ECONOMIC COMMISSION FOR EUROPE
Geneva

INLAND TRANSPORT COMMITTEE

Principal Working Party on Inland Water Transport

WHITE PAPER ON TRENDS IN AND DEVELOPMENT OF INLAND NAVIGATION AND ITS INFRASTRUCTURE

UNITED NATIONS
New York and Geneva, 1996

FOREWORD

It was in 1982 when the UN/ECE Principal Working Party on Inland Water Transport considered, for the first time, the preparation of a White Paper on inland navigation. The idea to prepare such a paper was triggered in the course of general discussions on possibilities regarding the development of a coherent navigable waterway network in Europe.

The question came to the fore again at the beginning of the 1990s when the Principal Working Party decided to draw up a White Paper within the framework of a study focusing on the establishment of a network of main European inland waterways of international importance. After the Inland Transport Committee's approval of the project, the secretariat was requested to start preparatory work for the elaboration of the White Paper.

The initial draft of the Paper was prepared in two parts: while the first one covered the area of inland waterway infrastructure and ports, the second one centred on economic and legal aspects of inland navigation.

In view of the overall importance of the White Paper for the drawing up of the European Agreement on Main Inland Waterways of International Importance (AGN), the Principal Working Party analyzed in detail the manifold technical and economic aspects of inland navigation contained in the various chapters of the Paper. In reviewing the various items of the draft, it paid special attention to the significance of the international dimension of inland water transport for the European inland navigation industry.

Subsequent to numerous consultations with Governments and competent international organizations, the Principal Working Party adopted the text of the White Paper in October 1995.

The text of the White Paper on Trends in and Development of Inland Navigation and its Infrastructure as reproduced below does not contain data on technical characteristics of European inland waterways and ports of international importance. The main reason for proceeding in such a way is the fact that the Principal Working Party intends to issue a separate publication ("blue book") which would widely reflect both existing and target technical parameters of European inland waterways and ports of international importance as well as a list of bottlenecks and missing links in the network of E waterways. The "blue book" is expected to be updated regularly and to be developed into a basic instrument for monitoring the progress made in the implementation of the AGN Agreement.

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Chapter I

PRESENT SITUATION OF INLAND NAVIGATION IN EUROPE

(a) Inland navigation performance in individual regions

1. Transport by inland waterways plays an important role in many European countries, especially in international trade. Nevertheless, its development cannot be considered as fully satisfactory, since a share of this mode of transport has in general in recent years been declining as a result, first of all, of a dynamic expansion of road traffic. Furthermore, the volume of cargo transported by inland waterways varies to a very broad extent in different countries. Whilst this volume is more or less substantial in western Europe (especially in the Rhine region), it is disproportionately low in eastern and central European States due mainly to the lack of appropriate inland water transport infrastructure. This difference influences unfavourably the use of inland navigation for servicing the increasing east-west trade.

2. In 1970, some 1.12 billion tons of goods were carried by European inland waterways. In the period from 1980 to 1990, the volume of goods carried annually by European inland waterways showed no essential change, being slightly below 1.3 billion tons (see Table 1 1/). A slight growth previously experienced in the sector thus turned into stagnation. The performance of freight transport dropped from some 300 billion tons-km in 1980 to slightly below 300 billion tons-km at the end of the decade, confirming the trend.

3. In contrast, a substantial increase in cargo flow by inland waterways (in tons) during the period from 1980 to 1990 took place in Belarus (61%), in Finland (91%), in the Netherlands (7%), in the Russian Federation (15.7%) and in the Ukraine (18%).

4. The French inland navigation industry, which was vigorously declining in the first half of the 1980s, increased its output in the second half, even though the amount of goods carried in 1990 only attained 72% of the 1980 level.

5. The performance of Poland's inland navigation has drastically decreased, only 45% of the 1980 amount of cargoes being carried in 1990. The situation is similar for the inland navigation sector of the United Kingdom.

6. The most drastic fall in the output of the inland navigation sector occurred in Central and Eastern European countries in the early 1990s with the advent of a transition to market economy carried out in most of them. Thus, the decrease of the volume of goods carried by inland waterways amounted to: in Austria -20.0% (1990-1993); in Bulgaria -52.3% (1991-1992); in the Czech Republic, -39.0% (1990-1992); in Hungary -48.0% (1990-1993); in Moldova -89% (1990-1992); in Romania -30% (1990-1991); in the Russian Federation -60.2% (1990-1993); in Slovakia -51.0% (1990-1993); and in the Ukraine -61.0%(1990-1993). This down-fall trend continued in 1994.

7. The modal split shows large variations throughout Europe (see Table 2). A share of inland navigation, in tons of goods transported, is below 1% in Finland, Poland, Romania and Ukraine where it plays a marginal role and is quite considerable in the Netherlands, Germany, Belgium and Yugoslavia.

8. At the same time, according to a study carried out in 1990 within the European Conference of Ministers of Transport (ECMT) 2/, from 1970 to 1990 the road transport performance in ECMT member countries more than doubled, while railway and inland water transport stagnated or even decreased.

1/ Tables and graphs appear in the annex to this paper.

2/ Report: "Inland waterway transport in ECMT countries to the year 2000: a new dimension".

9. For countries in transition such as the former Czechoslovakia, Hungary and Poland, the situation in the transport sector was essentially similar to that within the ECMT. There was, however, an important difference: the initial increase in railway and inland navigation output observed in the 1980s was followed by an abrupt and definite fall in the early 1990s.

10. Table 3 represents the impact of the above processes on the modal split. The global increase of road transport performance in ECMT countries (expressed in tons-km) reached 88% of total inland transport performance between 1970 and 1991. In the same period, railway and water transport experienced a decrease of 45% and 39%, respectively. In transition countries, doubling in the share of road transport occurred while railway transport declined and inland navigation in general maintained its position.

11. An analysis of the role of inland navigation in member countries of the European Union shows a clear distinction between tonnage carried by inland waterways in domestic and international trade (Table 4). Inland navigation has a very modest share in domestic inland transport operations (3.5% in tons-km performed in 1988), while 38.5% of international intra-Community traffic in tons is carried out by inland waterways. This share rises further to 46.3% in the volume of traffic between the European Union and third countries. This international aspect of inland navigation is all the more remarkable considering that, while all 15 member countries possess a dense rail and road network, only 6 of them have a well developed network of inland waterways.

12. On a large scale, after World War II, two important inland navigation markets were set up in Europe: on the Rhine and on the Danube (Figures 1 and 2).

13. The development of navigation on the Danube during the period from 1950 to 1980, in particular, represents an outstanding phenomenon with almost a tenfold increase in the amount of goods transported on this river. The momentum has been lost, however, after the recent drastic political and economic changes which have taken place in Central and Eastern European countries. Civil war in the former Yugoslavia brought the traffic on the Danube practically to a standstill. Remarkably, despite a decrease of 52% in the amount of goods transported in the period from 1980 to 1991, the performance in tons-km was all but maintained - evidence of the important international dimension of the navigation on the Danube.

14. The diagram of goods traffic on the Rhine resembles a curve of saturation in which the sharp moderation of the rate of growth appears at the turn of the 1960s.

15. The structure of traffic by inland waterways can be seen on Figure 3, depicting the breakdown by category of goods, the tonnage carried on the international rivers: Rhine, Danube and Moselle as well as on the Rhône and on the inland waterways of Finland, France, Germany, Italy, Luxembourg, Poland, the Russian Federation and Ukraine.

16. Transport by inland waterways of building materials of mineral origin is very important in the Russian Federation and the Ukraine, important on the Rhine and low on the Moselle. The share of transport of this material on the Danube is much higher than on the Rhine. This category of cargo consists mainly of gravel and sand.

17. The transport of metallurgical raw materials is important on the Moselle, Danube, Rhine, and on German inland waterways. These cargoes are of a marginal significance for inland water transport on the Rhône and in the Russian Federation.

18. Transport of crude oil, oil products and chemicals is quite important on the Rhine and on the Rhône, as well as on French inland waterways, highlighting the role of inland navigation in the transport of dangerous goods.

19. Agricultural products and foodstuffs are well represented in the structure of inland water transport in France, Germany and Luxembourg and total more than a quarter of goods transported on the Moselle. Timber dominates among the goods transported by Finnish inland waterways.

20. The traffic load of European inland waterways (total volume of goods traffic divided by the total length of inland waterways in tons/km) represents an extraordinary pattern (Figure 4). Countries where inland waterways are used the most are Belgium, the Netherlands and Germany. Despite the significant total performance of inland water transport in the Russian Federation, the traffic load of Russian inland waterways remains extremely low.

21. Referring to the traffic load of individual waterways, that of the Rhine is outstanding, being more than tenfold higher than the traffic load of the Danube. Bearing in mind the capacity of the Danube and the actual traffic flow, it becomes evident that the Danube is highly under-used.

22. Generally, on inland waterways open for international traffic, vessels flying foreign flags carry a considerable volume of cargoes and sometimes even dominate over the home-flag vessels (see Table 5 and Figure 5). The opposite tendency has developed, however, on the section of the Elbe crossing the territory of the Czech Republic as a consequence of unfavourable navigation conditions, which do not allow the use on this section of standard barges of Europe II type.

(b) **Inland navigation fleets**

23. A fleet of inland navigation vessels of European countries comprises more than 38,400 units, with a carrying capacity of some 28 million tons (Table 6).

24. In the last decade, some European countries have perceptibly enlarged their inland navigation fleets. The former Czechoslovakia increased its fleet by 59.4% from 1980 to 1991. In the same period, the tonnage of the Romanian fleet increased by 28.2%, that of the Netherlands (1980 to 1990) by 20.3% and of Austria by 6.3%.

25. An opposite tendency can be seen in France, whose inland navigation fleet shrunk by 32.2% of its carrying capacity from 1980 to 1991 and in Germany by 16.8% from 1980 to 1990.

26. Figure 6 shows the dramatic increase in the Danube inland navigation fleet from 1965 to 1990 with a global tonnage increase of 119%. In the same period, the Rhine fleet increased only slightly by approximately 5%. The combined fleets of the Rhine riparian countries showed a loss of 15.8% in tonnage during the period from 1970 to 1989.

27. Both the Rhine and the Danube fleets are unevenly distributed among the riparian countries (Figure 7). More than half of the Rhine tonnage belongs to the Netherlands, more than a quarter to Germany, with the fleets of Belgium, France and Switzerland sharing the rest. On the Danube, it is Romania that possesses the highest amount of tonnage (33.8%) with the Ukrainian fleet amounting to slightly above a quarter of the whole Danubian fleet. The remaining half is divided among Bulgaria, Slovakia, Hungary and Austria. The presence of Germany on the Danube has, so far, been negligible.

28. It can be stated for, both the Rhine and the Danube, that countries lying near the mouth of the river possess about a half of the carrying capacity of the river fleet.

29. Figure 8 shows a noticeable difference in the breakdown of the Rhine and Danube fleets by vessel type. Vessels for carriage of liquid bulk cargoes represent an important part of the Rhine fleet. A total tonnage of such self-propelled and pushed-type vessels represented in 1990 not less than 17.3% of the Rhine fleet. The proportion of units for carriage of liquid bulk cargo on

the Danube represents less than 10% of the river's fleet, even though these units are in general suitable for the transport of both dry and liquid cargo.

30. The breakdown of the Danube fleet by tonnage shows that almost three quarters of the vessels fall in the range of 1,000 to 3,000 tons of carrying capacity. Within this group, one third belongs to vessels of the 1,500 to 2,000 tons (Table 7). The second largest part of tonnage of the Danubian fleet falls in the 1,000 to 1,499 tons range. The Danubian fleets of the Austria, Bulgaria, Germany, Romania, Slovakia and the Ukraine possess vessels of increased size while Hungary and Yugoslavia are in possession of a considerable fleet of vessels of a lower tonnage. More than 40% of the entire Danube fleet is suitable for navigation on the Main-Danube canal with regard to the dimension of vessels and barges.

31. The breakdown of the Rhine fleet by tonnage shows, in comparison with the Danube fleet, a slight tendency towards a lower average tonnage of vessels. The tonnage of more than a third of the Rhine fleet of vessels does not reach a carrying capacity of 1,000 tons, and the vessels ranging from 1,000 to 3,000 tons, represent only 57% of the Rhine fleet.

32. The French Rhine fleet's average carrying capacity is significantly higher than that of the general French fleet, even though one third of the French Rhine vessels are under 1,500 tons carrying capacity. However, vessels of the French general fleet of a smaller tonnage which have the appropriate authorization sometimes navigate on the Rhine. A noticeable number of small vessels can also be found in the Belgian fleet.

33. The breakdown of vessels' tonnage on the Danube and on the Rhine can be seen on Figure 9. The majority of tonnage belongs in general to the higher categories. However, the tonnage is influenced by a waterway's parameters which can allow the use of vessels up to a given size. Disregarding the Russian Federation, the characteristic size of river vessels in Europe lies between 1,500 and 3,000 tons of carrying capacity.

34. There is a considerable difference between the methods of navigation used on the Rhine and on the Danube (Table 8). Towing by line has disappeared on the Rhine. Three-quarters of the Rhine tonnage consists of self-propelled vessels. On the Danube, push-towing has developed in the last decade, but so far has not been able to entirely replace towing by line; the share of vessels' tonnage intended for towing by line still exceeds a quarter of the total Danubian tonnage. Push-towing has become predominant on the Danube with a share of 63%, while the share of self-propelled vessels remains extremely low at about 10% of the total fleet tonnage. In total, not more than 53 self-propelled vessels on the Danube fell into the range of 1,500 to 2,000 tons in 1991.

35. On both the Rhine and the Danube, a general trend of increased vessels tonnage can be seen in Table 9. From 1965 to 1990, the average tonnage of self-propelled vessels on the Rhine increased by 58%, that of pushed-barges by 165%, and of the entire Rhine fleet by 66%. The average tonnage of self-propelled vessels on the Danube increased by 31%, of pushed-barges by 61%, and of the total fleet by 60%. The average tonnage of self-propelled vessels on the Danube was in 1990 36% higher than that of the Rhine. The ratio is the opposite for non-self-propelled vessels where the average tonnage of the Rhine fleet exceeds by 64% the average tonnage of the Danubian fleet of that kind.

36. The number of inland navigation businesses in EU member countries in 1987 was over ten thousand, with 95% of them operating only 1 to 2 vessels (Table 10). Small navigation businesses thus represent the backbone of the western-European inland navigation industry and their share seems to be stable in the long term.

37. A totally different business structure has developed in the Danubian basin in countries of central and eastern Europe. These countries usually had a single State-owned shipping company, possessing a large fleet of vessels operating on a certain waterway or a system of waterways. Every riparian country had its own inland navigation company on the Danube, enjoying either

exclusive or predominant monopolistic advantages in the domestic and foreign trade of a particular country. This business structure remains in general unchanged in most of the Danube riparian countries, although efforts are being made to turn them into smaller share-holding entities.

Chapter II

REGIME OF NAVIGATION ON EUROPEAN INLAND WATERWAYS AND ACCESS TO MARKET

38. The term "regime of navigation" used in this paper covers legal, technical and safety requirements to be met by an inland navigation carrier in order to be able to render transport services on inland waterways.

(a) Legal regimes

(i) Public law

39. From the point of view of public river law, European inland waterways can be divided into two categories: international waterways and national waterways. Since the White Paper is mainly focused on international aspects of inland navigation it seems appropriate to start by presenting the provisions relating to international waterways.

International waterways

40. The main principles of international public river law were laid down by the Vienna Congress of 1815. Articles CV - CXVII of the Final Act of the Vienna Congress contained provisions of a general character to serve as a basis for the development of conventions on the navigation of international rivers. It decrees that the navigation on any section of the river, from the point it becomes navigable to the mouth, is open for commercial shipping.

41. The Mainz Convention, concluded in 1831, was the first to regulate the navigation on the Rhine. It was followed by the 1868 Mannheim_Convention for the navigation of the Rhine which, as amended by a number of later conventions and additional protocols, continues to be in effect. Parties to the Mannheim Convention are: Belgium, France, Germany, Netherlands, Switzerland and the United Kingdom. The Central Commission for the Navigation of the Rhine (CCNR) was established in accordance with the Convention. The United Kingdom ceased to participate in the work of the Commission on 1 January 1994, although it continues to be a Contracting Party to the Mannheim Convention.

42. The European Danube Commission, responsible for the navigation in the delta of the Danube, was established following the 1856 Paris Peace Treaty which closed the Crimean War. It was in effect until World War II. Following the 1918 Versailles Treaty, the Paris Convention of 1921 governed the international regime of the Danube from Ulm to the mouth. The regime was extended to certain sections of the Drava and Tisza rivers. In accordance with this Convention, in which the riparian countries and the victorious powers of World War I took part, an International Danube Commission was established with the authority for the section of the Danube from Ulm to Braila. Following World War II, in 1948 in Belgrade, riparian countries of the Danube concluded the Convention on the regime of navigation on the Danube, still in force today. The Belgrade Convention was signed by the former Soviet Union, the former Czechoslovakia, the former Yugoslavia, Bulgaria, Hungary, Romania and Ukraine and was joined in 1960 by Austria. With the disintegration of the Soviet Union, Czechoslovakia and Yugoslavia, the list of Danubian riparian countries has changed. This, together with the unclear

status of Germany 3/ and of the Russian Federation 4/ at the Danube Commission, induced member countries in 1993 to initiate the preparation of a Diplomatic Conference on Questions of Danubian Cooperation, having as an objective the revision of the Belgrade Convention, with due regard to the present Danubian political and economic situation.

The Rhine

43. The Mannheim Convention governs the navigation on the Rhine, Lek and Waal from the mouth to Basel, ensuring the exemption of vessels from fees and providing for complete freedom of navigation for that section of the river. The Convention also introduces the term "vessels belonging to Rhine navigation". These are vessels which have the right to fly the flag of one of the Contracting States of the Mannheim Convention and which are allowed to choose optional routes through the Netherlands or Belgium, on their way towards the sea.

44. Adopted in 1979, the Additional Protocol No. 2 to the Mannheim Convention extended the right of vessels belonging to Rhine navigation to vessels flying the flag of any member State of the European Community. The entry into force in 1985 of this Protocol modified the regime of navigation of the Rhine.

45. Thus, only vessels belonging to the Rhine navigation are currently authorized to transport merchandise and persons between two ports situated on the Rhine and its tributaries. Other vessels may receive such authorization only under conditions laid down by the CCNR. For vessels not belonging to Rhine navigation, the transport of merchandise and persons between a point on the Rhine and its tributaries and a point situated in the territory of a third State may only be allowed under conditions laid down in bilateral agreements which are to be concluded between the Parties concerned (Article 5 of the Convention as amended by Additional Protocol No. 2, see document TRANS/SC.3/R.158/Add.4).

46. Resolutions adopted unanimously by the CCNR are binding, while those adopted by a majority constitute recommendations.

The Danube

47. Article 1 of the Belgrade Convention declares that the Danube "is free and open for the nationals, merchant vessels and goods of all States, on a footing of equality in regard to port and navigation dues and conditions for merchant shipping ... except for traffic between ports of one and the same riparian State" (Articles 1 and 25 of the Belgrade Convention, see document TRANS/SC.3/R.158/Add.2.)

48. The Belgrade Convention defines details of commitments by States Parties on the maintenance and development of the navigational channel, as well as on defraying the relevant costs.

49. The decisions of the Danube Commission are of a recommendatory character only and are not therefore binding to its member Governments.

The Moselle

3/ Germany is not a Contracting Party to the Belgrade Convention but, being a Danube riparian country, is subject to the provisions of the Convention.

4/ The Russian Federation is no longer a Danube riparian State but, as a successor to the USSR which signed the Belgrade Convention in 1948, continues to be a member of the Danube Commission.

50. In 1956, France, Germany and Luxembourg concluded a Convention on the canalization of the Moselle. The Moselle Commission was established in accordance with this Convention with Trèves as the seat. The Moselle Convention guarantees free navigation for international transport from the river's confluence with the Rhine to as far as Metz. The Moselle regime follows that of the Rhine since, according to the Moselle Convention "in the event of a change to the existing regime for the Rhine, the Contracting States shall consult with a view to extending to the Moselle the new regime applicable on the Rhine, amended as necessary" (see articles 29 and 30 of the Moselle Convention, document TRANS/SC.3/R.158/Add 3).

National waterways

51. In addition to the above-mentioned multilateral international instruments bearing on the regime of European international inland waterways, a number of bilateral agreements on inland navigation have been concluded by European countries concerning their national inland waterways. Agreements concluded by Germany and Danube riparian countries are of particular importance, especially after the opening in September 1992 of the Rhine-Main-Danube waterway.

52. The above bilateral agreements have much in common regarding their content. They are based on the following principles:

(i) The reciprocal use of inland waterways of two countries by their vessels for the carriage of persons and goods and for transit is permitted, without any additional authorization; equal participation of shipping companies of both sides in their bilateral trade should be assured;
(ii) Transport of goods and passengers by vessels of one Party between ports of the other Party and a third country, as well as cabotage on the territory of the other Party, are subject to authorization by the competent authorities and are supervised on both sides;
(iii) Navigation is performed according to the regulations of the country on whose waterway it takes place. Reciprocal recognition of ship's and crew's papers is possible only if regulations currently in force on inland navigation so allows;
(iv) Ships of both Parties are guaranteed the same treatment while on the territory of each Contracting Party;
(v) Such bilateral Agreements do not interfere with the rights and duties on both sides resulting from other existing agreements and conventions.

53. The regime of navigation on national inland waterways was further modified by action taken by the European Community. Within the territory of its member countries, the freedom of cabotage by inland waterways has been introduced for Community carriers since 1 January 1995.

54. Faced with the diversification of the rules governing inland waterway traffic between the Member States and countries of central and eastern Europe, the European Community had begun to develop a common external relations policy regarding inland navigation. Consequently, following the Council's decision of 7 December 1992, which gave the European Commission a mandate to negotiate an agreement, on behalf of the Member States, with third-party countries concerning the rules applicable to the transport of passengers and goods by inland water transport, negotiations have been initiated between the European Commission, on the one side, and countries of Central Europe (Czech Republic, Hungary, Poland, and Slovakia) on the other.

55. It should also be noted that inland waterways of the Russian Federation and other countries members of the Commonwealth of Independent States (CIS) remain closed so far for international shipping with the exception of the Ukraine, where the Government decided in 1992 to open inland waterways to international navigation on the basis of bilateral agreements. The first such agreement has been concluded with Germany.

56. In Russia, a study was carried out in 1991 on the regulations and conditions that would be needed for navigation of foreign vessels on Russian

inland waterways. The study showed that the organization of international navigation on Russian inland waterways would require a rather lengthy preparatory period to solve a number of organizational, economic and financial problems. At the same time inter-ministerial agreements were recently concluded between the Russian Federation on the one hand and Lithuania and Kazakstan on the other, on cooperation in the field of inland water transport which lay down conditions for the transport by inland navigation vessels of passengers and goods between two countries concerned. Further agreements are being prepared with the Ukraine and Poland on inland navigation matters.

(ii) Private law

57. A number of international conventions of a private law nature have been elaborated within the UN/ECE with a view to facilitating international inland water transport operations and minimizing the risks of carriers. They are as follows:

Convention relating to the Unification of Certain Rules concerning Collision in Inland Navigation, of 1960

58. This Convention governs the compensation for damage caused by a collision between vessels of inland navigation either to the vessels or to persons or objects on board in the waters of one of the Contracting Parties. It also governs compensation for any damage caused by a vessel of inland navigation in the waters of one of the Contracting Parties, either to other vessels of inland navigation or to persons or objects on board such other vessels, through the carrying out of, or failure to carry out a manoeuvre, or through failure to comply with regulations, even if no collision has taken place. It came into force in 1966 and 10 European countries are Parties to this Convention.

Convention on the Registration of Inland Navigation Vessels, of 1965

59. This Convention lays down the conditions for registration of inland navigation vessels, for the transfer of a vessel from the register of one Contracting Party to the register of another Contracting Party and for the cancellation of a registration. Two Protocols are annexed to this Convention: Protocol No.1 concerning the Rights in rem in Inland Navigation Vessels and Protocol No.2 concerning Attachment and Forced Sale of Inland Navigation Vessel. The Convention has been in force since 1982 and has been ratified by 6 European countries.

Convention on the Measurement of Inland Navigation Vessels, of 1966

60. This Convention provides for a procedure of measurement of inland navigation vessels as well as the modality of certificates to be issued by measurement offices designated in the territory of each Contracting Party. The measurement of a vessel is designed to determine its maximum permissible displacement and, where necessary, its displacements corresponding to given waterlines. The measurement of vessels intended for the carriage of goods may also have the purpose of enabling the weight of the cargo to be determined from the vessel's draught. The Convention entered into force in 1975 and 12 European countries are Contracting Parties to it.

Convention relating to the Limitation of the Liability of Owners of Inland Navigation Vessels (CLN), of 1973, as amended by the Protocol of 1978

61. This international instrument is intended to allow the owner of an inland navigation vessel to limit his/her liability in respect of certain claims by constituting, before the competent authority of a Contracting Party, limitation funds of amounts stipulated by the Convention. Three kinds of funds are provided for in the CLN: (a) for damage to goods, (b) for damage to the environment, and (c) for damage to persons. The Convention never came into force because it had been ratified by only one State.

62. The CLN Convention having become outdated before entering into force, the UN/ECE Inland Transport Committee, at its fifty-second session in February

1990, agreed on the need for developing a new legal regime for the limitation of the liability of owners of inland navigation vessels on a Europe-wide basis. Two alternatives for arriving at the new legal regime are currently under consideration: either the accession of States not members of the CCNR to the Convention on the Limitation of Liability of Owners of Inland Navigation Vessels (CLNI) 5/ elaborated in the framework of the CCNR or the drawing up of a new Pan-European instrument on the basis of the CLNI.

Convention on the Contract for the International Carriage of Passengers and Luggage by Inland Waterway (CVN), of 1976, as amended by the Protocol of 1978

63. The Convention provides for liability of the carrier for the damage caused to the passenger or his/her luggage and lays down limits to such a liability. It applies to every contract for the carriage of passengers and their luggage by inland waterway when, under the terms of the contract, the carriage is to be effected on the waters of at least two States and when the place of embarkation or the place of disembarkation or both are situated in the territory of a Contracting State. The provisions of the Convention are applied even if the vessel used is not an inland navigation vessel and regardless of the flag, the registration of the vessel and the place of residence or the nationality of the Parties. The Convention has been acceded to by one country and is therefore not yet in force.

Convention on Civil Liability for Damage caused during Carriage of Dangerous Goods by Road, Rail and Inland Navigation Vessels (CRTD), of 1989

64. The Convention provides for liability of the carrier in the case of loss of life or personal injury, loss or damage to property or to the environment caused by the carriage of dangerous goods on board a transport vehicle. It also provides for limitation of the above liability and stipulates that the carrier's liability is to be a subject of a compulsory insurance or other financial security. The CRTD Convention has so far only been signed by one European country and therefore has not yet come into force. The high cost of compulsory insurance required by this instrument for inland navigation operators engaged in transport of dangerous goods is mentioned as its major shortcoming although the limits of liability of an inland navigation operator stipulated by the Convention are nearly two times lower than those of road and railway carriers 6/.

Draft Convention on the Contract for the Carriage of Goods by Inland Waterways (CMN)

65. Provisions concerning the contract for international carriage of goods by inland waterways exist so far only in the form of rules elaborated by shipping companies. On the Rhine these are, in particular, the Verlade-und-Transportbedingungen (VTB-the shipping and transport conditions, see document TRANS/SC.3/R.157/Add.3). Danubian shipping companies concluded in 1955 the so-called Bratislava Agreements which included:

- Agreement on General Conditions for the International Carriage of Goods on the River Danube of 1955 as amended in 1989 (see document TRANS/SC.3/R.157); and
- Agreement on International Carriage of High-cube Containers on the River Danube of 1984 (see document TRANS/SC.3/R.157/Add.2).

5/ This Convention has not yet entered into force. On 26 October 1995 only Luxembourg was a Contracting Party to the CLNI.

6/ The matter is currently being studied by the CCNR Committee on River Law which is inclined to suggest a provisional arrangement based on the limits of shipowner's liability stipulated by the CLNI Convention.

66. The situation is different, however, as far as other modes of transport are concerned where the following legal instruments exist governing the contractual liability of carriers:

- Convention on the Contract for the International Carriage of Goods by Road (CMR), of 1956, as amended by the Protocol of 1978;
- Uniform Rules relating to the International Carriage of Goods by Rail (RU-CIM)(Appendix B to the COTIF Convention, of 1980);
- United Nations Convention on the Carriage of Goods by Sea (Hamburg Rules), of 1978;
- Convention for the Unification of Certain Rules relating to International Carriage by Air (Warsaw Convention), of 1929, as amended by the Protocol of The Hague of 1955;
- United Nations Convention on International Multimodal Transport of Goods, of 1980 (not yet in force).

67. An attempt to establish an intergovernmental instrument on this subject was made within UN/ECE where a draft Convention on the Contract for the Carriage of Goods by Inland Waterways (CMN) was elaborated in 1959 by the Working Party on River Law with the help of the International Institute for the Unification of Private Law (UNIDROIT). The draft was never adopted, however, because of divergent views among some UN/ECE member countries regarding provisions on the "nautical fault" exception 7/.

(b) **Technical and safety requirements in inland navigation**

68. The regime of navigation on European inland waterways is also governed by national or international legislative provisions concerning inter alia, (i) rules of the road (police regulations); (ii) construction of inland navigation vessels (survey regulations); (iii) boatmaster's licences; (iv) prevention of pollution from vessels; and (v) rules for the carriage of dangerous goods.

Rules of the road

69. The unification of the rules of the road in inland navigation was crowned by the adopting within UN/ECE in 1982 of the "Signs and Signals on Inland Waterways" (SIGNI) and in 1985 of the "European Code for Inland Waterways" (CEVNI). Both these instruments exist as recommendations of the UN/ECE Principal Working Party on Inland Water Transport. They are regularly amended in order to take account of new developments in inland navigation and the experience gained in their application. The CCNR and its member Governments made a significant contribution to the elaboration of SIGNI and CEVNI. The provisions of these two sets of regulations are, therefore, in general similar to those of the Police Regulations in force on the Rhine and had been used as a basis for the elaboration within the Danube Commission of their "Basic Provisions relating to Navigation on the Danube" (DFND) of 1990. The provisions of the SIGNI and CEVNI are, however, only partly applied by the Russian Federation, planned to be applied by the Republic of Moldova and Poland and not applied by a number of countries whose inland waterways can only be reached by sea-river vessels.

Construction of inland navigation vessels

70. Provisions concerning the requirements for the construction of inland navigation vessels have been equally unified within UN/ECE where the Recommendations on Technical Requirements for Inland Navigation Vessels were adopted in 1975 and revised in 1981. In 1982 the Council of the European

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7/ Consideration is currently being given on the initiative of the CCNR to a new draft Convention (CMNI) submitted by the Association for European Inland Navigation and Waterways (VBW), drafted mainly along the lines of the Convention of 1924 for the Unification of Certain Rules relating to Bills of Lading (Brussels Convention).

Community adopted a Directive 82/714/EEC concerning Technical Requirements for Inland Waterway Vessels (currently under revision).

71. In 1992 the Danube Commission decided to apply the UN/ECE Recommendations as minimum unified technical requirements for inland navigation vessels (both national and foreign) navigating on the Danube. On the Rhine a revised version of the CCNR Regulations for the Inspection of Vessels entered into force on 1 January 1995.

72. The existence in Europe of different sets of regulations on technical requirements for inland navigation vessels, complemented with different national legislation in this regard, has so far thwarted the efforts in arriving at reciprocal recognition throughout Europe of national ship's certificates without an additional survey of foreign vessels. The 1992 UN/ECE resolution No. 33 on Ship's Certificate only provides for partial recognition of certificates issued as an evidence that the vessel complies with the UN/ECE Recommendations and stipulates that the "technical inspection of the vessel may be wholly or partly dispensed with, in so far as regulations in force so permit". The above quotation of resolution No. 33 makes believe that even a partial recognition of ship's certificates may not necessarily be applied universally throughout Europe. It may not, in particular, be applied on the Rhine since article 22 of the Mannheim Convention stipulates that every vessel coming to this river must obtain a certificate at one of the Rhine riparian States.

73. The Danube Commission in 1993 adopted the new unified UN/ECE Ship's Certificate as a model to be issued to vessels navigating on the Danube.

74. In order to eventually arrive at a full reciprocal recognition of ship's certificates, the UN/ECE Inland Transport Committee, at its fifty-fifth session, in 1992 agreed to undertake the updating of the Recommendations on Technical Requirements for Inland Navigation Vessels, together with the unification of procedures and rules for the survey of inland navigation vessels.

Boatmaster's licences

75. In 1992 within UN/ECE a resolution No. 31 was adopted concerning the Recommendations on Minimum Requirements for the Issuance of Boatmaster's Licences in Inland Navigation with a view to their Reciprocal Recognition for International Traffic. This was a major step forward in unifying provisions on this subject although the resolution again falls short of full reciprocal recognition of boatmaster's certificates issued by national competent authorities.

76. The Danube Commission and CCNR are about to unify their provisions relating to the issuance and content of a boatmaster certificate. The exercise, however, is not to provide for automatic recognition, for the time being, by the Rhine riparian States and Belgium of certificates issued by countries not members of CCNR, since article 1 of the Convention of 14 December 1922 regarding Rhine boatmaster's certificates stipulates that "only the holder of a Rhine boatmaster's certificate issued by the competent authority of one of the Contracting States shall have the right to operate a vessel on the Rhine". Within the Danube Commission it was agreed, however, that its member Governments would recognize boatmaster's certificates issued by third States subject to the obtaining by their holders of practical experience in navigating particular sections of the Danube.

Prevention of pollution from vessels

77. In order to prevent any discharge of polluting substances by inland navigation vessels, the Recommendations for the control of water pollution by inland navigation vessels (Annexes I and II to UN/ECE resolution No. 21) were adopted in 1982.

78. The Recommendations stipulate in general terms the measures to be taken by Governments in order to prevent the discharge of hydrocarbons and other

dangerous substances and garbage in the waterways and to control the large-scale accidental spillage of such substances.

79. The UN/ECE Inland Transport Committee is currently involved in elaborating amendments to the above-mentioned resolution as well as to resolutions Nos. 17, revised, (Recommendations on Technical Requirements for Inland Navigation Vessels) and 24 (CEVNI). These amendments are to be based on practice and regulations in force on the Rhine and on the Danube and will concern, first of all, definitions relating to waste and waste disposal, technical means for prevention of pollution from vessels and operational aspects relating to pollution prevention.

80. The problem is complicated, however, by the fact that the philosophy governing the prevention of pollution from inland navigation vessels on the Rhine and on the Danube differs in principle: one advocates the retention of all sorts of wastes on board ships and their consequent discharge into special port reception facilities, the other is aimed chiefly at their processing by means of shipborne equipment.

81. It has been agreed that the work carried out within ECE should be based on the following principles: (i) a definitive solution of the problem of water pollution from vessels may only be found through the discharge of polluting substances accumulated aboard ships to reception facilities and their subsequent treatment ashore; (ii) to this end, a transition period may be needed in order to improve the current technical inland navigation infrastructure in some central and eastern European countries to a level required for full scope protection of inland waterways; (iii) a "polluter pays" principle should be applied when elaborating national as well as international pollution preventing measures; (iv) to ensure the continuous and appropriate level of prevention of water pollution during the transition period, interim UN/ECE provisions for inland waterways, where the technical infrastructure is still under development and therefore is not yet adequate, should be elaborated.

82. The outcome of the above work could be a useful contribution to the 1997 Conference on Transport and the Environment.

Rules for the carriage of dangerous goods

83. There exists no pan-European Convention or other instrument of a binding character which would govern the carriage of dangerous goods on inland waterways. In 1976 the UN/ECE Inland Transport Committee adopted a resolution No. 223 with the European Provisions concerning the International Carriage of Dangerous Goods by Inland Waterway (ADN) annexed to it. Since then the annexes to the resolution have been revised and are at present being kept in line with the Regulations for the Carriage of Dangerous Goods on the Rhine (ADNR) in force for the CCNR member countries. The Danube Commission, which so far had no provisions of that sort, adopted its own recommendations (ADND) drafted along the lines of the ADN/ADNR provisions.

84. Given the above, the UN/ECE Inland Transport Committee at its fifty-seventh session in January 1995, set up, jointly with other relevant intergovernmental organizations, an ad hoc Working Group for the Elaboration of a draft European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways.

(c) **The need for the unification of the regimes of navigation**

85. The need for unifying the regime of navigation on European inland waterways was clearly formulated the first time in the Final Act on security and cooperation in Europe (Helsinki, 1975) where, in chapter 6, the participating States "declared themselves in favour, with due respect for their rights and international commitments, of the elimination of disparities arising from the legal provisions applied to traffic on inland waterways which are subject to international conventions and, in particular, of the disparity in the application of those provisions; and to this end invited the Member

States of the CCNR, of the Danube Commission and of other bodies to develop the work and studies now being carried out, in particular within the UN/ECE;".

86. It proved, however, impossible at that time to translate the above declaration into practical deeds due mainly to the then existing political and economic realities in Europe.

87. On 11 September 1991 a unique event took place in Budapest: an all-European Ministerial Conference devoted exclusively to most-timely issues in inland navigation. High officials representing 25 European nations agreed to coordinate their inland water transport policies in order to further develop and promote inland navigation through:

(i) the establishment in Europe of an adequate network of inland waterways of international importance;
(ii) building an integrated all-European inland navigation system based on market principles; and
(iii) harmonization of technical and professional standards aimed at reciprocal recognition of national ship's certificates and boatmaster's licences.

88. The above objectives are still to be realized. At the same time, as a direct result of the Ministerial Conference, member Governments of UN/ECE elaborated and adopted in 1996 the European Agreement on Main Inland Waterways of International Importance (AGN), while the harmonization of technical and safety provisions are currently under way both within UN/ECE (see paragraphs 68-84 above) and in the framework of the newly-established cooperation between the two river commissions, i.e. CCNR and the Danube Commission.

89. For the time being, however, carriers which are planning to navigate along, for example, the Rhine-Main-Danube waterway, in particular carriers from Danubian countries, face a great number of challenging problems of a legal, technical and administrative nature to overcome.

90. In order to make full use of advantages offered by inland water transport and put this mode of transport in a more competitive position, the problems mentioned above should be solved.

91. The AGN Agreement may represent a suitable "hardware" for the unification on its basis of technical, safety, legal, environment- and market-related rules.

(d) **Access to the market**

92. There is no single inland navigation market in Europe. Instead it is composed of fragments based on different river basins and connecting canals. Rules governing the access to the market are equally fragmented, diverse and partly non-existent. They have been set up as a result of unilateral, bilateral and sometimes multilateral actions of Governments as well as by the shipping interests themselves.

93. From the point of view of freight tariffs, the market for international navigation on the Rhine represents the freeest market of competition where tariffs are set up mainly as a result of prevailing demand and supply. Access to it is governed mainly by the regime of navigation mentioned above. Only those shipping companies that are sufficiently efficient to offer high quality service at modest prices and/or are strong enough to attract sufficient cargo for their vessels can survive on the Rhine international market.

94. There are three types of shipping companies operating on western European inland waterways:

- Shipping entities belonging to an industrial company and working exclusively for this company (Werksreedereien);
- Shipping companies operating on a free market. Some of them have links with one or more shippers/consignees acquiring the cargo in direct negotiations with their customers, often on a one-year-contract basis.

Additional cargo may be obtained on the spot market through brokers in order to fill the gap in fleet engagement;

- One-ship companies (Partikulierschiffer) which are the most important phenomenon of western inland navigation industry. These are run by entrepreneurs who own the vessel, work and live on it.

95. Two sorts of market regulatory schemes have been in force so far on some western European inland waterways: compulsory tariffs and chartering by rotation (tour-de-rôle).

96. Compulsory transport tariffs were used in transport by inland waterways in Germany until 1 January 1994. The bilateral agreements on inland navigation concluded by Germany still provide for "economically justified freight tariffs to be fixed for bilateral traffic".

97. Minimum tariffs are also fixed in the Netherlands, where chartering by rotation is used. Within this scheme, the goods declared by a shipper are offered to the carrier who was the first to file his request for a cargo. The tour-de-rôle scheme is particularly suitable for one-ship owners who prefer to operate on their own. In Belgium, the regulation of the inland navigation market is similar to that of the Netherlands. In France, transport by national inland waterways may only be carried out by French vessels. This may have changed with the introduction within the EU from 1 January 1995 onwards of the freedom of cabotage by inland waterways. In international transport between the Netherlands, Belgium and France with the exception of the Rhine, the tour-de-rôle scheme is generally applied.

98. The European Commission is critical of both - the compulsory tariffs and the tour-de-rôle scheme, believing that both these schemes should, in the long term, be phased out. In June 1994 it prepared a report for the Council of EC on the organization of inland waterways transport markets and systems of chartering by rotation justifying the need for introducing common rules for the entire EC inland navigation market.

99. In accordance with the Belgrade Convention, only the cabotage is subject to licensing by individual Danubian States. Thus, in principle, any carrier is free to carry passengers and goods between the Danubian countries.

100. In practice, however, a strong tradition of cargo-sharing arrangements between the Danube riparian countries has been governing the access to this international market since World War II.

101. According to the Bratislava Agreements and in particular the Agreement on Uniform International Tariffs, concluded by the Danubian shipping companies, bilateral trade should be reserved for national shipping companies of the two countries concerned. The Agreements used to have a substantial impact on the Danube inland navigation market by setting-up a compulsory freight tariff system and introducing a cargo sharing principle in relations between individual Danube riparian States. These features of the Agreements (cargo sharing and compulsory tariffs) in principle do not give rise to any obligations at a governmental level, nor are they to be complied with by shipping companies non-Parties to the Bratislava Agreements. But, given the fact that the ports and shipyards in Danube riparian countries had been, and to some extent still are, in the hands of shipping companies, Parties to the Bratislava Agreements and that ship-brokerage continues to be carried out by the same companies, it becomes clear that the Danubian intra-basin inland navigation market remains in general very much controlled, if not closed, for outsiders. Danubian shipping companies, Parties to the Bratislava Agreements, have so far all been State-controlled or -owned, a situation which may change with the transition of countries concerned to a market economy.

102. Given the decisions of the Ministerial Meeting, cited in paragraph 87 above, the experience gained by the European Community in elaborating common rules for the organization of the EC inland navigation market might well be used in a pan-European context. In organizing a liberalized Europe-wide market, the preoccupations of all the parties concerned could be taken into

account such as the fleet overcapacity on the Rhine or existing cargo-sharing practice on the Danube.

103. Another important aspect related to the organization of the inland navigation market concerns the need for ensuring a fair competition among different modes of transport which would take their economic, safety and environment-related cost duly into account.

104. After the abolishment on 1 January 1994 of compulsory tariffs in Germany, followed by a sharp fall of inland navigation freight tariffs by as far as 60%, no significant transfer of cargo flow to inland waterways had occurred. This made the CCNR Economic Committee question the proper functioning of the market mechanism 8/.

Chapter III

BASIC FACTORS HAVING AN IMPACT ON THE PERSPECTIVES FOR INLAND NAVIGATION

(a) Advantages and shortcomings of inland navigation

105. In comparison with other modes of inland transport, inland navigation offers the following **advantages**:

Economy of scale

106. A convoy of two vessels amounting to 4,400 tons is equal by its carrying capacity to 110 railway wagons of 40 tons each, or to 220 road trucks of 20 tons each. The specific investment costs also favour inland water transport since: a driving power of 1 HP can carry 150 kg by trucks, 500 kg by railway and 4000 kg by inland waterways. The lifetime of ships is more than one and a half times longer than that of railway vehicles and more than five times longer then the lifetime of trucks. According to the statistical data of Germany for the years 1987-88, the haulage cost equivalent to 1 ton-km by road transport totalled 24.3 Pf., by railway 12.7 Pf. and by waterways 3.9 Pf.

107. The MERC Institute in Rotterdam carried out a comparative haulage cost calculation for the route: Rotterdam-Central Europe timed for the opening of the Main-Danube canal. Table 11 summarizes the conclusions of the study and confirms that the economic efficiency of inland navigation shows itself, first of all, in the transport of goods over long distances where it is hors concours for example in the transport of bulk or even general cargo carried in large consignments.

108. The first experience of the operation of the canal seems to confirm the calculations. Immediately after the opening of the Rhine-Main-Danube link, the Deutsche Bundesbahn declared tariff reductions of 50% for the transport of cereals along the route: Hamburg-Bamberg, and for the transport of fodder along the route: Hamburg-Nuremberg. The Preymesser company paid a haulage price of 400 Austrian schillings/t for transport by inland waterways from Dunaujvaros (Hungary) to Duisburg (Germany) in comparison to 1,000 Austrian schillings/t offered by the railway. The rated tariffs of the Danubian ports in Austria, as well as of the direct container route planned between Hamburg and Rotterdam are 10 to 20% lower than the railway tariffs.

109. On the Rhine, the price of haulage of one TEU container on the route: Strasbourg-Rotterdam/Anvers amounts to FF 2,400 by waterway, FF 5,500 by railway and FF 4,800 by road. The decision of the Neckerman company, transferring its container transport on the route Rotterdam-Frankfurt to waterway, resulted in an economy of almost 30% of haulage costs.

Inland navigation is the most economical inland transport mode in respect of the uncovered external and infrastructural costs

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8/ Report of the Economic Committee to the 1994 autumn session of the CCNR (ECO(94) 11-REV3).

110. Table 12 summarizes German calculations related to uncovered external costs relevant to different inland transport modes. The data have been used in particular in the drawing up of the study of the Rhine-Rhône connection.

111. There have also been calculations concerning the uncovered infrastructural expenses for different inland transport modes, the result of which was not favourable for inland navigation. German data revealed 4.10 Pf/t-km expenses for the railway, 1.13 Pf/t-km for road and 1.80 Pf/t-km for inland waterway. But even in the above-mentioned values, the infrastructural expenses supplemented with external costs make the advantage of inland navigation evident (road: 5.40 Pf/t-km, railway: 5.05 Pf/t-km, waterway: 2.03 Pf/t-km).

112. The aggregate total of all transport-related (internal, external and infrastructural) costs shown in Table 13 is further evidence of the price advantage of inland navigation.

Inland navigation is friendly to the environment and contributes to the improvement of quality of life

113. The water pollution and noise produced by inland navigation vessels are insignificant. In different analyses, inland navigation ranks as equal or even inferior to railways in respect of air pollution. Air pollution caused by inland navigation represents, in terms of social cost, only one seventh of that of road transport.

114. The evaluation of air pollution is based on specific emissions by different modes of transport (Table 14). As far as railways are concerned, the pollution by power stations and electrification is taken into account, although an important share of the electric power for railways is produced by hydro-electric or nuclear power stations which are considered as non-polluting to the environment. In contrast, the emissions of sulphur compounds causing acid rains, which are specific for thermal power plants, are not taken into account.

115. Inland navigation occupies land only for the construction of artificial canals. It is believed that to handle one and the same amount of goods traffic, inland waterways would require 30,000 ha of land, in comparison to 84,000 ha required by the network of railways and 290,000 ha by roads.

116. Particular projects of inland waterways development may well illustrate the role of inland navigation in protecting air purity. According to calculations of the Ministry of Transport of Germany, the construction of the Mittellandkanal and Elbe-Havel Canal had resulted in a reduction of CO_2 emissions by 200,000 tons/year.

117. Inland waterways, either natural or man-made, provide a favourable environment for the development and maintenance of a variety of species of animals and plants. At the same time, waterways and spaces adjacent to them form attractive landscapes most suitable for recreation and sports activities.
118. Navigation has a positive impact on inland waterways and in particular on artificial canals through the oxygenation of surface layers of water.

Inland navigation is safe

119. Accidents causing severe damage or personal injury are rare on inland waterways. This advantage of inland waterways is of particular importance for the transport of dangerous goods. Only 19 accidents were registered in 1991 on German inland waterways when dangerous substances were spilled or emitted

into the environment, amounting however to only 483 m^3, while in total, nearly 50 million tons of dangerous goods were transported in that year on German inland waterways.

120. **Shortcomings** of inland navigation can be summarized as follows:

The geographic extension of inland navigation is limited

121. The backbone of inland waterways is represented by naturally navigable rivers, having no connection with each other. To transform them into a network, the construction of artificial canals across watersheds is necessary. The network of waterways available for inland navigation does not necessarily follow major cargo flows. Regular road or rail haulage is then required to supply freight storage centres situated away from waterways, negatively affecting the general price advantage of inland navigation (problem of additional expenses for transshipment from one mode of transport to another).

Inland navigation requires a higher degree of organization of the production/transport chain

122. This disadvantage manifests itself mainly in connection with transshipment from inland water to road and rail transport which, in most cases alone, can establish direct access to points of origin or destination of goods. The inconvenience can be moderated by means of introducing modern logistical chains and port services. On the other hand, this particularity of inland navigation only becomes acute in economies of irregular organization where deadlines are often not met, and where deficient production and supply result in the existence of only one transport alternative - irrespective of price - that of public roads.

Inland water transport is slow

123. The speed of inland navigation vessels lies in the range of 10 to 20 km/h which is essentially lower than the speed of railway trains or road vehicles. Thus, inland navigation is practically excluded from the transport of urgent goods, e.g. perishables.

124. A comparison of the so-called "commercial speed" gives, however, different results to a certain extent. A modern inland navigation vessel operates 24 hours a day and is perfectly capable of ensuring the compliance with the voyage schedule. In comparison with road and rail transport, there is, in general, no congestion in inland water transport nor any significant delay at border crossings. According to Austrian calculations, the "commercial speed" of road haulage between Central Europe and Greece is as low as 12 km/h, between Antwerp and Rome - 20 km/h. The ever increasing demands for "just in time" delivery of goods apparently counterbalances the disadvantages of inland navigation relating to its slowness. In fact, it is not the speed of transport vehicles which is of main importance within a perfect logistical chain but the regularity and reliability of service. The modern inland navigation industry is capable of meeting these conditions.

The reliability of inland water transport on some occasions is lower than that of other modes of inland transport

125. Navigation on some stretches of inland waterways is subject to limitations related to current weather and hydrological conditions which are difficult to get rid of completely, even at relatively high expenses. Since there is usually no alternative to inland waterways, serious interruptions of traffic may occur, especially in the case of long-distance transport by inland waterways, decreasing both cost-effectiveness and reliability of inland navigation.

(b) **Trends in the development of inland navigation in Europe**

126. The analyses and prognoses related to the future role of European inland navigation are based mainly on the following basic assumptions:

- The integration process of the European Community will be accelerated and will play an increasingly decisive role in shaping all European developments;
- After some EFTA countries, the countries of Central Europe will join the European Community;
- Economic relations between Northern Europe and the Mediterranean region will become of greater importance;

- With the transition of Eastern European countries to a market economy, East-West economic cooperation will accelerate;
- The increase of demand in international transport will considerably exceed the demand for domestic transport within individual European countries;
- The specialization of national and international production and especially the important increase of a number of small businesses in Central and Eastern European countries will give rise to the demand for the "just in time" concept of goods transport;
- A relatively high share of transport services in the GNP of Central and Eastern European countries will approach the lower Western European level, while the demand for large shipments of goods will decrease considerably in countries in transition;
- The development of international cooperation and trade will give rise to a further increase of road transport operations. In this regard, countries in transition will face investment problems and problems related to the protection of the environment;
- European countries concerned will take measures to develop further inland navigation as a non-polluting and economical transport mode;
- The creation of a harmonized inland navigation market within the European Community, as well as the opening of the Main-Danube canal, will give new impulse to the development of European inland navigation.

127. Prospects for inland water transport have been analysed for each of the major European inland navigation routes. In addition to routes within the European Union (Table 15), the following forecasts have been made regarding the:

- **Baltic inland navigation route**:
  Existing traffic volume 1.5 million tons/year
  Forecast for 2000 7.5 million tons/year 9/

- **Danube-Oder-Elbe route**:
  Forecast for 2000 34.2 million tons/year 10/
- **Danube-Aegean Sea route**:
  Forecast for 2000 30.2 million tons/year 11/
- **Danube-Adriatic Sea route**:
  Forecast for 2000 30 million tons/year 12/

128. Description of the inland navigation routes mentioned above and in Table 15:

(i) The **Rhine route** connects the main Belgian and Dutch sea ports with Germany (Ruhr region, Frankfurt, Mannheim and Stüttgart industrial zones), and further on with Strasbourg, Metz-Nancy region and Basel. In addition to the Rhine, its tributaries and adjacent canals make part of the same corridor;

(ii) The **East-West route** is a connection from the Netherlands and Belgium via the Northern regions of Germany towards Berlin and then to Central

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9/ Source: Baltic Conference of Ministers of Transport (W6TIB/13/93).

10/ Source: Study of the establishment of the Danube Oder(-Elbe) Connection (TRANS/SC.3/R.160).

11/ Source: International commodity flows on the Danube-Aegean Sea waterway (TRANS/SC.3/AC.1/R.1).

12/ Source: Monfalcone-Gorizia-Ljubljana waterway (TRANS/R.268).

and Eastern European countries. An axis of the corridor is formed by the Elbe River and the Mittellandkanal together with adjacent waterways connected to them;

(iii) The **North-South route** within the EC comprises waterways of the Netherlands, Belgium and France, having an access to the Rhine. The principal waterways of the corridor are Schelde, Meuse, Moselle and Albert Canal;

(iv) The **South-East route** is formed by the Danube waterway;

(v) The **Baltic transport corridor** provides a connection between the ports of Eastern Germany and Scandinavia;

(vi) The **Danube-Oder-Elbe route** is a planned waterway connecting the Danube at Bratislava (Slovakia) via Prerov (Czech Republic) with the Oder and the Elbe rivers. This corridor is to give an access to the Moravian basin and Silesian industrial area, providing a sea exit via the Ports of Hamburg, Szczecin and Swinoujscie. An alternative link is being considered in Slovakia: from the Danube to the Oder via the Vah and Kisuca rivers;

(vii) The **Danube-Aegean Sea route** is based on a planned canal that will branch out from the Danube under Belgrade, reaching the Aegean Sea by making use of the Morava and the Vardar rivers;

(viii) The **Danube-Adriatic Sea route** is an extension of the canal to be built between Monfalcone and Ljubljana towards the Danube, reaching it at Gyor or Bratislava.

129. It is remarkable in Table 15 that the forecasts available practically do not expect any traffic increase on the Rhine and on the North-South corridor within the European Community. Among already existing corridors a considerable increase can be expected in the South-East, Baltic and East-West traffic. These future developments are all related to the territory of Germany.

130. For the period 1988-2010, Germany expects an increase by 46% of the total international traffic and an increase by 51% of transit traffic via its territory. The 1992 development plan for German transport infrastructure network is based on an envisaged increase by 95% of road traffic, by 55% of rail traffic and by 84% of inland water traffic until the turn of the century.

131. Traffic on the Main-Danube canal is expected to reach 8 to 10 million tons/year by the turn of the century. According to forecasts of the Bundesbahn, about 7.5 million tons/year will be transferred to inland waterways from the existing rail traffic of 15 million tons/year.

132. The initial data concerning the traffic on the Main-Danube Canal in 1993/1994 are promising (see Figure 10). The 3.3 million tons of traffic at Kelheim in 1994 was carried out mainly by German (40.69%), Dutch (38.53%), Belgian (9.35%), Austrian (5.52%), Hungarian (3.02%) and Slovak (1.50%) vessels.

133. The three projects of waterway links originating from the Danube are supposed to cross countries of Central Europe. Their feasibility to a large extent depends on the economic situation in these countries and on the development of international trade in the region. In this respect, the perspectives, at least for the middle-term, are far from being optimistic. The countries of Central Europe are all subject to severe recession, the deepest in their modern history, and their economic performance at the end of the millennium will perhaps again be at the level of the late 1980s. For the time being, the intraregion economic relations of this group of countries are diminishing with an increasing orientation of their foreign trade in Western Europe. The Danube is the backbone of all the three corridors, and the civil war in Yugoslavia had a devastating impact on the goods traffic by this waterway. The war and its implications make the realization of the Danube-Aegean Sea water link questionable, even on a long-term basis.

134. The project related to this corridor may be revived, however, by the dynamically increasing traffic between 14 countries of the EU, on the one hand, and Greece, Turkey and other countries adjacent to the Black Sea, Sea of

Azov and Caspian Sea, on the other hand. An expected traffic increase on this corridor may have a serious negative impact on the environment and transport infrastructure of transit countries if carried out mainly by road.

135. As to the transport corridor Danube-Adriatic Sea, it should be studied in the light of the prospects for the so-called Alps transit. The transit across the Alps tripled in the period from 1965 to 1990 and still continues to gain further momentum. An extraordinary environmental impact resulting from this traffic may force Governments concerned to consider transport routes and alternative modes to road haulage. However, the establishment of the Danube-Adriatic Sea corridor is very much subject to the possible development of inland waterways in Italy.

(c) **Trends in the development of commodity markets relevant to inland navigation**

136. Inland navigation is, to a large extent, a carrier of goods for the building, metallurgical, energy, chemical industries and, according to recent developments, of general cargoes in containers.

137. With the latest developments in world economy, some of the above-mentioned economic sectors have lost their particular significance (through sharp decrease in energy intensive production, transfer of production to sea-coast, increasing use of energy of nuclear origin, etc.), while others under economic recession have cut their output therefore causing stagnation or a decrease in inland water transport operations.

138. The economic recession reduced in particular building activities, diminishing consequently the demand for rocks, gravel and sand traditionally carried by inland navigation vessels. Some growth of demand in the building industry can be expected in Central and Eastern Europe because of the process of economic restructuring going on in the countries concerned and the urgent need to develop deficient infrastructures.

139. Metallurgy is currently experiencing a deep crisis, although its global output is increasing slightly (See Tables 16 and 17). Another characteristic trend is an important forging ahead of overseas iron ore extraction and exports and a stagnation or slight decrease of steel production in Western Europe as well as a tendency in some countries to transfer their metallurgical industry enterprises to sea-coast. The strong recession of the Central and Eastern European metallurgical industry is one of the features of the general economic situation, but the output of this sector will certainly stabilize with the normalization of the economy of this group of countries.

140. Coal mining and consumption are partly related to metallurgy, partly to energetics (see Table 18). As far as exports of coal are concerned, the characteristic trend is the decline of the role of Western European countries. The Port of Duisburg which had been an export port for the German coal industry, is today receiving imported coal for the metallurgy of the region.

141. The totality of crude oil export-import data indicates stagnation, or a slight increase (Table 19). Forecasts for energy supply (Table 20) predict a further, although moderate, increase of demand for solid fuels and crude oil.

142. The role of inland navigation, as a cheap and safe carrier, may come to the foreground in the transport of raw materials for chemistry and chemical products. The expected development of the chemical industry may lead to the increase of a share of such products within the freight structure of inland navigation.

143. In their totality, the traditional commodities transported by inland waterways will continue to constitute a core of transport nomenclature for this transport sector (see Table 21). Stagnation will be more characteristic for Western Europe while the increase of demand seems to be more probable in

Central and Eastern Europe. In this respect, the successful adaptation of countries concerned to the requirements of a market economy will play a key role.

(d) **Trends in the development of a logistics network including inland navigation ports**

144. The demand for the carriage of industrial finished and semi-finished goods of a superior processing degree is continuously increasing in European transport markets. This trend is based on changes in the structure of world trade and the specialization and diversification of production. Container transport, "just in time" production-and-transport concepts, collection-distribution centres supplying large areas and logistical networks are becoming more and more commonly used.

145. This process has had an impact upon most of the transport sectors. The introduction of modern logistical, combined transport techniques provides new possibilities for inland navigation as well.

146. Inland navigation ports play an outstanding role in the realization of such possibilities. A decisive majority of fundamental logistical requirements relating to storage and distribution, intermodal transport, modern methods of registration and control of transport operations and terminal services are of relevance to ports. Ports having suitable water, railway and road connections can be developed in transport centres satisfying the needs of all the three inland transport modes. This is illustrated fairly by Table 22 and Figure 11 showing the modal split of goods tonnage loaded/unloaded in different European inland navigation ports.

147. The biggest European commodities distribution centres cover the following areas:

- regions of Amsterdam, Rotterdam, Antwerp, Brussels, Paris;
- Hamburg, Bremen and Bremerhaven;
- the Rhine region, especially the route Basel-Frankfurt;
- Barcelona, Lyon, Milan, Geneva.

148. All these centres have inland waterway connections. The formation of important distribution centres can be expected in the regions of Berlin, Nuremberg and along the Danube between Vienna and Belgrade. Significant centres of European size may also be established in the mouth of the Danube, Dnieper and Don rivers as well as in the St. Petersburg region in Russia.

149. Possibilities of cooperation between inland navigation and railways are subject to the development of distribution centres. According to the national master plan, 25 such centres will be established within the German railway network, 18 of which concern inland navigation ports.

150. Container traffic was initiated on the Rhine and on the Danube in the 1960s. Since then the transport of containers has increased considerably on the Rhine, amounting currently to some 700,000 TEU/year. The Danubian traffic is much more modest, amounting to only 10-20,000 TEU/year.

151. Following the opening of the Main-Danube canal, the Danube Container Service has been launched, providing regular container transport services with two departures a week between Austrian ports (Linz, Krems, Vienna) and Rotterdam or Amsterdam. A new container transport service has also started recently on the Elbe between Hamburg and Dresden. A regular container service has also been established recently between Lille and Antwerp, between Châlon and Fos-sur-Mer via the Saône and Rhône rivers and between Paris and Le Havre on the Seine.

152. Connections on the European road network, restrictions for road haulage for environmental reasons, as well as the need for diminishing transport costs, promoted the development of ro-ro transport by inland waterways. Ro-ro services are rendered on the Rhine and on the Danube, and it became regular on the Elbe since autumn 1992. "Hungarolloyd", operating on the Danube, is

planning to extend its ro-ro traffic between Hungarian and German ports on the Danube up to Nuremberg, via the Main-Danube Canal.

153. The overseas transport of export-import goods with the origin or destination located inside the continent plays a considerable, if not decisive, role in the traffic on major European inland waterways. A good part of this traffic is carried out without transshipment to/from ports situated in the river mouth by sea-river vessels. The volume of direct sea-river traffic carried out on European inland waterways in the years 1989 to 1990 was as follows:

(i) on inland waterways of the Russian Federation 21.5 million tons/year;
(ii) on the Rhine 2.4 million tons/year;
(iii) on the Seine 0.5 million tons/year;
(iv) on the Rhône-Saône waterway 0.3 million tons/year;
(v) on the Danube 0.1 to 0.2 million tons/year;
(vi) on the Dunkerque-Valenciennes waterway 0.1 million tons/year.

154. Although direct sea-river transport is developing well in certain regions, the evolution of inland waterways with a sea exit is basically subject to the development of transshipment ports in the mouth of rivers.

155. In the late eighties, the following share belonged to inland navigation in traffic of ports located at sea exits of European inland waterways:

Anvers	48.6%
Gent	61.5%
Rotterdam	52.8%
Hamburg	15.4%
Bremen	27.1%
Le Havre	3.7%
Dunkerque	6.5%
Rouen	18.2%
Total share of ports in the mouth of the Danube	40.0%

156. Figure 12 gives an overview of the cargo turnover of sea ports located in the mouth of inland waterways, existing or planned. The figure can be completed with global traffic of seven major ports on the mouth of the Danube which is around 35 to 40 million tons/year. The absolute predominance of ports situated on the Atlantic and North Sea coasts and, in particular, the outstanding performance of ports in the mouth of the Rhine, is evident. The volume of goods traffic in ports situated in the mouth of the Danube follows that of the Rhine, Elbe and Seine. The outlet capacity of the Rhône can be compared to that of the Danube and the Adriatic Sea coast. This may be of

some interest for the construction of the planned Danube-Adriatic Sea connection which could absorb a substantial part of the goods traffic to/from the ports situated on the Adriatic Sea coast, currently carried by other modes of inland transport, and which could contribute to the economic development of the region.

157. The sea-river ports of North-Western Europe, already being in a leading position, strive for the stabilization and improvement of their performance through continuous development. They are also leading in the transport of containers (global turnover in 1991 amounted to 10.37 million TEU). The breakdown of the above-mentioned container traffic by ports is as follows:

Rotterdam	36.2%
Hamburg	21.1%
Antwerp	17.1%
Bremen	12.4%
Le Havre	8.9%
Zeebrugge	2.9%
Dunkerque	0.7%
Amsterdam	0.6%

158. Among the biggest sea-river ports, there is an important potential of cargo flow increase to/from Central European countries for the port of Hamburg. Nearly three quarters of European container traffic is not bound for this region, but rather to Scandinavia, the United Kingdom and Ireland. The unfavourable navigation conditions of the Elbe make it play a marginal role in catering for the east-west traffic, especially after the opening of the Main-Danube canal.

159. The need for sea exits in the Central European region can be illustrated by the breakdown of Austrian overseas traffic handled in 1990 by ports:

Hamburg	19.1%
Koper (Slovenia)	21.9%
Rijeka	14.7%
Triest	9.6%
Bremen/Bremerhaven	8.6%
Rotterdam	7.5%
Duisburg	6.5%
Antwerp	4.8%
Ports in the mouth of the Danube	2.1%

160. Adriatic ports play an outstanding role in handling the Austrian overseas traffic by reasons of geographic proximity and historic connections, which can again be an important factor for the evaluation of projects for the Danube-Adriatic Sea waterway.

161. By the construction of ports in the mouth of the Danube and at the outlet of the Cernavoda-Constanta Canal, Romania is trying to create ports infrastructure similar to that of the Rhine. The most recent forecasts predict an increase by 70-80% of freight transport for this region in the period 1991 to 2000. The Ukraine and the Republic of Moldova are also planning action aimed at the development of ports in the lower Danube.

162. Goods traffic via Thessaloniki (Greece), which has been assigned as a sea exit for the planned Danube-Aegean Sea waterway, increased on average by 4.1% a year in the last decade, and amounted to 6.5 million tons in 1991. A new programme of development of this port has been started, and a turnover of more than 9 million tons/year is expected for the turn of the century.

163. The programme adopted by the Government of the Russian Federation in 1993 provides for the development of sea and river ports located on European inland waterways of international importance at St. Petersburg, Kaliningrad, Vyborg, Vysotsk, Taganrog, Eisk, Azov, Astrakhan, Temryuk, Kavkaz, Podporozhie and Petrozavodsk.

(e) **National transport policy with respect to inland navigation**

164. The control over the increasingly negative impact of transport on the environment and the alleviation of problems relating to the limited capacity of existing east-west transport corridors represents an important challenge to the European transport system.

165. A pledge by Governments to encourage the development of non-polluting combined transport techniques, and implicitly the development of inland navigation, is contained in the Declaration of the second Pan-European Transport Conference, section, B paragraphs 2 and 3 (Crete, 14-16 March 1994).

166. This objective can be reached by the increase of competitiveness of European inland navigation which, in its turn, requires suitable organization of international inland navigation markets and an internationally coordinated development of inland water transport infrastructure.

167. The transport policy of the European Community is mainly aimed at:

- The development of a unified common transport market on the basis of unrestricted market competition;
- The harmonization of conditions for competition between transport sectors;
- The insurance of freedom of provision of market activities and transport services within the Community.

168. As from 1 January 1995, European Union member countries introduced the freedom of cabotage by inland waterways of the Community.

169. A number of member Governments of the European Union concluded bilateral agreements on inland navigation with third countries. These bilateral agreements mainly contain provisions regulating the participation of vessels flying the flag of Contracting States in bilateral trade and, at the same time, introduce licensing procedure for carriage by them of cross-trade cargoes even on their return voyages, thus decreasing natural flexibility and competitiveness of inland navigation on international markets.

170. With the support of the European Parliament (Resolution A3-007/92 dated 13 March 1992), and in accordance with the mandate given by the Council on 7 December 1992, the European Commission initiated negotiations with countries of Central and Eastern Europe on the replacement of existing bilateral agreements of member countries with multilateral EC/third countries inland navigation agreements. The basic principles of such agreements should be:

(i) fair competition, reciprocity and non-discrimination; and
(ii) exclusion of vessels of third countries from the Community cabotage (at least for the period when measures on control of structural overcapacity in the European Union inland waterway sector are in force) except where there is no suitable EU tonnage available.

171. By Council Regulation (EC) No. 1101/89, the European Community put into operation a set of measures aimed at reducing the structural overcapacity in inland navigation of the EC. These measures have been in force for five years and have recently been extended for another period of five years by the Regulation (EC) No. 844/94.

172. Countries of Central and Eastern Europe are taking steps aimed at their transition to a market economy. Among the measures envisaged to this effect, the State-owned shipping companies are being transformed into share-holding entities (generally with 100% of shares belonging to the State) and then privatized by the sale of their shares.

173. Following the privatization of the Deutsche Binnenreederei GmbH of the former German Democratic Republic, about 1,000 ships of the company have been acquired by a joint venture of about 20 medium-ranked inland navigation entrepreneurs, namely Mittelständische Binnenreederei und Spedition GmbH.

Twenty-five vessels of the former company belong to its former employees who are trying to succeed in operating small businesses.

174. After the privatization of an Austrian inland navigation company, Erste Donau-Dampfschifffahrts-Gesellschaft (DDSG), 49.9% of its freight department DDSG-Cargo passed into the hands of a group led by the German Stinnes AG. In the near future Austria will also have to comply with the requirements for a full EC membership. Thus, the EC regulations on structural improvement of inland navigation will have to be extended to the Austrian Danube fleet, although no over-tonnage exists on the Danube; on the contrary, there is a lack of tonnage in the Danubian basin.

175. In countries of Central and Eastern Europe, privatization and demonopolization in the field of inland water transport were gaining momentum. The former Czech and Slovak Elbe-Oder Shipping Co. became a share-holding venture preserving all the activities carried out by its predecessor: port operations, shipyards and transport services. Seven inland navigation companies are currently in operation in Poland; four of them are State-owned, and the other three belong to local authorities.

176. Under the ongoing privatization programme in Slovakia, preparations are being made for the conversion of the Slovak Danube Shipping Co., currently a State enterprise, into a joint-stock company, and subsequently into a holding company, which will have a number of subsidiaries engaging in passenger, sea and river transport as well as in operating the ports of Bratislava, Komarno, etc. The Bulgarian Danube Shipping Company (BDSC) was transformed into a share-holding company with the majority of shares belonging to the State. The BDSC is not involved in the operation of ports. In the Russian Federation, the transformation of State river enterprises into joint-stock companies has been under way since 1992. From 21 river shipping companies (State public transport enterprises), 14 of them located in the European part of the country, 86 joint-stock companies engaged in goods transport (61 in the European part of the country) had been formed by 1 January 1995. At the beginning of 1995 there were 5,462 owners of river vessels under various forms of ownership, including 3,346 in the European part of the country. Starting in 1995, by decision of the Government of the Russian Federation, responsibility for State regulation of river transport operations at the regional level rests with the State basin waterway and navigation administrations which are to be established for each basin. The principal tasks of the administrations will be to carry out, in cooperation with local authorities, the operation and development of waterways and water resources installations; State regulation of the activities of economic agents involved in river transport, whatever their form of ownership, in areas falling under the competence of State organs; monitoring of the safety of navigation, environmental preservation and fire protection; and technical supervision of the operation of river transport facilities which are in federal ownership.

177. A large holding company (concern) operates on the Dnieper, in the Ukraine, performing also port and ship repair activities. The operation of private inland navigation agencies has also been allowed in the Ukraine.

178. No precise data are available on infrastructural investments by European Governments in the inland transport sector. According to the ECMT study on inland navigation (Table 23 and Figure 13) and the national statistics of Germany (Table 24), the development of inland water transport is heavily under-financed throughout Europe.

179. According to the European Union plans, some 1,000 to 1,500 billion ECU should be invested totally in the period 1990 to 2010, in transport infrastructure of EU member countries. About one-fifth of this value is supposed to be earmarked for projects of Community interest.

180. In accordance with the Council Regulation (EC) No. 3359/90, transport infrastructure projects of Community interest are those which meet the following objectives:

- the elimination of bottlenecks;

- the integration of areas which, geographically, are either landlocked or situated on the periphery of the European Community;
- the reduction of costs associated with transit traffic in cooperation with any third countries concerned;
- the improvement of links on land/sea routes;
- the provision of high-quality links between the major urban centres, including high-speed rail links.

181. The European Union may also give non-reimbursable financial support to projects of common interest up to a maximum of 25% of the total project cost.

182. Following german reunification the "Federal Traffic Infrastructure Plan" was approved in 1992. Thereby investments amounting to DM 493 billion are allocated until 2010. A sum of DM 222 billion is planned for the most urgent problems, DM 14.7 billion thereof being earmarked for the modernization of inland waterways. Moreover, within the reunification programme, the Federal Government envisages, in addition, to spend DM 57 billion in transport infrastructure projects for the restoration of transport links between the Eastern and Western parts of the country, of which inland navigation will benefit DM 4 billion for the modernization of the east-west axis from the Rhine to Berlin and to the Polish border. However, according to the IFO Institute in München, the investments earmarked do not meet the requirements: their calculations reveal a demand for more than DM 1,000 billions.

183. Considering the multiple functions of inland waterways, the French Government has arranged for the participation of all potential users of waterways (industry, agriculture, local communities, etc.) in meeting the costs of their development and maintenance. This participation is supplemented by a scheme of Government subsidies to the public administration Voies navigables de France (VNF), which has been given responsibility for the great majority of French inland waterways and has an annual budget of approximately 800 million francs. In addition, at the end of 1994, the French Parliament passed a law providing for the completion of the Rhine-Rhône large capacity waterway by the year 2010, with funding from Eléctricité de France (EDF) through a company to be established jointly by EDF and the Compagnie Nationale du Rhône (CNR).

184. In 1990, the Dutch Government pledged that a backlog of about HFL 500 million would be recovered for the maintenance of national inland waterways. According to forecasts, however, the budget financing of inland waterways in 1994 and 1995 will amount to HFL 340 million, and in 1996 and 1997 to HFL 270 million only.

185. A general shortage of investment capital, lack of and deficiencies in the development of railways and roads in Central and Eastern Europe, resulted in such a huge investment demand that the development of inland waterways in this region has been almost entirely neglected and may only be revived in the framework of the development of general transport corridors in Europe. The countries concerned are looking for possible financial assistance for the realization of priority infrastructure development projects from international sources. The World Bank (WB), European Bank of Reconstruction and Development (EBRD), European Investment Bank (EIB) and other international financial institutions take part in financing some of the projects related first of all to motorway construction. The development of inland waterways with the use of bank credits is hindered by the heavy conditions for debts servicing during a relatively long period of time.

186. The cost of construction of an artificial inland waterway canal (DM 27.5 million per km in the case of the Main-Danube link) is similar to that of a highway (DM 10-20 million per km) and is even lower than the cost of the construction of a high-speed railway line (DM 35.7 million in the case of ICE Wurzburg-Hannover) 13/.

Chapter IV

13/ Source: Navigation, Ports and Industries, Sept. 1992, page 513.

DEVELOPMENT OF THE NETWORK OF EUROPEAN INLAND WATERWAYS

(a) **Present situation**

187. The declining importance of inland navigation in Europe in recent years, as shown in chapter I above, has inspired international institutions such as the European Conference of Ministers of Transport (ECMT), the European Commission and UN/ECE to undertake particular studies with a view to identifying the causes of the above-mentioned phenomena. It was found, in particular, that one of the important limitations responsible for the retardation of inland water transport development was the state of the waterway network. Basic improvement of this network was therefore considered to be essential.

188. One of the earliest actions in this respect was taken by the ECMT which established in 1964 a list of European waterway projects of primary importance. This list contained 12 projects providing for the construction of new or modernization of existing inland waterways considered as most essential.

189. Up to now five of the above-mentioned projects have been completed, three are currently under way and the implementation of the rest have not yet been started.

190. The European Commission, in its proposal for a Council Decision on the creation of a European inland waterway network (COM(92) 231/7), identified the following projects as calling for priority measures to be taken:

(1) upgrading of the Mittellandkanal and construction of the aqueduct over the Elbe at Magdeburg;
(2) upgrading of the links between the Elbe and Oder;
(3) linking the Twentekanaal and the Mittellandkanal;
(4) upgrading the connecting canal between the Seine and Scheldt in France and Belgium;
(5) upgrading the Scheldt-Rhine link in Belgium (southern section and Charleroi-Brussels Canal);
(6) upgrading the eastern section of the north-south link via the Meuse and the Lanaye and Juliana Canals to the Rhine;
(7) linking the Rhine and Rhône;
(8) upgrading the Elbe between Magdeburg and the Czechoslovak frontier;
(9) linking the Main and the Danube and upgrading the Main and Danube between Straubing and Vilshofen;
(10) upgrading the Danube between Vienna and the Black Sea (non-Community project).

191. In December 1993 the Council of Ministers of the EC approved the proposal of the Commission contained in a White Paper: "Growth, Competitiveness, Employment, the Challenges and Ways forward into the 21st Century" to earmark the development of the trans-European transport networks from now to the year 2000, with about ECU 220 billion of which 90 billion would be mobilized by the European Community itself including member Governments and the rest through private financing 14/.

192. The provisional list of 26 priority projects in all modes of transport mentioned in the White Paper includes in particular five projects relating to inland waterways:

(i)	Canal Rhine-Rhône	ECU 2,500 million
(ii)	Canal Seine-Nord	ECU 1,500 million
(iii)	Liaison between the Elbe and the Oder	ECU 600 million

14/ Source: Bulletin des Communautés Européennes. Supplément 6/93, page 77.

(iv)	Improvement of navigation conditions on the section of the Danube between Straubing and Vilshofen	ECU 200 million
(v)	System of traffic management on the Community inland waterways	ECU 1,000 million.

193. Within the UN/ECE a group of experts was set up in 1959 to study the problems involved in establishing a unified network of inland waterways of international concern in Europe. This Group decided, in order to promote the geographical and technical integration of western and eastern European waterway networks, to prepare economic studies for the Rhine-Main-Danube, the Danube-Oder (Elbe) and the Dnieper-Vistula-Oder connections. The first of the above-mentioned studies was completed in 1970, and the water connection was put into operation in September 1992. The second study was prepared in 1981 and updated in 1993 while the study on the Dnieper-Vistula-Oder link has not yet commenced.

194. A Ministerial Conference on the Most Timely Issues in Inland Navigation (Budapest, 11 September 1991) adopted a European Inland Waterway and Transport Declaration. As a first priority, the Declaration calls for the conclusion of a multilateral agreement on the network of inland waterways and ports of international importance and for the elimination of bottlenecks and completion of missing links in the existing European network.

195. The length of the European inland waterway network is shown in Table 25. In this table, waterways of regional importance (classes I-III) and waterways of international importance (class IV and higher classes) are differentiated. This differentiation is very important, since waterways of regional importance, which have usually restricted parameters only, are in many cases obsolete and can hardly meet the requirements of modern commercial traffic (in this respect not only limited dimensions of vessels, but also excessive number of locks and insufficient average length of dividing pools decrease the quality of many regional waterways). Many of them serve, therefore, only for recreational activities and cannot be considered as a part of an all-European inland water transport infrastructure.

196. It seems that the present unsatisfactory state of inland navigation traffic in Europe stems, inter alia, from:

(i) the insufficient length of waterways of international importance (E waterways), as well as insufficient density of the E waterways network;
(ii) the somewhat fragmentary nature of the network of E waterways;
(iii) a divergency between the routes of some E waterways and the pattern of important cargo flows;
(iv) the limited reliability of traffic on some sections of E waterways due to long breaks of navigation periods caused by low water levels, ice obstacles, lack of night-time navigation, etc.

Restrictions of draught are of primary importance since the navigation is most sensitive to them. Water depth fluctuations introduce an element of uncertainty in the process of transportation. As a result, a carrier has to either reduce a cargo load or face additional costs of intermediate trans-shipments. According to calculations made for the section of the Danube from its mouth to the Hungarian-Slovak section of the Danube, draught restrictions lower by 10 to 30% the efficiency of transport on this waterway;

(v) Low technical quality of some E waterways (great number of locks hindering the fluent traffic, low bridges, etc.).

197. It should be added that the quality and, in particular, the rapidity of port operations are also decisive for the development of competitiveness of the inland navigation industry. An indication of a poor quality of Danubian ports' services, for example, is that on average a purely navigation time of laden vessels constitutes only 30 to 40% of their entire operational time at distances of about 1,100-1,200 km.

198. The solution of the problems mentioned in paragraph 196 above is further complicated by a lack of proper international cooperation in promoting, planning and financing projects related to inland water transport infrastructure development.

199. In order to make inland navigation an effective and integral part of the European transport system, the share of waterways of international importance in the European inland waterways network should be increased through the elimination of bottlenecks and, first of all, through the modernization of existing waterways of regional importance.

200. As stated in chapter III above, the creation or upgrading of east-west inland waterway links is of the highest importance. Practically, two corridors can be analysed: the extension of the Mittellandkanal eastward to Poland and the improvement of the Danube waterway.

201. In Germany, the adaptation of the Mittellandkanal for the navigation of large modern inland navigation vessels (class Vb) from the Rhine to Berlin is currently under way. The modernization of the link between Berlin and the Oder remains, however, uncertain. For the time being, there are no plans for the development of national waterways of extremely small traffic capacity in Poland.

202. The Main-Danube Canal was opened in September 1992. The navigation problems on German and Austrian sections of the Danube can be solved by the relevant countries probably by 2010. The Slovak-Hungarian section of the Danube continues to constitute a major limitation to navigation conditions on this international river, although the putting into operation in 1992 of the Gabcikovo lock complex improved navigation conditions on a 50 km section of the river. The two countries have not so far come to an agreement on a possible way of development of the joint section of the Danube. Within a few years, however, it is expected that a common plan of development will be agreed upon and be put into operation, providing in particular for the elimination of bottlenecks on that section of the river. Given the huge traffic capacity of the Danube, this waterway should be considered as one of the most important elements of the European inland waterway network.

203. The elimination of bottlenecks and completion of missing links should be sought, first of all, with a view to ensuring continuous and homogeneous links between main points of departure and destination of traffic flows. Main routes should be clearly specified and designated. In order to draw the traffic flows to inland waterways, a well-considered system of modern inland navigation ports should be established.

204. It is self-evident that the modernization of the existing network consists not only of ensuring the required minimum classification parameters of waterways, but also the considerable improvement of operational characteristics of inland waterways. Therefore standard requirements concerning the reliability of transport on E waterways should be clearly defined.

(b) **European Agreement on Main Inland Waterways of International Importance (AGN)**

205. In order to enhance international cooperation in promoting, planning and financing inland waterway development, the UN/ECE Inland Transport Committee, at its fifty-eighth session (15-19 January 1996), adopted the European Agreement on Main Inland Waterways of International Importance (AGN) which is to complement the set of already existing UN/ECE infrastructure-related instruments providing for road (AGR), rail (AGC) and combined transport (AGTC) European networks. The preparation of the AGN was facilitated by the adoption in 1992 within both UN/ECE and ECMT of a new classification of European inland waterways meeting the requirements of modern navigation methods.

206. Similarly to those already existing Agreements, the AGN establishes an international legal framework laying down a coordinated plan for the development and construction by Governments of a network of inland waterways

and ports of international importance, based on agreed infrastructure and operational parameters, which they intend to undertake within the framework of their relevant development programmes.

207. The AGN is based on the understanding that, in the development of transport by inland waterways, the role of international transport is predominant with the ensuing need for building a network in Europe which should be:

- homogeneous, i.e. suitable for standard vessels, barges and pushed convoys;
- suitable for economical international transport including the operation of river-seagoing vessels;
- integrated, integration being ensured between different river basins by means of connecting canals as well as by means of suitable coastal routes;
- able to accommodate most important cargo flows, this condition being dependent on the sufficient density of the waterway network and on the reasonable development of the network in all European countries concerned including Eastern and Central European ones.

208. Meeting the above-mentioned objectives would contribute substantially to the increase of the share of economical and ecologically sound water transport in total tonnage of cargoes moved internationally by inland modes of transport as well as to the enhanced economic cooperation between UN/ECE member countries.

209. The system of waterways of international importance (E waterways) is first of all to cater for the connection between important sea ports or coastal routes and the hinterland. That is why the main E waterways identified in the AGN provide outlets either to sea ports on the coast of the Atlantic Ocean, the North Sea, the Baltic and the White Sea or to sea ports on the coast of the Mediterranean, the Black Sea and the Caspian Sea. Extreme northern and southern waterways represent coastal routes encircling the European continent from the White Sea to the Caspian Sea coast.

210. The geographical scope of the network of E waterways consisting of navigable rivers, canals and coastal routes extends from the Atlantic Ocean to the Ural mountains connecting 37 countries and covering the European region and beyond.

211. In accordance with the decision of the UN/ECE Principal Working Party on Inland Water Transport, data for both existing and target values of technical characteristics of E waterways and ports, as they are mentioned in the Agreement, will be issued as a separate publication ("blue book") which is expected to be reviewed regularly in the future by the Principal Working Party. This document will also contain a list of bottlenecks and missing links in the existing network of E waterways, as defined by member Governments concerned.

212. The AGN Agreement will be open for signature at the Office of the United Nations in Geneva from 1 October 1996 to 30 September 1997. It will also be open for accession by Member States as from 1 October 1996.

213. To monitor the implementation of the future Agreement, an ad hoc group of experts on the AGN could be set up which would publish regular reports covering, in particular, the following:

- updated list of States signatories to the AGN;
- evolution of traffic density on the network of inland waterways of international importance;
- development of the network of E waterways and ports;
- periodic publication of a general map of E waterways and, where necessary, an atlas of waterways and ports.

214. Elimination of the bottlenecks and completion of the missing links identified by the AGN would ensure the navigation throughout the AGN network of self-propelled cargo vessels having the following parameters:

Length	85 m
Beam	9.5 m
Draught	2.5 - 4.5 m
Deadweight	1,250 - 2,500 t

215. Such vessels are progressive enough to make use of all the main advantages intrinsic to inland waterway transport. They can also be adapted for combined sea-river navigation.

Concluding remarks

1. From being one of the very first modes of transport in human history, inland navigation now plays a comparatively modest role in total inland transport performance in European UN/ECE member countries.

2. A very dynamic growth of inland navigation observed during the first two decades after World War II was followed by a moderation of its growth rate which then turned into a stagnation. This explains why the volume of goods carried by European inland waterways practically did not change during the decade from 1980 to 1990, staying below 1.3 billion tons a year. The same trend may be observed in the development of inland navigation traffic performance as it accounts for some 300 billion t-km both in 1980 and in 1990.

3. This general development has been caused by a number of basic factors which were of importance either for the entire European continent or for parts of it only.

4. Among the main factors of all-European importance which contributed to the present state of inland navigation, the following could be mentioned:

(a) In the framework of general economic development, a fundamental shift has occurred in the structure of economies with the input and output of industries of primary importance for inland navigation, operating with large quantities of raw materials consumed and commodities produced, stagnating or even decreasing;

(b) An ever-increasing process of economic cooperation and integration has contributed to the setting-up and development of a chain of commodity production/distribution centres covering large regions which are most suitably serviced by road transport;

(c) Road freight transport became the dominant mode of transport in Europe due to its basic advantages of flexibility, ease of entry/exit, low capital requirements, and door-to-door service;

(d) Fierce competition with railways on some of the most profitable markets, which is often disadvantageous for inland navigation on certain waterways where railways are able to provide higher reliability of traffic and exceptional flexibility of prices;

(e) A tendency has appeared in the transport policy of many European Governments to limit their involvement in the development and maintenance of inland water transport infrastructure. As a result the development of inland water transport infrastructure became heavily under-financed throughout Europe.

5. Other negative factors were specific to countries of Central and Eastern Europe:

(a) Historically in the mouth of rivers running into the North Sea, outstanding trade and transport centres have been developed which give access to inland waterways leading deep into the continent. Such

centres are much less prominent in other parts of Europe which explains a lower level of traffic volume on the inland waterways they are situated on;

(b) Equally, at an earlier stage before railway and road transport had acquired a substantial importance, the existing network of inland waterways was developed in certain regions of Western Europe. In contrast, in Central and Eastern Europe, as a result of speeding up the construction of railways, the development of inland waterways was in general neglected;

(c) The transport of goods within the limited collection/distribution network may be carried out first of all by small shipping enterprises characteristic for Western Europe. Centrally-planned economy made the existence of such small enterprises in countries of Central and Eastern Europe impossible even in regions where there were sufficient infrastructural conditions for their operation;

(d) Under the market economy the competition in the market of commodities of a low processing level means, first of all, the competition of prices. The producers of these sorts of commodities had, therefore, to move their enterprises closer to inland waterways in order to ensure cheap transport components in the price of their products. This tendency has so far hardly been seen in the countries of Central and Eastern Europe due to the general insensitivity of their economy in the past to the cost of production/distribution, a complicated system of production subsidies and the special position of railways in the transport sector;

(e) In countries of Central and Eastern Europe, ports form a part of industrial or shipping enterprises playing a marginal role in their development. In the course of the privatization in these countries, the State is trying to get rid of its involvement in the development and maintenance of port infrastructure, which makes it difficult for these ports to be integrated into a pan-European network of regional transport and logistics centres;

(f) In contrast with Western Europe, the share of construction materials, such as gravel and sand taken from the bed of inland waterways, was very high in the total volume of goods carried by inland waterways of Central and Eastern European countries. The recession which hit the building industry at the beginning of the 1980s, and a subsequent fall in the extraction of building materials, left the inland navigation industry in these countries with about half of its usual cargo base.

6. All these unfavourable factors explain the poor performance of inland navigation in Central and Eastern Europe where its share in modal split in t-km stays in general below 5%, while in countries - members of the European Union - this share reaches some 10% and increases even to some 25% in international Community-related transport.

7. In spite of the above-mentioned, there are, however, good reasons to believe that inland water transport, similarly to railway transport, has prospects for further development on the European continent.

8. The overproportioned growth of road transport gave rise to a concern of both the public at large and Governments with regard to negative aspects concerning the environment, safety, congestion, etc.

9. In this respect, measures are already being taken by some Governments in order to improve the environmental performance of transport, relieve congestion and limit the growth of goods transport by roads, particularly on main international arteries. Such measures include, in particular, the promotion of combined transport including aids for its infrastructure, the use of incentives and taxes in order to encourage the use of environmentally-sound means of transport and land planning measures. In some densely populated and highly motorized western European countries, where there exist dense road and motorway networks, Governments are taking an increasingly closer look at how existing infrastructures, including those of the other modes, can be better used.

10. Being the friendliest mode to the environment and having an outstanding safety and energy-consumption record, inland navigation may contribute to the improvement of the overall European transport system. Furthermore, in contrast with other modes of transport, inland waterways are not only a transport infrastructure element but represent an environment for flora and fauna, provide amenities, are used for energy production and serve as a source of drinking, irrigation and industrial water supply.

11. In order to make inland navigation play a more significant role in the all-European transport system, a well-coordinated programme of action should be elaborated and carried out by Governments concerned aimed at:

(a) The development of a pan-European network of modern trunk inland waterways of international importance and ports capable of playing a role as regional transport and distribution centres;

(b) Encouraging modern methods of navigation (container, ro-ro, coastal/sea-river navigation, pushed towing, etc.);

(c) Elimination of administrative, technical and legal barriers for navigation by inland waterways of international importance. In so doing, a balance should be struck between the level of safety required and the acceptable degree of freedom of navigation;

(d) Development of the main principles governing navigation on the network of European inland waterways of international importance, and harmonization of provisions relating to the access to the international inland navigation market;

(e) Promoting transport by inland waterways through the use of economic instruments, such as incentives and taxation, and taking into account external costs of the various modes of transport.

Annex

TABLES AND GRAPHS

Table 1: Freight transport by inland waterways per country

	Transported amount of goods, thousand tons			Transport performance, million ton-kms		
	1980	1990	1992	1980	1990	1992
Austria	7,615	8,140	6,705	1,556	1,663	1,462
Belgium	100,930	98,269	89,496	5,853	5,448	5,083
Belarus	11,403	18,397	18,101	1,916	1,804	990
Bulgaria	4,817	2,630	1,238	...	1,606	837
Former Czechoslovakia	9,975	9,847	9,585[1/]	3,444	4,795	3,820[4/]
Finland	925	1,772	1,678	...	...	...
France	92,197	66,086	70,900	12,151	8,581	8,631
Germany	240,985	231,574	229,924	51,435	54,803	57,239
Hungary	3,524	2,825	9,097	1,874	1,882	1,495
Italy	3,057	705	483	203	115	65
Luxembourg	10,683	10,846	10,895	330	336	338
Netherlands	269,269	287,399	262,201	33,478	35,706	33,570
Poland	22,270	9,975	7,875	2,325	1,034	751
Romania	12,338	12,044	6,198	1,658	2,094	1,890
Russian Federation[3/]	354,381	410,179	233,214	166,151	156,727	95,155
Switzerland	9,064	9,507	8,694	57	56	50
Ukraine	51,341	65,728	40,758	10,712	11,925	8,217
United Kingdom	11,280	5,993	5,910	433	215	200
Yugoslavia	34,088	26,140	20,708[2/]	7,580	7,345	17,238[2/]
Total	1,250,142	1,278,056	1,033,660	301,156	296,135	237,031

Source: ECE Annual Bulletin of Transport Statistics for Europe and statistics received from Governments.

[1/] Data for the Czech Republic (6,773) and Slovakia (2,812) for 1993 altogether
[2/] Data for 1991
[3/] Data for European part of the Russian Federation
[4/] Data for the Czech Republic (2,978) and Slovakia (842) for 1993 altogether

Table 2: Modal split of inland freight traffic, % (A - in tons, B - in ton-kms)

		Railway			Road			Inland waterways			Pipelines		
		1980	1990	1992	1980	1990	1992	1980	1990	1992	1980	1990 0=	1992
Austria	A	...	...	31.5	...	...	33.0	...	...	1.7	...	...	33.8
	B	...	...	32.0	...	...	27.6	...	...	1.2	...	...	39.2
Belgium [3]	A	14.0	...	11.4	66.2	...	70.9	19.8	...	17.7	...	...	...
	B	24.9	...	15.9	56.9	...	73.4	18.2	...	10.7	...	...	...
Bulgaria	A	19.2	...	25.8	78.8	91.7	68.4	1.2	...	1.0	0.8	...	4.7
	B	56.8	...	55.3	32.4	51.3	36.9	8.4	...	6.0	2.4	...	1.8
Czech Republic	A	43.9	...	63.1	54.0	...	33.8	2.0	...	3.1	...	...	...
	B	84.1	...	83.5	13.1	...	12.9	2.8	...	3.6	...		...
Finland [3]	A	7.9	6.9	6.4 [2]	91.8	92.6	93.2 [2]	0.2	0.4	0.4 [2]	...	...	...
	B	30.9	23.8	23.9	68.3	74.9	74.6	0.8	1.3	1.4	...	...	...
France	A	11.3	8.6	8.2	78.2	83.7	84.1	4.9	3.8	3.6	5.6	...	4.1
	B	32.4	27.3	26.0	45.8	58.8	59.2	5.6	3.9	3.4	16.2	...	11.4
Germany [4]	A	36.0	29.0	29.4	30.5	41.8	44.3	24.8	22.1	18.7	8.6	7.1	7.5
	B	30.8	24.9	23.5	38.0	48.0	52.2	24.4	21.8	19.1	6.8	5.3	5.2
Hungary	A	25.1	...	28.4	71.9	...	59.6	...	...	2.9	3.0	...	9.1
	B	60.8	...	40.3	26.3	...	13.6	...	...	20.9	12.9	...	25.9
Netherlands	A	2.9	2.1	2.1	56.1	59.6	60.2	35.3	33.5	32.2	5.8	4.8	5.5
	B	5.8	3.9	3.8	29.6	44.7	45.9	56.1	45.2	43.5	8.5	6.2	6.8
Poland	A	22.5 [5]	...	14.8	74.7 [5]	...	82.4	0.8 [5]	...	0.6	2.0 [5]	...	2.2
	B	68.7 [5]	...	51.3	20.8 [5]	...	37.4	0.8 [5]	...	0.7	9.7 [5]	...	10.0
Romania	A	12.7	...	13.3	85.7	...	84.2	0.6	...	0.7	1.0	...	1.8
	B	68.2	...	58.8	25.0	...	31.9	2.1	...	4.0	9.7	...	5.3
Russian Federation [4]	A		31.2 [2]	33.5		43.8 [2]	40.8		8.2 [2]	6.3		16.8 [2]	19.4
	B		46.6 [2]	45.3		1.3 [2]	1.0		3.9 [2]	3.1		48.2 [2]	50.6
Slovakia	A	...	53.0 [1]	48.3	...	44.5 [1]	50.7	...	2.5 [1]	1.0	...	...	...
	B	...	76.0	67.3	...	13.1	26.1	...	10.9	6.6	...	...	...
Switzerland	A	12.2	9.6	...	82.2	86.4	...	2.3	1.7	...	3.3	2.3	...
	B	47.8	38.8	...	45.5	55.9	...	0.4	0.2	...	6.8	5.1	...
Ukraine	A		27.0 [2]	28.2		70.7 [2]	69.5		0.9 [2]	0.8		1.4 [2]	1.5
	B		76.0 [2]	75.2		14.8 [2]	14.4		2.2 [2]	1.8		7.2 [2]	8.6
Yugoslavia	A	51.3 [5]	...	58.8	30.1 [5]	...	26.2	18.6 [5]	...	15.0	...	...	...
	B	47.6 [5]	...	40.7	33.1 [5]	...	27.4	17.0 [5]	...	22.3	2.3 [5]	...	9.6

Source: ECE Annual Bulletin of Transport Statistics for Europe.

[1]/Data for 1988; [2]/Data for 1991; [3]/Without pipelines; [4]/Data submitted by the Government; [5]/Data for 1985.

Table 3

Modal split in ECMT member countries[1/] in ton-kms, % (1992)

	1970	1975	1980	1985	1990	1992
Railway	31.3	25.3	23.2	21.2	17.4	17.0
Road	56.2	62.9	65.9	69.3	74.2	75.1
Waterway	13.5	11.8	10.9	9.5	8.4	7.9
Total	100	100	100	100	100	100

1/ Belgium, Switzerland, Germany, Denmark, Spain, France, Finland, Italy, Norway, Portugal, Sweden, United Kingdom.

Table 3(continued)

Modal split in some countries in transition[2/] in ton-kms, % (1992)

	1970	1975	1980	1985	1990	1991	1992
Railway	80.8	76.4	72.7	73.7	67.5	64.6	62.6
Road	16.2	21.0	24.5	23.6	29.6	32.3	34.4
Inland waterways	3.0	2.6	2.8	2.7	2.9	3.1	3.0
Total	100	100	100	100	100	100	100

Source: ECMT information circular 1994.

2/ Bulgaria, Czech Republic, Estonia, Hungary, Croatia, Lithuania, Poland, Romania and Slovakia.

Table 4

Development of inland transport and modal split in EC member countries

Traffic within the European Community

	Road		Railway		Waterway		Total	
	billion tkm	%	billion tkm	%	billion tkm	%	billion tkm	%
Total intra-Community traffic								
1986	652.1	73.1	147.6	16.6	92.1	10.3	891.0	100.0
1987	696.0	74.7	146.1	15.7	89.2	9.6	931.0	100.0
1988	756.0	75.7	147.3	14.8	94.7	9.5	998.0	100.0
Domestic traffic								
1986	538.0	79.7	110.8	16.4	26.5	3.9	675.0	100.0
1987	571.0	80.9	109.3	15.5	25.7	3.6	706.0	100.0
1988	615.0	82.0	108.3	14.5	26.5	3.5	750.0	100.0
International intra-Community traffic								
1986	114.1	52.7	36.8	17.0	65.6	30.3	216.5	100.0
1987	125.5	55.6	36.8	16.3	63.5	28.1	225.8	100.0
1988	141.0	56.8	39.0	15.7	68.2	27.5	248.2	100.0

Table 4 (continued)

International traffic (intra-Community and between the EC and third countries)

	Road		Railway		Waterway		Total	
	million tons	%	million tons	%	million tons	%	million tons	%
1986	205.0	44.4	65.3	14.1	191.9	41.5	462.2	100.0
1987	222.3	47.0	64.1	13.6	186.0	39.4	472.4	100.0
1988	250.7	48.3	68.4	13.2	199.8	38.5	518.9	100.0
1988[1/]		27.4		26.3		46.3		

Source: Navigation, Ports et Industries; 30 January 1992.
Bedeutung der Binnenschiffahrt in Europa 1991. VBW.

[1/] Traffic between EC and third countries, including river-sea navigation.

Table 5

Distribution of inland waterways traffic in tons (National/Foreign), %

		1980	1985	1990	1992
Austria (Danube)	national	44.1	39.5	38.8	35.4
	foreign	55.9	60.5	61.2	64.6
Belgium	national	...	44.4	42.2	...
	foreign	...	55.6	57.8	...
Czech Republic	national	96.2	98.3	99.3	99.8
	foreign	3.8	1.7	0.7	0.2
Finland	national	17.5	7.4	6.5	7.9
	foreign	82.5	92.6	93.5	92.1
France	national	68.7	58.3	55.7	55.7
	foreign	31.3	41.7	44.3	44.3
Hungary (Danube)	national	62.5	52.4	26.2	35.8
	foreign	37.5	47.6	73.8	64.2
Luxembourg	national	1.6	1.7	1.7	1.3
	foreign	98.4	98.3	98.3	98.7
Slovakia (Danube)	national	24.3	39.2	28.6	13.3
	foreign	75.5	60.8	71.4	86.7
Switzerland (Rhine)	national	48.0	45.0	23.0	21.0
	foreign	52.0	55.0	77.0	79.0

Source: Information received from Governments.

Table 6: Development of the size of the European inland navigation fleet

	Number of vessels			Carrying capacity, thousand tons			Power, thousand kW		
	1980	1990	1992	1980	1990	1992	1980	1990	1992
Austria	214	232	225	195.8	257.9	250.2	46.1	44.4	41.7
Belgium	3,297	1,942	1,845	1,843.7	1,523.2	1,475.0	645.6	541.8	513.7
Bulgaria	...	...	274	...	...	370.6	...	...	...
Czech Republic	...	...	854	...	...	697.8	...	...	165.1
Finland	114	151	177	...	...	...	...	...	...
France	5,465	3,292	2,878	2,537.1	1,652.6	1,551.7	653.8	466.0	615.6
Germany	4,153	3,077	3,749	3,672.0	3,056.0	3,328.7	1,341.9	1,115.9	1,238.7
Hungary	280	246	249	241.4	236.4	251.2	33.3	39.0	34.4
Italy	2,564	3,127	3,127	...	...	...	...	...	...
Luxembourg	18	25	28	11.8	28.6	28.1	7.3	14.3	14.3
Netherlands	7,891	6,998	6,534	4,959.9	5,969.0	5,818.1	1,829.6	2,156.0	2,134.0
Poland	...	2,713	2,102	...	1,066.8	812.4	...	171.8	147.6
Romania	...	...	1,302[1/]	...	...	1,329.9[1/]	...	...	...
Russian Federation	...	...	12,219[2/]	...	...	9,302.8[2/]	...	...	2,863[2/]
Slovakia	...	...	...	299.3	387.3	389.9	47.3	60.0	63.8
Switzerland	413	186	156	599.7	321.5	281.4	207.2	117.7	105.1
Ukraine	...	875	838	...	946.3	961.0	...	277.7	282.5
United Kingdom	...	721	830	...	171.5	205.0	...	56.6	69.0
Yugoslavia	1,244	1,139	...	761.2	741.9	...	100.7	118.8	...

[1/] Data for 1993.

[2/] Data for the European part of the Russian Federation at the end of 1993.

Table 7

Breakdown of the navigation fleet on the Danube by carrying capacity, % (1993)

Country	Carrying capacity, tons						
	0 - 399	400 - 649	650 - 999	1000 - 1499	1500 - 1999	2000 - 2999	+ 3000
Austria	-	3.4	9.3	20.5	66.8	-	-
Bulgaria	0.1	0.4	5.1	19.2	49.3	25.9	-
Germany[1/]	5.6	2.3	10.0	26.9	55.2	-	-
Hungary[1/]	1.7	22.0	2.4	31.4	42.5	-	-
Romania	3.7	2.2	5.8	33.4	23.0	19 .4	12.5
Slovakia	-	0.8	11.2	12.3	1.5	73.3	0.9
Ukraine	-	-	31.6	21.6	29.9	8.5	8.4
Yugoslavia	0.9	8.7	16.3	36.3	36.5	1.3	-
Total Danube fleet	1.7	3.7	13.6	27.6	29.9	16.8	6.7

Source: Annuaire statistique de la Commission du Danube.
Calculations by the ECE secretariat.

[1/] Data for 1990.

Breakdown of the navigation fleet on the Rhine by carrying capacity, % (1990)

Country	Carrying capacity, tons						
	0 - 249	250 - 399	400 - 649	650 - 999	1000 - 1499	1500 - 2999	+ 3000
Switzerland	-	1	-	3	15	81	-
France	<1	60	4	12	1	22	1
Germany	<1	2	5	20	31	41	1
Netherlands	<1	5	14	20	21	33	7
Belgium	-	20	8	12	20	26	14
Total Rhine fleet	<1	8	10	19	23	34	6

Source: Rapport annuel de la CCNR.
Calculations by the ECE secretariat.

Table 8

Composition of the cargo vessel fleet operating on the Rhine and on the Danube (1990)

Breakdown of the fleets by their carrying capacity, %

	Rhine	Danube
Towed barges	2	27
Pushed barges	23	63
Self-propelled vessels	75	10

Breakdown of self-propelled vessels by carrying capacity, %

Carrying capacity, tons	0 - 399	400 - 649	650 - 999	1000 - 1499	1500 - 2999		+ 3000
Rhine	16	12	20	27	22		3
Carrying capacity, tons	0 - 399	400 - 649	650 - 999	1000 - 1499	1500 - 1999	2000 - 2999	+ 3000
Danube	2	7	8	17	23	4	39

Breakdown of pushed barges by carrying capacity, %

Carrying capacity, tons	250 - 399	400 - 649	650 - 999	1000 - 1499	1500 - 2999		+ 3000
Rhine	4	7	5	5	66		13
Carrying capacity, tons	0 - 399	400 - 649	650 - 999	1000 - 1499	1500 - 1999	2000 - 2999	+ 3000
Danube	<1	1	14	24	39	15	7

Source: Annuaire statistique de la Commission du Danube.
Rapport annuel de la CCNR.
Calculations by the ECE secretariat.

Table 9

Development of the average carrying capacity of vessel fleets on the Rhine and on the Danube, in tons

	Self-propelled vessels		Pushed/towed barges		Total	
	1965	1990	1965	1990	1965	1990
Rhine	552	872	666	1763	594	985
Danube	909	1188	668	1074	677	1084

Source: Annuaire statistique de la Commission du Danube.
Binnenschiffahrt in Zahlen 1992, BdB.

Table 10

Breakdown of shipping companies in EC member countries by number of vessels owned, %

	1975		1980		1987	
	No. of companies owning		No. of companies owning		No. of companies owning	
	1 - 2 vessels	3 or more vessels	1 - 2 vessels	3 or more vessels	1 - 2 vessels	3 or more vessels
Netherlands	...	...	96	4	96	4
Germany	...	...	...	...	95	5
France	...	...	93	7	93	7
Belgium	...	...	97	3	97	3
EC altogether	95	5	...	...	95	5

Source: ECMT Report on inland waterways. CM (89)27.
Bedeutung der Binnenschiffahrt in Europa, 1991. VBW.

Table 11

Transport cost calculations for the route Rotterdam-Central Europe, DM/t

Origin/destination	Road	Railway	Waterway
Vienna	110.62	124.77	64.47
Bratislava	110.62	126.54	69.01
Budapest	123.90	134.50	72.56
Belgrade	188.50	151.31	77.87

Table 12

External costs of freight transport by different modes of inland transport in Germany, Pfennig/tkm
(1985)

	Road	Railway	Waterway
Accidents	1.891	0.115	0.015
Noise generation	0.370	0.637	-
Air pollution	1.455	0.177	0.212
Water and soil pollution	0.428	-	-
Effects of delimitation	0.061	-	-
Utilization of lands	0.054	0.022	-
Total	4.259	0.952	0.227

Source: Navigation, Ports and Industries, 10 July 1991.

(1989)

	Road	Railway	Waterway
Water and soil pollution, noise load	0.87	0.70	<0.01
Accidents	1.78	0.12	0.01
Air pollution	2.36	0.33	0.34
Total	5.01	1.15	0.35

Source: Binnenschiffahrt 1991/92. Geschäftsbericht der BdB.

(1990)

	Road	Railway	Waterway
Air pollution	1.93	0.27	0.28
Water and soil pollution	0.40	-	-
Noise load	0.35	0.68	-
Total	2.68	0.95	0.28

Source: Towards a European policy for the inland water transport industry. 1991, NEA/Planco.

Table 13

Aggregate total of all transport-related costs by different modes of inland transport (according to German statistics) Road transport = 1.00

	Road	Railway	Inland waterway	
	Trailer unit	Train	1350-ton motor vessel	Two-barge pushed convoy
1983	1.00	0.32	0.20	0.12
1989 (estimation)	1.00	0.32	0.25	0.13

Table 14

Primary energy utilization and specific emissions by different modes of inland transport (according to German statistics)

	Roads	Railways	Inland waterways
Primary energy use, kJ/t-km	2,889	677	584
Specific emissions, g/tkm			
CO_2	207.00	41.00	42.00
CH_4	0.30	0.06	0.06
NO_X	3.60	0.20	0.50
CO	2.40	0.05	0.17

Source: Navigation, Ports et Industries, 10 July 1991.

Table 15

Forecast of traffic flows for major trans-European inland navigation routes, million tons/year

	Rhine route	East-West route	North-South route	South-East route 3/
1989 traffic	297.5	8.3 1/	47.3 2/	2 - 7
Forecast for 2000	309.9	19.4	49.1	8 - 10
Change	+ 4.2%	+ 133.8%	+ 3.8%	+200 - 300%

Source: Proposal of the Commission of EC on the creation of a European inland waterway network. COM (92)231 final.

1/ Data for 1988. 2/ Data for 1987.

3/ Cargo flow to/from the Community member countries.

Table 16

Development of iron ore exports, million tons/year

	1984	1989	1992
World total	372.5	420.3	365.9
Brazil	88.6	111.6	106.0
Australia	85.5	104.5	102.8
India	25.7	33.5	28.5
Europe total	...	24.7	22.6
France	4.8	3.5	2.9
Sweden	17.6	17.5	15.5
USSR (former)	45.9	39.9	27.0

Table 16 (continued)

Development of iron ore imports, million tons/year

	1984	1989	1992
European Community	123.5	140.1	122.7
Belgium-Luxembourg	19.6	19.8	18.0
France	16.1	20.0	17.4
Germany	42.5	47.2	41.3
Netherlands	7.2	8.1	7.5
EFTA	...	7.1	7.7
Austria	3.9	4.2	3.9
Eastern Europe	56.7	50.3	23.4
Czechoslovakia (former)	15.0	14.1	11.8
Hungary	4.2	3.3	2.4
Poland	17.1	13.4	6.5
Romania	15.0	13.6	2.3

Source: UNCTAD Commodity Yearbook 1994.

Table 17

Development of crude steel production, million tons/year

	1984	1989	1992
World total	711.1	784.7	716.8
European Community	134.5	139.6	132.3
Belgium-Luxembourg	15.3	14.7	13.4
France	19.0	18.7	18.0
Germany	39.3	41.1	39.7
Netherlands	5.7	5.7	5.4
EFTA	14.1	14.1	12.6
Austria	4.9	4.2	3.9
Switzerland	1.0	1.1	1.1
Eastern Europe	214.2	219.1	146.3
Czechoslovakia (former)	14.8	15.5	11.1
Hungary	3.7	3.3	1.6
Poland	16.5	15.1	10.0
Romania	14.4	14.4	5.4
USSR (former)	154.2	160.1	116.8
Yugoslavia	4.2	4.5	1.6

Source: UNCTAD Commodity Yearbook 1994.

Table 18

Development of hard coal exports, million tons/year

	1986	1989	1992
World total	340.1	386.1	461.9
USA	77.5	91.4	92.9
Canada	25.9	32.8	27.4
China	9.8	15.3	23.8
Kazakstan	-	-	43.5
Europe total	52.8	42.6	70.6
Czechoslovakia	2.4	2.2	-
Czech Republic	-	-	5.4
Germany[1/]	7.5	6.4	1.6[2/]
Poland	34.9	28.9	19.6
Soviet Union	33.5	42.5	-
Russian Federation	-	-	34.1

Table 18 (continued)

Development of hard coal imports, million tons/year

	1986	1989	1992
Europe total	155.0	152.6	224.5
Austria	3.7	3.7	3.8
Belgium	8.5	12.7	14.0
Bulgaria	7.3	6.2	3.7
Czechoslovakia	4.8	4.5	-
Czech Republic	-	-	1.7
France	17.0	15.9	22.0
Germany[1/]	17.4	11.1	15.4[2/]
Hungary	2.3	1.7	0.6
Netherlands	12.3	13.1	14.0
Romania	5.7	5.8	5.8
Russian Federation	-	-	39.7
Slovakia	-	-	2.5
United Kingdom	10.5	12.1	20.4
Yugoslavia	4.8	3.5	2.2[3/]

Source: UN Energy Statistics Yearbook, 1989-1992.

[1/] For years 1986 and 1989 GDR and FRG altogether.
[2/] Estimation.
[3/] Data for 1991.

Table 19

Development of crude oil exports, million tons/year

	1984	1989	1992
Total world	1,050.2	1,234.9	1,277.7
United Kingdom	77.3	49.2	53.8
Norway	28.7	65.3	92.8
USSR (former)	125.6	128.1	54.4

Table 19 (continued)

Development of crude oil imports, million tons/year

	1984	1989	1992
European Community	357.0	392.5	463.1
France	72.0	66.7	70.2
Germany	66.9	66.3	100.0
Netherlands	45.0	51.5	56.8
EFTA	34.2	34.0	39.4
Austria	5.9	5.9	7.2
Eastern Europe	101.6	105.7	52.0
Bulgaria	12.5	14.0	4.8
Czechoslovakia (former)	15.6	17.6	13.1
Hungary	8.8	6.3	8.4
Poland	13.6	15.0	17.9
Romania	13.5	18.6	7.7

Source: UNCTAD Commodity Yearbook 1994.

Table 20

Outlook for world primary energy supply, million tons of oil equivalent

	1989	1990	1991	1992	2010
Total World	7,790.6	7,800.1	7,922.5	7,932.4	11,560
Coal		2,302.3	2,304.2	2,293.2	4,299[1/]
Crude oil		3,257.5	3,255.1	3,277.3	3,363
Total OECD	4,087.0	4,079.8	4,164.7	4,196.3	5,296
Coal		1,029.0	1,042.6	1,025.3	2,021[1/]
Crude oil		1,694.8	1,710.7	1,748.8	1,299
Former USSR	1,368.9	1,343.4	1,336.6	1,230.2	1,332
Coal	306.0	288.8	257.6	243.4	200[1/]
Crude oil	495.7	462.5	454.1	378.5	391
Non-OECD Europe	369.9	329.9	299.7	274.7	375[2/]
Coal	187.7	160.4	151.2	142.5	103[1/]
Crude oil	104.1	83.6	65.2	57.3	151

Source: International Energy Agency: Energy statistics and balances of non-OECD countries, 1989-1992.
International Energy Agency: World energy outlook, 1994 edition.

[1/] Total solid fuels.

[2/] Countries of Central and Eastern Europe only (Albania, Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovakia and the former Yugoslav Republics).

Table 21

Development of total transport demand 1980 - 1988 and expected changes until 2000

Commodity	Trend		Expectation		
	1980-85	1985-88	West	East	Together
Agricultural products	+	++	=	+	+
Food products and fodder	++	+	=	++	+
Solid mineral fuels	=	---	=	++	+
Oil products	--	--	=	++	+
Metal products	+	+	+	++	++
Crude or processed mineral products, building material	---	++	=	++	+
Fertilizer	--	=	--	--	--
Chemical products	++	++	++	+	++
Machines, vehicles and manufactured goods	++	++	++	++	++
All commodities together	--	++	+	++	++

Legend: ++ Heavy increase --- Heavy decrease = Constant
+ Moderate increase -- Moderate decrease

Source: Transport Research and Training (NEA) and Planco Consulting-Ges.MBH (PLANCO): Towards a European Policy for the Inland Water Transport Industry, 1991.

Table 22

Modal split of goods traffic in some inland navigation ports, thousand tons

	1980			1985			1990			1992		
	rail	road	inland water-ways	rail	road	inland water-ways	rail	road	inland water-ways	rail	road	inland water-ways
Praha	110	1,060	591	119	820	636	128	1,198	1,089	151	856	660
Budapest/Csepel	873	240	869	673	192	594	657	121	451	234	213	147
Liege	254	1,929	6,885	200	1,344	6,239	438	1,734	7,353	1,426	3,089	7,683
Wien	...	...	1,115	2,032	3,360	1,479	2,762	4,831	1,491	2,682	4,518	1,063

Source: Calculations of the secretariat.

Table 23: Transport infrastructure investments of ECMT countries in 1975 prices, millions ECU

Code: A - Inland water transport infrastructure
B - Total inland transport infrastructure

		1975	1980	1981	1982	1983	1984	1975-1984
Germany	A	262	163	167	178	188	206	2,195
	B	6,182	5,836	5,253	4,879	4,736	4,600	55,898
Austria	A	8	5	1	1	9	7	46
	B	711	877	780	709	734	724	7,659
Belgium	A	77	83	96	82	87	78	826
	B	962	1,058	961	843	674	601	9,051
France	A	99	43	35	36	29	41	516
	B	3,672	3,319	3,021	2,686	2,892	2,506	30,930
Luxembourg	A	...	...	...	...	...	...	0.6
	B	...	...	...	...	...	...	397
Netherlands	A	69	42	31	44	43	61	289
	B	1,019	878	792	207	212	156	6,739
Switzerland	A	...	...	...	...	...	...	10
	B	...	...	...	...	...	...	8,192
Finland	A	5	5	6	7	6	5	53
	B	414	403	397	402	382	383	3,933
Italy	A	5	7	9	9	10	8	82
	B	1,632	1,316	1,474	1,654	1,915	2,102	15,173
United Kingdom	A	3	3	3	3	2	3	28
	B	1,807	1,308	1,226	1,305	1,316	1,331	13,765
Yugoslavia	A	73	70	78	79	82	72	828
	B	704	1,115	900	708	703	699	9,091

Source: ECMT report CM(89)27.

Table 24: Expenses for transport infrastructure from German federal budget

Year	Federal long-distance roads	Local roads	Railways	Federal waterways
1960	1,700	--	1,103	377
1970	5,018	970	3,358	794
1975	5,824	2,140	8,061	1,453
1980	6,830	2,421	11,397	1,620
1985	6,158	2,628	13,100	1,832
1990	6,724	2,630	12,393	1,943
1991	8,366	3,290	19,471	2,332

Source: Binnenschiffahft in Zahlen, 1992. BdB, VBW.

Table 25

Length of inland waterways network by countries, kms (1993)

Country	Length of navigable inland waterways		
	of regional importance	of international importance	Total
Austria	7	351	358
Belarus	1,849	635	2,484
Belgium	677	836	1,513
Bulgaria	-	470	470
Czech Republic	-	303	303
Finland	5,370	875	6,245
France	3,988	1,829	5,817
Germany	1,465	4,826	6,291
Hungary	1,034	430[1/]	1,464
Italy	258	1,108	1,366
Luxembourg	-	37	37
Netherlands	2,648	2,398	5,046
Poland	3,496	309	3,805
Romania	367	1,411	1,778
Russian Federation 1/	27,845	6,322	34,167
Slovakia	157	265	422
Switzerland	-	21	21
Ukraine	2,4262/	1,221[2/]	3,647
United Kingdom	530	662	1,192
Yugoslavia	426	993	1,419

Source: UN/ECE Annual Bulletin of Transport Statistics.
Information received from Governments.

[1/] European part of the Russian Federation.

[2/] Approximate data.