Deliverable D1

CEEC data and method

SCENES
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Project
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EXECUTIVE SUMMARY

The report has been created within the framework of the SCENES research project – WP 10.6. Deliverable 1 aims at two things: (1) providing necessary data to enlarge the database; and (2) extending the STREAMS model to Eastern Europe.

The SCENES project is closely connected with the previous SCENARIOS and STREAMS projects. The STREAMS model, however, did not cover the CEEC in detail. Some selected countries of Central-Eastern Europe including Poland, Hungary, and the Czech Republic, to some extent, were taken into account during the studies carried out within the framework of SCENARIOS, as well as in their database. On the other hand, one of SCENES assumptions was to include an analysis of all European countries, situated beyond the EU. It is clear that the studies are being conducted within a various degree of minuteness of detail as far as the analysis is concerned, due to both demands of the model and availability of reliable data.

D1 is divided into two main parts. The first part is concerned with macroeconomic, social and demographic data whereas the second one has been dedicated to transport data. Speaking in general terms, it is worth stressing the fact that the database being formed within the studies as an extension of the database created within the framework of the SCENARIOS project has a parallel structure. Namely, it is divided into seven parts: (1) General information; (2) Households; (3) Education; (4) Labour Market; (5) Transport; (6) Economy; and (7) Foreign Trade.

The first part of the report aims at collecting and analysing macroeconomic and demographic data as regards particular CEE countries, in accordance with the regional division of those countries of that report. According to the agreements signed under SCENES, the countries aspiring to their 1st stage membership were labelled as internal countries in comparison to the model. Those countries included: Poland, Czech Republic, Hungary, Estonia, and Slovenia. The remaining countries were assumed as external countries in comparison to the model where a required degree of detailed data is slightly lower. However, it should not be expected that the regional division is referred to the internal countries and in relation to the external countries, it is only the levels of the entire country that are being analysed. As a matter of fact, it is not the case. A different system has been assumed. Namely, large countries or the areas where there is a defined division into NUTS2 regions have been divided into regions. On the other hand, the data concerning the countries with relatively small territory and its population, or the countries where it would be very difficult to analyse according to regions that fit NUTS2, the data were collected on the level of the whole country. The definition of the regional structure for each country is presented in Chapter 1.

Apart from the Introduction and a section justifying particular spatial aspects, Chapter 1 is dedicated to elaboration of regional units accepted in the project. Furthermore, a general approach to the problem of data availability and reliability in particular groups of problems are presented. It was decided that the following data groups should be included into reliable data of all those countries:

- general information (population, area, territory) which is due to global availability of that kind of universally known and published information;
- education, since in almost all the countries the data are being collected according to uniform rules and being delivered to UNESCO in its uniform format, whereas regarding the remaining data groups, there are some stipulations as to their comparability and reliability, i.e.
- households: data are collected under different structures, therefore their comparability is limited;
- labour market - information on the rate of unemployment is not reliable due to high hidden unemployment in most of the countries;
- transport - data at different levels of detail in particular countries; a big differentiation of the quality of regional data. Differences in data reliability, e.g., referring to transport expenditure;
- economy; it would seem that such a basic guide as GDP calculations being made equally under the SNA principles will be regarded as reliable. However, in particular countries such reliability is different. Some national statistics use principles that are only approximate to SNA System, whereas in others a great significance of hidden economy makes direct comparison difficult.
- foreign trade - in general, data reliability can be regarded as satisfactory except for the foreign trade in the former Soviet Republics.

In the next item of the report a detailed summary has been made concerning reliability of particular data groups in accordance with the countries. A ranking of data reliability from different countries has also been made. Its results show the countries with the highest positions (i.e., the greatest reliability) include: Poland, Hungary, Czech Republic, Slovenia, Yugoslavia (situation before the war). On the other hand, data reliability is worse in the remaining countries hence they receive the worst rankings. The next item of the report presents data coverage. An assessment of particular data groups availability was presented in a schematic manner.

The detailed data regarding particular countries are presented in Excel format files and are enclosed in annexes. References to other reports and maps of regions are presented in annexes to Chapter 1. Moreover, some additional data not included in the database is also covered here. A list of annexes is contained in Chapter 4 – the actual annexes are contained on an accompanying CD-ROM.

The second part of the report is dedicated to transport modelling data. It was divided into four subsections dealing with such subsequent data as: (1) transport network; (2) transport operational data; (3) transport flows, and (4) mobility data.

The data on the transport network in CEEC was the subject of various comparative analyses conducted on an international level. The studies which are of particular use are: TINA project as well as EC, PHARE and EUROSTAT report 'Transport development in the Central European countries'. The analyses conducted within the framework of SCENES are based on official data and those published in particular countries as well as on direct consultations carried out among local experts. Also, the results of 'Transport development etc.' report have been used to some extent. However, the TINA project was being conducted at the time of the production of D1, and was generally not taken into consideration. At the moment of gaining an access to TINA reports one should make a comparative analysis of the results achieved under SCENES and TINA as regards infrastructure problems in particular.

The analysis of network data has been realised in accordance with transport modes. It has also summarised accessible information regarding origin-destination matrices, cross-border traffic, current national plans for transport infrastructure development as well as existing forecasts of transport development, traffic flows, foreign trade, etc.

It turned out that availability and comparability of the data differ considerably in particular countries. If data availability is sufficient in the countries treated as internal in relation to the SCENES model, then the situation in other countries like the former Soviet Union is quite different. Moreover, it is worth noticing the fact that the data shown in official statistical yearbooks refer to the roads by a nationally defined categorisation, and inconsistencies may arise between countries. The best comparable references are public hard surface roads, although statistical data do not take into consideration such a position in all the countries.

A comparison of the rail network is also possible using a uniform indicator referring to the railway network length, not the entire rail lines network. In some countries, due to closing up some rail lines, the data are not complete. In addition, the comparison of indicators should be based on public network, without taking into account company rail stretches, access lines to private sidings, etc. The data concerning transport networks in other transport modes are in available at different levels of detail, and in some cases they refer to only selected countries. It results from the fact that there is quite a different role of the remaining modes as well as a significance of a given network in different countries, especially referring to inland waterway transport and sea transport.

Apart from a quantitative analysis and comparability of accessible data, the annexes included transport network maps for particular countries.

That part of the report also covered some traffic data for selected countries for which such data were available or accessible. Very detailed data refer to Poland, for instance.

The next part of the report was dedicated to forecasts of transport development. Here the most essential studies are reported in the scope of an analysis of possible forecasts regarding the development of the entire transport or particular modes of that branch of economy. The methodology which was used as a basis for the forecasts is also summed up. The results of the discussed forecasts of transport development in CEEC were added to the annexes.

Transport operational data are presented in a division into transport modes. The data in the scope of costs and tariffs in particular transport modes were compared.

The data on transport flows are mostly as a contribution to the database. In the D1 text the nature of data collection as well as its structure is defined, and references are made to data contained in the Annexes. Generally, the freight flow data were collected in volume and in monetary units. In some cases the export and import flow data are broken down by origin / destination countries or country groups, but in some other cases only the total national data are available.

Unfortunately, it was not possible to collect comparative data concerning population mobility within CEEC. It seems that data of this natures does not exist in the official publications of those countries. Some of the countries publish the data regarding tourism mobility according to different distance zones.

The report is accompanied by annexes specifying detailed data concerning each discussed subject. The report includes a CD with files of which the contents as well as a brief subject scope is presented in Chapter 4, at the end of the report. The files include both transport network maps in graphic formats, 'Excel' files with the data concerning particular countries and particular problems as well as 'Word' files with chosen extracts of the studies referred to in the report. It was decided to include the data files on CD because of the extensive scope and quantity of the data – inclusion of all the data in the main text would have led to an over-voluminous report.

INTRODUCTION

The aim of the report is to determine data availability concerning macroeconomic and social indicators as well as supply and demand on transport markets in CEE countries. This is achieved by using available data, as well as findings and results of existing studies, models and forecasts, etc. The data on macroeconomic indicators and transport are indispensable to extend the STREAMS model in particular but are also of importance for other parts of the SCENES project.

The report is divided into two main parts: social and economic statistics in CEEC, and the specific data on transport. The responsibility for preparing the report has been distributed into the following way: NOBE is responsible for preparing first part of the report concerning macroeconomic data; UG and KTI are responsible for preparing the second part of the report dedicated to transport data. The second part consists of the following items:

UG:

2.1. Network data

2.2. Transport operational data;

KTI:

2.3.Flows

2.4. Mobility surveys.

Most of the countries lying in the Central and Eastern part of Europe are included in the report. Depending on a particular country, different variants of collecting the data have been agreed to. The countries aspiring in the first stage of the EU membership have been named internal countries within the model, i.e., Poland, Czech Republic, Hungary, Estonia and Slovenia. The division into the zones in those countries is the following:

Poland – 16 zones (16 new administrative voivodhips), Hungary - 7 zones,

Czech Republic - 8 zones, Estonia - 1 zone,

Slovenia - 1 zone.

The additional countries included in the internal ones are as follows:

Slovakia - 4 zones, Lithuania - 1 zone,

Latvia - 1 zone.

The second group of countries within the model will consist of external countries, i.e.

Romania – 3 zones, Bulgaria - 3 zones,

Albania -1 zone, Russia - 1 or 2 zones,

Ukraine - 1 zone, Moldova - 1 zone,

Belarus - 1 zone, Yugoslavia - 1 zone,

Croatia - 1 zone.

1. MACROECONOMIC DATA IN CEEC

1.1 General Remarks

Independent Center for Economic Studies NOBE was responsible for the collection of data concerning general economic environment and some transport indicators for the following CEE countries:

- Baltic countries (Estonia, Latvia, Lithuania),
- Poland,
- Bulgaria,
- FYR Macedonia,
- Countries of the Former Soviet Union: Russia, Ukraine, Belarus.

Collected data for the large candidate CEE countries (Bulgaria and Poland) are disaggregated to the regional level (NUTS2). For the small candidate countries (Baltics) and non-candidate countries only the general economy level data were collected. The only exemption is Russia in which case an effort was made to have at least some of the data disaggregated to the regional level.

The data were collected for the latest available year (an effort was made to collect the most important data for 1996).

KTI was responsible for the collection of data concerning general economic environment for the following CEE countries:

- Czech Republic
- Hungary
- Slovakia
- Slovenia
- Romania
- Croatia
- Federal Republic of Yugoslavia

For all these countries the data were collected on NUTS2 level for the latest available year, which was 1996 in most of the cases. Considering that the unified data base form was defined later then the majority of the data collection has been done, part of those tables can not be transformed to the unified form. These data are available in the earlier SCENARIOS format.

1.2 Regional units

1.2.1 Poland

Specific problems with the regional data were encountered in the case of Poland. Until the end of 1998 Poland was divided into 49 regions (voivodships) with the average population of below 1 million and the average area of 6,000 km^2. Since 1999 the new administrative regions of Poland have emerged: 16 relatively big regions (voivodships) with the average population of 2.5 million and the average area of 20,000 km^2. The new regions were designed as the NUTS2 units.

For the time being, all the available data cover the old 49 regions only. As we consider the right NUTS2 units crucial for the future-oriented part of the analysis, we have made an additional serious effort to estimate all the data according to the new 16 units (majority of the actual data for the new units will not be released by the CSO before end-1999). The results of our estimates can be regarded as relatively reliable.

Therefore, the regional database for Poland contains:

♦ 49 administrative regions (old regions):

1. Warszawskie	2. Bielskopodlaskie	3. Bialostockie	4. Bielskie
5. Bydgoskie	6. Chelmskie	7. Ciechanowskie	8. Czestochowskie
9. Elblaskie	10. Gdanskie	11. Gorzowskie	12. Jeleniogórskie
13. Kaliskie	14. Katowickie	15. Kieleckie	16. Koninskie
17. Koszalinskie	18. Krakowskie	19. Krosnienskie	20. Legnickie
21. Leszczynskie	22. Lubelskie	23. Lomzynskie	24. Lódzkie
25. Nowosadeckie	26. Olsztynskie	27. Opolskie	28. Ostroleckie
29. Pilskie	30. Piotrkowskie	31. Plockie	32. Poznanskie
33. Przemyskie	34. Radomskie	35. Rzeszowskie	36. Siedleckie
37. Sieradzkie	38. Skierniewickie	39. Slupskie	40. Suwalskie
41. Szczecinskie	42. Tarnobrzeskie	43. Tarnowskie	44. Torunskie
45. Walbrzyskie	46. Wloclawskie	47. Wroclawskie	48. Zamojskie
49. Zielonogórskie			

The new administrative system is as follows:

♦ 16 new regions:

1. Dolnoslaskie	2. Kujawsko-Pomorskie	3. Lodzkie
4. Lubelskie	5. Lubuskie	6. Malopolskie
7. Mazowieckie	8. Opolskie	9. Podkarpackie
10. Podlaskie	11. Pomorskie	12. Slaskie

13. Swietokrzyskie 14. Warminsko-Mazurskie 15. Wielkopolskie

16. Zachodniopomorskie

For the geographical location of both 49 and 16 regions, consult the file *'maps_regions.doc'* - Annex 4.1.3.

Some additional information on the old and new Poland's administrative regions, including the list of the main products manufactured in the regions, and the biggest enterprises, can be found in the attached file *'appendix_chapter1.ed.doc'* - Annex 4.1.2.

1.2.2 Bulgaria

In the case of Bulgaria we collected data from 9 administrative provinces. The average size of a province is similar to the old Polish regions (ca. 1 million inhabitants). However, since no indication exists about any plan of Bulgaria to change the administrative division of the country to make the region closer to the average NUTS2 size in the EU, we aggregated the data according to the 3 regions, which in our view can be treated as NUTS2 units.

The following 9 regions are presented in the database as the source data:

1 Sofia-city 2 Bourgas 3 Varna 4 Lovech

5 Montana 6 Plovdiv 7 Rousse 8 Sofia

9 Haskovo.

The three NUTS2 regions are the following:

1. Sofia-city

2. Severna Balgarija (Varna, Lovech, Montana, Rousse)

3. Juzhna Balgarija (Bourgas, Plovdiv, Sofia, Haskovo).

For the geographical location 3 NUTS2 regions, compare the file *'maps_regions.doc'* - Annex 4.1.3.

1.2.3 Russia

For a general disaggregation of the Russian data to the regional level the following groups of regions were chosen:

1 North 2 North-West 3 Central 4 Wolgo-Wiatskij

5 Central Tchernoziemnyj 6 Powolziskij 7 Notrhern Kaukasian8 Uralskij

9 Western Siberian 10 Southern Siberian 11 Far North 12 Kaliningrad

For the geographical location of the 12 regions, compare the maps in the file *'maps_regions.doc'* - Annex 4.1.3.

1.2.4 Hungary

In the case of Hungary the data were collected for the 19 counties and for the capital of Budapest. These counties are smaller and have less inhabitants than the NUTS2 regions in the other countries. Therefore, they were aggregated into 7 NUTS2 regions. The data are presented on county level.

The counties and the capital are as follows:

0. Budapest
1. Baranya
2. Bács-Kiskun
3. Békés
4. Borsod-Abaúj-Zemplén
5. Csongrád
6. Fejér
7. Gyõr-Moson-Sopron
8. Hajdú-Bihar
9. Heves
10. Jász-Nagykun-Szolnok
11. Komárom-Esztergom
12. Nógrád
13. Pest
14. Somogy
15. Szabolcs-Szatmár-Bereg
16. Tolna
17. Vas
18. Veszprém
19. Zala

The seven NUTS2 regions are:

1. Central Hungary (Budapest, Pest)
2. Northern Transdanubia (Fejér, Komárom-Esztergom, Veszprém)
3. Western Transdanubia (Gyõr-Moson-Sopron, Vas, Zala)
4. Southern Transdanubia (Baranya, Somogy, Tolna)
5. Northern Hungary (Borsod-Abaúj-Zemplén, Heves, Nógrád)
6. Northern Plain (Hajdú-Bihar, Szabolcs-Szatmár-Bereg, Jász-Nagykun-Szolnok)
7. Southern-Plain (Bács-Kiskun, Békés, Csongrád)

1.2.5 Czech Republic

Czech Republic is divided into 8 administrative regions. The data were collected for these NUTS2 regions:

1. Capital Prague
2. Central-Bohemia
3. South-Bohemia
4. West-Bohemia
5. North Bohemia
6. East Bohemia
7. South-Moravia
8. North-Moravia

1.2.6 Slovak Republic

Although Slovakia is divided into 8 NUTS2 regions, most of the data are not yet available on this level. Therefore the majority of the data were collected on national level.

The eight NUTS2 regions are as follows:

1. Bratislava	5. _ilina
2. Trnava	6. Banská Bistrica
3. Tren_in	7. Pre_ov
4. Nitra	8. Ko_ice

1.2.7 Romania

Romania consists of 42 administrative regions. Some of the required data were available on this level, the others on a national level only. The aggregation of the detailed data is necessary to the NUTS2 level. The administrative regions are as follows:

1. Alba	22. Hunedoara
2. Arad	23. Ialomi_a
3. Arge_	24. Ia_i
4. Bac_u	25. Ilfov
5. Bihor	26. Maramure_
6. Bistri_a-N_s_ud	27. Mehedin_i
7. Boto_ani	28. Mure_
8. Bra_ov	29. Neam_
9. Br_ila	30. Olt
10. Buz_u	31. Prahova
11. Cara_-_everin	32. Satu Mare
12. C_l_ra_i	33. S_laj
13. Cluj	34. Sibiu
14. Constan_a	35. Suceava
15. Covasna	36. Teleorman
16. Dâmbovi_a	37. Timi_
17. Dolj	38. Tulcea
18. Gala_i	39. Vaslui
19. Giurgiu	40. Vâlcea
20. Gorj	41. Vrancea

21. Harghita 42. Municipiul Bucure_ti

The seven NUTS2 regions are:

N-E Romania (4, 7, 24, 29, 35, 39)

S-E Romania (9, 10, 14, 38, 40)

South Romania (3, 12, 16, 19, 23, 31, 36)

S-W Romania (17, 20, 27, 30, 40)

Western Romania (2, 11, 22, 37)

N-W Romania (5, 6, 13, 26, 32, 33)

Central Romania (1, 8, 15, 21, 25, 28, 34, 42)

1.2.8 Yugoslavia

The data of Yugoslavia were collected for four greater administrative regions:

Montenegro

Central Serbia

Vojvodina

Kosovo & Metohia

On NUTS2 level Yugoslavia forms only one region.

1.2.9 Slovenia

Although Slovenia forms only one unit in NUTS2 level, for the possibility of a more detailed model representation the available data were collected for the 12 administrative regions as follows:

1. Dolenjska
2. Gorenjska
3. Gori_ka
4. Koro_ka
5. Notronjko-kra_ka
6. Obolno-kra_ka
7. Osrednjeslovenska
8. Podravska
9. Pomurska
10. Savinjska
11. Spodnjeposovska
12. Zasavska

The other data are on a national level.

1.2.10 Croatia

Croatia consists of 20 administrative regions and capital Zagreb, but represents only one NUTS2 region. For more detailed modelling, the available data were collected for the administrative regions, the others on national level. The administrative regions are as follows:

Zagreb

Krapinsko-Zagorska

Zagreba_ka

Sisa_ko-Moslava_ka

Karlova_ka	Vara dinska
Koprivni_ko-Kri eva_ka	Bjelovarsko-Bilogorska
Primorsko-Goranska	Li_ko-Senjska
Viroviti_ko-Podravska	Po_e_ko-Slavonska
Brodsko-Posavska	Zadarsko-Kninska
Osje_ko-Baranjska	_ibenska
Vukovarsko-Srijemska	Splitsko-Dalmatinska
Istarska	Dubrova_ko-Neretvanska
Me_imurska	

1.2.11 Other Countries

Data for the other countries (Baltic countries, FYR Macedonia, Ukraine, Belarus) are shown only on the national level.

1.3 General assessment of the data availability and reliability

According to the opinion of authors of the report, partially based also on the opinions circulated in international organisations (e.g, OECD and Eurostat), the reliability of statistical data is different for different countries in question. A quality rank has been attached to each country (from 1 - best to 3 - lowest) which characterises the general level of reliability of the statistical information in a given country. This reliability may, of course, vary according to the topic under consideration. The quality ranks are as follows:

- Baltic countries
  - Estonia - 2
  - Latvia - 3 *both may be*
  - Lithuania - 3 *upgraded to rank 2 soon*
- Belarus - 3
- Bulgaria - 3
- Macedonia - 3
- Russia - 3
- Ukraine - 3
- Poland - 1
- Croatia - 2
- Czech Republic - 1
- Hungary - 1

- Romania - 2
- Slovakia - 2
- Slovenia - 1
- Yugoslavia - 2

One of the most important economic indicators is GDP both total and per capita. It should be noted that for economic analysis it is not possible to compare internationally volumes of GDP in a reliable manner by using exchange rates because they are influenced by other elements than price differences alone. Instead PPPs (the quantity known as the purchasing power standard) which reflect only price level differences could and should be used as a conversion factor. In such a case GDP figures expressed in national currencies can be re-expressed to reflect purely the underlying volumes. To underline how important such calculations are, one can quote the Director General of DG I: "the comparison of per capita GDP in purchasing power standards for the Candidate Countries is at the centre of the enlargement exercise".

In mid-October 1998, the latest results relating to Candidate Countries for GDP level for 1996 became available (document Eurostat B-CC/98/13 new). A relevant table is reproduced as an annex to this report (see Table 1, file *'appendix_chapter1.ed.doc'* – Annex 4.1.2). In addition, on the basis of detailed results relating to 50 groups of final disposition of GDP, volume indices were calculated taking the EU average as 100.0 and shares (in national currency) in transport related GDP and private consumption of those expenditure (see Table 2, file *'appendix_chapter1.ed.doc'* – Annex 4.1.2). This data based on available information relate not to all Central and East European countries.

It should be noted that comparisons of the volume of GDP and of purchasing power parities were carried out in different country groups. The Russian Federation, Romania, Belarus, Bulgaria, Ukraine, Estonia, Latvia, Lithuania, and Slovenia took part in the comparisons co-ordinated by the Austrian Statistical Office (so called group 2). Slovenia, Czech Republic, Hungary, Slovenia, and Russia took part in comparisons co-ordinated by OECD (thus Slovenia and Russia participated in two groups of countries, being co-ordinated by the Austrian Statistical Office and this co-ordinated by OECD). Poland took part in the comparisons of so called group 1, together with all European Union Countries - OECD took over the results of this comparison and included Poland and all EU countries in its publications.

There are small differences between definitions of households consumption between group 2 and OECD comparisons. In the former case it is private final consumption, it means direct consumption of commodities (purchased or self produced) by households, while in the latter it includes also the value of actual consumption by households of non market services financed by General Government or Private non Profit Institutions.

As can bee seen from Tables 1 and 2 below which relate to the Russian Federation and Slovenia (i.e., the countries participating in two groups' comparisons), the differences in the per capita volume indices according to different definition of consumption are not significant (within the margin of error). They are more important in the comparison of structures of GDP.

Table 1: GDP Per capita, volume indices, EU-15=100

Name of heading	RUSSIAN FED.		SLOVENIA	
	Based on comparisons:			
	2nd group	OECD	2nd group	OECD
Private final consumption	-	28.4	-	61.1
Final consumption of population (national)[x)]	29.1	-	60.3	-
Food	45.4	48.6	73.6	78.9
Transport equipment	6.7	7.3	63.5	68.3
Operation of equipment	11.0	9.1	83.5	77.8
Purchased transport services	49.4	60.6	68.9	71.3
GROSS FIXED CAP. FORM.	19.9	26.9	70.5	69.9
Transport equipment	4.4	6.3	52.7	63.8
GROSS DOMESTIC PRODUCT	34.2	34.3	66.9	68.7

X) includes actual consumption of non-market services by households

Table 2: Structure of GDP 1996 (national currencies)

Name of heading	RUSSIAN FED.		SLOVENIA	
	Based on comparisons			
	2nd group	OECD	2nd group	OECD
Private final consumption	-	53.53	-	55.51
Final consumption of population (national)[x)]	60.90	-	68.84	-
Food	17.42	17.42	11.70	11.70
Transport equipment	1.75	1.75	4.54	4.54
Operation of equipment	1.61	1.61	4.81	4.81
Purchased transport services	2.32	2.32	1.45	1.45
GROSS FIXED CAP. FORM.	20.29	20.29	22.30	22.30
Transport equipment	0.80	0.80	2.64	2.64
GROSS DOMESTIC PRODUCT	100.00	100.00	100.00	100.00

X) includes actual consumption of non-market services by households

The final databases are divided into seven large areas: (I) General information, (II) Households, (III) Education, (IV) Labour market, (V) Transport, (VI) Economy, (VII) Foreign trade. The coverage of data for each country is presented in the form of tables – see spreadsheet files contained in Annex 4.1.1.

For all countries the data relating to '**General information**' (Population, Area, Density) should be regarded as reliable.

In the group '**Households**' the coverage is different for different countries (for some countries expenditures for transport are treated together with expenditures for communication). The structure of consumer expenditure is available for Belarus, Bulgaria, Estonia, Latvia, Lithuania, Macedonia, Russia, and Poland. However the reliability of data for all those countries can be questioned. Information is based on household budget surveys, which are not fully consistent with national accounts estimates. The size of the sample is usually rather small, households with a low income level and high income level are underrepresented. In our opinion it would be better to use for analysis data prepared by countries for the purpose of international comparisons of the volumes of GDP and purchasing power parities. These data are based on rather rough estimates in which the results of household budget surveys are confronted with several macro data. Nevertheless, those estimates have the merit of being consistent with national accounts estimates and probably give a better approximation than results of households surveys (households budgets are not suitable as a source of information for purchases of consumer durable such as cars; the under-representation of households with high levels of income results in underestimation of average expenditures for petrol).

Share of expenditures for transport (T) or transport and communication (TC) in total consumer expenditures according to the results of households surveys and shares of expenditures on transport (T) in final consumption of population according to the results of international comparisons (ICP) are as below:

	Household survey	ICP (T)
Belarus (TC)	4.9	4.7
Bulgaria (TC)	7.1	11.2
Estonia (T)	6.5	4.2
Latvia (T)	6.0	10.7
Lithuania (T)	5.2	7.1
Poland (TC)	9.7	13.3[x)]
Russia (T)	5.0	9.3

[x)] *per cent in private final consumption*

In principle the shares according to the results of ICP should be lower from those based on the results of family budget surveys since the total include in the former case the value of non market services financed by General Government and Private non profit institutions.

As far as '**Education**' is concerned the information is old but relatively reliable for the majority of countries (information delivered by countries to UNESCO).

Turning to '**Labour market**' data, the information on employment (and self-employment) is of acceptable quality, taking under consideration the general ranking of countries according to reliability of data. Information on unemployment (registered) are misleading in all countries. They do not cover hidden unemployment.

In the group '**Transport**' the data collected in the macroeconomic chapter shows values and expenditure in this sector of the in economies. In Chapter 2, detailed data on transport activities, especially concerning physical units and specific modes of transport are collected.

In the group '**Economy**' GDP estimates are carried out in all countries in principle according to SNA methodology (before 1990 all countries were using the so-called MPS system). The reliability of the estimates is strongly different in different countries (see general ranking of countries) and practical deviations from SNA recommendations are probably (no reliable information available) also different (e.g coverage of the so-called hidden economy).

As far as international comparisons of relative volumes of GDP are concerned, it is recognised that in the case of CEEC (apart from Poland which is treated as belonging already to EU), the methods currently used might produce results of lower quality. This is due to difficulties in finding comparable and representative products (due to the varying degree of implementation of the market economy). Furthermore the pricing of non-market services and housing sector represents perhaps a very serious problem. In our opinion the GDP level (volume) of Bulgaria, Romania, Russia, Belarus and Ukraine (maybe also Slovakia) is overestimated. The level of GDP in Poland *vis a vis* other Central and East European countries may be underestimated since Poland takes a direct part in EU comparisons.

The reliability of data in the group '**Foreign trade**' is in general of acceptable quality on the assumption that only trade registered by custom offices is covered. Certain problems (low reliability) may be encountered by ex Soviet countries in the recording of their trade with Russia.

As far as the data by regions are concerned the coverage for Poland is almost the same as for the country total. Selected information by regions were available for Bulgaria. Since no information is available for GDP by regions in Bulgaria we undertook ourselves a very rough estimate which however in our opinion could be treated as an acceptable rough approximation. The method was very simple. We calculated gross value added by activities in regions using data on employment and average labour productivity. Gross value added in a region is the sum of gross value added by activities. The data by activities may be not reliable (we do not quote them) but the total gross value added in a region may give rough approximation (mistakes by activities may cancel each other). The sum of gross value added by regions calculated the way described above gave of course figure very close to the published gross value added for Bulgaria. This small difference (approximately 2%) was distributed pro rata by regions. We would like to stress that the method used is very rough, but we did not see any other possibility.

Additionally selected information by regions (12 regions) was collected for Russia. They relate to population by gender and population by age, households by size, employment and unemployment, structure of industrial output, investment (fixed capital formation), length of roads per 1000 sq km, cars per 1000 households and busses per 1 mil of inhabitants.

The size of the economies in Central and Eastern Europe, as captured by the PPP (Purchasing Power Parity) comparisons produced by Eurostat and OECD is shown in the chart below. One should keep in mind, however, that the PPP comparisons for the FSU countries should be treated very cautiously (as advised by the World Bank in the World Development Report). In particular, the GDP numbers for Russia and Ukraine are generally judged as surprisingly high. For the time being, only Poland (out of all the countries covered) participates in the full Eurostat PPP excercise. However, the numbers for the other countries are drawn from the OECD research, and – despite some methodological differences – are reliable.

Size of the economies of CEEC in 1996
(GDP according to PPP, EU-15=100)

1.4 Data reliability (by countries)

1.4.1 Poland (rank 1)

General information (population, area) - good quality information.

Households - information based on households budget survey and are not fully consistent with national accounts data, budgets of farmers households are less reliable than that of employees.

Education - good quality information.

Labour market - standard quality of data, information on unemployment (registered) may be misleading.

Transport - good quality data.

Economy - GDP and related estimates can be regarded as similar quality as in the European Union countries.

Foreign trade - standard quality of data, apart from information registered by custom offices there is an important unregistered trade (informal economy) included in the national accounts estimates.

1.4.2 Belarus (rank 3)

General information (population, area) - good quality information.

Households - information based on households budget survey, not fully consistent with national accounts estimates; standard of survey doubtful.

Education - old information but reliable.

Labour market - acceptable quality data, information on registered unemployment may be misleading.

Transport - good quality data.

Economy - GDP estimated according to SNA methodology but the quality of data doubtful.

Foreign trade - acceptable quality of data, only trade registered by custom offices; important part (trade with Poland) of informal trade missing.

1.4.3 Bulgaria (rank 3)

General information (population) - good quality information.

Households - information based on households budget survey, not fully consistent with national accounts data; standard of survey doubtful.

Education - information old but reliable.

Labour market - information by regions limited to public sector - 58% of the total employment; classification by activities according to specific Bulgarian classification; no information on unemployment by age group and sex.

Transport - rather standard quality data.

Economy - GDP estimated according to SNA methodology but the quality of data doubtful; estimates of gross value added by regions performed by Polish experts (rough estimates).

Foreign trade - acceptable quality of data.

1.4.4 Baltic Countries (rank - Estonia 2, Latvia and Lithuania 3)

General information (population) - good quality information.

Households - information based on households budget survey, not fully consistent with national accounts; standard of survey better in Estonia than in Latvia and Lithuania.

Education - information old but reliable.

Labour market - information relatively reliable; no information on unemployment by age group and sex for Estonia and Lithuania.

Transport - standard quality data.

Economy - for Estonia and Latvia GDP calculated according to SNA, for Lithuania, methodology is not clear (further clarification necessary).

Foreign trade - rather acceptable quality of data (doubtful may be export and import data to ex Soviet countries for Latvia and Lithuania).

1.4.5 Macedonia (rank 3)

General information (population) - good quality information (year 1994).

Households - information based on household budget surveys, not fully consistent with national accounts; standard of survey doubtful.

Education - information old but reliable.

Labour market - information relatively reliable; information on unemployment by age but not by age and sex (additional information by number of years employed available but further clarification needed).

Transport - standard quality information.

Economy - GDP calculated according to SNA but quality doubtful - old data.

Foreign trade - quality of data rather acceptable (doubtful export and import to ex Soviet countries).

1.4.6 Russia (rank 3)

General information (population) - relatively good quality information (for certain regions may be doubtful).

Households - information based on household budget surveys - representativeness of sample doubtful.

Education - information old but relatively reliable.

Labour market - information on employment relatively reliable; on unemployment doubtful.

Transport - relatively reliable information.

Economy - GDP estimated according to SNA but poor quality of data - different information by different sources (further clarification needed).

Foreign trade - rather acceptable quality of data (doubtful export and import to ex Soviet countries).

1.4.7 Ukraine (rank 3)

General information (population) - relatively good quality information.

Households - information based on household budget survey, how representative the sample is may be doubtful; only information on structures available.

Education - information old but relatively reliable.

Labour market - information on employment relatively reliable; on unemployment no information (only rough estimates of unemployment rate).

Transport - available information relatively reliable.

Economy - GDP estimated according to SNA but quality of data doubtful (especially doubtful data on exports)

1.4.8 Croatia (rank 2)

General information (population, area) - good quality information.

Households - information based on household budget surveys.

Education - standard quality of data.

Labour market - standard quality of data.

Transport - good network data.

Economy - GDP estimated according to SNA.

Foreign trade - standard quality of data, sources are the customs declarations, published according to basic methodological declarations of the Statistical Office of the UN.

1.4.9 Czech Republic (rank 1)

General information (population, area) - good quality information.

Households - information based on households budget survey, classification corresponds to ESA 1995.

Education - standard quality of data.

Labour market - standard quality of data.

Transport - good network data.

Economy - GDP estimated according to methodology developed in compliance with Eurostat methodology ESA 1995 to suit Czech conditions.

Foreign trade - standard quality of data, sources are the data from the Directorate General of Customs.

1.4.10 Hungary (rank 1)

General information (population, area) - good quality information.

Households - information based on household budget surveys, in consistency with UN, EUROSTAT, IMF, OECD and World Bank recommendation (SNA 1993).

Education - standard quality of data.

Labour market - standard quality of data, because of the alterations of the data from different sources source groups were formed.

Transport - good network data.

Economy - GDP estimated according to methodology mentioned by households.

Foreign trade - standard quality of data, methodological sources: Methodology of external trade statistics (HCSO, 1994), source of data: customs documentation.

1.4.11 Romania (rank 2)

General information (population, area) - standard quality information.

Households - information based on household budget surveys, for families of employees the Laspéyres formula was used.

Education - standard quality of data.

Labour market - standard quality of data, based on yearly surveys.

Transport - standard quality network data.

Economy - GDP estimated according to the E.S.A..

Foreign trade - standard quality of data; on the basis of FOB effective prices for exports and of CIF effective prices for imports; source of data: customs documentation.

1.4.12 Slovakia (rank 2)

General information (population, area) - standard quality information.

Households - information based on household budget surveys.

Education - standard quality of data.

Labour market - standard quality of data.

Transport - standard quality network data.

Economy - GDP estimated according to the E.S.A..

Foreign trade - standard quality of data; on the basis of FOB effective prices for exports and for imports.

1.4.13 Slovenia (rank 1)

General information (population, area) - standard quality information.

Households - information based on quarterly households budget surveys.

Education - standard quality of data.

Labour market - standard quality of data; LFS in compliance with the ILO guidelines and with Eurostat requirements.

Economy - GDP estimated according to the E.S.A./ SNA.

1.4.14 Yugoslavia (rank 2)

General information (population, area) - standard quality information.

Households - information based on quarterly household budget surveys.

Education - standard quality of data.

Labour market - standard quality of data; based on semi-annual reports.

Transport - standard quality network data.

Economy - standard quality of data.

Foreign trade - standard quality of data; on the basis of FOB effective prices for exports and of CIF effective prices for imports; source of data: customs documentation.

1.5 Data coverage

The contents of the database are presented in the following table. The spreadsheet files can be found in Annex 4.1.1, with regional data contained in separate files for Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Russia, Slovak Republic and Yugoslavia, and a 'country comparison' file containing national level data only for these and the other countries listed below in Table 3.

Table 3: Macroeconomic data coverage in CEEC

	Albania	Belarus	Bulgaria	Estonia	Latvia	Lithuania	Macedonia	Poland	Russia	Ukraine	Croatia	Czech Republic	Hungary	Romania	Slovakia	Slovenia	Yugoslavia
General data	x	x	x	x	x	x	x	x	X	X	x	x	x	i	x	x	i
Population	x	x	x	x	x	x	x	x	X	X	x	x	x	x	x	x	x
Age and sex distribution	0	x	x	x	x	x	x	x	X	I	x	x	x	x	x	x	x
GDP	0	x	x	x	x	x	x	x	X	X	i	x	x	x	x	x	i
Productivity	0	x	x	x	x	x	x	x	X	I							
GDP at PPP	0	x	x	x	x	x	0	x	X	X							
Employment	0	x	x	x	x	x	x	x	X	I	x	x	x	x	x	x	x
Unemployment	0	x	x	x	i	x	x	x	X	I	0	i	x	i	x	i	i
Investment	0	x	x	x	x	x	x	x	I	I	x	x	x	0	x	x	0
Industrial output	0	x	i	x	0	x	x	x	I	I	0	0	x	x	x	0	0
Education	0	x	x	x	x	x	0	x	X	0	x	i	i	x	0	i	i
R&D	0	x	x	x	x	x	i	x	X	X	i	x	x	x	x	x	x
Households	0	x	x	x	x	x	x	x	X	i	x	i	x	i	x	x	x
Vehicles	0	x	x	x	x	x	x	x	I	i	x	x	x	x	i	x	
Transport network	0	x	x	x	x	x	x	x	X	x	x	x	x	x	x	0	x
Transport volume	0	x	x	x	x	i	i	x	X	i	0	i	x	x	i	0	x
Foreign trade	0	x	x	x	x	x	x	x	X	x	x	x	x	x	x	0	x
Trade matrices	0	x	0	0	x	x	0	x	I	0	x	x	x	x	i	0	x

Symbols: 0 - no, or almost no information; i - incomplete information; x - full, or almost full coverage

1.6 Data sources

The following sources of the data were used for preparation of the database, or for preparing the estimates:

International statistics:

EBRD, Transition Report, various issues

OECD, National Accounts, various issues

WIIW, Transition Economies- Handbook of Statistics, various issues

World Bank, World Development Report, various issues

National statistics:

Poland: Statistical yearbook (various issues), Statistical yearbook of regions (1997), Demographic yearbook (1997), Household survey (1997), GDP by regions (1998), Transport, Results of the activities 1997.

Belarus: Statistical yearbook (various issues),

Bulgaria: Statistical yearbook (various issues),

Estonia: Statistical yearbook (various issues),

Lithuania: Statistical yearbook (various issues),

Latvia: Statistical yearbook (various issues),

FYR Macedonia: Statistical yearbook (various issues),

Russia: Statistical yearbook (various issues), Russian science and technology 1995/

Ukraine: Statistical yearbook (various issues),

Croatia: Statistical yearbook (various issues) and data from the Central Bureau of Statistics of the Republic of Croatia,

Czech Rep.: Statistical yearbook (various issues), Yearbook of External Trade, Yearbook of the Regions and data from the Czech Statistical Office,

Hungary: Statistical yearbook (various issues), different regional and demographic yearbooks,

Romania: Statistical yearbook (various issues) and data from the National Commission for Statistics,

Slovakia: Statistical yearbook (various issues) and data from the Statistical Office of the Slovak Republic,

Slovenia: Statistical yearbook (various issues),

Yugoslavia: Statistical yearbook (various issues) and data from the Federal Statistical Office of Yugoslavia.

Data used for estimation of the cross-classified trade flows:

Direct information from the statistical offices (Lithuania, Russia, Poland)

Data from the World Bank (Latvia, Bulgaria, Belarus, Estonia)

2. TRANSPORT DATA IN CEEC

Taking into consideration experiences of institutes responsible in the SCENES project for collecting data in the range of transport in the CEEC, it has to be mentioned that the significant divergence still exists concerning availability and level of details of data in different countries.

If data on transport networks is rather available, the specific data on O-D tables or forecasts of transport development are not being worked out in all the countries. Generally, it has to be stated that the availability of transport network differs depending on the minuteness of detail concerning a particular data and country. The specific information on availability and comparability of the data is included in the next part of the report.

Among information in the range of transport operation, in most of the countries the official data is not published, especially on cost structure in different modes of transport etc. Even in the countries, where availability of the data is the highest, e.g., in Poland the data in the subject is not published in the form which is normally available in the EU countries. Only some information concerning profit and loss account of some big transport enterprises is available. The data on costs and prices is hardly available in former USRR countries.

In most of the CEEC the evidence concerning transport flows is being kept, though the level of minuteness of detail of the data is different. As an example, there is a different product categorisation, not always in accordance with international NSTR classification.

In CEE countries there is no tradition to publish mobility surveys, which enable to assess the mobility of societies. In such countries as Poland and Hungary, some studies were being conducted resulting in an assessment of society's tourist mobility, i.e., trips for the purposes which were consistent with WTO (World Tourism Organisation) definitions. On the other hand, there is no analysis concerning the entire mobility of societies, including such kinds of trips as commuting, shopping, short-distance family visits, etc. The data available in most of the CEEC allow to only define an average distance of the trip of one passenger in particular mode of transport.

2.1 Network data

2.1.1 Transport infrastructure in the CEEC - existing studies and analyses

There have been several studies on data definition and comparison concerning transport infrastructure in the CEEC in the past few years. The studies served different aims. One of the most essential ones is a report made thanks to common works of EC, PHARE and Eurostat as well as the studies conducted within the framework of TINA – this is now discussed below.

2.1.1.1 EC, Phare and Eurostat report "Transport development in the Central European countries.

As an example of a complex elaboration where an assessment of the extent of availability of transport data has been carried out, the report 'Transport development in the Central European countries - Analysis of trends for the years 1994 and 1995' is important. However, it should be noted that at times the approach presented in the report seems to be too optimistic since in reality, while searching for data which according to the report are fully accessible, it turns out that the situation looks much worse.

In June 1997 therefore the European Commission, PHARE and Eurostat published the report mentioned above, 'Transport development in the Central European countries. Analysis of trends for the years 1994 and 1995'. This report was prepared at the Statistical Office of the European Communities in close collaboration with the United Nations Economic Commission for Europe and the National Statistical Offices of the Central European countries. The report forms part of the Pilot Project 'Transport development in the central European countries. PHARE project on transport statistics' funded under the PHARE multi-country statistical co-operation programme.

In this publication, the harmonisation of transport statistics is described. The information concerning transport infrastructure in CEE countries is included in the report. The following countries are covered in the publication: Albania, Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, and Slovenia.

From the work carried out, it would appear that, in general, the CEE countries are able to provide the majority of the data for rail and inland waterways sought by the joint Annual Questionnaire to the Glossary definitions, referred to in this publication. There are some gaps in the information available but probably no more than those which exist at present in most Western European countries. Most countries have taken steps to try to fill the missing gaps or to change to Glossary definitions. The data on rail transport for 1995 and 1996 should show the results of these efforts to improve data comparability by CEE countries. There are also some problems of the confidentiality of the data for inland waterway transport. The information about oil pipeline transport is variable and, as might be expected, appears to be dependent upon the importance of this form of transport in a country. In some cases confidentiality issues prevent the publication of information for this transport mode.

Some data on maritime transport exists in those countries with access to the sea. Generally, data on goods loaded and unloaded at ports is available but is not classified by NST/R. Air transport data to ICAO definitions is available for most countries but some countries are now experiencing difficulties in getting data from privatised airlines.

The greatest problem faced by all CEE countries is obtaining data about road transport both of passengers and goods.

2.1.1.2 TINA project

The TINA (Common Transport Infrastructure Needs Assessment) group works in 11 CEE countries. The process is divided into three geographical subgroups: the Baltic Sea, the

Central European and Southern European Area. The TINA group is required to assess infrastructure needs in all 11 countries, with the aim of developing a common multi-modal transport network, linking this part of Europe and the EU.

This should provide the infrastructure necessary to allow transport throughout the enlarged European Union. For the aim of TINA project, data concerning transport networks in 11 CEEC have been collected. The first progress report was published in August 1998.

The detailed information concerning contents of the report as well as some of the results of the research are shown in the annex (attached in Word file *'EU PHARE report*' – Annex 4.2.1).

The example of detailed contents of statistical official data is shown in following annexes:

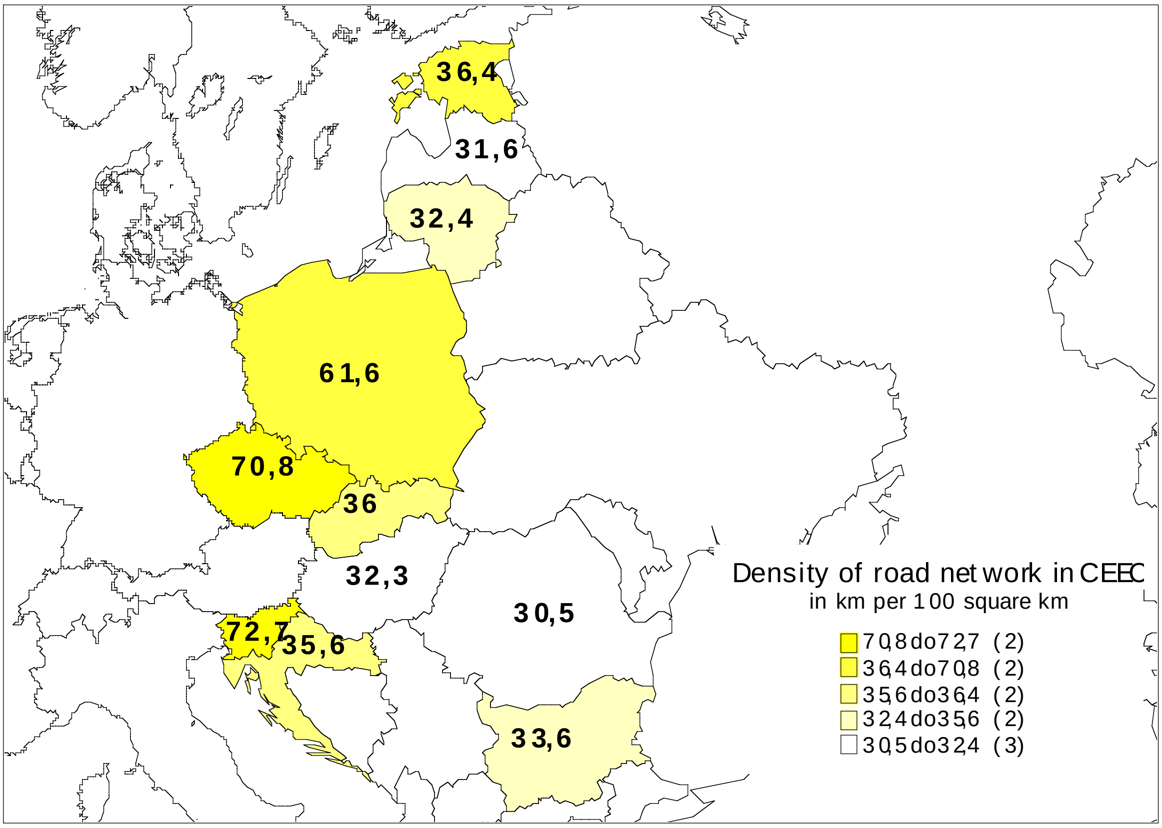
- Official transport data in Polish statistics - contents of statistical yearbooks chapter transport (contents of the chapter 'Transport' in the Statistical Yearbook; contents of the annual publication 'Transport – results of activities – Poland'; contents of Statistical Yearbook of Maritime Economy) - attached in Word file ('*Stat Yearbook PL'* – Annex 4.2.1).
- Contents of **JICA** report prepared in 1992 for Poland - attached in Word file ('*JICA report'* – Annex 4.2.1).

2.1.2 Road network

The road network in CEE countries varies both in a quantitative and qualitative aspect. On the basis of the collected data, a comparison was made on density of the road network in the counties being studied. The results are shown in the below map.

It should be noted that data in specific countries are being collected and analysed in a different way. Thus, the officially published numbers do not mean too much. For the aim of the project, the authors made a comparison of public road interurban network with hard surface. But this category is not included in each country's statistical data. Then, the authors were not able to make a comparison of networks in all the countries. In the next part of the report the categories of road network used in each country are described. In Figure 1, below, the data concerning Russia, Belarus, Ukraine and Moldova are not marked due to a different system of data collecting in those countries, i.e., it is difficult to separate the length of interurban public network in the whole network data.

Figure 1: Density of road network in the CEE countries in the years 1994-96 (depending on the country's data availability) in kilometres per 100 km^2



2.1.2.1 Belarus

The total length of a road network with hard pavement in Belarus in 1994 amounted to 50.2 thousand kilometres. The density of road network per 100 km ^{2} amounted to **24.2 kilometres**[1].

Table 4 presents the length of road network in Belarus. It has to be mentioned that the data concerns the whole network, including public and non-public network.

Table 4: The length of road network in Belarus in 1997

Country	Length in thousand km		% of roads with hard pavement	Length of roads category "E", thousand km
	Total	per/1km2		
Belarus	110,6	532,9	62,6	...

Source: UG 1998, Data provided by Russian experts from SCCTP – Scientific Centre of Complex Transport Problems.

[1] Narodnoje Chozjajastwo Respubliki Bielarus 1995. Ministerstvo Statistiki i Analiza Respubliki Bielarus, Minsk 1996.

The main road routes of an international importance are the following:

- M-1, E30 motorway: border with Poland – Minsk – border with Russia - pan-European corridor 2;
- M-12, A-250 motorway: border with Lithuania – Minsk – Bobruysk – Gomel – border with Ukraine - Corridor 9b
- M-20 motorway: border with Russia – Vitebsk- Mogiliev – Gomel – border with Ukraine - corridor 9
- M-13 motorway: Kobrin – Gomel
- A-234 motorway border with Lithuania – Lida – Slonim – Kobrin – border with Ukraine.

2.1.2.2 Bulgaria

The total length of the national road network excluding town-streets, woodland, industrial, agricultural, and other establishments' and local roads was 37,320 kilometres by the end of 1995[2]. The density of the road network, but is **33.6 km** per 100 square kilometre.

The relative share of the motorways of the total length of the small national road network is 0.8%, that of category I roads 8.2%, category II roads -10.5%, category III roads - 17.2%, category IV roads - 63.3%. Unpaved roads are only 8% of all roads. Of the 92% of roads that are paved, 95.9 are bituminised roads, 0.5% are cobblestones, 2.9% - crushed stone macadam roads and 0.7% - coarse aggregate (rubble).

The state and the development of the transport infrastructure in Bulgaria are directly dependent on the economic development, international relations and its role as a transit country. Taking into consideration the fact that about 75% of the territory of the country consist of hills and mountains, the built-up road network and its lay-out are designed to meet the transport needs of the economy and the population.

The road infrastructure provides links between almost all settlements, numbering 5,336 according to the last population census of 1992. In order to enhance the efficiency of the transport system as a whole, there is a need for investment for its maintenance, as well as for up-dating. Some of the roads and motorways of category I in Bulgaria are included in the European road network, which is subject to intensive transport activity. Within Bulgaria there are nine European roads with sign "E" (it means international roads), and they must be constructed to meet definite general technical requirements connected with traffic safety, protection of the environment, safety and comfort of the road participants.

2.1.2.3 Croatia

The total length of a road network in Croatia was 31,395 km in 1996. The density of road network was ca. **35.6 km** per 100 km^2.[3]

[2] Transport development in the Central European countries. Analysis of trends for the years 1994 and 1995. Report prepared at the Statistical the European Commission, Phare and Eurostat. June 1997

[3] Data provided by KTI, 1998

The specification of road infrastructure in Croatia is shown Table 5, below.

Table 5: Road network in Croatia in 1996 (length in kilometres)

By type of road	1996
Motorways	318
E-roads	2,153
Major roads	4,740
Regional roads	7,588
Local roads	14,600
Total:	31,395

Source: data provided by KTI, 1998

2.1.2.4 Czech Republic

The Czech Republic has a high density of population and a very extensive network of land communications which was created during its historical development. All roads have dust-free surfaces. The density of the road length network has changed only marginally over the past few years. An investment activity between 1990 and 1995 was concentrated on the construction of motorways, on communications of motorway standard and on the European road network of class "E" routes. On average there are **70.8 kilometres** roads and motorways per 100 square kilometres in the Czech Republic. There were 414 kilometres of motorways (compared with 357 kilometres in 1990) and 55,461 kilometres of state roads (55,554 kilometres in 1990) at the end of 1995[4].

The important pre-requisite for a successful development of transport activities in a national economy is the creation of a dense and high quality transport network. Judged by the road and railway network densities, the Czech Republic ranks among states with highly developed infrastructure. However the quality of the networks is variable and does not meet European standards in a number of cases.

There were 15 thousand bridges forming a part of the roads of nation-wide importance. From the point of view of their construction, 48.8% were ferroconcrete, 15.7% prestressed concrete, 17.7% stone and 9.5% steel bridges. Of the road network 2.5 thousand kilometres are roads in urban areas.

2.1.2.5 Estonia

The length of Estonian public road network is 16,437 km, 8,343 (51%) of which are state highways (data for 1997). There are 80 km of motorways with separated driving directions. In Estonia there are 20,547 km of municipal roads, 3,640 km of private roads and 3,564 km of

[4] Transport development in the Central European countries. Analysis of trends for the years 1994 and 1995. op.cit.

roads in Estonia not specified by the owner[5]. The density of road public network amounts to **36.4 km** per 100 km^2.

The total length of road network, including non-public roads, is 44,188 km and the density of road network is sufficient for today's traffic needs (the density of all roads in Estonia is approximately one thousand kilometre per 1000 square kilometres).

Main roads of Estonia start from Tallinn. Primary roads are: Tallinn - Narva, Tallinn - Pärnu - Ikla, TallinnTartu - Váru - Luhamaa (all these roads have border crossings and can be used for travelling further to St. Petersburg, Riga or Pskov). Other primary roads are: Valga - Tartu - Jõhvi, Pärnu - Rakvere and Pärnu - Valga.

Development of public roads ceased at the end of the Soviet period, when the budget for expenditure for the repair of roads fell. In 1992 only a few roads were repaired. But since the beginning of 1993, expenditure for the upkeep of roads has steadily increased and much attention has been given to the quality of roads. The length of public roads has increased especially due to former collective farm roads being turned into public roads in the last two years.

The road network in Estonia is shown in annex - road network and road traffic in Estonia - attached in Word file – '*road Estonia'* – Annex 4.2.3.2.

2.1.2.6 Hungary

The total length of the public road network in Hungary is 30,073 thousand kilometres. The density of road network amounts to **32.3 km** per 100 km^2. The length of motorways complying with international standards was extremely low, a mere 420 kilometres, although the network of motorways had grown since the beginning of this decade (in 1990 the length of motorways was 267 kilometres)[6]. Table 6 gives the details of the Hungarian road network.

Table 6: Road network in Hungary

In km	Motorways, express-ways	I.class highways	II.class highways	Other roads	Total lengths
Total network	420	2055	4390	23208	30073

Source: Data collected by KTI, 1998

Road traffic data in Hungary – measurement of the traffic 1997/8

A comprehensive series of Hungarian traffic counts by vehicle type and road type for 1997 is contained in the attached spreadsheet file '*road_Hungary*' – Annex 4.2.2. Computer files showing the road network and traffic levels for 1997 are attached as follows: '*hun_98_net*', '*hun_98_tra*', '*hun_07_net*', and '*hun_07_tra*' – all Annex 4.2.3.2. These files show the high speed road network and traffic levels for 1998 and forcasts for 2007 respectively.

[5] Data provided by Estonian experts from TTU – Tallinn Technical University on the basis of existing national statistical data.
[6] Data provided by KTI, 1998

2.1.2.7 Latvia

The total length of Latvia public roads is 20,412 km[7] (data for 1997). Out of the total length, 18.7 thousand kilometres, or 92%, are hard surfaced roads. Of the total road length, only 1.6 thousand kilometres, or 8%, are the main public roads of the country, 5.4 thousand kilometres, or 27%, are 1st category roads but the majority are 2nd category roads with a total length of 13.4 thousand kilometres.

The length of public roads per 100 square kilometres of the territory is 31.6 km. Apart from the public roads, there are also ‘pagast’ roads. At the end of 1995, the length of ‘pagast’ roads was 30.8 thousand kilometres and for the most part these were gravel-surfaced roads.

The road network in Latvia is shown in annex - road network and road traffic in Latvia - attached in Word file – ‘*road Latvia’* - Annex 4.2.3.2.

2.1.2.8 Lithuania

The density of transport network in Lithuania is presented in the Table 7.

Table 7: Density of transport network in Lithuania in 1994

Mode of transport	Per 1000 square kilometres
Railways	4.4
Roads (total network)	92.8
Inland navigable waterways	1.2

Source: Transport development in the Central European countries. Analysis of trends for the years 1994 and 1995. op.cit.

The length of Lithuanian roads is 65,135 km, of which surfaced roads are 57,075 km (87%). Lithuania with its almost 400 km of motorway and well development inter-city road network has a very good capacity for road traffic[8]. The motorway all the way from Kaunas to Vilnius and from Kaunas to Klaipeda passing Kaunas via a by-pass motorway around Kaunas gives excellent access to Klaipeda Port for road traffic.

Table 8 below gives more details of the road network in Lithuania.

Table 8: Road network in Lithuania in 1994

Year	Total roads	Public Roads		Local roads	Urban roads	Percentage of paved roads in the road network	Density of total network in kilometres per 100 square kilometres
		Motorways	Main roads				
1994	60584	394	20725	34788	4677	78.3	92.8

Source: Transport development in the Central European countries. Analysis of trends for the years 1994 and 1995. op.cit.

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[7] UG 1998, Data provided by Estonian experts from TTU – Tallinn Technical University

[8] UG 1998, Data provided by Estonian experts from TTU – Tallinn Technical University

Taking into account only public roads, one can calculate road network density in Lithuania. It amounted to **32.4 km** per 100 km^2 in 1994.

The percentage of roads with improved pavement was 28.2% in 1993, 26.9% in 1994 and 28.6% in 1995.

The route of the Via Baltica motorway which will join the road network of Western and Central Europe in the South and of the Finnish - Russian network in the North is based on the existing roads which are being improved gradually by renewing their surface, building by-passes, increasing the number of lanes, and constructing bridges and grade-separated road junctions. The length of the Via Baltica within the territory of Lithuania is 274 kilometres. Between 1993-1995, 25.3 kilometres of road was reconstructed on this route.

The road network in Lithuania is shown in annex - road network and road traffic in Lithuania - attached in Word file – '*road Lithuania'* – Annex 4.2.3.2.

2.1.2.9 Moldova

The total length of road network in Moldova in 1997 amounted to 17.5 thousand kilometres[9]. The length of public network is not available. Taking into account total network, one can calculate road network density at a very high level - 59.4 km per 100 km^2. On the other hand, this data can not comparable with other countries, due to the fact that a significant percentage of the road network are roads without hard pavement. Table 9 gives details of the road network in Moldova.

Table 9: Road network in Moldova in 1997

Country	Length in thousand km		% of roads with hard pavement	Length of roads category "E", thousand km
	Total	per/1km2		
Moldova	17,5	594,2	…	0,1

Source: UG 1988, Data provided by Russian experts from SCCTP – Scientific Centre of Complex Transport Problems

2.1.2.10 Poland

The total length of public motor roads in Poland was more than 372 thousand kilometres at the end of 1995. This was divided into 240 thousand kilometres of hard surface roads (65% of the total) and 129 thousand kilometres of land roads (35%). The share of hard surface roads of the total public motor roads is increasing and the share of land roads is decreasing. Hard surface roads are the most important component of the road network in Poland and are being continuously developed and modernised. With the development of the network, the total road length in 1995 increased by 2 thousand kilometres compared to 1994. Further changes occurred in the structure of public hard surface motor roads in 1995 to the benefit of improved surface roads, that is, surfaces made of concrete, bitumen, clinker, stone blocks and stone-

[9] UG 1998, Data provided by Russian experts from SCCTP – Scientific Centre of Complex Transport Problems

concrete boards. Improved surface roads make up an essential part of the hard surface road network (over 82%)[10].

Taking into consideration public hard surface road network in Poland, the density of road network in 1996 amounted to 77 km per 100 km^2. The total length of public hard surface roads is made up of 80.5% of interurban roads and 19.5% of urban roads. The length of interurban hard surface roads for 1996 was 192.6 thousand kilometres, i.e., the density amounted to **61.6 km per 100 km^2**.

An increase in the length of public hard surface roads was reflected in the increased density of the road network per 100 square kilometres of Poland - from 76.9 kilometres in 1994 to 77.7 kilometres in 1995 and that of the improved surface network from 62.8 kilometres to 63.8 kilometres respectively.

On the basis of available official data referring to road transport infrastructure published by Central Statistical Office in Poland one can be summarised in Table 10 as follows.

Table 10: Public hard surface roads in Poland

Year	Total					Among which improved surface roads				
	Total	per 1000 km2	National	voivodship	local	Total	per 1000 km2	National	voivodship	local
in kilometres										
1995	237 153	760	45 635	110 913	80 605	195 966	630	45 543	102 537	47 887
1996	239 330	770	45 634	111 350	82 346	199 304	640	45 543	103 327	50 434
1997	241 980	774	45 608	111 570	84 802	202 584	648	45 521	103 866	53 197

Source: Statistical Yearbook. Central Statistical Office - GUS, Warsaw 1991, 1992, 1993, 1994,1995,1996,1997.
Transport- Results of Activities. Central Statistical Office - GUS, Warsaw 1993, 1994,1995,1996,1997.

The main measurement of the traffic on national roads in the last year was carried out in 1995 by the local road administration on the recommendation of the General Management of Public Roads.

Road traffic data in Poland – measurement of the traffic 1995

The materials “Road Traffic 1995” were worked out at the Project-Research Office of Roads and Bridges Transprojekt - Warszawa, Ltd on the recommendation of the Office of Development Planning of Road Network in Warsaw (author: K.Opoczynski). The report (in Polish) “Road Traffic 1995” consists of the following main parts:

Method and range of measurements of the traffic on out-of-town national roads:

- ♦ General measurement of the traffic
- ♦ Automatic measurements of road traffic
- ♦ Continual measurements of the traffic
- ♦ Weighing of motor-cars in traffic

Profile of road traffic:

[10] Transport development in the Central European countries. Analysis of trends for the years 1994 and 1995. op.cit.

- Load with the traffic of national roads
- Average twenty-four hours traffic on the network of national roads
- Structure of motor-car traffic
- Length of roads in ranges of capacity of motor-car traffic
- Growth of road traffic
- Character of the traffic
- and reliable hourly traffic
- Traffic of heavy vehicles of axle load over 80 kN/axle
- Characteristics of vehicle traffic with foreign registration.

The main results of the traffic measurement in 1995 are shown in computer files and paper maps (see Annexes 4.2.3.1 and 4.2.3.2 for a full list):

- Detailed data on Polish road network according to 49 voivodships - attached in Excel file (‘*road 49Poland*’ – Annex 4.2.2). It should be noted that the data is real measured data, and it was collected for 49 voivodships for 1995. It is not possible to recalculate the data for new voivodships before the responsible organisation published maps and detailed data concerning specific stretches of roads in given new regions. But from the point of view of traffic, the aggregation of the data for 49 groups should not be a barrier due to the fact that every specific stretch is analysed.
- Annex 4.2.3.2 contans maps of flows on the road network in Poland in the form of computer files. The map of road network is made in two variants (Also shown as paper Map 1, from Annex 4.2.3.1):

(1) Variant consisting of eleven separate files with parts of map covering 11 parts of Poland – they are included in zip file: ‘*mappParts1-11’* (in *.bmp format), together with the additional file "*Scheme 1-11"* with location of the individual parts (also in *.bmp format)

(2) Variant consisted of joint eleven parts of the country in one whole map (A0 format, very large). The file ‘*mapAll’* is in jpg format, ‘*mapAll16’* is in pcx format in 16 colours, and ‘*MapAll256’* is in pcx format in 256 colours

- Maps prepared for the TINA project:

There are two files produced by TINA for 1995 and 2015 attached in Word file:

‘TINA_road_PL95’ (also shown as paper Map 9 in Annex 4.2.3.1)

‘TINA_road_Poland’ (forecast of road network traffic, also shown as paper Map 10 in Annex 4.2.3.1), both computer contained in Annex 4.2.3.2.

Information on maps

The required data concerning road network is presented on maps in Annex 4.2.3.1. On the cartographic maps prepared by *TRANSPROJEKT – Designing-Research Roads and Bridges Office* (TRANSPROJEKT Biuro Projektowo–Badawcze Dróg i Mostów), the data of Annual average daily traffic on the national road network in 1995 is shown (Map 1), as well as the increase of annual average daily traffic on the national road network in 1995 (Map 2). In addition, the character of traffic on the national road network in 1995 is also shown on a map (Map 3). There is an annotation of links of an economic character of traffic, tourist character of traffic and recreational character of traffic – these are explained below:

Road stretches of economic character of the traffic - road stretches on which there are not large seasonal traffic fluctuations, i.e., the average twenty-four hours traffic for individual months is similar to SDR, while average twenty-four hours traffic in work days is bigger than an average twenty-four hours traffic in holidays.

Road stretches of tourist character of the traffic - stretches of roads, where seasonal traffic fluctuations take place; a considerable (ca. 50%) growth of average twenty-four hour traffic in the months of July and August. Weekly traffic fluctuations are similar to road stretches of economic character of the traffic.

Road stretches of recreational character of the traffic - road stretches where slight seasonal traffic fluctuations take place, similar to the roads of economic character of the traffic, while weekly traffic fluctuations always show greater (by ca. 20%) average twenty-four hours traffic in Sundays and holidays rather than an average twenty-four hours traffic in work days.

In Annex 4.2.3.1 containing the paper maps, the maps prepared by the *Road Network Development Planning Office* (Biuro Planowania Rozwoju Sieci Drogowej) concerning the existing and planned network of motorways, expressways and international E-roads are included. Some maps are also attached in Word files: for current situation – '*AGR Poland',* forecasts in maximal and minimal variants: '*AGR PL 2015min'* (Map 5) and '*AGR PL 2015max'* (Map 6) - all files Annex 4.2.3.2.

The third group of relevant information provided consists of maps of road traffic prepared within the TINA project by Ministry of Transport and *Road Network Development Planning Office* (Biuro Planowania Rozwoju Sieci Drogowej). It should be added that within TINA project traffic is presented in AADT pcu / day, i.e., passenger car units / day as follows:

1 pcu = passenger car x 1;

heavy goods vehicle x 2

bus x 2

The 1995 base case is shown in Map 9. The 'upgraded' scenario (Map 11) concerns a situation of a new traffic generation resulting from new links construction, e.g., motorways development. The 'unchanged' scenario (Map 10) takes into account only existing at present network (methodology for scenarios are described in the chapter concerning forecast of road traffic).

Information concerning border delays (not peak - approximate annual average) is available for current situation. We did not find a rate of average border delay. Perhaps it is due to the fact that border delays considerably differ among seasons, months, type of cross-borders.

2.1.2.11 Romania

The total length of a public road network in Romania in 1994 was 75.8 thousand kilometres and the density amounted to **30.5 km** per 100 km2 and the details are shown in Table 11 below.

Table 11: Road network in Romania in 1994

Length in km	Public roads	of which:		Of total public roads:						Density of public roads per1000 km^2 of territory
				National roads	of which:		County and communal roads	of which:		
		Modernised	With light asphalt pavement		Modernised	With light asphalt pavement		Modernised	With light asphalt pavement	
Total	72828	17248	20498	14683	13036	1431	58145	4212	19067	305

Source: Data provided by KTI, 1998

2.1.2.12 Russia

The total length of road network in Russia in 1997 amounted to 924 thousand kilometres[11]. The length of a public network is not available. Taking into account the total network, one can calculate road network density at the level of 54.1 km per 100 km^2, see Table 12 below.

Table 12: Road network in Russia in 1997

Country	Length in thousand km		% of roads with hard pavement	Length of roads category "E", thousand km
	Total	per/1km^2		
Russia	924	54.1	72.9	2.2

Source: UG 1998, Data provided by Russian experts from SCCTP – Scientific Centre of Complex Transport Problems

The priority roads of an international significance in Russia include the following:

- ‘Scadinavian’ motorway (M-10, E-95): border with Finland – Vyborg – Sankt Petersburg - corridor 9
- ‘Russia’ motorway (M-10, E-65) Sankt Petersburg – Novgorod – Vyshny Volotshek – Tver – Moscow - corridor 9
- M-20 motorway Sankt Petersburg – Pskov – Nevel – border with Belarus - corridor 9
- M-1, E30 motorway – border with Belarus – Moscow - corridor 2
- M-7 motorway – Moscow – Vladimir – Nizny Novgorod - corridor 2
- M-4 motorway – Moscow – Voronezh – Rostov – Krasnodar – Novorossiysk - extension of corridor no 9
- M-6 motorway – Moscow – Tambov – Volgograd – Astrakhan -- extension of corridor no 9
- A-129 motorway – border with Poland – Kaliningrad – Nesterov – border with Lithuania – corridor 9
- A-218 motorway – border with Lithuania – Neman – Gvardeysk – Kaliningrad - corridor 1.

[11] Data provided by Russian experts from SCCTP – Scientific Centre of Complex Transport Problems.

Motorway Dorozhnoye – border with Poland (i.e., Berlinka) is part of corridor no 1 and motorway Sankt Petersburg – Pskov – Riga – Kaliningrad – Poland – Germany. The motorway is to connect the district of Sankt Petersburg, the Baltic States – the former Soviet Union republics as well as Poland and Germany. The length of the motorway on the Russian territory amounts to about 50 km. Partly the route is being reconstructed as a 1st category road with four traffic lanes. The foreseen traffic in the year 2000 in this stretch amounts to 1-1.6 million tonnes of cargo and 4-9 thousand of vehicles per 24 hrs.

The road stretch Neman-Gvardeysk, being part of the route Sovietsk – Tolpaki along with the roads Doroznoye – border with Poland and Vilnius – Kaliningrad seems to be an essential road stretch of the Via Hanzeatica. The length of the road on the Russian territory amounts to 62 km.

The map of the road network in Russia in presented in annex in the attached (in jpg file): '*mapRussia'* - Annex 4.2.3.2.

2.1.2.13 Slovak Republic

Between 1985 and 1995, 33 kilometres of motorways were built; their total length reached 198 kilometres. In 1995 there were 124 bridges above motorways, consisting mostly of pre-stressed concrete, 8 of them were situated above railway tracks, and 35 parking areas covering 0.17 square kilometres belonging to the motorways. The length of I, II and III class roads (i.e. roads of a state importance) increased mainly due to the reconstruction of lower class roads. In 1995, road length was 17,670 kilometres; class I roads made up 17.4%, class II roads 21.9% and class III - 60.7% of total road length[12]. The road network density amounted to **36 km** per 100 km^2. Table 13 gives details of the Slovak road network classification.

Table 13: Road network in Slovakia in 1995

Length in km	I category	II category	III category	Total
Total	3075	3869	10726	17670

Source: Data provided by KTI, 1998

As far as surfacing is concerned, light and heavy bituminous roads made up 97.8% of all roads, and the small balance was made up by roads with concrete or pavement. Some 7,357 bridges (almost 55 % of them belonging to class III roads) and 664 railway crossings were included in the road network.

2.1.2.14 Slovenia

In 1995, the Slovenian public road network was 14,761 kilometres in total length, of which 11% were motorways and major roads. The road network density amounted to **72.7 km** per 100 km^2.

[12] Transport development in the Central European countries. Analysis of trends for the years 1994 and 1995. op.cit.

Since 1985, the length of motorways has increased by 45% and the length of major roads by 25%. The National Motorway Construction Programme in the Republic of Slovenia, adopted on 15 November 1995, foresees by the end of 2004 the completion of the Slovenian motorway system in the west-east and north-south directions[13]. The west-east direction, with a length of 386 kilometres, which has been given priority is to be built by 1999, except for two sections that will be completed later. The north-south direction, with a length of 113 kilometres, except for two sections, will be constructed between the years 2000 to 2004.

2.1.2.15 Ukraine

The total length of a road network in Ukraine in 1997 amounted to 172.6 thousand kilometres[14]. The length of public network is not available. Taking into account total network, one can calculate road network density at a level of 25.8 km per 100 km^{2}, shown in Table 14 below.

Table 14: Road network in Ukraine in 1997

Country	Length in thousand km		% of roads with hard pavement	Length of roads category "E", thousand km
	Total	per/1km^2		
Ukraine	172.6	285.8	85	3.4

Source: UG 1998, Data provided by Russian experts from SCCTP – Scientific Centre of Complex Transport Problems

2.1.2.16 Yugoslavia

The total length of a public road network in Yugoslavia was 18.8 thousand kilometres in 1996 (excluding local roads). The density of road network amounted to 18.4 kilometres per 100 km ^{2} shown in Table 15.

Table 15: Road network in Yugoslavia in 1996

Length in km	Motorway	Modern	Other	Total
Total	374	15 755	2 676	18 805

Source: data provided by KTI, 1998

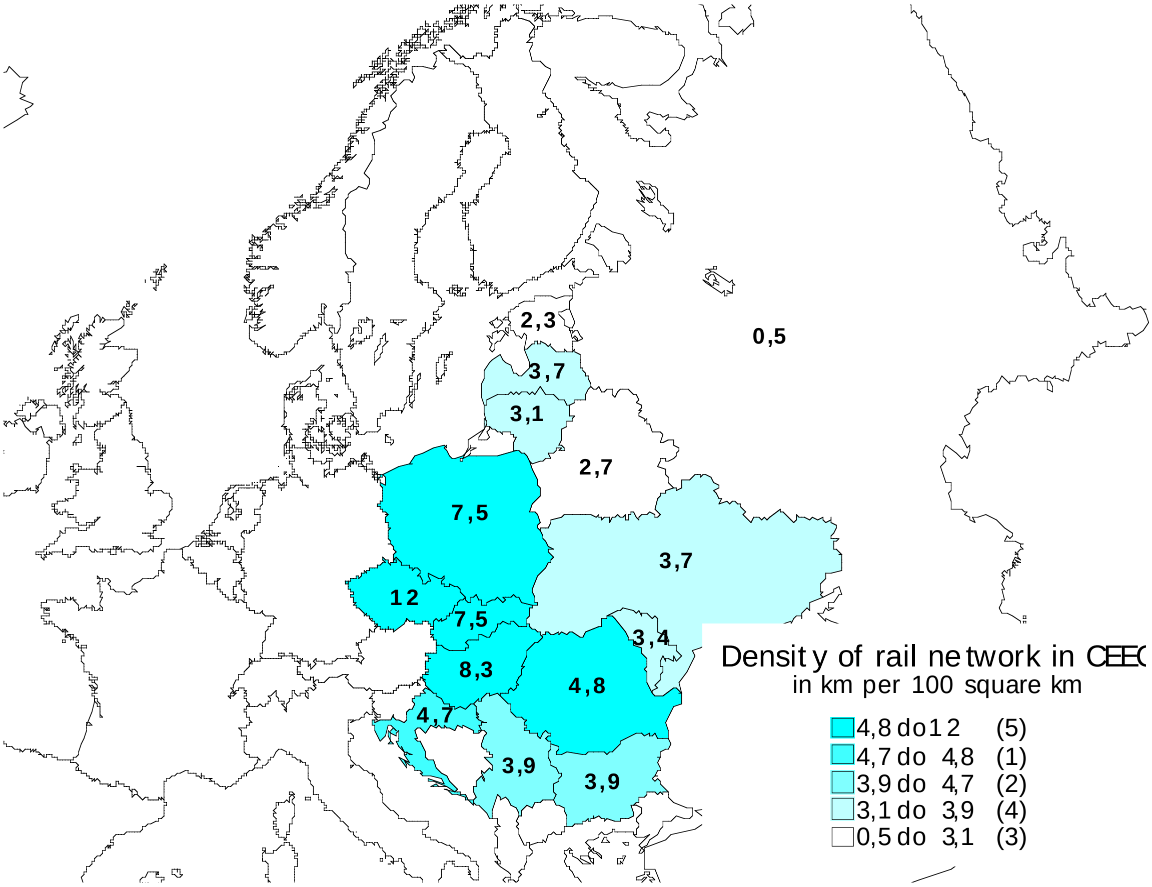
2.1.3 Rail network

On the basis of the collected data, a comparison was made on the density of the rail network in the counties being studied. The results are shown in Figure 2 below.

In order to obtain comparability of the data, the base year 1994 was taken into account. In all the countries only the exploited rail network was analysed. The data for the next years available in some countries is included in the descriptive part of the report.

[13] Transport development in the Central European countries. Analysis of trends for the years 1994 and 1995. op.cit.
[14] Data provided by Russian experts from SCCTP – Scientific Centre of Complex Transport Problems

Figure 2: Density of the rail network in the CEE countries (1994), in kilometres per 100 km^2



2.1.3.1 Belarus

The characteristics of the rail network in Belarus in 1997 are shown in Table 16 below. The total length of the network was 5,543 kilometres and the network amounted to **2.7 km** per 100 km^2 (in 1994 length of network – 5,543 km, density - 2.7 km per 100 km^2).

Table 16: Characteristics of rail network in Belarus in 1997

Country	Distance of exploited lines, Thousand km		Including double-track and multi-track		Including electrified	
	Total	/1km^2	thousand km	%	thousand km	%
Belarus	5.6	26.8	1.7	31	0.9	16
Average in CIS	142.3	6.4	…	…	55.9	39.3

Source: UG 1998, Data provided by Russian experts from SCCTP – Scientific Centre of Complex Transport Problems

2.1.3.2 Bulgaria

The railway network in Bulgaria, which is very important from both the domestic and from the international aspect, is characterised by an increase of the electrification of lines over the last 15 years. The total length of the track (including the platforms) was 6,507 kilometres at the end of 1995.

The length of the railway lines is 4,293 kilometres, of which 4,048 kilometres are standard gauge and 245 kilometres are narrow gauge. The density of railways amounted to **3.9 km** per 100 km^2.

The double lines are 969 kilometres, measured in one direction. The relative share of the electrified railway lines at the end of 1995 was 62% compared with 37% at the end of 1980[15].

2.1.3.3 Croatia

The total length of rail network in Croatia in 1994 was 2,681 kilometres, in which electrified lines amounted to 977 kilometres. The density of rail network was **4.7 kilometres** per 100 km^2 [16].

2.1.3.4 Czech Republic

In the Czech Republic in 1994, the total length of railway lines was 9413 kilometres. The density of exploited rail network was 11.9 km per 100 km^2.[17]

The total track length was 16.8 thousand kilometres. In the territory of the Czech Republic on average there was **12 kilometres** of railway line per 100 square kilometres. The major part of the railway system, which carries the majority of the traffic has now been electrified. At the present time less important lines are being electrified but at a slow rate. The more important lines still to be electrified are the Brno - Ceská Trebová (under construction but difficult to construct) and the Kadao - Karlovy Vary (under construction) sections. The technical maximum speed on the majority of lines does not meet European requirements. Reconstruction of the four main railway corridors is planned in order to upgrade to permit speeds of up to 160 kilometres per hour.

Between 1990 and 1995, the network of railways was not extended. Investment activity was concentrated on the partial electrification of railway sections, then on the installation of safety equipment (automatic railway safety equipment and relay equipment of railway stations) and on the installation of lines with ferroconcrete sleepers and elasticated tie fixings for the rails. Reconstruction and service works were carried out on a large scale. In 1995, work started on the modernisation of the main railway corridors (for speeds up to 160 kilometres per hour). The most frequently used railways are completely electrified but due to the lack of investment, the pace of the electrification of the less important sections of the railway network has slowed down over the last five years. At the end of 1995, 14.3% of the single-track lines were electrified and 86.8% of the double track lines in the Czech Republic.

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[15] Transport development in the Central European countries. Analysis of trends for the years 1994 and 1995. op.cit.
[16] Statisticki Ljetopis 1996. Republika Hrvatska. Zagreb 1996.
[17] Statistical Yearbook of Poland 1998. Warsaw 1999.

2.1.3.5 Estonia

The Estonian State railway has the total length of 1,018 km of public railways, of which the electrified ones is 132 km. Some 103 km are double-track lines. The density of public railways amounted in 1997 to **2.3 kilometres** per 100 km^2 (in 1994 the length of network amounted to 1024 km; average density 2.3 km per 100 km^2). In addition to public rail lines there are about 596 km of railway belonging to various enterprises[18].

In the beginning of 1995, 140 km of railways needed extensive repairs. Consequently, the average speed of the trains is decreasing. A very important problem is an efficient allocation of railway wagons, engines and persons for the fluctuating daily traffic needs.

The biggest bottleneck to the increasing of cargo volumes is the lack of satisfactory border stations on the Tallinn- Narva – St.Petersburg line and Tallinn – Tartu – Petseri (Russia) line.

The infrastructure of railways has not developed as fast as the infrastructure of other types of transport. The reason why Estonian railways fell behind was the fact that the headquarters of the Baltic Railway were situated in Riga (Latvia) in the Soviet period. Today Estonian railways are in a complicated situation. The situation in passenger traffic is especially bad. Because of the poor condition of railways, the trains travel slowly and this has had a marked effect on the volume of passenger traffic. The situation for freight traffic is better. According to expert opinion, the freight turnover on the Estonian railways may increase as much as 20%.

The rail network in Estonia is attached in Word file – '*rail Estonia'* – Annex 4.2.3.2.

2.1.3.6 Hungary

The total length of a rail network in Hungary was 7,714 kilometres in 1995 and the density amounted to **8.3 km** per 100 km^2 (in 1994 the length of network amounted to 7607 km; average density - 8.2 km per 100 km^2). Table 17 gives the details.

Table 17: The rail network in Hungary in 1995

Railways	Length in km
Construction length of railways, total of which	7714 km
With double track	1195 km
Electrified	2353 km
Small track	176 km
Lengths of rail tracks	13181 km

Source: data collected by KTI, 1998

The railway network has been shrinking for years, or perhaps decades. The length of lines with electric power, however, has slightly increased. Railway communication has had surplus capacity for years. The quality of service does not comply with the recommendations of international organisations. The condition of the railway network is very poor due to

[18] UG 1998, Data provided by Estonian experts from TTU – Tallinn Technical University

insufficient maintenance, manifesting itself in reduced loading capability and speed limitations[19].

For the reduction of environmental effects, transit transport is gradually re-routed to railways and waterways. Piggyback freight transport requiring relay stations or districts is becoming more and more popular, and Hungary is strategically positioned to become the logistics centre of Central Europe. The first steps toward this goal are the construction and/or modernisation of relay/logistics centres in Sopron, Kiskundorozsma, and Berettyóújfalu.

2.1.3.7 Latvia

Latvian State railway has 2,397 km of total length (in 1997), of which electrified 278 km and double-track lines are 303 km[20]. The density of rail network was **3.7 km** per 100 km^2 (in 1994 the length of network amounted to 2419 km; average density 3.7 km per 100 km^2).

The rail network in Latvia is attached in Word file – '*rail Latvia'* – Annex 4.2.3.2.

2.1.3.8 Lithuania

The length of the Lithuanian public railway is 2,000 km (in 1997), of which electrified 122 km and double lines are 569 km. The gauge of railway in the Estonia, Latvia, Lithuania, Russia, and Finland is 1520 mm. The gauge difference between Lithuania and most European railway (1435 mm) is of course a major obstacle of the present tracks. The density of rail network in Lithuania amounts to **3.1 km** per 100 km^2 (in 1994 the average density was 3.1 km per 100 km^2).

There is a project (1999-2005) to build a new railway (gauge 1435) line from Poland (border crossing Sestokai) to Kaunas. The second is to establish a modern terminal for change of the axles on the railway wagons from the one gauge to the another gauge.

The rail network in Lithuania is attached in Word file – '*rail Lithuania'* – Annex 4.2.3.2.

2.1.3.9 Moldova

The length of the total rail network in Moldova in 1997 is shown in the table (total length amounted to 1.2 thousand kilometres). The density of rail network was **3.4 km** per 100 km^2 (in 1994 the average density was 3.4 km per 100 km^2) shown in Table 18 below.

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[19] Transport development in the Central European countries. Analysis of trends for the years 1994 and 1995. op.cit.

[20] UG 1998, Data provided by Estonian experts from TTU – Tallinn Technical University

Table 18: Rail network in Moldova in 1997

Country	Distance of exploited lines, Thousand km		Including double-track and multi-track		Including electrified	
	Total	/1km^2	Thousand km	%	thousand km	%
Moldova	1.2	34.4	0.2	15.8	-	-
Average in CIS	142.3	6.4	…	…	55.9	39.3

Source: UG 1988, Data provided by Russian experts from SCCTP – Scientific Centre of Complex Transport Problems

2.1.3.10 Poland

The total length of railway lines operated in 1996 was 23.4 thousand kilometres. The density of railways network amounted to **7.5 km** per 100 km^2 (in 1994 the length of network was 24,313 km; average density was 7.8 km per 100 km^2).

The length of the railway network has been decreasing continuously since 1990. This was caused by the closure of unprofitable lines, where railway transport has been replaced by bus traffic and private motor transport by passenger cars. More than 94% of the total length of railway lines are lines of standard gauge, that is, lines with track gauge of 1435 mm or more.

In 1995, 14 kilometres of standard gauge lines were electrified and, as a result, the total length of railway lines electrified and operated at the end of 1995 was more than 11.6 thousand kilometres. The total length of standard gauge lines that are electrified increased from 50.7% in 1994 to 51.5% in 1995. Around 93% of the total goods transport and around 82% of total transport of rail passengers by standard gauge rail are now carried by electric traction. At the end of 1995, the ratio of the length of standard gauge lines per 100 square kilometres of Poland was 7.2 kilometres (3.7 kilometres for electrified lines). The details are given in Table 19 below.

Table 19: Rail network in Poland

	1990	1995	1996
Length of lines operated	26 228	23 986	23 420
standard-gauge	23 993	22 598	22 285
among which:			
electrified lines	11 387	11 627	11 626
including single-track lines	15 000	13 693	13 401
narrow gauge lines	2 235	1 388	1 135

Source: Statistical Yearbook. Central Statistical Office - GUS, Warsaw 1991, 1996,1997.

Information on maps

The paper maps attached in Annex 4.2.3.1 are prepared by the Strategic Planning Office of General Direction of PKP and KOLPROJEKT, and they present first of all freight and passenger train flows in the PKP network forecast for 1993 and 1994 (Maps 12 and 13 respectively). The forecasts of traffic flows and speeds based on the Strategic Planning Office researches are also included (Maps 14 – 19). These maps contain assume two variants: min and max.

The second group of maps (20 to 26) includes maps prepared for the aim of creating modified document of Polish transport policy. The maps are prepared by the Ministry of Transport with the co-operation of General Direction of the PKP.

Information also on Computer File

The following computer files are attached in Annex 4.2.3.2:

NB - All files are in jpg format, the map of Poland consists of two parts: map A (eastern part) and map B (western part), and the list of files is as follows:

Passenger rail traffic in 1994 – files: '*map1A'* and '*map1B'* (Paper Map 13)

Freight rail traffic in 1993 – files: '*map2A'* and '*map2B'* (Paper Map 12)

Freight rail traffic in 2015, variant maximum – files: '*map3A'* and '*map3B'* (Paper Map 14)

Freight rail traffic in 2015, variant minimum – files: '*map4A'* and '*map4B'* (Paper Map 16)

Passenger rail traffic in 2015, variant minimum – files: '*map5A'* and '*map5B'* (Paper Map 15)

Passenger rail traffic in 2015, variant maximum – files: '*map6A'* and '*map6B'* (Paper Map 17)

Forecasted speed in maximum variant, 2015 – files: '*map7A'* and '*map 7B'* (Paper Map 19)

Forecasted speed in minimum variant, 2015 – files: '*map8A'* and '*map 8B'* (Paper Map 18)

AGC (main international railway lines) network current situation - attached in Word file: '*AGC_Poland'* (Paper Map 20)

AGC network forecast, minimum variant - attached in Word file: '*AGC_PL_2015min'* (Paper Map 21)

AGC network forecast, maximum variant - attached in Word file: '*AGC_PL_2015max'* (Paper Map 22)

AGTC (main combined transportation lines) network current situation - attached in Word file: '*AGTC_PL1998'* (Paper Map 24)

AGTC network forecast, minimum variant - attached in Word file: '*AGTC_PL_2015min'* (Paper Map 25)

AGTC network forecast, maximum variant - attached in Word file: '*AGTC_PL_2015max'* (Paper Map 26)

2.1.3.11 Romania

The total length of Romanian railways amounted to 11,374 kilometres in 1994 (see Table 20). The density of rail network was **4.8 km** per 100 km^2. The rail network covers practically the whole country and is connected with all the railways belonging to the neighbouring countries, including Turkey and the Near East countries. The length of lines in operation, at the end of 1994, was 11,374 kilometres, of which 10 887 kilometres (95.7%) was standard gauge, 427 kilometres (3.8%) narrow gauge and 60 kilometres (0.5%) large gauge. Electrified lines were 34% of the total length of lines.

Table 20: Rail network in Romania in 1994

	Total	of which electrified	Of the total:			
			Standard gauge			Narrow gauge
			Total	With one track	With two tracks	
Total	11374	3866	10887	7921	2966	427

Source: data collected by KTI, 1998

2.1.3.12 Russia

The length of the total rail network in Russia in 1997 is shown in the table (total length amounted to 87.1 thousand kilometres). The density of rail network was **0.5 km** per 100 km^2 (in 1994 the length of network was 87469 km, the average density was 0.5 km per 100 km^2). The details are shown in Table 21.

Table 21: Characteristics of rail network in Russia in 1997

Country	Distance of exploited lines, thousand km		Including double-track and multi-track		Including electrified	
	Total	/1km^2	thousand km	%	thousand km	%
Russia	87,1	5,1	36,9	42,2	38,8	44,8
Average in CIS	142,3	6,4	…	…	55,9	39,3

Source: UG 1998, Data provided by Russian experts from SCCTP – Scientific Centre of Complex Transport Problems

The rail lines with international significance are the following:

- Border with Belarus – Vyborg – Sankt Petersburg ----corridor 9
- Sankt Petersburg – Moscow ---- corridor 9
- Sankt Petersburg – Nevel – border with Belarus ---- corridor 9
- Border with Lithuania – Nesterov – Kaliningrad –corridor 9
- Moscow – Briansk – border with Ukraine --- corridor 9
- Moscow – Riazan – Voronezh – Rostov – Novorossiysk – extension of corridor no 9
- Moscow – Lipietsk – Volgograd – Astrakhan – przed_u_enie korytarza no 9
- Niznyj Novgorod – Moscow – Smolensk – border with Belarus --- corridor no 2
- Kaliningrad – Mamonovo (border with Poland) – corridor no 1

2.1.3.13 Slovak Republic

The length of railway tracks amounted to 3,673 km in 1996 (see Table 22 below). The length of railway tracks per 100 square kilometres of land area was **7.5 kilometres**[21] (in 1994 the length of network amounted to 3661 km, the average density was 6.9 km per 100 km^2**).** Over the 10-year period, 378 kilometres of electrified tracks were added; in 1995 there was an addition of 13 kilometres. The share of electrified tracks was 40.2% of the total track length.

[21] data provided by KTI, 1998

Table 22: Rail network in Slovakia

Railways	Length in km
Railway tracks in total, of which	3673
Double-tracked, of which	1024
Electrified	1516

Source: data collected by KTI, 1998

2.1.3.14 Ukraine

The length of the total rail network in Ukraine in 1997 is shown in Table 23 below (total length amounted to 22.8 thousand kilometres). The density of rail network was **3.7 km** per 100 km^2 (the density in 1994 - 3.7 km per 100 km^2).

Table 23: Characteristics of rail network in Ukraine in 1997

Country	Distance of exploited lines, thousand km		Including double-track And multi-track		Including electrified	
	Total	$/1km^2$	Thousand km	%	thousand km	%
Ukraine	22,8	37,7	7,7	33,6	8,6	37,7
Average in CIS	142,3	6,4	...	...	55,9	39,3

Source: UG 1998, Data provided by Russian experts from SCCTP – Scientific Centre of Complex Transport Problems

2.1.3.15 Yugoslavia

The length of railway tracks in Yugoslavia amounted to 4,057 km in 1996, as shown in Table 24 below. The length of railway tracks per 100 square kilometres of land area was **3.9 kilometres** (the density in 1994 - 3.9 km per 100 km^2).

Table 24: Rail network in Yugoslavia in 1996

Railways	Length in km
Construction length	4057
With double track	276
Electrified	1356
Small track	0

Source: data collected by KTI, 1998

2.1.4 Inland waterway network

2.1.4.1 Bulgaria

The existence of the Danube River and the Black Sea, which form the larger part of the Northern and Eastern boundaries of Bulgaria, allows the development of inland waterway and maritime transport. The length of the Danube River within Bulgaria is 470 kilometres[22]. Along this length there are three river ports, which provide services of hire and reward and there are other five which carry out activities on their own account. The Eastern boundary of Bulgaria with the Black Sea is 378 kilometres long. The main ports are at Bourgas and Varna. There are some industrial enterprise ports operating on their own account.

2.1.4.2 Czech Republic

Transport infrastructure for water transport within the Czech republic is conditioned by the existing geographic conditions and, on the whole, meets transport requirements. Infrastructure of inland waterways transport has changed only minimally over the past few years. The total length of navigable rivers and lakes is 584.8 kilometres, including more than 211 kilometres navigable routes for vessels with a carrying capacity of over 1000 tonnes. In addition there is a total of 21.7 kilometres of canals available for navigation activity, including about 13.7 kilometres for vessels with higher carrying capacity (from 650 to 999 tonnes).

2.1.4.3 Estonia

About two-thirds of the Estonian border are coastal; hence water traffic is quite important for the country. In 1995, 66% of goods (including transit) were exported from Estonia by ship. The total length of Estonian waterways is 1640 kilometres (rivers, lakes and territorial water together). There is a good ferry connection with the islands of Saaremaa and Hüumaa. Ferries are used both for passenger and freight transport (there is no data collection for the carriage of goods, only the number of cars is counted). Although the total length of navigable inland waterways is 520 kilometres, there is no freight traffic (rivers and lakes' are too small).

2.1.4.4 Hungary

In 1995 the length of navigable waterways was 1622 kilometres, of which 1373 kilometres were permanently navigable and 249 kilometres were temporary waterways. Approximately 500 kilometres of the total length of waterways is of international importance, consisting of two sections without direct communication in Hungarian territory.

Due to the Yugoslav crisis the Tisza remained closed to traffic for years. The international waterways do not comply in many places to the classification criteria of gauge and bend of UN-ECE/ECMT, particularly the section of the Danube between Budapest and Rajka, which is only navigable with limitations in the best part of the year. With the opening of waterway communication between the Danube and the Rhine the market value of waterways has considerably increased. Due to international obligations concerning the Danube and the intention of Hungary to join the EU the waterways will have to be upgraded to European standards. This project must be started in this decade. Apart from this, water transport requires ports, stopping places and quays of high throughput, equipped with modern equipment. There is still a lot to do in Hungary in this respect.

[22] Transport development in the Central European countries. Analysis of trends for the years 1994 and 1995. op.cit.

Details of the current network are shown in Table 25.

Table 25: The length of waterway network in Hungary in 1996

WATERWAYS	CATEGORIES				TOTAL
	I	II	III	IV	
Danube	-	-	-	417	417
Danube (Moson branch)	-	-	14	-	14
Danube (Szentendre branch)	-	-	32	-	32
Danube (Ráckeve branch)	-	58	-	-	58
Lake Balaton	-	-	-	77	77
River Sió	-	92	-	25	121
River Dráva	43	85	-	-	128
River Tisza	90	122	313	-	525
Eastern Main Channel	-	43	-	-	43
River Bodrog	-	-	50	-	50
Hortobágy-Berettyó Main Channel	-	7	-	-	7
River Sebes-Körös	-	10	-	-	10
River Körös	-	-	115	-	115
River Maros	25	-	-	-	25
Total	**158**	**421**	**524**	**519**	**1622**

Source: KTI, 1998

2.1.4.5 Latvia

Inland waterway transport was in operation until the year of 1993. Some 347 kilometres of inland waterways were arranged for navigation.

2.1.4.6 Poland

Inland waterway transport has not, so far, played any important role in Poland. The navigable inland waterway network has not changed since 1994 when it was 3980 kilometres long (see Table 26). It consists mainly of the Oder River with the Gliwicki Canal and the Lower Vistula. Navigable rivers constitute over 69% of the total length of inland waterways and artificial waterways nearly 31 %, of which canals make up about 9%[23].

Table 26: Inland waterway network in Poland

	1990	1995	1996
Inland waterways network operated in km	3997	3980	3812

Source: Statistical Yearbook. Central Statistical Office - GUS, Warsaw 1991, 1996,1997.

Maps and attached computer files (Annexes 4.2.3.1 and 4.2.3.2) show the following data for Poland:

- Inland waterways in Poland, 1998, (Paper Map 27) – also attached in Word file: *'inland_PL1998';*

[23] Transport development in the Central European countries. Analysis of trends for the years 1994 and 1995. op.cit.

- Inland waterways in Poland, 2015, maximum variant (Paper Map 29)- also attached in Word file: *'inland_PL2015_max';*
- Inland waterways in Poland, 2015, minimum variant, (Paper Map 28) – also attached in Word file: *'inland_PL2015_min')*

These data are therefore maps presenting the inland waterway network in Poland at present (1998) as well as forecast for 2015 in two variants: min and max. It can be added that inland waterway routes in Poland have variable parameters and the network is not well developed. The routes of IV and V categories comprise only about 5% of the total network.

The traffic volumes are minimal. River border crossing points only exist on the Oder River at the German border.

2.1.4.7 Romania

The navigable waterways network at 31 December 1995 totalled 1779 kilometres, including the navigable length of the Danube river (1075 kilometres) the secondary branches of the Danube (524 kilometres), the Bicaz and Vidraru storage basins (48 kilometres) and the Danube - Black Sea canal (64 kilometres). The length of the inland waterway system has not altered in recent years.

2.1.4.8 Russia

The current inland waterways network in Russia consists of rivers, lakes and canals. The total length of the network amounts to ca. 84 thousand km.

The system of inland waterways in the European part of Russia consists of inland waterways of the rivers: Volga, Kama, Neva, Don; lakes: Ladozskoye and Odesskoye and canals. The guaranteed depth of inland waterways amounts to 4 metres and on some stretches – 3.5 metres.

The technical characteristics of the inland waterway network in Russia are shown in Table 27 below.

Table 27: Technical characteristics of inland waterways in Russia

Name of segments	Length, km	Guaranteed overall dimensions of shipping lane			Navigation time days/year
		Depth	Width	Radius	
1	2	3	4	5	6
White Sea - Baltic Sea channel					
Pobieniec - Bielomorsk	222	4	36-50	500-750	170
Volga - Baltic Sae water-way					
Sankt Petersburg - Vozniesenie	441	4	70-85	600-700	200
Vozniesenie - Tsherepoviec	807	4	50-80	600-700	200
Volga river					
Tvier - Ribinsk	355	4	100-125	400-1000	210
Ribinsk - Gorodiec	393	4	100	1000	210
Gorodiec - Nizny Novgorod	54	3,5	100	1000	210
Nizny Novgorod - Toliatti	764	4	100-150	1000	210
Moscow channel - Moscow river					
Bolshaya Volga - Moscow Sothern Harbour	172	4,0-3,2	55-60	400-1000	210
Volga - Don water-way	101	4	38	550	240
Don river					
Exit from Volga - Don water-way -	310	4	80-120	500-1000	240
Kotshetovskiy gidrouziel					
Kotshetovskiy gidrouziel - Azov	164	3,6	80	300	240

Source: Data provided by Russian experts from SCCTP – Scientific Centre of Complex Transport Problems

2.1.4.9 Slovakia

In Slovakia there are 172 kilometres of navigable inland waterways. On the completion of the Gabèikovo waterworks in 1992, a canal of a total length of 38.45 kilometres was brought into operation, shown in Table 28. In connection with the other rivers, the opening of the Rhine-Maine Canal has produced further possibilities for navigation on the Danube[24].

Table 28: Inland waterways in Slovakia in 1996

Length of inland waterways	in km
Total	172
canals	38,45

Source: data collected by KTI

2.1.4.10 Yugoslavia

The length and characteristics of inland waterways network in Yugoslavia is shown in Table 29.

[24] Transport development in the Central European countries. Analysis of trends for the years 1994 and 1995. op.cit.

Table 29: Length of navigable waterways by categories

	CATEGORIES				TOTAL
	< 400 tons	400 - 650	650 – 1000	> 1500	
Danube	-	-	-	588	588
Sava	-	-	207	-	207
Tisa	-	-	164	-	164
Tami	38	-	3	-	41
Begej	-	46	31	-	77
Danube-Tisa-Danube	21	321	-	-	342
Total	**59**	**367**	**405**	**588**	**1 419**

Source: Data collected by KTI, 1998

2.1.5 Air transport network

2.1.5.1 Belarus

From the airports of Belarus (Minsk-1, Brest, Grodno, Gomel, Mogiliev, Vitebsk) the passenger flights to 30 destinations of the former Soviet Union take place. On the other hand, the only international airport is Minsk-2, from which aeroplanes fly to European, Asian and American destinations. Table 30 shows traffic levels at Minsk.

Table 30: Passenger traffic - departures in the airport in Minsk in million, 1997

Airport	1990	1997	
		Total	Including international
Minsk	1,3	0,32	0,32

Source: UG 1998, Data provided by Russian experts from SCCTP – Scientific Centre of Complex Transport Problems

2.1.5.2 Czech Republic

In 1995 there were 73 airports, but only 10 of them had the facilities to receive international traffic, due to lack of strengthening of the runways for landing large-capacity aircraft of categories I and II. All other airports serve mainly sport purposes (they have grass landing strips) or for the air services of low-capacity aircraft on domestic flights[25].

2.1.5.3 Estonia

On the territory of Estonia, there is located one international airport - in Tallinn. The international airports are used for scheduled international, charter and local flights. Certain big military airports from the former USSR time are not used. The length of air corridors has not changed over time but their use has grown. In the Soviet period the use of many air corridors

[25] Transport development in the Central European countries. Analysis of trends for the years 1994 and 1995. op.cit.

was prohibited, especially the use of those located near military installations. Table 31 shows the level of air traffic in Estonia.

Table 31: Air traffic through Estonia in thousand in the years 1993-97

Year	Passenger number
1993	240
1994	336
1995	367
1996	431
1997	502

Source: UG 1998, Data provided by Estonian experts from TTU – Tallinn Technical University

2.1.5.4 Hungary

In 1995 the Hungarian air transport company (MALÉV) owned 38 lines of 49 thousand kilometres total length. No regular domestic flight are offer.

2.1.5.5 Latvia

On the territory of Latvia there is located one international airport - in Riga (see Table 32). The international airports are used for scheduled international, charter and local flights. Certain big military airports from the former USSR time are not in use.

Table 32: Air traffic through Latvia in thousand in the years 1993-97

Year	Passenger number
1993	Not available
1994	169
1995	199
1996	219
1997	221

Source: UG 1998, Data provided by Estonian experts from TTU – Tallinn Technical University

2.1.5.6 Lithuania

On the territory of Lithuania there are located 3 international airports: in Kaunas, Vilnius, and Palanga. The international airports are used for the scheduled international, charter and local flights. Certain big military airports from the time of the former USSR are not in use. Air traffic levels are shown below in Table 33.

Table 33: Air traffic through Lithuania in thousand in the years 1993-97

Year	Passenger number
1993	150
1994	194
1995	209
1996	214
1997	219

Source: UG 1998, Data provided by Estonian experts from TTU – Tallinn Technical University

2.1.5.7 Poland

Air transport in Poland is used almost exclusively for passenger transport. The total length of the air network in 1995 has remained constant in comparison with 1994. It was over 108 thousand kilometres long, of which 98% was the international network. Polish airlines maintained transport relations with 34 countries. In international traffic, seat utilisation was 70% and 52% in domestic traffic. In comparison with 1994, seat utilisation in aircraft has improved in international as well as domestic traffic.

The international airports in Poland are following – the details are shown in Table 34:

- Warszawa Ok_cie, Gda_sk Rebiechowo, Cracow Jana Paw_a II

The regional airports are following:

- Szczecin Goleniow, Poznan Lawica, Wroclaw Starachowice, Katowice Pyrzowice, Rzeszow Jasionka,

The secondary airports are following

- Koszalin Zegrze Pomorskie, Slupsk Redzikowo, Zielona Gora Babimost, Torun Lask, Modlin

Table 34: Technical characteristics of main airports in Poland

Airport	Number of citizens in the city in ths.	Existing equipment	
		Length of DS. in metres	Navigation equipment
Warsaw – Okecie	2140	3690, 2800	lighting cat. II, ILS cat. I, VOR/DME, NDB
Gdansk Trojmiasto	758	2800	lighting cat. I, ILS cat. I, NDB
Cracow - J.Pawel II	750	2400	lighting cat. I, ILS cat. I, NDB
Katowice – Pyrzowice	1553	2380	lighting cat. I ILS cat. I, NDB
Wroclaw – Strachowice	642	2500	lighting cat. I ILS cat. I, NDB
Poznan – Lawica	583	2500	lighting cat. I ILS cat. I, NDB
Szczecin – Goleniow	420	2500	lighting system simplified, NDB
Rzeszow – Jasionka	159	2500	lighting cat. I ILS cat. I, VOR, NDB
Lodz – Lask	830	..	..
Bydgoszcz	590	..	..
Czestochowa	260	2000	NDB
Koszalin	111	..	..
Slupsk	102	..	..
Biala Podlaska	56	..	..

Source: GILC (Glowny Inspektorat Lotnictwa Cywilnego), Warsaw 1996.

2.1.5.8 Russia

In the period of 1989-90 in Russia, there was a very significant growth of passenger air traffic. The most important complex of airports in Russia are still the ports providing Moscow, i.e. Bykovo, Vnukovo, Domodelovo i Scheremyetyevo.

In 1990 the biggest traffic took place in Domodelovo airport – 16.5 million passengers per year, and then Vnukovo – 14 million passengers, Scheremyetyevo – 11 million, Bykovo – 3 million. Among the remaining airports, one should mention Pulkovo – 10 million passengers per year. Moreover, a big importance had airports in Kiev – 5.6 million passengers (at present Ukraine), Minsk and Kishinev.

In the 90's there was a considerable growth in international transport, especially in the ports of Moscow and Sankt Petersburg. Out of 11 million passengers in Scheremyetyevo airport, 6.6 million was made up of foreign passengers.

The dynamism of passenger traffic growth in Russian airports is presented in Table 35.

Table 35: Traffic of passengers in major Russian airports

Airport	1990	1993	1994	1995		1996		1997	
				Total	Including international	Total	Including international	Total	Including international
Moscow region:									
-Bykovo	1,39	0,63	0,41	0,33	0	0,24	0,05	0,16	0,03
-Vnukovo	7,12	2,18	2,35	2,44	0,81	2,33	0,73	2,32	0,68
-Domodiedievo	8,26	4,42	3,52	3,22	0,08	2,58	0,7	2,24	0,52
-Sheremietievo	5,45	3,53	3,79	4,46	3,68	4,59	3,84	4,95	3,94
Sankt Petersburg – Pulkovo	4,9	1,64	1,5	1,46	1,37	…	…	…	…
Kaliningrad	0,29	0,17	0,19	0,17	0,12	…	…	…	…
Arhangielsk	0,97	0,33	0,29	0,2	0,12	…	…	…	…
Astrahan	0,4	0,16	0,11	0,12	0,14	…	…	…	…
Murmansk	0,97	0,37	0,37	0,3	…	…	…	…	…

Source: UG 1998, Data provided by Russian experts from SCCTP – Scientific Centre of Complex Transport Problems

2.1.5.9 Ukraine

A major airport in Ukraine is Kiev - Borispol. Passenger traffic in the port in the years 1990-97 is shown in Table 36.

Table 36: Passenger traffic - departures in airport Borispol in million persons

Airport	1990	1996		1997	
		Total	Including international	Total	Including international
Borispol	2,8	0,64	0,43	0,69	0,65

Source: UG 1998, Data provided by Russian experts from SCCTP – Scientific Centre of Complex Transport Problems

2.1.6 Sea shipping network

2.1.6.1 Bulgaria

The freight traffic in major Bulgarian seaports is presented in Table 37.

Table 37: Freight traffic in Bulgarian seaports in tonnes

Seaport	1995
Burgas	2578208
Varna	2057100

Source: A.Ormandijieva, CTC-Engineering, Bulgaria. Paper presented in the Seminaire in Barbizon, November 1998Priority orijects in Bulgaria along corridor IV and connected with it corridors VII and X, as part of the TEN in a conditions of a transition to a free market economy and Bulgarian report on national transport policy. Report prepared within CODE-TEN project by CTC Engineering, Ltd

2.1.6.2 Estonia

Total turnover of the Estonian, Latvian and Lithuanian ports in the year 1997 (million tonnes) is shown in Table 38 below.

Table 38: Total turnover of the Estonian, Latvian and Lithuanian ports in 1997, million tonnes/passengers

Port	Import	Export	Total	Bulk	Tank	Gen. Cargo	Cont. TEU	Passengers
Tallinna Sadam	4,2	12,9	17,1	2,7	8,1	6,3	54950	4,8
Liepaja	0,48	1,8	2,3	0,2	0,4	1,7	3246	Na
Riga	1,6	2,4	3,9	1	0	3	130988	
Ventspils	0,6	46,2	47,2	4,5	28,6	3,6	0	0
Klaipeda	3,7	12,4	16,1	2,9	3,1	9,3	36735	0,07

Source: UG 1998, Data provided by Estonian experts from TTU – Tallinn Technical University

Estonia's biggest and international ports are situated in Tallinn and surroundings and belong to the limited company the Port of Tallinn, which includes:

- Muuga harbour
- Vanasadama (City Center)
- Paljassaare harbour
- Paldiski -South harbours

In 1996 international freight traffic through Estonian ports increased by 12.5% to 17.7 million tonnes (see Table 39).

In 1997, the Vanasadama (City) harbour served 4.8 million passengers. In the future main fright activities will be concentrated at Muuga, which can accommodate shipment of ships of 120000-ton capacity.

Regular freight service exists between Tallinn and Helsinki, Stockholm, Copenhagen, Hamburg, Bremenhaven, Kiel, Rotterdam, Antwerp and Flexistove.

Table 39: Transport of goods through seaports in Estonia (millions tonnes) in the years 1993-97

Year	Total	of which transit
1993	12,9	9,8
1994	13	8,7
1995	15,7	9,9
1996	17,6	11,2
1997	23,3	14,7

Source: UG 1998, Data provided by Estonian experts from TTU – Tallinn Technical University

2.1.6.3 Latvia

Ports have always played a specific role in the economy of Latvia. There are 3 big ports with a total annual freight turnover of nearly 40 million tonnes and 7 minor ports on the shores of the Baltic Sea and the Gulf of Riga (see Table 40).

The three major ports of Latvia – Riga, Ventspils and Liepaja handled at 1997 ca. 47.8 million tonnes of cargo. Each Latvian port is specialised in handling of a particular cargo type.

The largest port in Latvia is Ventspils, it is a monopolist in oil and chemical product handling. The Port of Ventspils is a leading corridor for the export of Russian oil to the West. The port handles three quarters of the total freight turnover in ports.

Some 16 % of the total cargo through put handled in the Port of Liepaja – timber, metals, and containers.

Port of Riga is a main container port in Latvia, which specialising in the container traffic. The volume of the containerised cargo was at 1996 130,207 TEU.

Klaipeda Port is able to handle up to 20 million tons of various cargo: metal, oil, fertilisers, timber, containers, railway wagons, etc. Klaipeda Port is a harbour of the multi-modal transport on the corridor branch IX, linking maritime and land routes along East-West.

The hinterland and railway connections are very good. The highway links Klaipeda to Kaunas –Vilnius- Moscow. The port is served to railway stations.

Table 40: Transport of goods through seaports in Latvia (millions tonnes) in the years 1993-97

Year	Total	of which transit
1993	27,3	not available,
1994	34,7	
1995	38,5	
1996	44,8	
1997	47,8	

Source: UG 1998, Data provided by Estonian experts from TTU – Tallinn Technical University

2.1.6.4 Lithuania

The total freight transport in Lithuanian seaports is shown in Table 41, below.

Table 41: Transport of goods through ports in millions tons in the years 1993-97

Year	Total	Of which transit
1993	15,7	not available
1994	14,5	
1995	12,7	
1996	14,8	
1997	16,1	

Source: UG 1998, Data provided by Estonian experts from TTU – Tallinn Technical University

2.1.6.5 Poland

The total length of quays at seaports in 1995 was over 58 kilometres long; more than 5 kilometres longer than in the previous year. Quays fitted for operation accounted for 74% of the total length of quays. Out of all quays fitted for operation in 1995, transhipment quays account for nearly 35 kilometres (81 %)[26].

In 1995, 13,438 merchant ships called at Polish ports, that is, over 13% more than in 1994. Vessels calling at ports sailed under the flags of 74 countries. Most transhipments which took place were concentrated at the four large ports of Gdynia, Gdansk, Szczecin and Swinoujscie, less important ports were: Kolobrzeg, Darlowo and Elblag. In 1995, 49 million tonnes of goods were transhipped in Polish seaports, 6% less than in the previous year. Transit goods accounted for 7.5% of the total transhipment, this was 27% less than in 1994.

Traffic volumes (in tonnes) at Polish ports by commodity (NSTR groups) and by origin or destination are available in the attached files '*forecast of seaports*' and '*forecasts of Polish foreign trade*' - Annex 4.2.4 (Forecast of Polish foreign trade prepared in the years 1995-96, the base year 1994).

Table 42 below shows the share of transport modes servicing maritime ports in Poland in 1994.

Table 42: The participation of modes of transport in Polish seaports services in 1994

Maritime ports/modes of transport	1994
Gda_sk	
Rail	54.6
Road	5.5
Pipelines	39.9
Gdynia	
Rail	80.2
Road	19.1
Inland waterway	1.6
Pipelines	1.0
Szczecin-Swinoujscie	
Rail	82.3
Road	1.4
Pipelines	16.3

Source: Statistical Yearbook of Maritime Economy 1996, Warsaw 1997.

[26] Transport development in the Central European countries. Analysis of trends for the years 1994 and 1995. op.cit.

2.1.6.6 Russia

The total transhipping capacity of the Russian sea ports amount to ca. 160 million tonnes per year. Transport of goods in major Russian seaports is shown in tables in Annex 4.2.2 in the attached file '*seaports.xls'*.

2.1.6.7 Ukraine

In Ukraine there are 18 sea ports, located on the Black Sea and Sea of Azov and in the estuary of the rivers: Danube, Bug, Dniepr.

The main seaports include following: Ilichevsk, Odessa, Juznyj, Nikolajev, Maryjpol, Herson. The characteristics and the transport volume in the sea ports is presented in the tables in annex in the attached file '*seaports.xls'*.

2.1.7 Origin-destination matrix type information

2.1.7.1 Inbound and outbound passenger traffic in Poland

Analyses of international traffic flows have been conducted for the aim of the study prepared for the European Parliament in 1997. On the basis of the available data on international passenger flows from Statistical Office, Institute of Tourism, one can aggregate the data into the tables, which are shown in annex '*mobility_Pol.xls'*- Annex 4.2.5.

The number of inbound traffic has been growing at a very fast rate: 18 million people visited Poland in 1990, and the number increased up to 87 million in 1996 (the increase by 352%). It is worth noticing that in the first nine months of 1997 the number of trips to Poland amounted to ca. 88 million and the number of Polish citizens trips abroad - ca. 40 million.

At present, a tourist from the neighbouring countries that has been visiting Poland constitutes the majority. It is estimated at the same time that 80% of the people from the Czech Republic and Slovakia, as well as 60% from Germany arrived in Poland without using any accommodation. These trips do not therefore conform with the definition of a foreign tourist (i.e., a visitor who stays at least one night in accommodation).

The predominance of the EU as origins of the inbound tourism to Poland is apparent. Of the total number of visitors as much as ca. 56% comes from the EU, while ca. 28% of the total number - from the Central Europe, i.e., less than the share of the outbound tourism amounts in that direction. In addition, one fact is worth considering: a relatively high share - ca. 15% of tourists visiting Poland who come from Russia, Belarus, Ukraine, and Lithuania, are the result of trade visits. The people coming for the above mentioned purpose, to a great extent, do not use any accommodation, thus they do not conform with the definition of a tourist. It is characteristic that the share of tourists from the rest of the world coming to Poland seems to be insignificant (ca. 1%).

Within the years 1994-96 the number of Polish tourists going abroad increased from 34.3 to 44.7 million people. In the outbound traffic such countries as Germany, the Czech Republic and Slovakia as well as the states of the former Soviet Union are the most frequently visited destinations. Around 46% of Polish citizens visit the EU countries (for the most part Germany), on the other hand around 7% of tourism is concentrated on the destination of the former Soviet Union republics. The very high share of the Central European countries appeared in 1996, while in the previous three years (1993-95) the predominance of the EU can be observed. The decrease of the EU percentage results from a significant increase of Polish trips to the Czech Republic and Slovakia.

2.1.7.2 Origin - destination matrix for goods

In the years 1996-97 a forecast for the development of Polish foreign trade haulage was undertaken. Within the framework of the research, the base calculations were made for the year 1994 on the basis of accessible data. The goods traffic was defined according to NSTR groups from 49 voivodships (classified into 11 regions) into destination or origin countries. The prognosis was made according to the same 11 regions, taking into account macroeconomic indicators and development forecasts in the given 11 regions. The new administrative division of Poland is not identical with the former premises concerning 11 regions identified in the forecast.

The base information for the forecast of carriages of Polish foreign trade is the origin-destination matrix type information for the base year – 1994. The data is included in the attached file '*forecast of Polish foreign trade.xls'* – Annex 4.2.4.

It worth stressing that the new administrative division of Poland creates different problems in the scope of statistical data, including transport data. The difficulties result from the fact that 16 new voivodships have not been formed as a mere combination of a few former voivodships into one new administrative unit. The new 16 regions are a result of lengthy discussions and compromise in the political, economical and social spheres.

None of the newly formed regions is a composition of 'old' voivodships. Therefore, it is not possible to calculate statistical data from the 'old' voivodships into new ones by simply summing up specific data. It is difficult to foresee when statistical data set is established in the arrangement of the new 16 regions. As long as the data are not collected and converted into the new arrangement, one can say only about certain estimations.

An attempt was made to estimate existing transport data in new 16 regions. Since the formerly discussed prognosis was made by the same research team along with the experts from the Research Centre for Transport Economics, then the results of the estimations can be regarded as quite reliable. The results of the estimations are presented in separate attached file, '*transport_16PL.xls*' - Annex 4.2.6, concerning transport data in the 16 new Polish voivodships. In the annex, maps on the regional administrative division before and after 1st January 1999 are attached (file '*maps_regions.docs*' – Annex 4.1.3).

2.1.7.3 Origin-destination information in Hungary

In 1995-96 a nation-wide O/D survey was undertaken for road traffic. The roadside interviews were made three times in different seasons, on a weekday and on a weekend each time. The data were processed for smaller (municipal areas) and for bigger regions (counties), as well. The information regarding passenger and goods traffic were collected separately. The local and the international traffic were also distinguished.

There is no available O/D information for rail traffic in Hungary at this moment, but it will be created in the near future for goods traffic.

2.1.8 Cross-border traffic

A choice of modes of transport by tourists crossing Polish borders is also worth noting. Table 43 shows the modal structure of international traffic in Poland in the years 1994-96. As it is evident, road transport, especially private motorisation, predominate. Among the remaining modes of transport railways are distinguishable (ca. 5%); also the growth in significance of air transport has been noticed recently.

Table 43: Polish cross-border traffic in both directions in thousand persons and % by modes of transport in the years 1994-96

Border crossings	1994	1995	1996
Total:	217118	234871	260125
In %	*100*	*100*	*100*
road crossings	202179	222074	247411
In %	*93.12*	*94.56*	*95.1*
rail crossings	10270	8812	8190
In %	*4.73*	*3.75*	*3.1*
maritime crossings	2025	1326	1575
In %	*0.93*	*0.56*	*0.6*
airport crossings	2601	2649	2949
In %	*1.20*	*1.13*	*1.1*
river crossings	43	10	n.a.
In %	*0.02*	*0.004*	-

n.a. - data not available

Source:J.Lyszczarz: Border traffic. In: International Transport and Forwarding in Poland 1997. III edition. Europa Business, Warsaw 1997, p. 121. Pocket Statistical Yearbook of Poland 1997, Central Statistical Office, Warsaw 1997.

The purposes of foreign tourism arrivals in Poland can be described as follows in Table 44.

Table 44: The share and structure of foreigners arrivals in Poland

Citizens year	Share of total trips		%				
			visits	trade	tourism	transit	Other
German	1994	63.9	25.7	9.0	49.9	6.9	9.4
	1996	54.4	18.6	8.3	58.1	9.5	5.5
Czech	1994	15.0	21.7	5.6	66.5	5.3	0.9
	1996	19.9	10.6	3.8	80.2	4.1	1.3
Slovakian	1994	4.0	18.9	8.5	70.3	1.8	0.5
	1996	5.8	7.2	7.7	82.6	1.9	0.6
Ukrainian	1994	4.2	16.9	4.5	64.9	12.7	1.0
	1996	6.0	3.4	2.1	81.6	12.0	0.9
Belarussian	1994	2.9	3.6	2.8	79.6	12.7	1.3
	1996	4.5	1.1	1.8	83.1	13.4	0.6
Russian	1994	3.2	4.4	4.5	55.2	34.5	1.4
	1996	2.6	3.2	4.7	57.8	33.4	0.9

Source:J.Lyszczarz: Border traffic. In: International Transport and Forwarding in Poland 1997. III edition. Europa Business, Warsaw 1997.

The detailed data concerning traffic on border crossing points are shown in the attached annex '*traffic_border_crossing.xls'* – Annex 4.2.2.

2.1.8.1 Road transport in border crossing points in Poland

The vehicle traffic at border crossing points in Poland has been analysed for several years by the Ministry of Transport and the results are published in the annual publication 'International Transport and Forwarding in Poland' (last edition in 1997, edited by Europa Business).

Data regarding road transport in border-crossing points is the result of estimates received in two ways:

- Number of border crossings by trucks multiplied by their carrying capacity (20 tonnes) and loading coefficient,
- Sum of cargo volume (in tonnes) in international traffic shipped by Polish carriers (GUS Central Statistical Office data), plus estimates of shipment by carriers employing up to five and up to twenty persons, plus the volume of shipments executed by foreign carriers calculated on the basis of the proportional share of Polish and foreign trucks crossing the State frontier.

The estimates received by using each of these methods differ by 1% - 2%.

2.1.8.2 Rail border crossing points in Poland

In the years 1991 - 1996 the number of rail border crossing increased from 16 to 24 including such ones as on the border with Germany from 5 to 6, on the South border (with the Czech Republic and Slovakia) from 3 to 7 and on the East border (with Belorussia, Ukraine, Lithuania and Russia) from 8 to 11. The border crossing points at such places as: Braniewo, Malaszewicze, Przemysl, Lupkow, Muszyn, Zwardon and Zebrzydowice are being modernised.

The most congested rail border crossing include:

- on the East border: Terespol - ca. 19 thousand of passenger and freight train per annum,
- on the South border: Zebrzydowice - ca. 15 thousand of passenger and freight train per annum; Chalupki - ca. 11 thousand of passenger and freight trains per annum,
- on the West border: Kunowice - ca. 18 thousand passenger and freight train per annum.

In the case of rail transport lengthened waiting times are not being recorded at Polish border crossing, which deter users from car transport to a limited extent. It is due to still a low value of waste of time as regards transport in Poland, which to a high degree is of a subjective character.

The file attached Excel file (‘*traffic border crossing’*– Annex 4.2.2) presents the specification of the average daily numbers of vehicles cleared in both directions at major points (including the sea border) for the years 1995-96.

2.1.8.3 Traffic at border-crossing points in Baltic States: Estonia, Latvia, Lithuania

The rail and road traffic at major border-crossing points in Latvia, Estonia, and Lithuania is analysed in Tables 45 below.

Table 45: Railway traffic at border crossing points in Baltic States: Latvia, Lithuania and Estonia in 1996 and 1997 (million tonnes)

Border crossing points	Country	1996	1997
Narva	Estonia/Russia	10,4	Na
Kliima	Estonia/Russia	4	Na
Valga	Estonia/Russia	0,8	Na
Mazeikiai	Lithuania/Latvia	0,6	0,6
Sarkiai	Lithuania/Latvia	1,6	1,7
Sumskas	Lithuania/Belarus	13,9	14,6
Stasylos	Lithuania/Belarus	3,3	3,5
Sestokai	Lithuania/Poland	0,086	0,095
Kybartai	Lithuania/Kaliningrad	5,6	5,9
Pagegiai	Lithuania/Kaliningrad	1,1	1,1

Source: UG 1998, Data provided by Estonian experts from TTU – Tallinn Technical University

The specific tables concerning an average annual number of vehicles at major crossing points between each Baltic country (Estonia-Latvia, Estonia-Russia, Lithuania-Latvia, Lithuania-Belarus and Lithuania-Poland) is presented in the attached in Excel file (‘*traffic border crossing.xls’* – Annex 4.2.2).

2.1.8.4 Traffic at border-crossing points in Belarus

The traffic at border-crossing points in Belorus is analysed in Table 46 below.

Table 46: Annual average daily traffic in crossing border points (Belarus-Poland and Belarus-Lithuania) in Belarus in 1997

Border passages	Trucks		Passenger cars		Buses	
	Total	Including transit	Total	Including transit	Total	Including transit
Belarus – Poland	15506	14227	2923	2681	388	165
Belarus – Lithuania	9831	7618	54160	13687	923	337
Total	25337	21845	57083	16368	1311	502

Source: UG 1998, Data provided by Russian experts from SCCTP – Scientific Centre of Complex Transport Problems

2.1.8.5 Traffic at border-crossing points in Bulgaria

Annual and daily average traffic flow in 1995 according to number of vehicles is analysed in tables in attached in Excel file (‘*traffic border crossing’* – Annex 4.2.2).

2.1.8.6 Cross-border traffic in Hungary

There are 61 road border-crossing points on the national road network to the seven neighbour countries of Hungary in 1997. Several of them are open only for passenger traffic, and other ones are open for the citizens of the neighbouring countries only. Since the political situation has changed, the number of the small border-crossing points was increasing year by year. However the majority of the cross-border road traffic take place on the 30 main international frontier crossings.

Both the passenger and the goods traffic are monitored continuously, therefore there are exact data on them.

On the railway network there are 23 border crossings to the 7 neighbour countries. Traffic data are collected for passengers and for goods separately. In the latter container traffic is distinguished. Annual traffic flow in 1997/8 according to number of vehicles are reported in the attached Excel file (‘*traffic border crossing’* – Annex 4.2.2).

2.1.8.7 Border crossing points in other CEE countries

The number of the frontier crossings of these countries has been increasing since 1990. However the more important ones are those which are used traditionally, because of the better road connection. This is also true for the railway border crossings to a greater extent. The basic data of the main railway crossings are detailed for all the countries in different tables.

2.1.9 Current national plans for transport infrastructure development

2.1.9.1 Programme of road infrastructure development in Poland

Out of the ten priority transport corridors (set by the second Pan-European Conferences of Transport in Crete and by the third Conference in Helsinki) including railway lines, four of them (corridor I, II, III and VI) run across Poland. These corridors are in accordance with Polish programme of motorway construction and development of railways network:

- ♦ Corridor II (Berlin-Warsaw-Minsk-Moscow): A-2 motorway and E20 railway line,
- ♦ Corridor VI (Gdansk-Warsaw/Lodz-Katowice/Cracow-Zilina + Torun-Poznan): A-1 motorway and E65 railway line,
- ♦ Corridor I (Tallin-Riga-Warsaw-Kaliningrad-Gdansk): expressway Elblag – Kaliningrad,
- ♦ Corridor III (Berlin/Dresden-Wroclaw/Cracow-Kiev): A-4 motorway and E30 railway line.

According to the Polish transport policy document dated 1995, the most significant urgent and profitable investment undertakings, which concerns Polish stretch of the Berlin-Moscow corridor, are the following:

- ♦ construction of the motorway A-2,
- ♦ modernisation of the railway line E20 within the framework of the agreements AGC/AGTC,
- ♦ modernisation of road infrastructure at border crossing with the heaviest capacity,
- ♦ modernisation of railway infrastructure of the major border crossings,
- ♦ development of infrastructure (light cables) and system of automatic control engineering.

A next stage of conception began in a new political situation in the 90's. On July 27th 1993, the Council of Ministers accepted the Construction Programme for the Motorways (number 63/93). On December 6th, 1993, the Economic Committee of the Council of Ministers recommended to extend this programme from 1961 to 2600 km. This system includes a 140 km section already in existence, which has to be modernised to collect tolls and 200 km of 1 and 2-lane roads which have to be more modernised to a greater extent.

The construction of toll motorways system includes 2600 km and consists of following 7 connections (length in km – Polish parts of motorways):

- A-1 (Helsinki) - Gdansk - Torun - Wloclawek - Lodz - Czestochowa - Katowice - Gorzyce (Polish-Czech border) - (Brno) - 597 km;
- A-2 (Berlin) - Swiecko (Polish-German border) - Poznan - Konin - Lodz - Warsaw - Siedlce - Terespol (Polish-Belarussian border) - (Minsk) - (Moscow) - 626 km;
- A-3 Szczecin - Gorzow Wlkp. - Zielona Gora - Legnica - Lubawka (Polish-Czech border) - (Prague) - 365 km);

- A-4 (Drezden) - Zgorzelec (Polish-German border) - Wroclaw - Opole - Gliwice - Katowice - Cracow - Rzeszow - Przemysl - Medyka (Polish-Ukrainian border) - (Berlin) - ca 40 km;
- A-6 Szczecin - Kolbaskowo (Polish-German border) - (Berlin) - ca 70 km;
- A-8 Lodz - Wroclaw - Bolkow - ca 160 km;
- A-12 - Krzyzowa - Olszyna (Polish-German border) - (Berlin) - ca 70 km.

According to the transport policy document, the construction of motorways and highways is the most important investment project in the Polish transport infrastructure in the next 15-20 years. In Poland, the sequence of motorway construction will depend first of all on the traffic forecast. The level of investment expenditure will be another factor. The expenditure and the anticipated traffic flow (intensity) will allow estimation of the profitability of these investments for concessionaires and tenders.

The toll motorway construction program in Poland has been already commenced. Non-traditional financing is the basic of financing the Programme of Motorways Construction. Under this financing method, the government will issue concessions to an economic entity for the construction and operation of a motorway or its segment for a specific period of time (20 to 30 years). The process of issuing siting decisions is in progress, also in the range of West-East corridor.

Up to now Polish Ministry of Transport has adjudged 3 concessions for construction and operation of the motorway stretches. One of the concessions concerns the A-2 motorway, i.e., Swiecko-Strychow (Swiecko-Poznan-Konin-Lodz-Strychow) stretch (364 km length). The concession was obtained by the consortium, Autostrada Wielkopolska s.a., which was established in order to realise construction of the west part of A-2 motorway. The joint-stock company consists of several important Polish firms, banks etc.

In the range of national road network, the Strategy of maintenance and development of national roads in Poland runs up to the year 2015. The strategy is prepared by the General Direction of Public Roads. The final document is dated April 1998. In the strategy the tasks are considering in the desirable (maximal) and minimal levels.

On the desirable levels is assumed the following:

a. *execution of motorways and express ways within the pan-European transport corridors:*

- in the range motorways

A-1 – total length; A-2 – total length; A-4/A-12 stretch Zgorzelec (Olszyna)-Tarnów; A-8 stretch Wroclaw-Ole_nica;

- in the range of espressways

Two-lanes expressways – 1299 km;

No 3 stretch Goleniow-Szczecin – 28 km; No 5 stretch Swiecie-Bydgoszcz-Poznan (A-2) – 170 km; No 6 stretch Obwodowa Trójmiasta – 39 km; No 7 stretch Plonsk-Warszawa –Radom – North beltway of Cracow and Krakow – Rabka – 249 km; No 8 stretch Warszawa – Piotrków Trybunalski – 121 km; No 10 stretch Torun-Plonsk – 146 km; No 17 stretch Warszawa – Lublin – Piaski – 170 km; No 18 stretch Warszawa – Bialystok – 194 km; No 1, 15, 94, 944 stretch Pyrzowice-Bielsko-Biala – Zywiec – Zwardon – i Bielkso-Biala - Cieszyn – 182 km

One-lane expressways roads: 2234 km

No 3 stretch Swinoujscie – Goleniow – 66 km; No 5 stretch Poznan – Wroclaw – 192 km; No 6 stretch Goleniow-Wejherowo – 273 km; No 7 stretch Gdansk-Plonsk, Radom-Krakow i Rabka – Chyzne – 509 km; No 9 stretch Rzeszow- Barwinek – 91 km; No 10 stretch Torun-Szczecin – 281 km; No 17 stretch Piaski-Hrebenne – 121 km; No 18 stretch Bialystok- Kuznica – 57 km; No 19 stretch Budzisko- Lublin-Rzeszow – 570 km; No 82 stretch Piaski – Chelm – Dorohusk – 70 km.

b. adaptation of other international roads (E) and principal national road connections to European standards:

- stretches of express ways on parts of international roads with the heaviest traffic are expected to be built

c. carrying through the condition of roads and bridges to a required standard:

- getting, on average, satisfactory road surface state and getting 10-12 year period of interval between next repairs

d. safety traffic requirements:

- raising of the level of road signs and liquidation of the spots particularly dangerous as far as the year 2005.

On the minimal levels is assumed the following:

a. execution of motorways and express ways within the pan-European transport corridors:

- in the range motorways:

A-1 stretch Gda_sk-Gliwice; A-2 stretch Swicko-Warszawa (Minsk Mazowiecki); A-4/A-12 stretch Zgorzelec (Olszyna)-Krakow; A-8 stretch Wroclaw-Olesnica;

- in the range of expressways:

Two-lanes expressways – 762 km

No 3 stretch Goleniow-Szczecin – 28 km; No 5 stretch Swiecie-Bydgoszcz oraz Gniezno-Poznan (A-2) – 85 km; No 6 stretch Obwodowa Trójmiasta – 39 km; No 7 stretch Plonsk-Warszawa –Radom – North beltway of Cracow and Krakow – Rabka – 249 km; No 8 stretch Warszawa – Piotrków Trybunalski – 121 km; N 18 stretch Warszawa – Wyszkow – 58 km; Nr 1, 15, 94 stretch Pyrzowice-Bielsko-Biala – Zywiec – Zwardon – i Bielsko-Biala - Cieszyn – 182 km

One-lane expressways: 1159 km

No 3 stretch Swinoujscie – Goleniow – 66 km; No 5 stretch Bydgoszcz-Gniezno oraz Poznan – Wroclaw – 277 km; No 10 stretch Plonsk - Torun – 146 km; No 17 stretch Warszawa – Lublin - Hrebenne – 290 km; No 18 stretch Wyszkow-Bialystok – 136 km; No 19 stretch Bialystok-Budzisko – 145 km; No 82 stretch Piaski – Chelm – Dorohusk – 70 km; Nr 944 stretch Zywiec-Zwardon – 29 km

b. adaptation of the rest of international roads (E) and principal national road connections to European standards:

- it is assumed to modernise international roads to the AGR technical requirements

- on the rest of principal national road connections modernisation works will be carried out on the stretches of international roads with the heaviest traffic

c. bringing the state of roads and bridges to a required standard:

- it is assumed to improve the parameters of roads directly affecting the road traffic safety and to obtain a good state of road surface

d. safety traffic requirements:

- raising the level of road signs and liquidation of particularly dangerous spots

2.1.9.2 Programme of rail infrastructure development in Poland

The new aspects of railway modernisation in Poland are connected with the agreements of AGC (main international railway lines) and AGTC (main combined transportation lines). The European Agreements AGC and AGTC include plans to create 4 European quality lines in Poland, i.e. E-20, E-30, E-59, E-65.

The strategic importance for Polish and also European railway system has some stretches of the mentioned lines and absolute priority is given to the following lines:

- ♦ E-20 - Kunowice - Poznan - Warsaw - Terespol - (Moscow) - adjustment to 160 km/h, 690 km long - CORRIDOR II;
- ♦ E-59 - Wroclaw - Poznan, adjustment to 160 km/h, 164 km long;
- ♦ E-59/2 - Wroclaw - Miedzylesie, adjustment to 120 km/h, 138 km;
- ♦ E-65 - Zawiercie - Katowice - Zebrzydowice, adjustment to 160 km/h, 119 km long, CORRIDOR I.

The total length of these lines is 1365 km.

As was mentioned above, firstly the modernisation of the Polish stretch of the Berlin - Moscow line as the main route for East - West traffic is being realised. The modernisation is being carried in two stages:

- ♦ stage one - covers the stretch from Kunowice via Poznan to Warsaw (479 km). The costs for the Polish part amount to about 487 million ECU, out of which a substantial portion, 187 million ECU is to be financed by the Polish government. The EIB and EBRD are contributing 200 and 50 million ECU, respectively. PHARE has already contributed 30 million ECU and will increase its contribution to 50 million ECU. Due to the modernisation the effective time of the Warsaw - Berlin railway trip will be cut from 6 hours 18 minutes now to 4 hours 45 minutes from the beginning of this summer.
- ♦ stage two - covers the stretch from Warsaw to Terespol (211km), that will be adjusted to 160 km/h by the year 2005. This stage involves upgrading the section from Warsaw via Lukow to Terespol on the Belarussian border for 160 km/h operation. Work, which began in 1996 on the initial 36 km Warsaw-Minsk Mazowiecki secton is expected to be finished in 2000. The Warsaw-Terespol line, plus a bypass to the south of Warsaw from Lowicz via Skierniewice to Lukow, will provide improved freight services between the networks of PKP and Belarussian Railway, via existing interchange at Terespol. This section is due to

be rebuilt by 2005 – at the same time the entire east-west corridor linking Berlin to Warsaw, Minsk and Moscow is scheduled for completion.

It is necessary to plan not only the modernisation of an existing system of railways, but also a probable construction of new railways as well as construction of supplementary stretches to the existing lines. However, stretches and lines for possible future construction (without specifying any dates) have been additionally marked. The elaboration of the General Management of the PKP expects the construction of the following new stretches and railway lines:

- Wielun-Idzikowice, a missing stretch of the AGC E-26 line (105 km),
- Krakow-Tymbark, a small part (35 km) of the line of the AGTC agreement marked with C-31/1 making the connection with Slovakia advantageous,
- Korytow-Plock-Sierpc-Gdansk (317 km), an extension of the Central Railway Mainline towards the North,
- The western border of Poland-Poznan-Lodz-Warsaw-Terespol (660), the so-called E-20 bis.

After the breakdown of the planned-economy system the UIC began working on strategic studies of high-speed railway networks across whole Central-Europe in connection with the West European networks. A UIC regular group for High Speed matters appointed the “Eastern Zone” geographic group headed by the PKP representatives. It is significant that the railways in Central-Eastern Europe, in spite of their development delays lack of high speed railway lines, have been elaborating common development plans in order to accelerate making up for delays in that part of Europe.

In Poland in mid-90s a group of experts from the General Management of PKP elaborated a guiding programme of the development of the high-speed railway lines which received a positive opinion of Technical-Economic Council of PKP gathering scientific circles.

The modernisation of C-E 20 line was and is still being carried out in two stages. The former stage carried out in the years 1992-1997 covered the Kunowice-Warsaw stretch to V = 160 km/h with 479 km long. The latter one is a modernisation to V = km/h of 211 km of the Warsaw-Terespol stretch as well as modernisation of the line making it possible to bypass Warsaw, from the south Lowicz-Skierniewice-Lukow with the length of 182 km, to V = 120 km/h. The total costs of the C-E 20-line modernisation will amount to about 1945 million ECU, and the whole of the construction will be completed by around the year 2002. The line is planned to be equipped with modern ETCS controls. The modernisation priority of the C-E 20 line results mainly from its international significance and a possibility of both economic and political use of this significance by Poland. As a result of the modernisation the travel time between Warsaw and Berlin will shorten from 6 h 20 min. before the modernisation to 4 h 15 min. However, the C-E 20 line lying along the II corridor according to the Crete agreements makes up a part of a pan-European railway corridor connecting on the one hand Paris (and London at present), through Brussels, Berlin, Warsaw, and Moscow and St. Petersburg on the other hand. In January 1995 the ministers of transportation of the following countries: Germany, Poland, Belarus, and the Russian Federation along with the commissioner for transport matters of the European Commission signed in Berlin a memorandum on the development of the Berlin-Warsaw-Minsk-Moscow transport corridor. The memorandum resulted in and was the basis for four railway management to sign an agreement in April 1995 on a co-operation concerning modernisation, reconstruction and development of this railway corridor.

The second modernisation priority is two stretches of the C-E 65 line, namely Warsaw-Grodzisk Mazowiecki-Zawiercie and Zawiercie-Katowice-Zebrzydowice. The former stretch beginning from Grodzisk Mazowiecki to Zawiercie makes up the so called Central Railway Mainline forming, according to the project guidelines, a geometry of the route making it possible for train traffic at the speed of 200-250 km/h. However, a rail line at the speed more than 160 km has to meet certain requirements as far as crossings with road traffic, where they have to be two-levelled. The Central Railway Main Route does not meet these requirements, hence it is necessary to carry out its modernisation in spite of its relative modernity taking into account Polish conditions and time. After the modernisation of the CRMR its assumed target speed of 250 km/h is connected with an idea of applying in Poland trains with deflectable wagon body boxes. The latter shorter priority stretch of the C-E 65 line, after its modernisation up to v = 160 km/h will facilitate a further growth of standard connections of Warsaw with Katowice and Cracow, as well as with international connections in the direction of Prague, Bratislava, Budapest and Vienna.

Another important priority task is a modernisation of the E-59 Wroclaw-Poznan line. It is worth emphasising that Wroclaw, being one of the largest Polish urban agglomerations, in the mid-90's had no favourable rail connection with Warsaw and with the agglomerations of Gdansk and Szczecin. The modernisation of the C-E 20 line combined with this task as well as with a predicted further modernisation of the E-59 line to Szczecin will solve the problems until a missing stretch of E-26 line has been constructed, which has already been mentioned.

2.1.9.3 Programme of road and rail infrastructure development in the Czech Republic

On the basis of the report 'Programme PHARE Assistance into transport sector in the Czech Republic', the information referring to transport infrastructure programmes in the Czech Republic can be cited.

According to the Resolution No 631/695 of the Czech government, the motorway construction is fully financed from the state budget funds.

To provide for a proper technical standard of international E-roads, the Government took a decision to accelerate the implementation of the Rehabilitation Programme of International E-roads amounting to about 170 MECU.

Modernisation of railways:

TEN corridor IV

Part I – the route of (Berlin)-Decin-Prague-Brno-(Vienna/Bratislava), in the length of 476 km, the modernisation started in 1994 and is to be completed by 2000.

Part II – the route of (Katowice)-Ostaca-Breclav-(Vienna), started in 1996 and is to be completed by 2003.

2.1.9.4 Programme of road infrastructure development in Slovakia

In Slovakia a governmental document ‘Development of motorways and international roads in the Slovak Republic territory’ lays out future plans for the country.

The Slovak Government discussed in 1996 the ‘Complex project of preparation and construction of motorways in Slovakia’. The project targeted at an accelerated motorway construction programme established the methodology of solution of key problem areas in motorway construction. According to the programme, completion of the system of Slovak Motorways by the year 2005 – in the total length of 659.4 km – is assumed.

The motorway network in Slovakia approved by the Government is a complex line construction and it is defined as follows:

- ♦ D1 state border Slovakia / the Czech Rep. (Drietoma)-Trencin-Zilina-Poprad-Presov-Kosice-Michalovce-state border Slovakia/Ukraine (Vysne Nemecke), length 390.6 km,
- ♦ D2 state border Slovakia / the Czech Re. (Kuty)-Bratislava-state border Slovakia/Hungary (Rusovce), length 80.1 km,
- ♦ D18 Zilina (Visnove)-Kysucke Nove Mesto-Cadca-state border Slovakia/Poland (Skalite), length 61.0 km,
- ♦ D61 state border Slovakia/Austria (Jarovce)-Bratislava-Trnava-Trencin (D1), length 127.6 km.

2.1.9.5 Programme of road infrastructure development in Hungary

Road infrastructure development on the national road network is co-ordinated by the Ministry for Communication, Transport, and Water Management. The present aims are concentrated into two main directions.

Firstly, the Government approved the ten years programme of the high-speed road network development. In this period (1998-2007) ca. 900 km motorway and expressway will be built, including one or more river crossings, above all through the Danube:

M0 expressway round Budapest, northern and eastern sector,

M2 motorway, Budapest-Vác,

M3 motorway, Gyöngyös- Nyíregyháza,

M3 expressway, Nyíregyháza-Barabás (state border),

M5 motorway, Kiskunfélegyháza-Röszke (state border),

M6 (M56) expressway, Budapest-Szekszárd-Illocska (state border),

M7 motorway, Balatonaliga-Zamárdi,

M7 expressway, Zamárdi-Letenye (state border),

M9 expressway with Danube-bridge between roads No. 54 and 6,

M15 motorway, Mosonmagyaróvár-Rajka (state border),

M30 motorway, Emõd.Miskolc,

M31 expressway, M0-M3,

M43 expressway, M5-Csanádpalota (state border),

M70 expressway, Letenye-Tornyiszentmiklós (state border).

A network plot of the future network is attached in the file '*hun_07_net*' – Annex 4.2.3.2.

In a longer term, until 2030 an additional 670 km motorway and 660 km expressway are proposed to be built. If the proposed sections will be really built according to the planned schedule, the total Hungarian high-speed road network in operation will consist of 1970 km motorway and 1680 km expressway.

On the other hand bypasses will also be built on the main roads round the built up areas, in co-operation with the local governments. The schedule of this programme is highly dependent on the financial ability of the local governments. However there are several well-prepared projects, like the by-pass round Hódmezõvásárhely on the road N^{o} 47, and another one round Abony on the 1st rank road N^{o} 4, which is also used by the international traffic.

2.1.9.6 Programme of rail infrastructure development in Hungary

In consequence of the insufficient maintenance (mentioned in 2.1.3.6) of the railway network there are speed restrictions on the main lines as well. The first and main goal of the network development is to lift these restrictions. Besides this the regular maintenance has to be done (and financed) on the required level. This means 5.3 million HUF/year/km as an average for the whole rail network on 1998 price level. The planned investments are detailed in tables for the national and for the international lines, as well.

2.1.9.7 Programme of other transport infrastructure developments in Hungary

There are two main directions in the development of the Hungarian waterways.

- Upgrading river Danube to the European standards between Budapest and Rajka, and
- Development of - international ports Danube
Tisza
- local importance stopping and loading places
- yacht-harbours for promoting international tourism.

In the case of air transport, no regular domestic flight is expectable. On the other hand several airports will be opened for the irregular domestic and also for the international flights close to the bigger cities and to the Balaton area. Instead of the present Szeged airport, which is difficult to enlarge, a new, higher capacity airport will be built in the triangle of Szeged-Makó-Hódmezõvásárhely.

2.1.9.8 Programme of rail infrastructure development in other CEE countries

In **Croatia** the development concentrates for the renewing of two lines:

- Osijek-Str.Vrpolje,
- Pula-Kantaneri.

In **Romania** the beyond the required maintenance the closest development target is to increase the speed limit to 160 km/h on the (Biharkeresztes)-Oradea-Bucuresti line.

In Slovakia the main development plans are also the increasing of speed limitation to 160km/h on two of the main lines:

- Leopoldov-Zilina-Kosice,
- Bratislava-Sturovo.

In Slovenia the following three lines are planned to be renewed:

- Maribor-Ljubljana,
- Ljubljana-Divacsa,
- Divacsa-Koper;

and one new line is planned to be built:

- Puconci-Hódos.

2.1.10 Forecasts

2.1.10.1 Complex forecast of transport development in Poland

The complex forecast of transport development in Poland was prepared for the Ministry of Transport and with a close co-operation with the Ministry.

The final results of the forecast are available in the attached Excel sheets – *'forecast of trans_Poland.xls'* – Annex 4.2.4. In the attached Excel sheet it is not possible to simulate transport development (what can be done in the original file) – only values are available.

Structure of the model

The model has been drawn up in a multi-factoral way so that it sets the following: desirable quantities of goods in suitable analytical cross sections, number of the fleet, number of companies, number of employment and the most significant explanatory factors (costs per unit, service prices, carriage efficiency, etc.)

To make things less complicated one can present the following formula serving to determine quantities of load carriage through particular modes of transport:

$$T_{ti} = A \times \Delta D \times \Delta T \times \Delta g.$$

where: T_{ti} - volume of goods in tonnes by mode of transport 'i', A - volume of goods in a base year of the forecast,

ΔD - pace of growth of Gross National Product

ΔT - pace of growth of transport absorptive power of Gross National Product

Δg - assessed rate of development rate of a given mode of transport

In the case of forecasting the volume of goods, the above formula is supplemented with an index of changes of average distance of goods characteristics, for a given mode of transport.

In the forecast of load carriages of Polish Foreign Trade the formula of the model, in a simplified way, is of the following form:

$T_{mi} = A * \Delta H * 1/C * \Delta g$

where: T_{mi} - volume of carriages in tonnes by the mode 'i',

A - volume of carriages in a base year of the forecast,

1/C - reciprocity of price of one ton of goods of Polish Foreign Trade in export or import

Δg - assessed rate of development dynamism of a given mode of transport

The volume of passengers requires an application of a more complex model. A starting point of the process is the volume of real incomes of society, and options of its division into transport costs in a suitable structure arrangement (collective transport, individual motorisation, purchase of vehicles, and costs for their maintenance), and prices and unit costs of using particular forms passenger transport. The formula of the model can be, in a simplified way, inscribed in the following manner:

$P_i = D * \Delta R * \Delta T_i/c_i$

where: P_i - passenger carriages 'i' of this mode of transport

D - Gross National Product in a given year,

ΔR - rate of contribution in GDP gross income at the society's disposal

ΔT_i - rate of contribution in GDP gross incomes at the disposal of expenses for a given mode of passenger transport,

c_i - unit costs (prices) of using 'i' - this mode of transport

In the case of individual motorisation, the volume of movements made by passenger cars is a function of options of income divisions for car purchases and its exploitation (fuel and lubricants, repairs, insurance, tolled motorways, etc.).

Possibilities of simulation and creation of new scenarios

A spreadsheet based forecast model allows the user to create any number of scenarios of transport development, based on different options of dynamism of macroeconomic indexes. It also allows to create different options of dynamism of development of transport mode and different estimations of a probable evolution of prices as far as real factors of transport production is concerned as well as transport services. A creation of a unit of interrelated functions in a spreadsheet allows a quick obtaining of a new version of a forecast after a change e.g., in a given period an assumed pace of GNP changes, export or price evolution. Such correlated functions allow the user to calculate many additional data serving to control correctness of proportions and balancing of forecasted quantities. For example, while forecasting international carriages of loads in total as well as the carriages in relation with EU countries, it is possible to output additionally rows of numbers for carriages of loads in relations with other countries.

Factors used in the model

The model of the forecast of goods and passenger movements covers a list of the following factors:

A - GDP change in fixed prices
B – change in exports overall in fixed prices
B1 - rate of change of export in turnovers with EU in fixed prices
C - rate of change of import overall in fixed prices
C1 - rate of change of import in turnovers with EU in fixed prices
D - rate of growth of real income at the disposal
E – changes in demographic development
F - rate of transport absorptive power (tkm per GDP 1 zloty)
G1 - average prices of cargo in export of Polish Foreign Trade overall (zl/t)
G2 - average prices of cargo in import overall (zl/t)
G3 - average prices of cargo in export of Polish Foreign Trade to EU (zl/t)
G4 - average prices of cargo in import of Polish Foreign Trade with EU (zl/t)
H - average distances of cargo carriages within the country
I - average distances of carriages of passengers within the country
J - rate of transport expenses in family budgets
K - rate of expenses for collective transport in transport expenses in families
L - rate of expenses for individual motorisation in transport expenses of families
M1 - average prices of rail transport services (zl/paskm)
M2 - average prices of out-of-town bus transport services (zl/paskm)
M3 - average prices of air transport services (zl/paskm)
M4 - average prices of remaining transport services (zl/paskm)
N1 - average expenses for a purchase of a passenger motor-car (z_/car)
N2 - average expenses for repairs and vehicle lubricants (zl/car)
N3 - average expenses for car repairs (zl/car)
N4 - average remaining expenses for passener motor-cars (zl/car)
O - average filling of a passenger motor-car (number of persons)
P. - average annual mileage of a passenger motor-car (in km)
R - average fuel consumption of passenger motor-cars (l/100km)
S - average price of newly registered passenger motor-cars (zl/car)
T - average price of engine fuel in zl per 1 litre

2.1.10.2 Forecast of Polish foreign trade shipping

On the basis of the data from CIK (Railroad Information Centre), the CIHZ (Foreign Trade Information Centre), and data published by Central Statistical Office, the authors of the prognosis determined the character of the traffic flows by Polish regions of origin/destination.

This research was carried out within the project 'The forecast of the Polish foreign trade carriages, including flows of combined transport'.

The cross-section of prognostic information is based on the following structure:

- By the eleven regions of Poland and twenty four foreign trade partner countries,
- By ten NSTR groups (group 4 and 5 as well as 7 and 8 were aggregated due to the aggregation of source materials for 1994 in road transport,
- By border crossing type – inland (rail and road) and sea,
- In accordance with two scenarios with respect to volume – minimum and maximum.

The forecast was prepared for the base year 1994 and two development scenarios: minimal and maximal for the years 1994-2010. In preparing this projection, efforts were concentrated on the macro-economic indicators for the eleven regions, without taking into account factors which have an impact on changes in the structure of cargoes in Polish foreign trade, changes in geographical foreign trade exchange directions, and the structure of transportation by branch. (Full accounting of these factors could only be possible if data for the past ten to fifteen years were available; this is not possible, however, during this period of economic transformation.) A fixed structure for NSTR merchandise cargo groups and a fixed structure for geographical directions in both export and import has therefore, been assumed.

Two accessible macro-economic factors which have an impact on the volumes of exports and imports have been identified on the regional (voivodship) scale. These are available as GUS data: sold industrial production in fixed 1994 prices, and gross domestic product (GDP) growth for the years 1994-2010 coupled with regional demographic growth. The first factor was assigned a weight of 0.8, the second - 0.2. These assigned weights are fixed for the years 2000, 2005, and 2010, but a simulation may be undertaken on the basis of changing weights during this period. The 1990-1994 period has been taken as the source of input data for industrial production projections. Application of data from the 1985-1994 period would have resulted in negative growth indicators because Polish industrial production for 1994 continued to be lower than that for 1985 (in fixed prices). Even for the 1990-1994 period, the industrial production indicator was negative for certain regions. These values had to be adjusted for the purposes of this forecast by applying expert methods for expected future growth indicators. The industrial production value for individual regions was determined for the years 2000, 2005, and 2010 as a derivative of the following factors:

- Achieved production for the year 1994;
- Gross domestic product dynamics for the years 1994-2010 in line with the minimal and maximal scenario; and
- The proportions of the dynamics of industrial production growth for the given region to industrial production for the whole country.

As a result of the minimal scenario, industrial production for the whole country is predicted to grow by a factor of 1.617 in the year 2000 as compared with the year 1994, the value for the year 2005 is 1.966, while that for the year 2010 is 2.19 (showing a diminishing growth rate). In the maximal scenario, production indicators shall be 1.932, 3.077, and 3.963, respectively. Road and railroad exports and imports were multiplied by the appropriate indicators for the regions, weighed by a factor of 0.8 and increased by demographic growth weighed at 0.2 (consumer import is not dependent on production volume).

The basic quantities in the macro-economic prognosis encompass data regarding the demographic evolution of the regions and the value of sold industrial production. An overall indicator of 1.0 for demographic and industrial production development dynamics was applied in the case of shipments over land borders (developing at the greatest rate recently). For Polish foreign trade turnover through marine border crossings, an indicator of 0.7 - a “slowing down” of the import and export growth rate through seaports - was applied with respect to the demographic and industrial production development dynamics of the country.

In the research 49 voivodships were grouped into 11 following regions. As it was said before, the aggregation is not the same after Polish administrative reform (in force from 1.01.1999). Therefore for the aim of the SCENES project, the study team has prepared an estimation of the flows according to new 16 voivodhips.

The main results of the previous forecast (for 11 regions) are presented in Excel sheets in the annex – ‘*forecast of Polish foreign trade’* – Annex 4.2.4 (only values, without possibility of using the file to simulation – it can be done at original file of the forecast).

In the other attached annex the flows according to new 16 regions are shown – annex ‘*transport_16PL.xls’* – Annex 4.2.6.

2.1.10.3 Forecast of traffic flows on roads in Poland up to the year 2015

Description of the forecast bases

Traffic forecasts on the inter-urban network of national roads up to the year 2015 are the subject of a study prepared by Transprojekt, with a close co-operation with Roads Network Development Planning Office (Warsaw 1997). The forecast consists of the following parts:

- A method of traffic forecast
- Traffic forecast for normal points
- Traffic forecast for the points of extreme dynamism
- Results of the traffic forecast
- The scope of application of the forecast
- A simplified calculation method of traffic forecast on inter-urban roads up to the year 2015
- Input data
- A way of the forecast calculation
- An example of forecast calculation
- Concluding remarks.

The study was made on the basis of measurements of intensity and structure of road traffic being conducted since 1975 on the network of national roads in Poland (especially in the general measurement carried out in 1995). A necessity of an individual approach to the road traffic forecast results from a diversity of growth standards at individual measuring points.

The modernisation of the existing principles was necessary owing to obtaining new data about road traffic coming from a general traffic measurement in 1995, which showed decidedly bigger growth of traffic in the last five-year period 1990-1995 from that forecast assumed in a study in 1992.

The traffic forecast was worked out for the existing network of national roads for the following time horizons: 2000, 2005, 2010, and 2015. The basis of network division into measuring stretches was a list of points of the general traffic measurement in 1995.

For voivodship (before administrative reform – 49 voivodships) roads and for the stretches of national roads where the forecast was not worked out, a simplified calculation method of traffic forecast was drawn up. It refers to any time horizon up to the year 2015 on the basis of currently measuring traffic.

The input materials to the traffic forecast study were the following:

- results of general traffic measurements of the years: 1975, 1980, 1985, 1990 and 1995,
- results of continual traffic measurements conducted since 1975 at stationary points with the use of recorders of such firms as: Fischer-Porter, RPP-2 and Golden River,
- traffic forecast on out-of-town roads up to the year 2010 worked out by "Transprojekt-Warszawa" in 1992,
- statistical data on the number of registered motor vehicles in Poland in the years 1975-1995.

Methodology

According to introductory assumptions defined by The Planning Office of the Development of Road Network, an analysis of trends was used while working out the traffic forecast on out-of-town network of national roads up to the year 2015. The analysis was carried out both individually for particular road stretches (measuring points) and for the whole network of national roads.

The analysis of trends of traffic development at measuring points was carried out in three different periods: 1975-1995, 1980-1995 and 1985-1995. For each of the measuring point, in each of the periods, a regression line of the equation $y = mx + b$ was inscribed, where the year of measurement or forecast was an independent variable.

The forecast does not introduce any limitations as a result of neither road capacity nor the impact of changes in road network. The main source of information is an analysis of road traffic capacity, resulting in the growth at measuring points against the values applied to a group of points with selected uniform features analysed at the same time. On the basis of the analysis of traffic growth, the measuring points were divided into a group of a stable and logical trend and naming them 'normal points' and 'points of unstable trend', where were noticed either a sudden growth or fall at individual measuring periods.

Points with a normal growth

As far as the points of a normal growth are concerned, the forecast is based on a continuation of the trend for the period of 1985-95 using a method of linear regression. Owing to the fact that the values received in this way do not fully reflect the growth dynamism in the period of 1990-95, therefore, additionally, a correction coefficients have been introduced making a result trend obtained in the forecast an extension of the period of 1990-95.

As it was said, it has been accepted provisionally that for normal points the forecast will be calculated on the basis of prolongation of a trend line, while for the points of extreme dynamism - on the basis of average patterns.

With this end in view, for the set of normal points (in the scale of the whole country) it has been:

- calculated average SDR numbers of motor-cars overall in the years 1985, 1990 and 1995,
- inscribed a straight line according to the regression of the period of 1985-1995 and calculated theoretical SDR numbers in the years: 1995, 2000, 2005, 2010, and 2015,
- raised the obtained line simultaneously reaching a conformity with an average SDR in 1995 and worked out new theoretical SDR numbers in the years 2000, 2005, 2010, and 2015,
- inscribed a straight line constituting an extension of the trends of the years 1990-1995 and worked out the SDR numbers in individual years of the forecast,
- worked out correlation coefficients for next time horizons of the forecast as quantity quotients of the traffic which result from an extension of the trend of 1990-1995 as well as the traffic size according to the regression of 1985-1995 reduced to conformity in 1995,
- worked out average growth rates of the traffic in the years 2000, 2005, 2010, and 2015 with reference to 1995 on the basis of an extension line of the trend of 1990-1995.

Points of unstable growth

For these points a forecast has been determined on the basis of a size of base traffic multiplied by an average growth index ascribed to each horizon of the forecast.

The quantities of the coefficients are as follows in Table 47:

Table 47: Coefficient used in the road traffic forecast

Year	Coefficient
1995	1.00
2000	1.32
2005	1.64
2010	1.96
2015	2.28

Results of the forecast:

On the basis of the presented method a traffic forecast for the years 2000, 2005, 2010, 2015 has been calculated for 4412 stretches of roads. The forecast growth in particular five-year periods up to the year 2015 for the whole network of national roads in a functional division is shown in Table 48.

Table 48: Growth rates according to the traffic forecast on an out-of-town network of national roads up to the year 2015

Road network	Growth rates of the traffic in the years:				
	1995-2000	2000-2005	2005-2010	2010-2015	1995-2015
National roads	1.33	1.23	1.19	1.16	2.27
Inter-regional roads, including	1.34	1.23	1.20	1.16	2.29
international roads	1.35	1.24	1.20	1.16	2.33
Regional roads	1.32	1.23	1.19	1.16	2.24

It is worth noting that the forecast has been estimated based on the existing network of national roads, assuming that up to the year 2015 it will undergo no changes. Also it is assumed that no other factors affecting changes in communication behaviour occur, for example, road capacity running low, the opening of new border-points, or the establishment of new large urban centres. Therefore the forecast can be applied for the existing road network as well as for the analysis in the areas where economic development undergoes no essential changes.

Table 49: Road traffic forecast in Poland, vehicle/day

Road stretch	1997	2015 min	2015 max	min growth in%	max growth in %
S3 – Swinoujscie- Goleniow	6,250	13,600	17,000	118%	172%
S3 – Goleniow – Szczecin	10,949	26,400	33,000	141%	201%
S3 – Szczecin – German Border	7,748	15,200	19,000	96%	145%
S5 – Swiecie –Poznan	7,826	25,200	31,500	222%	303%
S5 – Poznan – Wroclaw	8,284	13,600	17,000	64%	105%
S6 – Goleniow – Wejherowo	5,926	8,400	10,500	42%	77%
S6 – Trojmiasto bypass	17,324	26,400	33,000	52%	90%
S7 – Gdansk – Plonsk	8,421	11,200	14,000	33%	66%
S7 – Plonsk – Warsaw	19,636	38,400	48,000	96%	144%
S7 – Warsaw – Radom	16,237	30,400	38,000	87%	134%
S7 - Radom – Krakow	8,776	20,800	26,000	137%	196%
S7 - Krakow – Rabka	13,214	17,500	21,000	32%	59%
S7 - Rabka – Chyzne	3,987	7,200	9,000	81%	126%
S8 - Warsaw – Piotrkow	16,528	21,600	27,000	31%	63%
S10 - Plonsk – Torun	6,338	26,400	33,000	317%	421%
S1,15,94 – Pyrzowice - Zywiec	13,337	32,000	40,000	140%	200%
S1 - Bielsko – Cieszyn	10,171	21,600	27,000	112%	165%
S94 - Zywiec – Zwardon	5,655	12,000	15,000	112%	165%
S9 - Rzeszow – Barwinek	4,255	8,800	11,000	107%	159%
S17 - Warsaw – Lublin – Piaski	10,610	26,400	33,000	149%	211%
S17 - Piaski – Hrebenne	5,699	9,600	12,000	68%	111%
S18 - Warsaw – Bialystok	9,142	20,000	25,000	119%	173%
S18 - Bialystok – Ku_nica	4,289	9,500	12,000	121%	180%
S82 - Piaski - Chelm – Dorohusk	4,122	8,800	11,000	113%	167%
S19 - Budzisko – Bialystok	3,313	6,000	7,500	81%	126%
S19 - Bialystok – Lublin – Rzeszow	4,226	7,000	8,000	66%	89%

The graphic results of the forecast is shown on maps sent by mail and some results are included in annex in the attached file *"TINA_road_Poland"*

The detailed information concerning traffic flows and forecast on specific stretches of road network is presented in annex – '*forecast of road traffic.xls'* – Annex 4.2.3.2.

2.1.10.4 Other forecasts in Poland

The results of other official forecasts are attached in annexe – Annex 4.2.4:

- Excel file '*forecast seaport.xls'* - forecast of turnover in Polish seaports
- Excel file '*forecast of rail transport_Mercer.xls'* - forecast of rail transport development in Poland prepared by Mercer Management Consulting.

2.1.10.5 Forecasts in Hungary

In the SCENARIOS project the Hungarian economic, transport and population data were published for 2005 and for 2020. In this also the estimated length of the road network and the forecasted motorization level can be found.

The trend of the increasing road traffic has been defined for long run in 1998. In this project the figures of increasing are determined by vehicle type and by road category for the NUTS2 regions, and national figures for the high-speed road network (motorways and expressways). These figures were derived from the estimated developments of the population and of the economy (e.g., motorization level, income, GDP) and will become official by the end of 1999.

In connection with different network development plans the long-term traffic forecast is always needed. Also for the above mentioned development plan of the high-speed road network the traffic forecast was made for two periods: for year 2007 and for year 2030.

2.2 Transport operational data

2.2.1 Road

The transport operational data are available in some results of the project carried out in CEE countries. The three projects are cited below:

- the EU project ‘Environmental costs of transport and policies’,
- the PHARE study on the conditions for the progressive integration of the European inland transport markets, and
- the report prepared by the University of Gdansk cyclically in the years 1991-94 (studies carried out every year) on costs in international road transport in Poland.

Fuel costs data for the base year as well as prognosis are available in Polish forecast of transport development in annex in the attached file ‘*forecast of trans_Poland.xls*’ – Annex 4.2.4. Some information on vehicle cost, vehicle occupancy in freight transport and private motorization are also available in the estimations prepared for the aim of SCENES concerning 16 regions in Poland (more information: look annex ‘*transport_16PL*’ – Annex 4.2.6).

Information concerning costs and tariffs in other modes of transport are available in some extent for selected CEEC but they are presented in annexes in the attached files: ‘*air tariff*’, ‘*rail tariff*’, ‘*tariff Baltic ports*’ – Annex 4.2.7.

2.2.1.1 EU project ‘Environmental costs of transport and policies’

In the years 1995-96 some institutes from the CEEC participated in the project “Environmental costs of transport and policies” (Environmental Programme of agreement within the framework of Environmental Programme of EU-DGXII – Co-operation with Central and Eastern European countries).

One of the aims of the project was collecting comparable data on road transport for the base year 1995 as well as prognosis in some cases for three CEEC, i.e. Bulgaria, the Czech Republic, and Poland. The main collected data can be presented in Table 50.

Table 50: Transport data for 1995 in Bulgaria, the Czech Republic and Poland

Country/function	Passenger				Freight	Total
	Car gasoline	Car gasoil	Car LPG	Cars total	Truck gasoil	Cars& trucks
Total vehicle kilometres per year inside country in million vkm						
Bulgaria	12418	181	-	12599	2552	15151
Czech Rep.	23678	2776	1305	27759	4039	31798
Poland	55627	6374	-	62001	14040	76041
Vehicle amount in 1000 vehicles						
Bulgaria	1596	18	-	1614	188	1802
Czech Rep.	2722	319	150	3191	115	3306
Poland	7041	371	-	7412	520	7932
Annual mileage per vehicle in vkm/veh						
Bulgaria	7781	10055	-	7806	13588	-
Czech Rep.	8700	8700	8700	8700	35000	-
Poland	7900	17200	-	-	27000	-
Total person or tonnes kilometres per year in million passenger km or tonnes km						
Bulgaria	33530	471	-	34000	10462	-
Czech Rep.	44988	5274	2474	52741	32313	
Poland	93100	14592	-	107692	87360	-
Annual person/tonne kilometres per vehicle in passenger km / tonne km per vehicle						
Bulgaria	21009	26143	-	21066	55711	-
Czech Rep.16	16530	16530	16530	16530	280000	-
Poland	13222	39374	-	-	168000	-
Persons / tonnes per vehicle (seat occupancy)						
Bulgaria	2.7	2.6	-	-	3.4	-
Czech Rep.	1.9	1.9	1.9	1.9	8.0	-
Poland	1.9	1.9	-	-	6.0	-

* Trucks in Poland without trucks below 3.5 tonnes

2.2.1.2 PHARE Study on the conditions for the progressive integration of the European inland transport markets

In order to present the comparable data referring to fuel prices in the CEEC we used the report prepared in the range of PHARE project 'Study on the conditions for the progressive integration of the European inland transport markets', draft final report, August 1997.

Overall management and coordination of the study was carried out by the Phare Multi-Country Transport Programme bodies (PHARE contract No 96-0822) in close co-operation with DGVII. Coordination was also assured with the ECMT, in particular the Group on the Integration of New Member States. The study has addressed the following objectives:

- to identify and evaluate institutional, legal, financial, commercial and technical barriers which limit the access to the European transport market for EU and CEEC transport operators; and
- to examine means to overcome these barriers and to develop suggestions for a progressive integration of transport markets.

In the Chapter 4 of the report "Preparation of a survey of road user charges in European countries under review", some data concerning transport charges is collected – see Tables 51 - 53 below.

Table 51: Comparison of Diesel –oil prices between CEEC and EU countries – base year 1995

Unit: ECU per litre	CEEC	EU	Ratio: CEEC/EU
Ex-tax price	0.162	0.211	77%
Specific road excise	0.118	0.296	40%
Percentage	72.8%	140.3%	52%
VAT	0.052	0.098	53%
Percentage	18.6%	19.3%	96%
Total price with VAT	0.333	0.605	55%
Price without VAT	0.281	0.507	55.4%

Source: PHARE Study on the conditions for the progressive integration of the European inland transport markets, draft final report. August 1997

Table 52: Comparison of gasoline prices – premium unleaded between CEEC and EU countries, base year 1995

Unit: ECU per litre	CEEC	EU	Ratio: CEEC/EU
Ex-tax price	0.197	0.229	87%
Specific road excise	0.181	0.432	43%
Percentage	91.9%	188.6	48%
VAT	0.065	0.126	52%
Percentage	17.2%	19.1%	90%
Price with VAT	0.443	0.787	56.3%

Source: PHARE Study on the conditions for the progressive integration of the European inland transport markets, draft final report. August 1997

Table 53: Gasoline taxes (premium unleaded in 2nd half 1995 in the CEEC

Ecu per litre	Retail price with VAT	VAT	Excise	Other specific taxes	Ex-tax price
Romania	0.267	0.041	0.025	0.009	0.192
Bulgaria	0.340	0.052	0.131	0.026	0.131
Estonia	0.340	0.052	0.080	0.000	0.208
Poland	0.359	0.065	0.139	0.000	0.156
Lithuania	0.379	0.058	0.080	0.000	0.241
Latvia	0.424	0.065	0.056	0.085	0.219
Slovenia	0.485	n.a.	n.a.	n.a.	n.a.
Slovakia	0.506	0.101	0.195	0.000	0.210
Hungary	0.556	0.111	0.202	0.061	0.181
Czech Rep.	0.568	0.102	0.250	0.000	0.215
Albania	0.677	0.000	0.091	0.381	0.211

Source of the data: Consultant's survey. PHARE Study on the conditions for the progressive integration of the European inland transport markets, draft final report. August 1997

Table 54 below summarises the range of the annual taxes supported by a 40 tonnes truck operating in each CEEC.

Table 54: Total annual taxes in CEEC. Domestic use only. Articulated (40 tonnes – 5 axles) truck

Ecu per year Reference 1995	Annual taxes with VAT	Annul taxes without VAT	Road user charges estimate	Percent net taxes
Lithuania	6.792	2,970	1.593	54%
Latvia	7.727	3.558	1.502	42%
Bulgaria	7.961	4.143	2.370	57%
Estonia	9.536	5.352	2.907	54%
Romania	9.664	5.584	1.622	29%
Albania	10.182	8.272	6.588	80%
Poland	12.322	6.909	3.485	50%
Czech Rep.	18.053	11.630	8.596	74%
Slovakia	18.821	11.731	8.339	71%
Hungary	19.483	12.038	9.122	76%
Average percentage				
Acquisition	48%	38%		
Ownership	3%	6%		
Use	49%	56%		

Source: PHARE Study on the conditions for the progressive integration of the European inland transport markets, draft final report. August 1997

In the report a case study of a 40t – 5 axles standard European truck is presented (for the year 1995). The basic data used to built up the table are:

- Average CIF price for a new truck (when local price was not made available): 115,000ECU
- Annual mileage: 90,000 km
- Average fuel consumption rate: 40 litres for 100 km
- Vehicle life-time: 10 years.

The data concerning car ownership in CEE countries is included in annexes - Excel files '*vehicles*' – Annex 4.2.7. Some data for new Polish voivodships is included in file '*transport_16PL*' – Annex 4.2.6.

2.2.2 Rail

The legal solutions valid in the CEEC do not allow a free setting of all prices by rail enterprises. In most of the countries, general competence of state authorities is applied for price setting for some articles and services, which are of essential impact on maintenance cost and production cost. Therefore, on the basis of certain legal regulations in each country, a given ministry can set tariffs for some transport services.

In Poland, since 1995 the minister of transport has been setting railway tariffs for passenger transport in slow trains as well as prices for coal and iron-ore transport, except for that transport for export. The percentage increases of tariff rates as well as their changes within the year depend on many factors, mainly on macroeconomic indicators in the economy. The rates being set by the minister have the nature of maximal prices.

Since 1995 at the official prices have been sold about 90% of railway passenger transport and about 40% of railway cargo transport. Price controlling by the state should be analysed separately for cargo transport and for passenger transport. Passenger transport prices are regarded as the prices of a vital significance for people's costs of living. It is worth noticing that in 1995 the state authorities freed prices for passenger transport in express and Inter-City trains.

The tariffs for passenger and cargo transport in PKP are shown in the tables in annex '*rail tariff*' – Annex 4.2.7.

As an example of rail tariff in Baltic States, the price of transport 20 container from Tallin to Moscow amounts to ca. 430 ECU. The tariff depends on the type of agreement and volume of cargo[27].

2.2.3 Sea shipping

The amounts of port fares are specified in tariffs in CEE countries. They differ depending on a port and separated for domestic and foreign payers. Some information concerning tariffs in ports of Baltic States, former Soviet Union Republics, i.e., Latvia, Lithuania and Estonia is included in annex '*tariff Baltic ports*' – Annex 4.2.7.

2.2.4 Inland waterway

There is a diversity with reference to fare application for inland-waterway navigation in CEE countries. For example, in Poland cargo tariff of inland waterway navigation was valid only to 1989. Since that time the prices for transport services are of agreed prices and have been set separately by each navigation enterprise on the level justified by the own cost and at the amount regulated by supply and demand.

By 1995 the tariff for rail-sea combined transport found application in inland-waterway transport of cargo. At present in only some instances of this type agreed prices are in force.

2.2.5 Air

Airports tariff prices in air transport cover more than 80% of provided services are of a relation-stretch structure. The fundamental criteria of rate differentiation are the following: comfort and travel-time, distance the route, social, or professional status of a passenger, the scale of service purchase, the aim of the travel.

For detailed data concerning fares in Polish airports, tariffs for landing in Polish airports and tariffs for handling fares - see attached Excel file in Annex 4.2.7 – '*air tariff*'.

Apart from special tariffs, a number of reductions are applied by PLL LOT, for example: children at the age up to 12 years-old (90% or 50%), depending on whether or not they occupy separate seats,

- children at the age-range 2-12 (50%),

[27] UG 1998, Data provided by Russian experts from SCCTP – Scientific Centre of Complex Transport Problems

- teenagers at the age up to 25 (25%) travelling between Poland and Europe,
- students at the age up to 26 travelling from the place of residence to the place of studies (25%),
- the people who turned the age of 60 (25-40%) travelling between Poland and Europe,
- families (for the spouse and the children),
- guides of the groups (50-100% depending on the number of the group),
- seamen,
- diplomats,
- salesmen,
- airline employees,
- groups.

The reduction applying depends on certain conditions, e.g., some reductions cannot be applied in case of some special tariffs.

2.3 Flows

For the modelling on the demand side the volume of the passenger and of the freight flow is required. In case of the passenger model these flows can be deduced by the population and the car ownership data, using the information of mobility surveys.

The demographic data are given as part of the regional data. The mobility surveys will be detailed later. For the freight demand model the population, employment, and other economic data are recorded as a part of the macroeconomic data of the different countries, and partly as a part of the regional data.

The freight flow data were collected in volume and in monetary units. In some cases, the export and import flows are broken down by origin / destination countries, or country groups, but in some other cases only the total national data are available. On the other hand in the case of Yugoslavia, the regional export / import monetary data are also given, but without any further breaking down. The collected data are aggregated in the FLOWxxxx.XLS files, where xxxx are the abbreviations of the names of the countries – Annex 4.2.6. Table 55 below shows the data content of these files.

Table 55: Structure of collected data concerning freight flows

	Natural unit [t]		Monetary unit [ECU, USD, etc.]	
Country	Export	Import	Export	Import
Croatia	Country groups	Country groups	Country groups	Country groups
Czech Republic			Country groups	Country groups
Hungary	Total	Total	Country groups	Country groups
Romania				
Slovakia	Total	Total	Country	Country

	Natural unit [t]		Monetary unit [ECU, USD, etc.]	
Country	Export	Import	Export	Import
Slovenia				
Yugoslavia			Country	Country

Some information concerning national accounts aggregates, employment, population and trade data in Poland for 1994 are included in annex as a base of the forecast of Polish foreign trade shipping – file *'forecast of Polish foreign trade'* – Annex 4.2.4.

Export / import data for new 16 regions in Poland are presented in annex '*transport_16PL'* – Annex 4.2.6.

Some data concerning other CEEC are shown in Annex 4.2.6 '*export_import.xls'*.

2.4 Mobility surveys

Information on the rate of passenger trip making is not available in the CEEC in format used in the West European National Travel Survey. Institutions dealing with tourism in some CEEC collect data on mobility of society for the tourist purposes. It is also worth adding that the definition of tourism used in some CEEC is not always consistent with WTO (World Tourism Organisation) standards. On the other hand it is difficult to find any reliable data concerning mobility of society of all modes of transport. They include all the objectives of mobility for all distances, also covering commuting to work, trips to school, visits to friends etc.

As an example, the data concerning railway sector allows to state, how long is an average distance of one passenger's trip. But it is not possible on this base to assess what is the average distance of rail trip of one citizen within a given country.

The Central Statistical Office in Poland published some data concerning average distance trips and passenger kilometres in rail, air, and public bus transport. The data of private car ownership is not published officially. Nevertheless, some estimates have been made. For the aim of Scenarios project data were collected in co-operation with experts from the Ministry of Transport and data which are not officially published, but they are available in the General Direction of Public Roads and Ministry of Tourism (Urz_d Kultury Fizycznej i Turystyki in Warsaw). The results of the data collection is included in annex '*mobility_pol'* – Annex 4.2.5

It should be mentioned that the data concerns **only tourism traffic** according to the World Tourism Organisation definition.

In 1996 - 1996 a national origin-destination road traffic survey was carried out in Hungary on behalf of the Ministry for Transport, Telecommunication and Water Management. The roadside interviews were done by filling stations by specially trained staff from 8 a.m. to 6 p.m. in three periods of the years. The summer weekday and weekend, furthermore the autumn and spring weekday surveys resulted round 1 million trips for 200,000 vehicles, including the waybill information of lorries for the same periods.

The survey gave information about long distance (rural) traffic, among others on the length distribution of trips, of daily mileage for the different vehicle categories. Mobility (number of daily trips) is also subdivided according to vehicle category and operator, as well as to day type. By the occupation of cars (number of passengers) the trip purpose is an additional classification point of view. Such a survey is repeated once in a decade in Hungary (the results are attached in Excel file "*mobility_hun*" – Annex 4.2.5).

3. LIST OF TABLES:

4. LIST OF ANNEXES

4.1 Annexes - chapter 1

4.1.1 Macroeconomic and social data (countries and regions)

Excel files named *xxx-reg* (xxx - country) and analytical files with comparisons. Each file is dedicated to one country. The structure of sheets is the same in each file. Names of sheets: general information, households, education, labour market, transport, economy, foreign trade. The countries covered in individual spreadsheets are: Bulgaria, Croatia, Czech Republic, Hungary, Poland, Russia, Slovakia, and, Yugoslavia.

4.1.2 Additional macroeconomic data

Word file with the additional data, not included in the database ("*appendix_chapter1*")

4.1.3 Maps of regions

Word file ("*maps_regions*") including regional structure of some CEEC.

4.2 Annexes - chapter 2

4.2.1 Availability of transport data in CEEC

Reports and additional information concerning availability of transport data in the CEEC. Attached in Word files.

4.2.2 Network data in tables

Separate Excel files concerning specific modes of transport and problems:
- road network
- rail network
- airports
- seaports
- inland waterways
- transport volume
- traffic at border crossings.

Each Excel file includes sheets dedicated to specific country.

4.2.3 Transport network on maps

4.2.3.1 Paper maps concerning each mode of transport in Poland.

Road network in Poland

Cartographic presentation - Maps prepared by *TRANSPROJEKT – Designing-Research Roads and Bridges Office* (TRANSPROJEKT Biuro Projektowo–Badawcze Dróg i Mostów).

Map 1 Annual average daily traffic on national road network in 1995
Traffic (number of vehicles per 24 h) with a division:
- annual average daily traffic (all vehicles) in 1995
- percentage of passenger cars
  - ♦ percentage of heavy goods vehicles
  - ♦ percentage of buses.

Map 2 Increase of annual average daily traffic on national road network in 1995
Copy of the original map in A3 sheets
Rate of traffic increase on road links (in comparison to previous year)

Map 3 Character of traffic on national road network in 1995
Copy of the original map in A3 sheets
Annotation of links of a:
- ♦ Economic character of traffic,
- ♦ Touristic character of traffic,
- ♦ Recreational character of traffic.

Maps prepared by *Road Network Development Planning Office* (Biuro Planowania Rozwoju Sieci Drogowej)

Map 4 Master Plan of motorway and expressway network in Poland
Map 5 Motorways, expressways and AGR roads – minimal variant 2015
Map 6 Motorways, expressways and AGR roads – maximum variant 2015
Map 7 Road Paneuropean transport corridors and additional proposals
Map 8 International roads (E) in Poland

III. Maps of road traffic prepared within the TINA project by Ministry of Transport and *Road Network Development Planning Office* (Biuro Planowania Rozwoju Sieci Drogowej)

Within TINA project traffic is presented in AADT pcu/day, i.e. special passenger car unit:
pcu = passenger car x 1;
heavy goods vehicle x 2

bus x 2.

Map 9 The road network 1995 traffic volumes
Map 10 TINA road network 2015 gross traffic forecast, unchanged scenario
Map 11 TINA road network 2015 gross traffic forecast, upgraded scenario

NB – The 'Upgraded' scenario concerns situation of a new traffic generation resulting from new links construction, e.g., motorway development. The 'Unchanged' scenario takes into account only existing at present network.

Rail network in Poland

Cartographic presentation - Maps prepared by the Strategic Planning Office of General Direction of PKP - Polish State Railways (Biuro Planowania Strategicznego przy Dyrekcji Generalnej PKP) and KOLPROJEKT:

Map 12 Freight train flows in the PKP network forecast. Current state (1993)
Map 13 Passenger train flows in the PKP network forecast. Current state (summer 1994)
Map 14 Freight train flows in PKP network. Forecast by 2015 minimum scenario
Map 15 Passenger train flows in PKP network. Forecast by 2015 minimum scenario
Map 16 Freight train flows in PKP network. Forecast by 2015 scenario max
Map 17 Passenger train flows in PKP network. Forecast by 2015 scenario max
Map 18 PKP strategy. Min scenario 2015. Railway lines – speeds
Map 19 PKP strategy. Max scenario 2015. Railway lines – speeds

Maps prepared for the aim of creating modified document of Polish transport policy

Map 20 AGC rail lines in Poland in 1998-06-30
Map 21 AGC rail lines – minimal network in 2015
Map 22 AGC rail lines – maximal network in 2015
Map 23 Combined transport terminals – current situation in 1998
Map 24 AGTC lines in Poland – situation in 1998
Map 25 AGTC lines – minimal network in 2015
Map 26 AGTC lines – maximal network in 2015

Inland waterway network in Poland

Maps prepared for the aim of creating modified document of Polish transport policy
Maps include all links, i.e. routes category V, IV, III and below III.
Map 27 Inland waterway network in Poland in 1998
Map 28 Inland waterway network – minimum variant 2015
Map 29 Inland waterway network – maximum variant 2015

4.2.3.2 Maps on computer files

ROAD NETWORK

Road network in Baltic Republics (Estonia, Latvia, Lithuania)
Road network and road traffic in Estonia - attached in Word file - "*road Estonia"*
Road network and road traffic in Latvia - attached in Word file - "*road Latvia"*
Road network and road traffic in Lithuania - attached in Word file - "*road Lithuania"*

Road network in Russia
Attached in jpg file: "*mapRussia"*
Road Network in Hungary
Road network and traffic in Hungary for 1998 and 2007 respectively, attached in jpg files: "*hun_98_net*", "*hun_98_tra*", "*hun_07_net*", and "*hun_07_tra*".

Road network in Poland
Scheme maps in Word format: AGR network in Poland - current situation - attached in Word file "*AGR Poland",* forecasts in maximal and minimal variants: "*AGR PL 2015min"* and "*AGR PL 2015max".*

The next maps of road network is made in two variants:

a. variant consisted of eleven separate files with parts of map covering 11 parts of Poland – they are included in zip file: "*mappParts1-11"* (in bmp format),
the additional file "*Scheme 1-11"* with location of the individual parts (also in bmp format);

b. variant consisted of joint eleven parts of the country in one whole map (A0 format, very large). The file "*mapAll"* is in jpg format, "*mapAll16"* is in pcx format in 16 colours, and "*MapAll256"* is in pcx format in 256 colours.

Maps prepared for the TINA project:
Attached in Word file:
"TINA_road_PL95"
"TINA_road_Poland" (forecast of road network traffic)

RAIL TRANSPORT

Rail transport in Poland
Group of maps - All files are in jpg format.
The map of Poland consists of two parts: map A (eastern part) and map B (western part)
The list of catalogues:
Passenger 1994:
Passenger rail traffic in 1994 – files: "*map1A"* and "*map1B"*
Freight 1993
Freight rail traffic in 1993 – files: "*map2A"* and "*map2B"*
Freight_forecasts_max2015
Freight rail traffic in 2015, variant maximum – files: "*map3A"* and "*map3B"*
Freight_forecasts_min2015

Freight rail traffic in 2015, variant minimum – files: "*map4A*" and "*map4B*"
Passenger_forecasts_min2015
Passenger rail traffic in 2015, variant minimum – files: "*map5A*" and "*map5B*"
Passenger_forecasts_max2015
Passenger rail traffic in 2015, variant maximum – files: "*map6A*" and "*map6B*"
Speedmax2015
Forecasted speed in maximum variant, 2015 – files: "*map7A*" and "*map 7B*"
Speedmin2015
Forecasted speed in minimum variant, 2015 – files: "*map8A*" and "*map 8B*"
AGC lines in Poland
AGC network current situation - attached in Word file: "*AGC_Poland*"
AGC network forecast, maximum variant - attached in Word file: "*AGC_PL_2015max*"
AGC network forecast, maximum variant - attached in Word file: "*AGC_PL_2015max*"
AGTC lines in Poland
AGTC network current situation - attached in Word file: "*AGTC_PL1998*"
AGTC network forecast, maximum variant - attached in Word file: "*AGTC_PL_2015max*"
AGTC network forecast, maximum variant - attached in Word file: "*AGTC_PL_2015max*"

Rail transport in Hungary
Present railway network in Hungary - jpg file "*Hunrail1",*
AGC network in Hungary - pcx file "*Hunrail2*",

Rail network in Baltic Republics (Estonia, Latvia, Lithuania)
Rail network and rail traffic in Estonia - attached in Word file - "*rail Estonia*"
Rail network and rail traffic in Latvia - attached in Word file - "*rail Latvia*"
Rail network and rail traffic in Lithuania - attached in Word file - "*rail Lithuania*"

Rail transport in Slovenia
Railway network in Slovenia - pcx file "*Slorail*"

COMBINED TRANSPORT

Poland:
Terminals in Poland - current situation, attached in Word file *"comb_PL1998"*
Hungary:
Lines of Hueckepack trains in Hungary - jpg file "*Hunrail3*",
Ro-La lines in Hungary - jpg file "*Hunrail4*",
Combined transport lines in Hungary - pcx file "*Hunrail5*",
Combined terminals in Hungary - pcx file "*Hunrail6*",

INLAND WATERWAYS NETWORK IN POLAND

Inland waterways in Poland, 1998 - attached in Word file: *"inland_PL1998"*
Inland waterways in Poland, 2015, maximum variant - attached in Word file: *"inland_PL2015_max"*
Inland waterways in Poland, 2015, minimum variant - attached in Word file: *"inland_PL2015_min"*

SEAPORTS IN POLAND

Attached in Word file *"seaports_PL1998"*

4.2.4 Annex forecasts

Complex forecast of Polish transport development
attached in Excel file ("*forecast of trans_Poland")*

Forecast of Polish foreign trade carriages
attached in Excel file *("forecast of Polish foreign trade")*

Forecast of road traffic in Poland according to up to the year 2015
attached in Excel file *("forecast of road traffic")*

Forecast of turnover in Polish seaports
attached in Excel file *("forecast of seaports")*

Forecast of rail transport development in Poland according to Mercer Management Consulting
attached in Excel file *("forecast of seaports").*

4.2.5 Annex mobility

Tourist mobility in Poland
attached in Excel file *("mobility_pol")*

Rural (long distance) mobility in Hungary
attached in Excel file *("mobility_hun")*

4.2.6 Annex flows

Export/import flows in the CEEC.
Data attached in Excel files named *flowxxx*, where xxx - country.

Transport data, car ownership, export and import estimated for 16 new Polish voivodships
Attached in Excel file - "*transport_16PL"*

4.2.7 Annex tariff / cost

Cars ownership
attached in Excel file *("vehicles")*

Tariffs in air transport

attached in Excel file *("air tariff")*

Tariffs in rail transport
attached in Excel file *("rail tariff")*

Tariffs in seaports
attached in Excel file *("tariff seaports")*

Fuel prices
attached in Excel file *("fuel prices")*