



## **Appendix VII: National report for Greece**

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International Energy Agency Demand-Side  
Management Programme  
**Task VIII: Demand-Side Bidding in a Competitive  
Electricity Market**

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## 1 Current Structure of the Electricity Market in Greece

### 1.1 The Path to Liberalization

Dimossia Epichirissi Ilectrismou, known as the Public Power Corporation (PPC) in English, was created in 1950 to serve Greece's growing electricity needs. Currently PPC oversees Greece's 1.2 trillion drachmae (3.52 billion Euros) electricity market and is the largest corporation in the country. PPC has had a vertically integrated monopoly over the generation, transmission, and distribution of electricity for over 50 years, and the government has tightly regulated the industry.

Operating under the Ministry of Development, in the past the government appointed top management and the board of directors, and all finances had to be approved by the Ministry of National Economy. The government has stated that the generation and supply of electricity is an important public service and not a profit maximizing business. PPC, as a result, has frequently been used as a macroeconomic tool and has not operated with a strong profit motive. With standardized tariffs, a low return on investment, yet at the same time competitive prices (when compared internationally), PPC has been operating in a sheltered environment. PPC has been able to generate profits, but the company emphasis has not been focused towards profit generation.

The generating systems of PPC consist of thermal and hydro-electric units on the mainland, and almost entirely of oil-fired units in Crete, Rhodes and the remainder for the Greek islands. More recently, renewable energy sources (mainly wind turbines) are starting to be utilized on the Aegean islands. In 1997, PPC used natural gas for the first time for electricity generation.

The distribution system delivers electric energy to medium voltage consumers via distribution lines of 22kV, 20kV, 15kV and 6.6kV and to the low voltage consumers at 380/220V. The total length of the distribution network exceeds 180,000km and supplies almost 6.5 million customers.

By the mid-1980s the government began exploring the possibilities of liberalization. In 1985 they passed a law permitting the establishment of private electricity generation, but only under the conditions that it either: served as a backup for PPC, was based on renewable energy sources or co-generation, or if PPC was unable to provide the necessary capacity in that region. This law was very limited in scope, and acted more as a way for PPC to expand its capacity without capital investment than actually open up the markets. In 1994 the government passed Law 2244/94, which defined two different classes of generation, and two subsets within each classification. The two classes were auto producers, and independent producers, with renewable energy sources and co-generation making up the two subsets. The 1994 revision allowed for the resale of excess electricity by recognized producers, but only to PPC, who wielded significant market power. In the 1994 law the prices for wholesale electricity purchases were fixed as a percentage of the PPC tariff. This allowed PPC to fix its profit margin and influence the price it paid for electricity by setting the final selling price. The Greek electricity market moved closer to liberalization in 1996 with the passage of Ministerial Decision 8907 which allowed for the private use of the national grid by co-generators as long as the generation site was within ten kilometers of the consumption point. The Ministerial Decision also allowed for the formation of co-generation consortiums that could pool together their co-

generation capacity and in effect create a mini-power pool. Once again, this change was very limited in its scope, but it was an encouraging step forward.

Complete liberalization was legislated in accordance with EU Directive 96/92 three years later with the passage of Law 2773/99. The law called for the deregulation of 26% of the Greek electricity market by 2001 (35% has been opened thus far), but the introduction of competition was to be conducted under a gradual process of implementation.

## **1.2 The New Structure of the Electricity Market**

Greece took the maximum amount of time in the first phase of the market liberalization, with privatization not taking effect till the last possible day, February 19, 2001. PPC has been divided into separate accounting and management entities along the core electricity processes of generation, transmission, and distribution. The parent company is not yet listed on the Athens Stock Exchange, but is to be listed soon. A new company was created called the Hellenic Transmission Systems Operator (HTSO) to act as the market and systems operator. Acting as a non-profit controller, the HTSO is responsible for ancillary services such as power reserves, frequency control and blackstarts, as well as matching supply and demand in the Greek electricity market. The HTSO does not yet operate a forwards, futures, or options market. The electricity market in Greece is very much in its infancy, and there are currently no vendors other than PPC for the HTSO to monitor. The HTSO covers their costs with uplift transfers from vendors and is regulated by the Regulatory Authority for Energy (RAE).

The Regulatory Authority for Energy is the highest energy authority in Greece, and oversees the actions of the independent HTSO. Working under the Ministry of Development the RAE will be responsible for coordinating the actions of the various stakeholders in the new electricity market and will more specifically be responsible for preparing the Supply Code (for eligible and non-eligible customers) and for making Supply Authorization recommendations to the Ministry of Development. Right now there is a very high degree of collaboration between the various players in Greece's electricity market. The independence of the parties is expected to increase in the future with the introduction of new competition.

### **1.3 Greece in an Open Electricity Market**

The coming years will be an exciting time for Greece and PPC as both reengineer themselves for the global environment in which they are to operate. At the present time there is limited third party access to the national grid, with only eligible customers, those with consumption greater than 100 GWh, able to purchase their electricity from licensed vendors. PPC is the only vendor in Greece though, and has been able to maintain their complete dominance of the market.

One trend that is affecting electricity delivery and Demand Side Bidding (DSB) in Greece is the change in electricity consumption patterns. The recent growth of air conditioners in the hot Greek summer has changed the peak demand period from the winter to the summer. Greece is also moving towards a service-based economy, a structure with unique consumption patterns.

The current plan for implementation has residential customers becoming eligible for the open market after further systems and economic integration has occurred between EU countries. PPC will remain the default provider. There are many reasons why Greece is taking a long time to move towards free markets, but the implementation process has been especially drawn out.

## **2 Experiences**

For many years PPC has advocated Demand Side Management (DSM), and has worked with the International Energy Agency to promote DSM initiatives. Because of their monopoly status however, there have been no Demand Side Bidding experiences in Greece to date. The section on Barriers will provide more insight into the possible establishment of DSB in the future, but at this time there are no DSB initiatives in operation in Greece.

## **3 Opinions**

When questioned about their views towards DSB and the potential benefits that it can provide in the Greek market, neither the Market Operator, System Operator nor Transmission Network Operator (all of which are under the HTSO) had considered the possible adoption of DSB. While this is disheartening for those who advocate the advantages of advanced and well integrated DSB schemes, it is important to remember that the liberalization process in Greece is a few years behind the rest of Europe. The HTSO will benefit from the access they are being given to DSB models currently being adopted in other countries, and is looking for a complete DSB implementation once the electricity market evolves.

## **4 Barriers**

### **4.1 Technological**

The effective operation of any Demand Side Bidding scheme requires close coordination and the rapid transfer of data between all market participants. At the present time PPC does not have an integrated enterprise wide information system that will give it the ability to actively participate in the market's ancillary services. Coordinating the forecasted demand of customers and translating that into the power pool supply requires a large investment in an information system and a coordinated communication effort overseen by the distributor and market operator. PPC is not experienced in the coordination of multiple party communications, and this creates a potential barrier to DSB implementation in the short term. In the medium to long term the technological barrier is quite small. Once new systems have been implemented and new communication methods adopted DSB schemes will be available for the Greek market.

### **4.2 Geographical**

Greece has a very unique geographical situation that affects both its role as a member of the international energy community, and its efforts to supply the entire country with electricity. The islands of Greece consist of 14 000 km of coastline and account for 20% of Greece's landmass. Some islands are connected to the national grid via underwater cable, but many rely on self generation. Some of the larger islands, such as Crete and Rhodes, have their own independent generation and transmission systems. These fragmented systems make DSB tough to implement.

Another unique geographical problem that faces Greece is their isolation from the rest of the EU electricity market. With no continental borders with other EU states, Greece's only link with other electricity markets is via underground cable with Italy. The European Union has committed 117 million Euros to the submarine cable project that would connect the two countries, however the project still only provides Greece with limited direct access to the large European electricity pool that would help facilitate DSB implementation.

### **4.3 Economic**

A well-developed program of Demand Side Bidding requires a strong commitment from market participants and is encouraged when participants have a strong market based profit motive. Unfortunately PPC has been operating with a monopolistic mindset for decades and the idea of profit motive is in its infancy. Compounding the problem, even when PPC was a monopoly, they were not a monopoly that was profit focused, but were used by the government as a tool of macroeconomic policy. From 1987-1996 the average real household electricity bill decreased 30%, and in 1997 the return on investment for PPC was only 2%. Both statistics show a company that is inexperienced in creating financial value for its owners.

As PPC moves into a competitive environment they are in the process of undergoing a complete organizational restructuring. This restructuring process is creating a sense of role uncertainty and DSB will have to be integrated into the redesigned organization. Currently, employment at PPC is very high and personnel expenses account for nearly 25% of operating costs. The restructuring is an opportunity for DSB to be embraced and integrated into the new PPC organization, however at this time the future role of DSB is unclear.

#### 4.4 Political

An advanced DSB system requires open communication between all members of the electricity market and is most effective when it operates using the incentive based forces of supply and demand. Historically, the Greek government has favoured a program of intervention and regulation and if this program is continued the success of DSB in Greece could be compromised. For example, Greece was given a two year extension for the liberalization of its energy market, and the government waited until the last possible day, February 19, 2001, to open the electricity market. The government is also planning on maintaining state ownership of PPC. While the EU will prevent protectionism within the Greek electricity market, the government as owner and regulator may not place significant emphasis on DSB as an integral part of the nation's energy market. An additional political influence facing PPC, the largest corporation in Greece, is the very strong union that represents the company's employees. The union is closely monitoring the effects of open markets, and will be vocal if the changes negatively impact their membership. While DSB does not pose a direct threat to staffing levels, the union will regard any new initiatives that disrupt the status quo with hesitation and likely opposition.

#### 4.5 Structural

The structural barriers to DSB can be broken down into two areas, the market structure, and the organizational structure of PPC. The market in Greece is small, with Greek energy consumption in 1997 accounting for only 1.8% of total EU energy consumption. DSB works best in large markets where demand and supply can be influenced by the aggregate decisions of market participants, and Greece is at a disadvantage in that it does not have the critical mass that is present in other electricity markets. DSB is also encouraged by the presence of a heavy industrial sector that is able to adjust their energy consumption and that is large enough to have an impact on the demand side of the electricity market. Greece does not have a large industrial sector, and this segment is not expected to contribute to any significant growth in electricity consumption.

Another structural characteristic of the Greek market that may prevent DSB adoption is the passive role that consumers have traditionally taken in the economy. Liberalization is new in Greece for both electricity and telecommunications, and there are many other industries that are still under government control. The advantages of DSB in an open economy are significant and obvious, and there is no reason to believe that consumers will be able to deny these benefits, but in the short term DSB may not be actively embraced.

Even after the opening of the electricity market to competition PPC still is the dominant force in the Greek electricity market. The combination of gradual implementation, history of regulatory influence, and the lack of present competition make an analysis of PPC important when analyzing the entire Greek market. The current structure of PPC may act as a barrier to the implementation of DSB in Greece. When PPC was operating as a monopolist the emphasis was on long range planning and not integrated resource planning. There is no active marketing department and very little of the cross-functional planning that creates the communication flow necessary for DSB. DSB relies on market forces providing the optimal allocation of electricity, and PPC has opposed market forces in the past. Given the aforementioned isolation and unique geography of Greece competition in the Greek market will be slow to develop. The decision to split the monopoly into two smaller monopolies (one over the generation side, and one over the distribution side) instead of creating a number of smaller companies that would compete against each other demonstrates the guarded approach to electricity markets that the

government and PPC are taking. If the organization resists change, and views liberalization as coming externally from the European Union and not internally as a positive step forward for Greece, then the adoption of a market based DSB system could be jeopardized.

## **5 Conclusions**

The electricity market in Greece is undergoing a great structural and philosophical change. The historical and geographical context within which Demand Side Bidding was analyzed has identified various barriers that may hinder the adoption of a large-scale DSB program in Greece.

This report does not portray the Greek market, and PPC in particular, as fostering a climate in which DSB will be able to grow and thrive in the near future. It is with regret that at this time Greece recognizes and acknowledges that there are no DSB programs currently in operation, and that there are obstacles which have to be overcome. However, it is with optimism that Greece looks at the efforts of others and looks forward to implementing DSB programs in the future.

In a competitive electricity environment DSB is an important and effective way to reach the optimal equilibrium between supply and demand, and once our markets are fully operational and developed, we look forward to adopting effective DSB programs in the future.