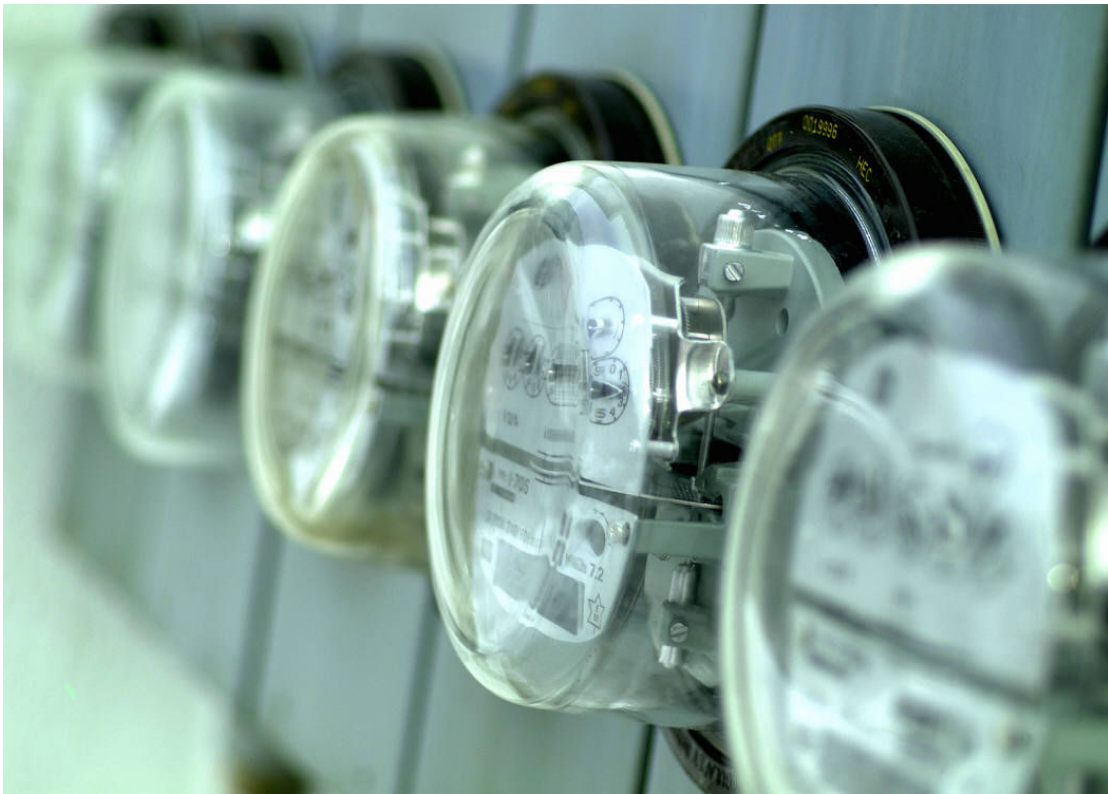


# **GREEK ENERGY MARKET REVIEW, TRENDS AND DYNAMICS IN YEAR 2012**

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This report is based on market surveys and data provided by Greek companies active in the domestic energy market.

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# **GREEK ENERGY MARKET**

## **Review and Dynamics**

### **in Year 2012**

Energy market followed the recession of the business cycle as can be seen from the System Marginal Price (SMP), as well as from the load Demand, since the SMP dropped by 4.4% and the load demand by 2.3% as compared to 2011. Renewable energy was another factor affecting the SMP. Its penetration caused a significant growth of installed capacity by 37% compared to 2011, namely 2,939 MW were in renewable energy operation by the end of 2012 in contrast to 2,141 MW at the end of 2011. On the production side, renewable energy equally increased by 36.5%, with a 5,406 GWh production during 2012 versus 3,985 GWh in 2011.

The Greek monthly average energy price of next day baseload dropped to 45.3 €/MWh in April 2012 from 63.6 €/MWh the previous month, whereas the drop in monthly prices continued in May 2012 (44.4 €/MWh). Monthly average energy prices of baseload and peak load in April and May 2012 were the lowest since December 2010.

Lower daily energy prices in April 2012 were mainly due to milder than usual temperatures and due to the vacation period that led to lower industrial demand for energy (Greek Easter in the middle of April). Mild weather persisted in May 2012 causing lower heating demand and therefore the prices stayed at low levels most of the days. Another factor contributing to lower prices was the upward trend of hydroelectric power generation. Hydroelectric power sources are usually conserved during winter in order to satisfy higher power demand over summer.

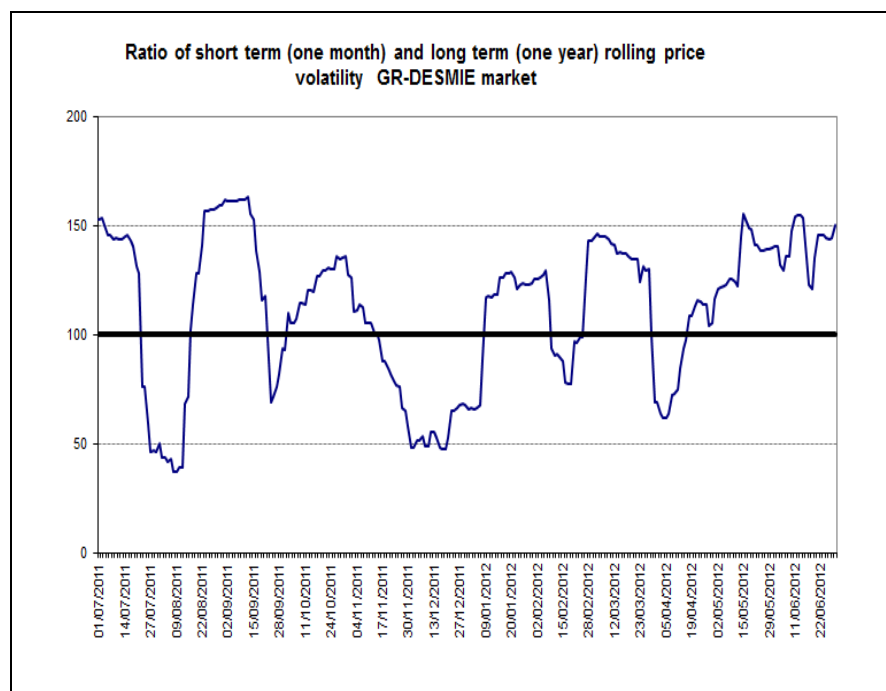
However, on May 14th, average daily baseload price increased to 83 €/MWh, while peak load price soared to 102 €/MWh. This growth is due to an abnormality in the supply calculation by the dominant energy provider (PPC - Public Power Corporation) as one of the independent natural gas power plants was shut down causing a decrease in the domestic energy supply. In June 2012, with the advent of the hot period, energy prices in Greece increased. Excess energy demand is usually satisfied with the operation of natural gas grid power plants in addition to the continuously operating lignite plants.

As production costs based on natural gas were high over that period since gas is being imported mostly on the basis of long-term contracts linked to oil prices, the above energy demand caused by the summer heat led to higher energy prices some days (the highest baseload price occurred on 27th June, above 90 €/MWh the 2nd quarter of 2012).

The Greek energy market volatility was higher than the previous year average during the greater part of the 2nd quarter of 2012, mostly due to a sharp price increase in the middle of May and to the high temperature effect on the energy production mix and to the production costs as described above.

**FIGURE 1**

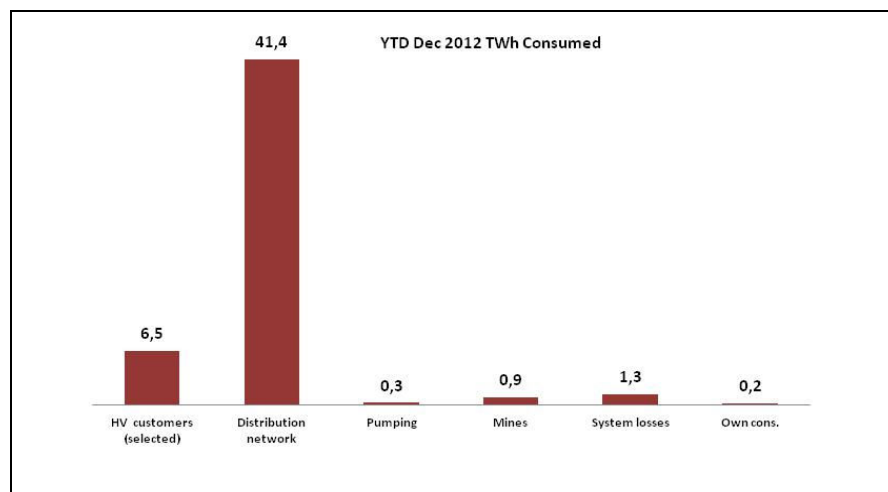
**Ratio of short-term (monthly) and long-term (annual) market price rolling volatility Greece - Hellenic Transmission System Operator**



**FIGURE 2**

**From the beginning of year – December 2012 Consumption TWh**

(HV selected clients – Distribution network – Pumping – Mines – System Losses – Own Consumption)

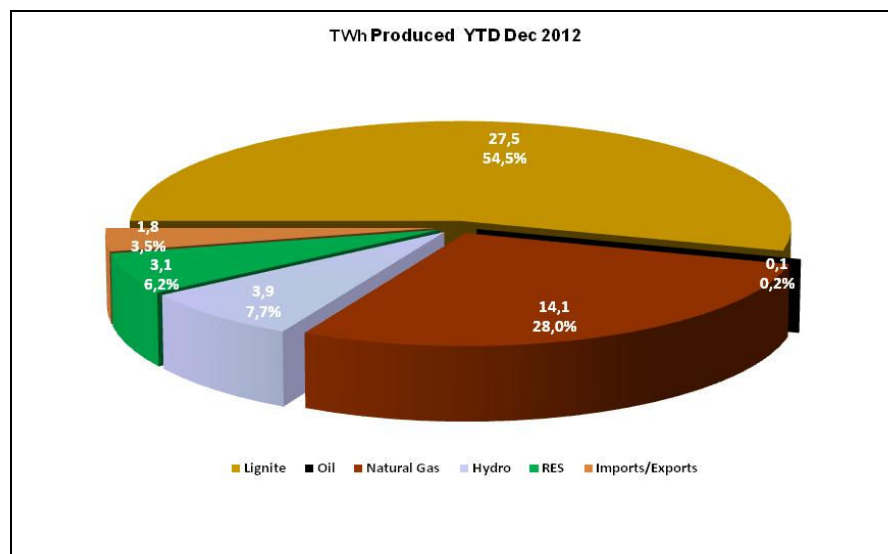


The 2012 production has reached 50.5 GWh including import and export, decreasing by 3% as compared to 2011 (51.9 GWh).

**FIGURE 3**

**TWh Production from the beginning of year – December 2012**

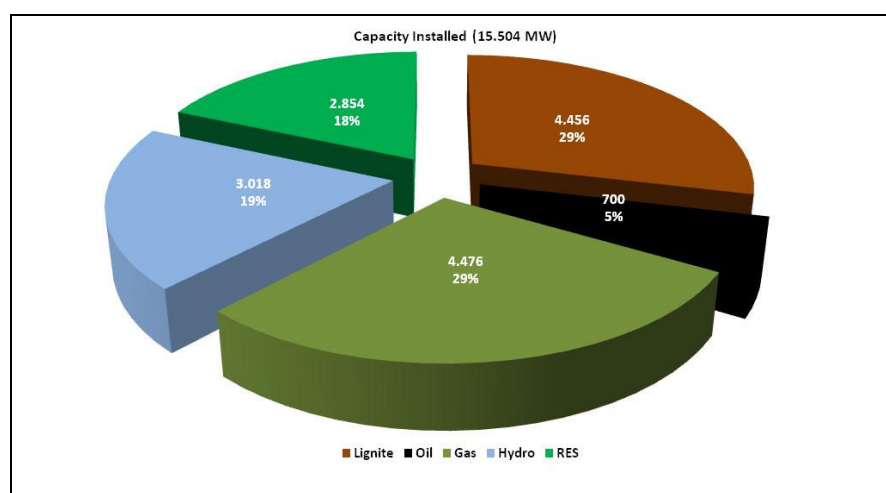
(Lignite, Oil, Natural Gas, Hydro, RES, Imports/Exports)



Throughout 2012, approximately 90 MW Wind generators, 579 MW Photovoltaic and 8 MW Small Hydropower plants were added. Thus, total production capacity amounts to 15.5 GW, and the production capacity of the Renewable Energy Sources amounts to 2,854 MW.

**FIGURE 4**

**Capacity Installed (Lignite, Oil, Natural Gas, Hydro, RES)**



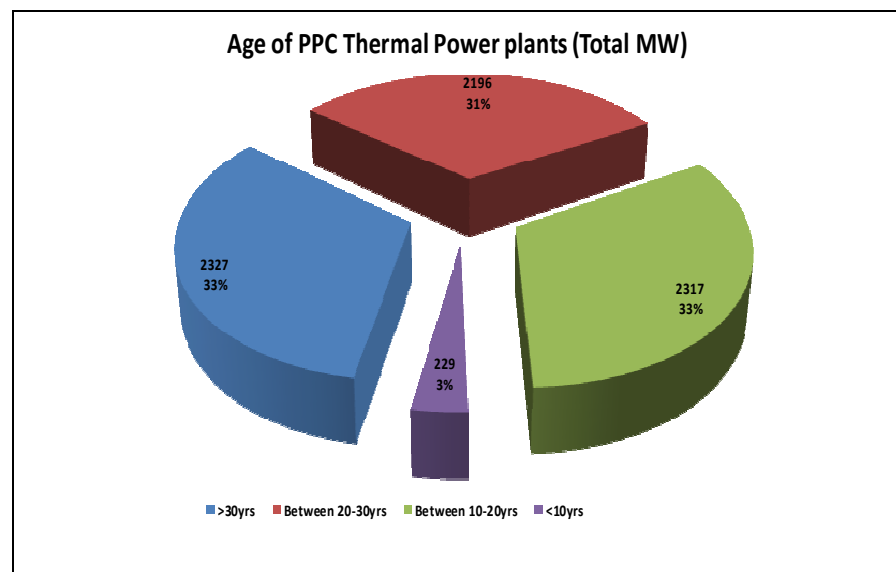
Throughout 2012, the commercial operation of a new Combined Cycle production unit with natural gas fuel (CCGT) was launched, specifically one (1) new entry in the Energy Market. Therefore, because of legislation, this led to a decrease in CACs payment by ~ 3.5%. In addition, after a period of public consultation, and in order to comply with the EU Directive 2009/72/EC, Law 4001/2011, the founding of the following was stipulated: “HTSO (Hellenic Transmission System Operator) spin-off process”, adoption of the IPTO (Independent Power Transmission Operator) model à since 1-2-2012, the following entities were established:

- ❖ System Administrator: grid line holder 100% controlled by PPC or by Independent Power Transmission Operator (IPTO), acting under the capacity of Administrator of the Greek Electricity Transmission System. It keeps most of the HTSO powers, including connectivity management, centralized transmission and real-time operation, imbalances settlement and cost recovery, system security and expansion planning.
- ❖ Market Operator: regulator of the energy market, (OEM) Operator of Electricity Market, 100% held by the Hellenic Republic. Manages mostly Next Day Purchase Planning.

Greek thermoelectric plants' maturity per decade of operation is shown below. We can see that more than 50% of the thermoelectric plants in Greece are less than 20 years old, mostly because of private natural gas power plant constructions.

**FIGURE 5**

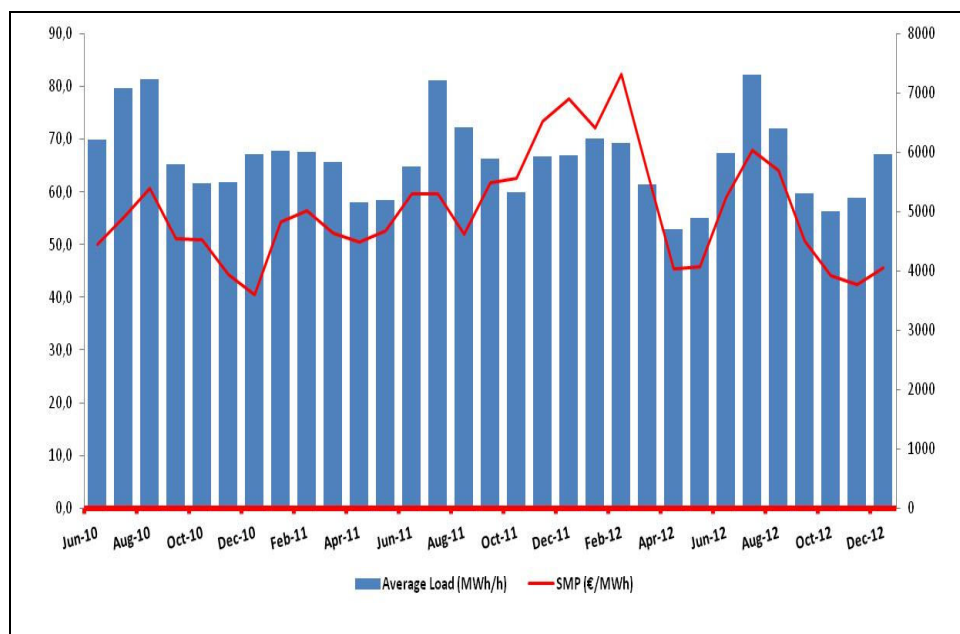
**Age of PPC Thermal Power Plants PPC (Total MW) – (>30 years, Between 20-30 years, <10 years)**



The following diagram shows the trend of SMP, the load, the baseload and the Dirty Spark Spread (difference between the price of electric energy and the corresponding cost of natural gas) from January 2008 until December 2012.

FIGURE 6

Average Load and SMP



The load recorded a decrease of -2.3% in 2012, followed by the SMP with a similar decreasing trend of 4.4% compared to 2011.

Electricity production based on natural gas decreased by 5% to 14,135 GWh within 2012 compared to 14,850 GWh in 2011, based on lignite remained at the same level of 27,570 GWh versus 27,544 GWh in 2011. Commercial activity also dropped by 45% because of a lower domestic demand and lower SMP. Regarding electric energy sales, 4 retail power companies were forced to interrupt their business activities because of the increasing debt to the Hellenic Republic, since this debt had led to operational difficulties and to delays in payments to independent energy producers and also to DEPA regarding the consumed quantities of gas. PPC privatization negotiations have been postponed until 2013 and the sale of 100% of DEPA shares shall also be discussed in 2013.

Natural gas combustion in 2012 was ~ 52 TWh. In particular, Heron I & II companies have consumed 5.52% of total consumption, which amounted to half of the previous year, 54% of the total Supply (3,828 MCM). The primary Natural Gas importer was Gazprom Russia with 54% of total supply (3,828 MCM) decreasing by 5% compared to 2011 (4,642 MCM). Power plants (2,633 MCM 69%) and the industry (641 MCM 17%) were the primary natural gas consumers.

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