, around 30% lower than in Spain, while there is also substantially less sunlight. In the built environment the feed-in tariffs are much higher, but the limiting factor is that the highest tariff is only available for PV systems that are completely roof-integrated. France's share of global sales of PV systems is approx. 3-4% in 2008 and looks to be very healthy for the long term.

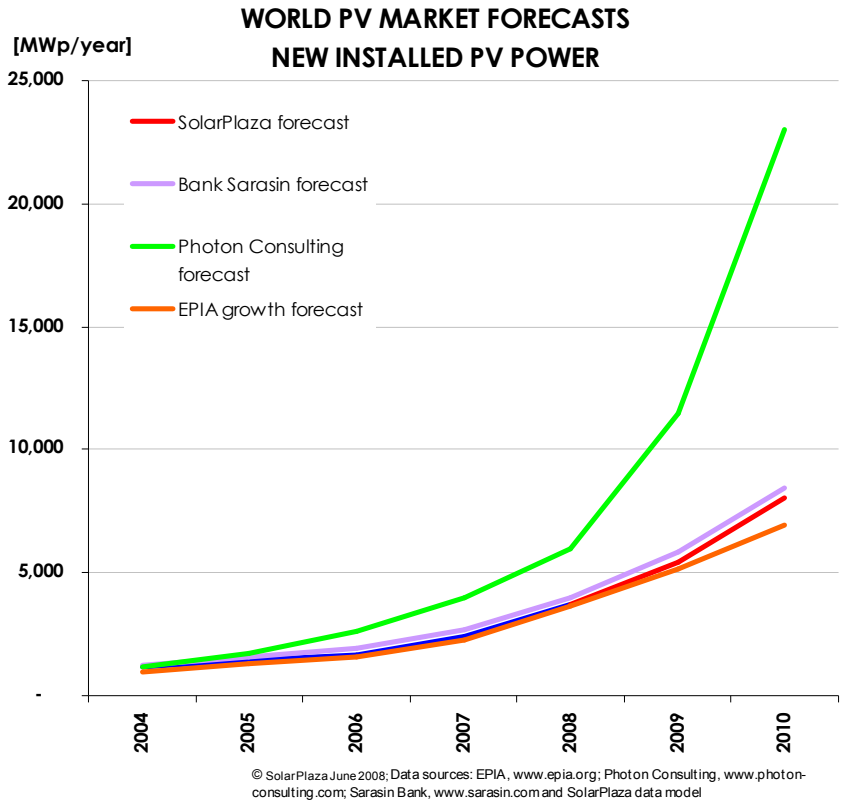
The impact of the other emerging markets is even smaller, but there are various promising markets nevertheless, like Canada and India. All these markets have one thing in common: they are all entirely dependent on incentive schemes set up by the government. The growth of the world market therefore, for the next few years until 2010, remains limited by available budgets in the form of subsidies or feed-in tariffs. Excessive growth, as in Spain over the last two years, leads to accelerated budget depletion or the attainment of the objective, and then automatically to the adjustment or cancellation of the scheme. The ceiling of the scheme (market cap) then determines the growth opportunities. In California, market growth is restricted by the inbuilt reduction of the investment subsidy as soon as a landmark in MWp is reached. The Spanish market grew in 2007 by some 300%, but the original objective of 400 MWp prior to 2010 was reached more quickly (in 2007) and now there is uncertainty about what, less attractive, scheme is coming next. Spectacular growth in certain markets – and within a short space of time – is therefore highly likely, but will be automatically restricted by the total budget or ceiling of the scheme. Therefore, SolarPlaza anticipates that non of the above markets will take a major share of the global PV demand in the coming 3 years.



The market segments that are not dependent on subsidies, such as autonomous applications, still only represent an extremely small portion of the world market. Only a substantial reduction in the price of modules could create new markets that are independent of government contributions.

Based on the forecasts for the major markets described above, and other data from its global demand model, SolarPlaza has calculated a possible growth scenario for global demand. SolarPlaza anticipates worldwide market growth of between 30% and 45% for 2008, 2009 and 2010. This would represent spectacular growth for this still young industry.



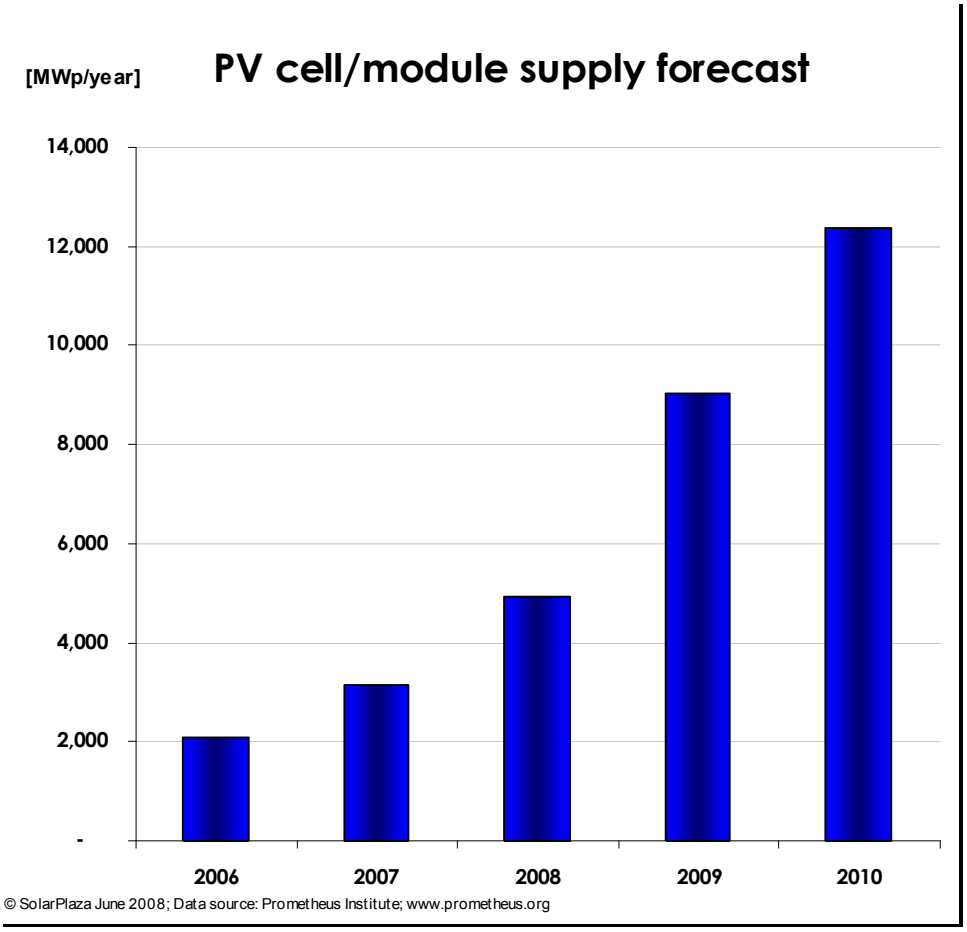


SolarPlaza's forecast is in line with forecasts from Bank Sarasin and the EPIA (European Photovoltaic Industry Association). Only Photon Consulting is predicting a much faster growth scenario.

Chapter II. Spectacular growth of PV industry

Spectacular growth in production capacity

Figures from the Prometheus Institute, an authority on PV industry data analysis, show that worldwide cell and module production capacity and production are growing rapidly. In China particularly, a real 'production explosion' is underway. Attracted by the robust growth of various PV markets in Europe, and attractive margins due to high feed-in tariffs, many new players have started exporting to Europe. The shortage of silicon – a bottleneck for the last two years – has prompted dozens of parties to invest in new silicon production plants. Worldwide there are already more than 300 producers of solar panels. The number of cell producers exceeds 100, excluding the 80 or so (mostly new) producers of thin-film cells. Spectacular growth is therefore discernible across the whole production chain. Even in the most conservative scenarios, the Prometheus Institute forecasts growth in cell and module production this year of 57%, and for 2009 and 2010 83% and 37%.



Almost all module producers aim to exceed the production capacity of 50 MWp per year before 2010. The world's 20 largest producers are investing in scaling up production from 500 MWp to 1 gigawatt by 2010. All this could result in a worldwide

production capacity considerably greater than 20,000 megawatts in 2010. Most of the construction activities designed to achieve this growth are already underway. Even though this has to do with growth in production capacity, all of these companies will want to prevent the shutdown of their capital-intensive production machines. Substantial growth in production, to more than 10 gigawatts by 2010 (Prometheus forecasts more than 12 gigawatts), therefore seems plausible and even a conservative assessment.

Rise of thin-film technology

The rise of thin-film technology merits special mention. The share of this technology in 2007 was still approx. 8% of the world market, whereas in 2010 the percentage of thin-film modules produced is expected to rise to 20%. New thin-film production initiatives are launched almost every week. And most of these companies are already sold out before they begin, for one or more years. The reason for this is that the prices offered are way below the current market prices for crystalline panels. The thin-film panels are much in demand for the major solar park projects in Spain and Italy, but also more and more in Germany and in new markets like France. The disadvantage of these panels is that they are less efficient than crystalline panels. This means that large-scale projects require more space (land), construction, cables and installation work. On the other hand, these panels enable a higher output per kWp to be achieved: up to at least 8-10%. The advantage of the thin-film technologies is that they perform better in diffuse light (cloudy conditions). The lower sales price of thin-film panels is more than sufficient to compensate for the extra costs (land, construction, installation work). In the current market, with larger orders of several megawatts, the price difference between crystalline and thin-film modules could rise to €1/Wp. This price difference could rapidly increase, as the ambitions of the (new) thin-film producers are fulfilled. Thin-film market leader First Solar was already able to produce its CdTl modules at $1.18/Wp in the first quarter of 2008. Its ambition is to achieve a production cost substantially below $1/Wp, when production capacity will reach 1 Gigawatt (before 2010).

Taiwan to become new thin-film production centre

Growing interest for thin-film modules…

In Taiwan alone there are already seven producers in waiting. They are mostly supported by, or emanate from, large companies in the semiconductor industry and have vast experience in thin-film technology (display technology). These companies have experience of large-scale industrial production processes – a good starting point for rapid cost price reduction. During the SolarPlaza trade

mission to Taiwan (February 2008) it appeared that various new producers are planning to enter the international markets on an ambitious scale in 2009. Moreover, during a SolarPlaza conference in Munich (June 2008), various producers confirmed that by around 2010 it will be possible to produce thin-film solar panels for less than $1/Wp. Taking account of a reasonable profit margin and price differences, a sales price of just over €1/Wp could be enough to make production sufficiently profitable.

Rapid growth Taiwanese thin-film industry

With a module sales price of just above €1/watt, in various (new) markets PV could be applied cost-effectively without subsidies or feed-in tariffs. With these prospects within three years, the rapidly growing interest in thin-film technology is therefore not surprising. An important question now is whether the rise and availability of thin-film panels will replace some of the market for crystalline panels, or whether it will lead to new markets being broken open. More about this in the next chapter.

Chapter III - Analysis of Supply versus Demand

Are the demand and supply sides of the worldwide PV market in balance?

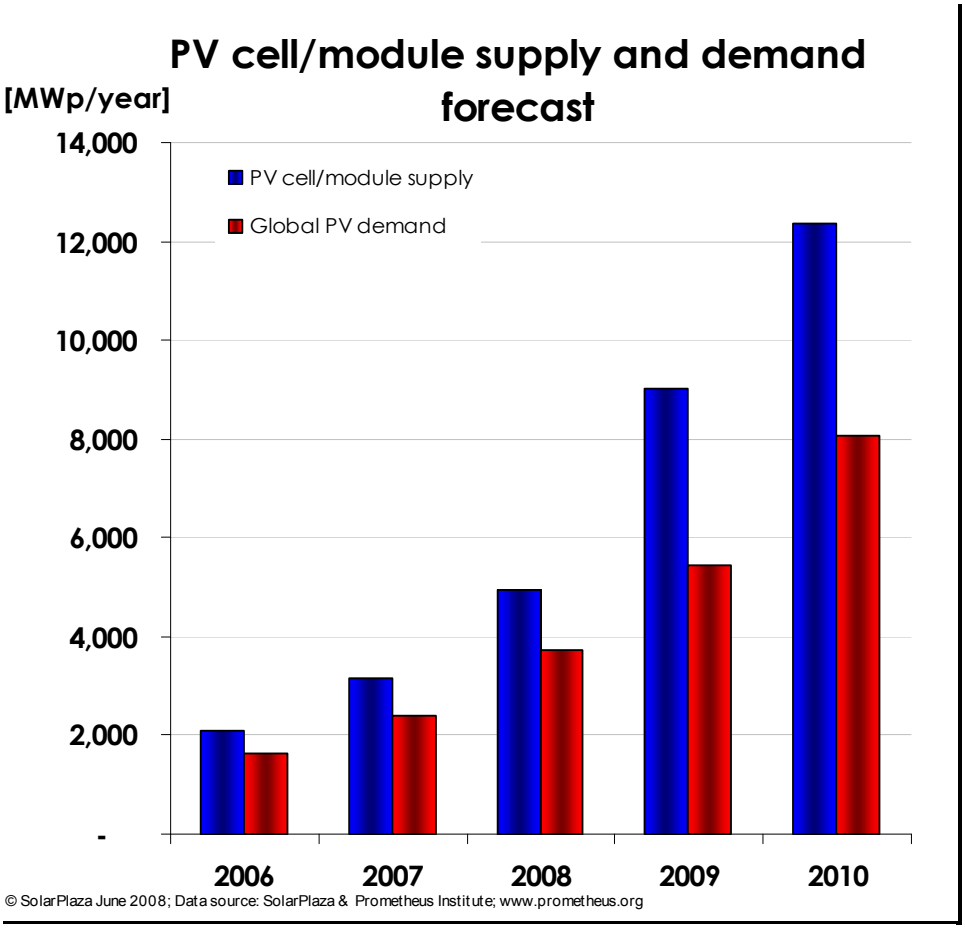
The previous chapters offer an insight into the vigorous growth of both the PV industry, ie supply, and the demand side of the markets. An important question now is whether the two are in balance...

The Prometheus Institute anticipates worldwide cell and module production growth in excess of 70% a year. In September 2007 SolarPlaza held a Global PV Demand Conference in Milan on the dynamics of the demand side of the market. The analyses from the experts in attendance there from all the big markets resulted in an anticipated growth scenario for the demand side of around 30% per year for the next few years. And, from the analysis in chapter I, it appears that the demand side is expected to grow by 30-45% per year.

...demand for modules greater than supply...

At the present time, midway through 2008, the demand for modules is greater than the supply and prices in recent months have risen rather than fallen. A major cause is the peak demand from Spain, since project developers are keen to complete their major projects quickly before the deadline of 28 September 2008. But what happens after that deadline, now that there is no certainty about the continuation of the current generous feed-in tariff? What will happen at the end of this year in America, now that there is no certainty about the tax credit in 2009? What will happen in Germany, where the feed-in tariff is being reduced by 9% from January 2009?

In the graph below, the supply figures from the Prometheus Institute are plotted against the demand curve from SolarPlaza's analysis. The figures need to be interpreted with caution. There are multiple data sets in circulation for supply and demand. There is no independent data set on the demand side. And the supply side also incorporates many assumptions. However, clear trends are discernible. In 2006 and 2007, supply and demand are still closely matched. From 2008 onward the supply side is clearly growing more rapidly than the demand side of the market. In 2009 the 'gap' between supply and demand could be 3500 MWp, or 65% more supply compared to demand. Even if these figures need some correction, a trend is clear.



At present, on the supply side, we can observe robust capacity expansions across the entire production chain, from new silicon production to cell and module production. On the demand side we see uncertainties about, and reductions in, financial support schemes for PV applications. In spite of this the demand side appears to continue growing rapidly (30-40% per year), but an oversupply situation seems unavoidable. The first important question now is when this oversupply will begin. The next question is what the possible consequences might be, particularly for the price of solar panels.

Oversupply

Will the demand from Spain slide (temporarily) at the end of 2008, because there is still no certainty at the present time about a new feed-in tariff scheme for the period after 28 September 2008? Will the new and very likely lower tariff in Spain in 2009 lead to more modest growth? Will the uncertainty surrounding the continuation of the tax credit lead to a slowdown in growth on the American market, which will not be resolved until the new government is in office in 2009? Will the feed-in tariff set to fall by 9% from 1 January 2009 have an impact on market development in the German market? Will these developments coincide with the rapidly growing supply of

modules and cheaper thin-film panels by late 2008, early 2009? It is quite possible that in early 2009 the impending oversupply situation will start to be felt in the market.

...spectacular market growth in Spain...

Most producers are currently sold out, due in part to the spectacular market growth in Spain. Since it is unclear what new scheme will come into force from October 2008, no new major projects are being commenced and therefore limited amounts of modules are being purchased before the end of 2008. The longer the Spanish government waits to announce a new scheme, the greater the likelihood that new module orders will not be placed until 2009. This could mean that there will already be a production surplus by the end of 2008. From that point on, some producers might try to limit their stocks and increase their sales by means of price reductions. Should the Spanish government announce a new scheme within a short space of time, it would be possible for module purchasing to start up again at the end of 2008. In this case, the overcapacity in the market will be visible slightly later, in 2009.

Price pressure

The oversupply situation could have two important consequences for the PV market: price reductions and a consolidation in the industry. SolarPlaza predicts increasing pressure on the prices of semi-finished and finished products across the entire production chain, which is not only caused by the oversupply situation.

SolarPlaza predicts price pressure caused by the following developments.

1. An increase in the supply of products (silicon, wafers, cells and solar panels), which is greater than the demand, results in increasing competition. This oversupply situation will lead to a price decrease for solar modules.

2. The availability of cheaper alternatives coming onto the market (thin-film panels). The rapidly growing interest in thin-film products could result in reduced interest in crystalline panels for large projects – currently one of the biggest market segments. According to the Prometheus Institute, the global market share for thin-film products could rise to more than 20% by 2010. This competition would chiefly result in price pressure on the relatively more expensive crystalline products. The lower sales price of thin-film modules (now around 20% on average) and their growing market share could put the price of crystalline products under further pressure.

3. In the largest PV markets (Spain and Germany) the feed-in tariffs have been (substantially) reduced. The potential sales volume in both Germany and Spain is considerable: together around 60% of the world market. In Germany the tariff is being reduced by 9% in 2009 and 8% in 2010. In Spain ASIF, the Spanish PV industry association, is in consultation with the government about a continuation of the successful system of feed-in tariffs after September 2008. Nothing is yet known about the detail, but the industry itself is looking for a way to temper slightly the spectacular growth seen in recent years. The current 'adverse wind' blowing over the Spanish economy, due to a decline in the construction and property sector, could also trigger a reduction in expenditure on solar energy. The general expectation is that the feed-in tariff per kWh of solar power generated will therefore be reduced by 2009. Based on concept proposals and rumours, this reduction could be as much as 25%. To keep solar modules and systems attractive for end customers, prices should decrease accordingly.

Demand from new markets

The difference between the costs of 'grey energy' and solar energy in the largest markets is more than a factor of two. Therefore, so long as system and module prices do not fall by at least 50%, the growth of the demand side of the market will depend on other factors: on the limitation of the available subsidies; on the speed at which projects can be implemented; and on the speed at which new players enter the market. And in many cases, the growth of the market is also determined by the speed at which licenses, finance or network connections are obtained. A fall in the price of modules will not change much here.

Solar Parks are major market segment in Spain and Italy

In Spain and Italy in particular, the speed of growth is determined by the speed at which licenses and network connections are obtained for new projects. These take about a year in both countries. Even if multiple new companies and projects were launched, it would still take around a year for this to have a major effect on module sales. It is different in Germany, however. Solar panels on the roofs of homes and other buildings make up the largest segment of the market. Even a 20% price drop in conjunction with a 9% lower feed-in tariff would not yet result in a spectacular increase in financial returns, nor clearly therefore to accelerated market growth.

Producers of solar panels prefer to seek out markets where higher margins and larger volumes are possible. Therefore, so long as feed-in tariffs are strengthened in Germany, Spain, Italy and Greece, and there are subsidies or tax incentives in

California, producers will seek out sales in these markets first and not offer the cheapest modules there. A demonstration of this is the situation in the Japanese market, which has scarcely grown at all, or has even shrunk, since the national subsidies programme ended. The Japanese PV companies have focused on exporting to the subsidised markets in preference to selling on their own market (without subsidies). Chinese and Taiwanese companies too will prefer to sell in Europe rather than on their own markets without incentive schemes. That is why SolarPlaza believes that Germany and Spain will remain the largest markets in the short term. A large 'developed' market with a small feed-in tariff is better for producers than creating a new market without any feed-in tariffs or subsidies and without any solar business infrastructure. The expectation is, therefore, that any new markets, and particularly those with no additional tariffs at all, will not make a substantial contribution to worldwide demand in the short term (one to three years).

USA and in particular California are most interesting new markets

One of the most interesting new markets is America. In some states electricity prices are relatively high or, as in California, even differentiated by time of consumption (attractive for PV applications). Energy prices are also still increasing, because of rapidly rising fuel costs, and the demand for electricity per inhabitant keeps rising too. On the other hand, a new government has no choice but to introduce a more sustainable policy. Some of the hundreds of energy companies in the US have now already started their own campaigns to encourage PV applications. However, it will still be some time before these different states can take on a substantial volume. There is still a limited infrastructure of experienced, skilled companies in these states.

A serious price reduction makes breaking open new markets more attractive, but the impact of this on worldwide demand is limited in the short term. A few thin-film producers have already hinted that price levels of €1.50/Wp will be achievable before 2010 – ie within two years... In the meantime, for module manufacturers and providers it is, and will remain, more profitable to sell products in an established or healthily developing market with subsidies or feed-in tariffs than in an entirely new market without these schemes. Developing a new market and infrastructure of companies and organisations, even if this market is supported by subsidies, is costly. And even when new markets with attractive subsidies or feed-in tariffs come along, it takes one or two years before any significant demand materialises. In Spain, which has an ample feed-in tariff, just 13 MW was installed in the first year. Not until two years later was growth explosive and on a scale of several hundred megawatts.

Consolidation

Price pressure could particularly impact upon relatively small, young or expensive producers that do not have a well developed sales and distribution network in the largest markets. Only by reducing prices could they hold on to or capture a share of the market, unlike the well known brands. Holding on to a share of the market is also very important for producers who have signed long-term delivery contracts for wafers or cells and now have to guarantee their module sales in order to keep their cashflow going. Companies with sufficient resources of their own could temporarily do with low profit margins, or even no profit at all, in order to build up a market share. These developments could also encourage (new) players, with sufficient vision and capital, to introduce a drastic price cut as a growth strategy. Starting with the knowledge that, over the next few years, sufficient silicon production capacity will be built up to ensure falling component costs, in the meantime they can reckon on market prices falling further. Companies who do not have much capital, and are locked into long-term purchasing contracts, will have a hard time.

The big brands will not be the first to cut prices. Even in 2008 and 2009 they will already have full order books, because (large) investors in Germany and Spain like to work with reliable brands and good guarantees, particularly in more uncertain times. In the largest markets, demand will only keep on growing if the financial returns remain worthwhile for resellers/system integrators and customers. A reduction in the price of modules and systems would be necessary to make this possible.

Bearing in mind the opportunism with which some new producers have entered the PV industry, it seems almost inevitable that, in the consolidation phase to follow, some producers will be forced to sell off their activities or terminate them altogether.

If market participants respond to an impending oversupply situation by delaying orders, hoping for imminently lower prices, this could further intensify price pressure in the short term.

Learning from developments in wind energy market…

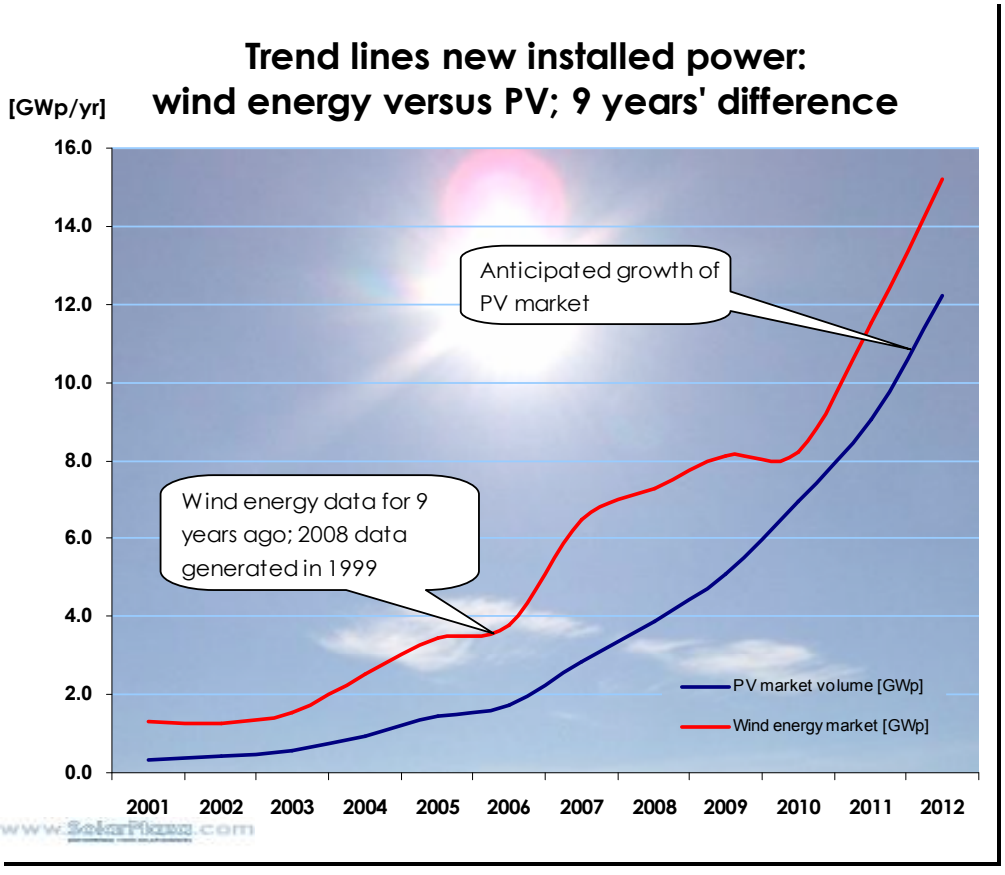
With the probable disappearance of the silicon shortfall and further increasing overcapacity of cells and modules, a falling price trend could continue into 2009 and 2010. This would lead to a further consolidation in the PV market. The PV industry would then be unintentionally following a hog cycle. Learning from the developments in other markets and industries (consumer electronics, wind energy, etc.) it appears that, in the market for solar panels too, the market will be dominated by a few major producers. In the wind energy industry, the 13 most successful manufacturers in 2007 accounted for 96% of the total world market (source: Sun & Wind Energy 3/2008). Solar panels are a commodity product which in future it will be possible to produce in large volumes at very low cost.

Therefore, with more than 100 cell producers and more than 300 module producers, a wave of consolidation could still be expected. This is a natural and healthy way for a fast-maturing industry to develop.

Bright long-term prospects

2008 could be regarded as a turning point in the history of the PV industry, and the next three years as an interim phase. Looking at the historic growth of the wind energy market, an excellent parallel can be drawn with the development of the solar energy market. The growth curves of the two sustainable energy sources are almost identical, although this development took place in the wind energy market nine years ago. It is worth noting that the development of the wind energy market faced hard times, with very limited growth. Also, in those earlier stages of market development, the wind energy market was more dependent on government support. And in the major markets, the support schemes were not always stable…

However, if the growth of the wind energy market is a model for the further growth of the PV market, then the future looks bright. Also, the application opportunities and market potential for solar energy surpass those of wind energy. Hence the authoritative Bank Sarasin anticipates growth percentages of 20-30% per year for the PV market over the next 10 years.



Within five years the cost price of solar power could come close to the price of conventional energy in a number of markets. From that moment on, the sky's the limit and the market potential for solar energy is infinite. After all, the cost price for solar power will by then be secure for at least 25 years, and will be a preferable alternative to the unpredictable and likely rising costs of conventional energy.

Wind energy, in more and more markets and segments, has now become independent of financial support. According to figures from the Global Wind Energy Council, in 2007 the market grew by a further 30% to 20,000 MWp per year. The wind energy market is expected see average growth of 20% over the next few years.

Grid parity within reach…

A number of companies have already indicated that they will be able to produce solar panels for less than $1 per watt by around 2010. With a reasonable profit margin, the market price could come out at just over €1 per watt. This claim is chiefly made by companies that produce thin-film modules. However, producers of crystalline technology have also indicated that the threshold of $1/Wp will be within reach soon after 2010. At this price, solar power could be produced in sunny climates at a price competitive with the consumer price for 'grey' power. With worldwide trends like a growing population and average prosperity per inhabitant with growing energy needs, further rises in the price of oil, and increased concern about global warming, it is likely that energy prices will rise even further. This will bring grid parity within closer reach in more and more market segments. Indicative calculations show that this situation could occur in sunny countries as soon as 2010 to 2012. From that moment on, market growth will no longer be dependent on any subsidies or government contributions whatsoever. Under the right conditions, such as limited impediments in the form of licences, this will result in phenomenal market potential. As soon as grid parity is reached, many new markets will quickly present themselves. Without the need for subsidies and feed-in tariffs, the speed of growth will be determined by considerations like 'can I install PV panels on my roof without a licence?' From then on a period of worldwide market growth of far more than 30% a year is not out of the question. Rapid growth could then even mean a period of undersupply.

Grid parity start of phenomenal market potential…

Conclusions

The demand side of the global PV market will continue to grow from 2008 to 2010. SolarPlaza anticipates a year-on-year growth of 30-45%. For the next three years, growth on the demand side of the world market will be determined and limited by the available subsidies and other government schemes.

In this period until 2010, industrial production capacity and actual production will grow much faster than the demand side of the market, giving rise to a period of oversupply. This oversupply situation, possibly starting by the end of 2008 or else in 2009, could lead to an accelerated reduction in PV module prices and a consolidation in the PV industry.

From 2010 onwards, grid parity will come quickly into reach in various markets, which will lead to a new increase in growth on the demand side. Global demand will then no longer be fully dependent on government financial support.

The next three to four years can therefore be considered an interim period – a bumpy ride with ups and downs, winners and losers. Fasten your seatbelts to get through this phase safely. But after that there is the prospect of phenomenal market potential and continuous, rapid market growth. Fasten your seatbelts again, but this time to safely steer your way along the road of robust growth!

On 2 September Solarplaza will be holding the Second Global PV Demand Conference in Valencia. This conference will focus on developments in the demand side of the worldwide PV market. International experts from the most important and largest markets will be sharing their analysis and vision of the anticipated growth of the supply and demand side and likely consequences of an oversupply. For more information visit: www.solarplaza.com and www.globaldemandconference.com.

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