INFRASTRUCTURAL QUESTIONS OF THE CENTRAL EUROPEAN REGION

- THE HUNGARIAN PERSPECTIVE

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INTRODUCTION

In what follows, the term *Central European region* will be taken to mean the region as affected by various eastern and western initiatives over the last few years rather than a sharply contoured geographic area. Such initiatives include the Alps-Adria Cooperation Agreement, the Pentagonale, the Central European Initiation, and naturally, other similar concepts as well. On the eastern side, the broader border-line will put all countries west of the former Soviet Union, perhaps even the Baltic Republics, in this region, while a narrower division would only classify the Visegrad countries and perhaps Slovenia as belonging here. From the west, a stricter division would take only the Italian, East Austrian, and the South German provinces into account, and in a broad interpretation, the whole of these countries and even Switzerland could fit into our framework.

A common feature of these regions, whichever way we define them, is one single fact, namely that they all somehow carry in themselves the borderline of four decades of political opposition between east and west, the range of the iron-curtain. Now as we take a closer look at the infrastructural issues of the East-European region, we will, to a large extent, concentrate on this dividing line. More precisely: on the one hand we will investigate, whether networks of the region have preserved something of their togetherness of the times prior to the iron curtain, and on the other hand, with

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even more scrutiny, we are going to examine what duty it is today to connect networks that are either torn or had been developed separately already from the outset.

We would like to mention at this point that the iron curtain is by far not the first spatial split in the history of this region; on the contrary, it may be regarded typical over the two-thousand-year history of the region that it was constantly *trying to position itself* inside Europe, at the periphery of significant empires, right at their colliding surfaces. It should suffice at this point to allude to Rome, to Charlemagne's Empire, or Bizantium, the border of western and eastern Christianity, or later the expansion of Islam and the Turkish Empire, or even Russia, in order to understand that the *Jalta* border was only *one* in this series.

Of course, when considering the formation of networks of transport and energy, we only have to look back on the last century and a half of this history, and primarily on its last decades.

THE SPECIAL ROLE OF THE INDIVIDUAL INFRASTRUCTURAL BRANCHES

ENERGY MANAGEMENT:
the starting point is a unilateral energy dependence

In the period of the change of régime the energy sector could be described by a few common features in each State of Eastern Europe. Such features - problems in fact - included an outstanding level of specific energy consumption in comparison to the GDP, the high ratio of energy-intensive branches within the whole of the national economy, and significant energy import relying very one-sidedly on the former Soviet Union. As a result, energy policies in each country specified the resolution of these major problems as their targets. Besides these set targets, entirely unexpectedly, there came a considerable down-scaling of industrial production, which also greatly reduced energy consumption for a period of time, independently from any other interference.

The basic aim of Hungary's energy policy mostly affecting international relations was a *one-sided diversification of energy imports* amounting to 61% of our energy consumption in 1989. Of course this translated into different requirements in each sub-branch, depending partly on the particular type of fuel that was used there, and partly on the local conditions in the European environment.

Coal base: local enclave plants

Coal resources constitute 2/3 of the fossile energy stock of the earth. 5.4% of the coal resources are found in Eastern and Central Europe, and this region provides 8%

of the entire global output. While the share of coal in the overall consumption of energy in the region is declining, it still reaches 48% of the total consumption. (In OECD countries the corresponding ratio is 22%; and it is similar to that in Hungary.) 2/3 of the coal used in this region is burned in electric power plants [9].

It seems that *environmental norms* will provide the basis for standardisation which is going to emerge as the criterion for international competitivity. This means that regional coal resources below the international competitivity are not going to be graded [9], and will be automatically excluded from export-import trade, and later, as emission standards become stricter, they will be naturally excluded from direct use even in the countries of origin.

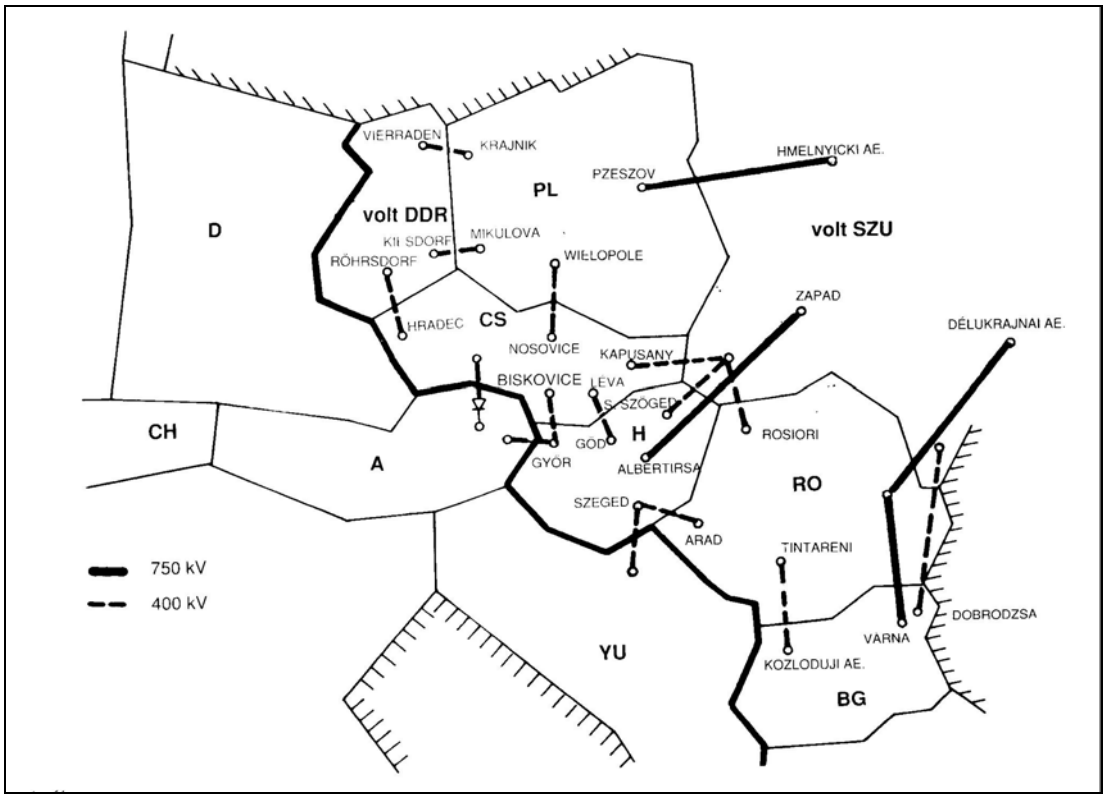
Hungarian coal mining is in a position of defense with regard to these tendencies. The current trend of development is diametrically opposite to making coal compatible with other fuels. And, in full harmony with the present Hungarian energy policy, the power-plant/target-mine mergers are meant to serve the purpose that a given quality of coal be burned in the one plant specifically adjusted to it from a technical point of view, thus mutually ensuring market and supply to each other on a longer term, independently from current world market price tendencies.

Electric energy industry: Visegrad cooperation - instead of iron curtain

Projecting on to the whole of Central and Eastern Europe, 34% of the total primary consumption of energy is used to generate electric energy.

The 1880s saw the construction of the first public power plants in towns (Temesvár, 1884, and, in today's Hungary, Mátészalka, 1888). Electric power supply first started in Budapest in 1893. Until the 1930s power plants operated characteristically on their own, supplying smaller regions with electric power independently from each other. The first long distance electric transmission line was built in 1929 between the two towns of Bánhida and Budapest with the aim of operating a train line on it. Supplying small settlements with electrical energy on the national grid, becoming gradually more and more uniform, reached completion in 1963 [10].

Upgrading the network to enable connection to the international grid started in 1952 with the view of creating the possibility of import through connecting the Hungarian and the Czechoslovakian networks. This was followed by the connection to Yugoslavia in 1958, and by the handover in 1962 of the first Soviet-Hungarian pipeline. In 1963 the Hungarian electric energy system also became member of the unified CDU system formed among COMECON member States. Apart from that, since 1968, there has been regular exchange of electric power between Austria and Hungary based on mutual benefits.



Source: Galambos L - Reguly Z. [1]

Figure 1. The CDU network and the most important international connections in 1991

The opposition between east and west, and the mere existence of the *iron curtain* was most tangible in the CDU and the UCPTE electric power systems among all technical networks (*Figure 1*). Within that, in the late 80s the Hungarian electric power system featured three main problems [1]:

- strong and direct network-related cooperation with the CDU system, but only feeble relations outside the system,

- large amounts of direct imported electric power and a mono-lateral import-dependence from the Soviet Union

- the quality (network frequency) of the supply did not reach up to European standards

A tentative inquiry got around in the late 80s, followed, in the summer of 1990, by the formal preliminary announcement to UCPTE of Hungary's intention to join. Since the regulations require the neighbouring countries to assess the request, the actual conditions of joining had to be agreed on with the competent persons in Yugoslavia and Austria. The agreement provides the following:

- the equilibrium of the balance and output of energy of the Hungarian electric power system shall be ensured on a long term

- adjustment of output frequency in accordance with UCPTE guidelines shall be applied, and

- a long-distance relation system of the required transmission capacity shall be constructed in order to make synchronised cooperation with UCPTE possible

The feasibility study finished by the middle of 1992 stated that the Hungarian network may be modified to become possible to connect. From among the problems, the setback of the economy, and the exploitation of the existing domestic facilities of power generation made it possible to reduce import 1800 MW down to 500 MW, which itself is split between the Ukraine and Poland, which in fact means that one-sided export-dependence has virtually come to an end. Our mid-term power plant construction programme is scheduled to build capacities in excess of the drop-out due to scrapping. The construction is designed to gradually connect blocks of up-to-date technology that may be flexibly and quickly erected. As concerns safe transmission capacity, the new 400 kW long-distance line has been extended to Austria due to the electric power repayment relating to Nagymaros is meant to satisfy this condition.

In order to comply with UCPTE standards of output-frequency, the plants will have to be equipped with automatic primary (seconds-based) adjustment. On the capacity side the primary reserves are sufficient. In system-level secondary (minutes-based) adjustment there is need for modernisation, and even the increase of output reserves might become necessary. This does not necessarily mean construction work may be required; it should be considered whether a competitive solution is available through operating uneconomical plants, overloading currently operating ones, or through purchasing secondary reserves.

Representatives of the neighbouring Czech, Slovak and Polish electric power systems has also announced their intention to join the UCPTE. In conformance with UCPTE's earlier practice it ordered the preparation of the feasibility study and that of the above procedure *by country*. Beginning with 1992, however, UCPTE has changed its rationale and is now managing the joining of all the four countries. So in that respect the Visegrad cooperation actually came live in the framework of CENTREL, the cooperation of the Hungarian, Slovakian, Czech, and Polish electric power systems. The four systems will have to form a four-sided autonomous operation splitting off the Ukrainian system. The main objective is to prove their independent operating and controlling capabilities. On the one hand, this is a constraint in the sense that Russia, which formerly did the adjustment across the whole CDU network declines to continue doing so; and it is sensible on the other hand, as UCTPE does not undertake this obligation either, since it sets the proof of the independent

working abilities as a condition to joining. (By the way, satisfying this condition is *easier* than the condition whereby the four countries have to prove their ability to work independently from each other.) The systems test has already been started in 1993 (29-30th of September).

Besides joining the UCPTE, the Hungarian electric power system wishes to keep Russian and Ukrainian import and export links as well as the freedom to transit. This requires the formation of a direct current cartridge equivalent to the necessary output. This cartridge is planned to be installed well inside the country, to the arrival point of the 750 kV line in Albertirsa.

Nuclear power plants: empires of market and technology

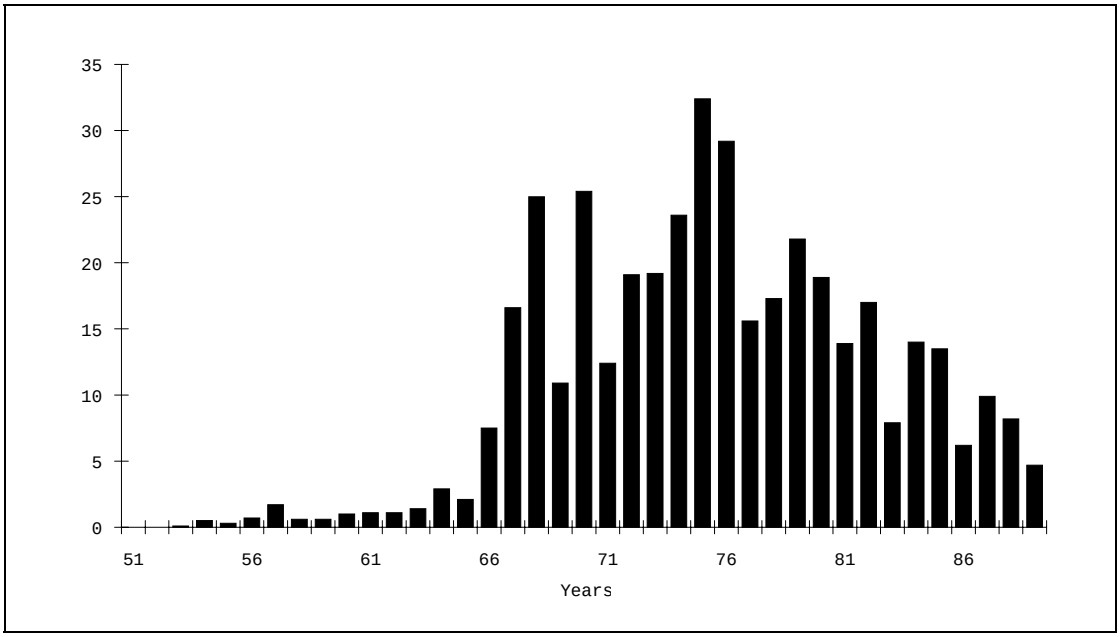
Even if not as conspicuously as in the case of networks, but even in nuclear power plants there is a *wall.* In this case, however, the wall is based on technology. Soviet power plants have been erected virtually in all parts of Central Europe (plus one in Finland). And they constituted a chain through their recourse to the Soviet Union for supply and reprocessing. One of the new problems is that this kind of *used fuel collecting network* service has been ended.

At present, there is a total of 61 Soviet designed power plants in Eastern Europe [11].

The 2 serviceable Ukrainian blocks in Tshernobil, the 11 blocks in the European part of Russia and the 2 blocks of 1500MW each in Lithuania are Tshernobil-type (RBMK) plants.

The similarly questionably safe VVER-440-230 type is represented by 2 blocks in Russia, 4 blocks in Bulgaria, and 2 blocks in Slovakia. (The four similar blocks in the former East Germany were shut down at the unification, and two blocks in Bulgaria have likewise been put out of operation.)

4 blocks of the VVER-440-213 type - considered safer - are still at work in the Czech Republic, 4 in Hungary, 2 in Slovakia, 4 in Russia and 2 in the Ukraine. The even newer VVER-1000 type is represented by ten blocks in the Ukraine and seven in Russia. Various other types have five blocks in Russia.



Source: Char, N.L, - Csik, B.J. [12] and IAEA data.

Figure 2. Orders for nuclear plants

There are 25 blocks under construction in the former Soviet Union, 2 in the Czech Republic, 4 in Slovakia, 2 in Bulgaria and 5 in Romania.

The share of electricity generated from nuclear power in the various countries: Hungary 47%, Slovakia 35%, the Czech Republic 21%, the Ukraine 25%, Russia 12%, Poland 0%.

If we put the construction of nuclear power plants into a broader global perspective, *Figure 2* obviously witnesses a steady fall of new orders placed over the last decade and a half. The whole cycle recalls a decline of a technology previously swinging upward. The huge pressure between 1989-91 whereby the western countries wildly competing with each other tried to lay their hands on the Hungarian market. By now the pressure *here* has eased up a little, since probably the centre of the potentially aquirable markets have shifted further eastward.

Natural gas: distributive and magistral networks gradually growing together

Gas production for public purposes came before the spreading of electricity in Hungary. Coal based town gas factories were established one after the other to service street lighting. 1856 saw the establishment of such a factory in Budapest, and two further ones were founded in 1864 in Szeged and Debrecen to be followed by others in a total of ten cities until the end of the century.

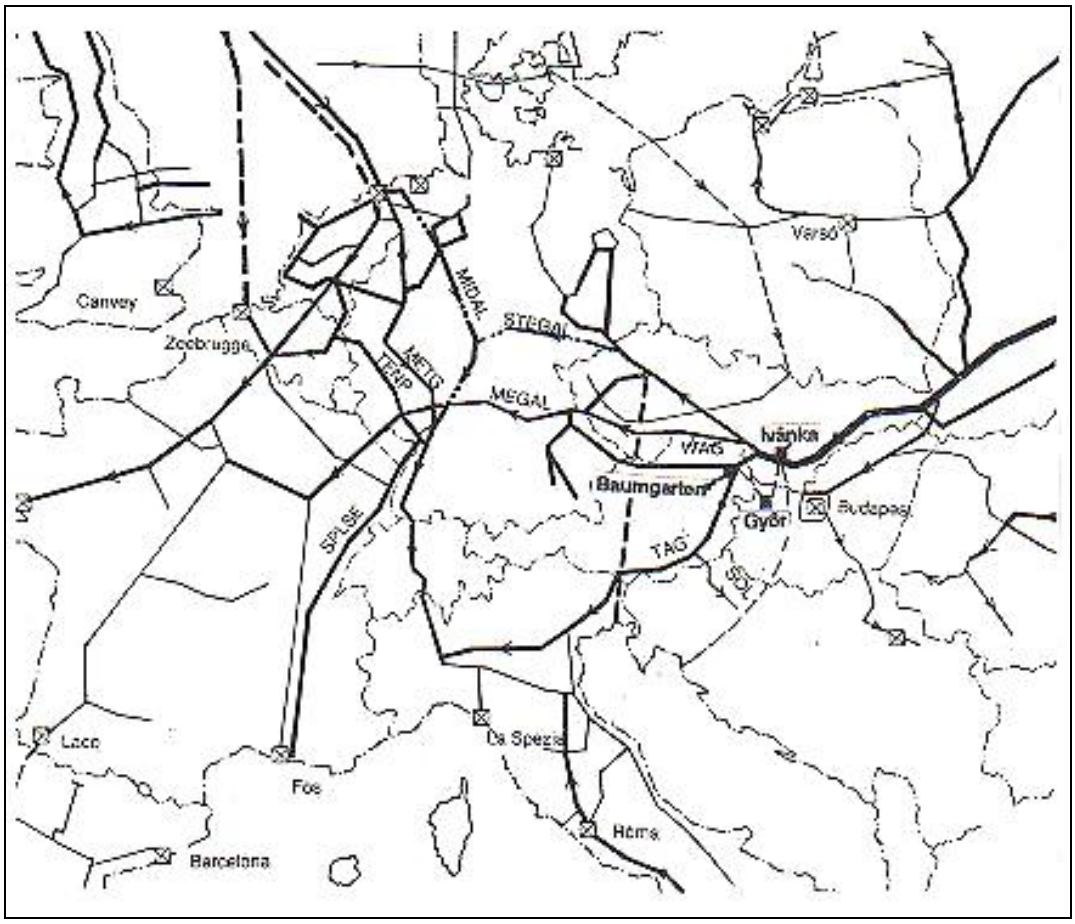
Producing and using natural gas did not start before 1937, and the periods of its growth are a faithful reflection of the history of the last century and a half. The first peak was triggered by German needs during the war, the following upward trend meant the commencement of the operation of a Soviet-Hungarian joint venture in the 50s, while the two other periods of increased production - in the 60s and the 70s - were meant to supply a 'manually controlled' industrialisation following the Soviet pattern. Consequently, the pipeline network was mainly built between the sources and the industrial districts, and reached the length of 2000 km-s by 1970.

In the early 60s, there was also an international link among the lines first constructed, supplying Romanian natural gas to the Tiszapalkonya chemical plant.

Even internationally, trade of natural gas only started at that time: it first meant the pipe connection between the Groningen natural gas fields in Holland and the neighbouring countries, and an Algerian natural gas liquidizer constructed in 1964 using American technology together with the installation of the European receiving station. Soviet natural gas entered the European market in the next decade from a pipeline built up to Germany. The major lines in Europe were constructed in these three 'climatic' directions i.e. sources of the Atlantic, sources of the Mediterranean and Soviet sources (*Figure 3*). This, at the same time meant the formation of two different types of gas supplying systems.

The Atlantic *distribution* system is an organic development of local networks relying on local sources, where - with some reminiscence of the operation of electricity networks - exports could be accounted for in the form of equivalent amounts through chain-transactions between neighbouring areas.

Unlike the above, the main feature of the *magistral* system is the construction of long, independent, large-diameter export target lines. It is built in cases where the source country cannot itself finance the production, and its supply network is also deficient. The user of the gas will then provide funds in order that the gas should reach him/her after overcoming the local difficulties. While technically this is up-to-date and it represents a high level of development, in the source country it results in an enclave-like formation to produce and transport exclusively raw material greatly independently from the local economy. This was characteristic of export departing from both *Algerian* and former *Soviet* territories.



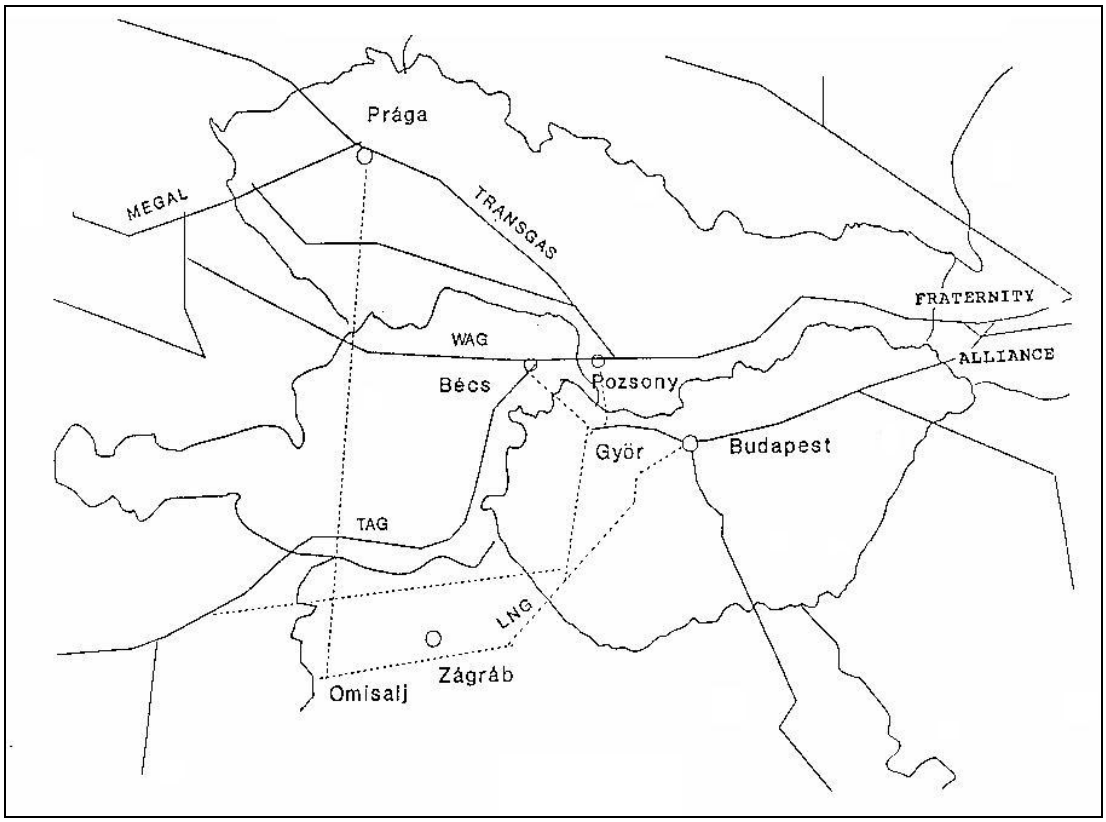
Source: Mramurácz L.. [4]

Figure 3. Possibilities of diversification in the European natural gas pipeline system

Figure 3 provides a good distinction of the three predominant destinations. Norwegian gas from the North sea together with the Dutch gas is fed into the system from the Atlantic. (In 1989 gas exports of these two countries totalled 60 billion m^3). From the south, besides liquid gas supplies already mentioned (this is how just about yearly 16 billion m^3 of natural gas arrives in Europe from Algeria), TRANSMED, the 3000 km Algeria-Tunisia-Italy magistral pipeline was completed in the 80s. In 1989, it conducted 11 billion m^3 of gas into Italy. Ukrainian-Russian gas comes from the south through Slovakia and branches off in the Bratislava region to travel on towards the Czech Republic, Germany, Austria, and Northern Italy. In 1989, a total of 100 billion m^3 of Soviet gas exports was shared on a 50-50 basis by Western and Eastern Europe. (Hungarian imports of the latter amounted to exactly 6 billion m^3.)

Natural gas supply systems reaching into Europe from various directions apparently merge in German and Northern Italian soil. It was primarily the interest of

these two countries to secure the nearly 50 billion m^3 German and just below 30 billion m^3 Italian gas imports from several sides. Linkages to the pipe networks, however, make it possible even for other countries to lift the one-sidedness of that import possibility now that the distributive use of magistral axes may take place on a continental scale.



Source: Energy policy July 1992 [3]

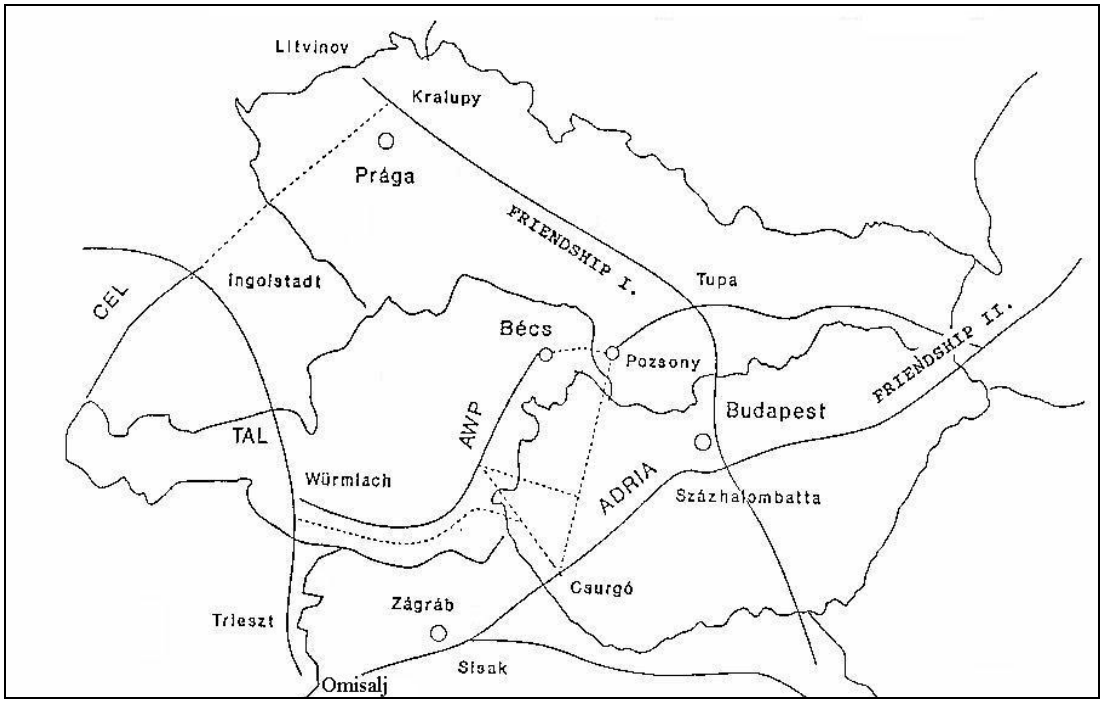
Figure 4. Interconnection possibilities for the Hungarian natural gas pipeline system.

Eliminating some of the one-sided exposure for Hungary would primarily require that direct connection into the pipeline become *technically* possible even westward, towards Italy and Austria. This purpose will be served by the 118 km pipeline planned between Gyôr and Baumgarten (Vienna), able to conduct 6 billion m^3 natural gas annually. *Figure 4* indicates that our energy concept counts on two further connections: the Slovakian line would also be accessible via Ivánka (Bratislava); a higher level of diversification - but also a one size larger investment - would be necessary to build a link between the Adriatic coast and the Northern Italian region.

In building this last link there would be Italian interest as well, provided that a deal even more attractive for it should not override this interest, which in fact could

be at the same time the typical incarnation of one form of cooperation offered to it in a Central European division of labour. To be more precise, for Italy the real advantage would be to have the natural gas coming from the Ukraine burned in Hungary and routed to Italy already as electricity. The environmental load resulting from the production would stay with Russia, the emission resulting from energy generation would stay with Hungary, with the possible energy surplus, with its positive and negative sides - while Italy would have the electric power. It should be noted here that from the point of view of the diversity of Hungarian electric energy the deal would definitely have its attractive sides for our energy management. (The Austrian construction industry sold its surplus capacity in a basically similar construct, when it *helped out* Hungarian water management in the erection of the Nagymaros hydroelectric dam.)

Oil industry: early diversification



Source: Energy policy July 1992 [3]

Figure 5. Interconnection possibilities for the Hungarian oil pipeline system.

Oil had been the only type of fuel in the case of which Hungary had two-way relations as early as the 80s even though the Adria pipeline was virtually out of operation and the country relied on Soviet import. Ever since it became important, however, using the pipeline has been impossible [since September, 1991) because of the civil war in former Yugoslavia.

Figure 5 demonstrates the pipeline systems crossing Hungary or touching the region. The linkages already completed ensure a connection towards Slovakia, the Ukraine, Serbia, and Croatia, while there is actually no connection with the network outside the 'bloc'. Plans include this as well, but we should add that in the case of crude oil, the line is going to be a target line, which, as pointed out above, work on the *magistral principle.* The capacity of the existing lines is mostly exploited, and together with the construction of the connecting pipe lines, capacity has to be ensured up to a harbour.

Another pillar supporting us in reducing our dependence is ensuring adequate reserves in the particular countries. In 1992, strategic oil reserves in Hungary did not exceed possible demand for 30 days, and storage capacity did not exceed 40 days. Our energy policy intends to expand oil reserves to the West European standards of 90 days within the framework of a 5 year programme. This expansion has priority: there is no specific programme accepted at this stage for diversifying through constructing pipelines.

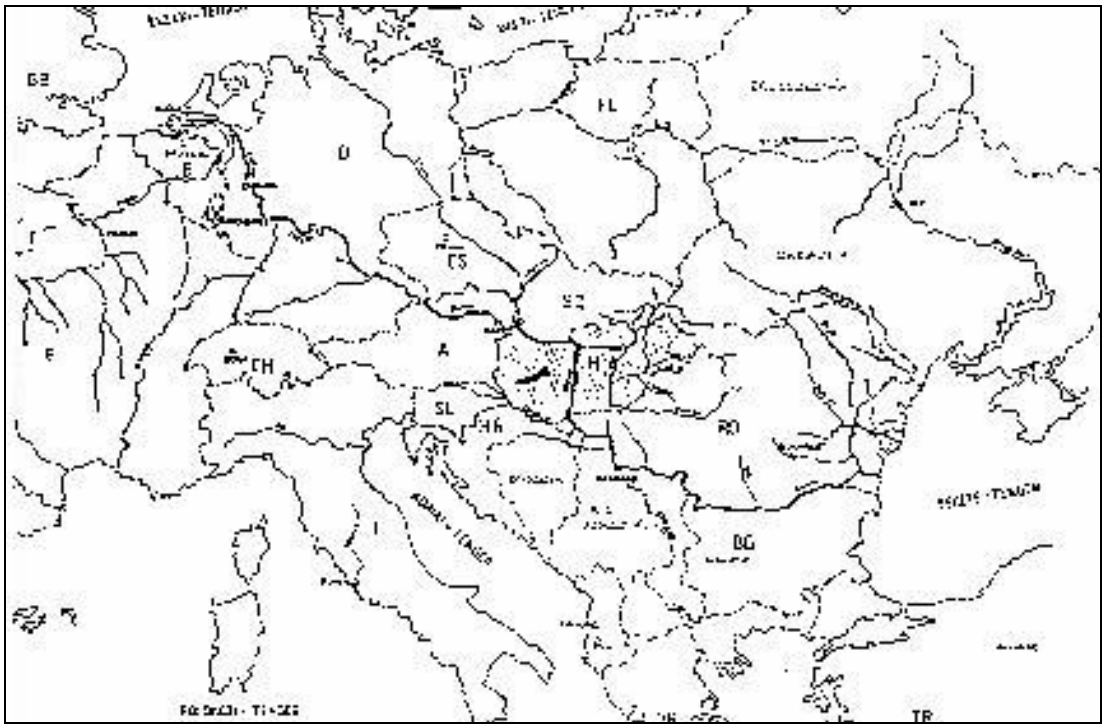
WATER-SYSTEMS

While the borders of Eastern Europe are generally disputable for reasons we have mentioned in the introduction, the same limits become considerably more obvious now as we come to water-systems. And that is so because *the watershed area of a particular river* provides a very clear limit to territorial units. (The situation is equally clear in the case of the Adria region, naturally.)

That is because the whole of Hungary is part of the Danube's watershed area, in fact a lower part of it, i.e. one that receives water. From this it is quite obvious that we will now primarily deal with the problems of the Danube region.

The Danube's entire watershed area totals 817.000 km^2 along the 2857 km-s of the river. It includes the whole of Hungary and Romania, and the majority of Austria and the former Yugoslav territories, nearly half of the Czech and the Slovak Republic, a third of Bulgaria, and large areas of Germany, the Ukraine, and Moldavia [13].

Even today there is cooperation among the States concerned, documented by the so called Bukarest Declaration (cooperation for the management of the water of the Danube with special attention to protecting it against pollution) signed in 1985. In 1991 the decision was made to broaden the declaration into an ecological agreement extending onto the whole of the watershed area.



Source: The development programme of waterways and ports [14]

Figure 6: The network of European waterways

The most general common problem is water quality in the light of communal, industrial, and agricultural pollution. To give the right impression it is worthwhile noting that global pollution *concentration* on the Danube approximately equals the same on the Rhine, while the mass of water of the Danube is about triple of that of the Rhine. And within that, the concentration of oil related substances and heavy metals is significantly higher in the Danube, which amounts to a problem in terms of public health. The situation is much worse on the affluents of the river, as the pollution in many cases greatly exceeds the relevant standards.

Naturally, the fact that different people are responsible for the activities and others suffering the consequences of measures concerning upstream and downstream regions is still a problem locally, but also regarding the affluents, the whole of the Danube as well as the Black Sea. Hungary, for example, receives 95% of its waters from abroad.

The Danube: a breaking point on the border of East and West

Regarding the whole of the Danube, the upstream-type, fast-flowing stretches and the slow-flowing downstream type stretches require different treatment in terms of water quality, control, and navigability.

In the case of the Danube, the transition between the two above types falls on the Hungarian-Slovak borderline[2]. And, the *upstream* nature of the river west from Vienna is obvious. Control through many small stores has been duly done. The situation is equally obvious east/south from the Pilis mountain, where the Danube builds islands, and discharges sediment, and the river displays downstream features. The status of the Vienna-Visegrád stretch, however, is uncertain, as partly reflected by the disputed technical judgement of the waterdam-issue, similarly to the destiny of the various measures to be taken in order to achieve navigability.

It is a possible account for the varying assessments by various parties, that some would find it justified, that here, too, the *upstream model* should be applied. This would be identifying the *relevant* Danube stretch with the characteristics of the Austrian stretch, and thereby copying a pattern which does not answer local conditions. Others find the *downstream model* to be the example to follow, which would entail the closing down of the waterdam-chain and require the search for an alternative way to ensure navigability, avoiding damming. This is to some extent the repetition of the Central-European dilemma in this question, namely the difficult decision on where, after all, this region really belongs more strongly: to the West, or to the East. One may suspect that the answer, too, will be something similar: neither the western nor the eastern methods may be servilely replicated, but a specific local solution is required.

The Danube's water quality and the effect of the fall and the control on the river's speed are closely related. One can more confidently rely on the river's capacity of self-purification on a relatively fast stretch, while critical load may build up more easily on slower parts. Recently the stream of the stretch downstream of Bratislava was slowed down significantly by control *without* changing the load on the main river-bed discharged directly into it or coming from affluents. Already the previous agreement required the treatment of the affluents setting treatment as a condition, which, however, has not materialized so far, and all odds are against it in the future.

Water transport: unexploited possibilities, or haunting illusions?

Similarly to many other regions of medieval Europe, this region of Central Europe also saw the one available waterstream of the region, namely the Danube, as the only means of large-volume water transportation. Water transport as a direct effect triggered the growth of a few river-bank settlements, promoting them into town status, and as a secondary effect, it also attracted a modest manufacturing industry. Economic growth lasted until the last thirty years of the last century with some set-

[2] Based on István Valkár's noteworthy analysis

backs caused by wars, which worked a negative effect on safety overall, but also had favourable consequences from the point of view of transportation. Even then, in the late 19th century, the problem was not navigation, but wheat, which was expensively grown and shipped here, and squeezed out from western markets by American and Ukranian wheat shipped by sea [6].

This period *before the coming of railway* was the first flourishing of canal construction with the purpose that small barks can be moved by horses. They mostly prove unfit already for steamboat traffic. In the second part of the century, the spreading of train transport further revalues the role of water traffic.

In the last forty years, the significant amount of exchange of mass-products among the Soviet Union and States of Central Europe but to some extent even Soviet exports to West Germany gives a major impetus to the Danube's international exploitation for water traffic. The broad navigation line sees the gradual development of traffic of ship-propelled 6-barge batches. On the Danube, specifying the parameters of the waterways is based on this method of navigation. These are the batch sizes of which two have to fit on the river at all times. Contrarily to this, in Rhine navigation available width is less, but the ships are deeper-sinking push and are engine-driven. The control of the Rhine-Main canal was designed to a Europe-type fleet, and now we see this type of ship take over on the Danube.

In order that water traffic become once again competitive - at least at places where even economically it is supposed to have straightforward advantages i.e. long-distance shipment of mass-products between settlements along the river - it is essential to ensure standard parameters on water ways and especially so on the Danube. As a guide-line for the development in Hungary we might say that a particular class of water way should be ensured the minimal parameters rather than already existing classes increased. It makes no sense at all pushing the achievement of a width of 180 m with reference to an earlier plan to access the Rhine-Main canal, when the canal itself only provides 80 m of navigable width. At this point then, the fairness and rationality of international relations require the revaluation of earlier standards.

As regards ports, a programme has been produced on how to establish a European level domestic basic network. Besides the location of major settlements along the river, the network also takes into account the road and the rail network, and, first of all, it is based on the location of already existing and planned Danube bridges.

TRANSPORT (this time without pipelines and water transportation)

As a dilemma common for the development of all branches of traffic it is worthwhile pointing out the question of *the ordering of magistral and local networks* as concerns the currently forming structures. The starting point is provided by the cen-

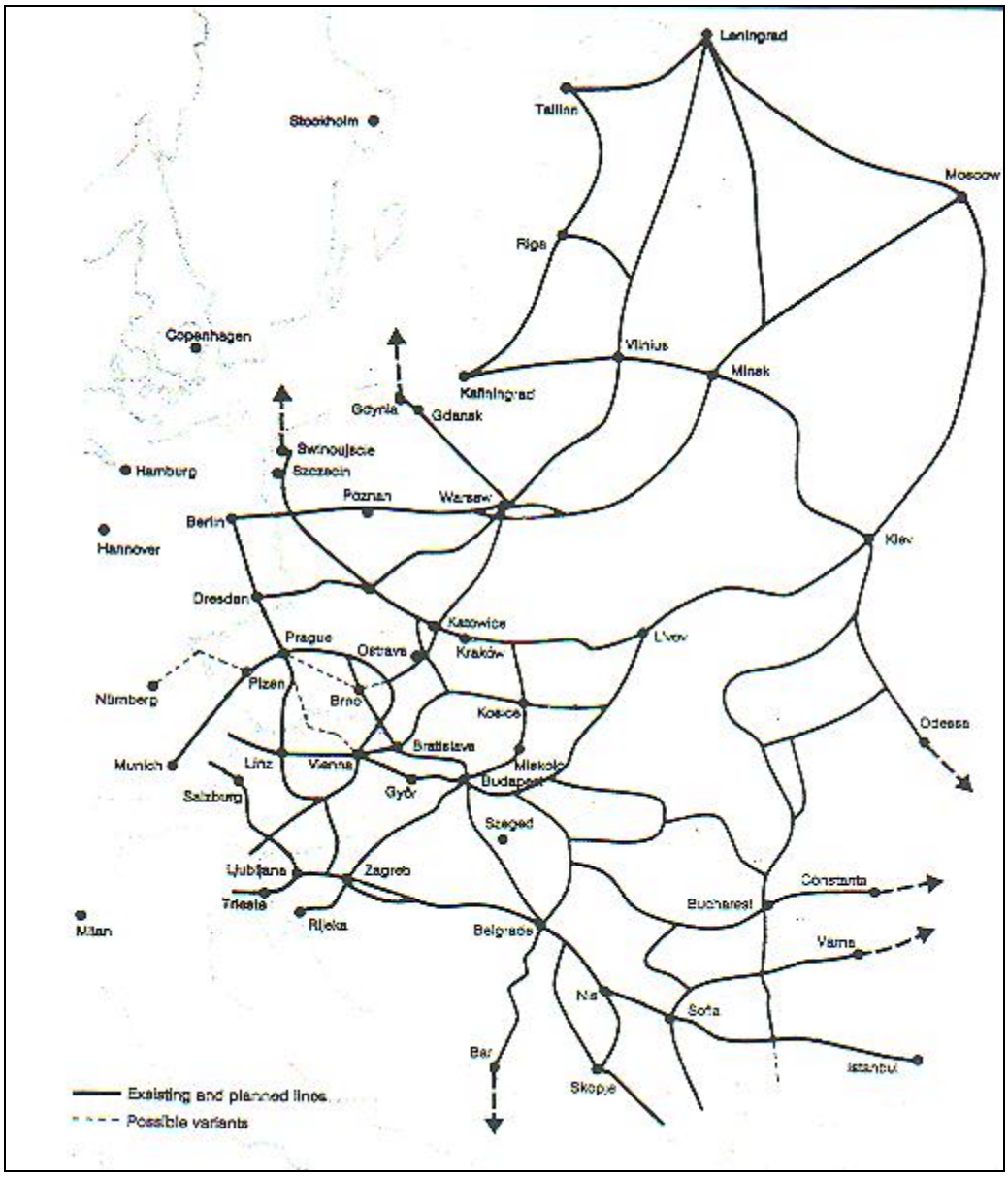
tralised hierarchical domestic structures of the individual countries relying on the capital cities. It is an unfortunate circumstance that just today, when western interest towards these countries has increased, the most conspicuous fact remains the difficult western access to these *capitals.* All those western proposals, credits and support packages targeted at improving the relation between East and West as well as at the construction of infrastructure are most frequently designed - logically for the investors - to build magistral lines *towards these cities* (motorways, high speed trains, telecommunication) capitalising on the fact that the 'country side' is the most easily accessible via the capital.

This way, however, development projects would build exactly on the existing centralised domestic structures. The capital becoming the access route of the country towards the more developed world strengthens the dependence of the domestic regions with regard to the centre; the capital as the centre would continue to be the origin of innovation and control, while the capital itself would be connected - instead of Moscow, as it used to be - to an unquestionably more developed point of the world, i.e. to Brussels for a symbol. At this point we are confined to ask whether this scenario has a *realistic alternative*, and whether we will be able to reinforce our internal structures simultaneously to external ones if not beginning with the former.

Rail: we build it on top and pull it down below

The point where the European railway network suddenly becomes denser does not coincide with the former *iron curtain,* but with the trace of even earlier Empires. This is how some define the edge of Central Europe: up to where the railway station buildings known from the Austro-Hungarian Monarchy have spread. The dense network also covers former German areas; the dividing line stretches from the East-Polish sea coast till Poznan, then to Krakow and Szatmárnémeti, from which it reaches Austria via Oradea, Belgrade, and Zagreb.

The 'development' presently experienced in Hungary has two objectives: on the one hand it is forced to give up part of the local network due to unprofitable operation, whilst the State, as before in the 1970s, sits and stares at the progress beyond its control. On the other hand, there is the pressure to develop the magistral network, and the intercity lines (there have been bids even by TGV (French high speed train). Connecting cities cannot, naturally, be objected as long as passenger transportation is concerned. However, real priority is only given to lines towards the capital, and the plan to build the network for freight trains *to by-pass Budapest* has once again been dropped by the railway company as unrealistic, in spite its significance in last year's programme.



Source: International Transport in Europe [15]

Figure 7 Existing and planned railways of major importance to the international traffic in Central and Eastern Europe

Similarly little attention is focused on the possibility of the restoration of railway lines discontinued by the borderlines; more precisely, there is insufficient investigation taking place as to the extent to which these lines could promote the upswing of local relations across borders becoming ever easier to cross, and thereby turn the proximity of the border - *formerly a regional disadvantage - into a regional benefit*.

Public roads: in an old or in a new structure?

The origin of the basic grid of public roads goes even further back in time than railway construction, yet the connection of small settlements to the basic grid with paved roads was only completed in the 1970-1980s. In a comparison among countries we find that the economic possibilities of the last decades are also reflected in the *level of pavement.* But developed and undeveloped Europe differ especially markedly in the density of their *motorway networks*.

In the tracing of the traditional main roads the *local surface* formations of the land were of lesser importance as compared to topographically conditioned traditional cart roads or to a network of side-roads developed from it. With the traditional main roads, the primary issue was the as-straight-as-possible connection between certain towns or other major targets of traffic. So this main grid developed according to a logic independent from the subordinate grid, and created *new spatial structure* in the early days of car traffic.

The same cannot be claimed about motorways, which replicate the *same structure* as is mirrored by the traditional main grid. This flows directly from the method by which the design of motorways is done, namely that at sections where the traffic (over)load of the main grid is highest, they build stretches of motorway next to the main road in order to relieve the load on it. That is to say that the way the high-speed grid developed was lead by capacity problems of intercity traffic, and even more specifically, by the needs of the capital, by the overload on the urban incoming roads, and by the intention to smooth car-access to Balaton, a weekend 'extension' of the capital. This meant providing for the traffic needs and reinforcing the former grid structure, further preserving the grid's focus on Budapest, maintaining or rather increasing the imminent consequences. The possibility that a new grid structure could also have been created by building up the motorway network remained unused. Instead, the grid ensures the traffic drain-off of the region within a circle of 100-120 km around Budapest instead of the 60-80 km, which it has been so far.

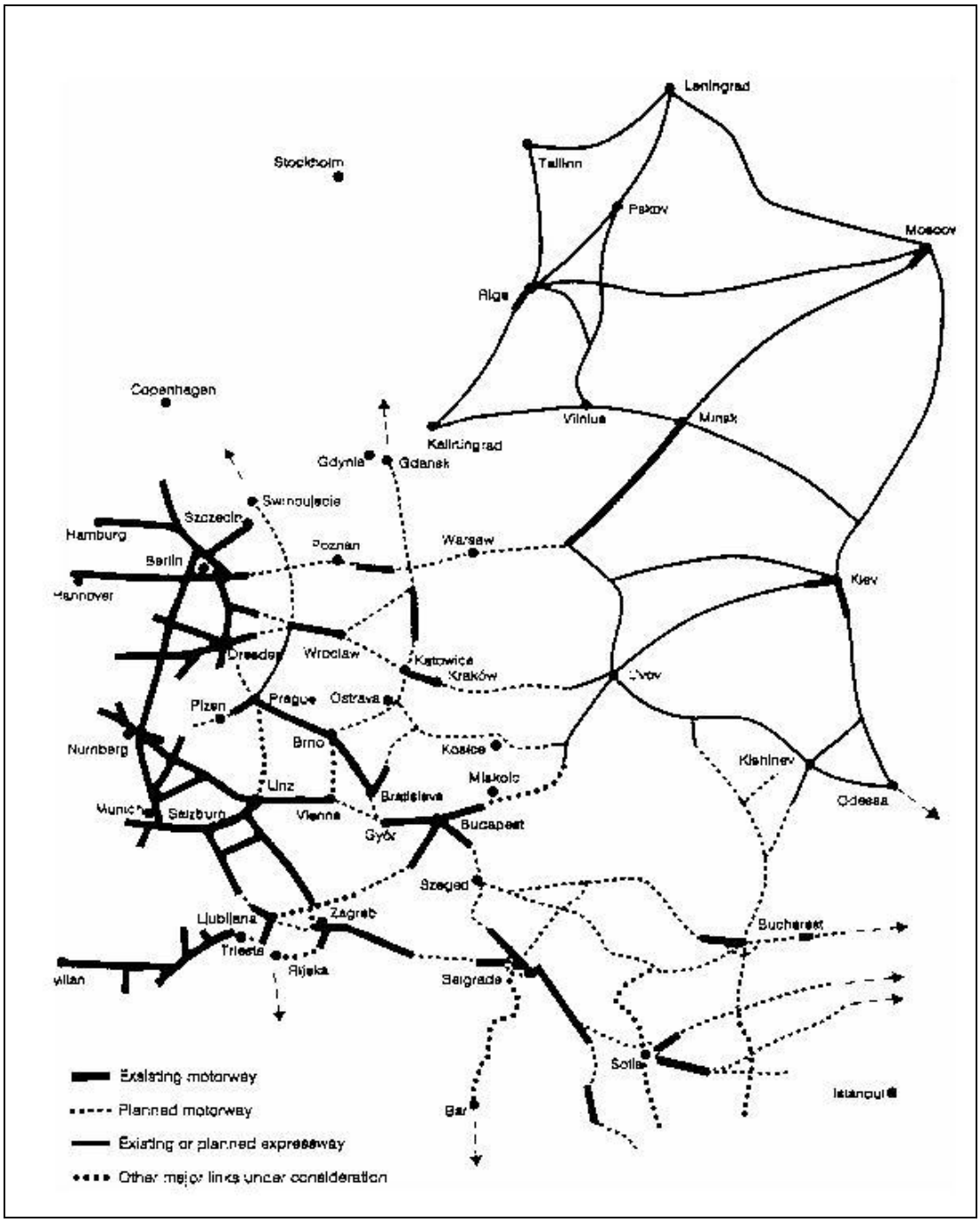
International experience, however, indicates that from among the effects of motorways extending into a network, the resolution of capacity problems releasing the process is a less significant change than the one triggered by the possibility of continuous high-speed in long distance traffic.

Motorways extending into a road network have a primary and a secondary *effect.* The original intention to resolve the capacity problems that triggered the extension becomes the secondary, while the primary is that they change *long distance traffic* through providing the possibility of continuous high-speed travel. International experience indicates that the primary remains the real lasting one. What happened, then, was not simply that local travel/transport - i.e. the drain-off range of a particular city - constituting the majority of traffic grew in distance by 30-50% due to the 30-50%

increase in average speed, but *an even faster change started, whereby long distance transportation, international traffic gradually shifted over onto public roads*. Traffic of continental scale came about which had already very little to do with cities, or the life in the cities along the road - similarly to cart roads formerly connecting villages having to break their dependence from villages in order to properly serve the emerging car traffic.

Questions concerning the creation of a high-speed network would be sensible to consider on a continental level, where the point of departure of such consideration is the *relations of Europe's chief regions*. When in the mid 1970s the International Road Federation altered the numbering of Europe's main roads, there was a shifting from the earlier London-centered radius-system onto the net-system based on east-west and north-south main axes. This measure reflected the fact that the network reached a level of density where the consideration of inter-regional connections levels became feasible. The new numbering naturally included Eastern Europe, where the majority of the selected roads did not have and does not even have today parameters required for high-speed traffic. On the other hand, the region did not count to be so important in long-distance traffic as to emerge as a shortage for the West.

A design principle gradually started to associate to the net-pattern numbering system in Western Europe. This design principle for example divided Europe into north-south corridors and analysed traffic along these and also assessed development needs on that basis. In the wake of the 1989 political changes in Eastern Europe the need arose for the analysis of similar, but *east-west* positioned corridors.



Source: International Transport in Europe [15]

Figure 8 Existing and planned roads of major importance to the international traffic in Central and Eastern Europe

Yet, in practice, the groundwork of the high-speed road network in Eastern Europe, even in 1992, really meant the in-coming urban roads around *a few large*

cities, while 'network' in this region means no more than *a planned connection of these beginnings* (*Figure 8*). Neighbouring countries, too, have built stretches of their motorways in order to compensate for the main grid running low on capacity. Besides, in doing so they also strengthened structural centralisation, which was in full harmony with the these countries' centrally operated *economic and political* establishment.

We have referred above to the fact that the fast construction of the east-west magistral grids tends to preserve exactly this structure. This is *in no way* related to the corridor concept or to the new structure of the magistral lines. On the contrary, what we see is just the building onto the top of the already existing internal centralised structure.

What would be practical for the whole of the Hungarian *high-speed public road network* is one that uses elements of the former radius-structured and the later ring-radius-structured development concepts, but which, instead of connecting again the individual node-points, bears in mind the principle of establishing an open *grid-system* (*Figure 9*).

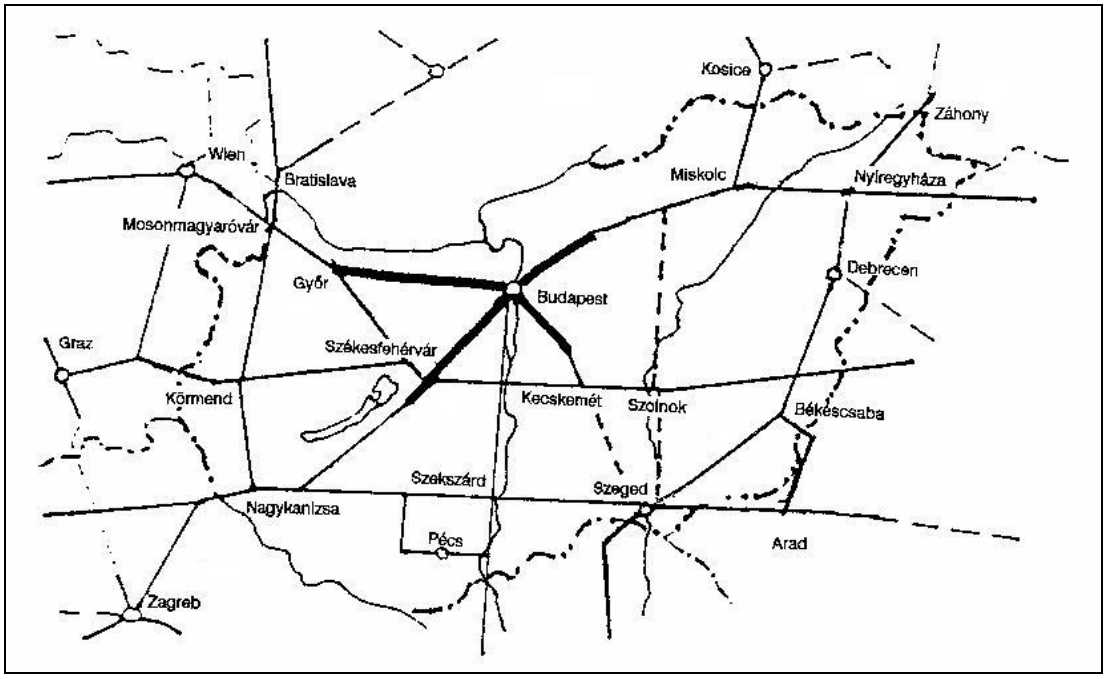


Figure 9: The scheme of the grid-structured high-speed road network

The grid concept - in harmony with the above mentioned and with the corridor-concept - is trying to promote the establishment of the most varied relationships rather than serving one privileged system of relations. This also answers the common necessity namely that in today's quickly changing and rearranging Europe *there is no*

telling today which directions in politics, trade, or society turn out to be more important than others in ten, twenty-five or fifty years' time, and what choices are going to stand the test of time. It is necessary to establish grid structures that can flexibly adapt to rearrangements of centres of gravity, but which at the same time are able to substitute for temporarily out-dropping stretches.

To sum up, the development of this grid requires the *establishment of corridors.* A *more detailed* design of the corridor - turning traditional priorities upside down - would be sensible to start exactly by 'sign-posting' the zones *that have to be by-passed by all means* when it comes to tracing the roads, moreover, which one had better refrain from approaching too closely. In Hungary these zones typically include the proximity of the capital, the district of the Balaton, and generally settlements and nature reserves.

The concept of the Hungarian high-speed public road network answering the above requirements is currently in the making. This grid consists of three east-west axes and of other axes crossing these, approximately in an east-west direction, but it takes into account certain transversal relations as well.

Urban transport: changing priorities

Even inside cities we sadly witness the operation of a mechanism whereby it is easier to force a HUF 200 billion metro-construction project (or an Expo-project) - which later turns out to be an economic strait-jacket - onto city-politicians than drawing up a well considered city-development policy, or have regular city-cleansing organised.

What needs to be reviewed is the priority system of the whole of the city traffic design. Currently, as it comes to plans, the drivers' interests are given priority, this is what ultimately determines the placement of the stops of public transports, the conditions of changing transports, possibilities for cycling, while the surface to be used by pedestrians only comes last. The 'habitability' of a city requires the consideration of the same *but in a reverse order.* At the same time, a city shaped on an investment basis and what is more, without prior concepts laid down on city policy it will provide no chances to have changes in that respect. A few sterile model-zones may be formed due to the self-defence of the rich districts forming on a segregatory basis.

TELECOMMUNICATIONS

Telephones: exchange of centres is under development, but the phone line takes some time to arrive

As regards telephones, the border line between east and west is best drawn by the phone set provision levels. The lag of Eastern Europe is huge, and not only in absolute terms, but also when adjusted with per capita GDP. Even in a comparison with the less developed regions of Southern Europe we find that telephone provision in the countries of the Eastern Bloc reaches about a third of what could be expected based on the development level of these countries.

Telephone is an industry which takes its origins from the last century, but in which dramatical changes in technology came in the last decades, and in fact it was the business world that generated - and financed - today's development level of telecommunication. The part of the world where the market was defunct started with a handicap in this respect.

Besides this, there was a *political* and a political power related aspect to the under-developed nature of telephone networks. Centralised power promoted infrastructure that was important from the power point of view. There were multiple, parallel communication channels between Budapest and the county centres - besides public lines there were the so called K-lines, and the special networks; systems of one-way communication equally improved, such as central radio and television networks - but based on the same logic, developing telephone connections to help people communicate among themselves was of no importance.

A peculiar development process took shape, whereby the upgrading of the most important phone exchanges into most up-to-date technology - Crossbar, or later digital exchanges - always *began*, but the process never went any further that, and, consequently, neither did the queue for phonelines become much shorter. Interestingly today, in the process of privatisation, the same is being repeated: it appears that the struggle in order to maintain technical and economic monopoly sweeps aside one by one all the solutions which would build on local initiatives to bring about fast changes on the consumers' side, and which would then have an effect of further activating the process.

SUMMARY

The inhabitants of Central Europe, of the territory which may well be seen as the clashing point of oceanic, continental, and Mediterranean climate zones are eagerly waiting to see what *economic* moves may be expected in the period of global climate

change, apart from warming already promised, which symbolically moves the natural properties of the region in a (south)-east direction. In that sense expectations tend to build up for a shift to the (north)-west.

The present paper provides an analysis of the development of Central European infrastructural networks from the point of view of the extent to which the current changes may serve as a basis for such expectations. Establishing links with Western European networks certainly occupies a central place among development plans, yet, the chances of catching up with the West vary considerably in the individual branches.

The endeavours that urge the soonest possible connection of the east and the west through high-output magistral pipelines usually *overlook* the fact that the *internal structure* of eastern grids should be modernised first of all so that they can link to the more developed western systems as adaptable, flexible grids capable of independent development, rather than as a dependent burdensome extension to them.

The electric energy system forms a characteristic exception, where the creation of internal equilibrium as well as the proof of the Visegrád countries' ability to cooperate with each other has been laid down as a condition of our joining. The ultimate aim on both side is *system-level connection, and cooperation on a network level.* Also, the purpose of the western side is *not* to look for new markets for its electricity; on the contrary, it wishes to ensure that such a situation may not emerge on a lasting basis. (Moreover, the interest of the western countries is rather to export *electricity generating equipment* to the east.)

The more disproportionate the interests concerning the grid, the larger the share of the magistral network elements will be not embedded in and having little direct access to local conditions. It should be stressed that magistral elements constitute an important level in the development of networks, that is to say that they do *not* only represent lack of development. A certain sign of lack of development, however, is if the magistral link is created *before* the basic grid, or *before* the well balanced operation starts on the basic grid. In such a case the link would not be established with the grid, but with isolated quasi-independent points, enclaves; (or, if it is exclusively transit line, then not even with such points).

These sources of danger must be carefully considered by all means when determining relation priorities of traffic and telecommunication. In the case of pipelines of crude oil and natural gas the European system itself is only now merging together to constitute a real network.

REFERENCES

[1] Galambos L. - Reguly Z.: A magyar VER nemzetközi együttmûködése az UCPTE-vel és a CENTREL-lel. (International cooperation of the Hungarian Electric Power System with UCPTE and CENTREL) MVM Rt. Közlemények 1992/6.

[2] Galambos László: A lengyel, a cseh, a szlovák és a magyar villamosenergia-rendszerek együttmûködése: a CENTREL. (CENTREL: cooperation of the Polish, Czech, Slovak and Hungarian Electric Power System) MVM Rt. Közleményei 1993/1-2

[3] Tájékoztató az Országgyûlés részére. A magyar energiapolitika. (=Hungarian energy policy. Guide to the Parliament) Hungarian Government, July 1992.

[4] Mramurácz Lajos: A földgáz szerepe és helye a nemzetközi kereskedelemben. (=Role of natural gas in the international trade.) MVM Rt Közleményei 1992 / 1.

[5] Energy policies in Hungary. Update to 1991 survey. International Energy Agency, Paris, February 1993.

[6] Molnár György: A belvizi közlekedés: kihasználatlan lehetôségek vagy visszatérô illúziók története. (Inland navigation: a history of unexploited possibilities, or haunting illusions) Kézirat 1993. pp 15.

[7] Hammer, Mich: A második vasúti forradalom. (A second revolution of the railways.) A New Scientist cikke nyomán. Technika, 1992 szeptember pp 30-32

[8] A magyar vasutak távlati fejlesztési programja. (Long-term development program of the Hungarian Railways) Gépirat. Közlekedési, Hírközlési és Vízügyi Minisztérium. Budapest, 1992. július. pp 7.

[9] Akira Kinoshita: Economic reform and industrial restructuring of coal related industry in Central and Eastern Europe. Manuscript, pp 7.

[10] A magyar villamosenergia-ipar 25 éve 1945-1970. (25 years of the Hungarian Electric Power Industry 1945-1970) Hungexpo, Budapest 1970

[11] Shutdown! Realising the low cost option to phase out Nuclear Power in Eastern Europe. Greenpeace International June, 1993

[12] Char, N. L., - Csik, B. J.: Nuclear power development: History and outlook (Events has changed the global prospects for nuclear power) IAEA Bulletin 3/1987

[13] Environmental Programme for the Danube River Basin. Programme Work Plan Commission of the European Communities, February, 1992

[14] A viziutak és kikötôk fejlesztési programja. Összefoglaló. (Development program for the waterways and ports. A summary) Tervezet Közlekedési, Hírközlési és Vízügyi Minisztérium, 1993 április.

[15] International Transport in Europe. An Analysis of Mayor Traffic Flows in Corridors. *United Nations N.Y. 1992. Economic Commission for Europe Geneva*

October 30, 1993

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- THE HUNGARIAN PERSPECTIVE

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