South East Europe: Regional Gasification Study

Draft Final Report: Albania Market Report

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1 Physical, Demographic and Political Profile

Albania is located in the western part of the Balkan Peninsula covering an area of 28,748 sq km. The Adriatic and Ionic Seas wash it along a coastline of 362 km. There is a narrow strip of lowlands along the coast, but about 70% of the country is covered by rugged mountains, which are not easily accessible. The highest mountain is Korab (2,753 m).

The country has a continental climate with nearly 95% of the rain falling in the winter. The lowlands have mild winters, averaging about 7° C, while summer temperatures average 24° C and humidity is high. The high altitude regions have cold winters and hot summers. Lowland rainfall averages from 1,000 mm to more than 1,500 mm annually, with the higher levels in the north. Rainfall in the upland mountain ranges is higher, ranging from 1,800 mm to as high as 2,550 mm in some northern areas. Figure 1 shows a map of Albania with its major cities.

Figure 1 Albania map

Source: CIA World Factbook

The population is estimated to be 3.6 million[1] (density 123 people per sq km), with a population growth rate of 0.5% pa. The urban population is about 45% of the total

[1] Latest known in 2007.

(1.6 million). Besides the capital city of Tirana, which has 800,000 inhabitants, the principal cities are Durrës, Elbasan, Shkodër, Gjirokastër, Vlorë, Korçë and Kukës.

For many generations, Albania was subject to periods of foreign domination and dictatorship. In the decades after the Second World War, there was a totalitarian, isolationist communist government in place. This was dismantled in the early 1990s. Protest over the first pluralistic elections held in 1991 led to fresh elections in 1992. Since that time, Albania has been regarded as an emerging democracy.

After three years of negotiation, Albania signed a Stabilisation and Association Agreement (SAA) with the European Union in June 2006. Once this has been ratified by all EU member states, Albania can be considered to be a potential 'candidate country' for EU membership. The SAA process envisages Albania incorporating the EU *acquis communautaire* into the national statute books. This is to be part of the broader policy harmonisation that will be a necessary precursor to full membership of the EU.

2 Economy

Albania had a GDP of about US$ 9.1 billion in 2006, equivalent to US$2,899 per capita (considerably higher in purchasing power parity terms). The economy has been performing well in recent years with average GDP growth in excess of 5.5% pa, inflation around 3% and a reasonably manageable 6% current account deficit. Exports are about US$1.2 billion (textiles, footwear, tobacco, vegetables, food, beverages and machinery) and imports US$2.6 billion (chemicals, machinery, minerals, fuels and electricity).

Albania has a relatively equitable distribution of income (as measured by the Gini coefficient), but only a mid-range human development index. A large share of household income (34%) is derived from transfers, including 14% from workers' remittances. Of the balance, 26% is derived from agriculture and the 40% from non-agricultural employment. While there is considerable scope for intensification of agriculture, the overall strategy is for the Albanian economy to move from an agriculture-based economy to a more industrial and service-based economy.

Albania scores rather well on indices of international freedom (66 in the world in the 2007 Index of Economic Freedom), but is regarded as a high risk country from the viewpoint of an international investor. Between 2000 and 2005, the country nonetheless attracted 8 PPI projects worth over US$1.5 billion and overall foreign direct investment is running at about US$400 million per annum.

3 Energy Sector

3.1 Energy Resources

Albania's most significant indigenous energy resources are coal and hydropower. Installed electricity generation capacity 1,684 MW, of which hydro constitutes 86%,

the remainder being 2 small oil/gas generation plants. Installed capacity, supplemented by imports, is insufficient to meet national demand. To fully meet demand from national generation would require domestic generating capacity to be increased by as much as 600 MW. With electricity shortages constraining economic growth, expansion of electricity capacity in generation, transmission and distribution is a national priority.

In the past Albania had a significant gas sector but there is virtually no gas now. Domestic gas production has declined from 1 bcm in 1982 to 0.01 bcm in recent years. The key question for Albania is whether a new gas industry should be developed, considering that it requires an almost entirely new or rebuilt gas transmission and distribution system.

Due to its geographical location and past political isolation, Albania is today the only country in Europe, not linked to interstate gas transmission systems. Albania has a completely isolated, national gas distribution system, which was established and gradually developed during the time period 1967 - 1985 for the gas supply from its indigenous sources (gas and oil fields) to the consumers and is largely located in the southern part of the country.

The very small remaining gas activity of Albania is concentrated in the southern part of the country supplying the oil refinery industry with limited volumes of indigenous produced gas from the fields of Devjake and Frakull and associated gas from the oil fields near Ballsh. Other industries such as the Fier fertilizer plant that used to be major natural gas consumers in the 70's have either shut down or reduced their production volumes.

There are two oil refineries at Balsh and Fier. The combined capacity is 1 Mt/y, but both are presently running at 40-50% of capacity. The technology in use is antiquated, producing a quality and mix of products which is not well suited to current environmental requirements and what the economy needs for future growth.

3.2 Energy Usage

In Albania's domestic sector, the primary competitors for natural gas are electricity, LPG and wood. Table 1 shows the proportion of the major fuels currently used in households for cooking and space heating.

Table 1 Household fuel use

	Cooking (%)	Space heating (%)
Electricity	83.6	70.0
LPG	3.0	6.0
Wood	13.4	24.0

Source: Energy Information Administration

In respect of oil consumption, Table 2 shows the historical consumption in five-year intervals and also projection up to 2020, based on a time series linear regression approach.

Table 2 Oil consumption 1990 - 2020

	1995	2000	2005	2010	2015	2020	2025
'000 bbl/d	14.8	21.0	28.9	40.1	51.2	62.3	71.1

Source: Energy Information Administration and ECA calculations

Hydropower generation accounts for the majority of Albania's electricity consumption. Table 3 shows the historic trend and forecast consumption of electricity based on hydropower generation in Albania.

Table 3 Hydro consumption 1990 - 2025

	1995	2000	2005	2010	2015	2020	2025
TWh	4.2	4.5	5.4	5.9	6.5	7.1	7.7

Source: Energy Information Administration and ECA calculations

The average residential electricity price in Albania was 5.95 USc/kWh for year 2006.

3.3 Energy Development Plans

It is the Government's intention to address the deficit in electricity generation primarily through establishing new gas-fired power stations, mainly in the south of the country (largest hydro plants are in the north). With power generation providing the anchor loads, a gas transmission and distribution system can be justified, thereby allowing gas to be used for other energy purposes in the country. In addition to expanding generation, there is also an urgent need to upgrade, rehabilitate and reinforce the electricity transmission and distribution system. The priorities were laid out in the 2003 Power Sector Action Plan, this leading to a number of projects which are in varying stages of completion. This plan is due to be revised in 2007.

Albania has a Law on Energy Efficiency in place which provides for energy auditing, energy labelling and funding of energy efficiency programmes. The same law also covers the promotion of renewable energy sources.

4 Gas Sector

4.1 Policy and Legal Framework

Existing legislation with respect to the natural gas sector includes the exploration, production and transportation of natural gas in Albania. The sector is subject to the rules governing the exploration and production of hydrocarbons, as set out in Law No 7746/1993, which encompasses petroleum, gas and their by-products. There is also Law No 8450/1999 on the processing, transportation and trading of oil, gas and their by-products.

Future legislation with respect to the natural gas sector must address regulatory issues regarding the natural gas infrastructure and networks, in-country supply of natural gas, special provisions for the usage of natural gas in electricity production, transportation of natural gas through transit networks etc.

4.2 Regulatory Bodies

At present, with no gas industry, there is no regulator for gas in Albania. However, it is anticipated that the responsibilities of the Albanian Electricity Regulatory Authority (ERE)[1] will in future be widened to include gas.

At present, there is commercial supervision of the oil and gas sector by the Ministry of Economy, Trade and Energy, which is the holder of publicly owned energy assets. The Competition Authority is required to cooperate with the Regulatory Authority on issues related to the abuse of market power in the field of energy.

4.3 Institutional Framework

The Ministry of Economy, Trade and Energy (METE) administratively head the oil and gas sector in Albania. Under the METE, the National Petroleum Agency (NPA) is the responsible government entity for oil and gas licensing activities in Albania. Along with NPA the Directorate of Hydrocarbons is also responsible for the drafting and implementation of governmental political issues related to the oil/gas sector.

Beside these government entities there are other institutions under direct control of the minister as follows:

- Oil and Gas Institute in Fier as a scientific unit

[1] web: www.ere.gov.al

- National Energy Agency (NAE), responsible eg for drafting Energy Strategy
- Institute for Pressurized Vessels and the Institute for Product Quality as Inspection Authorities

The Albanian Petroleum Corporation (APC), established in 1998 as a 100% state-owned company and controlled by a supervisory board headed by the minister, is the operative unit in the oil/gas sector.

APC supervises three companies:

- ALBPETROL, responsible for exploration and production
- ARMO, responsible for Refineries (Ballsh, Fier) and fuel wholesale - retail activities
- SERVCOM, supporting Albpetrol in field development and drilling

Each of the above companies is in varying stages of being privatised.

4.4 Fuel Prices

There is no major gas market in Albania. However the prices of the following fuels are available in Table 4.

Table 4 Fuel prices[1]

Sector	Unit	USD
LPG	kg	1.1
Light Fuel Oil	Liter	0.5
Heavy Fuel Oil	Liter	0.5
Wood	Cubic meter	25.0
Gas (small)	Cubic meter	190.0
Lignite	Ton	56.8

[1] As at end September 2007. 1 USD = 88 Lek.

4.5 EC Gas Commitments

As a signatory to the Energy Community Treaty, Albania is committed to adhering to the EU Electricity and Gas Directives. At present, much of the effort is directed to meeting the electricity provisions, but the process is also underway for the gas sector.

4.6 City Distribution Demand Studies

Tirana

Tirana is Albania's capital city and largest manufacturing centre, with a population of approximately 700,000. The main industries are concerned with the manufacture of agricultural machinery, textiles, pharmaceuticals and metal products. Figure 2 shows a map of Tirana and the proposed network plan.

Figure 2 Tirana distribution map

Residential / commercial areas occupy approximately 22.5 km², giving a population density of around 31,111 per km², with industry occupying approximately 2.5 km²

Satellite imagery suggests that industrial areas are to be found in a number of locations around the city, but predominantly to the north-west and east of the city centre.

There are a number of district heating plants operating in the city with a combined capacity of 246 MW, supplying approximately 22,000 residential and 850 commercial customers. The plants use heavy fuel oil.

Data provided indicates a total number of households of 153,846, which are estimated to comprise 115,385 (75%) apartments and 38,462 houses. Based upon an annual estimated consumption of 152,40 kWh and peak consumption of 3m^3/hr per residential customer, residential demand is estimated at 2,344,613MWh per annum, with a peak hour demand of 34,6154m^3/hr.

Using the sectoral demand assumptions set out above results in the following potential demand estimates shown in Table 5.

Table 5 Potential demand

Sector	Annual demand	Peak hour demand
	MWh	Cu.m/hr
Residential	2,344,613	346,154
Commercial	976,922	43,111
Industrial	586,153	21,556
Total	3,907,688	410,820

The proposed route of the Energy Community (EC) Ring System passes in close proximity to the western perimeter of the city. It is suggested that gas would be supplied to the city from the EC Ring via an off-take feeding a City Gate Station located to the west of the city. Gas would be metered and the pressure reduced to 16bar for supply to a 13.8km / 30in diameter and 5km / 12in diameter high pressure steel distribution system.

The HP distribution system would supply the 4bar medium pressure network, which would in turn supply customers.

Estimated capital costs for the gas supply system are shown in Table 6.

Table 6 Estimated capital costs

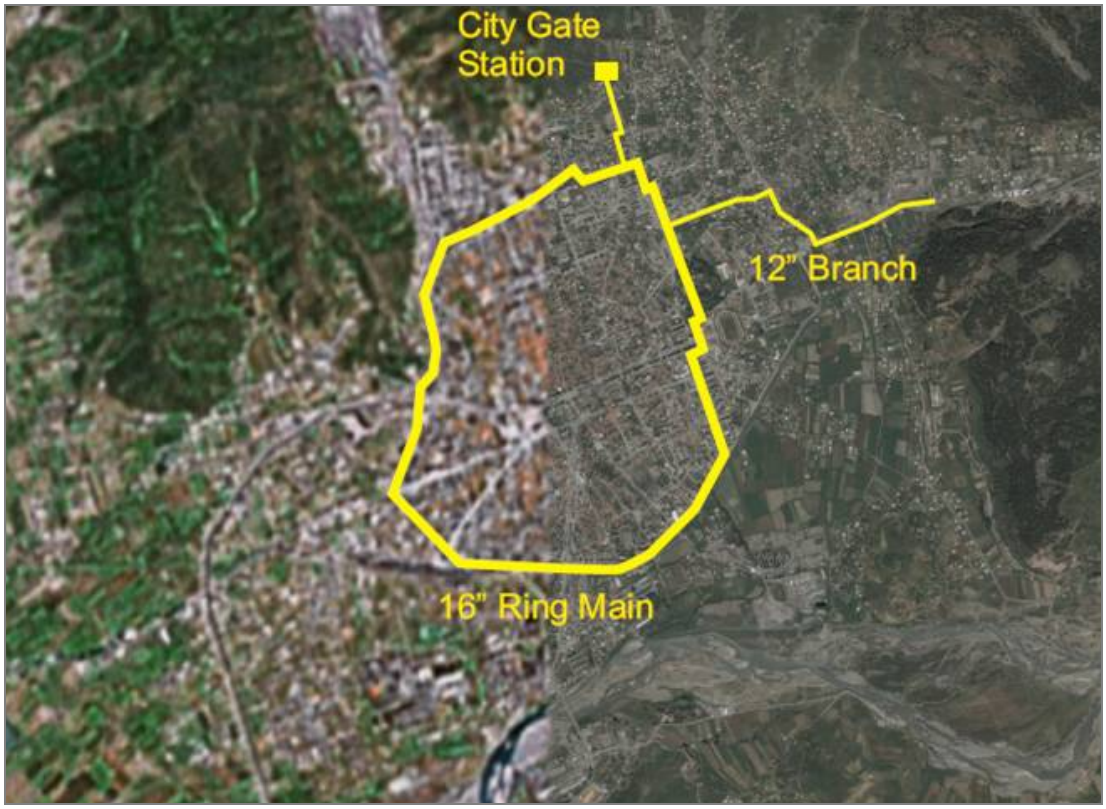
Item	Total Cost
	US$ million
EC Ring Connection	5.0
Spur Line	0
City Gate Station	5.0
HP Distribution System (16bar Steel)	14.7

Item	Total Cost
MP Distribution System (4bar PE)	30.8
Residential Connections	124.9
Residential Installations	36.5
Industrial and Commercial Connections	17.2
Total	234.2

Elbasan

Elbasan is a city with a population of approximately 123,210. It is made up of a Residential and Commercial area of around 3.8 km^2 and an industrial area covering approximately 0.4 km^2. This gives a population density of 32,424 per km^2. Figure 3 shows a map of Elbasan.

Figure 3 Elbasan distribution map



Data provided shows a total number of households to be 35,000, estimated to comprise 26,250 be apartments and 8,750 houses. Based upon an annual estimated consumption of 15,240 kWh and peak consumption of 3m^3/hr per residential customer, residential demand is estimated at 533,400 MWh per annum, with a peak hour demand of 78,750m^3/hr.

Using the sectoral demand assumptions set out above results in the following potential demand estimates:-

Table 7 Potential demand		
Sector	**Annual demand**	**Peak hour demand**
	MWh	Cu.m/hr
Residential	533,400	78,750
Commercial	222,250	9,808
Industrial	133,350	4,904
Total	889,000	93,462

It is suggested that gas would be supplied to the city from the proposed EC Ring via a 35km / 12in. diameter spur line, which will transport gas to a City Gate Station located to the north of the city. Gas would be metered and the pressure reduced to 16bar for supply to a 6.7km / 16in diameter and 1.7km /12in diameter high pressure steel distribution system.

The high pressure distribution system would supply the 4bar medium pressure network, which would in turn supply customers.

Estimated capital costs for the gas supply system are shown in Table 8.

Table 8 Estimated capital costs	
Item	**Total Cost**
	US$ million
EC Ring Connection	5.0
Spur Line	11.2
City Gate Station	4.0
HP Distribution System (16bar Steel)	4.0
MP Distribution System (4bar PE)	7.0
Residential Connections	28.4
Residential Installations	8.31
Industrial and Commercial Connections	3.9
Total	71.8

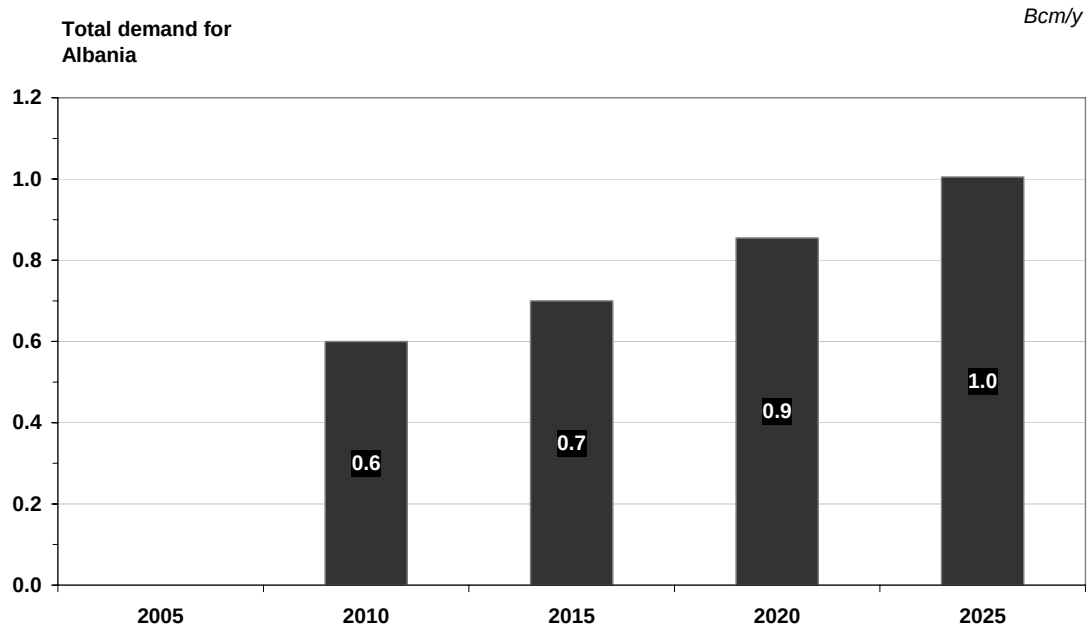
4.7 Overall Demand for Gas

Gas production increased to an absolute maximum of 940 mmcm per year in 1982. At this time the thermal power plants and fertiliser industry were the key consumers of gas followed by other industrial users. The residential sector did not play a significant role and never accounted for more than a few percent of the total consumption of gas. Due to the location of the gas and oil fields and the availability of pipeline infrastructure, the use of gas focused on the area of Fier, which represents about 70% of the gas market in Albania over the past years.

After the decline of gas production in the first half of the 1980s, priorities in gas consumption changed rapidly and the use of gas in thermal power plants was stopped and most of the units were converted to fuel oil. Furthermore, due to the shortage in gas production, most industrial plants were also converted to fuel oil with the exception of the fertilizer industry. However during the 1990s along with the recession of the Albanian industry, the fertilizer industry reduced gradually its production considerably and finally ceased operations. Today the gas market has nearly disappeared and locally extracted gas is mainly used in the refineries of Ballsh and Fier.

Figure 4 shows the forecast of gas consumption up to 2025. The forecast is based on a gas penetration method, which assumes consistent year-on-year growth in gas consumption over the period. Demand is driven both by connecting domestic customers through gasification projects and also fuel switching by the large users in Albania, such as power plants and industrial plants. Potential large industrial consumers of gas are the cement works at Elbasan and the brick factory near Tirana. These plants are currently using coke and mazut (HFO).

Figure 4 Gas demand to 2025



Source: ECA projections based on gas penetration.

Plans for the future development of the Albanian gas sector will mainly focus on deliveries to the industrial and power sectors.

4.8 Current Gas Supplies

Gas fields already have some pipeline infrastructure in place from Durres to Delvina. The pipeline network has a length of 498 km and connects all the previously operational gas fields (Povelec, Divjaka, Frakulla, Panaja and Delvina) with consumers located in Fier, Vlora, Elbasan, Lushuja, Ballsh and Durres. Gas infrastructure in many places is non-operational and needs rehabilitation. Much of the network needs to be totally replaced, but rights of way will be useful.

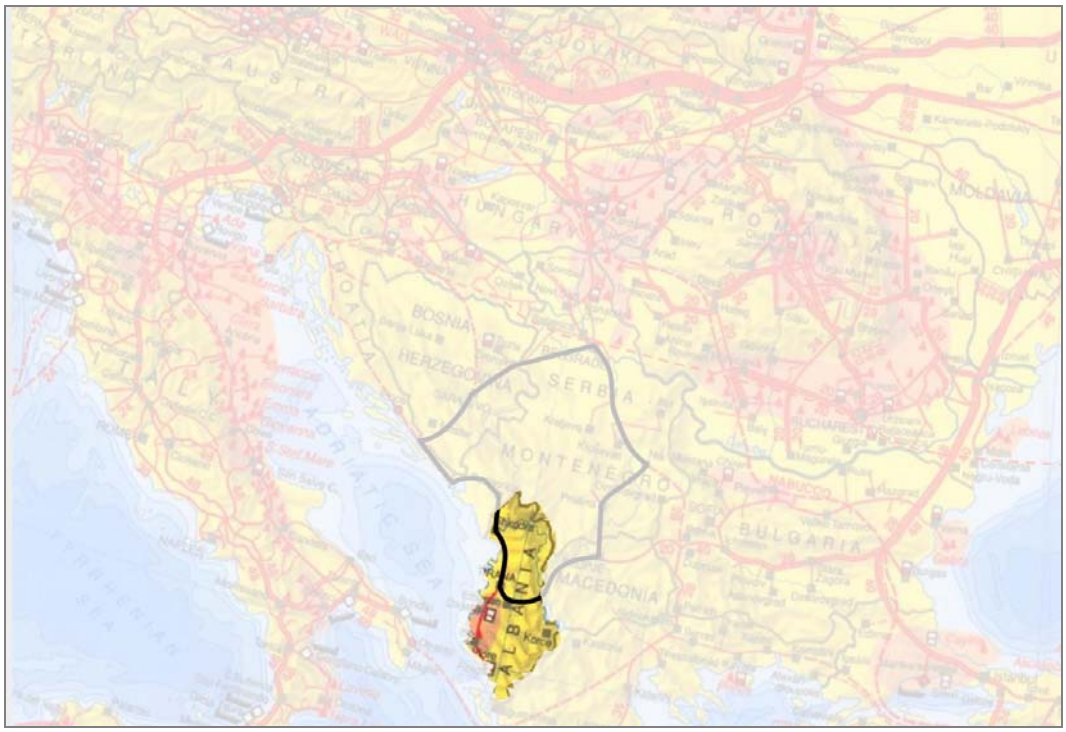
4.9 Anchor Loads

The power sector of Albania is in immediate need of base load thermal power generation plants. Considering the present situation, where the existing HFO fired thermal generation units in Fier are in need of rehabilitation and the fact that the remaining units are outdated, new natural gas fired generation could be constructed at coastal sites and be of combined cycle (CCGT) type units, most likely in Vlore region. Given the current supply deficit (estimated to be as much as 600 MW) and prospects for sustained economic growth, the 500 MW anchor CCGT load needed to underpin the Southern Balkan Ring would be a minimum target to plan for by 2011. The annual natural gas consumption for such an increment in CCGT capacity is estimated to be in the order of 0.5-0.6 bcm per annum.

4.10 Future Gas Supply Options

As can be seen from Figure 5, Albania is well placed to take advantage of the 24-inch Southern Balkans Ring. From Podgorica in Montenegro, the ring will enter Albania from the north, run to Tirana and then turn eastwards to link with Tirana in Macedonia.

Figure 5 EC Ring - Albania



Of the major truck pipeline projects under consideration, the principal ones which could supply gas to the ring from points in Albanian territory would be TGI or TAP. If one or other of these trunk lines is built, southern Albania could be directly supplied with gas via branch lines from the trunk carrying Caspian or Russian gas. In the absence of the TGI or TAP projects, supplies to the south would require a branch pipeline to be built from the ring itself.

Albania has several suitable sites for gas storage, including a salt dome in Dumere in central Albania (>1 bcm) and the depleted Diviaka field in the south (up to 1 bcm). By connecting these into the ring, Albania could provide regional storage facilities for the ring members.

There has been speculation about a possible LNG storage plant and re-gasification facilities in the Vlora region, proposed by the Danish company Trans-European Energy B.V. The proposed plant capacity would be 4 bcm per annum and would specifically link Albania with Italy[1].

There are also reports (as of April 2006) of a potential LNG terminal and power plant in Fier. According to reports citing AET (Azienda Elettrica Ticinese), the terminal will cost US$1.9 billion and have capacity to import 7.1 million tones per annum (mtpa) of LNG, equivalent to 10 bcm/year. It would be accompanied by a combined cycle power plant to be built in three phases of 400 MW each.

Italy could receive 8 bcm of gas/year from the terminal with the remaining 2 bcm available for use in Albania. This would depend on an interconnecting pipeline,

[1] The Energy in Albania Newsletter, June 2004

currently proposed by Swiss utility EGL, coming to fruition. AET also said that in an emergency some gas might be available for use in the Swiss canton of Ticino[1].

The need for power generation capacity increases the prospects for gas development in Albania. Probably the most attractive initial prospect would be to bring supply via an offtake point on the Greek border, from the Greek system via the FYR of Macedonia or from the Bulgarian system via the FYR of Macedonia.

The numerous supply possibilities are summarised Table 9.

Table 9 Supply options of immediate interest to Albania

Transmission connection	Contract source/s	Delivery and physical flows	Physical source and swaps
Greek border	Contract for LNG via Revithoussa	Backhaul through Greek system. Physical molecules flow to Athens. Russian gas flows to Albania through the Greek transmission system.	Swap LNG delivered at Revithoussa for Russian gas contracted to Greece **at the Greece-Bulgaria border** and pay Greek transmission fees. Yields transmission cost savings in Greece.
FYR of Macedonia border	Contract for LNG via Revithoussa	Backhaul through Greek system. Physical molecules flow to Athens. Russian gas flows to Albania directed from Bulgaria via FYR of Macedonia.	Swap LNG at Revithoussa for Russian gas contracted to Greece **on the Bulgarian system** and pay Bulgarian exit fees and Macedonia transmission fees. Yields transmission cost savings in Greece and Bulgaria.
Greek border	Contract for Algerian gas via TransMed	Backhaul through Greece-Italy Poseidon pipeline and Greek system. Physical molecules flow up into Italian system. Russian and/or Caspian gas flows to Albania though the Greek system reduces Greece-Italy flows.	Swap Algerian gas at Mazara del Vallo for Caspian gas at the Greece-Albania border (or at the Turkey-Greece border and pay Greek transmission fees). Yields transmission cost savings on Poseidon and maybe some transmission cost savings in Greece.

[1] http://acturca.wordpress.com/2006/05/07/albania-could-import-lng-from-2009-on-swiss-led-plans/

Transmission connection	Contract source/s	Delivery and physical flows	Physical source and swaps
FYR of Macedonia border	Contract for Algerian gas via TransMed	Backhaul through Greece-Italy Poseidon pipeline and Greek system. Physical molecules flow up into Italian system. Russian and/or Caspian gas flows to Albania though the Greek system and via Macedonia reducing Greece-Italy flows.	Swap Algerian gas at Mazara del Vallo for Caspian gas at the FYR of Macedonia-Albania border (or at the Greece-FYR of Macedonia border and pay Macedonian transmission fees, or at the Turkey-Greece border and pay the Greek and Macedonian transmission fees. Yields transmission cost savings on Poseidon and maybe some transmission cost savings in Greece.
TAP	Contract for Russian and/or Caspian gas	Conventional delivery via the Greek system and through Albania, with offtake in Albania	Russian and/or Caspian gas. No swaps required.
TAP	Contract for Algerian gas via TransMed	Backhaul through TAP direct to Albania. Physical molecules flow up into Italian system. Russian and/or Caspian gas flows to Albania though the Greek system reducing Greece-Italy flows on TAP.	Swap Algerian gas at Mazara del Vallo for Caspian and/or Russian gas at the Greece-Albania border and pay Greek transmission fees. Yields transmission cost savings on TAP. May yield some transmission cost savings in Greece.

Albania could also transit delivered via the Greek system (and/or the FYR of Macedonia system) northwards to Montenegro. Such a pipeline should be sized at constant diameter along its length, with a view to it subsequently forming part of the Energy Community gas transmission ring described in detail elsewhere in this report.

5 Conclusion

Therefore supporting measures for developing the Albanian natural gas sector would include:

- ❑ Initiate direct negotiations with FYROM and Greece for the possible cross border interconnection of Albania
- ❑ Negotiate gas supply with potential suppliers
- ❑ Enact legislation in accordance with the EU gas directive

- Drafting of State level energy sector legislation, enactment of energy sector laws and the establishment of a State level energy regulatory authority
- Encourage private sector capital to carry out the necessary supply side investments
- Further work to improve the coordination of Albania's energy policy with regional gas policy including issues related to the improvement in security of supply.
- Requirement of a major anchor load to kick-start the gas market