

Reviving the stalled shift to solar self-consumption

Business models | Solar's widely heralded shift to self-consumption models has failed to happen to any meaningful degree. But as it remains PV's only viable future business model, it's time to get the project back on track, writes Gaëtan Masson



Credit: Sundog Energy

Welcome to the real world! The real world is what the PV sector faces in Europe for the time being: the end of a Golden Age when money was falling from the skies, profits skyrocketing and electricity consumers' discontent growing. If I wanted to shock a little bit, I could say that a large part of the global PV market still lives in a fantasy land: the Americans have extended the ITC, the Chinese and Japanese continue so far to love feed-in tariffs (even if mentalities are evolving) and many newly installed PV capacities outside of the old continent are still policy-driven, or to be more precise, financially supported.

How many gigawatts have been installed in the world in 2015 without any support scheme, with a market-based remuneration and outside of competitive tenders... granting a stable feed-in tariff for years? Well, the answer is not straightforward. Out of the estimated 51GW installed in 2015 (PV Market

Alliance numbers from January 2016), we can hardly find many gigawatts where PV electricity is paid at market price or where self-consumption is the main driver of revenues. Let's face the truth: the policy-driven bubble is not over yet and it is time to prepare the transition smartly.

A failed transition?

From the 23GW installed in 2011, the level of installations in Europe has fallen to significantly less than 10GW in the last two years. And the number of markets in Europe where PV is still able to develop shrinks continuously. Only the UK, Germany, France, the Netherlands or Switzerland are still contributing significantly to the European PV market's development. Of course some dozens or hundreds of megawatts were installed in Belgium, Austria, Denmark, Sweden, Poland, Portugal or Italy in 2015, but far from the top numbers seen in the past. This can be easily explained by the

Self-consumption remains the only viable long-term business module for non-utility solar.

continuous decline of financial support in some cases, but also the move to market-based incentives that confused investors. Retroactive measures have finally contributed to demotivate them, leading to a European PV market crippled and expecting much from new business models, ad hoc regulations and the end of anti-dumping tariffs.

But the major reason for the dramatic decline of European PV markets is the decline in policy support. In almost all European countries, politicians still willing to openly support PV as a future energy source are not the majority, and by far. At best, they agree that PV will be the source of energy of the 'future' without committing to any major regulation that could re-ignite the market. A significant gain in PV competitiveness or the end of the minimum import price (MIP) for Chinese modules would have little or no impact on most markets in the short term, simply because regulators left no space for PV development outside of the constrained corridors. Sometimes no space at all. What is not present is simply the political willingness to let PV eat up the share of conventional electricity sources.

A part of the responsibility lies in the hands of the PV industry: it claimed too often and too loud that grid parity was the Holy Grail of the industry and that, once reached, it would unleash the market without incentives and financial support. This pushed policymakers to believe it and, with the support of conventional utilities, to decide to step up the transition to a post-FiT era. The result was a rapid move in the direction of self-consumption policies and tenders for utility-scale plants.

After some years, the result is clear: the transition from a feed-in-tariff-driven market to a competitive PV market has failed in Europe, at least for the time being. Self-consumption schemes are in

the best case incomplete and in the worst case inadequate or unfair. Regulations have been introduced in most European countries aimed at slowing or destroying the PV market, and those that could have offered a fair frame to define adequate self-consumption rules are either too weak or too much oriented towards integration into the electricity markets. And when regulations were acceptable, such as in Italy or Germany, they were either retroactive measures or ill-fated anti-self-consumption regulations that contributed to damaging the investors' appetite for PV. In almost all cases, the consequence was a market crash that the temporary boom in the UK cannot contradict any longer.

Self-consumption

This having been written, self-consumption remains the way to go: the only business model for PV in the future outside of utility-scale plants selling their electricity is and will remain self-consumption – PV as a way to decentralise electricity production and to reduce electricity bills.

But first, we should all start to use the same vocabulary. 'Self-consumption' is the generic term to qualify any kind of situation where a PV installation produces electricity first for local consumption (in the building or nearby or even elsewhere) and injects the excess PV electricity into the grid. All other systems are variants where the treatment of the self-consumed electricity and the excess PV electricity differ. In other words, any self-consumption scheme can be qualified by defining the conditions of remuneration of the self-consumed electricity and the value given to the exported PV electricity.

One main criterion in a self-consumption scheme is the ratio of self-consumed electricity to the total PV production; in other words an economic ratio that under normal regulatory conditions has to be maximised – retail electricity being more expensive than the wholesale market price. The prosumers will try usually to maximise this ratio. But in most cases, unless the PV system is really small compared to the annual electricity production, this ratio will be significantly lower than 100%: everyone knows that reaching high shares of self-consumption with a PV production close to the annual consumption of a building is a complex technology challenge. Battery storage offers options to increase

the self-consumption ratio but at a high cost, DSM through HVAC offers cheaper options, but unfortunately PV will have to face the truth: unless systems are strongly downsized, the excess electricity has to be valued.

Net-metering and net-billing

In order to value this excess electricity, net-metering has been popular for at least two reasons: it is easy to put it in place (with power meters turning

"The only business model for PV in the future outside of utility-scale plants selling their electricity is and will remain self-consumption"

backwards for instance) and doesn't require important regulatory changes. Actually net-metering is the most simple self-consumption system: it simply values the excess electricity at the retail price. But it was as difficult to tune as it was simple to implement, which explains why several countries have taken the decision to amend it, adding taxes or grid costs rather than switching to a pure self-consumption system.

On the road towards the pure self-consumption system, the net-billing concept starts to emerge. Net billing attributes different values to electricity depending on its direction, which allows the valuation of PV electricity injected into the grid below the retail prices. In that sense, net billing is almost as simple as net metering but much easier to tune.

The value of PV electricity

Since net metering is a temporary scheme, the main debate becomes, especially in the USA, how to value this excess PV electricity. At market price? Below (to take transaction and management costs into account)? Or above (to include some additional services to the grid, to the system, to society)? In Europe, this is the direction that has been taken by European institutions: valuing PV on the electricity market, an interesting idea if the electricity markets conceived for dispatchable conventional sources were able to value correctly variable renewables. Germany and the UK offer a premium above the market price, fixed or variable, but the idea is there: the excess PV electric-

ity should be valued on the wholesale electricity market. Spain was more radical: excess PV electricity below 100kW receives zero. And all other countries where PV is allowed are proposing a value for PV electricity between these two boundary values: the retail price (net metering) and this Spanish extreme.

The right to self-consume

In the last two years several countries have set up policies aimed at restricting the right to self-consume PV electricity and to reduce electricity bills. Such policies have taken various forms: in some cases, variable grid tariffs have been transformed into fixed ones that have to be paid, even in case the real consumption of electricity falls to zero. In other cases, it is a specific tax on self-consumed electricity that is applicable (Austria, Spain), or it is a part of the contribution for renewable energies that has to be partially paid by prosumers (Germany).

In all cases, these policies impact the profitability of self-consumption-based business models by reducing the part of the electricity bill that can be compensated. In most European countries, the part of energy in the electricity bill represents between one-third and half of the bill: in that respect the right to self-consume can be significantly reduced and the profitability of PV installations become really difficult to achieve, even with high self-consumption ratios.

This shows immediately the complexity of any self-consumption regulation: whereas a feed-in tariff requires simply the definition of a price for every kilowatt-hour produced, self-consumption requires the right to self-consume electricity, the right to compensate grid costs and levies, but also the need for a regulation on the excess electricity, either a feed-in tariff or a way to trade electricity on the electricity markets, directly (which is complex for small installations) or through an aggregator (which requires also ad hoc regulations). This is also the reason why so many different schemes have been implemented in Europe.

Common sense for regulators

Some simple ideas should guide regulators in establishing efficient and fair self-consumption policies:

- **First** the right to self-consume should be granted and without any self-consumption tax. The electricity that is self-consumed has, contrary to what

Spanish law says, exactly the same effect as energy efficiency.

- **Second**, taxes and levies should be compensated without any limit. It makes no sense to promote the development of renewable energy and then to brake it to save the revenues of the authorities.
- **Third**, variable grid costs shouldn't be paid until the penetration of PV reaches a significant percentage of the electricity demand. The grid costs unpaid by prosumers can be easily mutualised in the overall grid costs with a very limited impact on the electricity bill of all consumers. Three percent of self-consumed electricity (which is close to the German number) increases the electricity bill of all consumers by 1%, less than annual inflation. And without taking into account the positive effects of PV on the cost of the distribution grid. In a nutshell there is no urgency to modify the ratio between fixed and variable grid costs. This can be done in a few years, for new installations, when PV costs will have further decreased.
- **Fourth**, existing systems should be protected from regulatory changes.

A grandfathering clause is absolutely necessary in all European countries, at least until the end of the grant period for ongoing feed-in tariffs.

- **Fifth**, it seems obvious that for the time being electricity markets are unable to bring a reasonable return for PV electricity. With prices around four eurocents per kilowatt hour, this doesn't represent the real value of PV electricity. In that respect, ensuring a low feed-in tariff for self-consuming PV installations, in order to value PV at the right price, can be a much simpler option than forcing small installations to pass through an aggregator to get a reduced market price.

Reviving the self-consumption project

Europe has clearly missed the opportunity to frame its PV transition. The efforts from European institutions have been insufficient to counter the anti-self-consumption policies of some countries and the obvious mistakes of others. Now, consistency is needed at all levels to ensure that the right policies will be put in place and that the barriers to self-consumption will be lifted.

There is hope coming from the European Commission but the final decisions will have to be taken by national administrations that need to pave the way for a sustainable development of PV through self-consumption in Europe. Under these conditions, the European PV market will have a significant chance to experience a re-birth and play a major role in the PV market that continues to grow swiftly on a global scale. ■

Author

Gaëtan Masson is founder director of the Becquerel Institute, a Brussels-based research and consultancy organisation specialising in renewable energy, particularly PV. He previously led the business intelligence arm of trade body EPIA, now SolarPower Europe. He is the operating agent of Task 1 of the International Energy Agency Photovoltaic Power System Programme (IEA PVPS), vice-chairman of the European PV technology platform and participates on the scientific committee of EU-PVSEC and Intersolar Europe conferences.



SOLAR ENERGY UK

Clean Energy LIVE

Solar and Storage leading the low carbon transition

THE NEC, BIRMINGHAM, UK | 4 – 6 October 2016

uk.solarenergyevents.com

Some of 200+ exhibitors include:

