

## THE PV MARKET DEVELOPMENTS IN GREECE

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**Abstract:** This paper presents the state of the PV market segments in Greece, the achievements so far and the projections of the PV market for next year. The PV market environment in terms of new PV development policies, net-metering, the new feed-in tariffs and measures for feed-in tariffs reductions, The special imposition of taxes on revenues on PV electricity generation plants in Greece, aiming to reduce the burgeoning RES Fund deficit, which is forecast to almost triple by the end of 2014 due partly to the late photovoltaic growth will be presented and discussed.

**Keywords:** Greece, PV Market.

### 1. OVERVIEW OF THE GREEK PV MARKET

During the period 2008-2013, a total amount of around € 5 billion were invested in Greece in photovoltaics and the cumulative installed capacity is currently standing at 2600 MWp. For 2013, despite the economic crisis, the momentum due to the attractive feed-in tariff contracts that certain developers were still holding boosted the annual installed capacity to 1042.5 MWp. In the year 2013 the energy produced by photovoltaic systems in Greece reached 6.7% of the electricity consumed. The development of the annual and cumulative PV system capacity in Greece is presented in Figure 1.

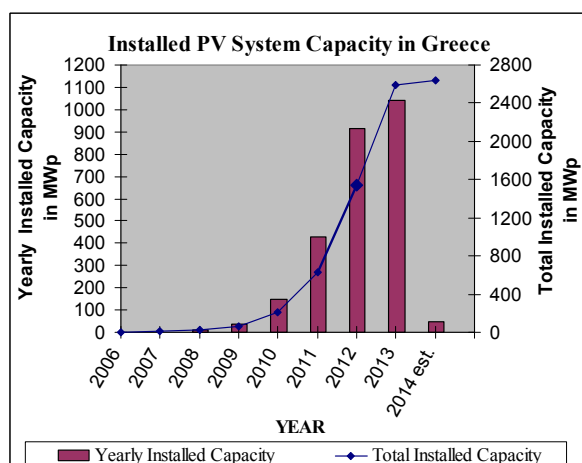


Figure 1: Historic PV market data, yearly and cumulative introduction of PV systems in Greece (CRES estimate for 2014).

Since 2010 the feed-tariffs for new PV systems were reduced four times, the first time in 2010, then twice during 2012, and finally in May 2013. Now the current feed-in tariffs for PV systems under 100 kWp are standing at 115 Euro/MWh and for systems over 100 kWp are 90 Euro/MWh. For all PV systems in the non-interconnected system (islands) the feed-in tariff stands at 95 Euro/MWh, see Table 1. While in Table 2, you may note the digression until the year 2020 of feed-in-tariffs (FiTs) for new PV plants under 10 kWp on buildings. For the year 2014 the FiT is standing at 120 €/MWh.

Due to the attractive feed-in tariffs that drove the interest in investing in PV systems and the methodology that the surcharge by PV systems over the System Marginal Price passed to consumers was calculated, without for example, taking into account the savings during the demand peak times that PV systems are contributing, led in part to the increasing deficit in the renewable energy fund that is managed by the operator of the electricity market (LAGIE) and it is the funding source for the RES system owners.

Table 1: Feed in tariffs for PV systems **other** than the special program for PV systems on Buildings.

	Interconnected System		Non-Interconnected System (islands) (independent of power)
	A	B	
	>100kW	<100kW	
February 2013	95,00	120,00	100,00
August 2013	95,00	120,00	100,00
February 2014	90,00	115,00	95,00
August 2014	90,00	115,00	95,00
For every year n from 2015 and on	1,1 x SMP <sub>n-1</sub>	1,2 x SMP <sub>n-1</sub>	1,1 x SMP <sub>n-1</sub>

SMP<sub>n-1</sub>= System Marginal Price of previous year

Table 2: Feed in tariffs for the special program of PV systems on Buildings under 10 kWp.

Month/Year	Feed-in Tariff in Euro/MWh
February 2013	125,00
August 2013	125,00
February 2014	120,00
August 2014	120,00
February 2015	115,00
August 2015	115,00
February 2016	110,00
August 2016	110,00
February 2017	105,00
August 2017	100,00
February 2018	95,00
August 2018	90,00
February 2019	85,00
August 2019	80,00

The Greek government under the pressure of the escalating renewable energy fund deficit, besides the drop of the feed-in tariffs for new PV systems, decided first in 2012 to impose a temporary (until July 2014) special tax on revenue for PV plants connected to the

grid in 2013 and earlier. The special tax was imposed between July 1st 2012 and June 30th 2014, ranging between 25 and 30% on the sales of electricity before VAT, depending on the connection time to the grid. Residential systems on buildings under 10kWp were excluded from the special tax.

As all the above measures were not sufficient to nullify the renewable energy fund deficit and there were delays of the payments to RES system owners, that at times reached 7 months, a so called “new deal” was drafted and was passed in the Law 4254/2014 (April 2014). The “new deal” is imposing a retroactive reduction of contracted feed-in tariffs in some cases up to 30% depending on the time of grid connection of the plant and whether there was a subsidy received or not for the initial investment. The rate of feed-in tariff reduction was recalculated aiming to reduce the Internal Rate of Return of the investment between 12 and 15%. Furthermore, all RES generators including PV system owners (excluding PV systems up to 10kWp on buildings) were required to issue once a credit invoice to the electricity market operator (LAGIE) providing a discount, from 20% to 37.5% depending on the connection time to the grid, on the total value of the injected electricity for the year 2013.

In return, the RES system owners would automatically receive an extension of their contracts of electricity sale for 7 additional years to the original 20 years, offering to the owners the selection between two ways of reimbursement for the additional 7 years. One of the two reimbursement choices offers a tariff of 90 Euro/MWh, which may be the extension contract of preference, since the second choice offers no specific tariff but mentions a methodology to be developed and implemented by ministerial decree at a later time.

The same Law lifted also the halt on the licensing procedure for new PV projects that was in effect since 2013 (residential PV systems were excluded from this licensing halt). The licensing procedure was opened again in 2014 with an annual cap of 200 MW. If the cap is not reached in the running year, then the remaining capacity is carried over to the next year.

Due to the significant and retroactive reduction of feed-in tariffs, the special taxes on the electricity sales and the general economic situation, the PV market in Greece is stagnant and according to the Hellenic Association of Photovoltaic Companies (HELAPCO) the collapse of the market at the end of 2013 that is going on in also in 2014 has reduced the workforce in the field of photovoltaics by more than 75%. In absolute numbers that represents more than 15.000 jobs. The PV market situation is confirmed by the small PV capacity of new connected systems for the first 7 months of 2014 that reached only about 10 MWp.

Currently, in the next month, we are waiting for the vote of the ministerial decree regarding a net metering program for photovoltaic systems. The public consultation that was organised by the Regulatory Authority for Energy (RAE) ended at the end of August 2014. The consultation was within the scope of Article 14A of Law 3468/2006 concerning the establishment of

renewable energy system auto-producers framework by offsetting their electricity consumption (Net Metering). The proposed net metering program for PV systems, as initially proposed, allows also owners of existing PV systems on buildings up to 10 kWp to join the program if they wish. The right for participation is open for all natural persons, private and public legal entities that own or have the right to use the PV system installation site. The credited energy may offset consumption for a period up to one year.

Most PV stakeholders are proposing to the government to increase the PV system capacity to at least 100 kWp and change the calculation methodology for the charges for the uniform fee for pollutants emission reduction (ETMEAR) and the grid charges so that they are applied only to the energy consumed from the grid. The stakeholders are claiming that the small PV system capacity and the extra charges are going to make the program unattractive financially. Therefore, the fine details of the proposed ministerial decree are expected to make the difference between a successful program and a reenergized PV market or not in Greece. Therefore, the projection of PV installations in Greece for 2014 is unclear but it is certainly going to be below 50 MWp given that the new PV program for auto-producers is not going to take effect before the last quarter of the year.

## 2. PV MARKET SUSTAINABILITY PROPOSALS

Regarding the sustainability of the PV market in Greece it is noted that in Table 1, the FiT for 2015 will be 1.1 to 1.2 times the average System Marginal Price in the previous year (2014) which now ranges at 50-60 €/MWh. Therefore a FiT of 60 €/MWh is a very low value as a new investment is not going to make any profit. Therefore the FiTs from 2015 and on should be reconsidered in order to render the investments in PV systems attractive. In comparison, it is mentioned that the FiTs for wind and other mature RES technologies range between 82 and 105 €/MWh in the mainland, depending on installed system capacity and whether there is a subsidy on initial investment or not. Furthermore, a study carried out by the firm Booz & Co on behalf the electricity utility Public Power Corporation (PPC) concerning the comparison of the cost of electricity production from lignite in Europe. It was estimated that the final full cost of producing electricity from lignite in Greece for the year 2012 was 60 €/MWh.

While considering that the cost of electricity production by gas plants is exceeding 110 €/MWh, it is reasonable to support a solar kWh compensated in the range of 80 to 100 €/MWh.

It is noted that according to the National Renewable Energy Action Plan (NREAP) [1]. That at the end of 2013 the total PV capacity in Greece, except the PV systems on buildings under 10 kWp, exceeded the 2200 MWp (2206.1 MWp) which was the planned photovoltaic system capacity in the year 2020. Therefore, the government has to update its NREAP targets and take appropriate measures so that the PV market sector, where up to 2013 several thousand companies were active and more than 25.000 people were employed. Furthermore, it has to take into consideration also all benefits and charges of all forms of energy and the initiative to

transform the electricity market into a simple, transparent and fair operating scheme for all players and the consumers.

### 3. CONCLUSIONS

Given that PV system installations in Greece have surpassed the target of installations for 2020 it is proposed to review the national renewable energy sources mix for 2020, as the relevant Ministerial Decision no longer reflects the reality of the market. As the new FiTs for new PV system installations no longer impose any financial burden to the special account for RES of LAGIE (The energy market operator in Greece) it is recommended to remove economic, administrative and institutional barriers that slow down projects and discourage investment in green development.

Finally, attention and a special FiT should be given to the developing sector of Building Integrated PV systems (BIPV). The integration gives added value to the PV system and promotes the involvement of architects, thus introducing BIPV in the mainstream of building design. In any case, action should be taken to modify the building code in Greece in order to allow PV integration on buildings.

### REFERENCE

[1]. NATIONAL RENEWABLE ENERGY ACTION PLAN, in the scope of Directive 2009/28/EC, July 2010, Ministry of Environment, Energy and Climatic Change.