

Energy

The Development of Energy Systems in the Balkans (1945–1990)

The reconstruction after World War II and later on, the enforced and hasty development of the industrial sector (particularly of heavy industry), characteristic for the Cold War era, made the qualitative and quantitative development of energy production essential. All the first (three-year or five-year) plans of the command economy in the region's countries included the improvement of the energy sector in some form or another. In the 50s and 60s the energy supply firstly tried to meet the demands of industry (even if not exclusively), and decisively favoured the use of domestic resources. Such were the Maritsa-iztok energy complex in South Bulgaria, established in 1957 on outcrop lignite, or a series of Albanian hydraulic power plants on the Drina from 1947 onwards. From 1951–1960 a 10 year electrification plan was carried out in Romania: thermal power plants (Doicești, Filipești, Borzești, Paroșeni) and hydro cascades (on the Ialomița and Sadu rivers or near Bicaz) were set up, increasing power production nearly sixfold between 1938 and 1960. A similar increase could be observed during the same period in Yugoslavia, where primarily coal fuelled and hydraulic power plants were set up.

In the following one and a half decades, the Balkan countries laid more emphasis on facilitating private consumption and on the establishment of integrated electricity networks within the individual countries, as well as on the construction of additional power plants. Village electrification programs were launched, district-heating plants were set up and the power networks began to aggregate. In the 60s electricity reached more than half of the Romanian villages, in contrast to the 10% before World War II. The domestic energy resources of the Balkan countries were unable to supply this profitably and to cope with the hasty development of power-consuming industries, the import of energy therefore gradually increased during the decade. This

primarily meant hydrocarbon and coal from the USSR (in Bulgaria, Romania) and to a lesser extent petroleum from third world countries, e.g. the Middle East (in Romania, Yugoslavia).

As a result of the growing demand on energy, the oil crises and strategic considerations, several countries tried to reduce their dependence on Soviet hydrocarbons. Romania and Yugoslavia made serious efforts to exploit the potential in their resources for hydraulic power. Splendid examples of this are the combined hydro plants on the Danube, Iron Gate I. (Romanian *Porțile de Fier*, Serbian *Djerdap*) (2,100 MW) opened in 1972 and Iron Gate II in 1984 with a considerably lesser capacity (balancing plant). As an alternative to the use of water-power, the more extensive use of coal-fuelled power plants was a way to substitute the increasingly expensive hydrocarbons (once again Yugoslavia and Romania, with coal reserves). Bulgaria – with a low hydro-power potential and scarce resources of coal – saw nuclear energy as a solution to decrease their energy dependence. The power plant at Kozloduj was opened in 1974 and has been expanded several times since then. For a short period in the late 80s Bulgaria occupied third place in the world ranking in terms of per capita output of nuclear energy.

In the 80s the Chernobyl disaster resulted in a setback in the construction of nuclear plants, while the growing price of hydrocarbons and an environmentally more conscious society hindered the building of thermal plants. However, alternative sources of energy have not yet gained ground in South Eastern Europe. The economic transformation at the turn of the 90s led to the shutdown of the exceptionally inefficient plants, and power consumption of the economy declined dramatically. Besides that, growing prices of energy also meant a restraint on private consumption.

The Main Features of South East European Energy Networks

Except for the Romanian resources in hydrocarbons, the South East European countries are poor in terms of energy sources. Due to the expected economic growth, the weight of imports is bound to rise. At the same time, the region only constitutes a relatively narrow segment of the total European market. The aggregate power consumption of these countries only slightly exceeds that of Poland. The only viable role is in transit. Although South East Europe does not have substantial transit capacities, the future transportation routes from the Middle East or pipelines from the Caspian Sea area might well pass through its territory. These trans-European networks would connect the region into the European energy infrastructure.

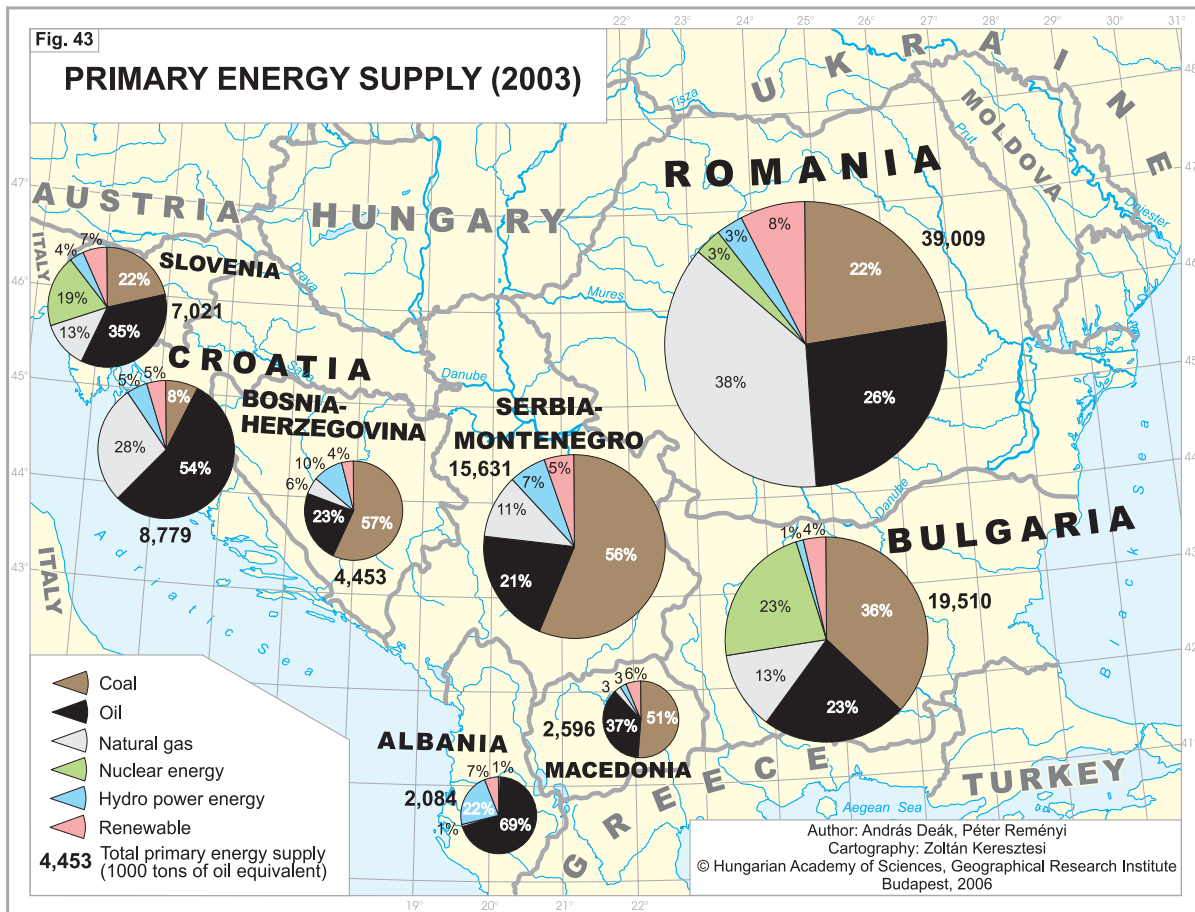
The main indices of power consumption fall behind those of West and Central European rates. This effectively indicates a low efficiency of power consumption in material production, and the low rate of consumption per capita. The regional average of power consumption per GDP unit is triple the developed Western rate and it is also 50% higher than in the Central Eastern European countries. In the case of power consumption per capita the figures show a reversed picture. Most of the Balkan countries have reached only a relatively low rate, which is similar to industrial societies in the second half of the 20th century. Meanwhile, in the Visegrád countries the boom in power consumption is in full swing (as a result of the emergence of consumer societies) and these countries are catching up with the rate in the old OECD nations. Nevertheless, the countries of the region show a very heterogeneous picture in terms of the nature of power consumption. Slovenia boasts of the effectiveness and consumption parameters almost matching those of the developed industrial countries, whereas Bulgaria and Serbia and Montenegro report strikingly low indexes.

The energy systems of the region's countries have been traditionally based on two kinds of fuel: coal and oil. This one-sidedness of the primary energy balances was particularly salient in the countries of the former Yugoslavia. The Yugoslavian energy system is based above all on self-sufficiency, relying on domestic coal. However, this originally one-sided bal-

ance was further distorted by the break-up of Yugoslavia and the accompanying war. These events brought about not only a more dramatic fallback in consumption than the Central European rate – except for Slovenia and Croatia – but also subordinated national energy policy to considerations of security policy. Thus, by the turn of the millennium, in the former Yugoslav area a highly fragmented system of energy supply emerged with only partial restoration of the former infrastructural links. In Macedonia, Serbia, Montenegro, Bosnia and Herzegovina the share of coal exceeds half of the total power consumption (*Figure 43*). In contrast to this, Croatia – in spite of the decreasing domestic output – favored petroleum, which could be imported by sea and it became the dominant fuel, similarly to the situation in Albania.

The primary energy balances are more uniform in the other countries of the region. It can be explained by the very high rate of self-sufficiency in the case of Romania, as this country produces 74% of its total consumption. The Romanian power supply, relying on domestic hydrocarbon resources, stands on several pillars. The unique regional nuclear capacities facilitated the situation of Bulgaria and Slovenia. The reactor in Krško, Slovenia (623 MW) and the four blocks in Kozloduj, Bulgaria (altogether 2,722 MW) supplied one fifth of the total power consumption in these countries. The latter one produces electricity for export on a large-scale basis. Furthermore, both countries have access to gas and electricity pipeline networks, Slovenia via the western, Bulgaria via its eastern (Russian) relations. Hence diversification of energy supply has become viable by relying on import.

In the future, an increase in consumption exceeding the European average can be predicted for the whole region. Considering the region's economic recovery and the commencement of growth, capacities must be expanded in the foreseeable future. At the same time, the growth rate of consumption is expected to be tempered by the improvements in energy efficiency. Nevertheless, this will not reach a degree that would save the relatively deteriorated infrastructure from a need for modernisation. In this respect the countries of the region will have to



face significant investments. At the same time, the surplus should be covered almost exclusively through import, which will manifest itself (according to the European trend) mainly in an increase in natural gas consumption. Currently, the consumption of natural gas in the region is below the European average. This trend will lead to the spreading of new energy sources, mainly in the area of the former Yugoslavia and could eventually re-arrange the structure of power consumption in a matter of decades. At the same time, such an increase of proportion in the energy balances can be understood most of the times as a type of diversification policy.

The energy networks of South Eastern Europe do not form a unified system. Both Yugoslavia and Albania constituted almost completely closed infrastructural units until 1990; they did not have solid access either to the Soviet or to the West European networks. Social, as well as security considerations called for self-sufficiency, or limited dependency at worst. Contrary to this, Romania and Bulgaria both attached themselves (in the frame of the CMEA)

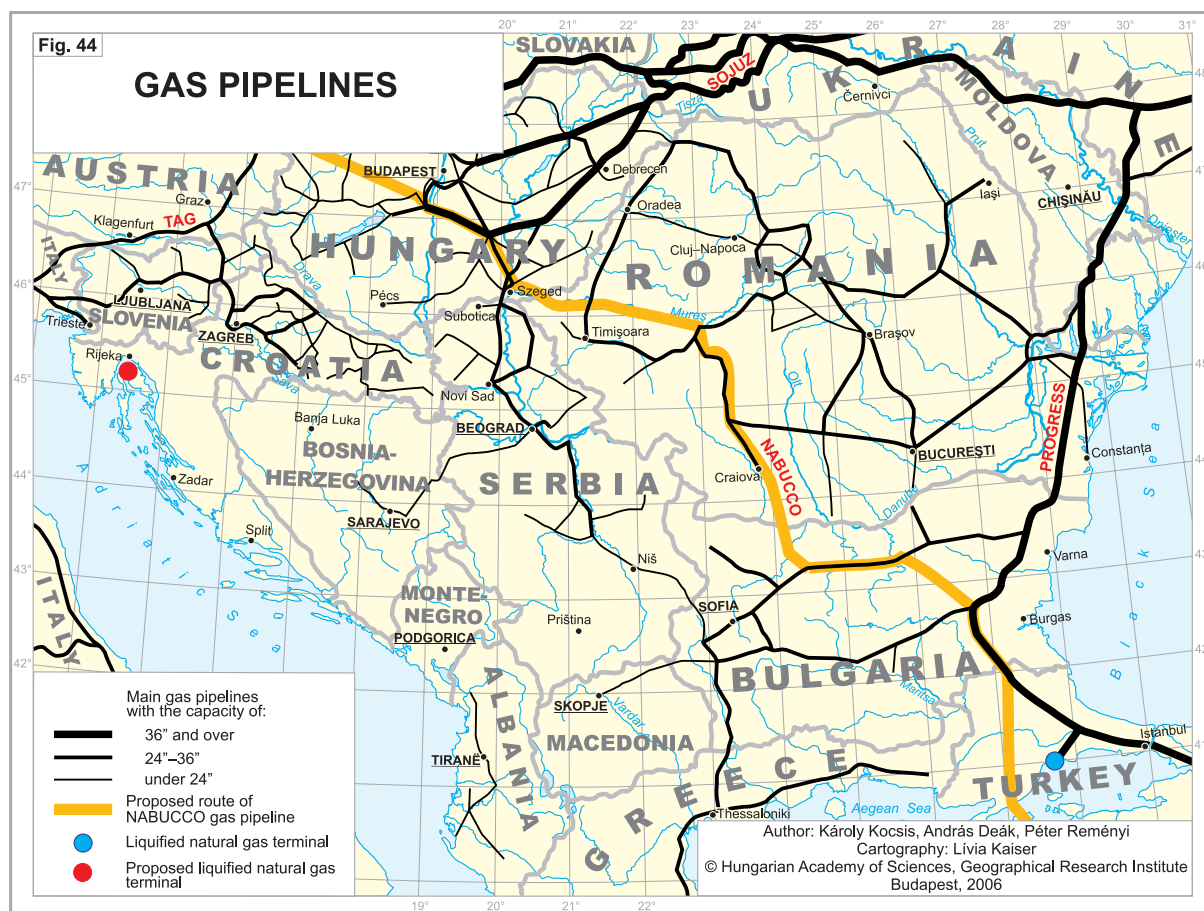
to the networks of the former Soviet bloc. Both countries have been integrated closely with it in terms of gas as well as with regards to oil. This had led, in many aspects, to pronounced differences in the use of energy sources in the eastern and western parts of the Balkan. Except for the electricity networks, there is no real connection between the Bulgarian–Romanian and the Yugoslav systems, and its development can be at best expected from the establishment of more extensive trans-European systems.

The European Union influences the future of the region's energy networks in many ways. As pre-accession countries, Bulgaria, Romania and Croatia are obliged to adopt the regulations of the Union. The most cardinal components of these are the gas and electricity market directives adopted to liberalise the Union energy market. They are bound to come into effect in June 2007 and their adoption does not promise a smooth landing in these states. The situation is slightly different in the Western Balkan region. Here – besides liberalisation – the EU focuses on the reconstruction and moderni-

sation of the industry within the frame of the stability pacts. A further Balkan specificity is the lack of large, financially strong and autonomous companies, owing to the energy industry of the region having been bought up mostly by East Central European, West European and Russian corporations. This is true especially for the East Balkan countries, but privatisation of the sector has also started in the countries of the former Yugoslavia, and micro-level integration is already under way. These three factors: the liberalisation by the Union, the micro-level integration and the region's geographical setting with long coastlines and proximity to several potential energy exporters creates a fair chance for the establishment of a real, competitive market environment in the future.

Natural gas. At present three large north-south gas-pipelines (built in the 1970s) supply the region's countries. The most important of them is the network running through Moldavia, Romania and Bulgaria (Progress pipeline) (Figure 44). Exclusively Russian gas arrives through this pipeline and it covers roughly half

of the Romanian and the entire Bulgarian consumption. Through the same system there is a limited amount of transit to Turkey, Greece and a negligible amount to Macedonia. The second pipeline runs via Hungary to Serbia and to a lesser extent to Bosnia. This network can hardly be regarded as of being of pan-European importance and it lags way behind the former in terms of capacity. The third pipeline runs off from the Austrian-Italian TAG (Trans Austria Gas Pipeline) and provides gas to Slovenia and Croatia. Among the capitals of the region, Ljubljana has made great efforts in order to improve its gas network. First of all, it consciously strives to diversify its supplies, so it has a binding operative contract on gas shipment with Algeria until 2007. The share of Russian and Algerian gas in the country's import is nearly equal. Beyond that, during the 90s Croatia converted to gas at a degree exceeding its own production. As a consequence it made serious efforts to improve its gas network and expanded the capacities crossing the Slovenian-Croatian border, making the increase of natural gas import possible.



Plans of the major trans-European pipelines running via Turkey to Europe are aimed at a significant increase in gas consumption. Among these projects, the most important one is the "Nabucco" pipeline, which is also among the priorities of the European Union. According to the plans, this network would deliver 20–30 billion cubic meters of natural gas annually to the European markets, an amount that equals the entire consumption of the region at present. Its supplies would be provided by producers in Azerbaijan, Iran, to a lesser extent perhaps in Russia and would reach the Austrian gas hub in Baumgarten via Bulgaria, Romania and Hungary. The plan has had great importance laid upon it owing to the gas war between Russia and Ukraine at the beginning of 2006, which proved Russian and Ukrainian transits to be insecure. The pipeline, which could be opened in the first half of 2011, would not only upgrade the area to a transit region, but would also make natural gas more widespread.

Furthermore, another possibility is to intensify the import of Russian natural gas, either by improving the existing systems or through the "Blue Stream" submarine pipeline under the Black Sea. The utilisation and interconnection of the latter one to the Balkan networks, increasing the capacities of the existing pipelines is supported predominantly by Gazprom. Thirdly, in line with the development of LNG (liquefied natural gas) technology, the setting up of such terminals seems to be increasingly realistic, most of all on the Adriatic Sea. Italy has already built several such liquefying terminals on the Italian shores, by means of which natural gas produced in any part of the world can be economically shipped to European consumers. One consequence of the Russian–Ukrainian gas war was that the plans for a similar project on the island of Krk, Croatia became known. At the same time, the capacity of such a terminal lags way behind that of "Nabucco" or those of all the existing pipeline networks.

Crude oil. The infrastructure of the region's oil industry is characterised by significant (and most of the time idle) harbouring and refining capacity, segmented pipeline systems and intensive foreign capital inflow. In the 90s, domestic output dropped in nearly all the countries of the area. This means that at present about 80% of the consumption of the entire region has to be supplied from harbours on the Black Sea and

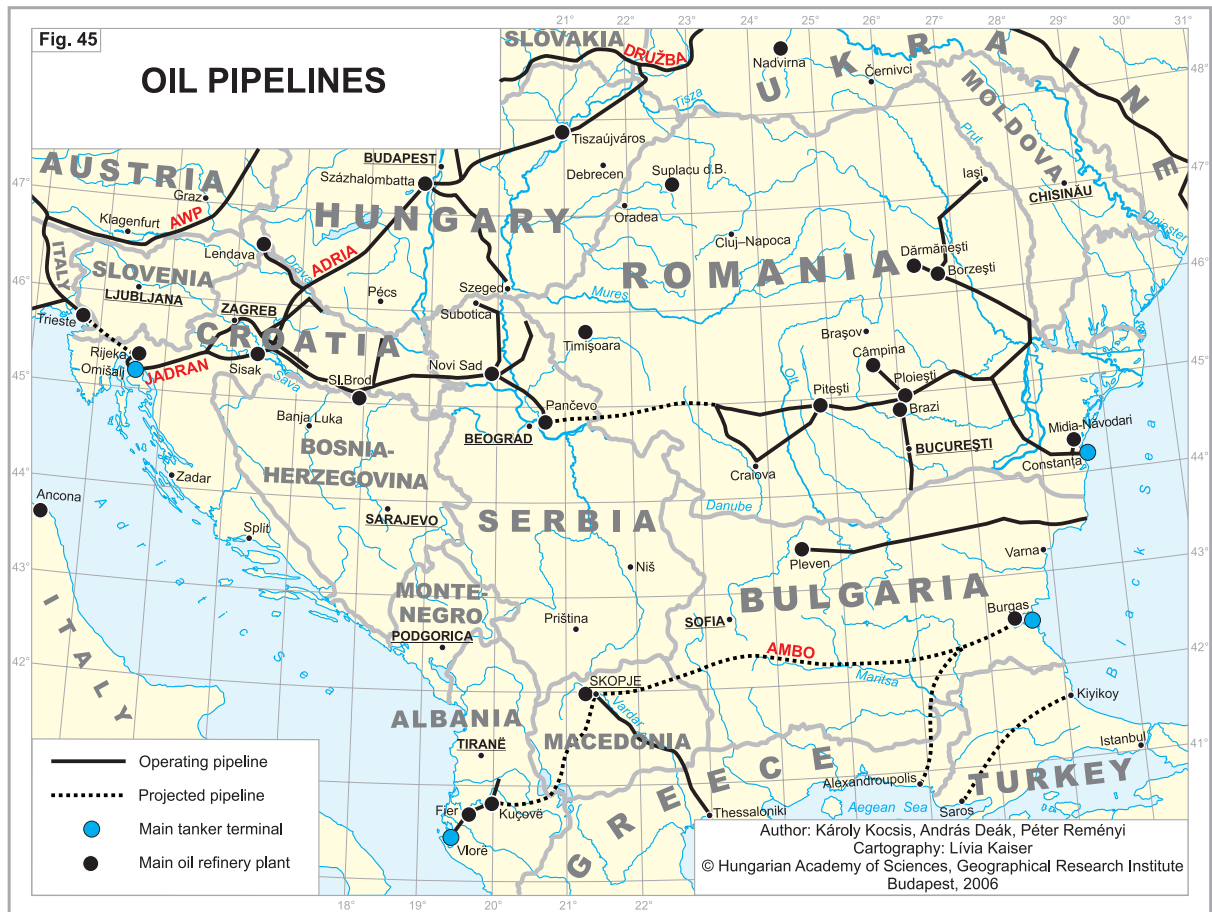
Adriatic Sea or via Russian or Greek pipeline capacities. Romania owns the largest oil reserves in Central Eastern Europe (nearly 1 billion barrels), which makes it one of the top exploration zones beside Albania and Bulgaria.

At the same time the countries in the area, especially Romania, have significant surplus capacities in refining. Most of them are situated in a strategically attractive place, have good marine or fluvial connections or enjoy access to European markets.

The most important schemes connected with the improvement in infrastructure are related to the transit of Black Sea crude oil through the area. A significant percentage of the dynamically expanding Russian and Kazakh petroleum output arrives at the Black Sea, especially at the port of Novorossiysk, Russia. Transporting this amount to the markets via the Bosphorus suffers serious stoppages. The limited throughput of the straits, as well as the disaster recovery and environmental considerations of the Turkish government make this route particularly slow and expensive. Several plans have been outlined to avoid the straits.

There are three alternative, Balkan-bound plans to build the detour route. The Burgas–Alexandroupolis pipeline is a plan mostly supported by Russia (*Figure 45*). The advantage of this project lays in its low construction cost, at the same time it would fully serve as a transit line and would not affect the markets of the Balkan countries. The Albania–Macedonia–Bulgaria line (AMBO) can be linked specifically to the U.S. administration. Both projects are nearly at the same stage and the parties accepted the letters of intent. The Constanța–Omišalj–Trieste line would cost the most but by means of expanding the already existing infrastructure, this project would have the largest effect on the region's oil industry, by reaching many refineries. This project has two disadvantages: one of them being its high cost, the other one its lack of a world power as a patron. The reversal of the Adria pipeline is a project also worth mentioning. Its construction costs would be minimal, although it would be suitable for transporting only meagre amounts to the markets through the Družba–Adria network. The two latter versions have minor chances, most of all because of the difficulties with their acceptance in Croatia.

Electricity. The electricity systems present a rather mixed picture, with significant

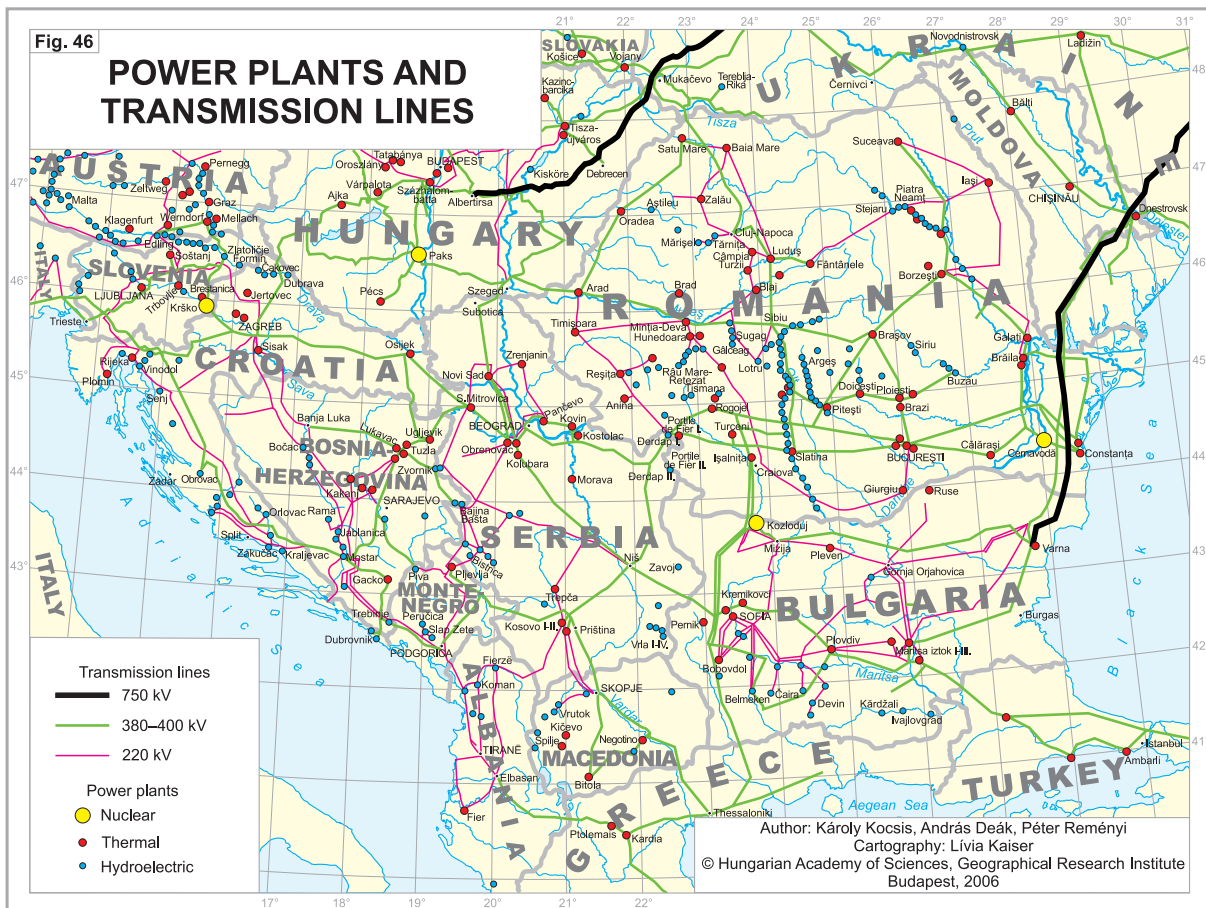


variations between countries. The area has sizeable surplus capacities; the interstate electricity trade is negligible. In line with this, the infrastructure is obsolete and the low return rates of the industry do not afford the necessary improvements in most of the cases. One of the extreme cases is Albania, where the consumption drastically dropped after 1991 and now it is capable of covering nearly its entire power demand with its own hydroelectric plants. Bosnia and Herzegovina also covers nearly half of its power consumption from similar sources. The potential hydroelectric power yet to be tapped and a major part of the existing power plant capacities are still idle, therefore the further increase of the already high proportion of this energy source is among the objectives in most of the countries.

One of the largest power producers in the area is Bulgaria. The nuclear blocks at Kozloduj supply the country and almost all the surrounding states with very cheap electric power (Figure 46). However, considering the safety flaws of these pressurised water reactors, their

operation was a serious item on the agenda in the relationship between the EU and Bulgaria. In return for the promise of accession, in 2002 Bulgaria shut down its first two reactors built in the early 70s, which had only limited safety systems. At the same time, the systems of the other four reactors (opened between 1981 and 1992) were modernised with the help of considerable EU subsidies. The future of blocks 3 and 4 is still a matter of debate, as Bulgaria wants to extend the deadline for shutting them down in 2006 to 2010. Moreover, the future of two additional uncompleted blocks in Belene is in the balance; the Bulgarian government wants to substitute the reduced capacities with them. There were no such qualms about the two other nuclear reactors of the area, the smaller one at Cernavodă, Romania and another one at Krško, Slovenia. The further improvement of the former is among the items on the agenda.

Apart from the Slovenian and Croatian electricity networks, which stand on many pillars, coal is the dominant fuel in the countries of former Yugoslavia. The power plant capacities of



the region are out of date, their efficiency is low and most of them are in need of reconstruction. The region has relatively modern coal mines and social considerations also call for preserving the existing capacities. Although this type of fuel is on the downgrade in the primary energy bal-

ances, its share in electricity generation seems to be secured. At the same time environmental principles point to the urgent need for modernisation of the coal industry. This is likely to lead to the privatisation of these facilities.

The European Union and the South East European Energy Systems

After the war in Kosovo in 1999, the EU started to deal with the area's energy networks in detail within the framework of the general EU policy concerning this region. The theories raised by the EU were mostly in accord with the objectives set up by Brussels for the Union's internal market. Despite that, the Union's energy policy concerning the Balkans shows few regionally specific features. Brussels intends to create a regional market with standard regulation where the new national borders bear no real signifi-

cance. Furthermore it intends to modernise the outdated capacities by means of allocating development aids, continuation of liberalisation and involving foreign investors. Essentially, within the framework of the stability pacts the EU conveys its liberalisation policy and normative systems (operative for the gas and electric power markets) towards these countries as well.

This policy is evident in the case of the newly acceding countries, whereas in the post-Yugoslav area it is justified. With respect to the

formerly uniform energy networks, the heavy and unnecessary costs accompanying the creation of segmented national systems, as well as the security policy consequences of the issue, makes the restoration of the uniform energy system seem to be reasonable. With regard to the perspectives of accession outlined for the former Yugoslav countries, it would be unwise to handle these processes separately from the issues of the EU. Therefore, in the former Yugoslav countries and Albania, Brussels also harmonises these energy systems within the framework of restoration.

As regards the natural gas market, this process is still in its infancy. The natural gas networks in the former Yugoslavia area are underdeveloped – Montenegro and Kosovo, for instance, have no systems worth mentioning at all. Therefore Brussels focuses its objectives mainly to the electricity markets. The implementation is coordinated by the "Athens Process" set up in 2002. The Balkan countries concerned agreed to establish (in accordance with the EU regulations) an unbundled system administration until 2005 and begin to open their electricity markets.

On the other hand, they strive to enhance interconnectivity among the countries by means of development aids, in order to turn electricity trade among the states into more than just a theoretical possibility. The efforts to increase the use of renewable resources can also be linked to the development aids. Apart from the significant number of hydroelectric plants (onetime favourites of socialist industrial policy), these energy sources bear no significance worth mentioning in the area.

Nevertheless, this process is not free of conflicts. In the majority of the countries energy policy is not merely a matter of economy; it has its consequences in social and security policy. The local governments and the objectives of the EU also seem to disagree to some extent in environmental aspects. This concerns, in particular, the capacities of coal-fuelled plants, for the modernisation of which the EU refuses to allocate resources much of the time, yet for the local owners the operation of these capacities would be less expensive and more preferable.