



INTERNATIONAL
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The Regulatory Framework of Gas Distribution Operators

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SID: 3303170002

SCHOOL OF SCIENCE & TECHNOLOGY

A thesis submitted for the degree of

Master of Science (MSc) in Energy Management

DECEMBER 2019

THESSALONIKI – GREECE



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Abstract

The purpose of this research is to examine the regulatory framework of gas distribution operators in Greece. For this purpose to be achieved, the presentation of a) the organization of the Greek gas market organization, b) the evolution of the EU legislation in respect to the regulatory framework of gas distribution operators that has influenced the respective Greek regulatory framework and, c) the evolution of Greek gas distribution operators and of the legislation that guided this evolution. The methodology adopted to investigate all above issues, is the systematic literature review of secondary qualitative sources regarding the regulatory framework of gas distribution operators both on an EU and Greek level. The results showed that Directive 2009/73/EC and Law. 4001/2011, as well as the subsequent Law. 4336/2015 and Law.4602/2019, clearly contributed to the acceleration and deepening of the liberalization of the Greek gas market, by assisting the unbundling of the gas distribution sector.

Keywords: gas distribution operators, Greece, legislative framework

Georgios Chasapis

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1 Introduction

The smooth operation of energy markets that allow safe energy supply at competitive prices is vital for the growth and well-being of consumers in the European Union (EU). To achieve this goal, the EU decided to open up its European gas and electricity markets to competition and create a single European energy market [1].

As declared in the European Commission's Communication, COM(2006) 851, the establishment of competition in European gas and electricity markets is an integral part of European energy policy, which aims to achieve the following three closely related objectives: competitive and efficient energy, security of supply and sustainability. All European consumers, i.e. households, commercial and industrial users, depend to a large extent on the safe and reliable supply of energy at competitive prices, and the European Union's objective of protecting the environment is crucial [1].

The three policy objectives of "competitiveness, security of supply and sustainability", are completely interconnected and complementary. Competitive markets send out the necessary signals for investment that lead to the most cost-effective supply security. In the same framework, the creation of a competitive internal market is expected to enable EU-based energy companies to operate in a larger market, which will improve their ability to contribute to security of supply. At the same time, market forces oblige European entrepreneurs to use the most cost-effective production methods, which can have a favorable effect on sustainability, provided the appropriate regulatory environment is in place. Consumers will be able to choose between different suppliers and types of contracts that will enable them to reduce their electricity costs and adapt their consumption to market developments. Cost-competitive pricing will in turn help to encourage energy efficiency, which can reduce dependence on external suppliers while supporting the EU's objective of sustainability and security of supply [1].

The process of creating competitive electricity and gas markets in Europe began in 1992, when the European Commission formally proposed the first set of Electricity and Gas Directives. Prior to this initiative, energy companies were state monopolies with the right to exclusively supply energy to final consumers. The European Commission, on the basis

of the Articles of the Treaty of Rome on Competition Policy [13], began to challenge these exclusive rights because they posed major obstacles to the creation of a common market, forcing member-states to abandon the monopoly structure and open up the market to competition. Then came the adoption of the second and third packages of electricity and gas directives [14].

As explained, the opening up of the market to free competition could not be realized without restrictions and drastic intervention, given the particular nature of energy supply, as well as the fact that each sector of the energy market operates under different conditions. The supply of electricity and gas must be continuous and inextricably linked to the infrastructure networks. The construction and operation of the network is either a natural monopoly or, if feasible, a separation of the network or the construction of parallel infrastructures takes place, which is not a viable and feasible, economically viable solution. Against this background and bearing in mind that in the past in all member-states of the EU electricity and gas supplies were carried out by vertically integrated undertakings engaged in production and supply, as well as transmission and distribution activities, it becomes apparent that the creation of conditions of free competition on the market is nothing but an easy undertaking [2].

Regulators play a key role in the process of liberalization of European energy markets. The particular features of these markets, such as their connection/ dependence on the existence of networks (which constitute natural monopolies), the vital importance of energy for the development of the economy and the satisfaction of the basic needs of the citizens, and thus, their close connection in the service of the public interest, coupled with the long-established presence of public vertically integrated companies with dominant position, has led to the urgent need for a new form of public intervention, which will be independent (both from government and industry interests), and will ensure that the servicing of public interest and the balancing of conflicting strategic objectives. In this respect, the necessary conditions for market entry, in particular by adopting appropriate regulatory measures, as well as the continuous monitoring of their implementation, is a necessary condition for operating in a healthy competitive environment [15].

It is noted that regulation as a form of public intervention in the areas of network markets is characterized by a combination of instruments and objectives, with the ultimate aim of the smooth liberalization and operation of network markets (2002/627/EC). It reflects the

need to adopt new methods of public intervention, which are appropriate to the functioning of the competitive market and the private financial management of public companies. It relates to all the intervention methods a) aimed at achieving defined results and objectives and b) that influence social material in a way that affect certain social or business behavior, by guiding the choices of individuals active in the respective field. It includes both ex ante behavioral influencing mechanisms and ex post control and sanctioning methods to ensure the compliance and effectiveness of the regulatory options [18].

In the case particularly of Greece, the official energy regulator, is Energy Regulatory Authority (RAE) that was established by Law. 2773/1999, as an independent regulatory authority, with administrative and financial autonomy and with the primary responsibility for overseeing the domestic energy market, in all its sectors, providing to the competent authorities of the state agencies and taking the same measures to achieve the goal of liberalizing the electricity and gas markets [27], [67]. In its first years of RAE's operation, its role was mainly consultative. Energy Law. 4001/2011, which came into force on 22 August 2011[46], transposed the European third energy package into Greek law, redefining the nature and role of RAE, which and subject to the responsibilities of the Minister for the Environment, Energy and Climate Change, exercises control, regulation and supervision of the energy market, and is the national and regulatory authority for electricity and gas in accordance to the concept of the 2009/72/EC and 2009/73/EC Directives, which make national energy regulators "guarantors" of the proper functioning of energy markets [7], [8]. With Law. 4001/2011 and to strengthen its independence guarantees, legal personality was given to RAE, while further enhancing its decisive, controlling and ratifying powers [43].

The import of gas in Greece was initially carried out by the Public Gas Corporation S.A. (DEPA), which was established in September 1988, as a subsidiary of the then Public Petroleum Corporation S.A. (DEP). According to Law. 2364/95, which regulated the Greek gas market, DEPA was entitled to purchase, export, transport, store, process and add odors, sell, distribute and generally trade gas and in particular had the right to sell gas: a) to gas distribution companies (EDAs) and gas supply companies (EPAs); (b) to large consumers; and (c) for the transport of motor vehicles. DEPA established three subsidiary companies in September 1995, the EDA of Attica, Thessaloniki and Thessaly, and in 2000-2001 the respective EPAs were established. EPAs were granted an exclusive thirty-eight-year license to manage their respective distribution networks and to promote

and distribute gas to customers with a consumption below 100 GWH at the geographical boundaries specified in their license. This exclusivity of distribution and supply to non-eligible customers was permitted following the prior approval by the European Commission and the grant of a derogation in accordance to the European law [34].

The internal gas market was set in motion by the 91/296/EEC Directive on the transit of gas through grids [10] and the 90/377/EEC Directive concerning a Community procedure to improve the transparency of gas and electricity prices charged to industrial end-users [9]. Subsequently, the 1998/30/EC Directive concerning common rules for the internal market in gas [11] was subsequently repealed and replaced by the 2004/55/EC Directive [6]. Subsequently, under the third energy package, the 2009/73/EC Directive was adopted [10].

At national level, market liberalization was first attempted by the provisions of Law. 3428/2005 [46], which incorporated the Directive 2004/55/EC and subsequently by the provisions of Law. 4001/2011 [43], whereby the corresponding provisions of Directive 2009/73/EC were incorporated. However, in view of the possibility of maintaining the derogations provided for by this Directive, as they have been through the granting of the aforementioned exclusive licenses to the EPAs, the provisions of Law. 4336/2015 are crucial to the liberalization of the Greek retail market. Specifically with Law. 4336/2015, the provisions of Law. 4001/2011 were amended, following the relevant commitment of the Greek state to abolish the relevant exclusions, and the adaptation of the retail gas market in accordance to other member-states was set in motion [37].

As a consequence, the existing EDAs of Attica, Thessaloniki, Thessaly and DEPA were obliged to legally and functionally separate the Distribution Network Management activity from their other activities, by levying, when referring to the EDAs, either the distribution or supply sector, and by levying, when referring to DEPA, the distribution sector. Subsequently, the existing EPAs were transformed into gas distribution companies (EDAs) and gas supply companies (EPAs). At the same time, full market opening up was promoted via the gradual abolition of supply restrictions [42].

1.1 Research Aim and Objectives

The purpose of this research is to investigate the regulatory framework of gas distribution operators in Greece. For this purpose to be achieved, the following constitute the research's secondary objectives:

1. Presentation of the Greek gas market organization.
2. Presentation of the evolution of the EU legislation that influences the regulatory framework of gas distribution operators on a member-state level, and thus, influences the respective Greek regulatory framework.
3. Presentation of the evolution of Greek gas distribution operators and the legislation that guided this evolution.

1.2 Research Methodology

In order for the above purpose and objectives to be met, the research employs a qualitative methodology, and in particular a systematic literature review of secondary qualitative sources regarding the regulatory framework of gas distribution operators both on an EU and Greek level.

The necessary qualitative data and information originate from a variety of different sources, including scientific books and articles, EU and national reports, as well as EU and national websites, related to the present study's research objective.

All data and information, since they are qualitative, are analyzed via critical thinking, so as for the final conclusions to be drawn.

1.3 Chapter Outline

The first chapter introduces the reader to the topic, describes the main purpose and secondary objectives of the thesis, as well as the methodology that is adopted for the main purpose and the secondary objectives to be met.

The second chapter summarizes the evolution of the EU legislation that influences the regulatory framework of gas distribution operators on a member-state level, and thus influences the respective Greek regulatory framework.

The third chapter provides details on the organization of the Greek gas market to allow for the understanding of public monopoly's organization and the liberated gas market's

organization and function. Here the influence of the EU legislation becomes apparent via the introduction of a series of Greek Laws, which were adopted so as for the Greek legislation to comply with the European one.

The fourth chapter presents the history of the Greek gas distribution companies and how they have evolved from gas providers to gas distribution operators and gas distribution networks' ownership.

For the fifth chapter, the legislation leading to the liberalization of the gas market in Greece by reforming the gas distribution framework through the obligation of integrated gas companies to legally and operationally separate distribution network operation activities from gas supply activities, is detailed.

The sixth and final chapter, includes the final conclusions, as drawn by the information provided by the previous chapters.

2 Evolution of the EU legislation related to the Regulatory Framework of Gas Distribution Operators on a Member-State Level

Before referring to the evolution of the EU legislation, which is related to the regulatory framework of gas distribution operators, it is important to refer to the way energy is viewed by the European Law, to the targets of the European energy policy. This issues are first analyzed, below, and then the EU legislation related to the regulatory framework of gas distribution operators is detailed.

2.1 Energy in the view of the European Law

Since the founding of the European Communities in the 1950s, the energy sector has been at the center of European member-states' interest. In this context, the two Treaties, i.e. the Treaty for the European Coal and Steel Community (ECSC) aimed at merging the coal and steel industries and the Treaty for the European Atomic Energy Community (EAEC or Euratom), with the objective to the development of nuclear power, for purely peaceful use, were signed [53].

In addition, the Treaty on the European Economic Community (EEC) was signed in 1957. The particular Treaty was the driving force behind European integration and development, but did not contain any energy policy provisions [48].

Clearly, the founding treaties did not confer on the Community any specific legislative competence in the formulation of a common energy policy, nor did they at this early stage impose an obligation on the establishment of an internal energy market [24]. On the contrary, the exclusive jurisdiction of the member-states in the energy sector, wholly intertwined with their national sovereignty over their land and their natural resources within it, was leading to the national energy markets' fragmentation [45].

With the exception of the ECSC and EAEC Treaties, the energy policy did not constitute the regulatory subject-matter of the primary community law, despite the oil crises of 1970 and the importance of energy for the internal market's smooth functioning [45].

Moreover, in the absence of community jurisdiction, the then Court of Justice of the European Communities recognized the sovereignty of member-states in this field and the community's non-interference [45].

With the so-called Lisbon Reform Treaty, a radical turning point emerged, since energy became clearly and explicitly linked to the EU policy, even with a shared jurisdiction with member-states, including the environment, transport, the internal market and trans-European networks [51]. The new Article 194 of the Treaty on the Functioning of the European Union (TFEU), introduces a new distinct legal basis for the EU's ability to take positive steps to form a single energy policy on the member-states' territory [45], [51].

This new provision, which incorporated in a special chapter entitled "Energy", stipulates that in the context of the establishment or operation of the internal market, the EU's energy policy aims to ensure the functioning of the energy market, energy supply, energy efficiency and energy savings, the development of new RES and interconnection of energy networks [45], [52].

In essence, this provision redefines and broadens the main objectives of the EU's energy policy. Indeed, the provision of a separate chapter on energy in TFEU is of dual importance: first and foremost of a policy importance, as it reflects the EU's intention to form a single coherent policy, and secondly of a strong legal importance, since for the first time a specific and autonomous basis for legislation has been established in respect to EU initiatives in this field [45], [54], [55], [58].

Clearly, the European developments in the field of energy had been launched long before of the Lisbon Treaty. As early as the 1990s, the European Commission began to systematically challenge the privileges of state-owned monopolies in key areas, such as energy, while the Court of Justice delimited the, in principle, legitimate for the "therapy" of the public interest business monopolies of the former Article 86 of TFEU (now Article 106), on the basis of the prohibition on the abuse of a dominant position provided for in the former Article 82 of the EC Treaty (now Article 102 of TFEU) [19].

In the same context, a number of precautionary measures in relation to the energy transit and transparent pricing of gas and electricity were imposed, having an indirect impact on the liberalization of energy market [19].

However, from 1996 onwards, the European legislature systematized its efforts and vigorously adopted secondary law rules, which provided for negative integration measures, based on a variety of legal bases, such as in the general empowering provision of the former Article 308 of the EC Treaty or in other more specific provisions [49], such as of the former Articles 174 and 175 (community jurisdiction on the environment), and 95 (approximation of laws) of the ECSC among others [19].

These rules introduced subsequent specific sets of legislative measures for the electricity and gas sectors, with a view to the gradual liberalization and operation of their respective markets under competitive conditions. These energy packages followed the sectoral approach of each specific energy market, formed a minimum guaranteed regulatory framework for liberalization and allowed for a wide range of initiatives to the member-states, while eventually evolved and adjusted to the at the time political and economic circumstances [44].

In particular, the first set of measures laid down the first common rules for the creation of an internal market in the electricity (Directive 96/92/EC) and gas (Directive 98/30/EC) sectors respectively (more details on Directive 98/30/EC are provided thereafter). Subsequently, the second set of measures was introduced, with the aim of further strengthening the functioning of the internal market in these sectors and establishing independent regulatory and supervisory authorities [19].

This package repealed the first two Directives and replaced them with the new Directives 2003/54/EC on electricity and 2003/55/EC on gas (more details on Directive 2003/54/EC are provided thereafter). Two Regulations have also been included in the second package: Regulation (EC) No 1228/2003 on the access conditions to the network for cross-border exchanges in electricity and Regulation (EC) No 1775/2005 on the access conditions to gas transmission networks. In addition, Commission Decision, 2003/796/EC, setting up a European Group of Regulators for Electricity and Gas, was adopted [19].

Finally, in August 2009 the third package followed, replacing the second one, and aimed at accelerating the liberalization of the electricity and gas markets and strengthening the independence and the responsibilities of the national regulators. It includes [19]:

- a) Regulation (EC) No 713/2009 establishing an Agency for the Cooperation of Energy Regulators,
- b) Regulation (EC) No 714/2009 on the access conditions to the network for cross-border exchanges in electricity that repealed Regulation (EC) No 1228/2003,

- c) Regulation (EC) No 715/2009 on the access conditions to the gas transmission networks that repealed Regulation (EC) No 1775/2005,
- d) Directive 2009/72/EC on the common rules on the internal market in electricity that repealed Directive 2003/54/EC, and finally,
- e) Directive 2009/73/EC (more details on Directive 2009/73/EC are provided thereafter) on the common rules for the internal market in gas that repealed Directive 2003/55/EC.

2.1.1 The Targets of the EU Energy Policy

The EU energy policy has over time focused on the following fundamental objectives: reducing energy costs for households and businesses, ensuring competitiveness, reliable and uninterrupted energy supply, ensuring security of supply, and reducing the environmental impact of production, transport and energy use, ensuring sustainability [4].

In this effort of the shaping of the EU energy policy, the promotion of solidarity and cooperation between member-states and the expansion of the sources and the paths of energy supply is crucial to further strengthen the EU's energy position against imports, energy crises and price fluctuations [4], [21].

The first aspect of the EU's energy policy is aimed at establishing a true internal market by effectively removing barriers of a public or private origin and applying common rules to ensure stable energy supply and security in the most economical terms. It is noted that supply security is defined as the ability to ensure continuous coverage of basic energy needs and the ability to continuously meet demand with high quality products and services, through adequate internal stocks, exploitable in economically acceptable conditions, as well as through the search for different and stable external supply sources [21], [20].

This primary objective of energy security is met via short term measures facilitating the infrastructure's smooth and uninterrupted operation to provide vital energy goods and services at a price accessible to all end-users (domestic and industrial). Simultaneously, to achieve long-term energy supply, the aim is to create an appropriate and secure investment environment, to attract long-term investment in labor force, equipment, networks, as well as to create a secure infrastructure and secure energy facilities [43].

Further, a vital and consistent strategic objective of the EU's energy planning is to achieve cost-efficiency, and thus, achieve competitiveness in the vital energy sector, for which the pursued economic activity, is influenced by the cost and the availability criteria of the supplied goods and services [43].

Clearly, the improvement of products' and services' quality, while simultaneously the absorption of the latest technological developments contributes to the utmost benefit in respect to consumers and boosts competitiveness [43], [20].

To the extent that energy activities cause environmental pollution, environmental protection is considered an important parameter of EU's energy policy to tackle climate change and the greenhouse effect and achieve energy efficiency, energy savings and sustainable development [53].

RES are gradually evolving into a noteworthy alternative way of secure supply, as they improve the environment's quality, the standard of living, and contribute to the development of an economically advantageous technology for a more sustainable and affordable energy economy [19].

Finally, the creation of interconnected energy networks throughout the EU, even in remote areas without access to networks, will contribute to the global coverage of demand and to the strengthening of economic and social cohesion [19], [20].

2.2 Laws related to the Organization of the Gas Market

2.2.1 1st Energy Package (Directive 98/30/EC) on the Internal Gas Market

In the context of the EU's first set of actions, Directive 98/30/EC was the first major step towards the transition of national gas markets from their monopoly structure to competitive conditions [47].

On a regulatory level, the Directive recognized the asymmetric organization and uneven structure of national energy markets and set a first framework of common principles for the gradual creation of a single internal gas market, focusing on the equal access to the transmission and distribution networks by third parties and the development of healthy competition conditions in the gas supply market [17].

The basic principles introduced by this first Directive consisted of [17]:

- a) Equal treatment and non-discrimination,
- b) Transparency and compliance with publicity,
- c) Taking measures to separate the exercise of monopoly responsibilities from those of production and marketing,
- d) Accounting separation to keep separate accounts for the individual gas activities, to avoid distortions of competition,
- e) Fulfillment of general interest obligations, and,
- f) Licensing schemes for the exercise of any gas activity.

It has to be noted that in this Directive's articles, the general organization and the operation of the gas sector was regulated, including the sector of Liquefied Natural Gas (LNG) [14].

In addition, the terms of the gas supply, distribution and storage were determined, while cases of derogation from the compliance with the provisions by the member-states were defined (i.e. when the application hinders the fulfillment, from a legal or actual perspective, of the obligations that are imposed on gas companies in relation to the general economic interest) [14].

Of great importance is the fact that provision has been given in respect to the accounting separation between companies operating in the production, distribution and transmission sectors. This Directive brought about significant innovation in the gas markets' operation by abolishing exclusive rights, since the primary objectives were transparency and non-discrimination [14].

2.2.2 2nd Energy Package (2003/55/EC) on the Internal Gas Market

With Directive 2003/55/EC the actual establishment of the EU internal gas market was intended, since this Directive determined the obligations of the provision of the public utility services of the gas companies, regulated and enhanced the right of third party access to transmission, distribution and storage networks, thus, paving the way for the introduction of new suppliers in the gas market [23].

The access to networks without discrimination constitutes the essential foundation for the liberalization of energy and in particular of the gas market, since it contributed to the exercise of energy activities and the realization of investments [23].

Moreover, the Directive imposed the member-states with the obligation to designate transmission and distribution operators, which have to provide guarantee of independence in respect to their organization and decision-making [23].

The Directive also deals with the issues of the pricing of the distribution and transmission services, obliging in compliance particular authorities during their realization, aiming in the ensuring of the necessary network investments so as for their sustainability not to be endangered [16], [5].

This Directive, also, obliges the accounting unbundling of the activities of the companies operating in multiple gas sectors [16], [5].

Notable is the mention on the role attributed to the independent regulatory authorities of the member-states. These authorities should ensure the operating and individual independence of their members with the aim of abiding by the principles of legality and transparency. These authorities are significantly enhanced due to the increased jurisdictions attributed to them. Some of these jurisdictions are the resolution of conflicts that arise between the operators of the transmission or distribution network, the handling of tasks related to bureaucratic issues, such as the issuance of licensing, the providing of appraisals, and so on [5].

2.2.3 3rd Energy Package (2009/73/EC and (EC) 715/2009) on the Internal Gas Market

In January 2007, the European Commission conducted a survey to identify pathogens and difficulties that hinder the creation of a single gas market at a European level. As a result, the existence of many parallel energy markets with elements of high concentration, strong vertical integration, cross-border heterogeneity and competition was concluded [3].

Furthermore, the need for urgent and concurrently effective measures focusing on the effective separation of network and supply activities, removing gaps in the regulatory environment was highlighted, in particular in relation cross-border issues, by addressing centralized market and entry barriers and by strengthening transparency in respect to the market. In this context, the second package of measures was repealed and the third was adopted, which included [22]:

- a) Directive 2009/73/EC on the liberalization of the gas market, and,
- b) Regulation (EC) No 715/2009 on the access conditions in gas transmission networks.

Directive 2009/73/EC, which was elaborated in a more sound way and which was more extensive than the two preceding ones, was adopted within a progressive and dynamic initiative, towards a more uniform addressing of the gas markets [22].

At a first level, this Directive sets the general objective of progressively implementing a fully open and well-functioning genuine internal gas market, where fair competition under equal access conditions for all established in the EU gas companies will be applicable and the fundamental freedoms guaranteed by the Treaty to the EU citizens will be actually met [10].

Furthermore, this Directive acknowledged the significant contribution of the repealed Directive 2003/55/EC to the creation of the internal gas market, but also identified the inadequacy of the previously applicable legal status [10].

To change the context, the need to consider the particular characteristics of gas, namely the EU's heavy reliance on third-country imports, as well as some structural rigidities, as a result of the concentration of suppliers or of long-term contracts, was highlighted. The need to also consider the main problems in the internal gas market (i.e. the lack of liquidity and transparency, which in turn impedes the efficient allocation of resources, the risk counterbalance and the new businesses' emergence) was stressed [19], [22].

In view of all above conclusions, this new Directive was reasonably considered as the cornerstone of the completion of the single gas market. The Directive highlighted the following pillars of the highest regulatory priorities [68]:

- a) Effective separation (unbundling) and complete independence of transmission operators,
- b) Establishment of orderly and transparent retail (supply) markets in the member-states,
- c) Effective access of all players to the relevant market via appropriate pricing and balancing mechanisms, and,
- d) Maintenance of high quality services of general interest, which shall be maintained in all member-states, with a view to ensuring sufficient information and protection for consumers, in particular, for vulnerable groups of the population.

More specifically, it has to be noted that this Directive sets the rules for the member-states in relation to the sectors that are related to gas production, distribution, transmission, storage, and supply [10].

In general, it provides for the rules of the organization and operation of the gas sector and the common rules in respect to, as already mentioned, the consumer protection issues. Its aim is, in every case, the liberalization of the market and the realization of the vision of a single energy market [10], [22].

In more detail, one of the primary elements of the Directive is the fact that the full ownership separation is provided for. In addition, the appointment of an independent system operator in accordance to the requirements laid down by the law is also provided for, while mention is made in respect to the independent transmission operator, highlighting their independence guarantee [10], [19].

The establishment and the operation of a supervisory body for the transmission system operator is defined, while the transmission system operator acquires an enhanced role with enhanced responsibilities [10].

The Directive, redefines the role of the regulatory authorities, while stresses to the member-states their obligation for the ensuring the regulatory authorities' independence and analyzes their targets and responsibilities [10], [22].

On the other hand, in respect to Regulation (EC) No 715/2009, an interesting point is that it provides for the establishment of the European Network of Transmission System Operators for Gas (ENTSOG) [12].

The duties of ENTSOG include the developing of EU network codes, the developing of a non-binding ten-year program for the development of networks (Community-wide network development plan), the coordination of the operation of the network under normal and emergency conditions, the developing of the recommendations in relation to the technical coordination between community and third country transmission system operators, drawing up an annual work program and annual report, and so on [12].

3 Organization of the Greek gas market

This Chapter includes the Greek legislation that led to the present organization of the Greek gas market. The primary Laws that have led to the forming of the present Greek gas market, will be analyzed for all different gas activities, except distribution, which will be separately analyzed in Chapter 5.

3.1 Introduction - Integration of Gas in the Greek Energy Market

Before discussing extensively the presence of gas in our country's energy life, it is worth mentioning some useful historical data. In particular, the precursor to gas in Greece was coal gas. Already in 1857, coal gas production with the raw material of charcoal started in a factory in Gazi, while in 1939 the coal gas company went to the Municipality of Athens [37].

During this time, Athens Gasworks (DEFA) supplied consumers with coal gas until 1985, when it stopped operating and began producing naphtha gas at the Aspropyrgos Public Refineries [37]. In September 1988, DEPA was founded with a 35% stake to the Hellenic Petroleum SA and 65% stake to the Greek State, absorbing DEFA [34].

Technological advances and modern requirements made it necessary to adopt new energy forms, more efficient and environmentally friendly. To this end, Greece undertook an innovative initiative and in 1987 integrated gas into its energy system [34].

Clearly, the entry of gas into Greece's energy balance, in 1997, was the most important choice of the period (following the electrification of the country), which has greatly influenced the energy sector's evolution in an attempt to converge with other European countries [47].

At this point, gas was regarded by the Energy Regulatory Authority (RAE) as a strategic fuel for the country's energy system on a medium-term period. Gas penetration, under

competitive terms, was inextricably linked according to RAE, considered as the achievement of the goals for the liberalization of the electricity market, the introduction of new technologies, the provision of modern consumer services, the modernization and competitiveness of the Greek economy, the diversification of energy efficiency, and the reduction of oil dependence, and in particular with the satisfying of Greece's international commitments under the Kyoto Protocol and the improvement of urban environment [65].

The integration and commissioning of the Natural Gas Transmission System (ESFA), in autumn 1996, transformed Greece into a fast-growing gas market, while at the same time attracted significant foreign investment, including the development and operation of the distribution networks of Attica, Thessaly and Thessaloniki. At the same time, there was a great interest in the construction by both Greek and foreign investors of power plants using gas as fuel [65].

The creation of appropriate energy market economic conditions, which will allow the Greek gas market to mature through the absorption of electricity production volumes in cities and towns, has been considered by the state and RAE to be crucial for the sustainability of the large gas infrastructure project and the achievement of the above objectives in respect to the country's energy policy [65].

Furthermore, and given the priority of gas penetration in the country's energy balance, the maximization of the use of gas as a fuel in final energy consumption, despite its use in energy conversion in other forms, was considered of utmost importance for the energy system [65].

In this context, great importance was given to the promotion of gas to the final consumption of city dwellers, through the Gas Provider Companies, to which distribution licenses were granted in 2001 and 2000 for the three largest urban centers of the country (Attica, Thessaly and Thessaloniki) [68].

3.2 The Organization of the Greek Energy Market

3.2.1 Monopoly Organization under Law. 2364/1995

The Greek gas market was launched with the Directive 91/296/EEC on the gas transit through large networks and with the Directive 90/377/EEC on the transparency of gas and electricity prices for the final industrial consumer [45]. Initially, under the prevailing

state interventionism, the gas sector was organized in accordance to a monopoly model [25].

At that stage, Law. 2364/1995 was adopted. It focused on the establishment of an energy control and planning body, and on the import, transmission, marketing and distribution of gas among others (the particular Law was subsequently amended by Law. 2528/1997 [26]) [25].

Until the early 1990s, there was an “agoraphobic”, strongly statist notion, clearly reserved in respect to the market economy, and a public economy of strong state intervention, with an adopted model of public enterprise model was organized [45].

In Greece, a public enterprise is set up by the state as a separate legal entity by law or regulation because it leads to a restriction of economic freedom, requires the exhaustion of a portion of state property and is owned by the state, subject to intense supervision and control [44], [56]. It is intended to serve the public interest by providing goods and services of fundamental importance to consumers, and to lead to an economic outcome, which is not only necessary for profit but also to reduce the costs of those goods or services [57].

According to the institutional framework established by Law. 2364/1995, the controlled by majority by the Greek state, monopoly company, DEPA, operated the gas transmission system, imported gas and sold it to major customers (large industrial customers and public power corporation (DEI)), as well as to EPAs, in which private investors also participated. The EPAs operated under a monopoly concession in specific areas of the country and sold gas to small consumers in those areas [25].

3.3 Activities in the Context of the Greek Gas Market

According to Law. 2364/1995, the activities of buying, importing, transporting, storing, processing, distributing and selling gas in the Greek territory, shall be carried out in accordance with the provisions of this Law, shall be of public interest and shall be completed under the supervision of the Minister of Industry, Energy and Technology. These activities were carried out in their entirety by DEPA, which, in particular, had the right to purchase, import, export, transport, store, process and add odors for the sale, distribution and marketing of gas [25].

The gas market in Greece has been and continues to be based on imports from other countries, as gas is not an endogenous fuel source of the country, which has small reserves of gas [50].

In addition, the introduction and exploitation of gas requires the existence of an appropriate infrastructure for its transport, storage and distribution. In its first years of operation, ESFA (completed and put into operation in the fall of 1996) had only one main import input, namely the interconnection with Bulgaria, from which only Russian gas was imported. The second entrance was at the Revithoussa liquefaction station. This station due to technical and economic reasons was intended to help offset the gas load fluctuations, rather than constitute a source of alternative energy for the country [68].

It has to be noted that according to Law. 2364/1995, ESFA was defined as all the installations of the gas transmission network within the Greek territory, which includes the main pipeline, the transmission lines, any type of gas storage facilities and gas re-introductions to the gas network, as well as the transport, measuring, compressing, depressing, audit facilities, and generally installations forming part of the operation and support of the transmission network [68].

The management body of ESFA and of the LNG station throughout the Greek territory was DEPA, which was granted the inalienable right of ESFA's planning, construction, ownership and operation. DEPA was also given the exclusive privilege of using this infrastructure to import, and supply gas to customers [68], [25].

3.4 Adoption of Directive 98/30/EC by the Internal Gas Market in Greece

Greece, as a country with an emerging gas market, was granted, until 2006, a special temporary exemption, from the incorporation into national legislation, of the requirements on third party access to networks and on gas supply competition of Directive 98/30/EC [44].

Thus, the previously described regime of Law. 2364/1995 continued to be applicable. It was only in 2003, when due to the significant developments in the European gas market and the decisive intervention of the Greek RAE, the need to lift the above exemption and to gradually reform the Greek gas market became apparent in order to fully adapt to the European developments [44].

3.4.1 Law. 2773/1999

The first step for the compliance with the European requirements, was the adoption of Law. 2773/1999. This Law, which incorporated Directive 96/92/EC concerning the common rules for the internal market in electricity, did not regulate the gas sector [27]. However, the interest in this particular Law, lies in the fact that it actually led to the establishment for the first time of RAE.

RAE constitutes an independent regulatory authority with the responsibility of supervising the domestic energy market at all its levels, cooperating with the competent state bodies, and taking the appropriate measures for the market liberalization of both the electricity and gas sectors. RAE operates aimed at serving the reasonable interests of consumers with a broad sense that includes both private-domestic consumers and companies [45].

RAE's basic priorities are the adequate, fair, and reliable energy supply of all citizens, the ensuring of the environment's protection and the guarantee of the necessary infrastructure for the related activities of energy production, storage, and transport [45].

Law. 2773/1999 includes RAE's responsibilities, which are regulatory, advisory, supervisory, decisive, and of a sanction manner. These responsibilities were enhanced with Law. 3426/2005 and Law. 3428/2005, which were aimed at accelerating the liberalization of the electricity and gas market respectively [45].

3.5 Adoption of Directive 2003/55/EC by the Greek Internal Gas Market - Law. 3428/2005

Directive 2003/55/EC was incorporated in the Greek Law via Law. 3428/2005, which was aimed at restructuring the Greek gas market's structure from a monopolistic to a competitive one [40].

The explanatory memorandum of Law.3428/2005 highlights the need to withdraw Greece's derogation from its obligation to immediately adapt to the arrangements of Directive 2003/55/EC, which had been granted until 15 November 2006, due to the special nature of the Greek market as an emerging gas market. The reason why the derogation was not exhausted and why it was necessary to immediately restructure the Greek gas market in line with European standards, was attributed to the parallel and systematic effort to accelerate liberalization in the country's electricity market [41].

In this context, the provisions of Law. 3428/2005 consist of [41]:

- a) Ensuring third parties' access to gas networks and other infrastructures with natural monopoly characteristics for the development of competition and the entry of new suppliers into the market,
- b) The designation of gas transmission and distribution system management bodies and the guaranty of their independence against fully integrated companies,
- c) The gradual market's liberalization through the gradual identification of eligible customers,
- d) The establishment of specific principles for the pricing of the services provided in the context of the monopoly activities of transmission and distribution with the aim of non-discrimination and the reflecting of costs, and,
- e) The obligation of keeping separate accounts for companies, engaged in more than one gas activities.

3.5.1 Changes brought about in the Activities in the Context of the Greek Gas Market

Gas Transmission

In order to implement the legal and operational separation of the ESFA operator, a separate public limited company, which is 100% a DEPA subsidiary under the name National Gas System Operator (DESFA) is set up. This company is safeguarded of DEPA. ESFA transfers its ownership to DESFA, without the right of further transfer or assignment, and grants DESFA with the exclusive rights of operation, management, exploitation and development, which are exercised in accordance with the ownership and management license granted to DESFA [60].

DESFA is generally substituted for DEPA's rights, obligations and legal relationships with respect to the industry in question. DESFA's responsibilities and obligations are set out in detail to safeguard the system's cost-effectiveness and technical integrity, as well as the users' seamless access to ESFA [41], [60].

Further, the requirement of the functional separation is reflected in the provisions prohibiting DESFA's involvement in companies operating in competing sectors, namely gas production and supply. It is also reflected in the provisions recognizing the exclusive operator's power to decide on the resources, required for the gas network's operation, maintenance and development [52].

In the same context, there is a specific procedure for the development of ESFA. It consists of the periodic preparation of development studies and development programs by DESFA and their approval by the Minister of Development with RAE's consent [69].

Specific provisions regulate issues related to the freezing and unblocking of LNG's storage and installation capacity and the congestion management, to prevent market entry barriers, and efficiently allocate capacity to those, who actually use it, as well as to avoid risk of non-utilization of parts of the ESFA [59].

Finally, legislative authorization is provided to regulate the individual management issues of ESFA via the ESFA Management Code [59].

Independent Gas Systems

Law. 3428/2005 provides for Independent Gas Systems (ASFAs), which are gas systems with limited local and operational scope, with the aim to meet energy needs in areas not served by ESFA. ASFAs exist beyond ESFA and independently of an interconnection with it [28].

The procedure and criteria for issuing licenses for the construction and ownership of ASFAs are laid down, and the possibility of competing for such licensing is provided as long as there are specific reasons. These reasons, in particular, include serving the public interest, and developing gas market competition [28].

In addition, the terms, conditions and the procedure for exemption from the obligation to provide third party access to ASFA are laid down in accordance with Directive 2003/55/EC [28].

ASFAs' administration and operation is authorized to those who have been granted with an ASFA Operation License. In this context, the procedure and conditions for issuing the ASFA Operation License are specified. The ASFA Operation License is first issued to the holder of the ASFA License. If the particular ASFA is linked to ESFA, the ASFA License is given to DESFA for the purpose of ensuring the efficient and safe operation of the two systems. Finally, special arrangements for ASFA operators participating in vertically integrated gas companies, are introduced to ensure the independence of the ASFA operator against these companies, and to ensure the equal treatment of ASFA users. To ensure equal treatment of ASFA users, the operator develops a Code of Conduct approved by RAE [28].

Gas Supply

In the context of the gas market's gradual liberalization and to open up the supply activity to competition, the concept of eligible customer is introduced, who is defined that customer who has the right to choose how to be supplied with gas [28].

To achieve this objective, Law. 3428/2005 gradually identifies the categories of customers who become eligible, and thereby, acquire the right to choose a supplier at different times, which are also specified in that provision [28].

In this regard, it is expressly defined that the EPAs are required to allow suppliers' access to the distribution networks they manage in the case this is required to supply customers, who become eligible. Until the abovementioned obligation, only DEPA had the right of access to EPAs' distribution networks for the supply of large customers [46].

Regarding gas supply, it is specified that the sale of gas to customers, eligible or not, shall be lawful only by the holders of the respective Natural Gas Supply License. All other activities of buying, selling, importing and exporting gas are freely exercised. This sets out the supply licensing procedure and imposes specific obligations on its holders in respect to the uninterrupted supply of gas to small consumers in an emergency instead of compensation in accordance with their authorization. It also sets out the regular updating of RAE and DESFA in terms of the estimated total gas demand of their customers [46].

For eligible customers, gas supply is governed by the Supply Code, which is approved by the Minister of Development after RAE's recommendation and published in the Government Gazette. Non-eligible customers are supplied with gas by the Attica, Thessaloniki, and Thessaly EPAs, provided that they reside within the geographical boundaries of their jurisdiction. In the case of non-eligible customers established in an area outside the jurisdiction of the three EPAs, however, the supply license is only granted to DEPA [46].

In order to prevent possible abuse of a dominant position, provisions have been included on the activity of gas suppliers with a high market share, which relate in particular to their obligation to disclose a draft standard supply contract to all customers of the same price and price range [46].

3.6 Adoption of Directive 2009/73/EC by the Greek Internal Gas Market - Law. 4001/2011

The EU's Third Energy Market Package, including both electricity and gas, was incorporated into Greek law via Law. 4001/2011, which was designated as a framework law on energy [67].

3.6.1 Natural Gas Transmission System (ESFA)

With Law.4001/2011, ESFA's definition is updated, and it is clarified that the interior space of the pipelines of the gas transmission system and the tanks of Revithoussa do not constitute a gas storage facility. It is explicitly stated that the projects included in ESFA are recognized as projects of major national importance, of obvious public interest and of general public interest [29].

ESFA's management is legally entrusted to DESFA and it is clarified that it is obliged to apply for certification and new specific obligations in respect to DESFA are set [29].

As regards to the ESFA Development Program, the framework governing it, is in line with the EU framework, as DESFA expressly commits itself to taking into account, during the drawing up the Development Program, the Community-wide Development Program and regional investment programs in accordance with the relevant provisions of Regulation 715/2009 [29].

3.6.2 Effective Unbundling of the Gas Transmission System

The effective unbundling of the transmission system operators is the foremost regulatory requirement of Directive 2009/73/EC, aimed at the proper functioning of the liberalized market, given the failure of Directive 2003/55/EC to achieve the particular target. This aim is to be realized through the rules of legal and functional unbundling provided for by Directive 2009/73/EC [10].

As typically noted in Directive 2009/73/EC, without the effective unbundling of networks from production and supply activities, there is a risk of discrimination in the operation of networks, as well as a risk in the motivation of vertically integrated companies to make the necessary investments in their networks. In this context, the third set of rules introduces new market realities and seeks to cover the deficit of Directive 2003/55/EC, describing the qualitative requirements of an effective unbundling, consisting of lifting any conflicts of interest between producers, suppliers and transmission system operators, as

well as of the non-discriminatory promotion of investments, the fair access of new entrants to the network and market transparency [10].

To achieve this regulatory objective, Directive 2009/73/EC proposed three equivalent systems for the unbundling of gas transmission systems, providing member-states with the choice option, and specifying the specific conditions for these option's application. In this context, Directive 2009/73/EC identified ownership unbundling as a central and effective option, which presupposes that the network owner is designated as the network operator and is independent of supply and production interests [10].

This way, a general prohibition clause is introduced, according to which natural or legal persons engaged in gas production or supply may not exercise control or rights over a transmission system operator or transmission system. Conversely, ownership unbundling excludes persons that are controlling a transmission system or transmission system operators from directly or indirectly exercising control over the rights of producers or suppliers [47].

Further, as alternative unbundling systems, Directive 2009/73/EC foresaw the systems of the independent system operator (ISO), as well as the independent transmission system operator. The member-states' selection of the ISO model assumes that the transmission system belongs to a vertically integrated company. The model concerns the member-states, who have not already applied for a voluntary ownership unbundling [47].

At the same time, the ISO is outside the scope of the integrated business, is a person independent, and completely separate (legally, functionally and in terms of ownership) from the company, and does not accept control by a person operating in competing market segments, nor involved in the pursuit of competitive activities. The integrated company is still active in production and supply, completely alienated from system operation. The ownership of the transmission assets must, in the context of legal unbundling, be transferred to a new legal entity, a subsidiary of the integrated company, which has no holding in the share capital of the independent system operator and which is independent against supply and production interests [47].

The third alternative operation scheme concerns the Independent Transmission Operator (ITO), who, although integrated into the structure of the integrated company, is a distinct legal entity in relation to this company and is equipped with the transmission system ownership and the responsibility of its operation. Further, in accordance with the requirements of operational unbundling, the ITO obtains effective decision-making with regard

to the resources required for the operation, maintenance or development of the transmission system, and in particular independently of the integrated company [46].

With regard to the unbundling of the transmission and supply activities in the Greek gas market, the ownership unbundling option that was initially adopted via Law. 4001/2011, was replaced with the ITO model, with the option of future ownership unbundling. Further, Law. 4001/2011 provided for the procedure of separating gas transmission system operators and for their certification by RAE [42].

Simultaneously, explicit provisions and measures have been adopted for the operation of DESFA, for the latter to comply with the provisions concerning the separate operators of gas transmission systems. The explicit DESFA provisions were added via Law. 4093/2012 and incorporate the set of rules of Directive 2009/73/EC for the independent transmission operator [30].

In view of all above, the provisions, which ensure the independence of DESFA and its staff, are as follows [29]:

- a) Staffing with the necessary staff and securing the necessary resources (logistical and financial) for this staff to perform their duties,
- b) Exclusive decisive responsibility, in relation to the resources necessary for the operation, maintenance and development of ESFA,
- c) Independence of the staff and of members of the DESFA Board of Directors,
- d) Appointment of a supervisory board, which will be responsible for the decision-making, with a significant impact on the value of DESFA's shareholders' fixed assets, in particular with regard to the approval of financing plans, DESFA loans and the amount of dividends distributed to them,
- e) The obligation of the operator to establish and execute a Compliance Program, including non-discrimination measures, as well as the obligations of DESFA officials to fulfill this program's objectives,
- f) Appointment of a Compliance Officer who monitors the implementation of the compliance program and reports any deviations from it,
- g) Elaboration of a ten-year ESFA Development Program, specifying the necessary ESFA development and interconnection projects, their timeframe, methods and cost,
- h) Certification process of the responding party, to be approved and appointed as the Gas Transmission System Operator or in accordance with the usual procedure of

Regulation (EC) 715/2009, Law. 4001/2011 and Directive 2009/73/EC or in accordance with the procedure specifically provided for via Law. 4001/2011 Directive 2009/73/EC, in the case of a certification application by a system owner or system operator controlled by a person(s) originating from a third country.

3.6.3 Independent Gas Systems

Law. 4001/2011, RAE is now responsible for issuing ASFA Licenses. This license is still granted exclusively to legal entities, but in the case of transmission systems it is granted only to companies falling in the categories of the Directive 2009/101/EC (limited company, limited liability company, and company limited by shares) [29].

Furthermore, since ASFA is a gas transmission system, for which no exempt has be given under Directive 2009/73/EC, its operator is subject to full ownership unbundling and is therefore subject to strict and effective unbundling obligations with respect to the competing activities of gas production and supply. Simultaneously, it is clarified that the granting of the ASFA License does not relieve its holder of certification obligations [29].

With regard to the exemption from the obligation to provide third party access to ASFA, it is expressly stipulated that the exemption granted no longer applies only to third party access, but also to ownership unbundling obligations in accordance to Directive 2009/73/EC [29].

Regarding ASFAs' operation, it is expressly mentioned that the License to operate ASFAs, for which no exemption has been granted, shall be granted exclusively to the holder of the ASFA License [10]. In any other case, such a License may be granted on the basis of efficiency and financial criteria to a person other than the ASFA License holder [29].

Finally, special arrangements are introduced, which refer to operators participating in vertically integrated electricity companies, to ensure the independence of the ASFA operator against the above companies, as well as the equal treatment of ASFA users [29].

In such cases, the ASFA operator is required to establish and implement a compliance program that ensures the equal treatment of the system's users and prevents discriminatory behaviors favorable to the integrated company [29].

3.6.4 Gas Supply

The original provisions of Law. 4001/2011 maintained the distinction between eligible and non-eligible customers of the previous scheme by stating that the former are supplied with gas by license holders and the latter by gas from the EPAs [29].

Under the current regime, eligible customers are supplied by gas license holders, while customers, who have not yet become eligible, are supplied with gas by EPAs on the basis of the regulated supply tariffs issued in accordance Law. No. 4001/2011. The supply license is now granted via RAE's decision, and supply is still subject to the specific terms and conditions set out in the Supply Code. Further, Law. 4001/2011, as in force in its original version, codified the repealed provisions of Law. 3428/2005 in respect to the designation of eligible clients, so as for their definition not to be confusing by their then elaborate definition [29].

It has to be noted that Law. 4336/2015 [31] and Law. 4414/2016 [33], now define a clear time frame so that, in accordance with Law. 4001/2011, all gas consumers, regardless of category and consumption, have become eligible, until 1-1-2018. From the conceptualization of the above, it can be seen that the cases of eligible customers are cited restrictively and cannot be enlarged except by a corresponding legislative provision [31], [33]. In this context, Law. 4001/2011, as currently in force under its' provisions' replacement by Law. 4336/2015, lists specific categories of eligible customers, which are as follows [29], [31]:

- a) The holders of electricity licenses using gas for energy production,
- b) All customers, including residential customers, located outside the geographical areas under the jurisdiction of EPAs of Attica, Thessaloniki and Thessaly,
- c) Within the geographical areas under the jurisdiction of the Attica, Thessaloniki and Thessaly Regional Administrations:
 1. Those supplying gas for the purpose of being used as fuel in marine and land transport engines,
 2. Customers supplying gas for industrial use, including cogeneration, who in the last twelve months have had actual consumption of more than 2.2 GWh per consumption place,

3. From 1 January 2017 all non-domestic customers, who had actual consumption of more than 2.2 GWh per consumption place,
 4. From 1 January 2018 all non-household customers, regardless of consumption,
 5. From 1 January 2018 all domestic customers.
- d) Existing EPAs established under the provisions of Law. 2346/1995 and defined in Law. 3428/2005, prior to their legal unbundling, become eligible customers:
1. Both for the supply of quantities of gas, in addition to the annual contractual quantity, fixed for the year 2010 by the applicable, at the time of the entry into force of Law. 3428/2005, contract of each EPA with DEPA, and up to expiry of each contract and upon the expiry of such contracts for any quantity of gas,
 2. As for quantities of gas reserved for the supply of exclusively eligible customers.

Customers established within the geographical areas that are under the jurisdiction of the existing EPAs (now EDAs) and who have not become eligible in accordance with the aforementioned timeframe and are not connected to the network, may submit a written expression of interest of connection to the network to the existing EPAs or EDAs, which are obliged within one month of the abovementioned expression of interest, to notify the client concerned in writing if the realization of the connection project is possible within three months, in accordance with the approved Development Plan. When the connection is feasible, the person concerned shall be notified within one month of the said deadline, and shall be also notified on the connection offer. Such customers shall become eligible consumers [29]:

- a) From the date of notification, within the time-limit set forth in the immediately preceding paragraph, of the refusal of connection,
- b) In the case when the time-limit referred above has elapsed, without the respective EPA or EDA having notified the customer in writing of the connection offer, the consumer has the right to be supplied with gas from alternative suppliers.

EPAs are obliged, at least two months before the dates mentioned above, and by customer category, to notify in writing the non-eligible customers, who are supplied with gas by the EPAs, of their ability to change supplier when they become eligible. To this end, the EPAs are obliged disclose to these customers [29]:

- a) The relevant consumption data for the previous year including the total customer charge and the charge per MWh consumption,
- b) The comparison with the consumption data in the corresponding billing period of the preceding year or the evolution in the last 12 months of the average rolling consumption per billing period.

The above mentioned written briefing may be provided either in a dedicated account space or with a separate information note attached to the account. In addition to the above information, the written update should include a clear reference to the RAE website, where a list of commission license holders is posted [29].

In this regard, EPAs (now EDAs) are obliged to allow suppliers with access to the distribution networks they operate, if it is considered necessary to supply customers who are eligible. Access shall be denied only in cases where access entails an infringement by the EPAs or EDAs of the provisions of the existing legislation or the terms of the Natural Gas Distribution Network License or jeopardize the safe operation of the distribution network. Access to the distribution network shall be due to the EPAs or EDAs in return for using this network, the amount of which is set out in the Pricing Regulation [29].

Finally, eligible customers are entitled to resell all or part of the amount of the gas supplied to another eligible customer, provided that the resold gas is traded through the same Gas System or Gas Systems, which are interconnected. Under the new regime, however, it is expressly stipulated that the restriction of the resale right is prohibited and that any terms of supply contracts, which limit it, are completely invalid. In this respect, it is still possible to impose a series of specific obligations on suppliers with a high market share, with RAE having the sole competence under the current regime [29].

4 Greek Gas Distribution Companies' Evolution

In this Chapter, the evolution of Greek gas distribution companies is detailed. However, prior to this presentation, it is considered as vital for the further understanding of this research's objectives, to initially provide some preliminary details on the introduction of gas in Greece, and the Greek transmission and distribution system.

4.1 Introduction of Gas in Greece

Gas is imported into Greece in three ways [71]:

- From Russia with a 70 bar nominal high-pressure onshore pipeline and a maximum diameter of 914.4mm,
- From England with tankers in liquefied form, and,
- From Turkey with 70 bar high-pressure onshore pipeline and a diameter of 914.4mm.

An integrated system for gas transit typically consists of the transmission network (very high pressure of 60 bar - 70 bar), the allocation network (pressure of 16 bar - 21 bar) and the distribution network (pressure of 0.1 bar - 4 bar) [71].

The transmission network transports high-pressure gas to the reduction stations. At the reduction stations the pressure of gas is lowered and at the exit of the station, the allocation network begins. It is here where the gas is distributed to the supplied with gas areas and to consumers [71].

The form of the distribution network varies and depends on the area to be supplied with gas (urban or industrial), but also on other factors, as for example the operation pressure classes, the distribution network format, and so on. Whatever the form of the distribution network, it always ends up in the stations of the gas sector, where the pressure is reduced and the beginning of the distribution network is defined [71].

ESFA consists of the main transmission pipelines with the branches to areas of high consumption, characterized by a maximum working pressure of 60 bar (high pressure), the

allocation networks, characterized by a maximum pressure of 19 bar (medium pressure) and the distribution networks, characterized by a maximum working pressure of 100 mbar - 4 bar (low pressure) [71].

4.2 The Gas Transmission System

ESFA consists of all the gas transmission network facilities in Greece. It includes the main pipeline and its branches, the gas storage, compression, control and metering facilities, as well as the LNG system with the special vessels at Revithoussa with the regasification and channeling equipment [71].

ESFA, according to Law. 3428/2005, consists of the [46]:

- 512 km high pressure (70bar design pressure) main transmission pipeline, from the Greek-Bulgarian border up to Attica,
- High-pressure transmission branches to Eastern Macedonia and Thrace, Thessaloniki, Volos, Oinofyta and Attica of total length of 440km,
- 87 km long high-pressure transmission branch - pipeline of Komotini - Alexandroupolis - Kipoi (Greek-Turkish border), which connects Greece with Turkey,
- 43 km long high-pressure pipeline to the Corinthian region,
- High-pressure pipelines to Antikyra, Aliveri, Western Thessaly of a total length of 147 km,
- Metering station for the reception of imported Russian gas at Sidirokastro (Greek-Bulgarian border region),
- Gas metering station at Kipoi (Greek-Turkish border region),
- Onshore part of the Greek territory of the pipeline connecting Greece with Italy between Komotini and Stavrolimena of a total length of 590 km,
- 31 metering and regulating stations for measuring gas flow and/ or pressure,
- Remote Supervision, Control and Data Acquisition System (SCADA),
- Operation and Maintenance Centers in Attica, Thessaloniki, Thessaly, and Xanthi,
- Central control room at Elefsina, which through the SCADA system, monitors and audits ESFA, and which operates around the clock,
- LNG facilities in Revithoussa in the Gulf of Attica, and,
- Additional facilities and infrastructures that serve the transmission system.

4.3 The Gas Distribution System

Gas distribution is defined as the channeling and the carrying over of gas through pipelines of design pressure up to 19 bar, that is, at an absolute pressure of 20 bar [71].

The gas distribution system consists of all the installations of the gas distribution network in an area, including the pipelines and the facilities required to carry out the distribution. The purpose of a gas distribution system is to supply consumers with gas in the required quantity, pressure and quality, ensuring continuous supply without interruption [71].

The main transmission pipeline, passing through Bulgaria, enters Greece from the Promachonas station (Thermopigi, Sidirokastro station) and ends at the southern point of Lavrion [71].

The distribution system consists of the [71]:

- Medium pressure network or allocation network,
- Sectoral measuring stations,
- Low pressure distribution network,
- Carrying over pipelines, and,
- Pressure regulators.

4.4 Gas Distribution Companies

Gas Distribution Operators are defined as any limited company that provides gas in a lawful manner to the end-consumers and is in compliance with articles 3 and 4 of Law. 2336/2005 [71]. In particular, according to article 3 of Law. 2364/1995, the following shall apply [25]:

- DEPA has the right, as already mentioned, to purchase, import, export, transport, store, process and add odors for the sale, distribution and marketing of gas.
- In order to carry out these activities, DEPA has the right to plan, design, build, own and operate the Natural Gas Distribution Systems, required to supply its customers.
- DEPA has the right to sell gas, as already mentioned, to EDAs and EPAs, to large consumers, to motor vehicles, and, to industrial and other gas consumers, regardless of the consumption level.

- Companies licensed for the installation and operation of a gas transmission system are responsible for the design, financing, construction, operation and maintenance of the system. During the concession period, its beneficiaries have and exercise the full and exclusive right to use and benefit from the system and are obliged, where technically feasible, to provide access to the network they are using to DEI or to the trading companies of the following paragraph, for the payment of a transit fee agreed between the parties. Since the beginning of their operation, the installations of the entire system have been owned by the National Transmission System Operator, and their operation and exploitation will be carried out after the expiry of the period for which the relevant right has been granted.

According to article 4 of the same Law, the following shall apply [25]:

- The EPAs, established by DEPA and which operate in the form of limited companies, with geographical boundaries of activity in the areas of Attica, Thessaly and Thessaloniki respectively, are governed by the provisions of this Law. The above activity limits of the EPAs, which are specified in their statutes, may be extended only after the approval of the Minister of Development.
- The EDAs or DEPA are granted with the exclusive and transferable right for the following:
 - a) Planning, designing, constructing, owning and operating a Gas Distribution System in their geographical area of activity.
 - b) Sale of gas to consumers who consume a volume of gas up to 100MW of gross calorific value per year. This annual consumption is deduced from the fuel consumption of the last twelve months of operation or for new plants, from the power of the installations. The above criterion applies to each consumer when signing the first gas sale contract and is not affected by any subsequent consumption fluctuations. For the application of the above criterion a consumer is defined as the one who owns or legally uses installations for which gas is used, on a single or adjacent plot.
- The gas distribution license shall include terms that the body audits, and which include the :

- a) Service primarily of the public interest and the provision of services of general interest.
- b) Obligation to provide high quality services to consumers.
- c) setting of communicable and transparent tariffs, in particular with regard to the prices of competing forms of energy and costs, with the prohibition in any event of their retrospective increase.
- d) Obligation to develop distribution networks in accordance with the timetable attached to the distribution license.
- e) Obligation to provide gas to consumers within a defined distance from the gas network.
- f) Obligation to comply with the rules and conditions laid down in accordance with of article 7 of this Law.
- g) Terms and conditions with which it is possible to discontinue the supply of gas to a consumer.
- h) Procedures for resolving disputes and monitoring complaints between consumers and EDAs or EPAs.
- i) Obligation to insure the holder of the distribution license for civil liability against third parties from carrying on their business.
- j) Obligation to operate, maintain, inspect, repair and replace the distribution system in accordance with the relevant provisions of EU and national Law.
 - ✓ The obligation to take all necessary measures to ensure the safe operation of the distribution system and to avoid causing personal injury or property damage.

- ✓ The obligation to submit a Distribution System Development Plan to the Ministry of Environment, Energy and Climate Change and RAE after five years from the date of issuance of the distribution license, which shall refer to the next five years.
- ✓ The obligation to submit to the Ministry of Environment, Energy and Climate Change and RAE the Activity Report for the previous year by 30 June of each year.
- ✓ The obligation to inform the Minister of the Environment, Energy and Climate Change and RAE annually on the progress of the development of the distribution system and on the progress of completing the other obligations of the distribution license's holder.

DEPA legalized its activities and created a new structure for gas companies in Greece. The general characteristic is that all gas companies operate as limited companies (that is, by definition commercial) but have, and maintain in the future, the public character directly controlled by the Ministry of Development, in coordination with the Ministry of National Economy [71].

DEPA's gas distribution subsidiaries are as follows [71]:

- Attica Gas Distribution Company.
- Thessaloniki - Thessaly Gas Distribution Company.
- DEDA (Public Gas Distribution Company Operation SA).
- Attica Gas Supply Company.
- Thessaloniki - Thessaly Gas Supply Company SA / ZENITH GAS & LIGHT.

Other companies involved in gas distribution are the following [71]:

- IGI Poseidon S.A. (Greek-Italian Underwater Gas Pipeline): IGI Poseidon S.A. was established in 2008 and DEPA and Italian EDISON are equally involved. The company is responsible for the design, construction and operation of the IGI Poseidon Pipeline and the Eastern Mediterranean Pipeline (EastMed). The company also participates as a 50% shareholder in the project of the Greek-Bulgarian Interconnector (IGB).
- Interconnector Greece Bulgaria AD (ICGB AD): ICGB AD was founded in January 2011. The Greek company YAFSA POSEIDON SA and the Bulgarian state-

owned company BULGARIAN ENERGY HOLDING EAD (BEH EAD) are equally involved. The company is responsible for the study and construction of the new Greece-Bulgarian interconnection pipeline, giving Bulgaria and other Southeast European countries access to new sources of gas supply. The pipeline will start at Komotini and end at Stara Zagora in Bulgaria.

4.5 Historical evolution of Gas Distribution Companies

Below the milestones of the historical evolution contributing to the creation of gas distribution companies in Greece are detailed [35], [38], [39]:

1988: DEPA is established as a subsidiary of Public Oil Company (DEP).

2000: Following the successful conclusion of an international bidding procedure for the selection of private investors, the first two EPAs are established in the Thessaloniki and Thessaly area. DEPA holds a 51% stake in the share capital, while the remaining 49% is owned by a private investor, who also has management responsibility.

2001: The third EPA is established in the Attica region through a similar procedure

2005: Law. 3428/2005 on the liberalization of the gas market, which provides for the creation of a DEPA subsidiary under the name of DESFA SA, is adopted by the Greek Parliament.

The Law provides for the division of the National Gas System branch and its transfer to DESFA and for the operational independence of the two legally separated companies.

2007: In compliance with the provisions of Law. 3428/2005, DESFA, which manages ESFA, as well as the entire system of transmission and installation of LNG, is established as a 100% subsidiary of DEPA.

2011: The new Law. 4001/2011, which largely replaces Law. 3428/2005 and incorporates the provisions of Directive 2009/73/EU aiming at enhancing market liberalization, is adopted.

2017: EDA of Thessaloniki - Thessaly begins its operation with the activity of planning, designing, and building networks in the Municipalities and Communities of the geographical region of the prefecture of Thessaloniki and the district of Thessaly.

The gas network of EDA of Thessaloniki -Thessaly serves 13 municipalities of the prefecture of Thessaloniki and 11 municipalities of the district of Thessaly.

EDA of Attica begins its operation as the sole operator of the gas distribution network in Attica with the activities of the operation, maintenance and development of gas networks and the connection of consumers with these networks.

EDA of Attica distributes gas daily, safely and reliably, to thousands of households and businesses across more than 65 municipalities in Attica.

The Distribution Company of the Rest of Greece (100% subsidiary of DEPA) is founded, which is responsible for the construction, expansion and activation of networks and services in the rest of Greece (except Attica, Thessaloniki and Thessaly).

The Distribution Company of the Rest of Greece is created in compliance with the obligation for the legal and functional unbundling of distribution activities from other DEPA activities (Law. 4336/2015)

5 The Evolution of the Regulatory Framework of Gas Distribution Operators

In this Chapter, the legislation referring explicitly to the gas distribution is detailed. Laws already mentioned previously will be detailed here, yet with the sole focus being attributed to gas distribution.

5.1 The Distribution of Gas under Law. 2436/1995

The development of distribution networks in the country's urban areas and the gas supply to the customers of these areas have been achieved through the establishment, establishment and operation of EPAs in specific geographical areas of the country [25].

As stated previously, DEPA has had the right to sell gas, including to large consumers, as well as to vehicles. These rights could, under explicit legal provision, be transferred in whole or in part to the EPAs, as well as to the EDAs, the establishment of which was provided by the provisions Law. 2436/1995 [25].

Furthermore, EDAs or DEPA were legally granted the exclusive right (more details are provided in Chapter 4) of [25]:

- a) Planning a study of the design, construction, ownership and operation of the Gas Distribution System in their geographical area of activity, and,
- b) The sale of gas to consumers, who consume a volume of gas up to 100MW of gross calorific value per year.

The aforementioned rights of EDAs or DEPA on a case-by-case basis, other than the right of ownership, were allowed to be entered only to EPAs, whose establishment would take place following a procedure specifically established by Law [25].

In particular, EDAs or DEPA could launch public international tenders, without any time limit, to identify private investors, who were to make a contract with them for the operation of a gas distribution network and to participate in the under establishment EPAs, in each case with an up to forty-nine percent (49%) of the share capital. Companies or

groups of companies conventionally associated with experience in the development, operation and management of gas distribution systems, could participate in these tenders [25].

The under establishment EPAs, would be in the form of public limited companies and would be established solely for the purpose of planning, designing, building and operating a gas distribution system within the geographical boundaries of the activity specified in their statutes, and after the granting of a license of a time limit spanning from 25 to 35 years [25].

In 1995, DEPA established the three EDAs of Attica, Thessaloniki and Thessaly, for all of which DEPA held all the shares. Subsequently, these three EDAs held three international tenders during the years 2000-2001 to jointly set up the respective EPAs, with the aim of developing, operating, maintaining and exploiting the gas distribution system, which will be integrated in their areas for the next thirty years [45].

Following the completion of the tenders, which provided the highest bidders (Attiki Denmark ApS for the region of Attica and ITALGAS for the regions of Thessaloniki and Thessaly), the EPAs of Attica, Thessaloniki and Thessaly were established. The share of Attiki Denmark ApS and ITALCAS were 51% and 49% respectively [45]. In this context, they established the EPAs of Attica, Thessaloniki, and Thessaly, for all of which a Distribution License was issued for thirty 30 years [25].

5.2 The Impact of Law. 3428/2005 on Gas Distribution

In the field of gas distribution, in principle, the legal status did not change, as existing EPAs retain the exclusive use of distribution networks in the areas where they operate, and as they continue to operate in accordance with Law. 2364/1995 and the Licenses for the Distribution of Gas [46].

At the same time, however, this regime is tightened, as the EPAs are now burdened with accounting unbundling and third party open access obligations for the distribution networks to serve eligible customers [46].

Further, their activities' status is regulated under the new regulatory framework, as is the activities' status of the established EDAs. DEPA issues by law gas distribution and supply licenses for the administrative boundaries of the regions of Central Greece and Euboea,

Central Macedonia and Eastern Macedonia and Thrace, and provides for the procedure of determining the distribution permits [69].

With regard to these licenses, however, DEPA is required to take legal action to set up and operate new EPAs in the above mentioned areas (except for the prefecture of Corinth). Also, it is provided for that the establishment of a new EPA will terminate the license granted to DEPA in that area. For the new EPAs it is foreseen that they will be granted a gas distribution license in accordance with the provisions of Law. 2364/1995, provided that the procedure for granting a derogation have been executed with in accordance with the previously analyzed provisions of Directive 2003/55/EC [46].

It is also possible to develop and manage new distribution networks outside the areas of existing and future EPAs, after the granting of the relevant licensing. In particular, in this context, it is provided for that the construction, operation and management of a distribution network, beyond the areas of the three EPAs, shall only be permitted following the issuance of a Natural Gas Distribution License. Simultaneously, specific arrangements for the holders of such a License that participate to a vertically integrated company, are introduced to ensure their independence from that company [46], [51].

5.3 The Impact of Law. 4001/2011 on Gas Distribution

The new regulations of Law. 4001/2011 provide for the granting of two licenses in respect of gas distribution networks. The construction of a distribution network requires the granting of a distribution license, and the operation and exploitation of a distribution network requires the granting of a distribution network operation license. Both licenses are issued by RAE's decision upon the application of the person concerned. The operation license is in principle granted to the holder of the distribution license, but may also be granted to a third party, on the basis of the criteria of profitability and financial balance. In the latter case, the holder of the distribution license and the holder of the operation license enter a contract, specifying the owed remuneration for the operation of the distribution network [29].

Further, and until the adoption of Law. 4336/2015 (detailed in the next Section), Law. 4001/2011 clarified that the derogations granted for the geographical areas and for the periods specified in the licenses that were issued before March 15, 2002, would be maintained in accordance to Directive 98/30/EC. Taking this into consideration, it was possible

to refuse the distribution license for the geographical areas referred to Law. 3428/2005. In this context, the three existing EPAs continued to operate under the monopoly gas supply and distribution regime within their territorial jurisdiction [29]. It is noted, however, that following the newer regulations of Law. 4336/2015, which imposed the unbundling between distribution and supply activities, the respective provisions of Law. 4001/2011 were amended and adjusted accordingly [31].

Under the new arrangements any interested party that fulfills the requirements of the License Regulation may apply to RAE for a distribution license and distribution network operation license for the development of a distribution network in areas falling under the territorial jurisdiction of the former EPA of Attica and Thessaloniki (and now EDA), subject to the following conditions [29]:

- a) These areas are not part of the approved development plan for the network,
- b) They are part of the approved development plan but 18 months have elapsed without completing the schedule set forth in the Distribution License of the network.

The obvious purpose of the above arrangement is to enable the network to be developed by a body other than the original, if the latter does not wish to expand the network or is slow to do so. It is also obvious that this provision derogates from the exclusivity that the EDAs (derived from the old EPAs) had over the operation of the network in question, since, under certain conditions, another owner and/ or operator of some part of the entire network, may exist in the same geographical area, which of course will not belong to the previous operator [61].

In this regard, in the context of the attempted liberalization of the retail gas market, it is stipulated that the distribution network operator's obligations are now specified in the distribution network operation license, with further indications of their main Obligations [29].

Further and under the new regime, distribution network operation, maintenance and development is carried out in accordance with the Distribution Network Operation Code, which is established by RAE's decision upon recommendation of the distribution network operator. The Code is published in the Government Gazette and may be amended either at RAE's initiative or at the request of the operator [29].

The law then gives an indicative indication of the main issues regulated by the Code. Subsequently, Law. 4001/2011 provides for the obligation of the distribution network operator to draw up a Metering Regulation and submit it by June 30, 2016, for approval

to RAE, which must decide on it within three months from the date of submission. The validity of the Metering Regulation starts with its publication in the Government Gazette [29].

The provisions of this Regulation shall include, for example, the manner in which the measuring of the quantity of gas delivered to the distribution network is carried out, the accuracy specifications of this measuring and the manner in which disputes that arise in relation to the measurements are resolved. Also included in the Regulation, are the reporting and data sharing rules on metrics to ensure the accuracy, transparency, unimpeded exercise of the right to change supplier and access of those who have a legitimate interest in the data free of charge [29].

Besides, the distribution network operator is responsible for implementing the distribution network with the resources of the Distribution Licensee, in accordance with the development plan, which is prepared by the operator and submitted to RAE for approval in accordance with the Operation Code. The development plan specifies, in particular, the projects and the timetable for the network's development, taking into account the evolution of demand, the needs due for the connection of new users, the needs of improving efficiency, the safe operation and quality of distribution network operator's services, the implementation of new technologies and, as far as possible, of technical specifications and environmental protection [29].

In the above program, the main axes of network development are defined for a period of five years. Network extension projects, due to connection, are legally executed even if they are not foreseen in the approved development program. The Initial Development Program coincides with the application for a distribution license. The first year of the Initial Development Plan shall translate to the year, in which the distribution license enters into force [29].

The methodologies, calculations, specific approvals and details required for the implementation of the Operation Code shall be prepared by the distribution network operator and approved by RAE [29].

Particular reference should be made to the independence guarantees that the holder of a distribution license and/ or a distribution network operation license must fulfill in the case of a vertically integrated gas or electricity company. Non-discriminatory access to the distribution network is crucial for access to retail customers at the next stages of the mar-

ket, while and to further create fair competition at a retail level, distribution network operators should not be able to exploit their vertical integration in terms of their competitive position in the market, in particular with regard to domestic and small non-domestic customers [29].

In this context, it is clarified that the holder of a distribution license and/ or a distribution network operation license in a vertically integrated gas or electricity company must be independent of other branches or departments of that company, at least in legal form, organization and decision-making. Specific arrangements are provided for the fulfillment of this purpose [45].

Finally, it is provided for that the special arrangements for the legal and functional unbundling obligation do not apply in the case where the holder of a distribution license and/ or a distribution network operation license is controlled by a vertical integrated gas or electricity company, which has this control via its participation in cumulative distribution networks serving less than 100,000 connected customers [45].

5.4 Liberalization of the Retail Gas Market via the Introduction of Law. 4336/2015

5.4.1 Explanatory Memorandum

Below, the explanatory memorandum on the need for the adoption of Law. 4336/2015 is detailed, exactly as it was recorded.

Greece as an EU equal member is committed to harmonizing the institutional framework for the operation of the Greek energy, electricity and gas market with the current framework of the third energy package systematically promoted by the EU in all member-states to organize the Europe's Energy Union [62].

The aim of completing the European internal energy market in electricity and in gas is to create an open energy market that will enable a) all consumers to freely choose electricity and gas suppliers, and b) all suppliers to supply energy freely to their customers, as well as to enable the economy to take advantage of the new modern energy infrastructure and reduce energy costs of the productive activities [62].

However, there are still obstacles to the development of the European energy market, notably in relation to the access to networks, the different speeds at which different member-states progress in their efforts to gradually integrate the energy market, the consumer

price differences in the wholesale and retail markets, the free choosing of suppliers by the consumers, the new opportunities for all businesses, the increased cross-border and internal trade, the security and diversification of supply, the competitive prices and the higher quality of the offered services, the improvement of the fuel mixture and the sustainable development [62].

In the context of this reality, Greece, among other member-states, is making an effort to harmonize its energy market model with the EU-based market model [62].

In particular, in relation to gas, the adaptation of the retail gas market to that of other member-states is under way. This requires the unbundling of the existing EPAs. A similar unbundling has recently been implemented in the (high pressure) transmission of gas with the creation of DESFA. For this reason, it is necessary to amend and supplement Law. 4001/2011 [62].

The gas model that is regulated in all EU member-states already applies the unbundling of retail activities, with the operation of two separate companies (operation and distribution companies), the regulated distribution activity with objective rules of third party access to networks, and the full market opening via the gradual abolition of supply restrictions [62].

The goals of the already operating unbundling are already in place, achieving competitive prices in gas and free supplier choice [62].

Particular attention should be paid to DEPA, as a decisive factor in ensuring the proper functioning of the retail gas market [62].

The liberalization of the retail gas market will in itself be a catalyst for increased competition throughout the wholesale and retail gas market [62].

For this reason, the liberalization of the retail gas market, as soon as possible, is the central objective for the amendment of Law. 4001/2011, so that unbundling can proceed in order for the new retail gas market structure to function smoothly and effectively [62].

During the unbundling of the current EPAs, the companies are transformed into EDAs and distribution network operator companies [62].

The unbundling is in principle accounting, and therefore, does not burden the state budget [62].

5.4.2 Law. 4336/2015

Until the adoption of Law. 4335/2015 and the implementation of its relevant regulations, the three EPAs of Attica, Thessaloniki and Thessaly continued to operate under the monopoly system of supply and distribution of gas within their territorial jurisdiction, thereby [68], [69], [70], contributing decisively to the distribution of gas to consumers in these areas. However, the aforementioned monopoly model has exhibited signs of “fatigue”, while conditions have matured to reshape the Greek retail gas market in line with European requirements. The gradual change in the monopoly organization of the EPAs, as well as the general framework of operation of the Greek retail gas market came into effect via Law. 4336/2015, which provided for the unbundling of the distribution activity from the activity of gas supply [67].

Under those circumstances, the new article 80A of Law. 4001/2011, as added by Law. 4336/2015 [31], and as amended by Law. 4337/2015 [32] provided that:

- a) As of January 1, 2016, DEPA SA and the three existing EPAs are required to keep separate accounts in their internal accounts for each of their activities, as specified in Article 89 of Law. 4001/2011, in respect to the activities of Distribution, to the eligible clients, the supply of eligible clients, and of the provision of Public Interest Services and Last Resort Services.
- b) By 31 July 2016, DEPA SA and the three existing EPAs are required to submit for approval the principles and rules of allocation for the accounting unbundling of their activities in RAE, which must decide on these principles and rules within three months from the date of submission.
- c) Until January 1, 2017, the three existing EPAs are obliged to make a legal and operational unbundling of the operation activity of the Attica, Thessaly and Thessaloniki Distribution Networks from their activity in respect to the supply of gas, with the contribution levy at the option of either the Distribution or Supply branch of each of them, at the stage of setting up an EDA or a new EPA respectively, in accordance with the provisions of Law. 4001/2011 and the Law. 2190/1920 on limited companies.
- d) DEPA, at the time of the establishment of the EDAs and to cover the rest of Greece, is obliged, when setting up a new operation of DEDA, to make a legal unbundling of the operation of the Distribution Network Operation of Greece from the other activities of the vertically integrated companies, with the contribution

levy of the Distribution Sector to the EDA, in which DEPA will retain all the shares, in accordance with the provisions of Law. 4001/2011 and the Law. 2190/1920 on limited companies.

The implementation of these provisions completed the legal and operational unbundling process for the three EPAs, which separated the supply sector and contributed to the establishment of the new gas companies. As a result, the following companies emerged [31]:

- a) The THESSALONIKI-THESSALY GAS SUPPLY COMPANY, which operates the competitive activity of supply.
- b) The THESSALONIKI-THESSALY GAS DISTRIBUTION COMPANY, which operates the now regulated distribution activity within the geographical boundaries of the Thessaloniki, Thessaly distribution networks, as defined in Article 2 of Law. 4001/2011.
- c) The ATTICA GAS SUPPLY COMPANY, which operates the competitive activity of supply.
- d) The ATTICA GAS DISTRIBUTION COMPANY, which operates the now regulated distribution activity within the geographical boundaries of the Attica distribution network, as defined in Article 2 of Law. 4001 / 2011.

Within DEPA, the distribution activity was separated from the supply, with the unbundling of DEPA's gas distribution sector and its contribution levy to a new public limited company named GAS DISTRIBUTION COMPANY OF THE REST OF GREECE S.A. EDAs which have developed according to the above, are required to submit, within three months of their establishment, an application for a Distribution License and Distribution Network Operation License so that [31]:

- a) The Distribution Network Operation activity shall be governed by the specific terms and conditions of such License in accordance with the new legislative framework.
- b) They will carry out the activity of the operation of the respective Distribution Networks within the geographical boundaries provided by the Distribution Network Operation Licenses in accordance with the specific provisions of Law. 4001/2011 and for the time to be determined by the decision of PAE.

- c) They will develop the respective networks according to the RAE-approved development program.

The issuance of such Distribution Licenses shall automatically abolish the Distribution Licensing arrangements granted to existing EPAs (now EDAs) under the provisions of Law. 2364/1995 only in so far as they relate to the operation of the Distribution Network. The above licenses shall continue to apply for the gas supply until the issue of the new Supply Permits in the new EPAs [32].

With respect to the new EPAs, it is foreseen to issue a Supply License to eligible customers, in accordance with the provisions of Article 81 of Law. 4001/2011, within six months of the issuance of the Distribution License, referred to in the previous paragraphs, to the EDAs. Until the issuance of this license, it is provided that the new EPAs may carry out the activity of supplying gas to eligible customers, while RAE may, within its competence, impose on them the measures and conditions necessary to ensure customer protection and the proper functioning of the market. It is expressly provided that such measures may not restrict the geographical extension of the supply activities of the new EPAs to customers, who become eligible under Article 82 of Law. 4001/2011 and who are outside the geographical limits of the licenses granted to the EPAs under the provisions of Law. 2364/1995 [32].

Furthermore, in the light of the newer regulations of Law. 4336/2015 and Law. 4414/2016 (detailed later in the Chapter), it is stipulated that the supply of gas to non-eligible customers by the EPAs is now carried out on the basis of regulated tariffs approved by RAE, following the recommendation of the EPAs, which must be submitted to RAE by October 31, 2015. In this respect, the basic principles governing the content of regulated tariffs are set out by law. Furthermore, with regard to the Supply of Gas to Eligible Customers by the EPAs, it is foreseen that it will be carried out under the terms of the License to be granted to them under Article 81 of Law. 4001/2011 and the provisions of the Supply Code issued according to Articles 51 and 85 of Law. 4001/2011 [33].

Regarding the now regulated distribution activity, the issuance of a Pricing Regulation, which regulates the pricing methodology for the billing of the Basic Gas Distribution Activity, was provided for. The Pricing Regulation is issued by RAE, following the recommendation of the relevant Gas Distribution Network Operator and after public consultation. The following expressly stipulates that tariffs on the basis of which the Distribution Network Operator receives any consideration levy for the distribution activity shall be

prepared by the operator in accordance with the methodology specified in the Pricing Regulation, which shall be submitted to RAE for approval and shall be decided upon within three months of their submission, and shall be effective via their publication in the Government Gazette [32].

For the implementation of these arrangements, the transitional provisions of Law. 4336/2015, as in force, provided for the following [32]:

1. Within three months of the entry into force of Law. 4336/2015, DEPA, as the Operator of DEDA, and the EPAs of Attica, Thessaly and Thessaloniki in their capacity as Operators of the networks of the respective geographical areas, make recommendations to RAE, which, after public consultation, and after making any modifications and additions, shall be required to issue the final text within three months of the date of submission for:
 - a) The issuance of the Pricing Regulation of such networks, in accordance with the provisions of Article 88 of Law. 4001/2011, as amended by Law. 4336/2015, and,
 - b) The issuance of the Distribution Network Operation Code, in accordance with the provisions of Article 80 (7) of Law. 4001/2011, as amended by Law. 4336/2015.
2. Within one month from the entry into force of the Pricing Regulation of Article 88 of Law. 4001/2011, as amended by Law. 4336/2015, DEPA, in its capacity as the Distribution Network Operator of the Rest of Greece, and the EPAs of Attica, Thessaly and Thessaloniki, in their capacity as Network Operators of the respective geographical areas, submit to RAE for approval the tariffs, on which they receive compensation for each Basic Activity provided to the users. From the date of entry into force of this tariff to the date of entry into force of the above tariffs, the price for the provision of Basic Activities to the users by DEPA and the Attica, Thessaly and Thessaloniki PSCs is set at four 4 € per MWh.

5.5 Gas Distribution Network Ownership Unbundling via the Introduction of Law. 4602/2019

5.5.1 Explanatory Memorandum

Below, the explanatory memorandum on the need for the adoption of Law. 4602/2019 is detailed, exactly as it was recorded.

The purpose of Law. 4602/2019 is to create a unified and clear legislative framework for regulating the ownership separation of existing natural gas distribution networks. With a view to removing any discrimination in the operation of gas distribution networks, but also to provide incentives for the necessary investment in distribution networks, it is necessary to effectively separate gas distribution networks from electricity and gas production and supply activities, but also from the electricity trade activity. Separation of ownership, which presupposes that the owner of the distribution network is designated as the operator of the respective natural gas distribution network and is independent of supply, trade and production interests, is an effective way of resolving the inherent conflict of interest, the supply security in the country, the fair access for new entrants to the gas distribution network and the gas market transparency [63].

In the context of the gas distribution network's ownership separation, it is therefore necessary to ensure that the DSO cannot control any gas or electricity production or supply activity or any electricity trading activity, while simultaneously exercise direct or indirect control or exercise any right over a gas distribution network operator and/ or a company that owns or controls the gas distribution network. Conversely, any person who controls a distribution network or distribution network operator should be excluded of the possibility of exercising control or rights over a company performing any gas or electricity production or supply activity or any electricity trading activity. Beyond these limits, a production, supply or trade company in Greece may have a minority interest in a gas DSO or gas distribution network [63].

In addition, and to ensure the complete independence of the operation of the gas distribution network from the interests of supply, production and trade and to avoid the exchange of any confidential information, the DSO should be restricted from certain responsibilities, as for example should not be allowed to exercise direct or indirect control over company carrying out in Greece any gas or electricity production or supply activity or any

electricity trading activity, while simultaneously exercise direct or indirect control or exercise any right over a gas distribution network operator and/ or a company that owns or controls the gas distribution network [63].

At the same time, Law. 4602/2019 is to regulate further issues regarding the implementation of full ownership unbundling of the DEPA's infrastructure sector, in order to ensure equivalent effects on competition and investment prospects, in line with European best practices. The foreseen structure of ownership unbundling ensures that public control over the strategic monopoly of the gas distribution network will be transferred after completion of the partial unbundling and levy of the infrastructure sector, to a new company called DEPA INFRASTRUCTURE SA, whose share capital and voting rights will be directly and indirectly owned by a majority by the Greek State (51%) with explicit reference that the percentage of the Greek State in the shares issued by DEPA INFRASTRUCTURE SA cannot be reduced below a 51% of the total share capital and voting rights of DEPA INVESTMENTS SA. With respect to the remaining shares and voting rights of DEPA INFRASTRUCTURES SA, owned by the Hellenic Republic Asset Development Fund (HRADF), it is foreseen to be sold and transferred by a tender procedure in accordance with the provisions of Law. 3986/2011 [63].

5.5.2 Law.4602/2019

With the introduction of Law.4602/2019, gas distribution network operators are explicitly defined as any company that owns the gas distribution network, and that exercises the responsibilities of a network operator in accordance with the provisions of this Law [34].

At the same time the conditions that shall apply for the exercise of the responsibilities of the gas distribution system operator (DSO), as well as their rights are determined [34].

With Law.4602/2019, it is also explicitly clarified that companies engaged in in any gas or electricity production or supply activity or any electricity trading activity in Greece shall not be entitled to acquire control or exercise any direct or indirect right over the separated gas distribution network operator of the country, in accordance with its provisions. In addition, a vertically integrated company, which owns the gas distribution network may not be prevented from taking any measures to comply with this Law's provisions and until this compliance is achieved, without, of course, affecting the obligations arising from their obligations stated in the latter explicit clarification [34].

In addition, gas distribution network operators' certification process is detailed [34].

On the other hand, according to Law.4602/2019, DEPA proceeds to a partial unbundling of its infrastructure sector, within 3 months of this Law's entry into force [34].

In the context of a partial unbundling, DEPA, transfers the infrastructure sector to a new company, under the name DEPA INFRASTRUCTURE SA, which is the beneficiary company. DEPA after the completion of the transfer of the infrastructure sector through partial unbundling, it is renamed DEPA TRADE SA., and maintains, either directly or through its subsidiaries, the following activities [34]:

- The import of gas into the Country (via either pipelines or LNG) through DEPA's long-term supply contracts; either from any other source,
- The supply of gas through or outside gas transmission systems or gas distribution networks,
- The electricity import, supply and trade,
- The refueling of CNG vehicles through proprietary service stations or through affiliated service networks, including all relevant contracts, and the use of the trademark "FISIKON",
- The supply of end-customers, not connected to the gas distribution network or to ESFA or to an ASFA, with CNG or LNG, for the use of gas as a fuel among others,
- The supply of remote gas distribution networks,
- Any other activity related to the development, expansion and operation of gas supply, including existing or future rights and obligations of DEPA in international projects, such as quantitative commitments at the IGB pipeline or the FSRU.

DEPA TRADE SA may carry out any other activity transferred to the infrastructure sector in accordance with the DEPA INFRASTRUCTURE SA activities, detailed previously, or in accordance with the DEPA INFRASTRUCTURE SA unbundling plan, provided that the conduct of such activities is permitted by this Law [34].

Finally, another important provision of Law.4602/2019 refers to the distribution networks' ownership, which is as follows [34]:

- a) Distribution networks built until April 1st, 2017 in the Greek Territory by DEPA or by the EPAs of Attica, Thessaloniki and Thessaly, under the distribution licenses issued via the provisions of Law. 2364/1995, remain the exclusive ownership of existing DEPA and, following the completion of the partial unbundling of

DEPA (detailed below), the exclusive ownership of DEPA INFRASTRUCTURE SA.

- b) Projects for the extension of the existing distribution networks running from 1 April 2017 by the EDAs, which arise in accordance with the provisions Law.4001/2011 and are operators of the Attica, Thessaloniki and Thessaly EDAs on the basis of their distribution licenses belong to their exclusive ownership. As of 2.1.2017, all distribution networks, including their expansion projects, which are managed by DEDA as the operator of DEDA on the basis of their respective distribution licenses, are the sole property of DEDA
- c) The value of replacement or rehabilitation works of existing distribution networks that are the sole property of DEPA or DEPA INFRASTRUCTURE SA after the completion of the partial unbundling and carried out by the EDAs, is considered to be DEPA or DEPA INFRASTRUCTURE SA income, as appropriate.

5.6 Other Relevant Legislation

In addition to the detailed above, Law. 4336/2005, Law. 4337/2015, Law. 4414/2016, as well as the articles 55 and 15 of Law. 4423/2016 Law. 4425/2016 respectively, led to the additional amendment of Law. 4001/2011, to further liberalization of the Greek gas market, through the reform of the gas distribution framework via the obligation of vertical integrated gas companies to legally and functionally separate the distribution network operation activities from gas supply activities, and to broaden the definition of the eligible gas customer. The new provisions also contain detailed provisions on the realization of this legal and operational unbundling [36].

In addition, with article 24 of Law. 4513/2018, the minimum capital requirements for the candidates, as well as for the holders of supply licenses, ASFA and ASFA operation licenses, distribution and distribution network operation licenses are introduced. In addition, the holders of supply licenses, ASFA and ASFA operation licenses, distribution and distribution network operation licenses within nine months of the entry into force of the revised Licensing Regulation, are required to submit to RAE an application for modification of their license, together with any supplementary information indicating their compliance with the provisions of article 90 of Law. 4001/2011, as it was amended by Law 4513/2018 and 4546/2018 and is valid, so as for their license not to be revoked [36].

On the other hand, with article 40 of Law 4546/2018, the ASFA operation licenses, and distribution network operation licenses shall also contain the terms, conditions and necessary measures to safeguard the independence and functional unbundling of the licensee, while with article 47, which replaces the first paragraph of Article 80B (2) of Law 4001/2011, it is clarified that the expansion projects of existing distribution networks, operated by the 1 April 2017 by the EDAs of Attica, Thessaloniki and Thessaly will be owned solely by them [36].

Moreover, and to harmonize the national legislation with the Directive 2006/32/EC on energy end-use efficiency and energy services, Law. 3855/2010 was adopted, introducing measures to improve end-use energy efficiency. Under the authorization of Law. 3855/2010, the Ministerial Decree D5/B/29891/2011 laying down the obligations of energy distributors, DSOs and energy retailers to provide end-use energy data. However, it is noted that since Directive 2006/32/EC was replaced by the Directive 2012/2 /EU, the provisions of Directive 2012/2 /EU were incorporated into national law via Law. 4342/2015. In particular, under the authorization of Law. 4342/2015, the Ministerial Decree 174063/28.03.2017 was adopted, establishing the Regulation for Operation of the Regime for Energy Efficiency Obligation [36].

Finally, and in relation to the operation of distribution networks, the following stand [36]:

- Natural Gas Distribution Network Operation Code (RAE Decree 589/2016) and its first amendment (RAE Decree 298/2018). With RAE Decree 642/2018, the Distribution Network Code was amended in accordance to comply with the Framework for the Development of Remote Distribution Networks by using Compressed Natural Gas (CNG) and LNG.
- RAE Decree 328/2016 approved the Regulation on Tariff Regulation of Basic Activities of the Natural Gas Distribution Network of the Attica, Thessaloniki, Thessaly and rest of Greece Distribution Networks.
- With respect to individual Network Distribution Charging Tariffs, RAE Decree 345/2016, RAE Decree 348/2016, and RAE Decree 347/2016, as well as RAE Decree 24/2017 approved the tariff for the Distribution Network of Attica, the tariff for DEDA, and the tariffs for Distribution Networks Thessaloniki and Thessaly respectively.
- RAE Decree 643/2018 approved the Framework for the Development of Remote Distribution Networks using CNG/LNG, which provides for the ability of

distribution network operators to deploy virtual LNGs/CNGs for gas supply to Users located on remote distribution networks. Pursuant to RAE Decree 643/2018, RAE Decree 821/2018 was adopted, fixing the maximum price per kWh for the service of the Virtual CNG Pipeline for 2018.

- The Ministerial Decree DHydrog /D/oik.174720 approved the Technical Regulation of Decompression of CNG Installations and Supplementary Provisions, which specifies the requirements for the design, construction, testing, commissioning, operation, maintenance, exploitation and fire protection of CNG decompression plants.

6 Conclusions

The liberalization of energy markets is an important issue and a huge challenge, both at European and a national level. The overall overview of the legal framework governing these the European and the Greek gas markets shows that with the application of the liberalization rules, and to achieve the objective of the EU's internal market, there is a substantial change in the country's role in the gas market.

From the monopoly model of the organization, in which the state functions as the sole body of economic activity and the provider of energy commodities and services, including gas commodities and services, the shift, through a gradual adjustment, is towards the free market model, where the role of the state becomes that of the guarantee and regulator. In the light of the above mentioned, liberalization contributes so as for the the energy markets, including gas markets, to go through a process of balancing the free economy and the development of effective competition, as well as to satisfy the general interest in the provision of services of general interest, which may consist of the security of energy supply and the provision of quality energy products to consumers, given that even under competitive operation conditions, the energy sector remains if intrinsically linked to the public interest.

In the context of the liberalization of energy markets, public intervention takes the form of independent regulation, which is an important achievement in the EU. In this respect, regulatory intervention is to create an appropriate regulatory framework, which will facilitate a smooth and effective transition to competitive conditions, ensuring equal access for third parties to the monopoly organized energy infrastructures and laying down rules for the separation of former monopoly energy companies.

In regards specifically to the Greek gas market, as a case of a regulated market, it presents particularities, as do the other European national gas markets that consist in the strong dependence on third country imports, on rigidities, because of the concentration of suppliers and of the long-term contracts, and the lack of liquidity and transparency. In addition to this, it should be added that for a long time the Greek gas market was regarded as an emerging market and was in derogation from the application of European liberalization rules in the gas market. Furthermore, the evolution of the gas market is affected among others by Greece's geostrategic position as a focal point for cross-border energy flows in

the Eastern Mediterranean. In view of the above, it could be said that the regulatory intervention of the relevant national energy authority has a particular role to play in the maturation of the Greek gas market.

Directive 2009/73/EC and Law. 4001/2011, as well as the subsequent Law. 4336/2015 and Law.4602/2019, clearly contributed to the acceleration and deepening of the liberalization of the Greek gas market, by assisting the unbundling of the gas distribution sector. However, the attempt to fully open up the Greek gas market to competition is complex, as it is affected both by the prevailing political and economic conditions and by the changing administrative and regulatory rules that must constantly be changed to respond to new social and economic requirements.

In any case, it should not be forgotten that the liberalization of national energy markets, and therefore of the Greek gas market, does not work in isolation, nor as an end in itself. Instead, liberalization should operate in an environment of interaction and solidarity with national energy markets, as well as with the constructive cooperation of national energy regulators, with each other, with international and European organizations or other bodies. Only in this way will it be possible to create truly competitive national markets to integrate them into one single market and to serve the fundamental objective of completing the European internal energy market, ensuring safe, sustainable, competitive and affordable energy for all its recipients.

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