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Power Imbalances - Alternatives for the energy sector in Greece and its European and global context

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Energy in Greece.

Basic information and figures.

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A. Energy. Energy mix, ownership, distribution, consumption

Ai. GENERAL

According to Eurostat, 4 out of 27 EU countries consume 56,5% of the EU consumed energy. These are: Germany=19,1%, France=15,3%, Italy=10%, UK=12,1%.

Greece consumes 1,6% of the total EU consumed energy. According to the Eurostat 13 February 2013 news release, Greece's energy import dependency is 65,3%, ranking 8th out of the 27 EU countries.

Through the years 2007 to 2010, total energy consumption decreased 13.24% [\[1\]](#).

Greece consumes about **19 million tons of oil equivalent (Mtoes)**. This corresponds to approximately €9 billion turnover, equivalent to 5% of the GDP and directly employs 50,000 workers, which is 1% of the workforce. The total consumption is constantly dropping since 2007 (Table 1).

The total energy demand (gross) is covered mainly by oil and petroleum products (53.2% - 2010), followed by solid fuels (27.8%), natural gas (11.4%) and renewables (7.6%) (Figure 1). In Table 2, the sectors which consume the final energy are presented.

The electric power accounts for 27% of the country's final energy requirements, and fossil fuels (oil and gas) 67%.

Table 1. Greek final energy consumption through the last years (EUROSTAT) [\[2\]](#)

	<i>[Mtoes]</i>							
	2004	2005	2006	2007	2008	2009	2010	2011
Greece energy consumption	20.3	20.8	21.4	21.9	21.3	20.5	19	18.8

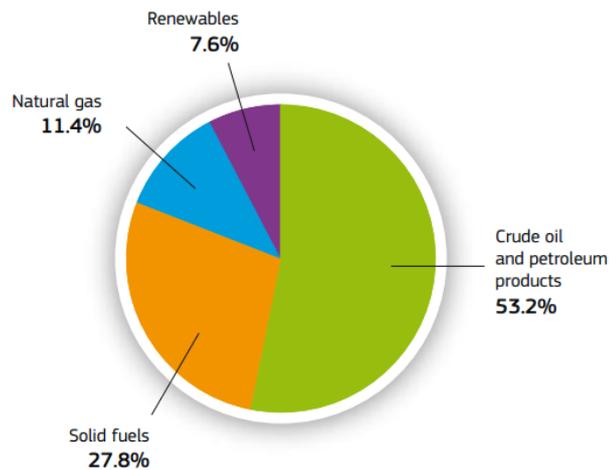


Figure 1: *Gross inland Consumption*
(as % of total Mtoe) – 2010 [3]

Table 2. Who consumes (Final energy consumption) [4]

	[Mtoes]
Industry	3,2
Transportation	7,6
Residential	5,5
Agriculture/Forestry	0,25
Services	1,87
Other	0,38
Total	18,8

Aii. ELECTRICAL POWER

Aii-a. Renewables

Through the last years, an effort of aiding the penetration of all kinds of renewable sources (RES) was made. Measures such as Feed-In-Tariffs (FITs) were taken in that direction. In 2011, RES produced energy increased to a percentage of **11,6%**, when at 2010 it was 9,2% (8% in 2008, 8% in 2006, 7,1% in 2004) [5]. Detailed data of installed power of the RES can be seen in Table 3 and in Figure 2. Today the RES total installed energy is higher.

Table 3. Renewables installed power. [6]

Installed Electrical Power (MW)										
Renewable	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Small Hydro	42	45	45	50	59	64	77	95	158	180
PV	0	1	1	1	1	1	5	9	12	37
Wind	226	270	287	371	472	491	749	846	1022	1140
Biomass	1	22	22	22	24	24	24	39	40	41
Total	269	338	355	444	556	581	855	989	1232	1398

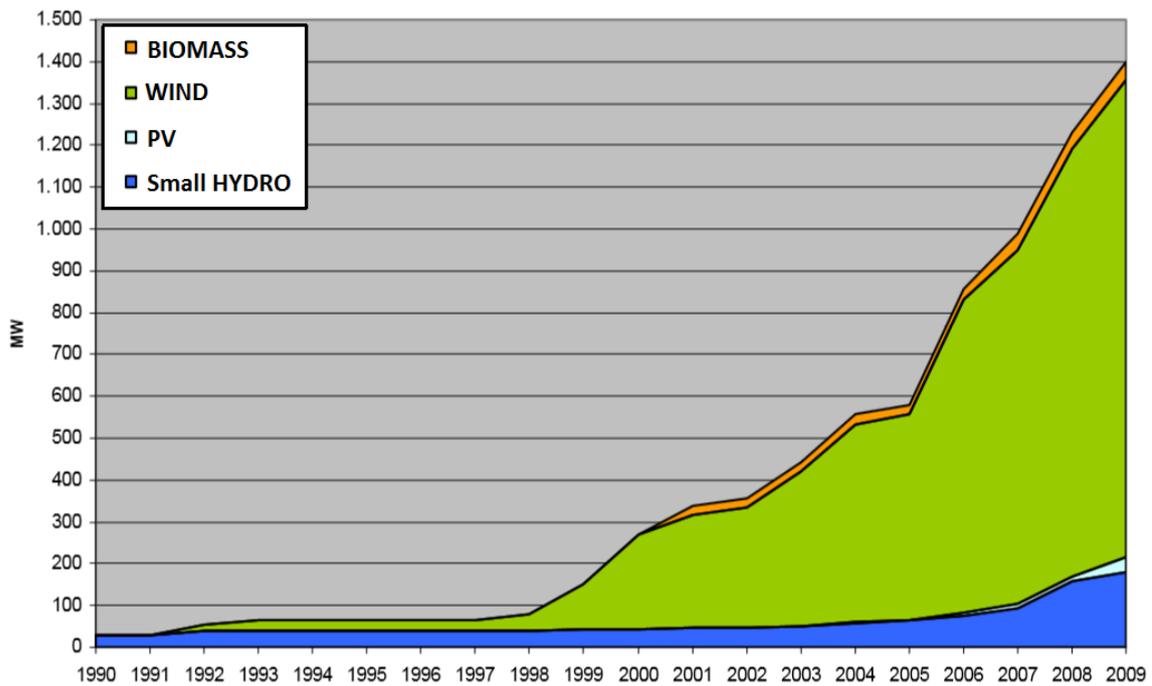


Figure 2: Renewables Installed power (2009 data) [6]

Aii-b. Ownership. Privatization. Trends. Prices

Public participation in PPC decreased gradually, only to give room to private capital investments.

The goal of downgrading PPC, was attempted for more than 20 years. Already from the right wing government of 1990-1993, the first moves towards this direction were made. A big effort to divide the company’s sectors was launched, mainly because the insurance deposits of the PPC workers were in fact part of PPC’s property. After this issue was “dealt with” (there is a very interesting debate about the responsibilities of governments and government-sympathizers trade-union leaders) everything was ready for the privatization of PPC.

In 1999, the law n.2773/99 [7] was passed, so the liberalization of the electricity market was legislated.

In the same year, 49% of the company was sold as shares to individuals.

In 2000, **RAE (Regulatory Authority for Energy)** was founded. RAE has been assigned more and more responsibilities since. Within RAE’s responsibilities lie the observance and rules setting, in the whole energy market.

A big effort to facilitate the development of new power companies is being made. The Greek state along with the EU cover an important part of the initial capital for new private companies investments (it may reach as much as 90% when it comes to RES) [8], [9]. PPC is forced to buy the expensive energy from the companies, and to re-sell it with losses. PPC is forced to put out its own generators to give way to the new companies. PPC is forbidden to develop new power plants of its own. Even if private companies do not produce energy, they are subsidized by 100.000 per installed MW/h.

Since the beginning of the energy liberalization the prices of the electrical energy have risen 50%, but more rises are demanded by the new energy companies executives, on the basis that “PPC doesn’t calculate the KWh price properly”.

The last 15 years the “subtle privatization” is developing widely, with the mechanical and electrical maintenance taken over by contractors, succeeding in large profits for them and very low wages for their workers.

Note that there are now three subsidiaries of the PPC, working on “separation of monopolistic activities” of PPC [10].

- **Independent Power Transmission Operator (ΑΔΜΗΕ)**
- **Hellenic Electricity Distribution Network Operator (ΔΕΔΗΕ)**
- **Operator of Electricity Market (ΑΑΓΗΕ)**

According to the 24/7/2013 Cabinet Act [11], until the end of 2013, 49% of the transmission lines will be sold and the main investor will take over the management, while PPC will give up the rest 51% of the networks in the first semester of 2014.

This means that the transmission lines paid and owned presently by the Greek Public sector, will be given away to private investors and PPC will have to pay good money to transfer its energy product, by the lines once belonging to PPC [8].

The current situation on electrical energy, as far as imports-exports, energy mix, installed capacity, and ownership of the production, is shown in Tables 4 to 8.

Table 4. Domestic production – Imports in electrical energy

	Percentage on final electrical power consumption				
Domestic production	90% (55,8 billion KWh)				
	<table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="text-align: center;">PPC</td> <td style="text-align: center;">67%</td> </tr> <tr> <td style="text-align: center;">Others</td> <td style="text-align: center;">23%</td> </tr> </table>	PPC	67%	Others	23%
PPC	67%				
Others	23%				
Imports	10 % (6,2 billion KWh)				
Total	100% (62 billion KWh)				

**Data of 2011*

Electrical power is mainly produced from solid fuels (Table 5).

Table 5. Energy mix in domestic electrical power production

	Percentage in electrical power production
Lignite	50%
Natural Gas	27%
Oil (Mostly on the islands)	9%
Renewable Sources <i>(Including large hydropower plants)</i>	14%
Total	100%

**Data of 2011*

According to RAE (Regulatory Authority for Energy),

*“The emergence of environmental protection as a high priority of the Greek state, leads to the promotion of **Renewable Energy Sources with the aim to increase their participation in electricity consumption to 34% by 2020.** In the same context, emphasis is put on accelerating the penetration of natural gas in the energy balance. As the life-time of the known exploitable lignite reserves does not exceed 35 years, it has been suggested that new fuels such as coal should be put in the Greek electricity balance, in order to extend the availability and use of lignite for more years. The coal units achieve higher efficiencies than lignite and therefore emit less carbon dioxide per unit of produced electricity. (The emissions of sulfur dioxide are treated with anti-pollution facilities such as flue gas desulphurisation.) Furthermore among the advantages of coal is that, while natural gas will be available for the next 50 to 60 years, coal will be available for at least 200 years yet. However, the future use of coal will depend on the ability of coal units to adopt low-cost clean and efficient combustion technologies to adapt to the strict environmental requirements of the "Kyoto Protocol" and the strict European standards for new combustion plants.”* [\[12\]](#)

Table 6. Installed Capacity

Installed Capacity (GW)	
Named installed capacity	14,8
Real available capacity	11
Peak demand	10

*Data of 2011

Table 7. Ownership of the Power plants

Real Available Capacity (GW)							
	Lignite	Gas	Renewable			Oil	Island Oil plants
			Hydro	Wind	PV		
PPC	4	1,7	2,5 (large Hydro)			0,7 GW (total 8,9)	1,6
Others private groups		2,7	1,7				

*Data of 2011

Table 8. Main private groups investing in electro-production

Main private groups Installed power	
ELPEDISON (EDISON {Italy} & Latsis Group collaboration)	0,8 GW
PROTERGIA & ALOUMINIO (Mytilineos Group)	0,8 GW
HERON (GEK-TERNA Group & GDF-SUEZ Group collaboration)	more than 0,6 GW
KORINTHOS POWER (Mytilineos Group & Vardinogiannis collaboration)	0,4 GW
ROKAS-IBERDROLA (ROKAS Group & IBERDROLA RENOVABLES {Spain} collaboration)	250 MW

*Data of 2011

Prices Power prices for households increased in 2010 and in 2011, mainly due to a sharp rise in VAT and other taxes, but also as a consequence of adjustments in regulated tariffs to bring them more in line with costs. From 2009 onwards, increases in prices for industrial customers were also due to the increasing tax and levy component of end-user prices and an adjustment in regulated tariffs, triggering a 14% rise in power prices between 2008 and 2011. In 2011, the share of network costs within the household prices without taxes was 28%, which was among the lowest in the EU-27. The share of network costs in industrial retail prices without taxes was even lower at 17%.

At the end of 2011, price regulation for medium voltage customers was removed. Price regulation for domestic and small business customers is expected to continue until mid 2013. Greece is starting to roll out smart meters and has adopted a legal framework on the implementation of smart metering (Article 15 of Law 3855/2010). Yet, no official schedule for the roll-out has been published. [3] However, prices keep rising rapidly (Figure 3).

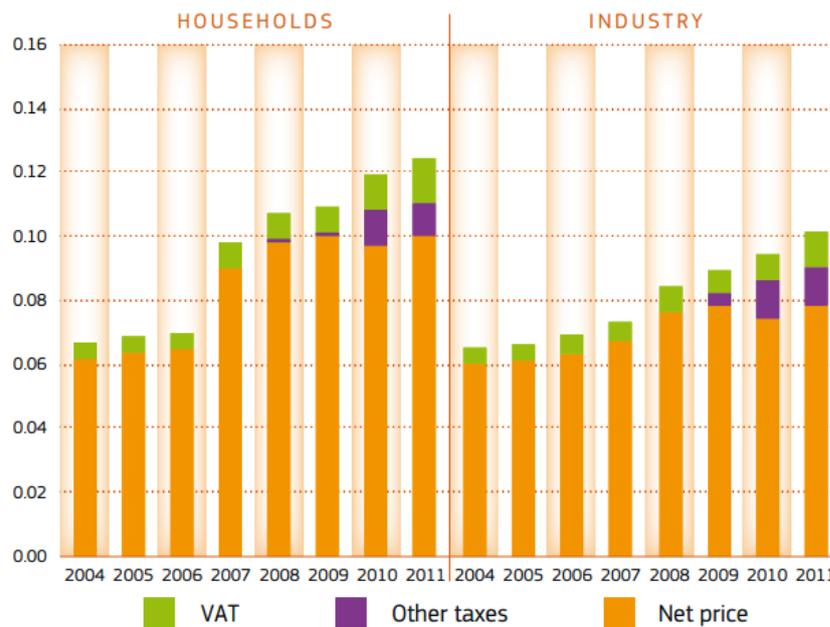


Figure 3: Electricity retail prices (€/kWh)[3]

Aiii. OIL

Oil production, is owned by **Hellenic Petroleum**. Since this year, there is no safeguard that the public sector will have a guaranteed participation in the Majority Board members [13].

(The latest Majority Board act states that there number of the Greek public sector is not harmed as long as it holds above 35% of the shares, **but** the correspondent paragraph of the Hellenic Petroleum *Articles of Association*, that used to set the lowest shares percentage of the Public Sector, has been deleted since January 2013).

Hellenic Petroleum has a €2,4 billions **borrowings debt**.

Main suppliers of crude oil are Russia, Kazakstan and Arabian countries. In Table 9, the main share holders of the Hellenic Petroleum are presented; the main sectors that consume oil can be seen in Table 10.

Table 9. Main share-holders of Hellenic Petroleum.

	Shares Number - % of total shares
Greek Public (HRADF) (ΤΑΙΠΠΕΔ)	108.430.304 35,4770%
Pan-European Oil and Industrial Holdings S.A.	130.122.305 42,5744%
Investing Public	67.082.576 21,9486%
Total Shares	305.635.185 100,00%

31st December 2012 data

Table 10. Oil consumption

Oil consumption per sector	
Transportation	54%
Household	20%
Industry	15%
Manufacturing and agriculture	10%

Oil prices constitute mainly of the refinery price (roughly 35%) and taxes (roughly 60%). Pump price of the **heating oil** was about **1,3 €/lt**, while in 2007 was about **0,60 €/lt**. In 2013, **unleaded gasoline** pump price fluctuates around **1,6-1,8 €/lt** (See also Figure 4), while in 2007 it was less than **1,1 €/lt** [14]. In September 2013, unleaded gasoline prices as high as 2€/lt can be found in certain petrol stations.

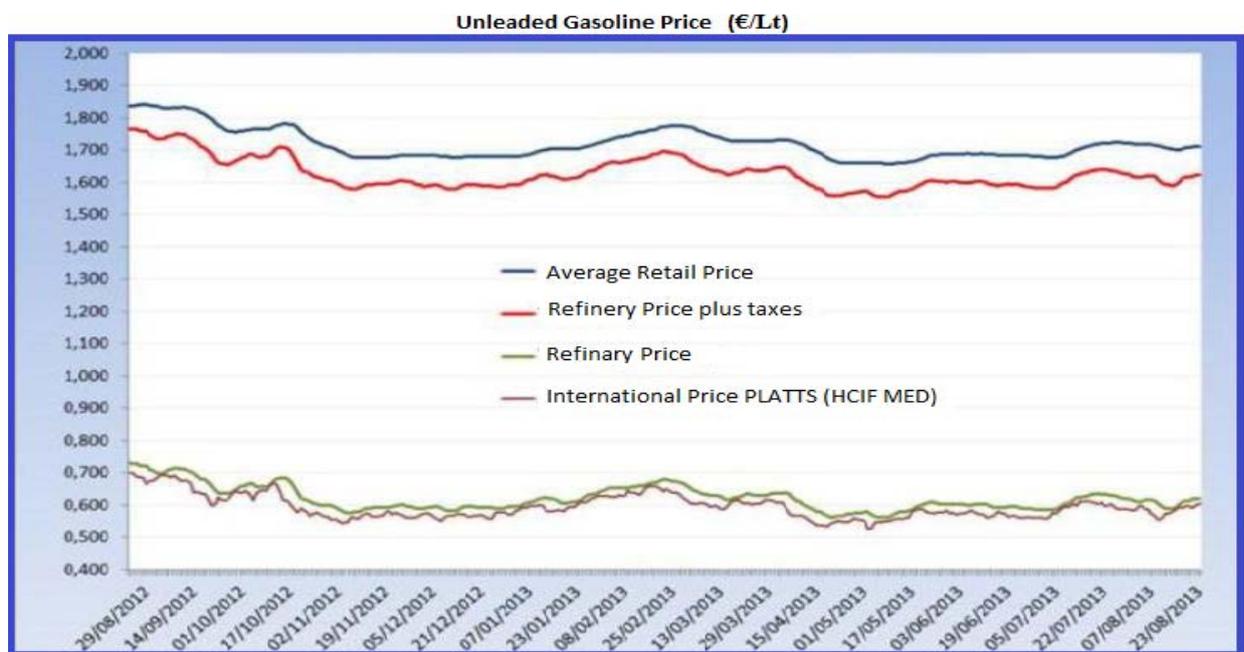


Figure 4: Unleaded Gasoline retail prices (€/Lt) [15]

Aiv. GAS

Natural Gas has only been available in Greece since 1997 and its use has been actively promoted through tax rebates, in order to reduce the use of oil. From 2010, however, due to the economic crisis, gas consumption related taxes have been substantially increased. There are currently three regional gas distribution/supply companies (called EPAs, the majority owned by DEPA) that operate under a concession regime for a period of thirty years. EPAs hold the exclusive (monopoly) right to (a) plan, design, construct, operate and exploit the distribution network in their respective area and (b) supply gas to small consumers (annual consumption <100GWh/pa) in their respective area. As a result, small consumers connected to the distribution grid of each EPA are not eligible and cannot switch to alternative gas suppliers.

In Tables 11 and 12 the main gas companies and the gas prices, are presented respectively.

Table 11. Gas companies

	Ownership	Management
EPA Thessalonikis	<ul style="list-style-type: none"> • 51% DEPA (Greek Public Gas Distribution Company) • 49% ENI Company (Italy) 	ENI Company (Italy)
EPA Thessalias	<ul style="list-style-type: none"> • 51% DEPA (Greek Public Gas Distribution Company) • 49% ENI Company (Italy) 	ENI Company (Italy)
Aerio Attikis	<ul style="list-style-type: none"> • 51% DEPA (Greek Public Gas Distribution Company) • 49% Attiki Gas B.V. (owned 100% by Shell Gas B.V.) 	Attiki Gas B.V.
Companies under establishment		
EPA in Eastern Macedonia and Thrace		
EPA in Central Macedonia		
EPA in Central Greece and Evia		

Table 12. Retail Prices for the Residential sector

Invoices	Aerio Attikis		EPA Thessalonikis		EPA Thessalias		
							
Charging by installed power (Fixed cost) (€60 days)	Up to 5 m ³ /hour	6,36	7,65*		7,65*		
	Up to 40 m ³ /hour	11,43	13,95**		13,95**		
	Up to 60 m ³ /hour	20,32					
	Over 60 m ³ /hour	33,01					
Energy charging (€/kWh)	<i>October 2012</i>	0,0786*	0,0718**	0,0732*	0,0621**	0,0705*	0,0592**

	<i>March 2013</i>	0,0754*	0,0686**	0,0694*	0,0581**	0,0692*	0,0577**

	<i>September 2013</i>	0,0693*	0,0624**	0,0742*	0,0629**	0,0698*	0,0583**
*Class "O" (heating, cooking, hot water)			* Class T1 (Cooking, hot water)				
**Class "KS" (Air conditioning or Cogeneration Heat/Electricity)			** Class T2 (independent heating)				

B. Important highlights of the past years

In general, the applied policies and managerial changes serve the goal of making room for private investors, thus, abandoning any serious effort on efficient national energy planning.

Some important highlights:

- a. **Feed-In-Tariff** system was introduced in order to support the development of all kinds of renewable sources. This favoured PVs at the beginning. In Table 13 the prices for PV electricity are presented (2009).

Table 13. Energy price paid to RES producers by PPC (2009) [6]

Source	Price (€/MWh)	
	Interconnected System	Islands
Small wind (<15 MW), geothermal, biomass etc	87,84	99,44
Wind power, near sea parks	104,84	
Solar Power (<100 kW) in private property	454,73	505,25
Solar Power (>100 kW)	404,20	454,73
Solar Power, non PV (<5 kW)	264,84	284,84
Solar Power, non PV (>5 kW)	244,84	264,84
Other RES (geothermal, biomass, biogas)	87,84	99,44

However, lately, governmental decisions shake the situation in FIT system, especially the one in PVs. **The Association of PV Companies, complains strongly on the new measures.** According to the Association, the PV investments were large and the employment of workers very important in terms of numbers, which is even more important in such hard times. They claim that such policies are going to get the companies closed.

In any case, buying prices from all the RES companies are dropping. The initial reductions on wind energy are 10%, and on PVs 15%. But reductions are only going to continue. [19]

- b. **Penetration of the renewables** in the produced energy presently reaches 11,6% (2011), whereas it was 7,1% in 2004.
- c. In recent years there has been an ongoing debate about the existence and extraction of hydrocarbons in Greece.
The data and the assessment of the alleged deposits will not be available for at least seven years yet.
 Therefore, the declarations that Greece will be able to cover a large part of its oil needs from own deposits, in the near future, lack seriousness.
- d. The vaunted pipe lines, and the growth myth around them, have proceeded only in a small extend. **“Burgas – Alexandroupoli”** oil pipeline was suspended by the Bulgarian government in December 2011. The **Interconnector Greece-Bulgaria (IGB)** gas pipeline is supposed to be put in operation in December 2014, but information is unclear at the moment. The **Interconnector Turkey–Greece–Italy (ITGI)** gas pipeline, is only completed as far as the Turkey – Greece part is concerned. The Greece-Italy part of ITGI is still unclear, while construction for the **Trans Adriatic**

- Pipeline (TAP)** is scheduled to begin in 2014. **TAP** was the one of the main goals of the Greek government.
- e. **In March of 2010, the “Save at home”** project was launched. Its original aim was to upgrade the energy efficiency of houses. However, the initial €200 millions (later risen to €396 millions) seem to have gone stagnant, and they have not been exploited in its whole.
 - f. The latest official report of long-term energy planning by the **Council of National Energy Strategy** was published in 2009. The official state seems to be determined to withdraw from regulation and interference in the energy market.
 - g. In **2003 Hellenic Petroleum merges with PETROLA owned by the Latsis Group** (a strong private group), so the state gradually losses control. Based on data as of 31.12.2011, the ownership structure is as follows: Greek public 35.48%, 41.85% Latsis Group, investors 22.67%. However, Greek Public’s percentage is no longer guaranteed.
 - h. The **Regulatory Energy Authority (RAE – founded in 2000)** plays a very important role, being in charge of observing the Energy market. **RAE is gradually gaining more powers at regulating the energy market, with ways far from clear and transparent.**
 - i. After years of efforts of the right wing and the social democrats governments, (from the 1990-93 administration till today) **PPC is finally, not the only player in the energy market.** Three subsidiaries of PPC are working on selling its profitable sectors.

C. Main actors involved in energy policy in Greece.

Even if the governments seem very determined towards their so called reforms, in the end there is little that the Greek state will be able to do or say, in order to regulate the energy market in the interest of the people. So the seeming decisiveness of the governmental statements leads only to the weakening of the Greek state as an important actor in the energy policy in Greece.

The privatization of energy sector was a main goal for the European Union for many years now. The economic crisis, gave the opportunity for the acceleration of this process.

The Troika sets the Memoranda and the memoranda set the rules for the management of the Greek state. Greek governments in agreement with their European associates are working mainly on that, particularizing the derivatives of the EU for Greece, even from the years before the crisis hit. In any case, the Troika's and European Union role on the Greek energy strategy are crucial.

The trade unions members, except the ones functioning as voice of the governments within the Syndicates, have tried to highlight these matters in the society and point out their importance. Their struggles have not been few, and their attitude is courageous. However, they are practically not accepted by the governments as a social interlocutor.

Social movements have been interested and activated in environmental and local issues, sometimes really courageously, creating mass support in local struggles. Yet, the issues of ownership, decision making, price policy, energy mix, are by nature more complex and hidden from the public. Thus, the people's movements, even though they can affect private investing plans, it is only natural that they need to be more organized and informed to push from a better position. This does not eliminate the duty of the radical political forces to cooperate with these movements and elaborate convincing alternatives.

The same apply on the case of NGOs, in the sense that they have not succeeded in creating large movements in the basis of their demands. However, some have succeeded in raising awareness, compose useful reports, and propose interesting alternatives on the energy situation on Greece with main interests on sustainability, and RES [\[20\]](#), [\[21\]](#).

Although, they cannot be considered as main actors, certain groups of left intellectuals as in [\[22\]](#) produce more progressive elaborations on energy and ecological issues.

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