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# **Natural Gas in Greece and Albania**

## **Supply and Demand Prospects to 2015**

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**Anastasios Giamouridis**

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## **Preface**

In the wake of the January 2009 Russia-Ukraine crisis, south east Europe began to receive more attention from the European gas community with the realisation that, for these markets, security of supply is a far more urgent issue than for most of north west Europe. However, because – with the exception of Romania – there are few large gas markets in the region, published work is still mainly conducted at a regional level without detailed analysis of specific countries.

When Tassos Giamouridis contacted me proposing a study of the Greek and Albanian gas markets, I was keen for two reasons, first it fills a major gap in easily accessible literature on the regional markets and complements our previous publications on this region. Second, it stresses the importance of these two – relatively small but key – markets for new interconnectors, transit pipelines and LNG terminals. The future of these projects is still unclear but, with most of the public commentary focussed on their political and geopolitical merits, there is a clear need for independent studies which are principally concerned with whether, and in what time frame, they can be achieved commercially.

We are very grateful to Tassos for suggesting this study and then carrying it through to a successful conclusion. His knowledge of the region and its language has proved invaluable, and evidence of the detailed research which he has carried out is evident on every page.

Jonathan Stern

December 2009

## **About the Author**

Anastasios Giamouridis is a Lead Consultant at PFC Energy, focusing on the oil and gas markets of South Eastern Europe and Turkey. Prior to joining PFC Energy, Anastasios worked in the Political Section of the Inter-Parliamentary European Security and Defence Assembly (Western European Union) in Paris, and in the House of Commons in London, while he has also served as Second Lieutenant in the Hellenic Army. Anastasios has published a number of articles in peer-reviewed academic journals, including in the *European Foreign Affairs Review* and the *Journal of Modern Greek Studies*. He holds an MSc with Merit from the London School of Economics, UK; an MA with Distinction from the University of Durham, UK; and a BA from the University of Ioannina, Greece.

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## Glossary

ARMO	Albanian Refining and Marketing of Oil.
bcm	Billion Cubic Metres
BCM/Y	Billion Cubic Metres per Year
BOTAS	Petroleum Pipeline Corporation of Turkey
CCGT	Combined Cycle Gas Turbine
CEFTA	Central European Free Trade Agreement
CNG	Compressed Natural Gas
BEH	Bulgarian Energy Holding
DCC	Dispatching and Control Centre
DEPA	Public Gas Company of Greece <i>Δημόσια Επιχείρηση Αερίου</i> (Dimosia Epicheirisi Aeriou)
DESFA	Hellenic Gas Transmission System Operator <i>Διαχειριστής Ελληνικού Συστήματος Φυσικού Αερίου</i> (Diacheiristis Ellinikou Systimatos Fysikou Aeriou)
DESMIE	Hellenic Transmission System Operator <i>Διαχειριστής Ελληνικού Συστήματος Μεταφοράς Ηλεκτρικής Ενέργειας</i> (Diacheiristis Ellinikou Systimatos Metaforas Ilektrikis Energeias)
E&P	Exploration and Production
EBRD	European Bank for Reconstruction and Development
ECGR	Energy Community Gas Ring
EDA	Gas Distribution Company <i>Εταιρεία Διανομής Αερίου</i> (Etaireia Dianomis Aeriou)
EDF	Electricité de France
EERP	European Economic Recovery Plan
EGL	Elektrizitaets - Gesellschaft Laufenburg AG
EIB	European Investment Bank
EPA	Gas Supply Company <i>Εταιρεία Παροχής Αερίου</i> (Etaireia Parochis Aeriou)
EPC	Engineering, Procurement, and Construction
EU	European Union
FCFS	First Come First Served
FEED	Front End Engineering and Design
FYROM	The former Yugoslav Republic of Macedonia

GDF	Gaz de France
GDF SUEZ	Gaz de France–Suez
GERB	Citizens for the European Development of Bulgaria
GWhe	Gigawatt electrical
GWhth	Gigawatt thermal
HFO	Heavy Fuel Oil
IAP	Ionian–Adriatic Pipeline
IGB	Interconnector Greece–Bulgaria
INGS	Independent Natural Gas System
ITGI	Interconnector Turkey–Greece–Italy
JV	Joint Venture
LNG	Liquefied Natural Gas
mcm	Million Cubic Metres
MoU	Memorandum of Understanding
MW	Megawatt
NATO	North Atlantic Treaty Organization
NIGEC	National Iranian Gas Export Company
NIOC	National Iranian Oil Company
Nm <sup>3</sup>	Normal cubic metres
Nm <sup>3</sup> /hr	Normal cubic metres per hour
NNGS	National Natural Gas System
NSRF	National Strategic Reference Framework <i>Εθνικό Στρατηγικό Πλαίσιο Αναφοράς</i> (Ethniko Stratigiko Plaisio Anaforas)
PASOK	Pan-Hellenic Socialist Movement <i>Πανελλήνιο Σοσιαλιστικό Κίνημα</i> (Panellinio Socialistiko Kinima)
PFI	Phosphoric Fertilizers Industry <i>Βιομηχανία Φωσφορικών Λιπασμάτων</i> (Viomichania Fosforikon Lipasmaton)
PM	Prime Minister
PPC	Public Power Corporation <i>Δημόσια Επιχείρηση Ηλεκτρισμού</i> (Dimosia Epicheirisi Ilektrismou)
RAE	Regulatory Authority for Energy <i>Ρυθμιστική Αρχή Ενέργειας</i> (Rythmistiki Archi Energeias)
RES	Renewable Energy Sources
SCP	South Caucasus Pipeline

SEES	National Energy Strategy Council of Greece <i>Συμβούλιο Εθνικής Ενεργειακής Στρατηγικής</i> (Symvoulío Ethnikis Energeiakis Stratigikis)
SMP	System Marginal Price
SOCAR	State Oil Company of Azerbaijani Republic
TAP	Trans–Adriatic Pipeline
TGI	Turkey–Greece Interconnector
TOE	Tonne of Oil Equivalent
TPA	Third Party Access
TPAO	Turkish Petroleum Corporation
UN	United Nations
y-o-y	Year-on-year

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## Research Focus and Rationale

South East Europe is neither a significant producer nor a significant consumer of natural gas, with the exception of Romania. Hence, research has for the most part tended to focus on the potential role the region can play as a transit point between the producer states in the former Soviet Union (notably Russia and the Caspian states) and the Middle East, to the major consumers in the European Union (EU), rather than in its own right.

In this framework, Bulgaria usually receives the most attention, as Sofia actively promotes the country's participation in two of the most prominent – and accordingly the most discussed – pipeline projects: Russia's South Stream and the EU/US-backed Nabucco. Only limited research has therefore so far focused on what the substitution effect may mean in terms of political, economic, and social development for countries in the – still largely impoverished – Balkan region, or what the specific outlook in terms of supply and demand for natural gas in these countries may be.<sup>1</sup>

What is more, research has tended to take a longer-term view of the situation, largely ignoring the question of how things are likely to look in the next five or six years. This is of course a question marred with uncertainties on a number of levels. These uncertainties include:

- the availability of natural gas liquefaction capacity in producer states;
- the available options related to bringing the necessary gas volumes to the region, and what has been proposed so far;
- the timely completion of envisaged pipeline and Liquefied Natural Gas (LNG) projects;
- the rate of substitution of other fuels with natural gas in receiving countries;
- expected demand levels in the coming years.

This paper attempts to answer the question of supply and demand in the medium term (specifically until 2015) with reference to two neighbouring – yet very different – markets: Greece and Albania. The geographical focus relates both to the need to cover developments there in their own right, but also to examine how each of these markets is affected by problems in their broader Balkan periphery, notably the market fragmentation that followed the breakup of Yugoslavia and the violent conflicts of the 1990s, and also the relatively low price environment that has resulted from economic underdevelopment.

The Energy Community of South East Europe, with its mandate of creating an integrated energy market in order to allow for cross-border energy trade and integration with the EU market, is of

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<sup>1</sup> For an exception, see for example Aleksandar Kovacevic, *The Potential Contribution of Natural Gas to Sustainable Development to South Eastern Europe*, March 2007, Oxford Institute for Energy Studies, [www.oxfordenergy.org](http://www.oxfordenergy.org)

course a step in the right direction, but so far not enough progress has been made to offset the continuing very real difficulties that governments and energy companies have to face on the ground.

Finally, the geographical focus of the paper relates to the growing centrality of Greece and, to a lesser extent, Albania in relation to pipeline routes and location of proposed LNG terminals. The latter has rendered Greek and Albanian energy policy (and especially attitudes towards the development of such infrastructure in their respective territories) of interest to a wider international audience which comprises academics, policy-makers, and industry executives alike.

Albania, a largely agricultural economy and indeed one of the poorest countries in Europe, is still only an aspiring member of major western institutions. Even though it recently gained full NATO membership, accession negotiations with the EU are still some way from being completed. A minor oil and gas producer with no international interconnections, Albania has seen natural gas consumption falter in the past two decades in both absolute and relative terms, mostly as a result of declining domestic production of the fuel. However, as the economy improves and energy demand rises, envisaged natural gas interconnections such as the Trans Adriatic Pipeline (TAP) offer Tirana an important opportunity both to meet increasing domestic demand, as well as to improve its relative geopolitical position.<sup>2</sup>

In contrast, Greece is a relatively prosperous service-based (notably tourism) economy, and has been a NATO member since 1952 and an EU member since 1981. Athens took the strategic decision in 1986 to promote the penetration of natural gas in the country's energy mix as a means of diversifying energy sources. This reduced oil dependency and energy costs in industry and private consumption, and, more recently, also enhanced environmental credentials in accordance with EU regulations. Over the course of the following two years, Greece signed contracts with Algeria (Sonatrach) for the supply of LNG in 1987, and with the then Soviet Union (Sojuzgazexport) for the supply of piped gas in 1988, the Public Gas Company of Greece (DEPA) being established in the same year.<sup>3</sup>

Against this backdrop, the National Energy Strategy Council of Greece (SEES) has lent its support to further natural gas penetration in the country's energy mix, albeit not to the extent that it would render the country excessively dependent on the fuel, especially in its growing power generation sector. What is more, Athens sees in natural gas a unique opportunity to appear on the European energy map

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<sup>2</sup> Stavri Dhima, *Prospects for the Introduction of Natural Gas in Albania*, Paper presented at 'Greek–Albanian Cooperation in the Energy Sector', Tirana, January 2009, [www.iene.gr](http://www.iene.gr)

<sup>3</sup> Spiros Paleoyannis, *The Greek Natural Gas Market and International Interconnections*, Paper presented at 'Greek–Albanian Cooperation in the Energy Sector', Tirana, January 2009, [www.iene.gr](http://www.iene.gr)

and, through that, to gain regional influence. The latter includes potential supply influence over the broader Balkan region, and geopolitical clout in negotiations with third parties, including both with partners in the Euro-Atlantic community but also with main regional competitors such as the country's neighbour, Turkey.

Planned natural gas pipelines include the Interconnector Turkey–Greece–Italy (ITGI), the Interconnector Greece–Bulgaria (IGB), the Trans Adriatic Pipeline (TAP), and South Stream. Since 2000, Greece also has also enjoyed a modern LNG terminal on the island of Revithoussa, with plans to expand capacity both there and in other locations.<sup>4</sup>

This study will thus focus on natural gas supply and demand prospects in Greece and Albania up to the year 2015, attempting to clarify the main issues and associated uncertainties in those two markets for the suggested time frame. It will:

- examine the structure of the National Natural Gas Systems (NNGSs) in these two markets, including their relevant physical infrastructure, legislation, and regulatory frameworks;
- present the main drivers of natural gas demand in the discussed region and analyse the main trends that are likely to define demand levels in the coming years;
- examine current contractual relations with main natural gas suppliers;
- assess progress being made towards securing new (or additional) supply sources aimed at improving supply/demand balances in the region, including the development of new transport infrastructure;
- scrutinize the role of LNG in the region, including prospects for further penetration/use of the fuel in the future;
- summarize the main findings and draw conclusions.

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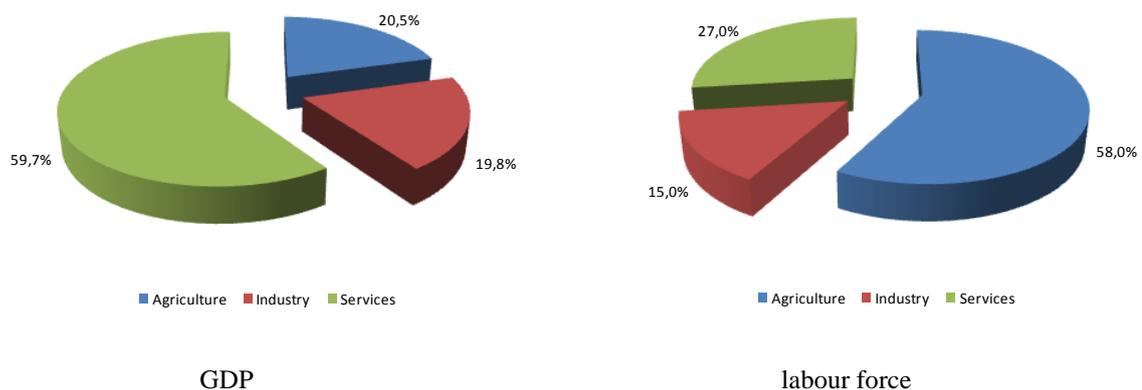
<sup>4</sup> SEES, *Measures and Means for a Viable and Competitive Energy Policy*, 2008, [www.sees.gov.gr](http://www.sees.gov.gr)

## Legislation and Regulatory Framework

### *Background and Natural Gas System in Albania*

Albania was one of the most isolated communist states during the Cold War, a situation which resulted in grave political oppression and severe economic underdevelopment. The scars from this era continue to be felt 20 years after the fall of the communist regime, with high levels of structural corruption and poor finances still being the norm. Albania suffers from being an essentially agricultural economy, with the sector still accounting for more than half of total national employment, but contributing only some 20 per cent to its GDP, due to unsophisticated production methods and other pending issues. At the same time, Albania has to rely on remittances from nationals living and working abroad (notably in Italy and Greece) which account for an additional 15 per cent of its annual income (see Figure 1).

**Figure 1: Composition of Albanian GDP and labour force by sector in 2008**



Source: Central Intelligence Agency, *The World Factbook*, [www.cia.gov](http://www.cia.gov)

The country also suffers from the existence of a large informal economic sector – believed to equal approximately 50 per cent of official Albanian GDP – which, coupled with serious and chronic energy shortages, deters necessary foreign direct investment. However, Tirana has been trying to improve this difficult position in several ways, including government efforts against organized crime and corruption, ongoing modernization of Albanian economic activity, introduction of corporate tax reforms, and implementation of a more liberalized regulatory framework for the country’s energy sector. GDP growth rates have accordingly risen to some of the highest in the region while inflation has successfully been kept at bay (see Table 1).

**Table 1: Basic Social and Economic Indicators in the Republic of Albania 2000–2008**

<b>Year</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
<b>Population (thousands)</b>	3058.5	3063.3	3084.1	3102.8	3119.5	3135.0	3149.1	3152.6	3170.0
<b>Unemployment rate (%)</b>	16.8	16.4	15.8	15.0	14.4	14.1	13.8	13.5	12.8
<b>Consumer price index (%)</b>	4.2	3.5	1.7	3.3	2.2	2.0	2.5	3.1	2.2
<b>GDP growth (%)</b>	6.7	7.9	4.2	5.8	5.7	5.7	5.5	6.2	6.0

Source: Albanian Institute of Statistics, *Social and Economic Indicators*, [www.instat.gov.al](http://www.instat.gov.al)

Additionally, Albania is a member of the Central European Free Trade Agreement (CEFTA), and the government has also been pushing forward with the establishment of economic zones in an attempt to boost investments and economic activity in the country. The global financial and economic crisis is of course taking its toll on the Albanian economy – as is across the Balkan region and wider afield – but the local market still enjoys large untapped potential which is expected to be realized as the country slowly converges with European standards.<sup>5</sup>

Albania is a minor oil and gas producer with no natural gas import capacity. Upstream gas activity began in 1960, for the most part in the country's resource-rich south, with all gas links subsequently developed geared towards use of the available domestic resources, in line with the hard-line isolationist policy of the then communist regime. In this context, the Albanian pipeline network consists of some 400 km linking producing sites in the south with major domestic consumers – thermal power plants, fertilizer producers, steel plants etc. – across the country. However, total production has been minimal in this 50 year period, standing at only 3.5 billion cubic metres (bcm) for non-associated, and almost 10 bcm for associated gas. Moreover, Albanian production is in structural decline, having fallen from approximately 250 million cubic metres (mcm) in 1990 to a minimum which stood marginally above 11 mcm in 2007 (see Table 2).

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<sup>5</sup> Further details on the Albanian political and economic context available in Central Intelligence Agency, *The World Factbook*, [www.cia.gov](http://www.cia.gov)

*Table 2: Natural gas production in Albania between 2000–8 (mcm)*

	2000	2001	2002	2003	2004	2005	2006	2007
<b>Total gas volumes</b>	12.1	9.9	10.3	11.6	12.0	11.3	11.1	11.1
<b>% change on previous year</b>	-15	-18	4	12	3	-5	-2	0

Source: Albanian Institute of Statistics, *Economic Indicators – Energy*, [www.instat.gov.al](http://www.instat.gov.al)

According to the Energy Information Administration of the US government, in 2008 the proven natural gas reserves in the country stood at only some 0.85 bcm. Against this backdrop, natural gas-fired power plants and other major consumers were forced to switch to oil products in order to be able to meet feedstock needs. The majority of current gas production in the country is used by monopoly refiner ARMO – which was privatized in the summer of 2008 – and upstream state operator Albpetrol.<sup>6</sup>

The urgent need to meet gas requirements through imports, as well as to promote natural gas further in order to diversify energy sources, has prompted post-communist governments to push forward with necessary reform. The Albanian authorities accordingly supported plans to put in place an EU-compatible regulatory framework that will allow development of the gas sector in Albania, as well as natural gas interconnections with other countries.

As a result, in July 2008 the Albanian government pushed through Parliament Law no. 9946 which aims at the development of a fully-fledged natural gas sector in the country. The introduction of the legislation was based on the Energy Community Treaty Gas Roadmap provisions, and is in accordance with EU Directive 2003/55/EC and Regulation 1775/2005/EC. Among other provisions, the law establishes a joint regulatory authority for both electricity and natural gas. Albanian authorities expect the new legal and institutional framework to set in motion all the necessary conditions and possibilities for investments in the Albanian gas sector.<sup>7</sup>

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<sup>6</sup> Energy Information Administration, *Albania Energy Profile*, September 2009, [www.eia.doe.gov](http://www.eia.doe.gov)

<sup>7</sup> Information from Stavri Dhima, *Prospects for the Introduction of Natural Gas in Albania*, Paper presented at ‘Greek–Albanian Cooperation in the Energy Sector’, Tirana, January 2009, [www.iene.gr](http://www.iene.gr)

Map 1: The Albanian Natural Gas System



Source: Oxford Institute for Energy Studies

## ***The Greek Natural Gas System***

The National Natural Gas Transportation System of Greece consists of:

- a) three entry points for natural gas (Sidirokastro, Kipoi, Agia Triada);
- b) a 512 km high-pressure trunk line of 70 bar design pressure;
- c) approximately 690 km of high-pressure branch lines (under expansion in both the Peloponnese and Euboea);
- d) almost 3,500 km of medium and low-pressure networks;
- e) tens of metering and regulating stations, with Sidirokastro and Agia Triada stations currently being upgraded;
- f) the dispatching and control centre (DCC);
- g) the control centre and load distribution centre;
- h) operation and maintenance centres in Athens, Thessaloniki, Larissa, and Xanthi;
- i) a modern nationwide telecommunication system, including an integrated SCADA system.<sup>8</sup>

Medium pressure networks (19 bar) allow natural gas to be delivered to major industrial consumers, while low pressure networks (4 bar) bring gas to the domestic, commercial, and small to medium industrial consumers in Greece. Medium pressure networks have been developed (and/or continue to be developed) at Alexandroupolis, Komotini, Xanthi, Kavala, Drama, Kilkis, Serres, Thessaloniki, Platy, Larissa, Volos, Lamia, Thiva (Thebes), Inofyta (Oinofyta), Halkida, and Attica; there are low pressure networks in Komotini, Xanthi, Kilkis, Thessaloniki, Volos, Inofyta, and Athens.

The distribution system in Attica/greater Athens (the largest such system in the country) stands at an estimated 2,900 km and covers more than 193,000 households, 5,000 commercial customers, and 400 industrial customers. An additional 500 km are planned to be constructed by end 2009. The system in Thessaloniki consisted of 921.5 km in mid 2009, aiming at some 1,200 km by approximately 2015. In October 2008, the National Gas System Operator (DESFA) completed the interconnection of the cities of Karditsa and Trikala with the Greek gas system at a cost of approximately €18 m, adding an additional 72 km to the network of the Gas Supply Company (EPA) in Thessaly.

Greece covers 100 per cent of its natural gas requirements with imports, which it distributes to customers through three entry points connected to its transportation system, namely:

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<sup>8</sup> Information from DESFA, *The National Natural Gas System*, [www.desfa.gr](http://www.desfa.gr); RAE, *Report on the Security of Natural Gas Supply in Greece*, 2009, [www.rae.gr](http://www.rae.gr); and other local sources.

a) Sidirokastro (Σιδηρόκαστρο) on the Greece–Bulgaria border (it is currently being upgraded)

- 28 inch, high pressure pipeline coming from Russia through Ukraine, Moldova, and Romania
- Sidirokastro entry point currently being upgraded to allow increased levels of natural gas imports
- Theoretical current capacity  $437 \times 10^3 \text{ Nm}^3/\text{hr}$ ; ongoing upgrades to  $660 \times 10^3 \text{ Nm}^3/\text{hr}$  (5.2 bcm/y)

b) Kipoi (Κήποι) on the Greece–Turkey border

- Since November 2007, fuel also enters the county through the interconnection of the Greek National Natural Gas Transportation System with the corresponding Turkish system (TGI connection)
- Theoretical current capacity is  $856 \times 10^3 \text{ Nm}^3/\text{hr}$  (6.7 bcm/y)

c) Agia Triada (Αγία Τριάδα), which serves as point of entry for the neighbouring Revithoussa LNG terminal

- Theoretical capacity at Agia Triada stands at  $580 \times 10^3 \text{ Nm}^3/\text{hr}$  (4.6 bcm/y) since February 2009
- Underwater link (600 m long 24 inch diameter) connects Agia Triada to Revithoussa, its sole current supplier
- Max Revithoussa vessel tonnage/length/draft at some 130,000 cu.m/290 m/11.8 m
- Since June 2007 upgrades, normal regasification capacity at Revithoussa stands at approximately  $1,000 \text{ Nm}^3/\text{hr}$  (5.2 bcm/y) or  $1,250 \text{ Nm}^3/\text{hr}$  (6.5 bcm/y) with all spare vaporizers in use
- Infrastructure includes two tanks with a combined storage capacity of some 144,000 cu.m (of which 130,000 cu.m recoverable) and a planned third tank of 90,000 cu.m capacity by end 2013 (in progress)
- Completion in early 2009 of 14.5 MW thermal/13 MW electrical co-generation unit aimed at covering own needs – in operation since April 2009

However, the real capacity of the network should be considered to be substantially lower compared to the theoretical total capacity the three points of entry (16.5 bcm/y) due to a number of restrictions. First, DESFA historical data and available Bulgartransgas information suggest that at the moment the

Bulgaria–Greece connection is unable to deliver volumes exceeding the level of some 3.8 bcm/y without upgrades to the system.<sup>9</sup>

Second, the activation of the link with Turkey in November 2007 has so far not allowed the system to be tested, and thus its maximum real capacity continues to be estimated by Greek authorities at only some 0.7 bcm/y – i.e. on a par with the current contractual obligations of Turkey. However, SEES estimates real capacity to stand closer to the level of some 3 bcm/y, which may be a more realistic estimate in this context.<sup>10</sup>

Third, Agia Triada is supplied only by the neighbouring Revithoussa LNG terminal, thus rendering it subject to all restrictions applicable to that terminal. Notable among them is a lack of adequate storage capacity at Revithoussa, which in turn requires the renewal of its supplies every four days, when operating at maximum capacity. The Greek Regulatory Authority for Energy (RAE) estimates that under the present conditions real capacity in Agia Triada/Revithoussa is closer to the level of some 2 bcm/y, which represents a utilization rate of less than 45 per cent.

The RAE estimate is based on the assumption that one 75,000 cu.m tanker would berth/unload at Revithoussa every eight days, in order to account for storage and weather limitations.<sup>11</sup> However, as mentioned above, the jetty of Revithoussa is indeed capable of receiving substantially larger LNG tankers with a theoretical max of 130,000 cu.m and 11.8 m in vessel tonnage and draft respectively. In fact, Revithoussa's real jetty capacity should be considered to be even higher as it received cargoes of up to some 145,000 cu.m in 2009, suggesting the RAE estimate may be too pessimistic in this context.

The operator itself estimates terminal capacity at Revithoussa to stand closer to the level of 1.95 million tons of LNG per year, or almost some 2.7 bcm of natural gas in the same period, which seems to be more realistic given the terminal's current configuration. However, even this improved figure remains far below Revithoussa's full theoretical import capacity (less than 60 per cent utilization rate).

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<sup>9</sup> Sergei Komlev, the Head of Contract Structuring and Price Formation Directorate of Gazprom Export, has claimed that the real capacity of the Bulgaria–Greece natural gas pipeline is in fact even lower and does not substantially surpass the 2008 transport levels of approximately 2.8 bcm (see Imerisia, *Μονάδες ηλεκτρισμού επιδιώκει η Gazprom*, 21 October 2009, [www.imerisia.gr](http://www.imerisia.gr) for more details). However, this assertion by Gazprom Export may even be part of its negotiation tactics with Athens concerning additional gas volumes, possibly as a means of applying pressure with regard to the still pending Acheloos projects (see below). The Bulgaria–Greece pipeline is in any case currently being upgraded.

<sup>10</sup> SEES, *Report on Long-Term Energy Planning*, 2009, [www.sees.gov.gr](http://www.sees.gov.gr)

<sup>11</sup> RAE, *Report on the Security of Natural Gas Supply in Greece*, 2009, [www.rae.gr](http://www.rae.gr)

Furthermore, the Greek gas system suffers from the lack of a compressor station on the main gas pipeline, which would allow it to offset inherent difficulties stemming from the country's geography; namely the fact that two out of the three points of entry for natural gas into the country are located in northern Greece, whereas the most important demand centre is Athens in the south. This limitation also has a direct impact on the capacity of entry points, with the problem further aggravated by the recent activation of the Aluminium of Greece link in April 2009, and the planned activation of the Corinth link some time in 2011.

However, in December 2008 the Greek government offered a €53.4 m contract for the engineering, procurement, and construction (EPC) of such a station in N. Mesimbria, Thessaloniki to a Joint Venture (JV) between Stroytransgaz and Prometheus Gas. The JV will also be responsible for assembling equipment, piping connections, electricity, instrumentation, and automated control systems, cathode protection, operational systems, and pre-commissioning. The unit is expected to come online by mid 2011.<sup>12</sup>

Finally, with the exception of Komotini in northern Greece, which is supplied by both the Turkey–Greece Interconnector (TGI) and the pipeline with Bulgaria, the rest of the Greek market is subject to inescapable interruptions in piped gas if their sole supply pipeline is for any reason disrupted. The urgency of this problem was exemplified during the Russia–Ukraine crisis of January 2009, when supply of natural gas to the country from both Bulgaria and Turkey was interrupted for a period exceeding three weeks.<sup>13</sup>

A careful consideration of the abovementioned technical and/or contractual restrictions indicates a serious discrepancy between theoretical and actual capacity in the Greek network which needs to be bridged as soon as possible. RAE has already called on DESFA to create a system whereby real capacity can be monitored, in order to facilitate Greek strategic planning and to boost competition in the Greek market, by making information freely available to interested players. Table 3 below summarizes the current theoretical, and estimated real, capacity of the natural gas entry points in Greece. Map 2 shows the main routes and locations on the Greek natural gas system.

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<sup>12</sup> Stroytransgaz, *Stroytransgaz Signs New Contract in Greece*, 9 December 2008, [www.stroytransgaz.com](http://www.stroytransgaz.com)

<sup>13</sup> However, DESFA and DEPA proved able to meet a maximum daily demand of 12 mcm in this negative context by means of full utilization of the LNG terminal at Revithoussa (sent out capacity) and purchases of additional LNG supplies on the spot market.

*Table 3: Theoretical current capacity of natural gas points of entry in Greece*

<b>Point of entry</b>	<b>Theoretical Capacity (bcm/y)</b>	<b>Real Capacity (bcm/y)</b>
<b>Sidirokastro</b>	5.2	3.8
<b>Kipoi</b>	6.7	0.7
<b>Agia Triada</b>	4.6	2.7
<b>Total</b>	16.5	7.2

*Source:* Interpreted by the author based on information from DESFA, *The National Natural Gas System*, [www.desfa.gr](http://www.desfa.gr) and RAE, *Report on the Security of Natural Gas Supply in Greece*, 2009, [www.rae.gr](http://www.rae.gr)

Map 2: The Greek Natural Gas System



Source: Oxford Institute for Energy Studies

## ***Structure of the Greek Natural Gas Market***

### **Liberalization of the Greek Natural Gas Market**

In 2003, the socialist Greek government put forward Law 3175/2003 which set in motion the liberalization process of the NNGS, in accordance with EU Directive 2003/55/EC on natural gas. Law 3428/2005 of the conservative administration (which took over in 2004) further clarified the regulatory framework concerning natural gas in the country, including the nature of Greek derogations from the EU Directive (see Table 4). In accordance with the provisions of the new law, DEPA proceeded with the legal separation – but not full unbundling – of its activities, dividing them between the parent company DEPA and its new subsidiary DESFA, as well as EPAs.<sup>14</sup>

***Table 4: Liberalisation Timetable of Natural Gas Market in Greece***

<b>Consumer</b>	<b>Date</b>	<b>Share of total market (%)</b>
Electricity generation and co-gen units with over 100 GWh annual consumption	With enactment of Law 3428/2005	80
Gas Supply Companies (EPAs)	With enactment of Law 3428/2005	80
Non-private users outside EPA jurisdiction	15 November 2008	85
CNG-fuelled cars	15 November 2008	85
All private consumers outside EPA area	15 November 2009	90
All consumers	After expiration of EPA licences (>2030)	100

*Source: SEES, Measures and Means for a Viable and Competitive Energy Policy, 2008, [www.sees.gov.gr](http://www.sees.gov.gr)*

<sup>14</sup> Information from DESFA, *The National Natural Gas System*, [www.desfa.gr](http://www.desfa.gr); from RAE, *Report on the Security of Natural Gas Supply in Greece*, 2009, [www.rae.gr](http://www.rae.gr); and from local media sources.

DESFA S.A. has accordingly undertaken responsibility for the transportation of natural gas in the territory of Greece, and now functions as an independent system operator. Since March 2007, DESFA owns all assets of the NNGS, including high pressure pipelines and the LNG terminal at Revithoussa, and acts as the National Gas System Operator (excluding the planned ITGI gas link). DESFA is responsible for the development of the NNGS, including the obligation to ensure Third-Party Access (TPA) in accordance with Greek Law and EU regulations. DESFA falls under the jurisdiction and monitoring of RAE and the Ministry of Environment, Energy, and Climate Change (which replaced the former Ministry of Development in October 2009).

By the same token, EPAs were set up with the aim of expanding, operating, and maintaining the urban gas networks, as well as distributing natural gas to domestic, commercial, and small industrial consumers with annual consumption up to 10 mcm. In return for their obligation to increase natural gas penetration in Greece, EPAs enjoy 30 year exclusive supply rights over their respective areas. DEPA holds 51 per cent of the shares in all EPAs through its 100 per cent distribution subsidiary Gas Distribution Company (EDA), while private investors hold 49 per cent and exercise management.

In June 2009 the (then) Ministry of Development announced it was abolishing EDA along with a number of other agencies under its direct supervision, in an attempt to reduce overall costs against the backdrop of the ongoing global financial and economic crisis.<sup>15</sup> This process had not been completed by the time of a snap election on 4 October, when the incumbent conservative administration was ousted and the Pan-Hellenic Socialist Movement (PASOK) was returned to power. However, PASOK has not yet clarified its position on the matter.

In any case, according to the existing model, DEPA has assigned use of all medium and low pressure networks to EPAs for their respective regions through EDA. There are currently three EPAs in operation in Greece, namely:

EPA of Attica	(with DukeEnergy–Shell JV)
EPA of Thessaloniki	(with ENI/Italgas)
EPA of Thessaly	(with ENI/Italgas)

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<sup>15</sup> Ependitis, *Κατάργηση–Συγχώνευση φορέων του ΥΠΙΑΝ*, 3 June 2009, [www.ependitis.gr](http://www.ependitis.gr)

DEPA is also in the process of establishing three new EPAs which will cover the areas of Central Greece, Central Macedonia (excluding Thessaloniki) and Eastern Macedonia and Thrace. The process of preparing the international tenders is already underway, aiming at inviting the participation of private investors for the setting up of new companies in 2010. DEPA accordingly expects gas to start flowing to new customers in these markets by 2011.<sup>16</sup> However, this process may in fact prove lengthier than expected, given the fact that the most profitable markets – Athens and Thessaloniki – have already been tendered, while the regions of Macedonia and Thrace are considered to have considerably less market potential. What is more, exclusive supply rights over these areas will be limited only to a maximum 20 year period, compared to 30 for the EPAs of Attica, Thessaloniki, and Thessaly.

Nevertheless, Italian major ENI (through subsidiary Italgas), French company Gaz de France–Suez (GDF SUEZ), and Spanish Gas Natural have all expressed an initial interest, making no further commitments at this stage. EPA of Attica has also expressed its interest with reference to the management of the new EPA of Central Greece, provided the government puts in place incentives for consumers to switch to gas from their current oil products.<sup>17</sup>

At any rate, DEPA remains responsible for low pressure pipelines outside EPA jurisdiction, as well as for the two Compressed Natural Gas (CNG) bus refuelling stations in Athens. Finally, independent operators enjoy a legal right to construct and operate natural gas infrastructure in the country – this includes LNG terminals, underground storage, and high pressure pipelines. However, no such venture has so far been undertaken in Greece.

### **Government attempts at privatization and full unbundling**

The natural gas market in Greece is dominated by gas operator DEPA, jointly owned by the Greek government and former state monopoly Hellenic Petroleum (65 per cent and 35 per cent respectively). Earlier attempts aiming at Spanish Gas Natural acquiring a stake in the company did not bear fruit. Likewise, a bid by the Greek Public Power Corporation (PPC) in 2008 to buy a 30 per cent stake, in accordance to an earlier agreement, was rejected by RAE, which advised the government that the move was contrary to EU competition law.<sup>18</sup>

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<sup>16</sup> See the interview of Makis Papageorgiou, CEO of DEPA, with Imerisia, 26 July 2009, [www.imerisia.gr](http://www.imerisia.gr)

<sup>17</sup> Energia.gr, *Ενδιαφέρον της ΕΠΑ Αττικής για την Στερεά Ελλάδα*, 11 March 2009, [www.energia.gr](http://www.energia.gr)

<sup>18</sup> Imerisia, *Ανοιχτή ρήξη ΔΕΗ–ΔΕΠΑ*, 20 November 2008, [www.imerisia.gr](http://www.imerisia.gr)

However, in a surprise move in 2009, the then conservative government announced it was actively considering the possibility of a partnership with a strategic investor for DEPA. This came as an attempt to meet urgent Greek capital needs, against the backdrop of the ongoing economic and financial crisis and the dire straits to which this has brought the national budget, but it still remained highly controversial in political terms.<sup>19</sup> At the same time, however, the government aimed to attract investors with upstream assets – notably with Italy – which could guarantee the viability of the country’s planned natural gas interconnections by securing at least some of the volumes needed to allow them profitable operations.<sup>20</sup>

Alpha Bank, Deutsche Bank, Rothschild, and UBS were reportedly taken on board in this context, in order to act as financial/investment advisors. Negotiations with the possible investors at the time were thought likely to commence in late 2009 and to be completed during 2010. However, July 2009 saw the emergence of conflicting reports, whereby Greek government officials stated they were planning to postpone the proposed sale of DEPA to the following year. These reports were refuted a week later by Kostas Hatzidakis, the then Minister of Development. The exact share to be offered also remained unclear, with potential bidder Edison speculating on a possible 33 per cent.<sup>21</sup>

What is more, the election victory of PASOK on 4 October signalled a possible reversal of the planned divestment. Indeed, prior to the election PASOK had unambiguously indicated it was in favour of majority ownership and direct management of energy companies of strategic interest, such as DEPA and also PPC, by the Greek government.<sup>22</sup> As a government, PASOK has yet to announce officially its position on the matter but, despite the fact it was PASOK that tried to divest DEPA to Gas Natural earlier this decade, it remains unlikely the new government will alter its pre-election position on this matter.

Until recently the privatization of DEPA also suffered from a number of interrelated legal and technical complications – reportedly conditions relating to assuming the management of the company, including that of 100 per cent of the transmission subsidiary DESFA – which were brought forcefully into the open by the initial expressions of interest by potential buyers. Nevertheless, according to

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<sup>19</sup> Reuters, *Greece Expects DEPA Sale Plan by Summer’s End*, 21 July 2009, [www.reuters.com](http://www.reuters.com)

<sup>20</sup> Kathimerini, *Αέριο για τον ελληνικό αγωγό θα πρέπει να φέρει ο στρατηγικός επενδυτής της ΔΕΠΑ*, 31 August 2009, [www.kathimerini.gr](http://www.kathimerini.gr)

<sup>21</sup> Reuters, *Greece Expects DEPA Sale Plan by Summer’s End*, 21 July 2009, [www.reuters.com](http://www.reuters.com)

<sup>22</sup> *Κοινή δήλωση του Μιχάλη Χρυσοχοϊδῆ και της Λούκας Κατσέλη για το διαχωρισμό ΔΕΣΦΑ - ΔΕΠΑ*, 1 September 2009, [www.chrisochoidis.gr](http://www.chrisochoidis.gr)

current Greek Law, private investors can neither own more than 49 per cent of DESFA nor assume its management before 2017.

The matter seems to be complicated further by issues such as the (still unresolved/pending) 30 per cent PPC option; by part-owner Hellenic Petroleum which arguably wants to protect its own and partner's Edison interests; and, finally, by potential conflicts of interest with shareholder (minority partner) companies in EPAs, if a new owner of DEPA were to be one of their international competitors with very divergent commercial interests to them, in Greece and beyond (see below).<sup>23</sup>

Against this backdrop, in September 2009 the (then still conservative) Greek government decided on the complete unbundling of gas trading and transmission in the country, through the full separation of DEPA and DESFA. Under this plan, the indirect owners of the latter, namely the Greek government and Hellenic Petroleum, would henceforward control direct stakes in DESFA, in accordance with their initial stakes in the, until now, parent DEPA, namely a 65 per cent and a 35 per cent stake (respectively).

In addition, the conservatives planned to proceed with immediate leveraging of DEPA – the company's debt ratio stands at zero<sup>24</sup> – in order both to meet immediate budgetary needs of the Greek government and also to discourage potential non-strategic investors who might otherwise seek to benefit from the existence of such leveraging opportunities in the company.<sup>25</sup> As with the broader matter of the discussed privatization, the new socialist administration has not yet clarified its position on this issue, although this is expected in the coming months.

The privatization process of DEPA was in any case expected to be lengthy, both because of potential political resistance on the matter, and also because of possible complications with EU regulations and policy, particularly the latter if negotiations with either PPC or Gazprom were to make progress.

Still, developments in this context would theoretically have the potential of resulting in a shake-up of the Greek gas system. The Greek press had speculated extensively on likely domestic and international candidates for the acquisition of DEPA, with the list including:<sup>26</sup>

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<sup>23</sup> Imerisia, *ΔΕΠΑ: Στις καλένδες η αποκρατικοποίηση*, 17 August 2009, [www.imerisia.gr](http://www.imerisia.gr)

<sup>24</sup> DEPA, *Annual Report 2008*, [www.depa.gr](http://www.depa.gr)

<sup>25</sup> Euro2day, *ΔΕΠΑ: Στην πορεία τα δύσκολα για αποκρατικοποίηση*, 2 September 2009, [www.euro2day.gr](http://www.euro2day.gr)

<sup>26</sup> For more information on the planned strategic partnership of DEPA see also Kathimerini, *Με συνέταιρο η ΔΕΗ επιδιώκει 35% συμμετοχή στη ΔΕΠΑ*, 9 September 2009, [www.kathimerini.gr](http://www.kathimerini.gr); Energia.gr, *Δημοσιοποίησε το ενδιαφέρον της για την ΔΕΠΑ η Edison*, 10 June 2009, [www.energia.gr](http://www.energia.gr); and Axiaplus.gr, *Νέο μοντέλο για ΔΕΠΑ – ΔΕΣΦΑ*, 23 June 2009, [www.axiaplus.gr](http://www.axiaplus.gr)

1. Hellenic Petroleum (already a stakeholder, having 35 per cent of DEPA)
2. PPC (retains option for acquiring 30 per cent of DEPA but targets more)
3. German operator RWE (which has signed a cooperation MoU with PPC)
4. Edison (a partner of Hellenic Petroleum in power generation, and of DEPA itself in ITGI)
5. GDF SUEZ (LNG supplier of DEPA on a spot basis, potential partner in E&P and trading)
6. E.ON Ruhrgas (the German company is reportedly interested in strategic access to the ITGI link)
7. Gazprom (the company is the main natural gas supplier of DEPA, and also a partner in South Stream)
8. A number of other international gas companies, including major Qatari LNG producer and exporter Ras Gas

### **RAE recommendations on the Greek NNGS and potential INGSs**

In November 2008, RAE completed public consultation on the management code of Greece's NNGS, which is to include provisions on TPA, fuel standards, and licensing. The finalization of the Greek regulatory framework is considered to be necessary in order to clarify the market context for large consumers that would like to use the fuel towards power generation, including a number who have already signed initial supply contracts with DEPA.<sup>27</sup>

In October 2009, RAE announced its recommendations to the Greek government with regard to licensing of Independent Natural Gas Systems (INGSS) and licensing for supply and distribution of natural gas in the local market. According to Law 3428/2005, an INGS is a natural gas system which is not included in the NNGS, irrespective of an interconnection with this system.<sup>28</sup> RAE recommended that licences in this context should be issued for initial 50 year periods, but that these should be accompanied by an obligation on the INGS licence holder to compensate DESFA (the owner and operator of the Greek NNGS) if the latter's operations were negatively affected by the operations of independent transmission/distribution systems.

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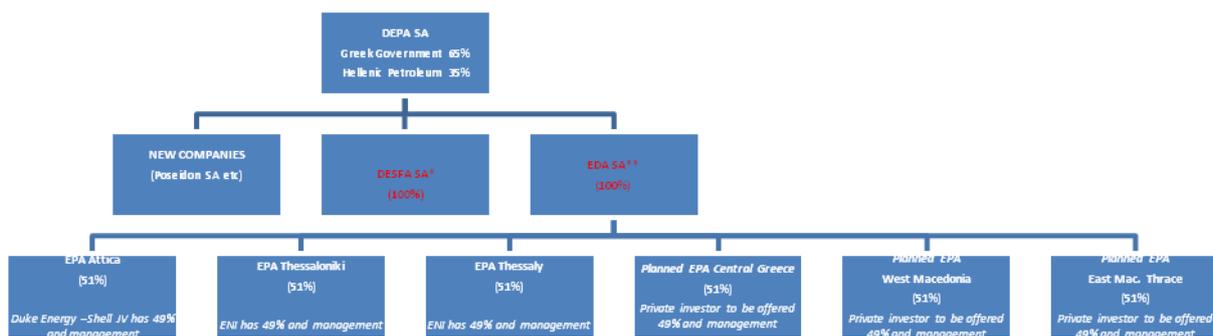
<sup>27</sup> RAE, *Αποτελέσματα της δημόσια διαβούλευσης για τον κανονισμό αδειών φυσικού αερίου*, 18 November 2008, [www.rae.gr](http://www.rae.gr)

<sup>28</sup> DESFA owns and operates the Greek NNGS. It currently functions as an independent system operator to parent company DEPA, even though there have been some discussions about full ownership unbundling of the two companies (see above).

RAE further maintained that the licence holder would need to enjoy the option of assigning operations to third parties, but would have to submit full details with regard to the INGS management (including pricing methodology) to RAE within six months of receiving the relevant licence (and pricing per se, three months later). According to the RAE proposals, INGS licence holders will be under an obligation to ensure TPA and also to be fully independent from any potential integrated parent companies. Such provisions bring the RAE recommendations in line with the independent system operator principles of the EU's Third Energy Package.

With regard to distribution, the licence holder will be under an obligation to satisfy all connection requests in due time (within a given reasonable geographical range) and to document any possible refusals to comply with such requests. Against this backdrop, RAE recommended to the government the acceptance of 20 year periods with regard to supply licenses. Figure 2 below summarizes the current structure of the Greek natural gas system.<sup>29</sup>

**Figure 2: Structure of Natural Gas System in Greece**



Source: Author from DEPA, *Company – Group Structure*, [www.depa.gr](http://www.depa.gr)

\* Greek government may unbundle DEPA and DESFA/\*\*Greek government may abolish EDA

<sup>29</sup> Energia.gr, *Νέο θεσμικό πλαίσιο για την αγορά φυσικού αερίου εισηγείται η ΠΑΕ*, 13 October 2009, [www.energia.gr](http://www.energia.gr)

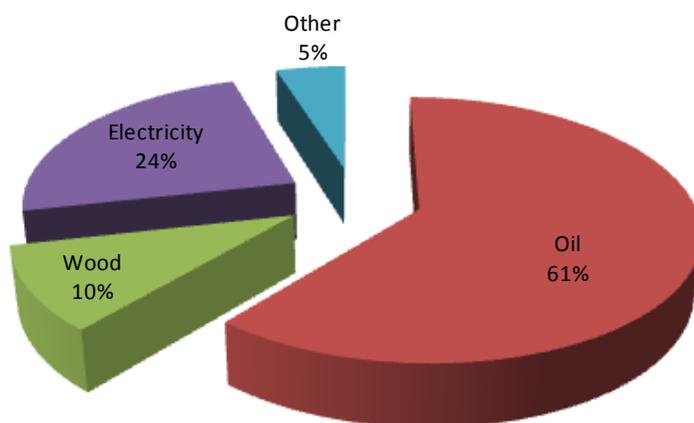
## Gas Demand in Albania and Greece to 2015

### *Albania pushes forward with gasification to meet growing energy demand*

Since the early 1990s primary energy demand has seen strong growth in Albania, as the country has moved away from agricultural and other traditional economic activities towards more modern (and thus also energy-intensive) ones; as it enjoys broader macroeconomic gains; and as its citizens enjoy improving (and, again, more energy-intensive) living standards. Demand levels exceeded 2 Mtoe in 2008, having doubled in the past decade.

However, years of underinvestment have led to an energy mix which is heavily skewed toward oil and hydro power. Oil is by far the dominant fuel in the country, accounting for more than 60 per cent of total demand. At the same time, electricity accounts for almost a quarter of the Albanian energy mix, and its generation is almost exclusively dependent on hydro. The remainder is accounted for by biomass, which is still in use in the country's largely poor residential sector, as well as by other fuels (accounting for some 15 per cent in total, see Figure 3 and Table 5 below for more information).

**Figure 3: Primary Energy Demand in Albania by fuel – 2007**



Source: Interpreted by author from Albanian Institute of Statistics, *Economic Indicators – Energy*, [www.instat.gov.al](http://www.instat.gov.al)

**Table 5: Electricity demand in Albania by source 2000–8 (GWh)**

	2000	2001	2002	2003	2004	2005	2006	2007	2008
<b>Hydro</b>	4595	3555	3073	4822	5417	5377	5459	2874	3850
<b>Thermo</b>	144	137	107	81	76	77	93	72	0
<b>Imports</b>	1224	1819	2279	1242	869	1253	1242	2935	2759
<b>Total</b>	5962	5511	5459	6146	6361	6707	6794	5881	6608

Source: Albanian Institute of Statistics, *Economic Indicators – Energy*, [www.instat.gov.al](http://www.instat.gov.al)

Locally produced electricity does not suffice to meet the still growing power needs, and Albania is accordingly obliged to import large volumes of electricity from neighbouring countries each year. The Albanian government has therefore already stated its intention to raise electricity production capacity through the construction of new hydro units in the country, as well as by diversifying away from this heavily weather-dependent source, in order to improve overall security of supply.

Against this backdrop, the Albanian government is actively promoting the introduction of natural gas in the country’s energy mix, with power generation and industrial use of the fuel being prioritized over residential use for heating and other purposes. By the same token, new projects in Albania in these priority areas are designed in a way that would allow them to benefit from the expected gasification of the country.

For example, the new 97 MW Vlorë Thermo Power Plant – a US \$112 m project which started test operations in June 2009 (operations are expected to commence in the near term) – has the capability of switching from gasoil to natural gas, as soon as the gasification of the country allows it.<sup>30</sup> Such planning also aims to help Albania improve its environmental credentials and be more in line with international and European emissions policies.

The revised National Energy Strategy of Albania projects gas demand to be between 1.5 bcm and 1.8°bcm/y by 2020, taking into account the country’s broader macroeconomic context and prospects.<sup>31</sup> However, this estimate may be optimistic, as it not only presupposes the timely gasification of the country through international pipeline and/or LNG terminals, but also the relatively rapid expansion of the Albanian gas-fired power generation sector (i.e. besides switching Vlorë from

<sup>30</sup> Balkans Business News, *Launch of Albania’s Vlore Thermal Power Plant Delayed to September*, 6 July 2009, [www.balkans.com](http://www.balkans.com)

<sup>31</sup> Cited in Stavri Dhima, *Prospects for the Introduction of Natural Gas in Albania*, Paper presented at ‘Greek–Albanian Cooperation in the Energy Sector’, Tirana, January 2009, [www.iene.gr](http://www.iene.gr)

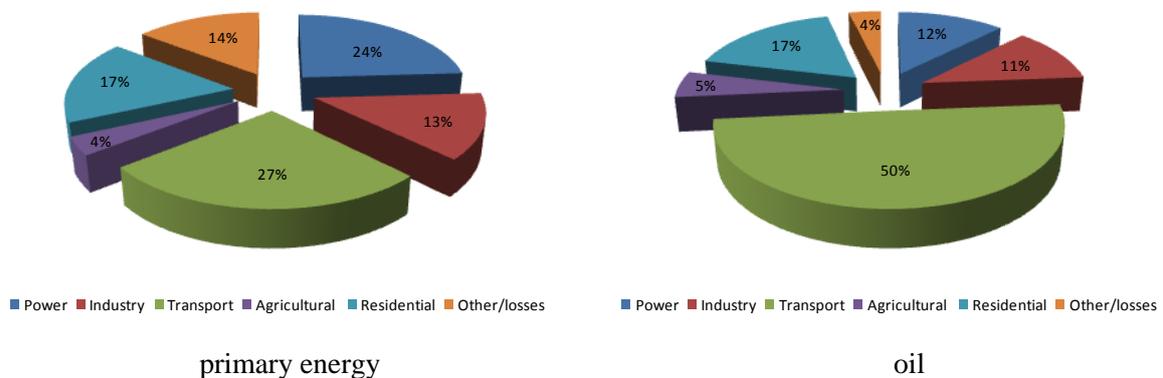
gasoil to natural gas) and the upgrading/extension of the country’s decrepit pipeline infrastructure, ultimately enabling it to reach all major industrial customers.

### ***Natural gas demand in Greece to continue on upward trend***

Growth in natural gas consumption in Greece is expected to come mostly from substitution of Heavy Fuel Oil (HFO) and other fossil fuels in the rapidly expanding Greek power generation sector, substitution of heating oil in the residential sector, and substitution of HFO and other oil products in the industrial sector. Low crude and oil product prices could of course undermine natural gas penetration; however this prospect remains rather unlikely for the period after the end of the ongoing economic and financial crisis. A breakdown of the Greek primary energy and oil product demand by use is presented in Figure 4 below.

**Figure 4: Primary energy and oil product demand in Greece by sector in 2006**

(thousand TOE)



Source: Interpreted by the author based on information from the Ministry of Development, *National Energy Information System*, [www.ypan.gr](http://www.ypan.gr)

Ever since its introduction to the energy mix in 1996, use of natural gas has grown rapidly. Total demand has more than doubled from 2 bcm in 2000 (1.9 billion Nm<sup>3</sup>) to some 4.2 bcm in 2008 (4.0 billion Nm<sup>3</sup>), threatening the role of oil across traditional demand sectors.<sup>32</sup> The power generation sector (baseload capacity) is by far the largest consumer of natural gas in the country, notably by

<sup>32</sup> All demand figures in normal cubic metres have been converted to standard cubic metres for easier reference. Normal cubic metres are measured dry at 0 °C and 760 mmHg while standard or else contractual cubic metres dry at 15 °C and 760 mmHg. The conversion factor used in this paper is 1 normal cubic metre = 1.0548 standard cubic metres, in accordance with Shell’s Natural Gas Terms and Measurements. The author is indebted to Professor Jonathan Stern for this clarification.

state-owned and former power monopoly PPC, accounting for some 71.6 per cent of total national gas demand in 2008. This renders the Greek natural gas market all the more appealing to suppliers, as demand remains largely secured, and indeed on a strong upward trend.

Power generation demand is followed by that in the industrial sector, with the latter representing approximately 15.2 per cent of the Greek gas market in 2008. The category includes consumers with an annual consumption in excess of 2,200,000 kWh Gross Calorific Value or approximately 200,000 mcm per year. According to DEPA, use of the fuel in areas of supply availability already exceeds the level of 90 per cent. The company claims contractual relations with 129 small and 25 large industrial customers (with annual consumption above 100 GWh) and total contracted volumes of almost 1 bcm annually. Of these players, roughly 96 small and 22 large industrial plants are already supplied with the fuel by DEPA.<sup>33</sup> The residential sector follows power generation and industry in terms of demand with a relatively low 12.6 per cent share of the market, suggesting large untapped potential. Good demand potential also exists in the transport sector, where gas usage is still minimal but growing. Table 6 below summarizes relevant data.

**Table 6: Natural gas consumption in Greece by sector, 1998–2008 (million cubic metres)\***

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
<b>Power Generation</b>	516	1051	1518	1511	1591	1759	1909	1912	2295	2966	3021
<b>Industry</b>	307	433	462	395	420	485	517	583	572	580	643
<b>Residential</b>	13	13	30	79	122	169	225	321	421	484	534
<b>Transport**</b>	0	0	0	7	12	13	16	18	21	21	23
<b>Total</b>	836	1497	2010	1993	2144	2425	2668	2834	3308	4050	4221

Source: Interpreted by the author from Spiros Paleoyannis, *The Greek Natural Gas Market and International Interconnections*, Paper presented at the ‘Greek–Albanian Cooperation in the Energy Sector’, Tirana, 2009, [www.iene.gr](http://www.iene.gr)

\*original figures in normal cubic metres converted to standard mcm

\*\*autogas consumption figures are author’s estimates

Short-term prospects for natural gas are likely to suffer, and some demand reduction looks inevitable as recessionary pressures take their toll on power generation and other industrial uses. Greek gas demand indeed contracted by some 24.5 per cent year-on-year (y-o-y) in the final quarter of 2008, with demand reduction reaching 35.9 per cent y-o-y in the first quarter of 2009.<sup>34</sup> Expected gas demand levels for 2009 with reference to Greece accordingly range between only 3.5 bcm and 4 bcm.

<sup>33</sup> More information on the matter available at [www.depa.gr](http://www.depa.gr)

<sup>34</sup> Information from Alexey Biteryakov, *Natural Gas Market of SE Europe Gazprom Export’s View*, Paper presented at ‘3<sup>rd</sup> South East Europe Energy Dialogue’, Thessaloniki, June 2009, [www.iene.gr](http://www.iene.gr)

If these estimates prove correct, as preliminary data in fact suggest, this will be the first annual contraction in gas demand in the country since 2001, and probably the largest ever. However, the structural trend is clearly upwards in all sectors, and estimates by SEES see it rising to *roughly* 7.1°bcm/y by 2015, and 7.3 bcm by 2020, with power generation needs being at the level of 5°bcm°per year from 2013 onwards (SEES does not make available exact figures but only graphs representing its gas demand forecasts for the country). DEPA is even more optimistic, projecting 8.1°bcm for 2015 and as high as 8.8 bcm for 2020 (see Table 7).

**Table 7: Projected natural gas consumption in Greece to 2020 (million cubic metres)**

<b>Year</b>	<b>Low Case Scenario</b>	<b>High Case Scenario</b>	<b>Volume Differential</b>	<b>Percentage Differential</b>
<b>2000</b>	2010	2010	-	-
<b>2008</b>	4221	4221	-	-
<b>2015</b>	7100	8100	1000	14
<b>2020</b>	7300	8800	1500	21

Source: SEES, *Report on long-term energy planning*, 2009, [www.sees.gov.gr](http://www.sees.gov.gr) ; RAE, *Report on the Security of Natural Gas Supply in Greece*, 2009, [www.rae.gr](http://www.rae.gr) ; and other local sources

The announcement in February 2009 by the (then new) leadership of the Greek Ministry of Development (Ministry of Environment, Energy, and Climate Change from October 2009) that the country has no intention of exploring the nuclear option, or of moving forward with previous government plans for new coal-fired power units – except ones that will use locally-produced lignite – lends further support to estimates, such as those presented above, envisaging strong growth in natural gas consumption.<sup>35</sup> This shift in official Greek energy policy, which was also supported by the country’s main opposition party PASOK (and since 4 October 2009 the new Greek government), suggests that the nature of the future energy mix is likely to offset any major long term losses in demand that could result from the ongoing global financial and economic crisis, or from any other non-structural factors.

SEES has argued in favour of the country retaining the expertise it has acquired in solid fuels through years of investments in lignite production and use, so to be able to make the most of clean coal technologies should they become widely available by the 2020s. However, even if this proposal were to be taken up by the Greek government, it would obviously not have a serious impact on Greek natural gas demand in the next decade. In the same vein, other voices in favour of lignite – including

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<sup>35</sup> Energia.gr, *Αλλαγή πλεύσης για τις μονάδες παραγωγής ενέργειας από λιθάνθρακα στην Ελλάδα*, 9 February 2009, [www.energia.gr](http://www.energia.gr)

from major player PPC – look set to be ignored in accordance with the broader political and societal consensus on this matter, at least for the coming five to six years.<sup>36</sup>

Serious encroachments from another potential competitor in the power generation sector, Renewable Energy Sources (RES), similarly remain unlikely in the current recessionary context and ensuing tight funding, despite commitments to the contrary by the Greek government. By the same token, SEES views the role of RES in the power sector as remaining rather limited in the coming decade (albeit of course growing) due a number of technical limitations that fail to render them cost-effective, notably the lack of storage options.<sup>37</sup>

Finally, SEES argues in favour of active energy conservation policies to reduce primary energy demand. SEES accordingly highlights the potential positive side-effects of such a shift for Greek security of supply, national balance of payments, CO<sub>2</sub> emissions, and competitiveness of the national economy. However, despite the existence of relatively ample room for improvement in terms of improving energy intensity in the country, reduction of natural gas demand as a result of these policies is expected to remain minimal by 2015, and not make a substantial impact until well into the 2020s.<sup>38</sup>

## ***Expanding power sector supports demand in Greece***

### **Introduction**

Electricity demand is covered primarily by power generation from locally produced lignite, although gas-based generation is increasing in importance (see Figure 5). However, the precise level of gas penetration in the Greek power generation sector in the coming years will depend on a number of relevant (and some of them interrelated) factors which do not necessarily have a clear prioritization.

These include investors' ability to fund construction of the new gas-fired units in the current framework of negative economic growth and tight funding; on the actual availability of affordable natural gas supply, as virtually all of the proposed gas links in the region face serious obstacles in their realization;<sup>39</sup> on the liberalization or, at least, adoption of more rational price mechanisms in the

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<sup>36</sup> PPC leadership has publicly announced its disagreement with the exclusion of lignite from the Greek power mix and has expressed its support for nuclear as the second best option (see Imerisia, *Σχέδια της ΔΕΗ για μονάδες πυρηνικής ενέργειας*, 17 July 2009, [www.imerisia.gr](http://www.imerisia.gr)).

<sup>37</sup> SEES, *Report on Long-Term Energy Planning*, 2009, [www.sees.gov.gr](http://www.sees.gov.gr)

<sup>38</sup> SEES, *Report on Long-Term Energy Planning*, 2009, [www.sees.gov.gr](http://www.sees.gov.gr)

<sup>39</sup> Spiros Paleoyannis, *The Fourth Corridor Puzzle*, Paper presented at 'International Black Sea Energy Policy Conference', Athens, October 2008, [www.kepa.uoa.gr](http://www.kepa.uoa.gr)

Greek electricity market;<sup>40</sup> on the actual electricity consumption levels in the country as a whole; and on strategic considerations on the level of dependency on the fuel. With regard to the latter, SEES has repeatedly warned that excessive dependency on natural gas for power generation needs would be strategically problematic, while at the same time highlighting the fact that high usage of the fuel in power generation has lead Greece to the unenviable position of having the highest costs per used calorie in Europe, due to the lower thermodynamic performance of the fuel in power generation compared to other uses.<sup>41</sup>

All these variables are currently in question due to the persistence of the recessionary context and its implications. For example, the System Marginal Price (SMP) on 11 August 2009 was €39/MWh compared to €120/MWh on the same day of 2008, or 67.5 per cent down y-o-y.<sup>42</sup> By the same token, in the first half of 2009 electricity consumption in the interconnected Greek system stood at only 25,786 GWh or 5.7 per cent down compared to the first half of 2008, the first such contraction seen in the country in years. Electricity demand reduction was most evident in the industrial sector, on account of the ongoing global crisis and its impact on the Greek national economy. What is more, of the approximately 23,272 GWh produced in the country in the first half of 2009, only some 3,776°GWh came from natural gas as the low SMP – combined with an abundance of lignite and hydro resources in the same period – rendered gas-based production uncompetitive at the time. This represented a value reduced by more than 46 per cent compared to the same period of 2008 (see also Figures 5 and 6).

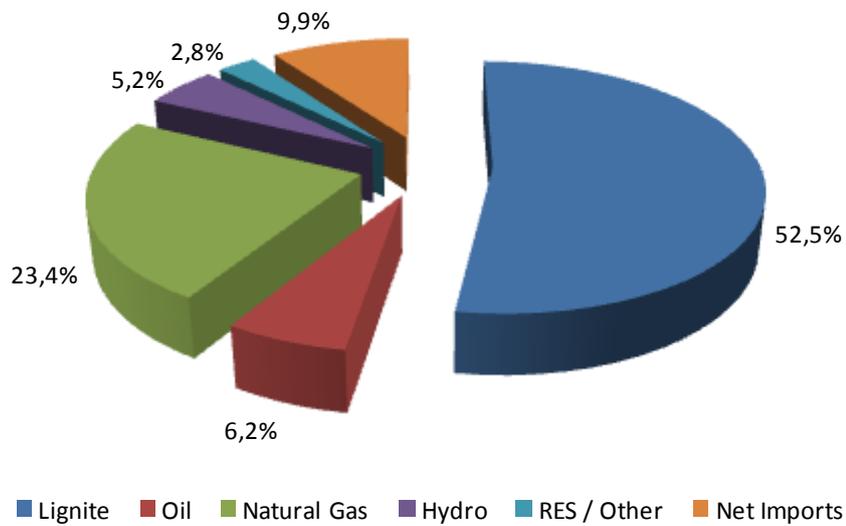
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<sup>40</sup> The European Commission has formally raised this issue with the Greek government, with liberalization vis-à-vis the commercial client segment considered possible within 2010 – for more information see [Energia.gr](http://energia.gr), *Ζήτημα απελευθέρωσης τιμολογίων της ΔΕΗ θέτει επιστολή της Ευρωπαϊκής Επιτροπής*, 20 August 2009, [www.energia.gr](http://www.energia.gr); and also Kathimerini, *Αύξηση των τιμολογίων ηλεκτρικού ρεύματος ζητεί η ΕΕ*, 13 September 2009, [www.kathimerini.gr](http://www.kathimerini.gr)

<sup>41</sup> SEES, *Report on Long-Term Energy Planning*, 2009, [www.sees.gov.gr](http://www.sees.gov.gr)

<sup>42</sup> Imerisia, «Βουτιά» στις τιμές ρεύματος στην αγορά χονδρικής, 11 August 2009, [www.imerisia.gr](http://www.imerisia.gr)

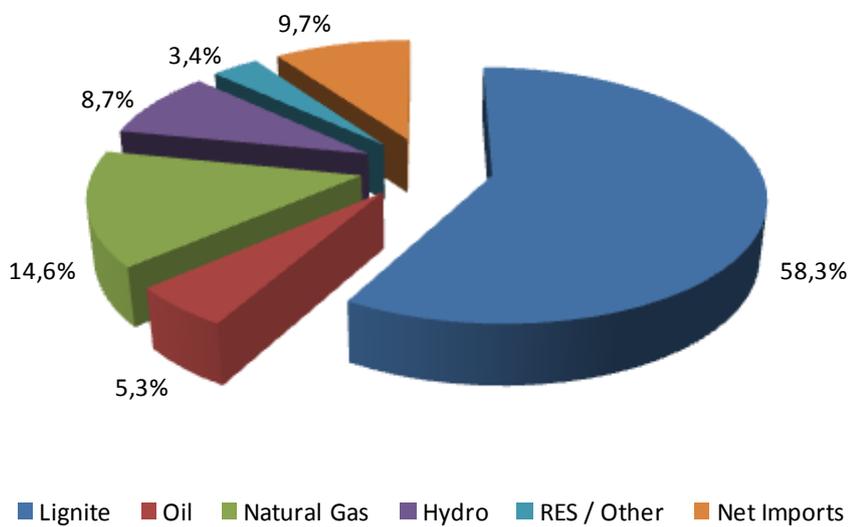
**Figure 5: Electricity consumption in Greece by source – 2008**



Source:

DESMIE, *Transmission system energy balance monthly report*, December 2008, [www.desmie.gr](http://www.desmie.gr)

**Figure 6: Electricity consumption in Greece by source – January to June 2009**



Source:

DESMIE, *Transmission system energy balance monthly report*, July 2009, [www.desmie.gr](http://www.desmie.gr)

Against this backdrop, SEES postponed publication of its annual report – which includes supply and demand forecasts – from early 2009 to July of the same year, in order to give more consideration to the impact of the financial and economic crisis on supply and demand patterns in the country.<sup>43</sup> SEES projections of Greek power needs now show an increase from less than 60,000 GWh in 2008 and previous years, to a level between 63,700 GWh and 65,600 GWh by the year 2015, and between 67,700 GWh and 74,100 GWh by the year 2020.<sup>44</sup> This suggests a strong upward trend for the Greek power sector, albeit weaker in comparison to the pre-crisis estimates of SEES when it projected power demand levels between some 72,000 GWh and 79,500 GWh by 2020.<sup>45</sup>

According to SEES, natural gas should meet approximately one third of the country's growing power needs, with the remainder accounted for by RES and lignite. Lignite-fuelled production represented some 52.5 per cent of total power generation in 2008 in the interconnected Greek system. Under current trends, SEES projects this share as falling to some 29 per cent in 2020 and to only 11 per cent in 2030, as by this date, all old-technology lignite units (approximately 2,500 MW in total) will have been shut down. However, SEES opposes replacing all of these units with gas-fuelled ones, as this would violate both the principle on supply diversification, as well as sound economic reasoning, as there are no indications that gas prices will be lower in the future, compared to solid fuel prices.<sup>46</sup>

## **Greenfield projects**

Against this backdrop, a number of state and private players are moving forward with plans to construct new power stations to meet the growing Greek demand. These plans include gas-fired units, taking advantage of the availability of the fuel, its relative competitive pricing, and environmental credentials. The bulk of the new capacity is expected to come online in the period 2010–13 (mostly in the form of replacements of old solid fuel power units) because projects that are already in advanced investment stages are left unaffected by the, otherwise dismal, impact of the current economic downturn. Table 8 at the end of the chapter summarizes all relevant information.

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<sup>43</sup> Energia.gr, *Η κρίση αναβάλλει τον μακροχρόνιο ενεργειακό σχεδιασμό*, 7 April 2009, [www.energia.gr](http://www.energia.gr)

<sup>44</sup> SEES, *Report on Long-Term Energy Planning*, 2009, [www.sees.gov.gr](http://www.sees.gov.gr)

<sup>45</sup> SEES, *Measures and Means for a Viable and Competitive Energy Policy*, 2008, [www.sees.gov.gr](http://www.sees.gov.gr)

<sup>46</sup> SEES, *Report on Long-Term Energy Planning*, 2009, [www.sees.gov.gr](http://www.sees.gov.gr)

### **Edison/Hellenic Petroleum**

*Thessaloniki CCGT and Thisvi CCGT*: Italian electricity group Edison and Hellenic Petroleum agreed in July 2007 to set up a 50/50 JV focusing on opportunities in the Greek power market. Among other assets, the JV incorporates an existing 390 MW gas-fired power generation unit at Thessaloniki (Hellenic Petroleum 100 per cent) and the 421 MW Combined Cycle Gas Turbine (CCGT) plant at Thisvi (Edison 65 per cent) which is currently under construction. The envisaged time of completion for the latter is the first half of 2010. DEPA is expected to supply Hellenic Petroleum's Thessaloniki power plant with some 500 mcm/year, while in June 2009 DESFA awarded a €6.9 m contract to Italian company Impresa Ghizzoni SpA for the construction of a 25 km, 20 inch pipeline between the Thisvi plant and the national natural gas pipeline. Completion is expected by mid-2010, with an additional option for the construction of a metering station to serve broader industrial and commercial customers in the area at some point in the future.<sup>47</sup>

### **Edison/HE&D/PFI**

*Nea Karvali CCGT*: Edison holds a 51 per cent stake in a consortium planning to construct a new 440°MW CCGT unit in installations owned by the Phosphoric Fertilizers Industry (PFI) in the region of N. Karvali in Kavala in northern Greece, potentially targeting supply synergies with new LNG infrastructure in the broader region (see below). HE&D (a subsidiary of Greek group Ellaktor Holdings) has a 35 per cent holding in the consortium, while PFI itself has the remainder 14 per cent. The planned unit has already secured a planning permit from the relevant Greek authorities, but there does not seem to be a specific timetable for completion of this project by the Italian–Greek consortium at this time.<sup>48</sup>

### **Elektrizitaets–Gesellschaft Laufenburg AG (EGL)**

*Overview*: In November 2009, Swiss energy trading company EGL (one of the two partners in the TAP project) submitted a licence application to RAE for the construction of a 153 MW CCGT unit in the region of Tithorea in Fthiotis, central Greece. The proposed site at Tithorea is within close range of PPC high voltage lines and a DESFA metering station. The unit will reportedly operate 16 hours per day for five days a week in order to meet mid-load power needs. According to local reports, EGL plans to invest some €120 m towards completion of this project by 2013. Furthermore, the company is

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<sup>47</sup> More information available at Hellenic Petroleum, *Power Generation Production and Trading*, 2009, [www.hellenic-petroleum.gr](http://www.hellenic-petroleum.gr); and DESFA, *Ανατέθηκε η κατασκευή του αγωγού σύνδεσης της μονάδας της Θιάβης με τον κεντρικό αγωγό φυσικού αερίου*, 18 June 2009, [www.desfa.gr](http://www.desfa.gr)

<sup>48</sup> Energia.gr, *Σε ισχύ τα ενεργειακά projects στις εγκαταστάσεις της ΒΦΛ*, 17 September 2009, [www.energia.gr](http://www.energia.gr)

considering the possibility of direct LNG imports to supply Tithorea, at least until it could be partially supplied by the planned TAP.<sup>49</sup> Such options may be facilitated by the MoU for a global partnership (including the region of South East Europe) on LNG procurement and marketing which EGL signed with LNG Japan Corporation in late October 2009. Moreover, the October MoU between the two companies had been preceded by a Framework Agreement on spot LNG sales and purchases, in May of the same year.<sup>50</sup>

### **Enel/Prometheus Gas**

*Livadia CCGT and Alexandroupolis CCGT:* Italian utility Enel and the Greek–Russian consortium Prometheus Gas have established the JV ‘Enelco’ which has won a tender to construct a 447 MW CCGT power plant at Livadia, central Greece (estimated cost of €250 m). The plant is expected to come on stream in 2011. Enelco is also considering the construction of a CCGT in Alexandroupolis, northern Greece, aimed towards meeting electricity needs in both Greece and neighbouring Turkey. DEPA reportedly has a preliminary agreement with Enelco for the supply of some 500 mcm/year to Livadia.<sup>51</sup>

### **Mytilineos/Endesa**

*Overview:* In March 2007 Greek Metals and Energy Company Mytilineos Holdings, and Spanish power group Endesa announced they would enter into a €1.2 bn JV (Endesa Hellas) to create the largest independent power producer in the country in the near future, aiming at 15 per cent market share by 2015. Endesa Europa holds 50.01 per cent and Mytilineos Holdings 49.99 per cent of the JV.<sup>52</sup> The fundamentals of the venture seem to be strong, but its prospects in the Greek market have been complicated due to the takeover of parent company Endesa by Enel in 2009. The Italian company thus has stakes in two competing consortia in the Greek power sector, namely Enelco (see above) and Endesa Hellas. This complication, along with the need to cut debt on a global level, may well lead Enel to the decision to divest itself of its stake in Endesa Hellas, and focus instead on Enelco (as originally planned). In that case, Mytilineos would have the right of first refusal, which it will most probably exercise, at least as a first step towards finding a new partner.<sup>53</sup>

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<sup>49</sup> Energia.gr, *Κατασκευή Ηλεκτρικής Μονάδας από EGL Group*, 9 November 2009, [www.energia.gr](http://www.energia.gr)

<sup>50</sup> EGL, *LNG Japan Corporation and EGL sign partnership on Liquefied Natural Gas*, 22 October 2009, [www.egl.ch](http://www.egl.ch)

<sup>51</sup> Information from Enelco, *Activities*, 2007, [www.enelco.gr](http://www.enelco.gr); see also Energia.gr, ΔΕΣΜΗΕ: *Υπογράφηκαν οι συμβάσεις με την Enelco για τη νέα μονάδα φυσικού αερίου*, 16 July 2008, [www.energia.gr](http://www.energia.gr)

<sup>52</sup> Endesa Hellas, *Introduction to Endesa Hellas*, 3 July 2009, [www.endesahellas.com.gr](http://www.endesahellas.com.gr)

<sup>53</sup> Capital.gr, *Endesa Hellas: τα σενάρια για το μέλλον της Enel και η στάση Μυτιληναίου*, 19 May 2009, [www.capital.gr](http://www.capital.gr)

**Aghios Nikolaos CHP:** In the second half of 2008 the consortium completed construction of a 334°MW co-generation unit in Aghios Nikolaos, aimed at supplying the nearby Aluminium of Greece site. The unit commenced operation in April 2009 and can use both natural gas and gasoil in combined or open cycle. In full capacity, it is expected to produce some 2,720 Gigawatt electrical (GWhe) and 1,760 Gigawatt thermal (GWth) annually, with an average natural gas consumption of some 510 mcm/year.<sup>54</sup> As of mid-November 2009, Mytilineos Group was to become to be the first operator outside DEPA to import LNG directly in order to meet own needs. The Group was reportedly seeking to take advantage of the cheap spot market, as its supply contract for piped gas with DEPA allows it 30 per cent flexibility (gas supply of between 80 per cent and 110 per cent of contracted volumes). Against this backdrop, Mytilineos was reportedly importing some 65,000 cu.m through Revithoussa by end-November 2009.<sup>55</sup>

**Aghios Nikolaos CCGT:** The JV is at the same time moving forward with plans to complete an additional 444 MW CCGT at Aghios Nikolaos, pending RAE authorization for independent producer status. The new Aghios Nikolaos unit is planned to be supplied with natural gas through a 20 inch pipeline from the Greek national gas system. The pipeline will be linked to a local metering station and thence through a 12 inch pipeline to the actual site. The new power plant at Aghios Nikolaos is expected to produce 2,700 GWhe annually, with an estimated gas consumption of some 460°mcm/year.<sup>56</sup> Streaming of Aghios Nikolaos CCGT is envisaged before mid-2010. The Group has not yet signed any supply contract with DEPA for Aghios Nikolaos CCGT, and may seek a greater role for direct LNG supply in order to make the most of the favourable spot market (see above).<sup>57</sup>

**Volos CCGT:** Endesa Hellas is also planning the construction of a 445 MW CCGT in Volos, Magnesia (north Greece). The company estimates average production at the unit at above 2,530°GWhe, with an expected natural gas consumption of some 450 mcm on an annual basis. Initial cost estimates for the project referred to a total of €280 m, but no revised figures reflecting the impact of the ongoing crisis on the cost of raw material and services had been presented by time of writing. Pre-Front End Engineering and Design (FEED) for this project was assigned to technical company

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<sup>54</sup> Endesa Hellas, *Introduction & Thermal Plants*, 3 July 2009, [www.endesahellas.com.gr](http://www.endesahellas.com.gr) and other local sources

<sup>55</sup> Reporter.gr, *Μυτιληναίος: Σφήνα στο μονοπώλιο ΔΕΠΑ*, 11 November 2009, [www.reporter.gr](http://www.reporter.gr)

<sup>56</sup> Endesa Hellas, *Introduction & Thermal plants*, 3 July 2009, [www.endesahellas.com.gr](http://www.endesahellas.com.gr)

<sup>57</sup> Reporter.gr, *Μυτιληναίος: Σφήνα στο μονοπώλιο ΔΕΠΑ*, 11 November 2009, [www.reporter.gr](http://www.reporter.gr)

Castor in 2007, while the equipment for the new unit is expected to come from General Electric. Completion is envisaged by 2012, even though this may be optimistic given the lack of any substantial progress so far.<sup>58</sup>

***Aghii Theodori CCGT (Mytilineos with Motor Oil Hellas):*** In November 2008, Mytilineos also announced it was entering into a 65/35 JV (Korinthos Power) with Motor Oil Hellas, the sole independent refiner in Greece. The target is to construct a 396 MW CCGT at Aghii Theodori in Corinth to meet the power needs of the Homonymous refinery. Completion is envisaged by mid-2011, at an estimated cost of €285 m. The project is awaiting authorization by RAE. Motor Oil has already started use of natural gas for its refinery needs, while there is reportedly an agreement with DEPA for the annual supply of some 250 mcm/year.<sup>59</sup>

### **Public Power Corporation**

***Overview:*** PPC is by far the largest producer of gas-fired power in the country, having six gas-fired power generation units in operation with a combined capacity of 1,980 MW. Some 540 MW of this capacity are to be phased out, as soon as they can be replaced with new and more efficient CCGT units. Despite PPC having been legally prevented from tendering for new plants in Greece until 2010 to prevent it from taking unfair advantage of its overwhelming dominance in the Greek power market, it has two long-approved CCGT plants under development at the Aliveri area (Aliveri V) and Megalopolis (Megalopolis V).<sup>60</sup> PPC is also considering the possibility of a 500 MW LNG (or CNG) fuelled unit on the island of Crete, which is not connected to the country's main electricity grid.<sup>61</sup> The company reportedly consumes some 700 mcm/year more than levels described in its supply agreement with DEPA in total.

***Aliveri V:*** Aliveri V is planned to have a capacity of almost 417 MW and efficiency yields of above 58 per cent, while associated costs are estimated to stand at the level of €219 m. Preliminary construction works by METKA (Mytilineos Group) finally began in September 2009, following

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<sup>58</sup> Naftemporiki, *Μονάδα παραγωγής ηλεκτρικού ρεύματος συνδυασμένου κύκλου στο Βόλο*, 11 January 2008, [www.naftemporiki.gr](http://www.naftemporiki.gr)

<sup>59</sup> Naftemporiki, *Αρχίζει η κατασκευή μονάδας φυσικού αερίου στην Κόρινθο*, 5 January 2009, [www.naftemporiki.gr](http://www.naftemporiki.gr)

<sup>60</sup> For more details on PPC production capacity and planning see Dimitris Papakonstantinou, *PPC Business Plan 2009–2014*, Paper presented at 'Greek–Albanian Cooperation in the Energy Sector', Tirana, 2009, [www.iene.gr](http://www.iene.gr)

<sup>61</sup> Dimitris Papakonstantinou, *PPC Business Plan 2009–2014*, Paper presented at 'Greek–Albanian Cooperation in the Energy Sector', Tirana, January 2009, [www.iene.gr](http://www.iene.gr).

delays that were caused by the discovery of antiquities in the initially proposed site. Aliveri V targets supply of the southern Greek power system, the country's main demand centre. Completion is envisaged in 2011, somewhat delayed compared to the project's original deadline of 2010.<sup>62</sup>

**Megalopolis V:** Progress at Megalopolis has been even slower, with the main obstacle reportedly being specific contractual provisions under the previous tender, according to which PPC would be obliged to pay damages to the construction company, if unable to perform test use by the envisaged completion time.<sup>63</sup> Nonetheless, PPC believes that DESFA will not have completed the construction of the planned pipeline that is to supply the unit by 2012, the envisaged date of completion for the project under the previous tender. Additionally, PPC saw scope for lowering the relevant budget from €570 m in the previous tender to €500 m in the new one, in order to account for cheaper raw materials which had become available due to the ongoing economic crisis.<sup>64</sup> Copelouzos Group which had participated in the initial tender with Ansaldo Energia (Finmeccanica Group) had previously asked for the cancellation of the project, but its demand was rejected by the PPC board on 18 June 2009.<sup>65</sup> METKA (Mytilineos Group), which had similarly submitted a joint bid with General Electric, was in favour of moving forward with the current tender, adjusting it with new agreements where necessary, as it had submitted the most favourable initial bid.<sup>66</sup> PPC labour unions, local authorities, and residents similarly pushed for completion of the project as soon as possible, for economic and environmental reasons.<sup>67</sup> In August 2009, PPC and METKA reached a preliminary agreement along the lines discussed above for the construction of an 811 MW power generation unit (expected efficiency yields of almost 57 per cent) at Megalopolis.<sup>68</sup> On 22 September 2009, the board of PPC awarded construction of Megalopolis to METKA under the previously agreed August provisions, with the agreement finally being signed on 13 November 2009.<sup>69</sup> However, the new unit is not expected to become operational before mid-2013.<sup>70</sup>

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<sup>62</sup> Energia.gr, ΔΕΗ: Ξεκλείδωσε η κατασκευή μονάδας στο Αλιβέρι, 29 September 2009, [www.energia.gr](http://www.energia.gr)

<sup>63</sup> Axiaplus.gr, Την ερχόμενη εβδομάδα στο ΔΣ της ΔΕΗ η Μεγαλόπολη, 24 July 2009, [www.axiaplus.gr](http://www.axiaplus.gr)

<sup>64</sup> Energia.gr, Ανοίγουν οι προφορές για την Μεγαλόπολη, 28 July 2009, [www.energia.gr](http://www.energia.gr)

<sup>65</sup> Imerisia, Σχέδια της ΔΕΗ για μονάδες πυρηνικής ενέργειας, 17 July 2009, [www.imerisia.gr](http://www.imerisia.gr)

<sup>66</sup> Reporter.gr, Μόνο με τη METKA οι διαπραγματεύσεις της ΔΕΗ για Μεγαλόπολη, 5 August 2009, [www.reporter.gr](http://www.reporter.gr)

<sup>67</sup> Kathimerini, Διαμαρτυρίες για την ακύρωση κατασκευής μονάδας της ΔΕΗ, 27 July 2009, [www.kathimerini.gr](http://www.kathimerini.gr)

<sup>68</sup> Balkans Business News, Greece's Metka Engineering wins 500 mln-Euro Power Plant Contract, 26 August 2009, [www.balkans.gr](http://www.balkans.gr)

<sup>69</sup> Energia.gr, Υπογραφή της σύμβασης για τη μονάδα στη Μεγαλόπολη από ΔΕΗ και METKA, 13 November 2009, [www.energia.gr](http://www.energia.gr)

<sup>70</sup> Energia.gr, Ένα χρόνο πίσω η λειτουργία της Μεγαλόπολης V, 28 July 2009, [www.energia.gr](http://www.energia.gr)

***Elefsis CCGT (with Halyvourgiki)***: PPC is seeking to circumvent legal restrictions by entering into joint ventures for building new power stations as a minority stakeholder. In this framework, in April 2008 the PPC board approved a Memorandum of Understanding (MoU) with Greek steel operator Halyvourgiki for a joint venture, in which the company will hold a minority stake of 49 per cent for the construction of two gas fired CCGT units of a combined 880 MW capacity at Halyvourgiki's site in Elefsis. The JV was authorized by the Greek Competition Commission in May 2009 but the project has already run into planning difficulties with the local authorities at Elefsis due to environmental objections.<sup>71</sup>

### **TERNA SA.**

***Heron***: Finally, Heron Thermoelectric of TERNA S.A. operates a 147 MW open cycle power plant at Thiva in central Greece (Heron I), the capacity of which TERNA aims to increase to 210 MW. The plant uses natural gas as feedstock but can switch to gasoil as backup. Storage capacity for the backup fuel is equivalent to five days normal use. In addition, the company is moving forward with the construction of an additional 435 MW gas fired power plant in the same area (Heron II). The unit is expected to start test operations by the end of 2009, and to be fully operational by early 2010. In June 2009 TERNA and international operator GDF SUEZ announced that they had secured all necessary permits from the Greek authorities for the establishment of a 50/50 JV that will own Heron I and Heron II. TERNA has also applied for an 830–900 MW gas fired unit in Lamia (Heron III) as well as an 840–1160 MW natural gas fired unit in Euboea (Heron V) in place of a previously planned coal fired unit. The latter is blocked due to the decision of the Greek government to steer away from coal and nuclear energy (see above).<sup>72</sup>

### **Peak Units**

***Overview***: Natural gas demand in the Greek power generation sector can rise even further with the spread of gas fired peak units. RAE and HTSO reportedly favour such units, and aim to incentivize their construction through the offered SMP. Maximum size per peak unit is expected to be at the level

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<sup>71</sup> Energia.gr, *Η Επιτροπή Ανταγωνισμού εγκρίνει την σύσταση κοινής επιχείρησης Χαλκουργικής – ΔΕΗ*, 1 June 2009, [www.energia.gr](http://www.energia.gr)

<sup>72</sup> Information from TERNA, *GEK TERNA and GdF Suez enter into a partnership in the Greek power generation market*, 18 December 2008, [www.terna.gr](http://www.terna.gr); and Capital.gr, *ΓΕΚ ΤΕΡΝΑ: προωθεί μονάδα φυσικού αερίου στην Εύβοια*, 11 June 2009, [www.capital.gr](http://www.capital.gr)

of 150 MW, but there is no envisaged ceiling to total combined capacity. Both state-owned PPC and private investors have expressed their interest in the construction of peak units. RAE forecasts that almost 35 per cent of total electricity production in the country will come from natural gas by the end of 2010, compared to only 16 per cent as recently as 2005.<sup>73</sup>

**Table 8: Operational and planned gas-fired power generation in Greece  
(excluding peak units)**

Company	Site	County	Type	On-Stream Date	Status	Capacity (MW)
Edison/Hellenic Petroleum	Thessaloniki	Thessaloniki	CCGT	2005	operational	390
Edison/Hellenic Petroleum	Thisvi	Viotia	CCGT	2010	planned	421
Edison/HE&D/PFI	Nea Karvali	Kavala	CCGT	TBC	planned	440
EGL	Tithorea	Fthiotis	CCGT	2013	planned	153
Enel/Prometheus	Alexandroupolis	Evros	CCGT	TBC	planned	440
Enel/Prometheus	Livadia	Viotia	CCGT	2011	planned	447
Mytilineos/Endesa	Aghios Nikolaos	Viotia	CHP	2008	operational	334
Mytilineos/Endesa	Aghios Nikolaos	Viotia	CCGT	2010	planned	444
Mytilineos/Endesa	Volos	Magnesia	CCGT	2012	planned	437
Mytilineos/Motor Oil	Aghii Theodori	Corinth	CCGT	2011	planned	437
PPC	Aghios Georgios 8	Attica	Open cycle	1997	phased out	160
PPC	Aghios Georgios 9	Attica	Open cycle	1998	phased out	200
PPC	Aliveri V	Euboea	CCGT	2011	planned	417
PPC	Komotini	Rodopi	CCGT	2001	operational	495
PPC	Lavrio 3	Attica	Open cycle	1998	phased out	180
PPC	Lavrio 4	Attica	CCGT	1999	operational	560
PPC	Lavrio 5	Attica	CCGT	2006	operational	385
PPC	Megalopolis V	Arcadia	CCGT	2013	planned	811
PPC/Halyvourgiki	Elefsis	Attica	CCGT	TBC	planned	880
TERNA	Mantoudi	Euboea	TBC	TBC	planned	840
TERNA	Domokos	Fthiotis	TBC	TBC	planned	830
TERNA	Thiva	Viotia	CCGT	2010	planned	435
TERNA	Thiva	Viotia	Open cycle	2004	operational	147

*Source:* Interpreted by the author based on information from operating power companies and local media sources ; information on PPC units from Dimitris Papakonstantinou, *PPC Business Plan 2009–2014*, Paper presented at the ‘Greek–Albanian Cooperation in the Energy Sector’, Tirana, January 2009, [www.iene.gr](http://www.iene.gr)

<sup>73</sup> Energia.gr, *Η ώρα των αιχμακόν μονάδων παραγωγής*, 2 September 2008, [www.energia.gr](http://www.energia.gr)

## ***Greek demand fundamentals remain strong in the residential sector***

Despite a drop in natural gas consumption in Greece's residential sector in late 2008, demand fundamentals remain strong, and the decline should be seen within the framework of the global financial crisis (consumption of electricity and oil products similarly saw negative growth in the same period in Greece). Even so, household connections to the Greek gas system actually increased, as did residential gas demand, reaching approximately 534 mcm in the year 2008, up 10.4 per cent compared to the 484 standard mcm in the year 2007.

Sales of natural gas in the EPA of Attica in 2008 were up by a similar factor of approximately 10°per°cent compared to the previous year, while applications and/or requests for new connections climbed by more than 60 per cent y-o-y in the same period, to some 18,650 cases from approximately 11,400 in 2007.<sup>74</sup> Households and small business connected to the national gas system as of end-2008 in Attica are estimated at about 170,000, while preliminary data for the period January to June 2009 refer to an estimated 193,000 households in the region, as well as 5,000 commercial and more than 400 large commercial customers. What is more, EPA of Attica is continuing to offer incentives targeting further residential sector penetration, such as offers for households to switch to cooking with natural gas instead of electricity,<sup>75</sup> and also reduced rates for new connections to its grid.<sup>76</sup>

Demand growth for 2008 in the area of Thessaloniki (the second largest city in Greece, after the capital Athens) was comparable, with the local EPA seeing incremental sales in the order of 9.6°per°cent compared to 2007.<sup>77</sup> Significantly, Thessaloniki saw a 20.34 per cent increase in sales volumes between the first half of 2008 and the first half of 2009 as a result of new clients coming online, while new contracts signed in the same period reached a total of 6,306.<sup>78</sup> Like Attica, Thessaloniki enjoys a vibrant natural gas market of 113,943 households (data for January to June 2009) while the local EPA is pushing forward with discount connection packages to support further penetration. These packages typically offer discounts in connection fees in the order of 50 per cent, but can even be as high as 84 per cent on certain occasions.<sup>79</sup> In contrast, Thessaly is by far the least dynamic of the three EPA areas, with the gas network largely still under development. Accordingly,

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<sup>74</sup> Ta Nea, *Πατάει γκάζι το φυσικό αέριο*, 31 December 2008, [www.tanea.gr](http://www.tanea.gr)

<sup>75</sup> Ta Nea, *Επιδοτούν το μαγείρεμα νε φυσικό αέριο*, 4 June 2009, [www.tanea.gr](http://www.tanea.gr)

<sup>76</sup> Energia.gr, *ΕΠΑ Αττικής:σημαντικές εκπτώσεις και προσφορές για τη χειμερινή περίοδο*, 1 October 2009, [www.energia.gr](http://www.energia.gr)

<sup>77</sup> DEPA, *Annual Report 2008*, [www.depa.gr](http://www.depa.gr)

<sup>78</sup> Naftemporiki, *Αυξήθηκαν κατά 20.34% οι πωλήσεις φυσικού αερίου*, 22 July 2009, [www.naftemporiki.gr](http://www.naftemporiki.gr)

<sup>79</sup> Naftemporiki, *Αυξήθηκαν κατά 20.34% οι πωλήσεις φυσικού αερίου*, 22 July 2009, [www.naftemporiki.gr](http://www.naftemporiki.gr)

annual sales in 2008 increased y-o-y by only about 3.4 per cent, roughly one third of the Thessaloniki and Attica percentage increment.<sup>80</sup>

An additional 150,000 connections are envisaged to come online in the planned new EPA areas, namely in central Greece and Evia, central Macedonia, and eastern Macedonia–Thrace. However, there have been some hold-ups in the tendering of the planned EPAs, partly as a result of reported delays in the EU approval process for exclusive 20 year access rights for the new operators, as requested by DEPA. As of late 2009, the Greek operator is at the stage of selecting the tender advisors, and should be moving forward with the actual tenders once this process is completed, and it has also received requested clarifications from the EU.<sup>81</sup>

DEPA expects connection of these areas to the Greek gas system in 2011, while the Greek government is reportedly targeting a total of 85,000 households to connect to the NNGS by year end, rising to a total of 250,000 households by the end of 2010.<sup>82</sup> Italian ENI through subsidiary Italgas, GDF SUEZ, and Spanish Gas Natural have all expressed an initial interest, making no further commitments at this stage. EPA of Attica has also expressed its interest, with reference to the management of the new EPA of Central Greece, provided the government puts in place incentives for consumers to switch to gas from their current use of oil products.<sup>83</sup>

However, there may be significant further delays in the expansion of the network to the new EPA regions, due to the economic recession and financial crisis, as well as to the relatively unattractive markets involved. EU and government incentives that may be introduced – such as exclusive distribution rights for a certain period of time, supply discounts, and/or assuming part of the connection costs for consumers – are likely to make a difference for potential investors. By the same token, actual penetration/gas consumption in these three regions and beyond will probably be dependent on the pricing of the fuel in comparison to traditional energy source, notably heating oil. At the time of writing, there is no firm indication as to where the new government stands on these issues.

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<sup>80</sup> DEPA, *Annual Report 2008*, [www.depa.gr](http://www.depa.gr)

<sup>81</sup> See the interview of Makis Papageorgiou, CEO of DEPA, with Imerisia, 26 July 2009, [www.imerisia.gr](http://www.imerisia.gr)

<sup>82</sup> Kathimerini, K. Χατζηδάκης: «Φυσικό αέριο σε 250,000 νοικοκυριά μέχρι το 2010», 28 May 2009, [www.kathimerini.gr](http://www.kathimerini.gr)

<sup>83</sup> Energia.gr, *Ενδιαφέρον της ΕΠΙΑ Αττικής για την Στερεά Ελλάδα*, 11 March 2009, [www.energia.gr](http://www.energia.gr)

## ***Wholesale and retail pricing of natural gas in the Greek market***

Pricing for industrial users with annual consumption below 100 GWh is calculated on the (calorific) basis of the price of low sulphur HFO, plus excise tax and retail margins. Prices are offered to customers on a differentiated basis, depending on consumption levels, location of units in question, and substitution threat. Pricing for co-generation units with annual consumption not exceeding 100°GWh is based on the commodity plus capacity charges minus discounts (again, on a calorific basis).<sup>84</sup> The commodity charge is proportionate to consumption levels, and is expressed partly in euros and partly in US dollars. The capacity charge is calculated on the basis of load fluctuation on maximum daily consumption for the year. Discounts are offered on the basis of respective levels of consumption. Pricing for commercial customers with annual consumption of up to 100 GWh is based on the retail price of heating oil, with natural gas being offered at rates ranging between 65 per cent and 90 per cent of ex-refinery prices of heating oil on a calorific basis, plus excise tax. Pricing for autogas CNG depends on the final price of its main competitive fuel, motor diesel.

Retail pricing of natural gas in Greece is liberalized, with EPAs enjoying the right to set gas prices freely in their respective markets, but in accordance with the initial framework agreement with the Greek government. The latter determines maximum annual income levels for the operating companies, in order to balance the fact that EPAs enjoy a complete monopoly over their respective markets. Retail prices are subject to excise tax and VAT. In accordance with this framework, the EPA of Attica – managed by the Duke Energy/Shell Gas JV – sells natural gas to non-commercial retail customers at a discount of 20 per cent off concurrent ex refinery heating oil prices. This strategy aims to hedge pricing risks for existing and potential customers, in order to render the fuel more attractive compared to oil products, and thus allow substitution to proceed more rapidly. The JV reportedly aims to achieve an ambitious 80 per cent coverage rate of eligible customers in the next decade, from the current base of approximately 30 per cent.

However, in September 2008 the Athens Chamber of Small and Medium Sized Industries protested against natural gas price hikes for its members which exceeded the rate of increase for comparable oil products. The Chamber linked the phenomenon with the monopoly status enjoyed by EPA of Attica, and accordingly asked for the intervention of the (then) Ministry of Development and of RAE.<sup>85</sup> Since 2006 EPA Attica has reportedly reduced available discounts to Small and Medium Industries, in an attempt to decrease price differentials with larger clients. These industries in fact enjoyed a

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<sup>84</sup> Information from DEPA, *Pricing policy*, June 2009, [www.depa.gr](http://www.depa.gr)

<sup>85</sup> BEA, *Καταγγέλλεται η τιμολογιακή πολιτική της εταιρείας παροχής αερίου Αττικής ΑΕ*, 3 September 2008, [www.acsmi.gr](http://www.acsmi.gr)

28°per°cent discount compared to heating oil and 48 per cent compared to motor diesel. This was reduced in 2007 to 19 per cent (heating oil) and 41.5 per cent (motor diesel), and in 2008 to some 10°per cent (heating oil) and 35 per cent (motor diesel).<sup>86</sup>

If this trend continues, the substitution rate in favour of natural gas could decelerate, while at the same time raising important questions as to the efficiency of the present monopoly structures of the Greek gas market. However, substitution remains likely to continue at a relatively rapid pace in Greece, in light of the still competitive pricing for the fuel (albeit since late 2008/early 2009 this has reduced in relative terms) as well as the expected rise in crude oil and product prices in the coming months and years.

In contrast to the EPA of Attica, the EPAs of Thessaloniki and of Thessaly – both managed by Italian major ENI – follow a cost-plus pricing policy. Specifically, the Italian operator applies a fixed profit margin on wholesale supply prices, which is readjusted annually. Wholesale prices for the Greek EPAs – including of course those at Thessaloniki and Thessaly – depend on international gas prices incurred by wholesaler DEPA. The latter are in turn calculated in relation to oil prices with a 6 month time lag. Therefore, retail gas pricing in Thessaloniki and Thessaly is more directly linked to concurrent international gas prices and ensuing supply costs. In this context, wildly fluctuating crude and product prices between the first quarters of 2008 and final quarter of 2008/first quarter of 2009 resulted in retail prices of T2 and T3 gas in Thessaloniki and Thessaly exceeding concomitant heating oil prices by up to 20 per cent at the final quarter of 2008 and first quarter of 2009. Ad hoc pressure groups were accordingly established in March 2009 in Thessaloniki, asking the government to intervene and to force ENI to price gas consistently at 20 per cent below heating oil prices.<sup>87</sup>

RAE, which has de facto oversight over gas pricing in Greece, concluded in February 2009 that there is nothing irregular in the pricing policy of the respective EPAs, and affirmed their right to follow independent pricing policies.<sup>88</sup> In contrast, in May 2009 the Greek Ombudsman asked RAE to introduce an obligation of more transparent pricing for EPAs, including an obligation of the latter to make sufficient information available to their customers to allow direct comparison of their pricing structures with competitive fuels.<sup>89</sup>

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<sup>86</sup> Express, *Ασύμμετρες οι αναπροσαρμογές στις τιμές του φυσικού αερίου*, 4 September 2008, [www.express.gr](http://www.express.gr)

<sup>87</sup> Energia.gr, *Συγκυριακές οι ανατιμήσεις για το φυσικό αέριο στη Βόρεια Ελλάδα, εκτιμά η ΡΑΕ*, 27 February 2009, [www.energia.gr](http://www.energia.gr)

<sup>88</sup> ΡΑΕ, *Ανακοίνωση αναφορικά με το θέμα τιμών φυσικού αερίου στις περιοχές Θεσσαλονίκης και Θεσσαλίας*, 9 February 2009, [www.rae.gr](http://www.rae.gr)

<sup>89</sup> Energia.gr, *Συνήγορος του Πολίτη: παρέμβαση για τα τιμολόγια φυσικού αερίου*, 15 May 2009, [www.energia.gr](http://www.energia.gr)

Against this backdrop, the (then) Ministry of Development decided to grant all available discounts through DEPA to EPAs in March and April 2009 to cushion any negative impact on customers.<sup>90</sup> This suggests that the then conservative government was willing to intervene to ensure the competitiveness of natural gas against oil products, and thus support the fuel's further penetration in the Greek energy mix, at the expense of oil. At the same time though, it implied that without the government's explicit support (including with reference to connection costs) penetration of the fuel into the residential sector could face setbacks in the future. The market now awaits clear signals from the new socialist administration as to where it will stand on, and how it intends to deal with, such issues.

### ***Increasing CNG usage to support natural gas penetration in the Greek market***

DEPA actively supports penetration of CNG into the country's motor fuel mix, as it sees substantial market opportunities in that context. Indeed, the Greek motor fuel mix remains largely confined to traditional fuels such as gasoline for the passenger car fleet, and motor diesel for commercial vehicles, thus leaving ample room for substitution. Against, this backdrop, in January 2001, DEPA introduced the country's first CNG refuelling stations in Ano Liossia, followed by a second one at Anthoussa in January 2006 – both sites being located in the capital region of Greater Athens.<sup>91</sup> Economic benefits from substitution seem to be more obvious for commercial vehicles, due to the high mileage of such vehicles. Ano Liossia and Anthoussa thus primarily serve the needs of the capital's gas-fuelled public transport bus fleet, estimated to be approximately 20 per cent of the total public transport bus fleet in the city. For the moment, the total Greek vehicle fleet running on CNG consists only of the 416 buses of Thermal Buses ETHEL SA in Athens, and an additional 106 waste collection vehicles – also based in Greece's capital – that form part of a related pilot scheme. However, the company is planning to upgrade Anthoussa in the near future in order to be able to supply non-commercial vehicles as well (and also to potentially expand operations to new locations in broader Athens) while also planning to establish a new refuelling station in the second city of Thessaloniki in order to supply public transport vehicles in the local market.

In addition, DEPA has submitted a number of action plans and proposals for consideration by the Greek government, targeting increased penetration in the country's vehicle fleet, and aiming to cover vehicles operated or used in the broader public sector. The plans propose to treat gas-fuelled vehicles as hybrids for tax purposes, to reduce requirements for related power engine capacity with regard to taxis (the Greek government has already agreed to this request for smaller engine taxis of 1,300<sup>o</sup>cc)

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<sup>90</sup> Energia.gr, *Λύση για φθηνότερο φυσικό αέριο για τη Β. Ελλάδα*, 13 March 2009, [www.energia.gr](http://www.energia.gr)

<sup>91</sup> Information from DEPA, *Annual Report 2008*, [www.depa.gr](http://www.depa.gr)

and also to arrange co-financing under the National Strategic Reference Framework (NSRF) 2007–13 for projects facilitating penetration of gas fuelled vehicles in the Greek market (such as waste vehicles in local authorities). The former conservative administration was reportedly considering the expansion of the pilot scheme to all waste collection vehicles and taxis in Athens, but the direction to be followed on the matter by the socialist government that emerged in the early election of 4 October remains to be determined.<sup>92</sup> Finally, DEPA is reportedly exploring the possibility of cooperation with downstream oil operators to develop CNG infrastructure in the country’s extensive retail motor fuel network. CNG could also be used in the supply of the Greek islands and other remote regions.<sup>93</sup>

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<sup>92</sup> For more information on the matter see also Hellenic Ministry of Transport and Communications, *Σημεία ομιλίας από το χαιρετισμό του Υπουργού Μεταφορών και Επικοινωνιών*, 3 June 2008, [www.yme.gr](http://www.yme.gr); and Ta Nea, *Πράσινο στα «πράσινα» IX*, 23 February 2007, [www.tanea.gr](http://www.tanea.gr)

<sup>93</sup> See, for example, Imerisia, *Πρατήρια φυσικού αερίου θα κατασκευάσει η ΔΕΠΑ*, 27 May 2008, [www.imerisia.gr](http://www.imerisia.gr)

## Supply Prospects for Albania and Greece to 2015

### *Natural gas supply options for Albania*

Albania has no access to foreign natural gas supplies as it lacks the necessary interconnection infrastructure. In this context, it relies exclusively in its small – and declining – natural gas production to cover local needs. However, these volumes are insufficient to meet current and future power generation and industrial needs for natural gas, let alone to allow for the further diversification of Albanian primary energy sources through penetration of the fuel to the country's residential sector (see above).<sup>94</sup>

Tirana is thus pushing for the implementation of a regional energy policy that would allow its relatively rapid gasification, and it accordingly promotes Albanian participation in a number of planned international pipeline projects. Successful implementation will offer Tirana the additional advantage of putting Albania on the global energy map of energy transit countries. In this framework, Albania has four broad supply options for its gasification:

1. Supply from the northern Balkan region (Croatia, Bosnia, Montenegro) through the Ionian–Adriatic Pipeline/Energy Community Gas Ring (IAP/ECGR) project.
2. Supply from the southern Balkan region (Turkey, Greece) through the TAP and/or ITGI projects.
3. Supply from the eastern Balkan region (Bulgaria, former Yugoslav Republic of Macedonia) through ECGR.
4. Supply from one or more LNG terminals on the country's Adriatic coast.

Tirana reportedly considers the IAP and TAP projects to be the most conducive for the country's gasification. IAP of course aims at facilitating northwards exports from TAP but the Albanian government would arguably see merit in its redesign/construction as a two-way pipeline. Moreover, the government would be willing to lend its support towards construction of greenfield LNG terminals in Albania, provided the country does not have to pay full market prices and/or there are no cheaper supply alternatives. Furthermore, to make its bid more competitive, Tirana is actively promoting the development of natural underground gas storage in its territory, as local geology offers such natural reservoirs in western and central Albania. The most notable examples are a salt dome in Dumrea with an estimated storage capacity of approximately 1–2 bcm, as well as the depleted Divjaka gas field

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<sup>94</sup> Information from Stavri Dhima, *Prospects for the Introduction of Natural Gas in Albania*, Paper presented at 'Greek–Albanian Cooperation in the Energy Sector', Tirana, January 2009, [www.iene.gr](http://www.iene.gr)

which reportedly could be converted into a storage facility of up to 1 bcm. The government authorities in Tirana are accordingly highlighting the importance of Albanian underground gas storage as an inexpensive means of helping the broader region hedge against problems such as peak demand and seasonal variations.

In contrast, the Albanian bid for gasification suffers from a number of disadvantages, most notable among them being the country's low price environment. What is more, there is no evidence at this time to suggest that the Albanian government is willing – or indeed able – to move to a direction whereby natural gas and electricity prices in the Albanian market will rise to a level more reflective of actual import and production costs, for example by offering direct support to sensitive socio-economic groups that would be most affected by the existence of a relatively high price environment.

In November 2009 the Albanian energy regulator rejected the application of local utility OSSH, a 76 per cent owned subsidiary of CEZ since March 2009, for an increase in electricity prices of the order of 20–23% per cent, from January 2010. The regulator reportedly based its rejection of OSSH's application on disagreements concerning the level of energy losses in the network.<sup>95</sup> The latter is one of the most important problems facing the electricity market in Albania (along with theft and non-payment of electricity bills) and CEZ targets reduction to the level of 14 per cent by 2014, from the current official estimate of 32 per cent.<sup>96</sup>

In this negative market context, price increases were also requested by Albanian power producer KESH, but the Albanian regulator has instead decided to move forward with more limited and gradual increases during 2010–14. What is more, it still remains unclear whether these increases will be at the lower end of the envisaged range – approximately 8 per cent – or closer to 15 per cent.<sup>97</sup>

This rather unfavourable regulatory framework inescapably renders the Albanian gas market somewhat less interesting to foreign investors. What is more, this problem is further aggravated by the lack of obvious alternative markets which could act as the main market in place of Albania in the broader Balkan region, as in general the region suffers from relatively low prices and market fragmentation.<sup>98</sup> The Energy Community of South East Europe is of course a step in the right

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<sup>95</sup> ISI Emerging Markets, *Energy Regulator Rejects OSSH Request for 23% Hike*, 4 November 2009, [www.securities.com](http://www.securities.com)

<sup>96</sup> ISI Emerging Markets, *Electricity Distributor OSSH Initiates Debt Collection Campaign*, 20 October 2009, [www.securities.com](http://www.securities.com)

<sup>97</sup> ISI Emerging Markets, *Power Utility KESH Seeks Electricity Price Hike in 2010*, 29 October 2009, [www.securities.com](http://www.securities.com)

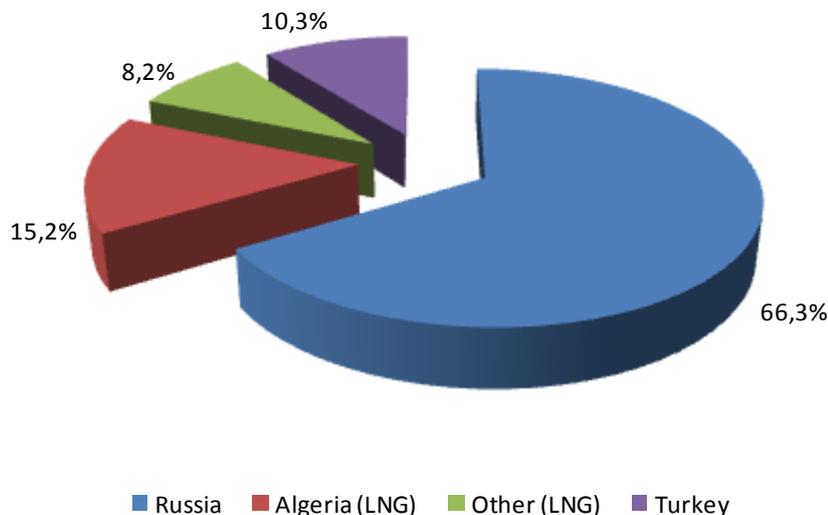
<sup>98</sup> For example Serb utility EPS is claiming that a 20% increase in prices was necessary in 2010 in order for the company to avoid major losses, with price hikes in the order of 30% and above needed to render the company in fact profitable; for more information on this matter see ISI Emerging Markets, *Power Utility EPS to Seek Electricity Price Hike of at Least 20% in 2010*, 13 October 2009, [www.securities.com](http://www.securities.com)

direction, but not enough progress has yet been made to offset the very real difficulties governments and operating companies have to face on the ground. The current state of the Albanian market (in both pricing and regulation) combined with the lack of clear positive prospects for both it and for the broader region, thus have the potential to undermine energy investments in the Balkan countries, to the detriment of the government's plans at diversification of supply.

### ***Current natural gas supply options for Greece***

2007 saw natural gas demand exceed relevant contracted supply volumes for the first time in Greece, reaching the level of approximately 4.05 bcm, compared to only 3.93 bcm of contracted volumes for that year. Russian gas accounted for 66.3 per cent of total Greek natural gas supplies in 2008, followed by LNG of Algerian and other unspecified origin with some 23.4 per cent, and Turkey with approximately 10.3 per cent. However, this distribution masks the level of Greek dependence on Russian imports. Natural gas volumes coming from Turkey are for the most part probably Russian supplies through Blue Stream, as Turkish upstream production is minimal and Ankara itself remains heavily dependent on imports (see Figure 7).

**Figure7: Actual natural gas imports by source in Greece – 2008**



Source: Spiros Paleoyannis, *The Greek Natural Gas Market and International Interconnections*, Paper presented at the 'Greek – Albanian Cooperation in the Energy Sector', Tirana, January 2009, [www.iene.gr](http://www.iene.gr)

DEPA has signed long term supply contracts with Russia's Gazprom; Algeria's Sonatrach; and with the Petroleum Pipeline Corporation of Turkey (BOTAS). The contract with Gazprom – specifically with its export subsidiary Gazexport – runs to 2016 and provides for the supply of DEPA with gas

volumes of up to some 3 bcm/y, through the existing Bulgaria–Greece pipeline.<sup>99</sup> The contract with Sonatrach runs to 2020 and covers between 0.51 and 0.68 bcm/y though LNG deliveries to Greece’s Revithoussa terminal. Finally, contractual obligations of BOTAS to the Greek side run to 2022 and provide for the supply of DEPA with (mostly resold) natural gas through the TGI link. The BOTAS contract provided for volumes of up to 0.25 bcm for the first year of its implementation (2007); for up to 0.5 bcm for its second year (2008); and for up to some 0.75 bcm/y from 2009 onwards (see Tables°9–11).

**Table 9: Natural gas volumes contracted to DEPA in 2007**

Supplier	Country	Maximum volumes (bcm/y)
Gazprom	Russia	3.00
Sonatrach	Algeria	0.68
BOTAS	Turkey	0.25
<b>Total maximum volumes contracted to DEPA for 2007</b>		<b>3.93</b>

Source: Spiros Paleoyannis, *The Greek Natural Gas Market and International Interconnections*, Paper presented at the ‘Greek–Albanian Cooperation in the Energy Sector’, Tirana, January 2009, [www.iene.gr](http://www.iene.gr)

**Table 10: Natural gas volumes contracted to DEPA in 2008**

Supplier	Country	Maximum volumes (bcm/y)
Gazprom	Russia	3.00
Sonatrach	Algeria	0.68
BOTAS	Turkey	0.50
<b>Total maximum volumes contracted to DEPA for 2008</b>		<b>4.18</b>

Source: Spiros Paleoyannis, *The Greek Natural Gas Market and International Interconnections*, Paper presented at the ‘Greek–Albanian Cooperation in the Energy Sector’, Tirana, January 2009, [www.iene.gr](http://www.iene.gr)

**Table 11: Natural gas volumes contracted to DEPA from 2009 onwards**

supplier	Country	Maximum volumes bcm/y	Expiration date
Gazprom	Russia	3.00	2016
Sonatrach	Algeria	0.68	2020
BOTAS	Turkey	0.75	2022
<b>Total max. volumes contracted to DEPA 2009–16</b>		<b>4.43</b>	
<i>Total max. volumes contracted to DEPA 2016–20</i>		<i>1.43</i>	
<i>Total max. volumes contracted to DEPA 2020–22</i>		<i>0.75</i>	

Source: Spiros Paleoyannis, *The Greek Natural Gas Market and International Interconnections*, Paper presented at the ‘Greek – Albanian Cooperation in the Energy Sector’, Tirana, January 2009, [www.iene.gr](http://www.iene.gr)

<sup>99</sup> The agreement with Gazprom provides for maximum supply of almost 3 bcm/y of contract/standard natural gas, namely cubic meters with gross calorific value of 9,000 kcal at 20 °C, equal to the level of 2.8 Nm<sup>3</sup> (the author is indebted to Spiros Paleoyannis for this clarification).

Potential supply of contractual natural gas volumes thus added up to a maximum total of 4.18 bcm in 2008, with contractual volumes rising to some 4.43 bcm/y for the period 2009–16. However, from that point to 2020, they fall to some 1.43 bcm/y in total maximum volumes, as the contract with Gazprom expires, and even more from then to 2022, as the contract with Sonatrach also comes to an end. For the period after 2022, Greece has as yet no secured gas volumes (see above). The declining rate of contracted gas supplies after 2016 is a cause of concern for the Greek side, accentuated by the fact that last year the country was once more close to running out of gas, even with all contracted volumes being made available to DEPA. Indeed, while contractual natural gas volumes added up to a maximum total of 4.18 bcm in 2008, actual natural gas demand in Greece in the same year was at the level of 4.22 bcm.

Arguably, the supply and demand balance would have been highly problematic if the global economic downturn and other related factors hadn't started to take their toll on the Greek economy late that year, affecting gas demand and forcing it to a violent contraction in the fourth quarter of 2008, when there was a y-o-y decline of 24.5 per cent. This was further accelerated in the first quarter of 2009, when there was a decline of 35.9°per cent y-o-y. For example, a number of gas-fired power generation units were out of use at the time, either as a result of prolonged maintenance (Aluminium of Greece, Thessaloniki Power) or because of the competitive pricing for oil products achieved by that time due to a substantial drop in international crude prices from their mid-2008 highs, combined with increases in natural gas prices (which were based on the oil highs of previous months, due to the time lag in their price linkage). The latter naturally pushed PPC to opt for more oil-based power generation, at the expense of gas-fired units.<sup>100</sup>

At the same time, DEPA proved successful in securing additional LNG cargoes from the spot market, thus ameliorating the Greek supply position and improving further the ensuing supply/demand balance for the country. This strategic importance of LNG for Greece became even more marked in January 2009, as a result of the natural gas crisis between Russian Gazprom and Ukrainian operator Naftogaz. Supplies of natural gas to the country were accordingly interrupted for a period of time exceeding three weeks, from both the Bulgarian and Turkish entry points. Against this backdrop, DEPA and DESFA proved successful in covering maximum daily demand requirements of 12 mcm,

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<sup>100</sup> Information from Alexey Biteryakov, *Natural Gas Market of SE Europe: Gazprom Export's View*, Paper presented at the '3<sup>rd</sup> South East Europe Energy Dialogue', Thessaloniki, June 2009, [www.iene.gr](http://www.iene.gr)

thus minimizing consequences for Greek consumers, through full utilization of the sent out capacity of Revithoussa and also by securing additional spot LNG cargoes, mainly from GDF SUEZ and British Gas. As a result, the country was even able to export volumes to Bulgaria, which was suffering from shortages due to the crisis.<sup>101</sup>

### ***Scope for additional gas volumes for Greece through existing interconnections***

Prometheus Gas S.A., a 50/50 JV between the Greek Copelouzos Group and OAO Gazprom subsidiary Gazprom Export Ltd., claims to have secured an additional 3.1 bcm/y of Russian gas, rising to some 7 bcm/y from 2016 onwards. In accordance with the provisions of Law 2299/1995, Prometheus Gas has the right to supply natural gas to the Greek market as long as DEPA has disposed of all its annually contracted quantities. However, the latter can of course be problematic, in terms of proving that this is the case in time for Prometheus Gas to supply the market.<sup>102</sup>

In 2008, Gazprom supplied Greece with an additional 200 mcm, up from approximately 150 mcm the previous year. Furthermore, in 2008 the Greek government sought to set the basis for the renewal of the supply agreement at increased volumes (possibly at the level of some 5 bcm/y) with Russia for the period 2016 to 2040. Nevertheless, the possibility of a positive outcome for Athens has been marred by potential supply constraints on the Russian side (which has contractual obligations with a broader client list which extends across Europe and, increasingly, Asia) combined with lack of progress in a number of issues of interest to Moscow (relating to the previous intergovernmental supply agreement between Greece and the then USSR).

This agreement includes the construction by the Russian side of two hydro power plants at Sykia and Peukofyto on Acheloos River, as well as a new compressor station at N. Mesimbria, Thessaloniki for the EPC. Even though the latter is no longer an issue for the two sides, thanks to the €53.4 m contract which was offered to Stroytransgaz and Prometheus Gas in December 2008 (see above) Sykia and Peukofyto remain points of contention. The diversion of Acheloos River and development of associated infrastructure has in any case been marred with numerous delays in past years.

Indeed, the projects at Acheloos River have been in legal limbo since as early as 1994, following planning objections from a number of environmental and other local groups which were submitted to

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<sup>101</sup> For more details on the unfolding of the Russo–Ukrainian gas crisis and its impact on Greece (and neighbouring Bulgaria) see for example Energia.gr, *Περικοπές στη ροή ποσοτήτων φυσικού αερίου και προς την Ελλάδα*, 5 January 2009, [www.energia.gr](http://www.energia.gr); Energia.gr, *Ξεκίνησε η ροή φυσικού αερίου από την Ελλάδα προς τη Βουλγαρία*, 19 January 2009, [www.energia.gr](http://www.energia.gr); and Energia.gr, *Σε τρεις πηγές και πάλι ο εφοδιασμός της χώρας σε φυσικό αέριο*, 24 January 2009, [www.energia.gr](http://www.energia.gr).

<sup>102</sup> For more on this supply agreement see Prometheus Gas, *Activities – Natural Gas Supply*, [www.prometheusgas.gr](http://www.prometheusgas.gr)

the State Council of Greece. The previous conservative government of Greece projected completion by 2012, even though this may prove to be a rather optimistic deadline.<sup>103</sup> Instead of issuing a binding decision on the matter, in October 2009 the State Council referred the case to the Court of Justice of the European Communities, asking for a preliminary ruling on a number of related issues, thus leading to substantial further delays for the project. In any case, a final decision on the matter by the Court of Justice of the European Communities is not expected before the first half of 2011.<sup>104</sup>

Gazprom seems to be walking a fine line on this issue. On one hand, it applies pressure on the Greek side by not agreeing to supply additional gas volumes until it secures its other interests relating to infrastructure development in Greece. At the same time, the Russian company does not want to expose itself to excessive risk in its key target of securing markets for the additional gas flows that will come through South Stream, in the face of growing LNG competition.

Gazprom has in any case openly discussed its willingness to sell more gas to Greece, if the additional volumes were to be directed to Prometheus Gas, and thence probably to an Enelco subsidiary power generation unit which is under construction in Viotia (see Table 8). Such a framework would also be in accordance with the business model of more active downstream involvement which the Russian company is following in other markets.<sup>105</sup> For example, in 2009 Gazprom reached an agreement with natural gas retailer Bosphorus Gas of Turkey to acquire a majority stake, while it is also in cooperation negotiations with Aksa Enerji with respect to ongoing electricity privatization and natural gas trading opportunities (among others) in the country.<sup>106</sup> Against this backdrop, in October 2009 the Russian company expressed its interest in swapping the Sykia and Peukofyto projects with other power generation projects in Greece, if the latter cannot move forward due to the abovementioned difficulties.<sup>107</sup>

In 2008, DEPA negotiated with Turkish operator BOTAS the expansion of their supply agreement from a maximum 500 mcm/y to the level of a maximum 750 mcm/y, which it achieved with 2009 as its starting point (see Tables 10 and 11). The Turkish company enjoys a resale right with reference to gas exported to Greece, rather than merely receiving transit fees for access to its gas network. Local media reports in early 2009 suggested that the Greek side will receive an additional 1 bcm/y through

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<sup>103</sup> Information available in Imerisia, *Εκτροπή του Αχελώου στη Θεσσαλία μέχρι το 2012*, 10 April 2009, [www.imerisia.gr](http://www.imerisia.gr)

<sup>104</sup> See Kathimerini, *Έως δύο έτη «πάγωμα» στον Αχελώο*, 14 October 2009, [www.kathimerini.gr](http://www.kathimerini.gr)

<sup>105</sup> See the interview of Sergei Komlev, Head of Contract Structuring and Price Formation Directorate of Gazprom Export, with Energia.gr (Energia.gr, *Μεγάλο το ενδιαφέρον της Gazprom για την εγχώρια αγορά*, 20 March 2009, [www.energia.gr](http://www.energia.gr))

<sup>106</sup> See Energia.gr, *Η Gazprom απέκτησε το 51% της τουρκικής Bosphorus Gaz*, 22 August 2009, [www.energia.gr](http://www.energia.gr); also ISI Emerging Markets, *Aksa Enerji still in cooperation talks with Russian Gazprom*, 14 September 2009, [www.securities.com](http://www.securities.com)

<sup>107</sup> Imerisia, *Μονάδες ηλεκτρισμού επιδιώκει η Gazprom*, 21 October 2009, [www.imerisia.gr](http://www.imerisia.gr)

TGI from Azerbaijan from 2010 onwards, and for at least a five year period. The gas will be delivered by the State Oil Company of the Azerbaijani Republic (SOCAR) to DEPA at its point of entry to neighbouring Georgia, and will reach Greece via Turkey.<sup>108</sup>

The main difference to the current supply agreement is that BOTAS will no longer enjoy a resale option for the Azeri export volumes, but will only receive transit fees. However, Greece and Azerbaijan have so far failed to reach a final agreement with Turkey on the matter, and the bilateral agreement thus remains unrealized until that point.

### ***New interconnections face delays, are marred with uncertainty***

#### **Introduction**

Besides perceiving it as a necessary means of meeting increasing natural gas demand in Greece, Athens sees in new natural gas interconnections a unique opportunity to appear on the European energy map and, through that, to gain influence over the broader region. Planned natural gas pipelines include the Turkey Interconnector–Greece–Italy (ITGI), the Interconnector Greece–Bulgaria (IGB), South Stream, and the Trans Adriatic Pipeline (TAP). However, all these proposed links have been suffering from delays, relating both to political as well as commercial uncertainties. ITGI and IGB seem to be ahead in the broader pipeline race, while South Stream will probably also be built, even though it may be considerably later than its original schedule. TAP faces a much more uncertain future compared to all other links involving Greece and/or Albania, due to a number of interrelated reasons. The following pages examine each proposed pipeline in further detail.

#### **Interconnector Turkey–Greece–Italy (ITGI)**

In November 2007, the governments of Greece and Turkey inaugurated the first gas link between the two countries. The Turkey–Greece Interconnector (TGI) involved the construction by DEPA/DESFA and BOTAS of a 36 inch natural gas pipeline. The relatively recent activation of the link with Turkey in November 2007 has so far not allowed the system to be tested, and thus its maximum real capacity continues to be estimated by Greek authorities at the level of some 0.7 bcm/y – i.e. on a par with the current contractual obligations of Turkey.

However, SEES estimates real current capacity to stand at some 3 bcm/y, which may be more realistic in this context. In any case, there are plans to expand capacity to some 11.6 bcm/y in the future. The link stretches approximately 297 km from Karabacey in Turkey to Komotini in north-eastern Greece, of which some 210 km lies in Turkey and 87 km in Greece (see Map 2 for its route). The Turkish

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<sup>108</sup> Eleftherotypia, *Αέριο και από το Αζερμπαϊτζάν*, 29 September 2008, [www.enet.gr](http://www.enet.gr)

segment also includes a 17 km subsea section with a maximum depth of 70 m. Table 12 outlines relevant specifications.

**Table 12: Specifications of Turkey–Greece Interconnector (TGI) upon completion**

Section	Length (km)	Diameter (inch)	Capacity (bcm/y)
Turkey	210	36	up to 11.6
Greece	87	36	up to 11.6
<b>Total</b>	<b>297</b>	<b>36</b>	<b>up to 11.6</b>

Source: Spiros Paleoyannis, *The Greek Natural Gas Market and International Interconnections*, Paper presented at the ‘Greek–Albanian Cooperation in the Energy Sector’, Tirana, January 2009, [www.iene.gr](http://www.iene.gr); and other local sources

In June 2008, in Athens, DEPA and Edison signed the establishment of 50/50 JV ‘IGI Poseidon’ for the development of an underwater pipeline connecting the region of Epirus in western Greece with Otranto in Italy (see Map 1 above) with up to 12 bcm/y of carrying capacity (initial capacity of some 8°bcm/y). The aim was to connect the existing TGI with the Italian gas network, thus forming the Interconnector Turkey–Greece–Italy ITGI. The Greek and Italian authorities are also examining the possibility of constructing the planned pipeline as a two-way link. If indeed implemented, this would be in the direction of the proposals by the European Commission for enhanced security of supply in the EU.<sup>109</sup>

Successful completion of the project will require the construction of a 42 inch pipeline from Komotini in the northern Greek region of Thrace, to the Ionian coastline in the western part of the country (Epirus), crossing a total of 570 km – including the existing Greek TGI segment – at a cost exceeding €900 m. In addition, it will require the construction of a 32 inch, 206 km subsea pipeline to Otranto, Italy, approximately 1,400 m deep, at an estimated cost of €500 m. Table 13 below outlines the technical details.

**Table 13: Specifications of Interconnector Greece–Italy (IGI) upon completion**

Section	Length (km)	Diameter (inch)	Capacity (bcm/y)
Greece	570	42	up to 12
Adriatic	206	32	up to 12
<b>Total</b>	<b>776</b>	<b>32–42</b>	<b>up to 12</b>

Sources: Nikos Katsis, *The strategic projects of DESFA in the region of South East Europe*, Paper presented at the ‘3<sup>rd</sup> South-East Europe Energy Dialogue’, Thessaloniki, June 2009, [www.iene.gr](http://www.iene.gr); and other local sources

<sup>109</sup> Energia.gr, *Διπλής ροής και ο αγωγός IGI*, 21 July 2009, [www.energia.gr](http://www.energia.gr)

Construction costs associated with the above-ground part of the pipeline in Greece will be borne by DEPA, while the remaining costs for the subsea section (namely Poseidon Pipeline) are to be shared on an equal footing between DEPA and Italian Edison. In late 2008, the Poseidon consortium made two calls for tenders relating to the construction of the subsea pipeline.<sup>110</sup> Specifically, in October 2008 the consortium called for a €10 m Detailed Marine Survey, in which approximately ten companies expressed an interest. Only six of these companies were finally accepted as valid candidates for this tender, namely as meeting its minimum criteria. By the same token, in December 2008 the consortium called for a Front End Engineering and Design (FEED) of the 206 km pipeline itself, with an estimated cost of some €6 m. A decision on both tenders was anticipated during 2009, with expected completion of the projects in the first half of 2010.<sup>111</sup>

Funding arrangements for these projects will be 25 per cent each for DEPA and Edison, with the remaining 50 per cent expected to be covered by European Economic Recovery Plan (EERP) funds. In accordance with decision 1364/2006, ITGI has been included by the EU in the Projects of European Interest, the highest level of priority recognized by the European Union. The consortium was also the first to apply to DESFA for long term capacity rights on the Greek system. This represents an additional competitive advantage for the planned link, as under Greek Law capacity allocation follows First Come First Served (FCFS) principles, even though there might be some complications with the EU Gas Directive on that matter. In any case, the consortium claims the interconnection will be ready by 2013.<sup>112</sup>

Against this backdrop, a number of Balkan countries have expressed their interest in being supplied by ITGI through the construction of new branches to their respective territories, including the former Yugoslav Republic of Macedonia (FYROM) and Albania.<sup>113</sup>

The former is, for the moment, supplied exclusively with Russian gas through the sole available international gas pipeline in the country, via Bulgaria. Despite the pipeline's relatively low capacity (800 mcm/y), it remains underutilized due to the current minimal levels of natural gas demand, which stood only marginally above 125 mcm in 2008. However, national gas demand is expected to rise in

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<sup>110</sup> SEES, *Measures and Means for a Viable and Competitive Energy Policy*, 2008, [www.sees.gov.gr](http://www.sees.gov.gr)

<sup>111</sup> For more information see Makis Papageorgiou (CEO of DEPA), *Η Ευρώπη έχει ανάγκη επιπλέον ποσότητες φυσικού αερίου – η ΔΕΠΑ συνεχίζει τις ενεργειακές επενδύσεις*, Speech delivered at the 'Third International Energy Summit', Athens, 2009 (available at [www.depa.gr](http://www.depa.gr)); also his interview with Greek daily *To Vima*, 24 September 2008, [www.tovima.gr](http://www.tovima.gr)

<sup>112</sup> IGI Poseidon, *The Project*, 2009, [www.igi-poseidon.com](http://www.igi-poseidon.com)

<sup>113</sup> See the interview of Makis Papageorgiou, CEO of DEPA, with *Imerisia*, 26 July 2009, [www.imerisia.gr](http://www.imerisia.gr)

the coming years, and accordingly will require (at least some) new sources of diversified supply.<sup>114</sup> Indicatively, the country launched its first CHP power plant in May 2009 in Skopje, with a capacity of almost 57 MW. Construction costs stood at an estimated €20 m.<sup>115</sup>

By the same token, Russian Energy Group Sintez and local heating utility Toplifikacija AD–Skopje are reportedly moving forward with construction of the country’s first CCGT unit outside the country’s capital, which they intend as an export-oriented unit (approximately 70 per cent of generated electricity, and 50 per cent of generated heat). Completion of the project is envisaged in mid-2010, at a cost of approximately €150 m. The plant is expected to have a capacity of some 230°MW electrical and 160 MW thermal, and will probably require an additional 200 mcm/y once operational.<sup>116</sup>

A potential expansion of ITGI to the former Yugoslav Republic of Macedonia and/or Albania would thus support core policy objectives of these countries, respectively security and diversification of natural gas supply, and gasification of national economy (see above). At the same time, such an expansion would offer new markets to the two Poseidon partners, Edison and DEPA, while also allowing for increased levels of strategic influence of Athens over its northern neighbours (arguably, an advantage of some strategic importance for the Greek government). However, no further information on possible timetables, technical specifications, and commercial aspects was available at time of writing for either of these proposed extensions.<sup>117</sup>

### *Issues affecting pace of implementation*

Swift progress on construction of the planned ITGI is unlikely to come easily, due to a number of factors, such as opposition from local authorities and ad hoc resident groups on environmental grounds; continuing doubts as to availability of adequate sources of supply; and tight credit in the current recessionary context.

In 2007, the Local Councils of Perdika and Sybota in Epirus, Greece voted against allowing the pipeline to pass through its boundaries. Following almost a year of delays, DEPA decided to bypass these areas by diverting the pipeline to Parga, where it would also construct a compressor station.

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<sup>114</sup> Energy Regulatory Commission of the (former Yugoslav) Republic of Macedonia, *Annual Report 2008*, March 2009, Skopje

<sup>115</sup> Balkans Business News, *FYROM’s First Natural Gas Co-Gen Plant Launched in Skopje*, 25 May 2009, [www.bbn.com](http://www.bbn.com)

<sup>116</sup> ISI Emerging Markets, *Heating Utility Toplifikacija To Launch New Gas-Fired Power Plant in April*, 21 August 2009, [www.securities.com](http://www.securities.com)

<sup>117</sup> ISI Emerging Markets, *Russian Company Sintez Group Will Invest in Macedonia*, 31 July 2009, [www.securities.com](http://www.securities.com)

However, in August 2008 the Local Council of Parga refused to allow the construction of the compressor station within its boundaries – expressing fears relating to an alleged lack of clear health and safety regulations – thus leading to further delays. No concrete progress has been reported on this issue since that time.<sup>118</sup>

In addition, the link is still far from solving its supply problems. These have been complicated further as a result of Turkish insistence on reselling natural gas volumes destined for ITGI that pass through its territory, rather than only receiving a transit commission for it, despite an initial commitment by Ankara to support gas transit through its territory in an intergovernmental agreement it signed with Rome and Athens in July 2007.<sup>119</sup> Accordingly, the initial request of Turkish operator BOTAS to buy and resell 100 per cent of Azeri gas volumes transported through the country was rejected unequivocally by producer SOCAR. However, there are indications that Turkey is moving towards a more flexible position on the matter, which could allow progress to be made in the near future (see below).

DEPA and Edison claim requirements will be covered by a combination of Caspian and Middle East sources. Nevertheless, the Greek side has so far secured only 1 bcm/y from Azerbaijan – expected to start flowing from 2010 onwards – while still being in negotiation over a total of some 3 bcm/y. What is more, it seems unlikely that upstream production delays will have been addressed in proposed sources such as Azerbaijan – where Shah Deniz II continues to face delays – or Iran – where politics continue to get in the way of gas infrastructure development – at least until the envisaged completion date of the ITGI (see below).

### *Drivers supporting implementation*

The planned ITGI could possibly benefit from additional sources outside the geographic scope originally proposed by Edison and DEPA, and there are indeed indications that the two partners will enjoy this option. For example, Russia has reportedly already made overtures to both the Greek and the Turkish government for supplying the link with excess Russian natural gas through Blue Stream.<sup>120</sup>

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<sup>118</sup> Energia.gr, *Όχι για το φυσικό αέριο από την Πάργα*, 15 October 2008, [www.energia.gr](http://www.energia.gr)

<sup>119</sup> Poseidon, *Signing of the Italy–Greece–Turkey Intergovernmental Agreement*, July 2007, [www.igi-poseidon.com](http://www.igi-poseidon.com)

<sup>120</sup> Andreas Andrianopoulos, *Russian Energy Diplomacy and the Southeast European Response*, Paper presented at the Woodrow Wilson International Center for Scholars, 21 May 2008, [www.wilsoncenter.org](http://www.wilsoncenter.org)

In July 2009, in a reversal of previous government policy on the matter, US special energy envoy Richard Morningstar confirmed that Washington views Moscow as having a right to bid for the supply of part of the 50 per cent of gas that will go into Nabucco (that will be open to tender). This shift may mean Washington would be ready to accept that part of ITGI could be filled with Russian natural gas, especially if all other options fail, risking the major Nabucco project.<sup>121</sup>

Moreover, plans to construct the pipeline as a two-way link could allow Greece to tap into a broader range of supply sources, especially at times of crisis like that of January 2009. Potential new sources would include traditional Italian suppliers such as North African producers. Italy indeed enjoys pipeline connections with both Libya, through the 8 bcm/y Greenstream connection, as well as Algeria, through the recently upgraded 32 bcm/y TransMed pipeline. Moreover, Italian import capacity of piped gas is expected to rise by up to a further 10 bcm/y by 2012, through the construction of an additional natural gas pipeline with Algeria under the project name Galsi.<sup>122</sup>

Additionally, despite a broader recessionary context that could undermine funding and undercut future profits – at least in 2009/10 – the project benefits from an exemption with regard to the EU's requirement for TPA under Article 22 of EU Directive 55/2003, for a period of up to 25 years. The JV hopes that this exemption can boost future profitability, and as such support investment at the present stage. Under the provisions of the exemption, DEPA and Edison will enjoy almost exclusive access to the new link, with only 10 per cent of total capacity having to be allocated to third parties. The remaining capacity will be split 80/20 between Edison and DEPA, in favour of the Italian operator.

With regard to Third Party Access, there already exists strong demand, which indicates the level of the industry's interest in the Poseidon project. In May 2009, DEPA CEO Makis Papageorgiou revealed that 17 international gas and power operators had already expressed their interest in TPA to the allocated 800,000 mcm (initial phase) of the Poseidon pipeline, in the framework of its Open Season Procedure.

According to local media sources, these operators included majors such as Shell, British Gas, E.ON–Ruhr Gas, GDF SUEZ, Enel, and RWE; and also smaller companies like Italian EGR, World Energy, Utilita Compania, and FRL LONG Trading; Belgian company BE Gas; Italian–Spanish group ENOI; Swiss–Italian HERA; Dutch company ESSENT (now owned by RWE); and German operator VNG.

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<sup>121</sup> Upstream Online, *US Says Russia Can Supply Gas To Nabucco*, 19 July 2009, [www.upstreamonline.com](http://www.upstreamonline.com)

<sup>122</sup> Downstream Today, *Algeria's Sonatrach Seeks European Role*, 21 July 2009, [www.downstreamtoday.com](http://www.downstreamtoday.com)

According to the same sources, Italian major ENI similarly showed initial interest in access to Poseidon but failed to secure authorization from the Italian regulatory authority, due to competition concerns.<sup>123</sup>

TAP partner StatoilHydro did not, in the end, express interest for access to the link, despite previous reports in the Greek media claiming that the Norwegian company was examining this option as an alternative, at least until TAP made sufficient progress. Nevertheless, the consortium denied the reports on StatoilHydro's alleged interest as being inaccurate, immediately after their publication in Greek press.<sup>124</sup>

By the same token, there has been no official press release or other communication on the matter of participants to the Poseidon Open Season Procedure by any of Edison, DEPA, or IGI Poseidon at the time of writing. In any case, in mid-2009 it emerged that Edison may make available an additional 800,000 mcm to third parties from its own allocated capacity, thus effectively doubling the available Poseidon capacity for interested operators. However, no additional information was available at the time of writing.

Finally, a potential additional advantage for ITGI seems to relate to the fundamentals of the Turkish natural gas grid, which are currently favourable to it. In its present form the Turkish network reportedly has a spare capacity of some 6 bcm/y, and the needs of ITGI could thus be accommodated merely through incremental additions to it. In contrast, any competing project exceeding levels of some 8 bcm/y in terms of transport capacity – notably Nabucco but also TAP in later phases of its development – is likely to require a standalone pipeline to be constructed across the country. Investment costs for this pipeline and other upgrades that would be required in the Turkish network in order to accommodate such increased gas flows are estimated in the order of €6 bn.<sup>125</sup>

### **Interconnector Greece–Bulgaria (IGB)**

As economic, political, and technical difficulties continue to take their toll on the pace of advancement for the larger of the planned interconnection projects – especially Nabucco and South Stream – Sofia is turning its attention to smaller ventures with fewer stakeholders, and economic demands that seem capable of earlier realization, and hence of meeting more urgent Bulgarian needs.

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<sup>123</sup> Energia.gr, *Τον Σεπτέμβριο οι προσφορές για πρόσβαση στον Ποσειδώνα*, 27 May 2009, [www.energia.gr](http://www.energia.gr)

<sup>124</sup> TAP, *Statement from Statoilhydro regarding Articles Appearing in Greek Media*, 15 April 2009, [www.trans-adriatic-pipeline.com](http://www.trans-adriatic-pipeline.com)

<sup>125</sup> Gareth Winrow, *Problems and Prospects for the Fourth Corridor: the Positions and Role of Turkey in Gas Transit to Europe*, June 2009, Oxford Institute for Energy Studies, [www.oxfordenergy.org](http://www.oxfordenergy.org)

In the immediate aftermath of the painful cuts in the country's Russian natural gas supply in January 2009, during which time Sofia was able to replace some of the missing gas volumes with direct imports from Greece, the Bulgarian government announced its intention to move forward with plans aimed at supporting security of supply. One of the core objectives for Sofia is diversification of supply away from Moscow, and accordingly the Bulgarian government has a target of sourcing 40 per cent of national gas needs from non-Russian sources – such as TGI, Nabucco, and the LNG market – by 2020.<sup>126</sup>

Neighbouring Greece – having surplus gas import capacity, existing interconnection to the Caspian region in the form of TGI, and direct access to the Mediterranean Sea and the LNG market through its Revithoussa import terminal – could help ease Bulgarian dependence on Russian gas, irrespective of developments on the Nabucco project. Therefore, Greece is actively being targeted by Sofia for enhanced cooperation within the energy framework. Indeed, Greece and Bulgaria have already signed an agreement whereby the former will supply the latter in the event of major supply disruption.<sup>127</sup>

Furthermore, in April 2009 the governments of Bulgaria and Greece signed one MoU on the construction of a natural gas branch between the two countries, and another on the construction of a new LNG terminal in Kavala, northern Greece. On 14 July Bulgarian Energy Holding (BEH) consolidated this initiative by signing cooperation memoranda with Poseidon partners DEPA and Edison for the construction, ownership, and operation of a new natural gas pipeline planned to connect the Bulgarian natural gas network with ITGI (and also, through this new pipeline, with Caspian gas producers).<sup>128</sup>

The agreement between the three sides provides for the establishment of a new, Sofia-based, subsidiary that will be responsible for the construction of the planned link, and which will be equally controlled by the Poseidon partners (DEPA and Edison 25 per cent each) and BEH (50 per cent). In contrast, the new trading subsidiary for IGB will not only be based in Athens but will also be controlled by the majority stakeholders DEPA and Edison (each owning 35 per cent) while BEH will own only a minority 30 per cent. The new subsidiaries are expected to be officially established in November 2009.<sup>129</sup>

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<sup>126</sup> Imerisia, *Διπλό ενδιαφέρον για τον ελληνοιταλικό αγωγό*, 14 April 2009, [www.imerisia.gr](http://www.imerisia.gr)

<sup>127</sup> See the interview of Makis Papageorgiou, CEO of DEPA, with *Imerisia*, 26 July 2009, [www.imerisia.gr](http://www.imerisia.gr)

<sup>128</sup> The Wall Street Journal, *Edison to Build Greece–Bulgaria Pipeline*, 15 July 2009, [www.wsj.com](http://www.wsj.com)

<sup>129</sup> Imerisia, *Δύο εταιρείες θα συσταθούν για τον αγωγό φυσικού αερίου*, 2 October 2009, [www.imerisia.gr](http://www.imerisia.gr)

The deal also includes provisions for the supply to Bulgaria of up to 1 bcm/y of Azeri natural gas from 2015 onwards, as well as for an additional 1 bcm/y from the Greek LNG terminal at Revithoussa, which still enjoys some spare capacity (and is also set for an upgrade in the coming years). According to DEPA CEO Makis Papageorgiou, the primary targets of this agreement are to boost the role of Caspian deliveries to Europe, as well as offering the option of supplying natural gas to regional markets.<sup>130</sup> The contracting parties have already submitted a request to the European Commission asking for TPA exemption for this project.

Earlier media reports had suggested that IGB partner Edison might even consider the diversion of some of the volumes it has secured in the framework of the ITGI project (for the Italian market) to Bulgaria, but no further information was available on the issue at the time of writing. Prometheus Gas had reportedly also expressed its interest in the project, but its chances of participation were limited from the outset, given the declared objective to diversify away from Russian gas supplies (Prometheus Gas is a 50/50 JV between the Greek Copelouzos Group and Gazprom).<sup>131</sup> The pipeline is planned to be a two way, 28 inch link with a transport capacity of 3–5 bcm/y.<sup>132</sup> Local sources have suggested a route from Stara Zagora through Dimitrovgrad and Kurdjali in Bulgaria, to Komotini in Greece, largely following the route of the road link to Makaza Pass (see Map 2 above for the proposed route). Table 14 outlines related technical details.<sup>133</sup>

**Table 14: Specifications of Interconnector Greece–Bulgaria (IGB) upon completion**

Section	Length (km)	Diameter (inch)	Capacity (bcm/y)
Greece	25	28	up to 5
Bulgaria	135	28	up to 5
<b>Total</b>	<b>160</b>	<b>28</b>	<b>up to 5</b>

*Source:* Interpreted by the author based on information from operating companies and other local sources

<sup>130</sup> ISI Emerging Markets, *Bulgaria and Greece Sign Memorandum on Joint Gas Connections*, 16 July 2009, [www.securities.com](http://www.securities.com)

<sup>131</sup> Imerisia, *Αγωγός φυσικού αερίου: ενδιαφέρον από Edison*, *Gaz de France*, 28 April 2009, [www.imerisia.gr](http://www.imerisia.gr)

<sup>132</sup> ISI Emerging Markets, *Bulgaria and Greece Sign Memorandum on Joint Gas Connections*, 16 July 2009, [www.securities.com](http://www.securities.com)

<sup>133</sup> See for example Naftemporiki, *Με γοργούς ρυθμούς προχωρά ο αγωγός Κομοτηνή – Χάσκοβο*, 14 July 2009, [www.naftemporiki.gr](http://www.naftemporiki.gr)

In early July 2009 BEH awarded by a €30 m feasibility study for this project to UK-based firm Jacobs Consultancy, a subsidiary of the Jacobs Engineering Group of the USA. The company is expected to develop options for reverse flow on the new gas pipeline, technical–economical analysis of the efficiency of the new gas connection construction, and a business model of the investment. Jacobs will also examine applicable European and national legislation and regulations, including a preliminary environmental impact assessment. Finally, it will look into possible financing sources.<sup>134</sup>

Projected construction costs are thought to be around €125 m, and approximately €45 m is expected to come from the European Recovery Program.<sup>135</sup> According to Galina Tosheva, Executive Director of BEH, construction of the link has to commence by 2011 if EU funding is to be secured.<sup>136</sup> The initial phase of the project (construction of the pipeline but not of the relevant compressor station) has an expected completion date of 2012. However, the full capacity of the planned link (3–5 bcm/y) will not be realized until completion of the compressor station.<sup>137</sup> Its initial capacity is estimated at some 1.5°bcm/y.<sup>138</sup>

Greek–Bulgarian efforts seem to fit well with the direction proposed by the EU, whereby EU countries will have to bolster their defences against future supply interruptions. According to preliminary planning, the European Commission will declare a ‘Community Emergency’ if the EU loses more than 10 per cent of its gas imports, or if there is an EU national crisis. In such an emergency, EU countries would be obliged to help each other by ensuring unhindered flow of gas across their borders.

By the end of September 2010, EU countries will have to draw up plans for diversifying their networks and for responding to emergencies. By the end of March 2014, member states will have to make sure that their infrastructure is sufficiently diversified to deal with the possible failure of their largest supplier – which is usually Russia – for 60 days of cold weather.<sup>139</sup> Greek and Bulgarian calls for (financial and/or regulatory) support probably stand a better chance of being met by the EU when

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<sup>134</sup> ISI Emerging Markets, *Jacobs Consultancy to Advise on New Greece–Bulgaria Gas Connection*, 10 July 2009, [www.securities.com](http://www.securities.com)

<sup>135</sup> ISI Emerging Markets, *Bulgaria and Greece Sign Memorandum on Joint Gas Connections*, 16 July 2009, [www.securities.com](http://www.securities.com)

<sup>136</sup> ISI Emerging Markets, *EU Finances for Gas Connections*, 19 June 2009, [www.securities.com](http://www.securities.com)

<sup>137</sup> See the interview of Makis Papageorgiou, CEO of DEPA, with *Imerisia*, 26 July 2009, [www.imerisia.gr](http://www.imerisia.gr)

<sup>138</sup> Rosen Simitchiev, *The Balkans as a Corridor of Energy Supplies to Europe: Contribution and Role of Bulgaria*, Paper presented at the ‘3<sup>rd</sup> South-East Europe Energy Dialogue’, Thessaloniki, June 2009, [www.iene.gr](http://www.iene.gr)

<sup>139</sup> Upstream Online, *EU pushes Gas Security Rules*, 19 July 2009, [www.upstreamonline.com](http://www.upstreamonline.com)

seen against the apparent convergence between potential benefits for the broader region from the planned construction of IGB, with the stated policy goals of the EU.

### *Broader cooperation between regional partners*

At the same time, the government of Bulgaria and GDF SUEZ are reportedly pushing towards construction of the discussed LNG terminal in northern Greece, possibly in an onshore area of Kavala, or offshore in approximately the same region, while GDF SUEZ is also pushing for participation in the planned IGB link.<sup>140</sup> The French company is increasingly active in the broader region, both as a natural gas supplier as well as a being a power producer, including in Greece (see above).

With regard to Bulgaria, in October 2009 GDF SUEZ and French energy services company Dalkia confirmed their interest in buying a stake in Sofia's heating utility, which was suffering due to low heating prices in the first quarter of 2009. The Bulgarian utility represents one of the largest energy suppliers in the country, enjoying heat production capacity in excess of 3,000 MW as well as co-generation units with a combined capacity of some 280 MW.<sup>141</sup>

Sofia seems to favour a broader strategic partnership with Greece, whereby it would lend its support to Greek regional interests in exchange for reciprocal support on a similar level. This quid pro quo could include Bulgarian support for the planned Bourgas–Alexandroupolis crude oil pipeline which seems to represent a much lower priority for Sofia compared to Athens – despite second thoughts on the matter even from the side of the new socialist administration in Greece – or even facilitation of DEPA penetration in the Balkans, in return for Bulgarian access to the Mediterranean through the port and airport of Thessaloniki, as well as progress towards construction of the discussed northern Aegean LNG terminal.<sup>142</sup>

In this context, declarations questioning the value to Bulgaria of the planned crude oil pipeline between Bourgas and Alexandroupolis, which were made by officials of the winning GERB (Citizens for the European Development of Bulgaria) party in the aftermath of the July 2009 national election, in which such projects were put in question, may have been merely a message to its voter base. GERB

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<sup>140</sup> Naftemporiki, *Με γοργούς ρυθμούς προχωρά ο αγωγός Κομοτηνή – Χάσκοβο*, 14 July 2009, [www.naftemporiki.gr](http://www.naftemporiki.gr)

<sup>141</sup> ISI Emerging Markets, *Dalkia, Gaz de France Confirm Interest in Sofia Heating Utility*, 14 October 2009, [www.securities.com](http://www.securities.com)

<sup>142</sup> Authors' discussion on *Greek–Bulgarian Energy Cooperation* with regional government and industry officials

had opposed the plan before the election on environmental grounds. However, the declarations may be an attempt at geopolitical trade-offs with Greece and/or major partner Russia.<sup>143</sup>

The fact that the Bulgarian Prime Minister-elect Boiko Borisov said (on almost the same day) that Bulgaria should pursue as many oil and gas pipelines as possible, including Bourgas–Alexandroupolis and South Stream (which was similarly questioned by some GERB members), as a means of enhancing energy security and boosting national economy, suggests that his government will probably use this as a negotiating card with Athens and Moscow, rather than as strict policy orthodoxy.<sup>144</sup>

Indeed in September 2009, the country's new Economy and Energy Minister, Traicho Traikov, indicated that Sofia was expecting to see tangible economic benefits from Moscow, in order that related energy projects could move forward.<sup>145</sup> The Russian government immediately responded in kind to Bulgarian ambivalence by throwing its weight behind the main competitor project of Samsun–Ceyhan, even if this was mostly as a trade-off for Turkish support for South Stream (see below).<sup>146</sup> Against this backdrop, Traikov seemed to change his position as early as October 2009, commenting that local communities at Bourgas could in fact be persuaded concerning the environmental merits of the planned link, if necessary. The full impact of this political chess game obviously remains to be seen.<sup>147</sup>

The Greek government is already liaising with Romanian counterparts for the gradual extension of GBI to Central Europe (Hungary) through the integration of the intermediate national natural gas grids, including storage capacity wherever available in those countries (Revithoussa in the case of Greece, natural gas storage in Romania). Athens has reportedly already secured the agreement of Bucharest for this project, and since mid-2009 is similarly seeking the support of Sofia and Budapest for the interconnection/integration of their respective natural gas networks. Greek efforts also aim at securing EU funding, as part of the latter's push towards enhanced levels of security of supply (see above).<sup>148</sup> By the same token, Sofia is pushing forward with a number of regional interconnections

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<sup>143</sup> ISI Emerging Markets, *Possible Regional Minister Plevneliev Questions Bourgas–Alexandroupolis Pipeline*, 22 July 2009, [www.securities.com](http://www.securities.com)

<sup>144</sup> Energia.gr, *Μ. Μπορίσοφ: «Όσο περισσότεροι οι αγωγοί, τόσο καλύτερο για τη Βουλγαρία»*, 21 July 2009, [www.energia.gr](http://www.energia.gr)

<sup>145</sup> Upstream Online, *Sofia Demands 'Perks' from Moscow*, 15 September 2009, [www.upstreamonline.com](http://www.upstreamonline.com)

<sup>146</sup> Upstream Online, *Putin Visit Boosts Ankara Energy Hopes*, 6 August 2009, [www.upstreamonline.com](http://www.upstreamonline.com)

<sup>147</sup> ISI Emerging Markets, *Oil Pipeline to Greece to get Environmental Permit in Spring*, 12 October 2009, [www.securities.com](http://www.securities.com)

<sup>148</sup> Energia.gr, *Συνάντηση Κ. Χατζηδάκη με τον Ρουμάνο Υπουργό Οικονομικών για τους αγωγούς φυσικού αερίου*, 14 July 2009, [www.energia.gr](http://www.energia.gr)

aimed at boosting its own energy security notably through interconnections with Turkey and Romania (see Table 15).

**Table 15: Planned natural gas interconnections actively pursued by Bulgaria**

<b>Project</b>	<b>Description</b>	<b>Route/Location</b>
Nabucco	Main link	Turkey–Bulgaria–Romania–Central Europe
South Stream	South branch	Russia–Bulgaria–Greece–Italy
GBI	Greece–Bulgaria Interconnector	Komotini GR–Dimitrovgrad BG–Stara Zagora BC
TBI	Turkey–Bulgaria Interconnector	Kesan TR–Malkoclar TR–Lozenetz BG
BRI	Bulgaria–Romania Interconnector	Russe BG–Giurgiu RO
BSI	Bulgaria–Serbia Interconnector	Dupnitza BG–Nis or Sofia BG–Nish SR
8th ECGP	8th European Corridor Gas Pipeline	Bulgaria–FYR Macedonia–Albania–Italy (possible branches to Kosovo and Montenegro)
Aegean LNG	Northern Greek LNG Pipeline	Kavala GR or offshore GR

Source: Rosen Simitchiev, *The Balkans as a Corridor of Energy Supplies to Europe: Contribution and Role of Bulgaria*, Paper presented at the ‘3<sup>rd</sup> South-East Europe Energy Dialogue’, Thessaloniki, June 2009, [www.iene.gr](http://www.iene.gr)

In this context, Bulgargaz is also examining its participation in the planned expansion of the Marmara Ereğlisi LNG terminal in Turkey. Since mid-2009 Sofia has been reportedly negotiating with a number of potential natural gas suppliers including Turkmenistan – for imports of piped gas via Iran and Turkey – and could also see LNG imports from Qatar and Egypt. Finally, Bulgargaz is planning to utilize the Galata storage in Turkey.<sup>149</sup>

At the same time, BEH is in negotiation with the European Bank for Reconstruction and Development for a €250 m loan for the upgrading of the Chiren natural gas storage facility. The Bulgarian company has already signed an agreement with the upstream oil and gas firm Moravske Naftove Doly from the Czech Republic for completion of FEED, possibly by the end of 2009. BEH aims at an extraction rate of some 10 mcm/day, up from the current 4.2 mcm/day.<sup>150</sup>

### **South Stream**

The South Stream pipeline is being promoted by a joint venture set up on equal terms by Russian state operator Gazprom and Italian major ENI in November 2007 after an initial agreement between the two sides in June of the same year. Major French utility player Electricité de France (EDF) is reportedly also in negotiation with Gazprom regarding participation in the project. According to preliminary information, EDF is interested in acquiring a stake in excess of 10 per cent in the project.<sup>151</sup>

<sup>149</sup> ISI Emerging Markets, *Bulgaria and Turkey to Build Common Gas Terminal*, 7 July 2009, [www.securities.com](http://www.securities.com)

<sup>150</sup> ISI Emerging Markets, *BGEH to Sign 250 M EBRD Loan for Gas Storage Facility by Year-End*, 17 July 2009, [www.securities.com](http://www.securities.com)

<sup>151</sup> ISI Emerging Markets, *Electricité de France May Join South Stream Project*, 16 September 2009, [www.securities.com](http://www.securities.com)

Following the May 2009 agreement between the two original partners for the doubling of South Stream's initial 31 bcm/y capacity – possibly also a way of applying additional political pressure on Ukraine – the pipeline is planned to carry up to 63 bcm/y of Russian gas to central Europe and Italy by means of two 900 km long pipelines. Natural gas supplies will start from the Beregovaya compressor station near the city of Novorossiysk in Russia, pass under the Black Sea, and finally reach Bulgaria. From there, two northern routes will carry the fuel to central Europe, while a southern one will reach project partner Italy, via Greece.

South Stream will completely bypass Ukraine, as Moscow proved successful in reaching an agreement with Ankara in August 2009, under which the offshore segment of the pipeline will be allowed to pass through the Turkish Exclusive Economic Zone in the Black Sea.<sup>152</sup> This agreement represents an important development for the viability of South Stream. Indeed, even though Ukraine would probably have lacked the necessary leverage to block the Russian project altogether, it might still have been able to cause significant delays which could have undermined it, for example by failing to issue necessary environmental licenses.<sup>153</sup>

In return for Turkey's support towards removing this obstacle/uncertainty from one of its key energy projects, Russia committed itself to a re-examination of the proposed Samsun–Ceyhan crude oil pipeline. The Turkish government strongly supports this project, but has so far failed to attract the necessary (Russian/Caspian) crude volumes to render it economically viable.<sup>154</sup>

On 19 October 2009, the governments of Russia, Turkey, and Italy followed up by signing a joint statement whereby they reiterated their commitment to enhanced security of supply and environmental protection in the region, and also to progress towards establishing a suitable regulatory framework that would facilitate construction of Samsun–Ceyhan. At the same time, ENI, Calik Holding, Transneft, and Rosneft signed an MoU agreeing to examine the project.<sup>155</sup> In addition, the Ankara government gave its permission for all necessary geological studies that will need to be conducted in its Exclusive Economic Zone in the Black Sea with regard to South Stream.<sup>156</sup>

Moscow probably did not have major problems in agreeing to this non-binding commitment, especially as by doing so it seems also to have responded in kind to the new administration in Sofia,

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<sup>152</sup> Upstream Online, *Turkey 'to Give South Stream Nod'*, 5 August 2009, [www.upstreamonline.com](http://www.upstreamonline.com)

<sup>153</sup> Kommersant, *Ukraine Surfaced in South Stream Project*, 29 February 2008, [www.kommersant.com](http://www.kommersant.com)

<sup>154</sup> Upstream Online, *Putin Visit Boosts Ankara Energy Hopes*, 6 August 2009, [www.upstreamonline.com](http://www.upstreamonline.com)

<sup>155</sup> Rigzone, *Italy, Russia, and Turkey Cooperate on Samsun–Ceyhan Oil Pipeline*, 19 October 2009, [www.rigzone.com](http://www.rigzone.com)

<sup>156</sup> Kathimerini, *Έκδοση αδειών από Τουρκία για «South Stream»*, 20 October 2009, [www.kathimerini.gr](http://www.kathimerini.gr)

which in July 2009 expressed reservations on a number of Russian-backed projects in the country, including the Bourgas–Alexandroupolis crude pipeline and South Stream itself (see above).

Development costs for the enlarged project remain unclear, with the most recent estimates referring to a total of approximately US\$35 bn.<sup>157</sup> Estimates offered by the Russian government in 2008 brought construction costs up as high as US\$20 bn – for only one of the planned lines – while Russian Energy Minister Sergei Shmatko had drawn attention at the time to the fact that even the US\$20 bn figure represented only a preliminary estimate, subject to revision in accordance with the findings of the project’s feasibility study. CEO of ENI Claudio Scaroni had previously mentioned US\$15 bn as the most likely cost for the project.<sup>158</sup>

The feasibility study for the onshore part of South Stream is expected to be completed by end-2009, and the offshore/seabed study is expected at the beginning of 2010. The combined feasibility study will accordingly be completed by mid-2010.<sup>159</sup> In October 2009, there were statements by both the Russian and Italian parties envisaging the final investment decision and commencement of construction activities by the end of 2010.<sup>160</sup>

In terms of supply, Russian guarantees – even though themselves not assured – provide the pipeline with a major advantage compared to competitors such as Nabucco, which have to rely on still limited Caspian resources, given that the envisaged 40 bcm/y production of Azerbaijan is unlikely to become a reality before 2020 (see below).

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<sup>157</sup> ISI Emerging Markets, *Gazprom, ENI Consider Third Partner for Sea Segment of South Stream Project*, 1 October 2009, [www.securities.com](http://www.securities.com)

<sup>158</sup> Upstream Online, *South Stream Price Tag Hits \$20 bn*, 30 July 2008, [www.upstreamonline.com](http://www.upstreamonline.com)

<sup>159</sup> Information from Alexey Biteryakov, *Natural Gas Market of SE Europe: Gazprom Export’s View*, Paper presented at the ‘3<sup>rd</sup> South East Europe Energy Dialogue’, Thessaloniki, June 2009, [www.iene.gr](http://www.iene.gr)

<sup>160</sup> See Kathimerini, *Τέλη του 2010 η έναρξη κατασκευής του South Stream*, 20 October 2009, [www.kathimerini.gr](http://www.kathimerini.gr); also Upstream Online, *Eni sets South Stream date*, 27 October 2009, [www.upstreamonline.com](http://www.upstreamonline.com)

### *Southern route*

On 18 January 2008, the Bulgarian government signed an agreement with the Russian Federation for the construction of the southern route of South Stream, with the Bulgarian parliament ratifying it in July of the same year, despite protests from the country's opposition (and also from some members of the current administration). Also, on 29 April 2008, Greece and Russia signed an intergovernmental agreement for the establishment of a 50/50 JV for the construction and operation of the section of South Stream that will pass through Greek territory. The agreement was ratified by the Greek parliament on 2 October 2008.<sup>161</sup>

On 15 May 2009, DESFA and Gazprom signed the Basic Cooperation Agreement which establishes the JV to be tasked with carrying out the FEED and ultimately reaching a final investment decision for the project. The headquarters of the 50/50 JV are to be based in Greece. A similar agreement was signed on the same day with Bulgaria. According to the agreements between the two sides, the feasibility study should have been completed around mid-2009, but various obstacles/delays seem to have pushed that back to late 2009.

A final decision on implementation has to be reached within 24 months following completion of the study, hence by late 2011, while the agreement is to stay valid for a 30 year period. The consortium envisages completion of the project by end-2015, a deadline already delayed compared to previous estimates. Nonetheless, even this time frame may prove to be too optimistic in the current context of tight credit and major investor/supply uncertainties.<sup>162</sup>

The pipeline is projected to have a capacity of some 11 bcm/y but it still remains unclear what percentage of this capacity is intended for Greece (SEES estimates approximately 3 bcm/y) or indeed at what prices gas volumes are likely to flow to the country.<sup>163</sup> Preliminary reports from the Russian side suggest that half of the pipeline's capacity will be used to serve existing Gazprom contracts, while the remaining capacity will be utilized by volumes aimed at meeting new contractual obligations. Cost is estimated between €700 m to €1 bn, depending on the actual route the pipeline will follow in Greece.<sup>164</sup>

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<sup>161</sup> Gazpromexport, *South Stream: a Project to Ensure Energy Security in Europe*, 2009, [www.gazpromexport.com](http://www.gazpromexport.com)

<sup>162</sup> DESFA, *Basic Cooperation Agreement Signing Between Gazprom and DESFA*, 14 May 2009, [www.desfa.gr](http://www.desfa.gr)

<sup>163</sup> SEES, *Report on Long-Term Energy Planning*, 2009, [www.sees.gov.gr](http://www.sees.gov.gr)

<sup>164</sup> Panagiotis Kanellopoulos, CEO of DESFA, quoted in the Balkans Business News, *Greek Section of South Stream Seen Costing up to 1°Bn°Euros*, 20 May 2009, [www.balkans.com](http://www.balkans.com)

Local reports suggest Sidirokastro on the Greece–Bulgaria border as the most probable point of entry. Sidirokastro already serves as the sole current point of entry for natural gas from Bulgaria. A possible second option would be Komotini in the Greek region of Thrace.<sup>165</sup> In any case, the pipeline is likely to be parallel to ITGI, at least with reference to the latter’s onshore section. Proposals for the routing of the pipeline to Italy through Albania have been all but abandoned, in favour of a direct pipeline between the two countries.<sup>166</sup>

### **Trans-Adriatic Pipeline (TAP)**

In 2007, Swiss electricity company EGL concluded studies and basic engineering for its planned Trans Adriatic pipeline. In February 2008, the Swiss company signed an agreement with Norwegian oil and gas company StatoilHydro on the establishment of a 50/50 JV for the construction of the pipeline. TAP is expected to start/diverge from TGI in the Greek city of Thessaloniki, where its first compressor station will be located. Thence, the pipeline will cross Albania to the north-west to form part of the planned Ionian–Adriatic Pipeline (IAP)/Energy Community Gas Ring (ECGR) projects, and finally reach Brindisi in southern Italy through an underwater connection.<sup>167</sup> The Croatian government has reportedly also expressed interest in this project, asking for the expansion of the planned pipeline to its territory through neighbouring Montenegro and Bosnia.<sup>168</sup>

TAP’s total planned length is estimated at more than 520 km, of which some 186 km would be in Greece, 200 km in Albania, 115 km offshore (820 m depth) and 19 km in Italy. It will be 48 inches in diameter both onshore and offshore, enjoying an initial capacity of some 10 bcm/y, with the option of doubling capacity in the longer term. The project is in its FEED stage, with a final investment decision expected by end-2009. Costs will probably exceed €1.5 bn, while construction is expected to take approximately three years. See Maps 1 and 2 for the proposed route of TAP in Albania and Greece respectively, and also Table 16 for an outline of its technical specifications.

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<sup>165</sup> Capital.gr, *Δύο διαφορετικά σενάρια για τον «ελληνικό» South Stream*, 20 May 2009, [www.capital.gr](http://www.capital.gr)

<sup>166</sup> More information available in Ministry of Interior, *Η Ελλάδα κόμβος πετρελαίου και φυσικού αερίου*, 2 May 2008, [www.minpress.gr](http://www.minpress.gr)

<sup>167</sup> Information from Naske Afezzoli, *Opening the Eurasia Gas Corridor: interconnecting Greece, Albania, and Italy*; and from Spiros Paleoyannis, *The Greek Natural Gas Market and International Interconnections*; both papers presented at ‘Greek–Albanian Cooperation in the Energy Sector’, Tirana, January 2009, [www.iene.gr](http://www.iene.gr); information also from Elias Karydogiannis, *Ο αγωγός αερίου TAP και η συμβολή του στη περιφερειακή ανάπτυξη*, paper presented at the ‘Ενέργεια και ανάπτυξη στην Ανατολική Μακεδονία και Θράκη’ conference, April 2007, [www.iene.gr](http://www.iene.gr); and various local media sources.

<sup>168</sup> ISI Emerging Markets, *EGL, StatoilHydro Begin Study on Natural Gas Pipeline Route*, 13 July 2009, [www.securities.com](http://www.securities.com)

**Table 16: Specifications of Trans-Adriatic Pipeline (TAP) upon completion**

<b>Section</b>	<b>Length (km)</b>	<b>Diameter (inch)</b>	<b>Capacity (bcm/y)</b>
Greece	186	48	10
Albania	200	48	10
Adriatic	115	48	10
Italy	19	48	10
<b>Total</b>	<b>520</b>	<b>48</b>	<b>10</b>

*Source:* Interpreted by the author based on information from operating companies and other national sources

With reference to the Albanian section, EGL has already succeeded in obtaining the second Authorization for Continuation of Procedures (aimed towards development rights guaranteeing investments) in April 2007. Between mid-2006 and early 2008 the company received regional route approval, while Environmental Declaration Approval was secured by the Albanian Ministry of Environment in July 2007. The final approval by Albania's Central Government Authority was accordingly received in August 2007, with the final submission of the Decree being in May 2008. The Environmental and Social Impact Assessment is still pending.

Furthermore, in May 2008 EGL and StatoilHydro signed a tie-in contract with Italian SNAM Rete Gas. The consortium boasts strong support in the Italian region of Puglia where the pipeline will end. In June 2008, the TAP consortium filed a petition with RAE for the design, construction, and ownership of an Independent Natural Gas System in Greece, in line with Greek legislation. The TAP shareholders also applied to DESFA for long term transit rights, including access to the level of 5°bcm/y of TGI capacity each. In January 2009, TAP commenced a seabed survey of the Adriatic Sea with Norwegian company Deep Ocean, in order to assess the most appropriate route for its subsea section, following a preliminary reconnaissance study carried out in October 2006.<sup>169</sup>

In July 2009, the company started a route assessment survey in Albania, with international companies ILF and ERM, in order to assess five potential onshore routes, based on technical, environmental, social, and cultural criteria. The survey's findings on the optimal route are expected to be presented to the Albanian government in December 2009. Once approval is secured, the consortium plans to begin detailed Environmental and Social Impact Assessments.<sup>170</sup>

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<sup>169</sup> TAP, *Marine Survey in the Adriatic Sea to Verify Offshore Route for TAP*, 22 January 2009, [www.trans-adriatic-pipeline.com](http://www.trans-adriatic-pipeline.com)

<sup>170</sup> TAP, *TAP Starts Route Assessment Survey in Albania*, 2 July 2009, [www.trans-adriatic-pipeline.com](http://www.trans-adriatic-pipeline.com)

According to local media, the Greek authorities are not favourable towards construction of TAP, as it is seen as competing with some of the most important government-supported pipeline projects, notably ITGI. Competition between the two projects is accordingly believed to exist both in terms of their respective supply sources as well as of access to almost all of its transport capacity, an assessment which of course does not lack realism. In any case, cooperation from DESFA with regard to infrastructure development in Greece is indispensable for TAP, given the consortium's dependence on the Greek System Operator for the required network expansion from Komotini to Thessaloniki by mid-2011.<sup>171</sup>

Overall the project enjoys good supply prospects in the longer term, particularly with regard to the period after 2020. StatoilHydro enjoys a 25.5 per cent stake in Shah Deniz in Azerbaijan, which has also been promoted as a potential source for ITGI and Nabucco, especially in Phase 2 of its development. In addition, in 2007 (the Swiss company) EGL completed a preliminary 25-year agreement with the National Iranian Gas Export Company (NIGEC). According to the deal, NIGEC would be under an obligation to deliver some 5.5 bcm/y to Europe, but no further information on the nature of the agreement was made available at the time.<sup>172</sup> The initial agreement was complemented/superseded in March 2008 by a formal contract, the signing of which was also attended by the Swiss Federal Department of Foreign Affairs.<sup>173</sup>

Phase one reportedly envisaged the export of some 1.5 bcm/y from early 2009, but the Swiss company sought to re-negotiate pricing against the backdrop of the global financial crisis, and also because it still had not succeeded in securing transit through Turkey and Greece. According to local sources, EGL thus sought to sell the 1.5 bcm to the Turkish market – where it has a trading licence – which however was at the time oversupplied due to the economic recession. In September 2009, NIGEC Managing Director Reza Kasaizadeh confirmed his company was in negotiations with EGL over pricing.<sup>174</sup>

Despite boasting the world's second largest gas reserves after Russia, in recent years Iran has repeatedly failed to fulfil contractual obligations to Turkey, largely due to continuing underinvestment in its gas sector and a standoff with the USA and its allies over its nuclear programme. Admittedly, in 2009 Turkey has in all probability failed to meet its take-or-pay obligations due to the ongoing

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<sup>171</sup> Energia.gr, *Προβόδισμα TAP στον αγώνα δρόμου των αγωγών*, 17 June 2008, [www.energia.gr](http://www.energia.gr)

<sup>172</sup> Reuters, *Swiss Firm EGL in 25-Yr Gas Deal with Iran*, 4 June 2007, [www.reuters.com](http://www.reuters.com)

<sup>173</sup> TAP, *EGL Seals Final Gas Purchase Agreement with NIGEC*, 17 March 2008, [www.trans-adriatic-pipeline.com](http://www.trans-adriatic-pipeline.com)

<sup>174</sup> Zawya.com, *NIGEC Confirms Pricing Differences Remain on EGL Gas Export Deal*, 28 September 2009, [www.zawya.com](http://www.zawya.com)

recession, and so the problem is at the moment on the other side. However, the existing shortcomings of Iran on the matter continue to raise questions as to the TAP consortium's ability to rely on Tehran as a supply source over the next decade of the programme. Against this backdrop, EGL is planning to invest also in storage facilities in Albania, in an attempt to offset possible supply failures associated with inefficient Iranian infrastructure and other potential supply problems. According to the company, feasibility studies are already under way and aim at utilizing the existence of salt caverns in the country.

LNG options with regard to Albania's Adriatic coast are also being actively considered. Importantly, TAP is supported in its development phase as an EU Priority Project. Specifically, TAP falls under the EU's Trans-European Energy Networks provisions, by virtue of contributing to the EU objectives and policies aimed at diversification and security of gas supply.<sup>175</sup>

### **Ionian-Adriatic Pipeline (IAP)**

IAP is planned as a 28 inch natural gas pipeline, running approximately 400 km from Ploče in Croatia to Fier in Albania (see Table 17 below). The pipeline falls within the framework of the broader Gas Ring of the Energy Community of South East Europe, a project which plans to connect the national natural gas grids of Serbia, the UN Mission in Kosovo, the former Yugoslav Republic of Macedonia, Albania, Bosnia and Herzegovina, Montenegro, and Croatia in an attempt to boost security of supply and create economies of scale in the region.<sup>176</sup> More specifically, the Energy Community of South East Europe was established in Athens in October 2005 with the aim of creating a stable regulatory and market framework in order to:<sup>177</sup>

- attract investment in power generation and networks, in order to ensure stable and continuous energy supply;
- create an integrated energy market which would allow for cross-border energy trade and integration with the EU market;
- enhance security of supply in the Balkan region and beyond;
- improve the environmental situation in relation to energy supply in the region;
- enhance competition at the regional level, and make use of available synergies/economies of scale.

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<sup>175</sup> TAP, *StatoilHydro Joins EGL in Trans Adriatic Pipeline Gas Project*, 13 February 2008, [www.trans-adriatic-pipeline.com](http://www.trans-adriatic-pipeline.com)

<sup>176</sup> Information from Stavri Dhima, *Prospects for the Introduction of Natural Gas in Albania*, Paper presented at 'Greek-Albanian Cooperation in the Energy Sector', Tirana, January 2009, [www.iene.gr](http://www.iene.gr)

<sup>177</sup> Energy Community, *Facts and Figures*, 3 July 2009, [www.energy-community.org](http://www.energy-community.org)

Against this backdrop, September 2007 saw the signing of a Ministerial Declaration in support of the planned IAP by the governments of Albania, Montenegro, and Croatia in Zagreb. Additionally, Albania signed a joint declaration with Bosnia in December 2008 for the same project. Estimated costs are at the level of approximately €90–230 m with regard to the 170 km Albanian section. IAP is expected to meet TAP in the broader Fier region, but no concrete progress had been announced at the time of writing (see Map 1 for the route to Albania). Table 17 outlines proposed technical details.

**Table 17: Specifications of Ionian–Adriatic Pipeline (IAP) upon completion**

<b>Section</b>	<b>Length (km)</b>	<b>Diameter (inch)</b>	<b>Pressure (bar)</b>	<b>Capacity (bcm/y)</b>
Albania	170	28	80	2.5
Montenegro	100	28	80	2.5
Croatia	130	28	80	2.5
<b>Total</b>	<b>400</b>	<b>28</b>	<b>80</b>	<b>2.5</b>

*Source:* Stavri Dhima, *Prospects for the Introduction of Natural Gas in Albania*, Paper presented at the ‘Greek–Albanian Cooperation in the Energy Sector’, Tirana, January 2009, [www.iene.gr](http://www.iene.gr)

## **Problems associated with proposed supply sources**

### *Azerbaijan*

Azerbaijan is considered to be one the most promising future gas suppliers to Europe, mostly by virtue of its Shah Deniz field which is believed to hold approximately 1.5 bn barrels of crude oil and some 1.2 trillion cubic metres of natural gas. Shah Deniz is linked to the 10 bcm/y South Caucasus Pipeline (SCP), which leads to Turkey via Georgia. However, in addition to the existing gas export infrastructure, there is considerable enthusiasm to expand export capacity to Europe. However, it seems unlikely that this goal will be reached before 2015 as a number of interrelated production and transport require to be addressed, notably:<sup>178</sup>

1. Shah Deniz II continues to face serious delays, and production potential has not been verified independently;
2. the consortia of TGI, TAP, and Nabucco are all hoping for substantial volumes from Shah Deniz II;
3. Russia, Iran, and Turkey have each offered to buy 100 per cent of Shah Deniz II production, when operational;

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<sup>178</sup> Information from Stratfor, *Iran: The Natural Gas Problem*, May 2008, [www.stratfor.com](http://www.stratfor.com)

4. Moscow is attempting to reassert its influence over former Soviet republic Azerbaijan and its natural gas exports;
5. there has been a lack of progress on the Trans-Caspian pipeline that would facilitate additional Caspian supplies to Europe.

Hence, the nexus of uncertainties surrounding both Azeri gas production levels (current/future) and politics, as well as the development of the necessary logistical infrastructure to allow Caspian gas to flow westwards, puts in question the viability of projects, including ITGI and TAP, that rely heavily on Azeri upstream developments for their success, at least in the medium term to 2015.

### *Iran*

Iran holds the second largest natural gas reserves in the world with approximately 28 trillion cubic metres, and aims to become a major gas supply source for Europe in the coming years. In fact, Tehran would reportedly like to pipe as much as 37 bcm to Europe annually, and is accordingly considering the available options. A branch of the SCP pipeline already extends into Iran, but is not currently being used. Against this backdrop, and given also the lack of progress on its primary goal of joining the planned Nabucco pipeline, in September 2008 the Iranian regime proposed the construction of a new pipeline between South Pars (it is unclear which phase) and the significant European natural gas markets of Turkey, Greece, Italy, Switzerland, Austria, and Germany.<sup>179</sup>

Unconfirmed sources claim that NIGEC has provisionally allocated some 14 bcm/y to cover Italian and Greek needs, while the Iranian company already has contractual relations with EGL for the delivery of some 5.5 bcm of natural gas per year. By the same token, NIGEC has allegedly entered negotiations with the National Iranian Oil Company (NIOC) for its participation in the development of the twelfth phase of the South Pars field, in exchange for some 8 bcm/y for exports to Europe.<sup>180</sup>

In July 2008 Ankara and Tehran signed a preliminary accord for the export of Iranian natural gas to Europe through Turkey (it is still not clear if this would be done through Nabucco), including a provision for the Turkish Petroleum Corporation (TPAO) to produce some 20.4 bcm/y in South Pars in the coming years, at an estimated cost of US\$3.5 bn. Iran is already Turkey's third biggest gas supplier.<sup>181</sup>

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<sup>179</sup> Upstream Online, *Iran eyes \$4 bn Gas Pipeline to Europe*, 24 September 2008, [www.upstreamonline.com](http://www.upstreamonline.com)

<sup>180</sup> Energia.gr, *Αλλάζει τα δεδομένα ο περσικός αγωγός αερίων*, 9 October 2008, [www.energia.gr](http://www.energia.gr)

<sup>181</sup> Upstream Online, *Iran Eyes Turkey Gas Deal*, 14 August 2008, [www.upstreamonline.com](http://www.upstreamonline.com)

In June 2009, a consortium of Turkish operators led by TPAO signed a preliminary agreement with the NIOC for the investment of approximately US\$12 bn in the development of phases 22, 23, and 24 of South Pars. Major Turkish groups AKSA, Calik, Dogan, and Koc, are reportedly also seeking to conclude independent supply agreements with Iranian suppliers, to be effective as soon as the Turkish market is fully liberalized and the BOTAS monopoly over gas imports accordingly abolished.<sup>182</sup>

However, the growth of Iranian gas production continues to be limited by chronic underinvestment, partly as a result very low domestic prices, while exports have been negatively affected by the country's growing domestic demand, including the need for massive volumes of gas for reinjection into oil fields. In fact, Iran already imports gas from Turkmenistan at the level of some 8 bcm/y in order to be able to meet its export obligations to Turkey. Furthermore, the country has failed repeatedly in recent years to fulfil its contractual obligations to its northern neighbour.<sup>183</sup>

Admittedly, in 2009 Turkey has in all probability failed to meet its take-or-pay obligations due to the ongoing recession, with the current dispute on take-or-pay looking likely to go to arbitration, and the long-term demand implications are not yet clear.

The abovementioned shortcomings of Iran in terms of production capacity continue to raise questions, with the underinvestment problem being further aggravated by the country's ongoing internal political problems, as well as by the diplomatic standoff with the UN (especially with the USA and a number of key European allies) over its nuclear programme. Washington opposes the abovementioned deal between Turkey and Iran, as well as any other deal which could be perceived as lending support to the Islamic Republic, before a solution on the nuclear issue has been reached, with potentially direct consequences for players active in the region.

For example, Turkish drilling at South Pars was expected to commence in 2009 (see above) but in October the Iranian government offered a three month extension to Ankara for finalizing investment details, as per the latter's reported request. There has been media speculation on the role US pressure might have played in this delay. The Iranian side invoked the need to clarify pricing and technical aspects of the project.<sup>184</sup>

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<sup>182</sup> ISI Emerging Markets, *Turkish Petroleum Signs Natural Gas Development Pact with Iran*, 24 June 2009, [www.securities.com](http://www.securities.com)

<sup>183</sup> Stratfor, *Iran: The Natural Gas Problem*, May 2008, [www.stratfor.com](http://www.stratfor.com)

<sup>184</sup> Upstream Online, *Turkey Gets Extra Time at Pars*, 28 October 2009, [www.upstreamonline.com](http://www.upstreamonline.com)

US opposition to Iranian participation in major western-backed energy projects is indeed so firm that since mid-2009 Washington has even been ready to accept Russia as a (partial) supplier of the flagship project Nabucco, while explicitly ruling out any Iranian involvement in this and similar projects, at least for the moment.<sup>185</sup> Against this backdrop, IOCs and major regional players such as Shell, Total, and Repsol have already curbed LNG projects at South Pars, citing increased political risk as one of their major concerns.

Gas infrastructure development that would allow substantial increases in Iranian output and the realization of greater export potential thus seems highly unlikely, at least prior to 2015. What is more, Iran is reportedly considering the possibility of being supplied by Shah Deniz II in Azerbaijan at the level of 12 bcm/y, as soon as the latter becomes operational, suggesting that even Tehran may not be optimistic about its production capacity during the next decade.<sup>186</sup> Likewise, Ashgabat is reportedly to launch a new pipeline to Iran, aimed at increasing its gas exports to the Islamic Republic from the current 8 bcm/y to some 20 bcm/y.<sup>187</sup>

### *Turkey*

Supply problems for ITGI (and of course other planned links such as Nabucco) have been delayed by Ankara's initial insistence on reselling all foreign natural gas passing through its territory, rather than merely receiving a transit fee for it. However, agreement on such a supply arrangement would impact negatively on suppliers' profitability, and BOTAS' initial request to buy and resell 100 per cent of Azeri gas volumes transported through Turkey, in the framework of the ITGI project, was accordingly rejected by producer SOCAR. Turkish energy policy then moved to a new position, whereby it aimed at receiving 15 per cent of transported natural gas volumes as transit fees, which it could then resell directly to western companies. There are indications that since mid-2009 Ankara has become even more flexible on the matter (see below).

Ankara's 15 per cent position on transit fees officially remains far from the positions of both the Azeri company and the major western governments, but it is (at least) a good starting point for relevant negotiations. In addition to the important issue of profitability, direct Turkish control over westwards gas flows from the Caspian region would pose additional strategic and commercial threats, stemming from the fear that gas volumes could be diverted to Turkey's fast growing domestic gas market,

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<sup>185</sup> Upstream Online, *US Says Russia can Supply Gas to Nabucco*, 19 July 2009, [www.upstreamonline.com](http://www.upstreamonline.com)

<sup>186</sup> Stratfor, *Iran: The Natural Gas Problem*, May 2008, [www.stratfor.com](http://www.stratfor.com)

<sup>187</sup> Upstream Online, *Turkmenistan Lines up Iran Gas Pipe*, 13 August 2009, [www.upstreamonline.com](http://www.upstreamonline.com)

especially if the more optimistic scenarios concerning increasing levels of foreign gas supply, and also of domestic upstream production, failed to materialize.

Turkey is already a minor oil and gas producer and TPAO, in collaboration with major international partners, is moving quickly with broader E&P plans in the Black Sea, aiming at reducing the country's dependency on foreign energy sources. TPAO believes that the area holds reserves of up to 10 bn barrels of oil, and 1.5 trillion cubic meters of natural gas. The company has since gone as far as targeting self-sufficiency by the 2020s. However, any impact from Turkish E&P activity in the medium term is expected to be minimal, while even longer term prospects still remain far from being assured.<sup>188</sup>

Full control by Ankara over westwards gas flows would pose an additional strategic challenge for Athens as – despite notable improvements since 1999 – the two neighbouring countries continue to be faced with a number of serious bilateral issues. However, it remains unlikely that Turkey would decide to use the supply advantage over Greece to apply pressure to Athens, at least not if the same pipeline also supplied Italy and other major European countries, as is the case of ITGI.

Moreover, these problems seem now to have been overcome with regard to Nabucco, and there are indications that this may be part of a broader trend in Turkish energy policy. In July 2009, Turkish energy minister Taner Yildiz announced that the country was dropping its demand for direct marketing/use of 15 per cent of Nabucco gas. On balance, Yildiz claimed Ankara had nonetheless ensured security of supply through an intergovernmental agreement with Nabucco partners, whereby 50 per cent of the pipeline's capacity would be reserved for stakeholders.<sup>189</sup>

This is possibly the result of a convoluted process between the two negotiating parties – essentially, Ankara on the one side and all the remaining stakeholders on the other – which seemed to intensify, without pointing to a clear winner or solution in mid-2009. For example, great expectations had arisen from reports that Turkish objections on the matter had been dropped at the Prague conference of May 2009 – organized by the Czech presidency of the EU – but these reports were not confirmed, with analysts also seeing a link with Turkey's (problematic) EU accession negotiations.

By the same token, even as late as June 2009 the (then) new Turkish Energy Minister Taner Yildiz was advocating a different policy to the one he currently supports. Hence, at the time he let it be

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<sup>188</sup> Sunday's Zaman, *Turkey Seeks Sufficiency in Oil Production by 2023*, 12 April 2009, [www.sundayszaman.com](http://www.sundayszaman.com)

<sup>189</sup> ISI Emerging Markets, *Energy Minister Yildiz Comments on Nabucco Pipeline Deal*, 20 July 2009, [www.securities.com](http://www.securities.com)

known that, besides Nabucco, Turkey would also be seeking the addition of re-export clauses on the new supply contract with Russia, after the expiration of the current one in 2011.<sup>190</sup>

The substantial divergence between Ankara's old and new positions may be accounted for by a combination of factors, including increased levels of political pressure on the country from Nabucco commercial partners and their respective governments, the new leadership in the Turkish Energy Ministry following the Erdogan reshuffle of early May 2009, and the fact that the Turkish Ministry of Foreign Affairs is gradually assuming a more prominent role in the whole process. Specifically, the latter seems to have introduced to the process increased levels of cross-departmental coordination, efficiency/speed, and overall moderation in the Turkish position, since the start of 2009.<sup>191</sup>

Main beneficiaries from a wider policy shift on the matter would probably include ITGI and TAP, as there had been indications from Ankara that it was planning to extend demands for a 15 per cent share over total transit gas volumes to TAP partners StatoilHydro and EGL as well.<sup>192</sup> Against this backdrop, in April 2009 StatoilHydro announced it was actively considering alternatives to Turkey for bringing gas to Europe from its stake in Shah Deniz, including using either a northern route through Russia or a southern one through Iran. This position will probably have to be revisited in light of the new developments, even though relevant rhetoric may of course continue to apply, in order to put additional pressure on Ankara towards sealing a deal on more favourable terms for the Norwegian company.<sup>193</sup>

The planned revision of the Natural Gas Market Law of 2001 (possibly even by end-2009) may further facilitate the cooperation of Turkey with international partners on the matter. The Law is expected to remove a number of bottlenecks by means of strengthening the hand of BOTAS, notably by abolishing current provisions that oblige the company to transfer 80 per cent of its supply contracts to third companies by the end of 2009. This trend could be further enhanced by a possible merger between BOTAS and TPAO in order to allow the emergence of a vertically integrated company of greater scope – this seems to be supported by a number of stakeholders in Turkey. The latter could in turn offer the company (and the Turkish side in general) a new confidence as to its role as a guarantor

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<sup>190</sup> ISI Emerging Markets, *Government to Seek Re-Export Deal for Russian Natural Gas*, 8 June 2009, [www.securities.com](http://www.securities.com)

<sup>191</sup> Gareth Winrow, *Problems and Prospects for The Fourth Corridor: The Positions and Role of Turkey in Gas Transit to Europe*, June 2009, Oxford Institute for Energy Studies, [www.oxfordenergy.org](http://www.oxfordenergy.org)

<sup>192</sup> Gareth Winrow, *Problems and Prospects for The Fourth Corridor: The Positions and Role of Turkey in Gas Transit to Europe*, June 2009, Oxford Institute for Energy Studies, [www.oxfordenergy.org](http://www.oxfordenergy.org)

<sup>193</sup> Upstream Online, *StatoilHydro may Bypass Turkey*, 2 April 2009, [www.upstreamonline.com](http://www.upstreamonline.com)

of security of supply, thus allowing it to reach necessary compromises with its international partners where needed.<sup>194</sup>

However, a number of potential obstacles still remain. One of these is the agreement giving Turkey cheap gas imports from Azerbaijan. Baku would like to see this agreement changed, especially in light of its displeasure over the ongoing rapprochement of Ankara with Yerevan – with which Baku is in dispute over Nagorno Karabakh. In early 2009 Baku asked for a review of this pricing agreement.<sup>195</sup>

Moreover, in October 2009 Azeri President Ilham Aliyev said that his country was considering alternative energy routes to Europe for its natural gas, as Turkey's terms had become 'unacceptable'. This was arguably a means of applying additional pressure to the Erdogan administration in Turkey in retaliation for its efforts at rapprochement with Armenia, which had achieved a breakthrough in Switzerland a few days earlier.<sup>196</sup> Pending issues potentially affecting the viability of all new pipelines will therefore need to be resolved/clarified as soon as possible, in order to remove investor uncertainty and render the projects financially viable.

#### *Other possible sources*

There have been a number of proposals of additional supplies that could provide the still largely missing natural gas volumes for these pipelines, including Turkmenistan (the largest central Asian producer), Iraq, and even Egypt. All of these potential gas suppliers have expressed their interest in supplying European markets. For example, the interest of Ashgabat in diverting substantial Turkmen natural gas volumes to Europe intensified after main buyer Gazprom, which used to buy some 50 bcm of the 70 bcm of annual Turkmen gas production, stopped imports in April 2009, after a pipeline which carried approximately half of its export volumes exploded.<sup>197</sup>

The Turkmen side seems to believe that this was not an accident but aimed to save Russia from having to import gas volumes which, in a recessionary context, were surplus to requirements. In any case, Turkmenistan was losing a reported €1 bn every month in export revenues, and would arguably prefer not to have to suffer such losses again in the future. Against this backdrop, in July 2009 Turkmen leader Kurbanguly Berdymukhamedov declared that his country was ready to market excess natural gas volumes to Europe, including through Nabucco. Following up on this potential

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<sup>194</sup> Gareth Winrow, *Problems and Prospects for the Fourth Corridor: The Positions and Role of Turkey in Gas Transit to Europe*, June 2009, Oxford Institute for Energy Studies, [www.oxfordenergy.org](http://www.oxfordenergy.org)

<sup>195</sup> ISI Emerging Markets, *Turkish, Azeri Officials Still Negotiate Natural Gas Price*, 15 May 2009, [www.securities.com](http://www.securities.com)

<sup>196</sup> Upstream Online, *Azeri Boss Slams Turkey Pipe Route*, 16 October 2009, [www.upstreamonline.com](http://www.upstreamonline.com)

<sup>197</sup> Upstream Online, *EU Team Heads to Turkmenistan*, 30 July 2009, [www.upstreamonline.com](http://www.upstreamonline.com)

opportunity, in July 2009 the EU sent an exploratory delegation to Ashgabat to discuss energy cooperation.<sup>198</sup>

There have also been similar expressions of interest with respect to Nabucco from Baghdad and Cairo. In July 2009, Prime Minister Nuri al-Maliki of Iraq asserted that Europe could receive up to some 15<sup>o</sup>bcm/y from Iraq via Turkey, while Egypt's oil minister Sameh Fahmy argued that the planned Arab gas pipeline could serve as a potential source of gas for Europe.<sup>199</sup>

However, these options seem difficult to realize before 2015 as, for example, Turkmen exports to Europe presuppose construction of a sub-Caspian pipeline which, according to a section of international opinion, would require agreement of all littoral states including Russia and Iran, or at least land connections through the latter, which does not look achievable in the medium term, due to political issues. What is more, as of 2009 the two indispensable partners for the sub-Caspian pipeline project – Turkmenistan and Azerbaijan – have gone to arbitration on their maritime boundary in the Caspian Sea, and disputed oil and gas fields in that area.<sup>200</sup> This is a process which could take years to resolve. Finally, problematic application of human rights in Turkmenistan could also complicate efforts towards a deal with the EU.<sup>201</sup>

At the same time, starting at the end of 2009, gas exports from Turkmenistan to China will commence, reaching up to some 40 bcm/y by 2011, while at the same time existing exports to Iran are being expanded. In 2010–11, Turkmen exports could easily shift back to earlier trade patterns, with natural gas starting to flow back in large volumes to Russia. Berdymukhamedov in fact stated in September 2009 that his country would continue to strengthen energy ties with Russia, its 'historical and strategic partner'.<sup>202</sup> In the same framework, unconfirmed reports in October 2009 suggested that Gazprom was ready to resume imports of Turkmen natural gas within the year, even without a clear idea as to exact volumes that would be involved in the short term.<sup>203</sup> However, preliminary reports suggest that Turkmen export levels to Russia will be below around 10 bcm/y and at prices of

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<sup>198</sup> Upstream Online, *Ashgabat Offers Gas for Nabucco*, 10 July 2009, [www.upstreamonline.com](http://www.upstreamonline.com)

<sup>199</sup> Upstream Online, *Iraq Boosts Nabucco Supply Plans*, 13 July 2009, [www.upstreamonline.com](http://www.upstreamonline.com)

<sup>200</sup> News.Az, *Azerbaijan, Turkmenistan to Discuss Division of Caspian Sea in November*, 24 October 2009, [www.news.az](http://www.news.az)

<sup>201</sup> Upstream Online, *EU Team Heads to Turkmenistan*, 30 July 2009, [www.upstreamonline.com](http://www.upstreamonline.com)

<sup>202</sup> Upstream Online, *Turkmenistan to Talk Gas With Russia*, 26 September 2009, [www.upstreamonline.com](http://www.upstreamonline.com)

<sup>203</sup> Upstream Online, *Russia to Resume Turkmen Gas Flows*, 5 October 2009, [www.upstreamonline.com](http://www.upstreamonline.com)

approximately US\$200 per thousand cubic metres, substantially down on prices Moscow had to pay before the pipeline explosion.<sup>204</sup>

Plans for substantial Iraqi exports to Europe could easily fall victim to continuing – albeit gradually diminishing – political instability, and the lack of infrastructure development, which is still needed to realize the production potential. What is more, the rival Nabucco project seems to be targeting substantial supply volumes from the region of Iraqi Kurdistan by mid-next decade (some 8 bcm/y in its initial phase, and possibly even more in later phases) as reliance on Azeri gas volumes is becoming increasingly problematic for the pipeline consortium.<sup>205</sup> Similarly, Egyptian piped gas exports essentially presuppose the development of a pipeline network – for example the Arab pipeline – the realization of which seems to be fraught with difficulties, at least in the medium term. What is more, since June 2008 the Egyptian Ministry of Petroleum and Mineral Resources has imposed a moratorium on new natural gas exports until at least 2010, due to soaring domestic demand.<sup>206</sup>

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<sup>204</sup> ISI Emerging Markets, *Gazprom to Put Turkmenistan Gas Purchase Agreement Back Into Action*, 8 October 2009, [www.securities.com](http://www.securities.com)

<sup>205</sup> Upstream Online, *Nabucco Boss Names the Date*, 1 October 2009, [www.upstreamonline.com](http://www.upstreamonline.com)

<sup>206</sup> Jerusalem Post, *Egypt–Israel Gas Deal Taken to Court*, 1 September 2008, [www.jpost.com](http://www.jpost.com)

## Liquefied Natural Gas in Greece and Albania

### *Infrastructure and Supply*

Albania does not have any regasification capacity, nor does it operate any other LNG-related infrastructure. In contrast, since 2000, Greece has been able to import LNG via the terminal on the islet of Revithoussa, close to the capital (and main gas market) Athens. Revithoussa is equipped with two tanks having a combined storage capacity of some 144,000 cu.m, of which some 130,000 cu.m are in fact recoverable. Theoretical capacity at Agia Triada, which serves as the point of entry for Revithoussa and to which it is connected by an underwater 600 m/24 inch link, has stood at  $580 \times 10^3$  Nm<sup>3</sup>/hr, or some 4.6 bcm/y since February 2009.<sup>207</sup>

Following the completion of an upgrade aimed at improving capacity in 2007, Revithoussa raised its theoretical regasification capacity to 1,000 Nm<sup>3</sup>/hr. The upgrade also included the construction of a 14.5 MW co-generation unit, aimed at covering the terminal's own power needs. Maximum vessel tonnage/length/draft at Revithoussa stands at some 130,000 cu.m/290 m/11.8 m respectively. However, the Greek terminal continues to be unable to realize its full theoretical regasification potential for a number of reasons, notable among these being its lack of adequate storage capacity.

RAE estimates that, under the present conditions, real capacity in Agia Triada/Revithoussa stands at the level of some 2 bcm/y, which represents a utilization rate of less than 45 per cent. The RAE estimate is based on the assumption that one 75,000 cu.m tanker would berth/unload at Revithoussa every eight days, taking into account various storage and weather limitations at the terminal.<sup>208</sup>

However, as mentioned above, the jetty of Revithoussa is capable of receiving LNG tankers even in excess of some 130,000 cu.m and 11.8 m in tonnage and draft respectively, and has in fact received cargoes of up to 145,000 cu.m in 2009, suggesting that the RAE estimate may be too pessimistic in this context. The operator estimates real terminal capacity closer to the level of 1.95 million tons of LNG per year, or almost some 2.7 bcm of natural gas in the same period, which seems to be more realistic given the terminal's current configuration. However, even this improved figure remains far below Revithoussa's full theoretical import capacity, with a utilization rate of less than 60 per cent.

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<sup>207</sup> Information from DESFA, *The National Natural Gas System*, [www.desfa.gr](http://www.desfa.gr); RAE, *Report on the Security of Natural Gas Supply in Greece*, 2009, [www.rae.gr](http://www.rae.gr); and other local sources

<sup>208</sup> RAE, *Report on the Security of Natural Gas Supply in Greece*, 2009, [www.rae.gr](http://www.rae.gr)

Against this backdrop, in May 2009 DESFA assigned to French company Sofregaz a technical feasibility study for the construction of a third tank with an expected capacity of some 90,000 cu.m by end-2013. The aim of the project is to boost the terminal's receiving capacity, and possibly also increase send-out rates by an additional 40 per cent at the site. Sofregaz will also examine the scope for constructing truck unloading facilities in the area. Funding for basic design and construction has reportedly already been secured through the country's NSRF.<sup>209</sup>

Assuming that one 145,000 cu.m vessel is able to reach Revithoussa and unload its full cargo every eight days, by the time the logistical upgrade is complete and operational around 2013–14, the real send-out rate at the terminal could reach 755 Nm<sup>3</sup>/hr. That would give Revithoussa a real capacity of almost 4 bcm/y, or a real capacity increment of almost 1.3 bcm/y compared to 2009 levels.

Importantly, this figure does not take into account other potential upgrades at the terminal, notably improvements in the berthing facilities necessary for the accommodation of larger vessels; improvements in its send-out rate; and improvements in Agia Triada's import rate, which could all boost further utilization rates at the terminal. DEPA claims (theoretical) post-investment capacity at the Greek terminal will stand at up to some 5.3 bcm/y.<sup>210</sup>

DEPA has contractual relations with Algerian upstream and marketing company Sonatrach on take-or-pay terms for deliveries of between 0.51 bcm and 0.68 bcm/y until 2020, with the two sides reportedly being in negotiations for the supply of an additional 0.5 bcm/y.<sup>211</sup> By the same token DEPA has signed additional supply contracts with international operators British Gas and ENI, as well as analogous preliminary agreements with Qatari companies Qatar Gas and Ras Gas.<sup>212</sup>

Furthermore, in 2006 Athens signed an MoU with Cairo for increased cooperation on LNG, while in July 2008 DEPA also signed an MoU with GDF SUEZ on the supply of LNG to the Greek market, as well as potential investments of up to €1 bn in Greece and beyond. The latter includes provisions on the possible construction of a new LNG terminal and also E&P activities in the broader region. In this framework, DEPA is reportedly asking for up to 1 bcm/y from GDF SUEZ in order to cover projected

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<sup>209</sup> DESFA, *The Study for Construction of a Third Storage Tank at Revithoussa Has Been Assigned*, 29 May 2009, [www.desfa.gr](http://www.desfa.gr)

<sup>210</sup> DEPA, *Annual Report 2008*, [www.depa.gr](http://www.depa.gr)

<sup>211</sup> SEES, *Measures and Means for a Viable and Competitive Energy Policy*, 2008, [www.sees.gov.gr](http://www.sees.gov.gr)

<sup>212</sup> More information available in Kathimerini, *Αναβάλλεται η είσοδος της ΔΕΠΑ στο ΧΑ*, 16 October 2008, [www.kathimerini.gr](http://www.kathimerini.gr)

supply imbalances in the country. The MoU was expected to see the establishment of contractual obligations between the two sides around mid-2009.<sup>213</sup>

Finally, as of mid-November 2009 Mytilineos Group was to become to be the first operator outside DEPA to import LNG directly in order to supply its 334 MW co-generation power unit in Aghios Nikolaos (Mytilineos/Endesa). The Group was reportedly seeking to take advantage of favourable spot market conditions, as its supply contract for piped gas with DEPA allows it flexibility in the order of 30 per cent (gas supply of between 80 per cent and 110 per cent) of annual contract quantities. Against this backdrop, Mytilineos was, reportedly, to import some 65,000 cu.m through Revithoussa by end-November 2009. The Group may seek a similar arrangement for its 444 MW Aghios Nikolaos CCGT which is currently under construction and expected to come online in 2010.<sup>214</sup>

## ***Planned infrastructure***

### **Greece**

DEPA is reportedly examining the possibility of an international JV of two or more partners for the construction of a new LNG terminal in Kavala, northern Greece. The company has already taken over 33 per cent of phosphoric fertilizers company PFI in partial fulfilment of the latter's €50 m debt to it. PFI owns a 250 hectare site in Kavala, which DEPA sees as suitable for the construction of its new terminal. The Greek company has already completed a preliminary geological survey of the PFI site at Kavala to determine suitability for the terminal.<sup>215</sup>

An alternative to Kavala would be an offshore LNG terminal. However, the broader Kavala region would enjoy a competitive advantage compared to other possible Greek offshore locations, because of some scope for storage in the form of depleted gas fields, in and around the upstream Prinos site in the area of Thasos.<sup>216</sup> Preliminary estimates bring costs for this project to the level of €500 m, with an envisaged completion date of 2015. A northern Greek LNG terminal would then be connected to pipeline links ITGI and IGB, and thence also to the gas networks of neighbouring Balkan countries.<sup>217</sup> Regasification capacity at the site is planned to be 3–5 bcm/y.<sup>218</sup>

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<sup>213</sup> Ta Nea, *Ελληνογαλλικές πιζίνες στο αέριο*, 3 August 2008, [www.tanea.gr](http://www.tanea.gr)

<sup>214</sup> Reporter.gr, *Μυτιληναίος: Σφήνα στο μονοπώλιο ΔΕΠΑ*, 11 November 2009, [www.reporter.gr](http://www.reporter.gr)

<sup>215</sup> See the interview of Makis Papageorgiou, CEO of DEPA, with Imerisia, 26 July 2009, [www.imerisia.gr](http://www.imerisia.gr)

<sup>216</sup> Ta Nea, *Ελληνογαλλικές πιζίνες στο αέριο*, 3 August 2008, [www.tanea.gr](http://www.tanea.gr)

<sup>217</sup> Imerisia, *Διπλό ενδιαφέρον για τον ελληνοϊταλικό αγωγό*, 14 April 2009, [www.imerisia.gr](http://www.imerisia.gr)

<sup>218</sup> See the interview of Makis Papageorgiou, CEO of DEPA, with Imerisia, 26 July 2009, [www.imerisia.gr](http://www.imerisia.gr)

DESFA and PPC are also considering the construction of a regasification terminal in Crete, as the island remains unconnected to the country's main electricity grid and thus relies on expensive gasoil for power generation. PPC in particular is examining the possibility of the construction of an LNG terminal, a pipeline network, and two CCGT units with a combined 500 MW, to replace diesel-fired power generation on the island. However, as oil prices subsided from their mid-2008 highs, the economic rationale for this project has become less compelling. As a result, the project is on hold, while the two companies examine all available options. A pre-feasibility study is planned to begin by end-2009.<sup>219</sup>

In parallel, the Greek government and PPC are reportedly examining the possibility of direct imports of CNG from Egypt to Crete. MEDGAS, a 60–30–10 JV between Greek group Copelouzos, Egyptian EGAS, and Arabia Gas reportedly signed an MoU with PPC in May 2009, for the latter to evaluate its proposal for direct CNG imports to the Mediterranean island.<sup>220</sup>

This could prove to be a cheaper alternative to LNG, given that it has no need for costly infrastructure development. However, the technology for CNG transport has not yet proved itself to be commercially viable and, if it were in fact to move forward, it would be the first such application in the world.<sup>221</sup> Against this backdrop, Athens has indicated to Cairo its willingness to assess its proposal on technical and economic grounds, and see if it would be interested to take it forward.

Finally, unconfirmed reports suggested a Russian interest in building a new LNG terminal in western Greece, potentially to supply the western Balkans and Italy. However, nothing concrete has subsequently emerged in this context.

## **Albania**

### *Introduction*

There has been a string of suggestions in recent years for the development of LNG infrastructure, and associated projects, in Albania. For the most part, these revolved around the construction of LNG terminals, related distribution links, power plants, and relevant electricity interconnections around

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<sup>219</sup> Kathimerini, *To 2009 η μελέτη για την εγκατάσταση φυσικού αερίου στην Κρήτη*, 16 March 2009, [www.kathimerini.gr](http://www.kathimerini.gr)

<sup>220</sup> Energia.gr, *Πρόταση Κοπελούζου και Αιγυπτίων στη ΔΕΗ για Συμπιεσμένο Αέριο στη Κρήτη*, 29 May 2009, [www.energia.gr](http://www.energia.gr)

<sup>221</sup> See Aleksandar Kovacevic, *The Potential Contribution of Natural Gas to Sustainable Development to South Eastern Europe*, March 2007, Oxford Institute for Energy Studies, [www.oxfordenergy.org](http://www.oxfordenergy.org), for a discussion of the potential for CNG transportation in the Black Sea

River Vjosa (Aoos) in the area of Fieri, some 100 km south-west of the capital Tirana.<sup>222</sup> Against this backdrop, in October 2009 the European Commission reiterated its determination to support energy projects in Albania through the European Bank for Reconstruction and Development (EBRD) and the European Investment Bank (EIB), including proposed LNG terminals that could contribute to overall European security of supply.<sup>223</sup>

However, the small domestic market and fragmented broader Balkan market, the low price environment in Albania and beyond (which is further aggravated by the problem of widespread electricity theft and other losses), the threat of growing competition from power generation units in Albania and neighbouring markets (which will be fired by lower-cost fuels such as coal and, potentially, also nuclear), and the lack of progress on developing a regional gas pipeline network that would allow the fuel to be channelled to more profitable markets further afield, raise serious questions about the prospects of these projects, at least before 2015.

What is more, Albanian LNG projects face serious competition from similar plans elsewhere in the Adriatic, which are probably able to offer better prospects to investors. For example, in July 2009 Italian authorities gave their approval for the construction of an 8 bcm/y LNG terminal in Trieste by 2012.<sup>224</sup> Completion of this and other Italian LNG projects may be far from assured, due to strong environmental and other concerns, but competition for the LNG projects in Albania is potentially even stronger from Adria LNG. The Adria LNG consortium is pushing forward with the construction of a €600–800 m terminal on the island of Krk in Croatia by 2014, with a planned regasification capacity of 10–15 bcm annually.<sup>225</sup> Despite seeing various setbacks in 2009 – such as the withdrawal of original partner RWE and the relevant ambivalence of local Croatian players in participating – Adria LNG continues to enjoy a competitive position, and accordingly stands a good chance of moving forward with construction.<sup>226</sup> What is more, strategic energy investor MOL is reportedly putting pressure on the Croatian government to allow price hikes in retail natural gas prices in the country, something which could render the Croatian market even more competitive in terms of attracting investors.<sup>227</sup>

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<sup>222</sup> Staffetta Quotidiana, *LNG, EGL-TEE-ASG Green Light in Albania*, 29 March 2007, [www.staffettaonline.com](http://www.staffettaonline.com)

<sup>223</sup> ISI Emerging Markets, *EU Pledges Support for Energy Sector Development*, 12 October 2009, [www.securities.com](http://www.securities.com)

<sup>224</sup> Upstream Online, *Italy Gives Key Nod for Trieste LNG Terminal*, 19 July 2009, [www.upstreamonline.com](http://www.upstreamonline.com)

<sup>225</sup> ISI Emerging Markets, *LNG Terminal – Strategic Interest for Croatia*, 6 July 2009, [www.securities.com](http://www.securities.com)

<sup>226</sup> Upstream Online, *Adria LNG Shrugs Off RWE Exit*, 27 October 2009, [www.upstreamonline.com](http://www.upstreamonline.com)

<sup>227</sup> ISI Emerging Markets, *MOL Directing Croatian Energy Policy*, 3 June 2009, [www.securities.com](http://www.securities.com)

## *ASG Power*

In this framework, in April 2006 the international consortium ASG Power signed an MoU with the Albanian government for the investment of approximately €1.5 bn towards development of the LNG infrastructure required to meet both domestic and export needs, with an envisaged three year timetable. ASG Power has reportedly already spent some US\$16 m towards preliminary studies, while Italian oil and gas contractor Saipem has accordingly carried out the terminal's design, and has also been given the right of first refusal with regard to the project's EPC. More specifically, the ASG project reportedly includes construction of:<sup>228</sup>

1. an LNG terminal with a regasification capacity of up to 10 bcm/y (and possibly up to 20°bcm/y);
2. a 1,200 MW CCGT, to be constructed in a piecemeal fashion with some 400 MW in each phase;
3. electricity interconnections to third countries with a planned capacity of up to 500 KV
4. a 120 km subsea connection linking Fieri with Brindisi of some 8 bcm/y capacity.

The initial agreement between the two sides provides for the supply of the domestic market with up to 2 bcm/y at below international prices in order to meet growing Albanian power needs, with the remaining 8 bcm/y destined for the more profitable Italian market through the subsea interconnection. The company reportedly hopes to be supplied by Qatar, Oman, and Algeria among others, but no detailed negotiations have taken place.

No concrete progress has been reported on this project so far, despite the initial three year time framework, which would normally expire in 2009. What is more, any substantial progress should in fact be seen as unlikely in the current context of tight credit, supply problems, and uncertain demand patterns. Any start date prior to 2013/2014 is unrealistic, and previously envisaged deadlines of around 2011 do not seem feasible. While the 2014 deadline may be more realistic, it still does not resolve the structural problems facing the project.

## *Gruppo Energia Falcione*

In December 2008, Trans-European Energy BV/Falcione Group of Italy signed a €1 bn agreement for the construction of an LNG terminal near Levan in the Fieri region, with handling capacity of some

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<sup>228</sup> For more information on the proposed LNG project of ASG in Albania see Albanian Economy, *Our Race is Against Time And Bureaucracy, ASG Power CEO Says*, 2 March 2007, [www.albanianeconomy.com](http://www.albanianeconomy.com); Platt's LNG Daily, *Falcione Says it has Done Proper Studies for Proposed Albanian Terminal*, 16 December 2008, [www.platts.com](http://www.platts.com); and LNG Unlimited, *Second Contender Comes to Surface on Albanian Coast*, 19 December 2008, [www.lngunlimited.com](http://www.lngunlimited.com)

8°bcm/y, which could, in the future, be expanded to 12 bcm/y at the behest of the company and/or the Albanian government.<sup>229</sup>

The terminal will reportedly be able to unload ships of up to some 140,000 cu.m, while the project's plans also include the construction of two storage tanks with a combined capacity of some 280,000°cu.m, and a possible third tank in the future. Finally, the project provides for the construction of a 120 bar subsea pipeline, to facilitate delivery of the fuel to the (substantially) more profitable Italian market.

According to Energia Falcione, detailed design studies (with Technip) and preliminary environmental studies have already been completed and submitted to the Albanian government, which has issued the Italian company with the necessary permit for its planned terminal. In this context, Falcione is reportedly targeting the launch of pre-FEED studies. As in the case of the ASG project, the initial agreement of Falcione with the government in Tirana provides for the supply of the local market with at least 500 mcm per year at below-market prices, to help meet the growing energy needs in this Balkan country (although this is significantly less than the 2 bcm/y pledged by ASG Power), with the remainder of available volumes targeting supply of the lucrative Italian natural gas market.

Gruppo Energia Falcione has been active in Italy for the past 20 years, and distributes up to some 1°bcm/y in the local market. Moreover, the company reportedly already has a long-term supply contract with Algerian producer Sonatrach for up to 500 mcm/y between 2008 and 2019 (with the possibility of extending it to 2026) while it is also attempting to secure additional supply options (including from other LNG producers) to meet its growing feedstock needs. Potential completion of the Falcione project is not envisaged before 2014 but, as with the ASG timetable discussed above, even this may be rather optimistic.

Importantly, both the Falcione and ASG projects in Albania are completely independent of developments on the TAP pipeline and its own planned LNG infrastructure. TAP partner EGL holds a licence from the Albanian authorities to construct an LNG terminal in the same region, and also to link it to its planned subsea pipeline to Italy, with the latter being the offshore part of the broader TAP

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<sup>229</sup> Information from ICIS Heren, *Italian Gruppo Falcione Signs Deal for 8 Gm<sup>3</sup>/Yr LNG Site in Albania*, 2 December 2008, [www.heren.com](http://www.heren.com); Albanian Economy, *Falcione Ready to Build 1 Bn Euro Re-Gasification Plant in Albania*, 3 December 2008, [www.albanianeconomy.com](http://www.albanianeconomy.com); Platt's LNG Daily, *Falcione Says it Has Done Proper Studies for Proposed Albanian Terminal*, 16 December 2008, [www.platts.com](http://www.platts.com); LNG Unlimited, *Second Contender Comes to Surface on Albanian Coast*, 19 December 2008, [www.lngunlimited.com](http://www.lngunlimited.com); and also from Energia Falcione, *Gruppo Falcione Signs a 1 Bn Euro Agreement with the Albanian Government for an Onshore Regasification Terminal near Levan*, 9 January 2009, [www.energiafalcione.com](http://www.energiafalcione.com)

project, thus being based on the same business rationale as the proposed Falcione and ASG projects. However, this aspect of the broader TAP project in the country seems to be on hold.

Furthermore, in March 2009 the Albanian prime minister visited Qatar where, among other issues, he discussed the possibility of a €2.5 bn Qatari investment towards development of LNG infrastructure in Albania. This would include construction of an LNG regasification plant, a 1,200MW CCGT, and associated marine infrastructure in Fieri. Sali Berisha, the Albanian prime minister, has reportedly already expressed his strong support for further cooperation between the two countries in this context. However, the willingness to support the Qatari project so openly, at the expense of other pending LNG projects with very similar rationales and business plans, suggests that their progress may in fact be unlikely in a time frame of five to six years.<sup>230</sup>

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<sup>230</sup> Balkans Business News, *Qatar Eyes Albanian LNG Regasification Project, Tirana to Open Embassy in Doha*, 12 March 2009, [www.balkans.com](http://www.balkans.com)

## Conclusions and Summary

### *Albania*

Albania is set to face major challenges to its attempt at gasification in the coming years – hoping to meet fast growing domestic energy needs on the back of broad macroeconomic gains, as well as to address overreliance on hydro for power generation purposes – due to a number of related development obstacles. First, the option of LNG imports (by constructing one or more terminals on the country's Adriatic coast) is faced with serious cost issues, as the low-price environment in both the Albanian and neighbouring electricity markets (further aggravated by the problem of widespread electricity theft and other losses) undermines profitability. In addition, the LNG projects face fierce competition from similar plans in potentially more suitable locations/markets such as Croatia.

The fragmented nature and low profitability of the wider Balkan market, which could otherwise serve as an export destination for LNG delivered to Albania, does not help in overcoming these problems. At the same time, the profitable Italian market – which is a primary export target for most of these LNG projects – is similarly targeted by a number of other players, who aim to supply it with their own volumes of natural gas. Some of these competitors (like ITGI) are at a more advanced stage of development, and can offer cheaper piped gas and as such enjoy an advantage over Albanian LNG projects. Against this backdrop, the whole rationale for the high investment costs associated with the development of LNG infrastructure in Albania becomes problematic.

Second, the prospect of flows of piped gas to Albania in the coming years is marred with difficulties, as construction of the necessary physical links continues to face supply, economic, and political problems. Furthermore, the main pipeline hope of Albania, TAP, does not seem to enjoy the necessary support in Greece. The other pipeline project of interest to Albania, IAP, is also facing delays, as well as serious structural problems. Moreover, IAP is currently planned to serve northward gas flows coming from TAP, rather than being the two-way pipeline which would be necessary if it were to supply Albania. The power options for Tirana are also limited, as was evident in discussions with Zagreb during 2009, over a joint 1,500 MW nuclear station close to the border with Montenegro, at a cost of some €4 bn.<sup>231</sup>

Nevertheless, the construction of a direct link to ITGI, which seems to have an advantage in the broader pipeline race, could see the first international natural gas volumes flow to the country before 2015. The latter is of course conditional on two factors: a) ITGI does not exceed substantially its

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<sup>231</sup> Balkans Business News, *Albania and Croatia Plan Nuclear Plant on Montenegro's Doorstep*, 15 April 2009, [www.balkans.com](http://www.balkans.com)

envisaged 2013 deadline, which of course is not assured at this stage; and b) Albania successfully negotiates its connection to the project with Greece. Importantly, any such pipeline would most probably have to come under the control of Greece's DESFA in order for the latter to commit to such a project. The revised National Energy Strategy of Albania projects demand levels of up to 1.8 bcm/y by 2020, but the decrepit state of existing Albanian gas infrastructure suggests that this may be too optimistic. Hence, even very limited northwards flows from ITGI via Greece could support Albania in the initial phases of its gasification.

## ***Greece***

In contrast to the Albanian case, Greece already enjoys a number of international gas links, including the flexibility of an LNG terminal at Revithoussa. The main question for Greece is whether enough gas will be available to meet growing needs in the coming years, and what the best policy towards achieving this goal should be. A number of policymakers and analysts in Greece believe the country is at risk of running out of gas within the coming decade.

This is indeed a real threat, but the evidence presented above suggests the Greek side still has room for manoeuvre. Greek natural gas needs are being met through a relatively balanced mix of three entry points. Even if demand were to rise to the level of some 8.1 bcm/y projected by DEPA for 2015 – and this remains in serious doubt given the current recessionary pressures and their expected long term impact – Athens seems to be relatively well placed to meet the challenge.

First, as a result of ongoing upgrades, the entry point on the Bulgaria–Greece border (Sidirokastro) will have at least 0.8 bcm/y of spare capacity for a total of some 3.8 bcm/y, from the currently contracted levels of some 3 bcm/y. In fact, 2008 imports from Sidirokastro were even lower than that at 2.8 bcm, suggesting a 1 bcm margin. Importantly, this additional capacity can be utilized without any further substantial upgrades to the system, while supplementary gas volumes could even flow to the country from the planned reversible natural gas link between Greece and Bulgaria, once the pipeline becomes operational sometime in 2012 (initial phase).

The real challenge for Athens thus lies in successfully exploring the option for the supply of additional volumes from Russia, in addition to the extension of the current natural gas supply contract for the period 2016–40. However, agreement on this might presuppose speeding up the process of meeting Greece's contractual obligations towards Russia for infrastructure development in Acheloos River and elsewhere in the country; or swapping the Sykia and Peukofyto hydro projects in Acheloos with other power generation projects in Greece as requested by Gazprom in October 2009 (if other

options fail); and/or facilitating Gazprom subsidiary Prometheus Gas in supplying the Enelco power plant in Livadia directly, as has similarly already been requested by Moscow.

With regard to the latter, Enelco Livadia is projected to come on stream in 2011 and will probably require some 500 mcm/y in its initial phase. Importantly in this context, Prometheus Gas already enjoys a legal right to supply natural gas to the Greek market, albeit suffering from related provisions that it can only do so once DEPA has disposed of all its annually contracted quantities. On the matter of infrastructure development, according to Greece's previous contractual obligations towards the Russian side, Prometheus Gas has already won a €53.4 m contract for the EPC of a compressor station in N. Mesimbria, Thessaloniki in collaboration with Russian company Stroytransgaz.

Furthermore, the previous conservative Greek administration was reportedly pushing towards unblocking the pending Acheloos projects by 2012. The new socialist administration has not yet clarified its position on the matter, while the referral of the case by the Greek State Council to the European Court of Justice of the European Communities in October 2009 for a preliminary ruling suggests no action can be taken until early 2011. However, that would still leave a theoretical window of opportunity to meet the previously envisaged 2012 deadline. These developments suggest that the Greek side is – theoretically at least – in a position to negotiate the supply of increased gas volumes from the Russian Federation in the next couple of years.

Second, according to local reports, Athens has already reached a preliminary agreement with Baku for the supply of an additional 1 bcm/y through TGI from 2010 onwards, for at least five years. If indeed implemented, the deal will raise the contractual obligations of the Azeri side towards Greece to the level of some 1.75 bcm/y. This seems in any case to be the limit of gas volumes DEPA can transport through TGI for own use once the Poseidon interconnector is constructed at full capacity. Specifically, upon completion of Poseidon, DEPA will need to allow Caspian gas to flow further westwards at a level of some 1.2 bcm/y, plus additional volumes of (almost) 8.65 bcm/y, in order to fulfil respectively the 10 per cent TPA obligation and the 80 per cent capacity share obligation towards project partner Edison.

The Azeri agreement will obviously also need to be confirmed in practice, in order to be able to make an actual difference to Greek consumers. This uncertainty is further aggravated by the lack of concrete progress on issues that, if left unresolved, could hamper gas flows reaching the country. One such issue is the ongoing negotiation between Turkey and Azerbaijan over the current preferential pricing of Turkey's gas imports from Azerbaijan, and Turkey's overall role in the transit process of natural gas to Greece, specifically whether it will continue to enjoy a resale option, or what will be the level of transit fees/commission it will charge its western neighbour. However, since mid-2009 analogous problems with regard to the Nabucco pipeline seem to have been overcome, and there are indications that this may be part of a broader trend in Turkish energy policy, to the benefit also of projects like ITGI.

Third, existing LNG import infrastructure at Revithoussa allows imports of almost an additional 1.7°bcm/y, as only approximately 986 mcm (out of a total real current capacity of almost 2.7 bcm/y) was used in 2008, and DEPA has reportedly already requested additional volumes of a combined 1.5°bcm/y from existing supplier Sonatrach and potential partner GDF SUEZ. What is more, the Greek side is planning the construction of a third storage tank in its Revithoussa terminal with an envisaged capacity of some 90,000 cu.m by end-2013, which will boost utilization rates further.

Assuming that by the time the logistical upgrade is complete and operational around 2013–14, one 145,000 cu.m vessel will be able to reach Revithoussa and unload its full cargo every eight days. Real send-out rate at the terminal could then reach the level of 755 Nm<sup>3</sup>/hr. That would give Revithoussa a real capacity of almost 4 bcm/y, or a real capacity increment of approximately 1.3 bcm/y compared to 2009 levels. Importantly, this figure does not take into account other potential upgrades at the terminal, notably improvements in its berthing facilities in order to be able to accommodate larger vessels; improvements in its send-out rate; and improvements in Agia Triada's import rate, which could all boost further utilization rates at the terminal.

Hence, by 2015 Greece could achieve a total real import capacity increment in excess of some 2.3°bcm/y compared to 2008 levels, or a real import volume increment of more than 5.3 bcm/y (again, compared to 2008 levels), the highest level in Greek gas imports seen so far. What is more, these figures exclude any additions that could come from the TAP and South Stream interconnections, which look less likely to be able to contribute additional natural gas volumes to the Greek energy mix by 2015. The figures also exclude contributions that could come from possible reverse flows of the planned two-way IGB link, as well as possible CNG imports that may come following Cairo's proposal in May 2009 on the issue. All the above projects have the potential to increase further gas availability for the country.

The supply/demand balance outlook for Greece is thus conditional on Athens realizing the country's infrastructure potential, notably completing planned investments at Revithoussa, from where the bulk of the incremental LNG is going to come in 2015. At the same time, it is conditional on Athens succeeding in securing the additional gas volumes needed to sustain high utilization rates in both existing and planned import infrastructure. If Greece fails to attract new gas volumes, the country will almost inescapably head towards substantial supply problems. Under such a supply crunch scenario, serious imbalances will probably start to be seen in the country from 2012/2013 onwards, by which time the bulk of greenfield gas-fired power generation will have been commissioned. By that date, gas-fired power generation alone will require some 5 bcm/y, compared to only some 4.43 bcm/y of available natural gas from contracted volumes.

In contrast, if the country proves successful both in moving forward with planned investments as well as in sustaining high utilization rates with regard to its import infrastructure, it will find itself in a position of not only being able to meet growing domestic needs until 2015, but also of being able to export volumes to neighbouring countries. In fact, even if natural gas demand in the country were to rise to the optimistic 8.1 bcm levels per year envisaged by DEPA, Greece would still enjoy an export capacity option of some 1.4 bcm/y – which already exceeds the level of volumes with which Greece has agreed to supply Bulgaria. Moreover, exportable surpluses for Greece could be much higher in 2015 if

- a) demand at home proves to be closer to the somewhat less optimistic projections of SEES;
- b) upgrades at the Sidirokastro entry point improve import capacity beyond the currently estimated 3.8 bcm/y threshold;
- c) the country moves forward with additional investments in logistics and berthing at Revithoussa;
- d) any one of the CNG, TAP, and South Stream options proves able to make a meaningful contribution to the Greek energy mix.

*Table 18: Potential import capacity and real imports increment, 2008–2015*

<b>Point of entry</b>	<b>Imported 2008 (bcm/y)</b>	<b>Capacity 2008 (bcm/y)</b>	<b>Capacity 2015 (bcm/y)</b>	<b>Capacity Increment (bcm/y)</b>	<b>Import Increment (bcm/y)</b>
Sidirokastro	2.80	3.80	3.80	-	1.00
Kipoi	0.44	0.70	1.76	1.06	1.32
Agia Triada	0.99	2.70	3.97	1.27	2.98
<b>Total</b>	<b>4.22</b>	<b>7.20</b>	<b>9.53</b>	<b>2.33</b>	<b>5.31</b>

*Source:* Interpreted by the author based on information from operating companies and other national sources

Exports to the neighbouring Balkans and beyond seem in any case to be a strategic priority for Greek operator DEPA, and plans to construct the IGB as well as a new LNG terminal in Kavala probably aim to increase Greece’s influence in a number of Balkan countries. That would indeed offer DEPA – possibly in partnership with an international operator such as Edison or GDF SUEZ – the opportunity of entering those retail markets and of benefitting from expected growth. In this vein, the Greek government is already liaising with Romanian counterparts for the gradual extension of IGB to Central Europe through the integration of the national grids.

However, talk of a rapid construction of a second LNG terminal in Greece may be premature, unless of course such a project were to fall under the aegis of a grand commercial–political bargain between Greece and Bulgaria for enhancing security of supply, penetrating the western Balkan markets, and providing political leadership in the region. Problems for Greece in the coming five to six years are more likely to come from a lack of actual/contracted gas volumes, rather than from inadequate import infrastructure.

A final investment decision on the Kavala LNG project can thus be postponed until a number of important related issues that could have an impact on the terminal’s profitability have been clarified for potential investors. These include the full impact of the international financial and economic crisis on demand levels in Greece and the neighbouring Balkan markets; the progress of planned Greek import capacity upgrades; the availability of gas volumes that would allow improvements in associated infrastructure utilization rates; and the progress of major greenfield energy projects (including gas pipelines and competitor/substitution fuel projects such as coal and nuclear in the broader region).

It is likely that at least some of these issues:

- The impact of the financial crisis on primary energy demand in the countries in question.
- The availability of the agreed 1 bcm/y from Azerbaijan through the Kipoi point of entry.
- The additional 0.8 bcm/y (at least) of Russian gas through Sidirokastro.
- The new LNG supplies through Revithoussa – including the requested 1 bcm/y from GDF SUEZ and 0.5 bcm/y from Sonatrach (and potentially also from other LNG suppliers which need to find markets in the currently unfavourable spot market).
- The funding availability/construction progress for important energy projects, including natural gas pipelines by competitors, and also projects relating to competing fuels, that can affect natural gas supply and demand patterns in the broader region.

will be clarified in the next couple of years. It is also possible that, by then, there will be more concrete information on the overall availability of gas volumes that could flow westwards from major producer states, notably those in the Caspian region.

Assuming a 36–48 month construction period, Athens could indeed still construct an LNG terminal in Kavala by end-2015, provided that the project proves necessary by then in order to pre-empt envisaged shortages in the domestic natural gas market and beyond. Potential investors such as DEPA/DESFA and other international gas operators should thus use the time to complete FEED studies which will incorporate an assessment of the emerging supply/demand balance in the region by early 2012, and thus allow them to move forward with actual construction immediately upon their completion, if conditions so require. Obviously, the successful fruition of at least some of the major proposed pipeline links, especially Nabucco and South Stream, would undermine utilization rates of a new LNG terminal, thus rendering the whole project considerably less profitable.

### ***Summary of Conclusions***

Planned Albanian gasification, aimed at meeting fast growing energy needs, is set to be a challenge, as the low-price environment both there and in neighbouring markets hampers investments in greenfield LNG capacity, especially in the current cash-strapped environment. Meanwhile, plans to connect to new gas links inescapably suffer from delays in their implementation. Nonetheless, construction of a direct link to ITGI via Greece seems to be closer to realization than other regional pipeline projects, and could see the first volumes flow to the country before 2015. The revised National Energy Strategy of Albania projects demand levels of up to some 1.8 bcm/y by 2020, but the

decrepit state of existing Albanian gas infrastructure suggests that this may be too optimistic. Hence, even very limited northwards flows from ITGI could support Albania in the initial phases of its gasification.

Greece is a fast-growing gas market which enjoys a number of international gas links (and has more planned), including the flexibility of an LNG terminal in Revithoussa. Demand is likely to contract for the first time this year due to the global financial crisis, but the structural trend is clearly upwards as a result of an expanding gas-fired power generation sector and increasing penetration in the residential and commercial sectors. Demand in 2015 will probably be in the range of 7.1–8.1 bcm/y but Athens seems to be relatively well placed to meet the supply challenge. By 2015, Greece could have a total real import capacity increment in excess of 2.3 bcm/y compared to the current levels of 7.2 bcm/y, or a real import volume increment of more than 5.3 bcm/y compared to 2008 levels of 4.2 bcm/y, assuming full utilization of existing capacity and planned logistical upgrades at the Revithoussa LNG terminal by 2013.

The supply/demand balance outlook for Greece is thus conditional on Athens succeeding in securing the additional gas volumes needed to sustain high utilization rates in both existing and planned import infrastructure. If it fails to do so, serious imbalances will appear from 2012/2013 onwards, when the bulk of new gas-fired power generation will have come online. In contrast, if it succeeds both in moving forward with planned investments as well as in sustaining high utilization rates, it will find itself in a position of not only being able to meet growing domestic needs, but of also being able to export natural gas volumes to regional countries. Exports to the neighbouring Balkans and beyond seem in any case to be a strategic priority for Greek gas operator DEPA, and plans to construct the IGB as well as a new LNG terminal in Kavala would extend the influence of Greece over a number of Balkan countries.

However, rapid construction of a second LNG terminal in Greece would be premature, unless as part of a grand commercial–political bargain between Greece and Bulgaria for enhancing security of supply, penetrating the Balkans, and providing political leadership in the region. A final investment decision should thus be delayed until uncertainties stemming from the current global financial crisis have been clarified. Investors should use the time to complete FEED by early 2012, including assessment of the emerging regional supply/demand balance, in order to allow construction by 2015, if conditions allow. Successful fruition of even some of the major proposed pipeline links in the coming decade would undermine utilization rates of a greenfield Greek LNG terminal, thus rendering the whole project considerably less profitable.