IEA INTERNATIONAL ENERGY AGENCY

2018

SNAPSHOT OF GLOBAL PHOTOVOLTAIC MARKETS

PVPS

PHOTOVOLTAIC
POWER SYSTEMS
PROGRAMME

Report IEA PVPS T1-33:2018

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WHAT IS IEA PVPS

The International Energy Agency (IEA), founded in 1974, is an autonomous body within the framework of the Organization for Economic Cooperation and Development (OECD). The IEA carries out a comprehensive programme of energy cooperation among its 32 members and with the participation of the European Commission. The IEA Photovoltaic Power Systems Programme (IEA PVPS) is one of the collaborative research and development agreements (technology collaboration programmes) within the IEA and was established in 1993. The mission of the programme is to "enhance the international collaborative efforts which facilitate the role of photovoltaic solar energy as a cornerstone in the transition to sustainable energy systems."

In order to achieve this, the Programme's participants have undertaken a variety of joint research projects in PV power systems applications. The overall programme is headed by an Executive Committee, comprised of one delegate from each country or organisation member, which designates distinct 'Tasks,' that may be research projects or activity areas. This report has been prepared under Task 1, which deals with market and industry analysis, strategic research and facilitates the exchange and dissemination of information arising from the overall IEA PVPS Programme.

The participating countries are Australia, Austria, Belgium, Canada, Chile, China, Denmark, Finland, France, Germany, Israel, Italy, Japan, Korea, Malaysia, Mexico, Morocco, the Netherlands, Norway, Portugal, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, and the United States of America. The European Commission, Solar Power Europe, the Smart Electric Power Alliance (SEPA), the Solar Energy Industries Association and the Copper Alliance are also members.

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ISBN 978-3-906042-72-5 A Snapshot of Global PV (1992-2017)

Data for non-IEA PVPS countries are provided by official contacts or experts in the relevant countries.

Data are valid at the date of publication and should be considered as estimates in several countries due to the publication date.

A SNAPSHOT OF GLOBAL PV: 2017, A YEAR OF CONTRASTS

IEA PVPS has distinguished itself throughout the years by producing unbiased reports on the development of PV all over the world, based on information from official government bodies and reliable industry sources. This sixth edition of the "Snapshot of Global PV Markets" aims at providing **preliminary information** on how the PV market developed in the last year. The 23rd edition of the PVPS complete "*Trends in Photovoltaic Applications*" report will be published in Q4 2018.

In 2017, in a similar basis to 2016, the PV market again broke several records again and continued its global expansion, with reaching almost the 100 GW threshold. After a limited global development in 2014, and a slow 25% growth in 2015, the market continued its growth in 2016 and 2017. The main reason is the contribution of the China whose PV development accounts for almost the 54% of the total installed capacity in 2017, even more than in 2016 (fig.1).

In fact, after a stabilisation in 2014 the Chinese PV market grew to around 15,2 GW in 2015, to 34,4 GW in 2016 and to 53 GW in 2017. In the Americas, the US market decreased in 2017, installing around 10,6 GW. The position of third PV market leader was finally taken over by India that installed 9,1 GW, ahead of Japan and the European Union, fifth.

Together with China and India, as well as many other countries growing as established markets in the region, Asia is now the leader of the Global PV market. Next to China and India, Japan still remains a relevant presence in the market with 7 GW installed.

Other Asian markets have confirmed their maturity: Australia (1,25 GW), Korea (1,2 GW), Pakistan (estimated about 800 MW), Taiwan (523 MW) and Thailand (251 MW) are now established PV markets. Many others are also developing such as Malaysia (50 MW) as well as Philippines, Vietnam and Indonesia, which are showing signs of possible rapid PV development in the coming years.

In the Americas, the decline of the US market (10,6 GW) is balanced by Brazil that installed 910 MW in 2017. Another market that grew significantly was Chile with at least 668 MW while Canada remained stable respect to 2016 (212 MW). Mexico (around 150 MW) is also progressing and should become a massive market in the coming years.

In Europe, Germany confirmed its leading position among the continent and installed 1,8 GW in 2017. UK followed with 950 MW, France with 875 MW and the Netherlands that continued to progress by installing 853 MW. The Italian market stayed to a rather low level for another year in a row (409 MW). Some medium-size European market remained stable such as Switzerland (260 MW), Austria (153 MW), Hungary (136 MW) and Sweden (93 MW). Others European markets experienced a growth again, such as Belgium that installed 284 MW and Spain 147 MW. Denmark, Finland and Norway installed respectively 60 MW, 23 MW and 18 MW. Portugal remains stable and installed 57 MW. Poland installed 77 MW.

Former GW markets continued to experience a quasi-complete shutdown, with between nothing and a few dozens of MW installed: Czech Republic, Greece, Romania, and Bulgaria, for instance.

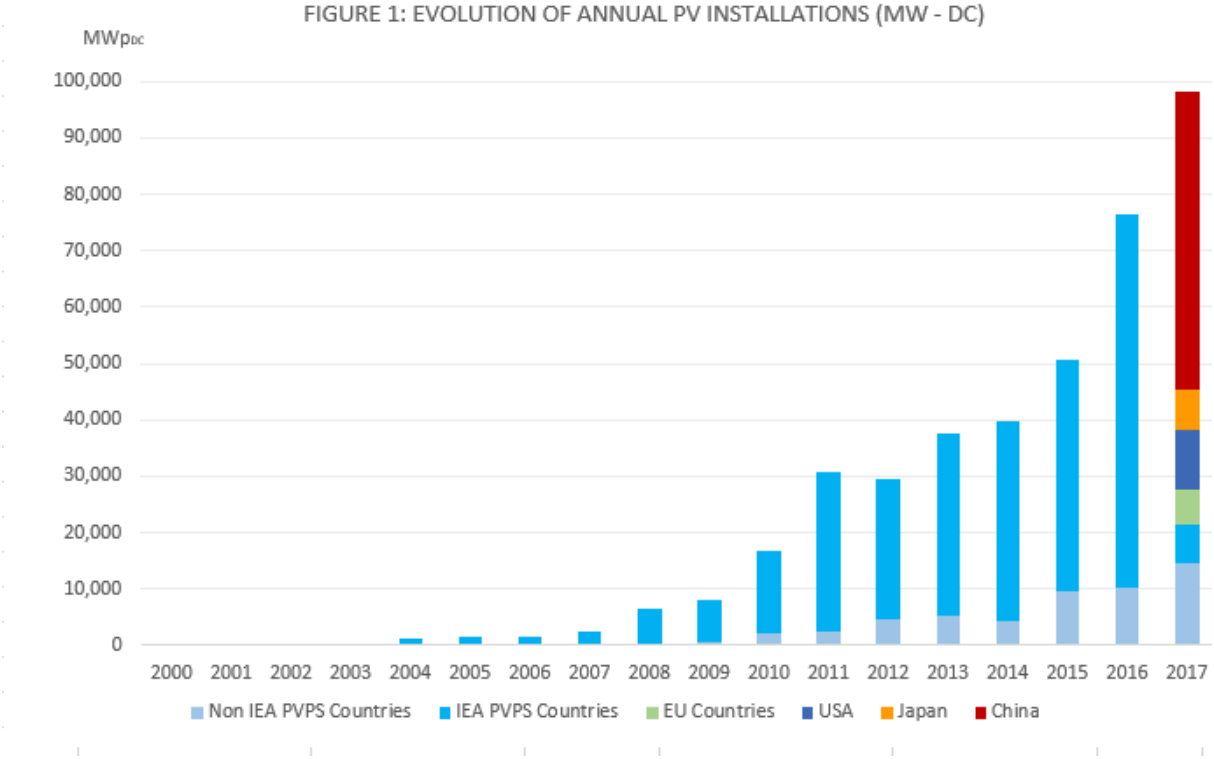
In the Middle East, Turkey installed 2,6 GW, a massive increase compared to past years, while Israel installed an additional 60 MW, the lowest performance for years. Following the tenders, 260 MW have already been installed in the UAE, and there is ample activity foreseen in the region: In early 2018, Saudi Arabia unveiled a 200 GW plan for 2030. While these super-competitive tenders, such as in UAE, have a minority share in the global PV market, they show how competitive PV has become. More have been installed in Jordan and other countries are on the list.

In Africa, South Africa became the first African country to install close to 1 GW of PV in 2014. In 2017, its growth stopped abruptly with only 13 MW installed, after 500 MW installed in 2016. Algeria installed about 50 MW last year, but it is expected to launch a tender for 4 GW in 2018. Many countries have announced projects, with Egypt leading the pace (5 GW have been announced) but so far, most installations have been delayed or are still in the project evaluation phase.

Overall, these developments raised the global PV market for the first time to at least 98 GW, a significant increase from 2016 numbers where 76 GW was connected to the grid.

In the year 2017, 29 countries passed the GW mark with respect to the PV installed capacity. Seven countries now have more than 10 GW of total capacity, four more than 40 GW and China alone represented 131 GW. Germany, which used to lead the rankings for years, lost its leading position in 2015 and now ranks fourth (42 GW), with Japan third (49 GW) and the USA second (51 GW). With more than 111 GW of total capacity, Europe is now significantly behind the Asian leader that runs at least 219 GW, and much more to come in the coming years.

FIGURE 1: EVOLUTION OF ANNUAL PV INSTALLATIONS (MW - DC)



2017 HIGHLIGHTS

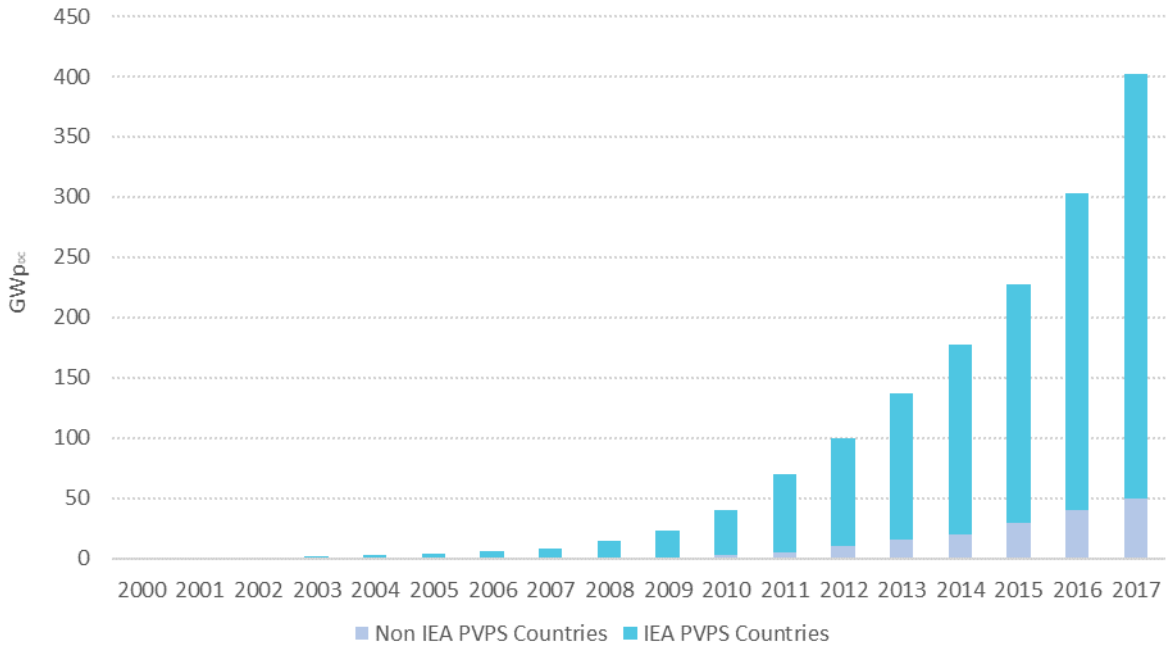
Preliminary reported market data shows a significantly growing market in 2017. At least 98 GW of PV systems have been installed and connected to the grid in the world last year. While these data will have to be confirmed in the coming months, some important trends can already be discerned:

- The global PV market grew significantly, to at least 96 GW in 2017. With non-reporting countries, this number could grow up to 98 GW, compared to 76 GW in 2016. The 2 GW difference comprises non IEA PVPS markets countries such as most African, Asian and unreported Latin American countries.
- This represents a 29% growth year-on-year.
- This year confirmed the strength of China's growth that now accounts for 32% of the global installed capacity and 54% of the PV market in 2017. China installed 53 GW in 2017 and is the leader in terms of total capacity with 131 GW.
- Asia ranks first for the fifth year in a row with around 75% of the global PV market; up from 67% last year.
- Outside of China, the global PV market grew from 41,5 GW to 45 GW.
- The US market decreased by 28% to 10,6 GW, with large-scale and third-party ownership dominating.
- India progressed significantly to around 9 GW, becoming the third-largest PV market.
- Japan continued its declining path with around 7 GW installed and connected to the grid in 2017.
- The market in Europe stabilized after the decline in 2016, from 6 GW of installed capacity in the previous year to around 6,5 GW in 2017. The largest European market in 2017 was Germany (1,8 GW), followed by the UK (954 MW), France (875 MW) and the Netherlands (853 MW).
- The MEA markets experienced growth, particularly thanks to Turkey, which installed 2,6 GW in 2017.
- In the top 10 countries, there are now five Asia-Pacific countries (China, India, Japan, Australia, Korea), two European countries (Germany and UK) and two countries in the Americas (the USA and Brazil).
- The level to enter the top 10 in 2017 was around 910 MW, up from 759 MW in 2016.
- The top 10 countries represented 90% of the global PV market.
- Honduras, Germany, Greece, Italy and Japan now have enough PV capacity to theoretically produce more than 5% of their annual electricity demand with PV.
- PV represents around 2,1% of the global electricity demand and 4% in Europe.
- 29 countries had at least 1 GW of cumulative PV systems capacity at the end of 2017 and eight countries installed at least 1 GW in 2017.
- The share of distributed application rose in 2017 for the first time in years, thanks mainly to Chinese PV installations on rooftops.
- PV was the first renewable source of electricity for new capacities in 2017, ahead of wind and hydro. Other renewable sources and especially CSP are far behind.

USHOW MUCH PV CAPACITY IS PRODUCING ELECTRICITY IN THE WORLD TODAY?

The total installed capacity (fig.2) at the end of 2017 globally amounted to 402,5 GW. The IEA PVPS countries represented 347 GW of cumulative PV installations together, mostly grid-connected, at the end of 2017. Additional countries that are not part of the PVPS programme represent at least 50 additional GW: India with at least 18 GW, UK with 12,7 GW, Greece with 2,6 GW (stable in 2017), the Czech Republic with 2,2 GW (stable in 2017), Pakistan and Taiwan with 1,8 GW and the Philippines with 1,4 GW, Romania with 1,4 GW, Brazil with 1 GW and Bulgaria with 1 GW (stable in 2017). Many other countries have installed PV systems, but none have reached the GW scale. While other countries around the world have reached various PV installation levels, the total of these remains hard to quantify with certainty. At present, it appears that 397 GW represents the minimum installed by end 2017 with a firm level of certainty. Remaining installations account for some additional 5,7 GW installed in the rest of world (non-reporting countries, off-grid installations, etc.) that could bring the overall installed capacity to around 402,5 GW in total.

FIGURE 2: EVOLUTION OF TOTAL INSTALLED CAPACITY (GW - DC)



On a worldwide level, China now leads the cumulative capacities with 131 GW, followed by the USA (51 GW) Japan (49 GW) and Germany (42 GW). Italy (19,7 GW) ranks fifth, India (18 GW) sixth and the UK seventh (13 GW) . All other countries are below the 10 GW mark, France at 8 GW, Australia at 7,2 GW and Spain at 5,6 GW.

ELECTRICITY SYSTEM INTEGRATION

Europe and the USA favour the market integration of renewables, including solar PV. While this is more a recommendation in the European Union than a compulsory decision, several countries are modifying their support schemes to make them more "market compliant." Consequently, Germany and the UK, for instance, have introduced feed-in premiums with a variable premium that compensates for the variations of electricity market prices. This situation has started to be translated in several other countries.

STORAGE DEPLOYMENT

In the last years the storage market hasn't developed as fast as expected. After the numerous initiatives announced in 2015, things are moving slowly. This delay is mainly due to the high costs and the lack of incentives for these technologies.

Germany supports storage through financial incentives for prosumers, which has led to a significant share of new residential PV installations with storage units. In Australia, 20,789 storage units were installed in 2017, mainly in the residential segment. In other surveyed countries, such developments haven't been reported at the same level.

RETROACTIVE MEASURES

In 2017, the situation of existing PV plants didn't experience significant retroactive measures. The most important changes took place in the last years in Spain: it imposed retroactive measures to PV system owners arguing about difficult economic conditions. These measures reduced in some cases the revenues of PV system owners by 50%. In Italy, in order to reduce the impact of PV on the electricity consumers, the government imposed a decrease of the FiT level compensated by an increase of the payment years. Other countries also applied retroactive measures that reduced the level of financial support or changed the conditions applying to already existing PV systems. Bulgaria, Romania and the Czech Republic have discussed or applied such measures in the last three years, often with the consequence of destroying investors' confidence and bringing down the PV market. In the south of Belgium, retroactive measures were integrated in the law granting green certificates, which legally allowed a decrease of the number of years during which the certificates were granted. These measures, sometimes legally justified, have significantly decreased the confidence of investors. The biggest threat to PV development for prosumers is now the fear that self-consumption or net-metering policies already granted could be changed, downgraded or taxed for existing PV installations.

GRID FINANCING AND ADDITIONAL TAXES

In Belgium, the region of Flanders imposed a grid connection tax in 2015 aimed at compensating for the losses in grid revenue linked to the existing net-metering scheme. In 2017, there were numerous discussions about introducing the same tariff in the Wallonia region of Belgium as well, which is now supposed to enter into force by 2020.

This same question has been raised by policymakers and grid operators in several countries but led to few concrete policies. In the USA, several debates took place with regard to the compensation of net-metering policies, with the consequence of establishing either caps to net-metering or adding small additional fees in some states. Other countries such as Italy (but not implemented) and Spain (with its famous sun tax) have either set up or discussed additional taxes on solar PV systems. In Germany, the decision has been made to force prosumers to pay a significant percentage of the levy paid by electricity consumers to finance renewables incentives, even on the self-consumed part of the PV electricity.

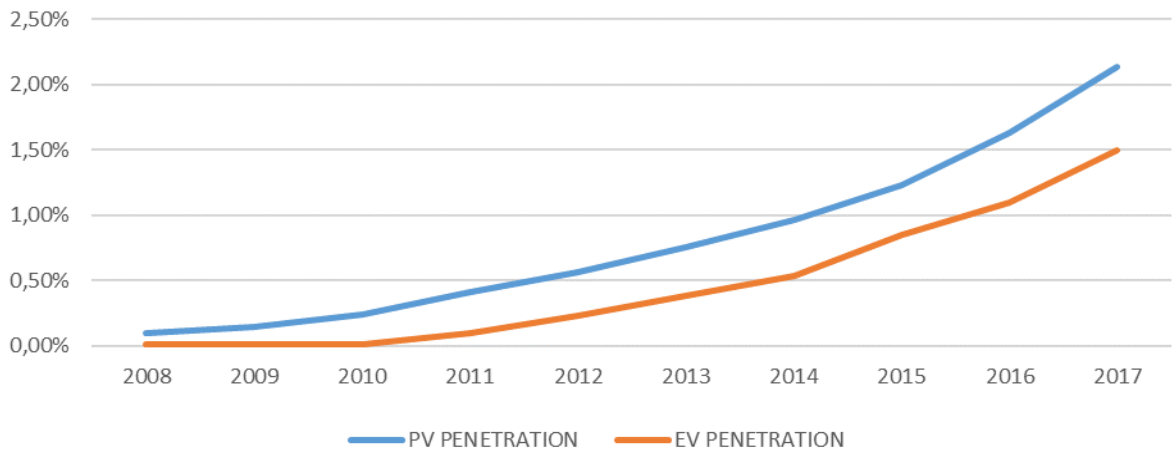
FROM PRODUCERS TO *PROSUMERS*

The idea that PV producers could be considered as "prosumers" – both producers and consumers of energy – is evolving rapidly and policies are being adapted accordingly in several countries. The most popular policies are called "Net-metering" policies and are adopted in a growing number of countries, with different definitions. The genuine "net-metering" which offers credits for PV electricity injected into the grid, have previously supported market development in the USA, Canada, Denmark, The Netherlands, Portugal, Sweden, Korea and partially in Belgium. Many countries around the world are either discussing its introduction or a variant through self-consumption. For instance, France has recently introduced within its new norms of the energy code, further regulations for allowing self-consumption both at the individual and collective level. Therefore, self-consumption is becoming a major driver of distributed PV installations, often completed with a feed-in tariff for the PV electricity in excess.

The use of self-consumption in collective buildings is not yet widespread but exists in the Netherlands or France. In Italy PV systems connected through a private transmission line to a single end user are allowed under specific conditions within a real time self-consumption mechanism, and several countries are testing the concept. The idea of virtual self-consumption between distant points has been tested in Mexico and Brazil, Australia, but encounters a fierce resistance from many distribution system operators.

ELECTRIC VEHICLES

FIGURE 3: COMPARISON BETWEEN PV PENETRATION AND EV PENETRATION



Source: IEA until 2016 and compilation of official national sources or estimates for 2017

The electrification of transport accelerates in many locations, almost all of them countries active in the IEA PVPS programme. The link between PV development and EVs is not yet straightforward but it could become a reality rapidly. To charge electric vehicles during workhours, the need for additional energy sources will become a key, while concepts such as virtual self-consumption will rapidly get the favours of many. The accelerated development of the EV market could be compared to the development of the PV market, with similar penetrations. With more than 1,2 million electric vehicles sold in 2017 (or 1,5% of the global car market), the penetration of this industry could reach the same level as the PV penetration in the power sector in the coming years and then evolve even faster.

ANTI-DUMPING AND LOCAL CONTENT POLICIES

The anti-dumping and anti-subsidy policies that have been undertaken in Europe and the USA against Chinese manufacturers have been followed by similar policies from Chinese authorities, for instance for the US polysilicon. Many other countries stepped into these policies in order to protect their local industry. But after five years of anti-dumping policies, the return to a fair market appears in sight.

Several countries adopted specific measures aiming at favouring the local content of PV components over the last years. Started by the province of Ontario in Canada, it has continued with Italian, French, Malaysia or Turkish regulations aiming at promoting their local industry. Measures blocking the market for foreign producers have disappeared while those adding some incentives for local producers have been continued.

Recently, the USA announced new anti-dumping tariffs on all imported modules and cells manufactures. The tariff will be applied for the next five years, starting at 30% and ending at 15% in Year 4, with a reduction of 5% for each year. As at the end of March 2018 already China, South Korea, Taiwan, the EU, Singapore, Japan, Malaysia, the Philippines and Vietnam have already formally requested consultations over the new US safeguard measures on solar cell and module imports to the WTO and more is yet to come.

THE TOP 10 COUNTRIES IN 2017

In the major evolutions, 8 out of the top 10 markets for PV in 2017 have installed at least 1 GW of PV systems. Looking at the total installed capacity, 29 countries are now within the 1 GW club.

As mentioned earlier, capacities for a few countries that report PV installations in AC power, have been converted into DC power to facilitate comparison. This can lead to discrepancies with official PV data in several countries such as Spain.

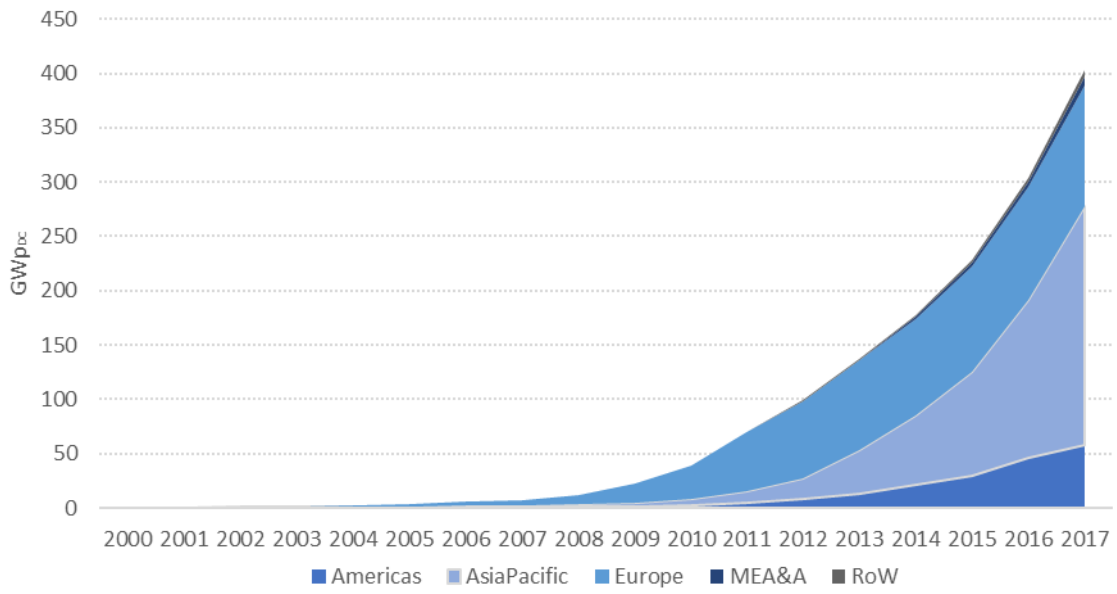
TABLE 1: TOP 10 COUNTRIES FOR INSTALLATIONS AND TOTAL INSTALLED CAPACITY IN 2017

TOP 10 COUNTRIES IN 2017				TOP 10 COUNTRIES IN 2017			
1		China	53 GW	1		China	131 GW
2		USA	10,6 GW	2		USA	51 GW
3		India	9,1 GW	3		Japan	49 GW
4		Japan	7 GW	4		Germany	42 GW
5		Turkey	2,6 GW	5		Italy	19,7 GW
6		Germany	1,8 GW	6		India	18,3 GW
7		Australia	1,25 GW	7		UK	12,7 GW
8		Korea	1,2 GW	8		France	8 GW
9		UK	0,9 GW	9		Australia	7,2 GW
10		Brazil	0,9 GW	10		Spain	5,6 GW

EVOLUTION OF TOTAL INSTALLED PV CAPACITY PER REGION

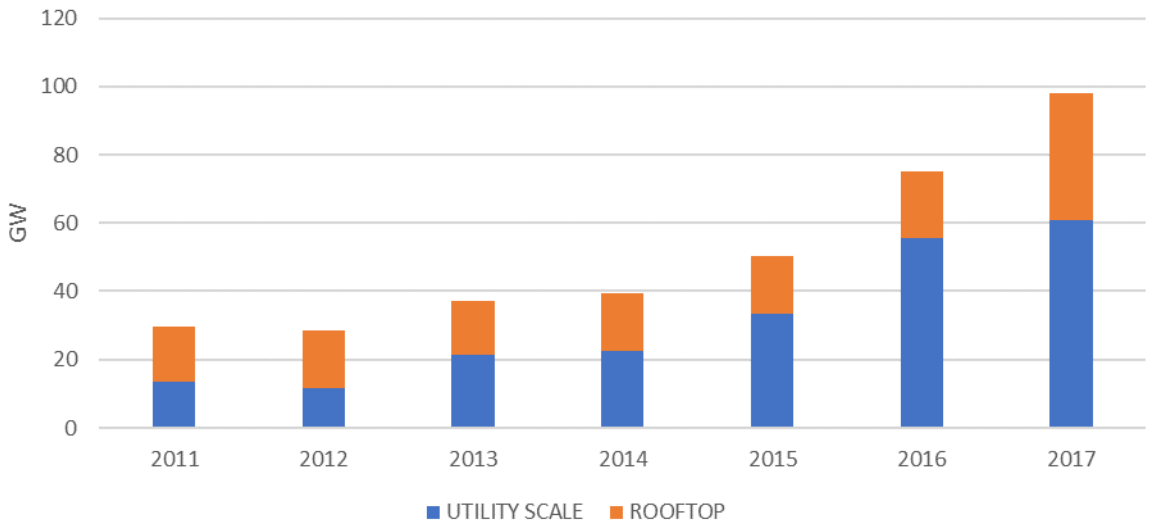
While Europe represented a major part of all installations globally, Asia's share started to grow rapidly in 2012 and it has never stopped since (fig.4). Now, Asia represents around 54,5% of the total installed capacity and this percentage shall continue increasing in the coming years. Europe, instead, is losing it share year by year and in 2017 accounted for only the 28% of the global total capacity. The Americas reached 19%, thanks to the USA and some Latin American countries, while the remaining 2% comes from the MEA region.

FIGURE 4: EVOLUTION OF REGIONAL PV INSTALLATIONS (GW - DC)



SEGMENTATION, AC & DC NUMBERS, GRID-CONNECTED AND OFF-GRID

FIGURE 5: SEGMENTATION OF PV INSTALLATION 2011 - 2017



PVPS counts all PV installations, both grid-connected and off-grid when numbers are reported. By convention, the numbers reported refer to the nominal power of PV systems installed. These are expressed in W (or Wp). Some countries are reporting the power output of the PV inverter (the device converting DC power from the PV system into AC electricity compatible with standard electricity networks) or the grid connection power level. The difference between the standard DC power (in Wp) and the AC power can range from as little as 5% (conversion losses, inverter set at the DC level) to as much as 50%. For instance, some grid regulations in Germany limit output to as little as 70% of the peak power from the PV system. Most utility-scale plants built in 2017 have an AC-DC ratio between 1,1 and 1,5. Canada, Chile, Japan (since 2012) and Spain report only AC numbers officially. The numbers indicated in this report have been transformed to DC numbers to maintain the coherency of the overall report. Preliminary data show that the distributed PV market grew for the first time for years, thanks to policies implemented mostly in China. This also means the decrease in the fast uninterrupted growth of the utility-scale market.

Global PV Market 2017

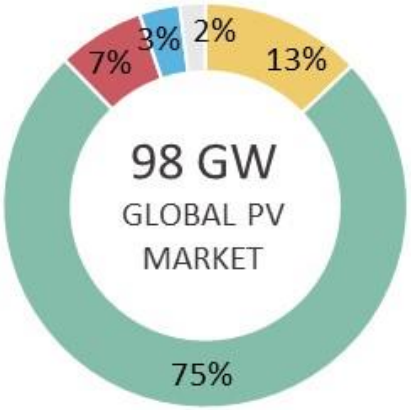
TOP PV MARKETS 2017

1st CHINA 53 GW

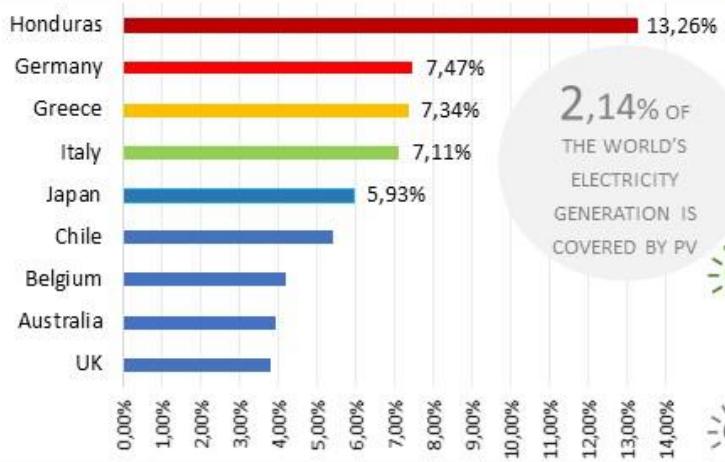
2nd USA 10,6 GW

3rd INDIA 9,1 GW

EVOLUTION OF ANNUAL PV INSTALLATIONS (MW - DC)



2017 THEORETICAL PV PRODUCTION



2,14% OF THE WORLD'S ELECTRICITY GENERATION IS COVERED BY PV

98GW has been installed all over the world by the end of 2017

China is the world's #1 PV market

SOLAR PV PER CAPITA 2017 Watt/capita

1st GERMANY 518

2nd JAPAN 386

3rd BELGIUM 338

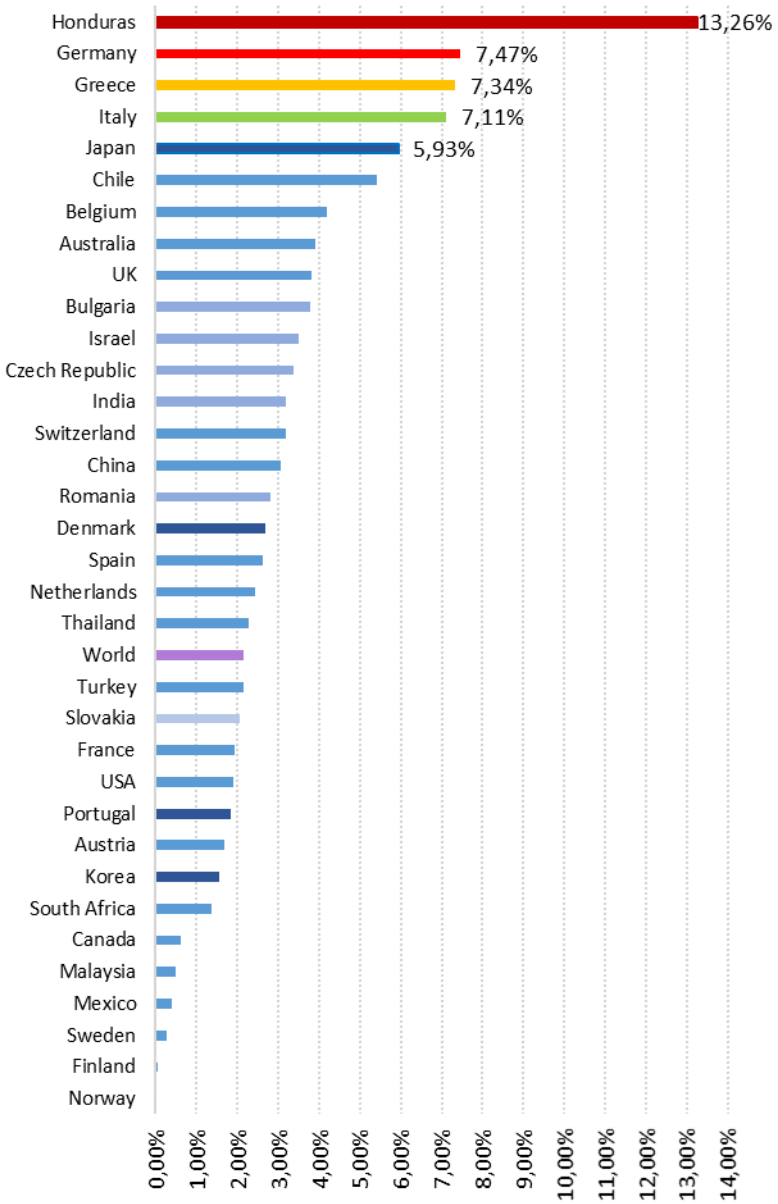
29 countries had at least 1GW of cumulative PV capacity at the end of 2017

8 countries installed at least 1GW each in 2017

ELECTRICITY PRODUCTON FROM PV

PV electricity production is easy to measure for a power plant but much more complicated to compile for an entire country. In addition, the comparison between the installed base of PV systems in a country at a precise date and the production of electricity from PV are difficult to compare. A system installed in December, will have produced only a small fraction of its regular annual electricity output; systems installed on buildings may not be at optimum orientation or may have partial shading during the day. Furthermore, and/or the weather in 2017 may not have been typical of the long-term average. For these reasons, the electricity production from PV per country as shown below estimates what the PV production could be based on the cumulative PV capacity at the end of 2017; close to optimum siting, orientation and average weather conditions.

FIGURE 6: THEORETICAL PV PRODUCTION 2017



In several countries, the PV contribution to the electricity demand has passed the 1% mark with Honduras in the first place with 13%, Germany in second place with close to 7,5%, Greece third with an estimated 7,3% and Italy fourth at a similar level. The overall European PV contribution amounts to close to 4% of the electricity demand. Japan reached the 5,9% mark in 2017. China reached 3%. Figure 4 shows how PV theoretically contributes to the electricity demand in key countries (IEA PVPS and others), based on the PV capacity installed by the end of 2017. Since these numbers are estimates based on the total capacity at the end of the year 2017, they can slightly differ from official PV production numbers in some countries. These numbers should be considered as indicative aiming at comparing different situation in different countries rather than official data.

CONCLUSION AND FUTURE PROSPECTS IN PVPS COUNTRIES

Solar PV technology continued to expand in 2017, in particular thanks to the rapid development in China and other keys Asian markets, such as India. However a large part of the growth seen in 2017 came from the People's Republic of China, while the rest of the world grew by less than 4 GW. In other words, the global PV market outside of China grew from 41,5 GW to 45 GW while China drove the global numbers up to at least 98 GW. Once driven by financial incentives in developed countries, PV has started to progress in developing countries, answering a crucial need for electricity, or cleaner air. Whereas in several developed countries, PV comes in direct competition with existing plants from incumbent utilities and in emerging countries, PV already helps to satisfy a growing need for energy in general and electricity in particular, pushed by declining prices.

In that respect, the super-competitive tenders seen in many countries around the world are sending a clear signal to policymakers that the most competitive PV installations can now compete with most fossil and nuclear sources of energy. In times of policy uncertainties in several key countries, the progress achieved in 2017 contributed to raising the awareness of PV's potential.

Today PV has become a major actor in the electricity sector in several countries. Globally, close to 500 TWh, or 500 billion kWh will have been produced in 2017 by PV systems installed and commissioned until the end of December 2017. This represents more than 2% of the electricity demand of the planet, though some countries have rapidly reached significant percentages.

Around 402,5 GW of PV are now installed globally, at least 70 times higher than in 2006.

Finally, with declining prices in the last few years, PV has appeared on the radar of policymakers in charge of energy policies in numerous countries and plans for PV development have increased rapidly all over the world. With dozens of countries developing PV now, and much more to come, the globalisation of PV is now a reality.

Among PVPS countries, several Asian countries have announced their intention to continue developing PV, but the market size remains the question. In the USA, the policy choices of the new administration will have consequences on the PV market in the coming years, but the extent is unknown. In Europe, the picture is more contrasted with a complex process of transitioning from the current financially supported markets to a more competitive PV market. In emerging countries, the potential for solar PV deployment is gigantic, but so are the challenges. All these elements considered together could propel the future PV market to new heights, but under the condition of continuous support.

SYNTHESIS TABLE

Table 2 compiles preliminary information valid as of 16 March 2018. PVPS countries' data are issued by national experts. Data related to non-IEA PVPS countries are estimates that have been delivered by the Becquerel Institute in Belgium, RTS Corporation in Japan and other sources. Data for some IEA PVPS countries may still be updated by national authorities. In particular, data for Belgium, Canada, Korea, the Netherlands and Sweden are not definitive but official estimates. Updated data will be published in the next edition of the complete report *"TRENDS 2017 In Photovoltaic Applications."*

Solar yield data has been provided by member countries or GIS data providers.

Electricity production is a **theoretical calculation** based on average yield and the PV installed capacity as of the **31 December 2017**. Real production data could differ due to differences in irradiation across the countries themselves and the characteristics of the PV power plants considered.

TABLE 2: ANNUAL AND CUMULATIVE INSTALLED PV POWER 2017 IEA-PVPS COUNTRIES

	ANNUAL INSTALLED CAPACITY		CUMULATIVE INSTALLED CAPACITY	
China	**53**	**GW**	**131**	**GW**
USA	**10,6**	**GW**	**51**	**GW**
Japan	**7**	**GW**	**49**	**GW**
Turkey	**2,6**	**GW**	**3,4**	**GW**
Germany	**1,8**	**GW**	**42**	**GW**
Australia	**1,25**	**GW**	**7,2**	**GW**
Korea	**1,2**	**GW**	**5,6**	**GW**
France	875	MW	**8**	**GW**
Netherlands	853	MW	**2,9**	**GW**
Chile	668	MW	**1,8**	**GW**
Italy	409	MW	**19,7**	**GW**
Belgium	284	MW	**3,8**	**GW**
Switzerland	260	MW	**1,9**	**GW**
Thailand	251	MW	**2,7**	**GW**
Canada	212	MW	**2,9**	**GW**
Austria	153	MW	**1,25**	**GW**
Mexico	150	MW	539	MW
Spain	147	MW	**5,6**	**GW**
Sweden	93	MW	303	MW
Denmark	60	MW	**0,91**	**GW**
Israel	60	MW	**1,1**	**GW**
Portugal	57	MW	577	MW
Malaysia	50	MW	386	MW
Finland	23	MW	61	MW
Norway	18	MW	45	MW
South Africa	13	MW	**1,8**	**GW**

Electricity consumption data has been provided by official authorities. In most cases, 2016 or older data have been used when 2017 data was not yet available.

(GW-scale numbers in bold)

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