TRANSPORT INFRASTRUCTURE REGIONAL STUDY (TIRS)
IN THE BALKANS

FINAL REPORT

prepared by
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on behalf of the French Ministry of Foreign Affairs

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World Bank, European Bank for Reconstruction and Development, Stability Pact,
Danube Commission, UNECE/TER, UNECE/TEM
Pan European Corridors VII and X

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RESUME ET CONCLUSIONS

Le rapport ci-après constitue le Rapport Final de l'Etude Régionale des Infrastructures de Transport dans les Balkans, communément appelée l'étude TIRS. Cette étude a été entreprise dans le cadre du Pacte de Stabilité. Elle n'est en réalité que la première phase d'un exercice qui doit se prolonger sur plusieurs années. Les termes de référence de cette étude, qui sont présentés en Annexe 11, ont été préparés par les organismes européens les plus impliqués dans le développement du système régional de transport de l'Europe du Sud-Est, à savoir la Banque Européenne d'Investissement (BEI), la Commission Européenne et la Conférence Européenne des Ministres des Transports (CEMT). Le Gouvernement français a financé cette première phase de TIRS au travers de l'Agence Française de Développement (AFD), la CEMT assurant la supervision des études. La Banque Mondiale et la Banque Européenne de Reconstruction et de Développement (BERD) ont aussi participé à l'examen critique des versions provisoires des documents d'étude.

L'étude a été attribuée à un bureau d'études français, Louis Berger S.A. à la suite d'une consultation restreinte. Elle a été menée de mars 2001 à janvier 2002. Un rapport intérimaire, avec des conclusions préliminaires, a été présenté en juin 2001 et discuté à une conférence tenue à Bucarest les 12 et 13 juillet 2001. Une version préliminaire du rapport final a été préparée au début de janvier 2002 et discutée à une conférence qui s'est tenue à Paris les 14 et 15 février 2002. L'équipe d'étude s'est rendue à plusieurs reprises dans les différents pays intéressés par l'étude, et s'est efforcée d'y développer d'étroites relations de travail avec les autorités en charge de l'organisation et du développement des transports, de manière à évaluer au mieux les conditions et les besoins de transport existants dans ces pays ou susceptibles d'y apparaître dans les prochaines années. On a sollicité en permanence de ces autorités des avis, des orientations ou des commentaires, et notamment à l'occasion des deux conférences organisées au cours de l'étude, dans le but d'arriver à des recommandations finales à la fois réalistes et acceptables par les pays concernés.

L'étude a couvert sept pays, l'Albanie, la Bosnie et Herzégovine, la Bulgarie, la Croatie, la République Fédérale de Yougoslavie, l'Ex République Yougoslave de Macédoine et la Roumanie. Les objectifs de la Phase 1, tels que définis par les termes de référence, étaient les suivants:

- Identifier les axes principaux de communication aux plans international et régional,
- Définir un réseau cohérent de transport à moyen terme, qui puisse servir de cadre à la planification, à la programmation et à la coordination des investissements d'infrastructure,
- Définir des projets prioritaires pour les prochaines années et pouvant intéresser un financement international.

L'exercice TIRS a consisté pour l'essentiel en un examen critique des plans de développement et des programmes d'investissements préparés par les différents pays de la région pour l'amélioration de leur système de transport dans la perspective des objectifs de développement du secteur des transports.

Ces objectifs sont divers par la force des choses. Les sept pays de la région sont dans des situations éminemment différentes. Leurs demandes particulières d'investissements en infrastructures de transport sont donc de nature différente et se traduisent par des projets de
type différent. Les objectifs qui apparaissent régulièrement au niveau national sont les suivants:

a. Reconstruction d'infrastructures détruites ou endommagées,
b. Réhabilitation d'infrastructures existantes dégradées suite à un entretien insuffisant,
c. Amélioration des principales infrastructures afin d'offrir une meilleure qualité de service,
d. Développement de nouvelles infrastructures de transport modernes et à forte capacité
sur les principaux axes de communication pour satisfaire la demande à long terme.

Chacun des sept pays de la région poursuit actuellement un panachage des objectifs ci-dessus, qui est en relation plus ou moins directe avec l'importance et la période de son implication dans les dernières crises des Balkans. Ainsi la République Fédérale de Yougoslavie se concentre sur les deux premiers objectifs, en essayant lorsqu'elle le peut d'améliorer parallèlement quelques infrastructures, la Bosnie et Herzégovine a pour l'essentiel réalisé le premier objectif et poursuit à présent les deux suivants, la Bulgarie et la Roumanie sont préoccupées par les deux derniers objectifs alors que la Croatie se focalise sur le quatrième. L'Albanie de son côté a hérité de nombreuses années de sous-investissement et se concentre, comme la Bosnie et Herzégovine, sur le second et le troisième objectif.

Au niveau de la région dans son ensemble, et en accord avec les termes de référence, le rapport suggère que les objectifs spécifiques du réseau de transport pourraient être exprimés comme suit:

- Porter ou maintenir le système de transport entre les principaux centres économiques et démographiques de la région à des standards techniques et à un niveau de service correspondant à la demande de transport,
- Faciliter, améliorer ou raccourcir quand il est possible les connexions entre les réseaux de transport nationaux,
- Faciliter l'accès à la région et le transit à travers la région du trafic extérieur à celle-ci, dans des conditions normales de confort et de sécurité,
- Rationaliser, simplifier et accélérer les procédures de franchissement des frontières dans toute la région,
- Mettre en place des accords inter-régionaux visant à coordonner le développement des principales infrastructures de transport ou à améliorer les services de transport par une coopération plus étroite et une gestion commune des équipements et du matériel, lorsqu'elle est réalisable.

De tels objectifs au niveau régional ne sont pas en contradiction avec les objectifs nationaux d'accessibilité interne et de distribution. Ils doivent néanmoins se traduire par des programmes d'investissement accordant une place particulière aux projets intéressant les liaisons d'importance inter-régionale et à ceux ayant le plus d'impact sur le trafic international.

Les réseaux de transport dans les Balkans se sont développés au cours des siècles derniers en fonction des échanges effectifs et des besoins de transport, mais aussi en fonction de l'environnement politique. Ces facteurs ont été modifiés récemment de façon significative. Cependant on peut dire que les liaisons assurant l'accessibilité de base à la région existent déjà, même si certaines ont des caractéristiques insuffisantes et n'assurent qu'un niveau de service médiocre, conséquences d'un long retard sur les investissements et d'un entretien largement insuffisant. Le rapport a ainsi défini un réseau de base pour l'étude TIRS composé
pour l'essentiel par des infrastructures existantes. Ces infrastructures ont été décrites au moyen d'un système d'information géographique (GIS). Le rapport présente aussi une vue synthétique de l'organisation du secteur des transports par pays, ainsi que le niveau d'activité des transports par mode pour l'ensemble de la région. Cet examen inclut les difficultés et les contraintes de franchissement des frontières.

La situation économique de la région a été examinée dans le cadre de l'évaluation des potentialités de croissance, et plus particulièrement pour la détermination des paramètres nécessaires à la formulation des modèles gravitaires de transports de personnes et de marchandises, utilisés pour les prévisions de trafic sur la période 2000-2015. Considérant les difficultés d'établir des prévisions dans le contexte actuel de la région, une analyse de sensibilité a été introduite sur la base de trois scénarios, avec des hypothèses optimistes, vraisemblables et pessimistes pour la croissance du PIB, de la population et de l'activité agricole et industrielle.

L'analyse des potentialités de croissance montre que la demande de transport par route doit continuer à croître régulièrement à moyen terme, poussée par le redressement économique régulier que devrait connaître la région. En moyenne, le trafic routier devrait plus que doubler d'ici 2015. Par contre, on ne s'attend pas à une croissance significative du transport ferroviaire durant la même période, le trafic ferroviaire de marchandises étant étroitement lié à l'avenir des activités minières et industrielles, pour l'instant encore incertain. Toute amélioration du niveau de vie se traduira automatiquement par une mobilité accrue de la population, mais qui doit avant tout se reporter sur le trafic routier par le biais de l'accroissement rapide du taux de motorisation.

Le développement des réseaux de transport routiers dépendra principalement de la croissance du trafic local, qui représente 85 à 98 % du trafic total, à l'exception des franchissements de frontière. Le trafic local doit croître un peu plus rapidement que le trafic international sur la plupart des liaisons internationales. En ce qui concerne les chemins de fer, qui ont souffert des crises récentes des Balkans, la perspective de revenir aux niveaux de trafic d'avant-guerre d'ici 2015 doit être considérée comme une hypothèse optimiste. Les transports fluviaux, notamment le long du Danube, encore plus sévèrement affectés par les crises récentes et en partie interrompus, devraient être restaurés aussi vite que possible pour profiter de leur compétitivité sur les autres modes de transport. On pense notamment aux travaux de nettoiement et de réhabilitation des couloirs de navigation aux normes de sécurité requises.

La capacité des infrastructures existantes a été évaluée au regard de la demande de transport actuelle et potentielle. On peut en conclure que, après l'achèvement de la reconstruction des ouvrages d'art ferroviaires de Bosnie et Herzégovine, il n'y aura plus de goulot d'étranglement physique sur les transports de surface, à l'exception de quelques ouvrages détruits ou endommagés en Yougoslavie.

Des problèmes de congestion sont néanmoins prévus à moyen terme sur quelques sections du réseau routier, et notamment:

- Sur le Corridor IV entre Sofia et la frontière grecque,
- Sur le Corridor X entre Belgrade et la Hongrie et, dans une moindre mesure, entre Leskovac et Kumanovo,
- Sur les routes desservant la côte Adriatique en Croatie, entre Zagreb/Rijeka et Split,
- Sur la route E763 entre Belgrade et Cacak,
Près des plus grandes agglomérations, comme Bucarest, Sofia, Belgrade ou Sarajevo.

Toutes les sections mentionnées ci-dessus nécessiteront d'être portées à moyen terme à quatre voies, autoroutières ou non. Les autres problèmes ponctuels de congestion dans la région devraient être sensiblement soulagés en mettant les routes existantes aux normes habituelles des routes à deux voies, avec voie supplémentaire pour véhicules lents dans les fortes rampes.

Les infrastructures existantes des autres modes de transport ne devraient pas connaître de phénomène de congestion avant longtemps. Les ports et les aéroports supportent actuellement des trafics dans la plupart des cas largement inférieurs à ceux d’il y a dix ans. Le développement à venir du transport maritime et aérien ne devrait en conséquence ne nécessiter d'investissement qu'avec des projets de modernisation ou de réhabilitation pour faire face à l'obsolescence des infrastructures et des équipements ou à l'évolution de la nature des trafics. Les voies ferrées ne devraient pas connaître d'augmentation notable de leur trafic et les lignes déjà proches de leur capacité pratique pourront, moyennant quelques adaptations mineures en voies de croisement et en signalisation, supporter des trafics plus élevés. Si l'on considère l'incertitude des perspectives du transport ferroviaire dans la région et la situation financière généralement critique des compagnies de chemin de fer, toute stratégie de développement des infrastructures ferroviaires devrait rester pour l'instant modeste et se focaliser sur les lignes les plus empruntées, en pratique celles situées le long des Corridors de Transport Pan-Européens. La réhabilitation systématique et l'amélioration de ces lignes devraient redonner une chance au transport ferroviaire de jouer son rôle et de garder ses marchés traditionnels. Des investissements lourds, tels que ceux liés à l'augmentation de la vitesse de ligne, au doublement des voies ou à l'électrification des lignes, doivent être soigneusement analysés. L'organisation des compagnies de chemin de fer et leur situation financière devront, dans la plupart des cas, être sérieusement améliorées avant que des investissements lourds ou pour le long terme puissent être envisagés.

S'agissant du transport intermodal, l'étude montre que ce type de transport est encore peu répandu en Europe du Sud-Est et que des équipements intermodaux spécifiques, lorsqu'ils existent, sont largement sous-utilisés. Les opérations de transfert d'un mode à un autre sont pratiquées dans les ports fluviaux ou maritimes, ou dans les stations de chemin de fer, avec du matériel et du personnel sous la responsabilité du port ou de la compagnie ferroviaire en question. Le développement de ces capacités de transfert intermodal est en général inclus dans les plans de développement des ports et des chemins de fer.

La longue liste des projets d'investissement en infrastructure transport présentés par l'exercice TIRS a été établie en étroite collaboration avec les autorités en charge du secteur dans chacun des pays, et soigneusement réexaminée avec ces mêmes autorités après que ces projets aient fait l'objet d'un examen complémentaire. La présentation de quelques projets pourra néanmoins apparaître comme dépassée, dans la mesure où des accords de financement sont en permanence en gestation entre les pays et les organismes de financement. Des accords de financement tout récemment finalisés ont pu ainsi échapper au Consultant.

La définition de chacun des projets d'infrastructures ainsi proposés, l'estimation de leur coût et l'état de leur financement ont été systématiquement vérifiés dans chaque pays avec les différents départements, sociétés ou agences intéressées par ces projets, sous la supervision des correspondants officiels de TIRS au sein de l'administration locale. Chaque fois qu'il l'a pu, le Consultant a vérifié les principaux éléments des projets discutables. Il n'a malheureusement
pas été possible de le faire pour chaque projet, du fait de la difficulté d'accès aux documents correspondants.

L'évaluation des projets retenus dans la longue liste a ensuite été réalisée afin d'établir un programme d'investissements pour la région. Pour ce faire, les projets ont été classés au moyen d'une analyse multicritère axée sur deux soucis fondamentaux, la rentabilité socio-économique de l'investissement d'une part et de l'autre la fonctionnalité et la cohérence du réseau résultant. Les projets ont été classés en quatre catégories, selon leur intérêt global et la fiabilité de leur définition. Les projets classés en Catégorie I sont considérés comme immédiatement finançables et peuvent être réalisés dans les meilleurs délais. Les projets classés en Catégorie IIa et IIb nécessitent quelques analyses complémentaires avant que leur financement soit approuvé. La Catégorie IIa couvre les projets les plus intéressants et les mieux définis et la Catégorie IIb des projets plus discutables. La Catégorie III regroupe tous les projets qui doivent être écartés pour le moment. La classification des projets ainsi faite résulte directement de l'appréciation faite par le Consultant des différents critères pris en compte dans l'analyse, sur la base des informations qui lui ont été communiquées. Elle n'engage pas les membres du Comité Directeur de l'étude, qui pourraient avoir une appréciation différente de ces critères pour certains projets spécifiques.

Pour parvenir à la sélection finale des projets à inclure dans les programmes de développement des infrastructures à court et à moyen terme, les enveloppes budgétaires pour les projets de Catégorie I et IIa ont été ajustées pour correspondre en gros avec la capacité globale de financement des pays de la région pour des investissements en infrastructure de transport, estimée à 1,5 % du PIB\(^1\). Ce niveau d'investissement a été aussi admis dans les récentes études TINA pour le développement des infrastructures dans les pays éligibles à l'accession dans l'Union Européenne.

L'analyse des projets considérés comme immédiatement finançables ou vraisemblablement finançables (Catégories I et IIa) a conduit aux résultats suivants:

- Parmi les 153 projets de ces deux catégories, les projets de réhabilitation comptent pour 73 (48 %), les projets d'amélioration pour 49 (32 %) et les projets d'extension ou de nouvelles infrastructures pour 31 (20 %).
- La répartition du budget d'investissement correspondant donne 42 % pour les routes, 40 % pour les chemins de fer, 6,5 % pour les ports maritimes, 7 % pour les voies navigables et 4,5 % pour les aéroports.
- En première analyse, les capacités de remboursement du pays pourraient constituer une contrainte majeure pour la Bosnie et Herzégovine et pour la Bulgarie, alors que la Croatie garde quelques possibilités en la matière. En ce qui concerne les quatre autres pays de la région, les budgets correspondants aux projets classés dans les Catégories I et IIa sont en accord avec les capacités théoriques de financement de ces pays.

La distribution des projets et des budgets d'investissement selon les quatre catégories de projets est donnée ci-après pour chacun des sept pays et pour la région dans son ensemble.

\(^1\) Résolution n°97/1 du CEMT sur le Développement des Transports et des Infrastructures, adoptée à Berlin les 21 et 22 avril 1997.
Beaucoup de projets d'infrastructure ne trouveront de fait leur pleine justification que dans la mesure ou des aménagements institutionnels et des accords bilatéraux ou multilatéraux auront été réalisés entre temps.

Parmi les problèmes institutionnels les plus critiques pour la mise en œuvre d'une gestion saine du développement des infrastructures, il faut certainement faire mention de la capacité réduite de la plupart des États ou des agences étatiques à générer les ressources financières nécessaires au fonctionnement, à l'entretien ou au renouvellement des infrastructures de transport. En ce qui concerne l'infrastructure routière, les ressources budgétaires résultant de la taxation des carburants et des véhicules sont dans la plupart des pays ou bien largement utilisées à d'autres fins ou bien insuffisantes pour financer à la fois un entretien normal et une amélioration du réseau. Les moyens de prélever et d'affecter automatiquement les ressources budgétaires nécessaires sont connus, mais leur mise en place et leur application restent très progressives. Les ressources financières sont aussi limitées pour la plupart des sociétés de chemin de fer, qui n'ont généralement pas adapté leur organisation et leurs moyens en personnel à la réduction de la demande et par voie de conséquence dépendent actuellement de subventions disproportionnées. Des restructurations draconiennes seront dans la plupart des cas nécessaires pour permettre aux chemins de fer de réhabiliter leur image et de jouer leur fonction naturelle.

L'entretien des infrastructures a été sérieusement négligé au cours des dix dernières années, et il est essentiel que les pays de la région développent ou renforcent leurs systèmes d'entretien, avec les moyens financiers appropriés, afin de sauvegarder le capital de leurs infrastructures.

Les systèmes d'information sur les infrastructures de transport et sur les activités de transport sont en général insuffisants pour permettre une planification adéquate du développement et de l'entretien.

Parmi les accords bilatéraux ou multilatéraux que l'on devrait s'efforcer d'obtenir dans les prochaines années, on doit mentionner:

<table>
<thead>
<tr>
<th>Pays/ Catégorie</th>
<th>Selon</th>
<th>I</th>
<th>IIa</th>
<th>IIb</th>
<th>III</th>
<th>Tous Projets</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Nombre</td>
<td>8</td>
<td>9</td>
<td>2</td>
<td>5</td>
<td>24</td>
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<td>Coût en € Mio</td>
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<td>67</td>
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</tr>
<tr>
<td></td>
<td>Coût en € Mio</td>
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</table>
- La reconnaissance du statut international de la rivière Sava, ainsi que la répartition des charges de son exploitation et de son entretien entre les pays riverains,
- Une utilisation plus facile du port croate de Ploce par le trafic en provenance ou à destination de Bosnie et Herzégovine.
- Une meilleure coordination pour l'aménagement des Portes de Fer sur le Danube,
- La simplification et l'accélération des procédures de passage des frontières notamment pour le transport ferroviaire, avec un seul point de contrôle des marchandises et un contrôle des passagers à bord des trains en circulation.

Les recommandations du présent rapport seront affinées par des études ultérieures, notamment par la seconde phase de l'exercice TIRS, qui doit être conduite par la Commission Européenne. Il est prévu que cette Phase 2 couvrira, entre autres thèmes, quelques études de pré-faisabilité et quelques études prospectives de marché, le développement d'un système d'information approprié au niveau régional, avec la création d'un centre de documentation qui s'assurera que les informations les plus importantes et la documentation sur le système des transports des Balkans sont régulièrement collectées et mises à la disposition des utilisateurs potentiels.
EXECUTIVE SUMMARY

The present report constitutes the Final Report of the Transport Infrastructure Regional Study in the Balkans, commonly referred to as the TIRS study. This study is undertaken in the context of the Stability Pact and constitutes actually the first phase of a longer exercise. Its Terms of Reference, attached in Appendix 11, have been established by the lead European agencies involved in the development of the regional transport network in South-Eastern Europe, namely the European Investment Bank (EIB), the European Commission and the European Conference of Ministers of Transport (ECMT). The French Government, through the "Agence Française de Développement" (AFD), provided the grant resources for this first phase, ECMT being responsible for the supervision of the work. The World Bank and the European Bank for Reconstruction and Development (EBRD) were also involved in the reviews and commented on the draft reports.

The study was contracted to a French consulting firm, Louis Berger S.A. after a tender, and has been conducted between March 2001 and January 2002. An Interim Report, with preliminary conclusions, was presented in June 2001 and discussed at a Conference in Bucharest, on the 12th and 13th July 2001. The Draft Final Report of the study was issued at the beginning of January 2002 and discussed at a Conference in Paris, on the 14th and 15th February 2002. The study team visited on several occasions the different countries involved in the study, and endeavoured to develop close relations with the Authorities in charge of transport management and development in these countries, in order to better assess the transport conditions and requirements prevailing at the present time and likely to develop in the future. Advice, guidance and comments have been regularly solicited from these Authorities, in particular through the two conferences organised during the study, in order to arrive at final recommendations both realistic and acceptable by all countries.

The study area encompasses seven countries, Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Federal Republic of Yugoslavia, the Former Yugoslav Republic of Macedonia and Romania. The objectives of TIRS Phase 1, as stipulated by the Terms of Reference, were essentially:

- To identify major international and regional routes in the region,
- To define a coherent medium term network to be used as a framework for planning, programming and co-ordinating infrastructure investments, and
- To define short-term priority projects suitable for international financing.

TIRS has, of necessity, been an independent yet critical review of existing plans and programmes which the different Authorities in the region have developed as their basis for infrastructure improvements in response to defined objectives for transport development in their countries.

These objectives are varied. At present the seven countries in the region are facing very different situations. As a result, their individual requests for transport infrastructure investments are of a different nature and result in substantially different types of projects. The national objectives which regularly appear are:

a. Reconstruction of destroyed or damaged facilities,
b. Rehabilitation of existing facilities severely deteriorated through lack of maintenance,
c. Upgrading principal facilities in order to offer improved levels of service, and
d. Development of substantial and modern transport infrastructure on the main communication axes so as to meet expected long-term requirements.

The current objectives for each country are a mix of the above and depend directly on the time at which a country started its transition process and the extent of its involvement in the recent crises within the Balkans. Typically, for example, FRY is focused on the first two objectives, attempting to upgrade its facilities as far as possible; Bosnia and Herzegovina has mostly attained the first objective and is at present preoccupied by the two following ones; Bulgaria and Romania are concerned by the two last objectives whereas Croatia is mainly concerned with the fourth objective. Albania on the other hand is developing from many years of under-investment, and is concentrating, like BiH, on the second and third objectives.

The report suggests that at the level of the region as a whole, and in line with the Terms of Reference of TIRS, specific transport infrastructure objectives could be expressed as follows:

- Raise or maintain the transport communication system between the main economic and demographic centres in the region at technical standards and with the quality of service required by transport demand,
- Facilitate, improve and shorten wherever possible the connections between different national transport networks,
- Facilitate access to the region and transit through the region, of foreign traffic, at required standards of comfort and safety,
- Rationalise, simplify and accelerate the procedures at border crossings throughout the region, and
- Introduce inter-regional agreements in order to co-ordinate development of the main transport infrastructure and to improve transport services by jointly operating equipment or rolling stock whenever feasible.

Such objectives at a regional level do not contradict national objectives of internal accessibility and distribution. They should, however, result in investment programmes giving greater emphasis to projects on links of inter-regional importance and to those with the greatest impact on international traffic.

Transport networks in the Balkans have developed for centuries according to actual trade and travel requirements but also to political constraints. Both factors have significantly changed recently, but the links to provide basic accessibility to the region already exist, even if many of them are sub-standard and provide a poor level of service, largely as a result of accumulated under-investment and a lack of adequate maintenance. This report has therefore defined a network for the TIRS study that is mostly based on existing infrastructure, which has been described using a geographic information system. The report also summarises transport organisation by country and the current activities on the various modes throughout the region. This includes the difficulties and constraints to transport movement across borders.

Economic conditions in the region have been examined as part of the assessment of the overall potential for growth and more specifically for determining the parameters for insertion into the gravity model developed for forecasting passenger and freight demand over the period 2000 – 2015. Given the difficulties of forecasting in the region, sensitivity analyses have been undertaken reflecting three scenarios spanning optimistic, medium and pessimistic levels of growth for GDP, population and agricultural and industrial activity. The results of the analysis indicate that transport demand by road should continue to increase regularly in
the medium term, supported by the steady economic recovery expected in the region. On average, road traffic should more than double before 2015. Conversely, railway transport is not expected to develop significantly in the same time, as rail freight traffic is largely dependent on the future of mining and industrial activities, and on the success of the reconversion of these activities. Any increase in prosperity will surely be reflected in more passenger mobility, but this will at first profit to road traffic through a rapid increase in car usage. Development of Road transport networks will be mainly governed by the growth of local traffic, which represents 85 to 98% of total traffic, except near border-crossing points. Local traffic is expected to grow a little faster than international traffic on most international routes. For the Railways, which have suffered the most from recent Balkan crises, the prospect of restoring pre-war levels of traffic before 2015 should be considered an optimistic assumption. On the other hand Inland Waterways transport, especially along the Danube, which has suffered extensively from the recent crises and in parts has collapsed completely, should be restored as quickly as possible because of its competitiveness, by cleaning and rehabilitating navigation channels to required safety standards.

The capacity of existing infrastructure has been examined, leading to the general conclusion that, once ongoing reconstruction of railway bridges in Bosnia & Herzegovina is completed, there will be no physical bottlenecks on the surface transportation networks, with the exception of a few bridges destroyed or damaged in Yugoslavia.

Traffic congestion is however expected to become a constraint in the medium term, but only on a few sections of the highway network, namely:

- on Corridor IV between Sofia and the Greek border,
- on Corridor X between Belgrade and Hungary and to a lesser extent between Leskovac and Kumanovo,
- along the roads servicing the Adriatic coast in Croatia, between Zagreb/Rijeka and Split,
- on the E 763 road between Belgrade and Cacak, and
- near the largest cities, like Bucharest, Sofia, Belgrade and Sarajevo.

All of the links listed above should require upgrading to four lanes expressway/motorway in the medium term. Other localised congestion in the region should be significantly reduced by upgrading existing roads to regular 2 lane highway standards, with the addition of crawler lanes, when necessary, in mountainous terrain.

The existing facilities of other modes of transport should not be congested for some considerable time to come. Ports and Airports currently support much less traffic than ten years ago; as a consequence, future development of air and maritime transport should only need investment for appropriate modernisation or rehabilitation projects in response to the evolving nature of traffic. Railway lines should not experience any noticeable increase in traffic, and those lines which are already close to their capacity could, with some minor adaptations in signalling and crossings, handle higher levels of traffic if necessary. Given the unclear prospects for rail transportation in the region and the generally poor financial situation of the railway companies, any strategy for rail infrastructure development should remain modest for the moment and concentrate on the most trafficked lines, basically those along the Pan European Transport Corridors. Systematic rehabilitation and progressive upgrading of these lines should give railway transportation a chance to play its role and to protect its natural markets. Major investments, such as those which may lead to a significant increase in
the nominal minimum speed, the doubling of tracks or the electrification of lines, should be carefully analysed. The management of rail companies and their financial situation has in most cases to improve before more important and long-term investments may be envisaged.

Regarding intermodal transport, the study found that this form of transport is still limited in the countries of South-Eastern Europe and that specific intermodal facilities, when they exist, are largely under-utilized. Most intermodal transfer operations are accommodated in seaports or river-ports, or in railway stations, with equipment and personnel under the responsibility of relevant rail or port companies/agencies. The development of intermodal transfer capabilities is thus generally included in individual development plans for ports and railways.

The long list of projects, presented through the TIRS initiative for future investments in transport infrastructure in the Balkans region, has been established in close liaison with the transport authorities in each country and selectively reviewed when it has been possible to make a more detailed examination of specific project materials. The presentation of some projects may nevertheless prove to be obsolete, as financing agreements are continuously discussed between countries and financing institutions. Recently decided funding agreements may therefore not have been taken into account in this report.

The definition of the proposed infrastructure projects, the associated cost estimates and the status of their financing have been systematically checked with the different responsible departments or entities in every country, under the supervision of the official correspondent for TIRS in the local administration. Whenever possible, the Consultant has checked the essential elements of critical projects. It was not possible to do this for every project, as relevant documentation was in many cases not readily available.

In evaluating this long list of projects for establishing future investment programmes across the region, potential projects have been classified through a multi-criteria analysis centred around two basic concerns, namely the socio-economic return on investment on the one hand and the functionality and coherence of the network on the other hand. Projects have been classified into four categories, depending on their overall interest and on the reliability of their definition. Projects under Category I are deemed to be immediately eligible for financing and should be implemented immediately. Projects under Categories IIa and IIb necessitate some additional analyses before they may be approved for financing. Category IIa includes the most worthwhile and well-defined projects whilst Category IIb contains rather more questionable projects. Category III includes all projects which should be discarded for the moment. The resulting classification is derived directly from the Consultant's assessment of the different criteria taken into account in the analysis, on the basis of information provided to him. This classification does not bind the members of the study's Steering Group, which may have a different assessment of these criteria for certain specific projects.

In arriving at the final selection of projects for inclusion in the short and near term programmes for infrastructure development, budgetary envelopes for Categories I and IIa have been tailored to fit approximately with the estimated global financial affordability of transport infrastructure investments by the countries in the region, taken as 1.5% of GDP\(^1\). This level of investment is compatible with the earlier TINA studies for infrastructure development in countries being considered for accession to the European Union.

\(^1\) ECMT Resolution n° 97/1 on Transport and Infrastructure Development adopted in Berlin on 21-22 April 1997.
The consequent analysis of the projects considered as eligible or likely to be eligible (Categories I and IIa) produced the following results:

- Out of 153 projects, rehabilitation projects account for 73 (48 %), upgrading projects for 49 (32 %) and extension or new infrastructure projects for 31 (20 %).
- Distribution of the corresponding budget between the modes gives 42 % for highways, 40 % for railways, 6.5 % for seaports, 7 % for inland waterways and 4.5 % for airports.
- At first sight, reimbursement capabilities could constitute a real constraint for Bosnia and Herzegovina and Bulgaria, whereas Croatia has still some spare capacity in this respect. For the four other countries, the budgets corresponding to projects categorised in Categories I and IIa fit with the theoretical financing capabilities of those countries.

Distribution of projects and investment budget by category is given hereunder for each country and for the region as a whole.

<table>
<thead>
<tr>
<th>Country/ Category</th>
<th>By I</th>
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<th>IIb</th>
<th>III</th>
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<td>6,175</td>
<td>8,442</td>
<td>27,545</td>
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The full value of many infrastructure projects will only be realised if institutional or bilateral/multilateral arrangements are reached in the meantime.

Among the most critical institutional problems in achieving an appropriate management of infrastructure development, is the reduced capacity of most of the States or of the State-owned companies to generate the necessary funds to operate, maintain and renew transport facilities. Regarding road infrastructure, budgetary resources derived from fuel or vehicle taxes are in most countries either largely used for other purposes or are insufficient to finance adequate maintenance and upgrading of the network at the same time. Awareness of appropriate measures to levy and earmark the necessary budgetary resources may exist but the introduction and full implementation of such measures is still slow. Financing capabilities are also limited for most railway companies, which in general have not adapted their organisation and their staffing to the rapid decline in demand and are over-subsidised at present. Drastic restructuring will in many cases be a pre-requisite before railways recover their attractiveness and play their normal role.
Infrastructure maintenance has been seriously neglected in the last decade and it is vital that countries introduce or reinforce their maintenance systems, with appropriate financing, to protect their existing assets.

Information systems on transport infrastructure and transport activities are in general insufficient to support adequate planning and programming of development and maintenance.

Among the bilateral/multilateral arrangements to be reached in the near future, we should mention inter alia:

- The recognition of international status for the Sava river and distribution of responsibilities among the riparian countries for its maintenance and operations,
- The facilitation of use of the Croatian port of Ploce by traffic to or from Bosnia and Herzegovina
- The facilitation of the passage through the Iron Gates,
- The facilitation and speeding-up of border crossing operations in general, in particular for railway transport, with a single control point for cargo and custom control on line for passengers.

The recommendations in this report should be refined by future works, in particular the second phase of TIRS that is being implemented by the European Commission. It is envisaged that Phase 2 will include, amongst other actions, some pre-feasibility studies and selective prospective analysis, the development of an appropriate information system at regional level based on the creation of a documentation centre to ensure that the most important information or documentation on the transport system of the Balkans is collected and made accessible for future users.
1 INTRODUCTION AND OVERVIEW OF THE REPORT

1.1 Introduction

1. This report constitutes the Final Report of the Transport Infrastructure Regional Study in the Balkans, commonly referred to as the TIRS study. The report has been prepared at the end of a twelve month period designated for the Study and follows publication of two reports, an Interim Report at the beginning of July 2001 and a Draft Final Report at the beginning of January 2002. The Interim Report was presented and discussed at a conference in Bucharest, held on the 12 and 13 of July 2001 and the Draft Final Report likewise at a conference in Paris on the 14 and 15 of February 2002. Official comments on these Reports have been taken into account in the preparation of this Final Report.

2. The TIRS study actually constitutes the first phase of a longer exercise. Its Terms of Reference have been established by the lead agencies involved in the development of the regional transport network in South-Eastern Europe, namely EIB, the European Commission and the European Conference of Ministers of Transport (ECMT). The French Government, through the “Agence française de développement” (AFD), has provided the grant funding for this first phase. A second phase will follow after March 2002, when Phase 1 will be completed with the production of the Final Report. This second phase will cover the next steps which are considered necessary to further improve the understanding of the transport system in the region, to set up appropriate procedures and structures for monitoring the development of such a system and to review some specific investment projects identified during the first phase. The detailed terms of reference for the second phase will be produced by the European Commission. This report however includes recommendations for the scope of the second phase of TIRS.

3. The study area encompasses seven countries, Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Federal Republic of Yugoslavia, the Former Yugoslav Republic of Macedonia and Romania.

4. The objectives of the current project are basically:
   - To identify major international and regional routes in the region,
   - To define a coherent medium term network to be used as a framework for planning, programming and co-ordinating infrastructure investments,
   - To define short-term priority projects suitable for international financing.

5. The TIRS exercise:
   - Is not the preparation of a Transport Master Plan for the Balkans, nor is it the preparation of seven National Transport Plans,
   - Deals only with the main communication infrastructure within the region, and not with the transport equipment, (e.g. rolling stock, airplanes, air traffic control, etc.)
   - Deals with the institutional issues only to the extent that they may constitute a serious impediment or constraint to the development of normal communications within the region or through the region, thus reducing the interest of new infrastructure investments.
6. The execution of the current project required the collection and processing of numerous data: macro-economy, demography, characteristics and the state of repair of transport infrastructure and facilities, external trade, present and past transport activities and traffic flows, etc. It also required a comprehensive knowledge of recent or planned development of different transport modes, in all of the seven involved countries.

7. It was clear that this level of research and analyses could not reasonably be undertaken from scratch, by the Consultant, in such a short period. In every country, the authorities, responsible for the transport sector, have developed appropriate systems of information over many years and regularly update their own planning and programming for transport. They have been supported by numerous studies, requested by themselves and often undertaken and monitored by multinational or bilateral aid. Most information and analyses necessary for the TIRS exercise are therefore already available in official documents or are contained in recent reports prepared by consulting firms. The main interest of the TIRS exercise is not in the collection of data but in the selection and utilisation of the most explicit information.

8. The Consultant had therefore to take due care of plans and programmes developed in each country, and to review the most important studies recently carried out, whilst maintaining an independent critique of proposals. Systematic visits have been organised in each of the seven countries, and appropriate meetings and work sessions conducted with key officials involved in the development of the different modes, under the auspices of official correspondents for TIRS, designated by the respective Ministers of Transport. These visits have been essential for discussing the importance of the different routes and for reviewing pending infrastructure projects.

9. With the exception of the existence of a few recent reports available on the web, the Consultant has experienced serious difficulties in identifying, locating and physically finding the reports of a number of important studies carried out over the last five years. Studies and other technical assistance projects are not systematically registered in a data bank, as they used to be by OECD before 1995. Some agencies keep libraries with selective important reports and documents, others do not. In many cases the Consultant has had to resort to searching for such reports and reviewing them in the different departments or agencies visited during field trips. It is to be regretted that such valuable research material is almost inaccessible and indeed may be progressively lost.

1.2 Purpose and Content of the Final Report

10. The Final Report presents all the findings of the project, together with information collected on the transport system, its organisation and its present and potential utilisation. It provides in particular:

- A review of the organisation of the transport sector in the different countries in the Balkans and of transport activities,
- The description of the study network, composed of transport infrastructure of international and regional importance,
- An assessment of the potential future traffic on the study network,
- A list of infrastructure projects considered on this network and not yet financed, with a fiche for each of these projects,
• The evaluation and classification of the above projects, and a corresponding investment programme for the short and medium terms,
• The identification of necessary accompanying measures,
• The recommended scope for Phase 2 of TIRS.

1.3 Miscellaneous Remarks

11. The Study Network selected by the Consultant differs somewhat from the networks considered in the region up to now, i.e. the Trans-European Corridors, the TINA network(s) and the Strategic Networks recently set out by the European Commission (see Maps 1, 3, 4 and 5). It closely resembles the TINA network(s) for Romania and Bulgaria and the networks analysed by EIB in its recent Western Balkans Transport Infrastructure Inventory, with the addition of a few links where traffic is significant; it only covers existing infrastructure. This network has been discussed, and sometimes completed, with the Authorities who have been met in the different countries. It is believed that the initial definition of the network should not be too restricted, in order to avoid eliminating projects from the long list which may have a real impact on existing communications within the region.

12. The review of the different reports prepared recently on the development of transport activities and infrastructure in the region, shows in general that the conclusions derive almost directly from the assumptions made on the evolution of transport demand or on traffic assignment. Such assumptions are actually very difficult to make at the present time. The economic situation of most countries in the region is still unstable and its future evolution depends largely on external events, like the integration within the European Union or the interest of potential investors in such or such industry. Similarly, the assignment of international traffic to one route or another is highly dependant on transit conditions, safety and prevailing tariffs: reopening Yugoslav routes for international traffic has thus led, in one year, to a dramatic switch of freight transit traffic from the “Romanian route” to the Yugoslav one, because of too high railway tariffs imposed by Romanian Railways.

13. In the present context, the most valuable data input for any prospective study like TIRS would be an overall review of the economies of the different countries, globally and by sector of activity (Agriculture, Heavy Industry, Light Industry, Mining and Quarrying, etc.), with their status and potentials identified. The Consultant has searched for such analyses, in the Funding Agencies as well as locally in the local Ministries of Economy or in the Chambers of Commerce, or in the reports he has reviewed. Such analyses are still embryonic or not readily available. Estimates of the national macro aggregates made by international institutions also at times seem questionable, given their excessive levels of growth or decline. Such estimates may often be biased by currency fluctuations and by the importance of effects of the hidden economy.

14. Under such circumstances, it appeared more realistic to the Consultant, when assessing future transport demand, to refer to present traffic flows, with due account being taken of present obstacles or impedance to traffic, and to make realistic assumptions on the likely evolution of key macro economic elements and on the constraints on each route. These assumptions will often be based on common sense or merely on fair judgement by experts. Such assumptions will be clearly stated in this report. Scientific approaches may seem more satisfactory: however they often simply hide behind sophisticated formulae and computations.
to counter the difficulty of quantifying key elements of the economy and may finally represent unrealistic and false considerations.

15. The extensive use of the notion of “Corridor” and “Network” has obviously had positive effects in bringing some “long distance communication” coherence to the development of transport networks in Central and Eastern Europe. However it may also be counter-productive if interested countries concentrate their efforts and their external financing resources on these corridors and networks, to too great an extent. Facilitation of long distance transport operations should not lead to overstating transport infrastructure. In this context, one should not consider that a road “Corridor” should be systematically equipped with a motorway. A modern two-lane highway, with good characteristics, appropriate shoulders and a crawler lane on long steep gradients, may accommodate significant levels of traffic to high standards of comfort and safety (see Appendix 5). Conversely, as is seen sometimes in the Balkans, a motorway constructed from an existing sub-standard two lane highway, by dualling through the provision of a new carriageway without shoulders, may not offer the sought level of comfort and safety and result in higher maintenance costs.

16. Inter-modal transport is still rare in the Balkans and inter-modal facilities or equipment do not, for the moment, constitute an impediment to the development of long distance traffic through the region. Existing inter-modal terminals, like those in Skopje and Dimitrovgrad, are largely under-utilised. Safety problems still hamper the utilisation of containers. Facilities may be expected to be progressively adapted to inter-modal transport, and actually most of the projects envisaged in seaports, river ports or in railway stations, include some inter-modal elements. Systematic multi-modal transport systems, requesting appropriate adaptation of infrastructure or rolling stock, like combined transport, may be envisaged in time.

17. Mention has to be made of the fact that, among the most critical institutional problems, the capacity of most of the States or of the State-owned companies to generate appropriate funds to operate and to renew transport facilities, when necessary, is poor. Regarding road infrastructure, budgetary resources derived from fuel or vehicle taxes are largely insufficient to finance adequate maintenance and the upgrading of the network at the same time. A feeling commonly met in Road Departments is that privately funded concessions will solve funding issues for important new infrastructure in many cases. Experience in other countries of Central Europe however demonstrates the limits and conditions that have to be kept in mind when preparing such arrangements (see Appendix 9). Financing capabilities are also limited for most railway companies, which in general have not adapted their organisations and staffing to the rapid decline in demand and are largely subsidised at present. Drastic restructuring will in many cases be a pre-requisite before railways may recover their attractiveness and play their normal role.

18. The long list of projects has been established in close liaison with the transport authorities in each country and reviewed when the projects have been more closely examined. The presentation of some projects may nevertheless prove to be obsolete, as financing agreements are continuously discussed between the countries and the financing institutions. Some agreements which were decided in the last two or three months have not been taken into account. Appendix 12 provides the lists of projects for which financing is considered as already secured by the different countries at the date of the Paris Conference (mid February 2002). These lists are reproduced as they were presented.
19. The definitions of new infrastructure projects, the associated cost estimates and the status of their financing have been systematically checked with the different responsible departments or entities in every country, under the supervision of the official correspondent for TIRS in the local administration. Whenever possible, the Consultant has checked the essential elements of critical projects. It was not possible to do it for every project, as relevant documentation was in many cases not readily available.
2 ECONOMIC FRAMEWORK

2.1 Overall Economic Situation of the Region

It appeared necessary to the Consultant to have a reliable overview of the economy of the region before preparing any assessment of the present and future transport demand. Appendix 2 presents a report on the demographic and economic situation of each of the seven countries in the region.

The situation obviously differs according to each country, because of their respective potentials and historical development, also because they entered into the process of transition at different times and were not affected in the same way by the recent political crisis in the region. Although we realise that quantifying the status of the Balkans’ economies is a much more perilous exercise than that for presently stable countries, we set out below some significant indicators for each country.

<table>
<thead>
<tr>
<th>Country</th>
<th>Present population in million (1999)</th>
<th>GDP in billion USD (1999)</th>
<th>% Agriculture</th>
<th>% Industry</th>
<th>% Services</th>
<th>% Exports</th>
<th>% Imports</th>
<th>GDP per capita in USD</th>
<th>GDP per capita, PPP assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albania</td>
<td>3.4</td>
<td>3.1</td>
<td>54</td>
<td>25</td>
<td>21</td>
<td>10</td>
<td>32</td>
<td>912</td>
<td>1,481</td>
</tr>
<tr>
<td>BiH</td>
<td>3.9</td>
<td>4.5</td>
<td>11</td>
<td>40</td>
<td>46</td>
<td>10</td>
<td>45</td>
<td>1,154</td>
<td>1,494</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>8.2</td>
<td>12.4</td>
<td>18</td>
<td>27</td>
<td>55</td>
<td>38</td>
<td>43</td>
<td>1,512</td>
<td>4,094</td>
</tr>
<tr>
<td>Croatia</td>
<td>4.5</td>
<td>20.4</td>
<td>10</td>
<td>32</td>
<td>58</td>
<td>41</td>
<td>48</td>
<td>4,533</td>
<td>5,287</td>
</tr>
<tr>
<td>FRY</td>
<td>10.6</td>
<td>16.2*</td>
<td>18</td>
<td>39</td>
<td>43</td>
<td>9</td>
<td>14</td>
<td>1,528</td>
<td>-</td>
</tr>
<tr>
<td>FYROM</td>
<td>2.0</td>
<td>3.4</td>
<td>12</td>
<td>28</td>
<td>60</td>
<td>41</td>
<td>57</td>
<td>1,700</td>
<td>1,039</td>
</tr>
<tr>
<td>Romania</td>
<td>22.5</td>
<td>33.8</td>
<td>16</td>
<td>40</td>
<td>44</td>
<td>29</td>
<td>33</td>
<td>1,702</td>
<td>4,034</td>
</tr>
</tbody>
</table>

* recent estimates for 2000

Such a table requires a few comments.

- In countries recently hit by war or in a transition process, the informal economy is the only way to survive for much of the population. Corresponding activities are either not taken into account, or are poorly assessed. GDP figures for the countries emerging from war have thus to be considered with some care, even more so if we keep in mind the fluctuations of the local currencies’ exchange rates. Significantly, exports and imports, which are more easily quantifiable, represent for most countries relatively high percentages of their estimated GDP, probably an indication of the under-estimation of the latter.

- With the exception of Albania, and to a much lesser extent Romania and Bulgaria, agriculture is at levels observed in many countries of the EU, whereas industry (+ construction) is still relatively important. As a clear indication of the development of the economies, services often account for more than half the GDP.
We may examine in Appendix 2 the recent evolution of these figures. They show in general a rather stable situation for agriculture, a regular decline in industry and a regular increase in services.

If we wish to draw some overall assessments of the economic situation of the region as a whole, we would say that:

- Industry, mainly heavy industry but also light industry, is still in the process of restructuring and may take some more time before stabilising, depending on new investments or the opening of new markets. Many plants will remain abandoned because of their obsolescence or stalled demand for their products. Conversely, construction activities will probably increase with the stabilisation of the economy and the important requirements for reconstruction or modernisation.

- Agriculture will probably be more resilient than industry, and even have some real potential for exports, mainly in Europe and the CIS. This is particularly relevant to countries like Bulgaria, FRY and Romania, with their high level of productivity and their rich soils.

- All indicators in the region show that the regular economic decline experienced during the past ten years should now have stabilised and indeed there may be a tendency for some recovery already.

2.2 Regional Trade

Attached to the country monographs in Appendix 2, are schemes representing the origin, destination and importance of the present foreign trade, extracted from year 2000 official statistics. These schemes clearly illustrate the pattern of trade in the region:

- Trade between the countries in the region is significantly reduced, except for certain traditional relations or for particular reasons (Bosnia and Herzegovina and FRY for example): they represent only 6 % of the total external trade of all countries in the region;

- Trade is strongly polarised towards the EU, which attracts 54% of external trade in the Balkans;

- Trade with CIS is quite significant for three countries, Bulgaria, FRY and Macedonia: they represent 15 % of the external trade of the region;

- Trade with Greece, Turkey and the Middle East is also quite sizeable for countries like Bulgaria and Romania. They represent 14 % of the external trade for the whole region.

The low level of trade within the region may be easily explained by the remaining natural hostility between certain countries, and also by the physical and administrative difficulties to cross the newly created borders, often as a result of that hostility. We may believe that such attitudes and their consequences will progressively soften and that steadier economic
relationships will be re-established between former traditional or natural trading partners. It may take some time.

When looking at the development of the basic transport inter-regional infrastructure, it will be necessary to take account of the importance of trade with the Middle East and with Eastern Europe. This will be reflected in the development of the gravity models for trade.

2.3 Likely Evolution

The above information and statements demonstrate how it may be difficult to assess the likely evolution of the economy in the coming 15 years. The crystal ball has yet to be found, and the political situation may still dramatically evolve, in many directions, with unfortunate results. An exercise like TIRS is not supposed to provide differential judgements on the economic strength and prospects of the different countries in the region, but is required only to assess the size and the spatial distribution of transport requirements, thus allowing funding to be identified for the most appropriate projects. We believe therefore that bringing differential assumptions to economic development according to the respective countries, would not result however in substantial differences with regard to the expected traffic volumes, and have therefore preferred to keep average assumptions for the region as a whole. These assumptions will be used in the modelling exercise and in traffic forecasting. They are presented in the table below.

Estimated yearly rates of increase of basic indicators throughout the period 2000 – 2015 in South-Eastern Europe (%):

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Pessimistic</th>
<th>Medium</th>
<th>Optimistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>2.0</td>
<td>3.5</td>
<td>5.0</td>
</tr>
<tr>
<td>Population except...</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>...Albania</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Agriculture</td>
<td>0.0</td>
<td>1.5</td>
<td>3.0</td>
</tr>
<tr>
<td>Industry</td>
<td>-3.0</td>
<td>0.0</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Assumptions on the evolution of the most critical indicator, Gross Domestic Product, are extracted from a prospective study made by OECD in 1997, “The World in 2020, Towards a New Global Age”.

3 TRANSPORT ORGANISATION AND ACTIVITIES

3.1 Review Country by Country

The general organisation for Transport is discussed for each country in the following sections of the report. More detailed technical descriptions of the study network have been developed for each mode in Appendix 4, where these have been identified, and the reader is referred to that appendix for further explanations on the status of the infrastructure.

3.1.1 Albania

Transport is headed in Government by the Ministry of Transport, which in the main has organised the sector through General Directorates, each with defined responsibilities. Although there are intentions to re-organise the Ministry those directorates currently are:

- General Directorate of Roads (GRD)
- General Directorate for Rail (GDR)
- General Directorate for Civil Aviation (GDCA)
- General Directorate for Maritime and Land Transport

However, government policy, encouraged in particular by the World Bank, has been moving towards privatisation particularly for transport operations within the sector. Consequently a number of activities have been partially or fully privatised including the majority of bus operations. Through the GRD privatised road maintenance operations are to be tested through pilot schemes currently under preparation.

Joint Stock Companies have been formed for Maritime, Rail and Civil Aviation activities, directed by the Transport Ministry and other Ministries through respective Supervisory Councils. Shares in those companies are owned by Government, through the Ministry of Public Economy and Privatisation. The Transport Ministry’s Directorates have seats on the respective Supervisory Councils, which have a general remit to ensure government policy is followed by those Companies.

In respect of infrastructure development other Ministries have inputs too; the Ministry of Economic Co-operation and Trade has particular influence when priorities for implementation and finance arrangements for schemes are being determined. Other Ministries have remits for inputs relating to Road Safety and the Environment. Whilst policy and general direction may be determined at Transport Ministry level, this goes before the Council of Ministers and the Prime Minister for approval where others are known to weald considerable influence particularly when foreign aid is involved. Albania is still a country where influence and control, even of detail, particularly when it comes to infrastructure development, goes to the highest level.

Within the Ministry there are also other Departments and Units with responsibilities across all activities of the sector, for budgets, economic planning, technical matters and monitoring. The Directorate of Maritime and Land Transport is responsible for transport operations (licensing,
regulation and registration for all modes), which also includes the registration of Albania’s Maritime Fleet. There is clearly an urgent need to introduce a suitable Port Authority Law, a Maritime code and appropriate Port rules and regulations.

Implementation of Road infrastructure is generally undertaken by GRD although recent changes have introduced split responsibilities for these activities, with direct involvement by technical staff within the Ministry for certain grant aided schemes.

3.1.2 Bosnia and Herzegovina

The organisation for the Transport Sector in BiH is complex, reflecting the political arrangements established through the Dayton Agreement. This has inevitably had a serious impact on the management and development of the sector’s activities with little evidence of recovery or strategic direction for the sector, even after 6 years following the end of the war.

The institutional arrangements for the transport sector are essentially divided between two levels of organisation; one at the State level and the other at the level of two entities, the Federation of Bosnia and Herzegovina (FbiH) and the Republica Srpska (RS), and the Brcko District. The establishment and operation of common and international communications facilities and regulation of inter-Entity transportation lies on institutions of B&H (presently Ministry of Civil Affairs and Communications). All governmental functions and powers not expressly assigned in Constitution to the institutions of Bosnia and Herzegovina shall be those of the Entities. Regional interests and actual implementation of schemes, particularly those for the highway network, are administered through the respective entity Ministries (Federation of BiH, Ministry of Transport and Communications and Republica Srpska’s Ministry of Transport and Communications.

The peace accord arrangements provide for Public Corporations to be responsible for Transport operations throughout the country. Just two (Road and Rail) have been agreed to date by the three political factions in the country but have not been developed into operational units due to lack of political consensus.

**In the road sector**, a Joint Road Infrastructure Public Corporation (BRIC) has been created in February 2000 to establish institutionalised co-operation among the two entities in the field of road infrastructure and to provide for the taking of whatever decisions are necessary to ensure smooth safe and regular traffic by road through the whole of Bosnia and Herzegovina. This corporation is not yet operational mainly due to lack of agreement on its financing between the two entities. The Federal Road Directorate may be financed through an ad-hoc Road Fund, whereas Republica Srpska finances its road system only from its general budget.

**Railways** in Bosnia and Herzegovina are run by two railway companies; the Federation BiH Railways and Republica Srpska Railways. These companies are arranged according to the geographical limits of the two political entities. The two main lines, Corridor Vc and the East-West line Bihac–Banja Luka–Doboj–Zvornik, are thus operated by one or other of the companies depending on the respective section and the territory it is passing through. Corridor Vc in this way is therefore cut into three different sections, and the East-West line into four. The two companies manage the infrastructure and provide the transport operations. Infrastructure, equipment and rolling stock is fully owned by the two entities. Railways in the Brcko District are operated by both Railway companies.
It is worth noting that two other railway lines of international importance cross BiH territory. The line from Bar to Belgrade has a section of 9.3km in BiH territory and the line from Knin to Bihac crosses the Croatian border 7 times within a distance of 73km. Operations on the first line are actually fully managed by Yugoslav Railways whilst on the second line, an agreement between BiH and Croatia allows a single operational system.

The Bosnia and Herzegovina Railways Public Corporation (BHZJK) is, for the moment, mainly responsible for developing the two main railway corridors, representing both entities’ companies for foreign and international relations and co-ordinating the two companies on operational and costing issues. The two railway companies are still in charge of the management of the railway infrastructure in their respective entity territory. It is the intention, like in many other European countries, to discharge these two companies of transport operations, and to allow new companies, private or semi-private, to take over such services. It is also the intention to transfer more managerial functions for key rail infrastructure to the Bosnia and Herzegovina Public Corporation, i.e. at State level.

Airports are attached to the two entities’ Civil Aviation Departments within the relevant Ministries, which in turn are coordinated by the Directorate of Civil Aviation at State level. In accordance to the Dayton Peace Agreement, the SFOR restored control and management of the air-space to relevant authorities of Bosnia and Herzegovina. Since B&H does not have neither infrastructure needed, nor personnel trained for performance of such work, the issue was settled as follows:

- Control of the upper airspace was entrusted to the Regional Control in Belgrade and Zagreb, until the construction of CEATS Regional Center in Vienna, while
- Control of the media airspace was entrusted, by a contract, to Zagreb Regional Control.

River ports are managed and financed for the time being by the Municipalities. This issue will be raised at the level of the State, Entities as well as B&H Brcko District.

3.1.3 Bulgaria

The Transport sector in Bulgaria is under the legal power of the Ministry of Transport and Communications. The Government of Bulgaria has formulated three main priorities in the transport sector:

- Harmonization of national legislation and transport regulations with those of the European Union Member States,
- Development of transport infrastructure,
- Implementation of structural reform and privatisation in transport.

In order to achieve the goals set forth by these priorities several steps have been taken:

- Elaboration and enactment of the following laws:
  - Civil aviation law, approved and put into effect from January 1st 1999,
  - Law on maritime areas, inland waterways and ports of the Republic of Bulgaria, approved and put into effect from February 14 2000,
  - Road traffic law approved and put into effect from September 1st 1999,
  - Road transport law, approved and put into effect from September 17 1999,
railway transport law approved and put into effect from January 1st 2002.
  - Preparation and submission to the National Assembly of the following laws:
  - Law for amendment of the Merchant Shipping Code

Besides the aforementioned laws, several regulations in air, road and maritime transport sectors are expected to be prepared and made operational within a short period, in order to accommodate EU regulations.

The Ministry comprises several Directorates and executive agencies each of which deals with a specific transport mode or with general transport policy, such as the Department of Transport Policy Infrastructure and construction which is responsible for setting up development strategies and priorities as well as dealing with international fund providers and donors.

**Road transport**

Two entities are responsible for road transport in Bulgaria:

- The Directorate General “Road Administration” which has been established within the Ministry of Transport and Communications and is responsible for road policy matters, including vehicle licensing, relations with other countries, etc.

- The implementing Agency “Roads Executive Agency” which is under the Minister of Regional Development and Public Works and has the responsibility for the maintenance and development of road infrastructure.

**Rail Transport**

With the new Railway Transport Law, the railway industry and other entities of the “Bulgarian State Railway” (BDZ), together with the commercial activities of railway transport are on the eve of being completely restructured, with the separation of infrastructure (National Company Railway Infrastructure) and transport operations (BZD EAD) in order to achieve open access to the railway network for licensed operators.

Furthermore an implementing agency, “Railway Transport Administration”, will be established in accordance with the law already approved by the Council of Ministers and examined by the National Assembly (Art. 6 & 7 of the Railway Transport Act, published in issue 97, year 2000 of the State Gazette).

**Air Transport**

Air Transport is dealt with by the implementing agency «Civil Aviation Administration” under the Minister of Transport and Communications. Privatisation in the air transport sector has been carried out swiftly with many difficulties arising from the privatisation of Bulgaria’s main air transport asset, “Balkan Bulgarian Airlines”.

**Maritime Transport**

Maritime transport is undergoing step-by-step privatisation. At present there is a new Executive Agency “Port Administration” which is in charge of all port infrastructure, be it maritime or on the Danube. Superstructures in the port (i.e. cranes, fork lifts, storage buildings, etc.) are planned to be the responsibility of private operators under concession agreements.
With respect to shipping companies, the separation of the qualification centre from the “Navigation Maritime Bulgaria” as well as the separation and subsequent privatisation of the tug fleet and the Bulgarian Register of Shipping is in progress. At present, there are two Executive Agencies in the maritime sector: Port Administration and Maritime Administration.

3.1.4 Croatia

The Transport sector in Croatia is dealt with by the Ministry of Maritime Affairs, Transport and Communications.

Within the Ministry, the transport sector is organised through General Directorates with executive agencies or state owned companies.

General Directorates have the responsibility for establishing general policies and transport operation regulations such as licensing for example.

A document defining the strategy for the Transport sector has been approved by the Croatian Parliament in 1999.

Road transport
In the road transport domain, Croatia has started an ambitious motorway construction programme for which tentative implications of the private sector has been sought with limited success. Therefore, the present road transport infrastructure responsibilities have been recently split into two separate entities:

- Croatian Road Authority (HC),
- Croatian Motorway authority (HAC),

along with two concession companies: Autocesta Rijeka-Zagreb and Istrian Motorways.

The Croatian Road Authority is a State owned entity in charge of maintenance and construction of the National Roads whilst the Croatian Motorway Authority, which is also a State owned entity, is responsible for maintenance and construction of the non-conceded motorway network.

Rail transport
The Croatian National Railway Company, HZ, is restructuring, in line with EU guidelines for the organisation of rail transport. The State will take over responsibility for organising the rail network and operators will have the possibility to operate on this network. At present, the State efforts are aimed at the improvement of HZ’s financial situation by rationalisation and restructuring. However, the task is very difficult for a small railway system, which operates on a 2726.5 km network.

Air Transport
The national airline company is a joint stock company, of mixed ownership, which started in August 7, 1989 under the name of “Zagreb Airlines”. In 1992, after independence of Croatia, the company restarted with scheduled flights to EU capitals under the name “Croatia Airlines”
3.1.5 Federal Republic of Yugoslavia

The transport sector is monitored, at the level of the Federation, by the Federal Ministry of Transport. Under this Ministry, two parallel administrations exist, one for Serbia and another one for Montenegro (Crna Gora). Co-ordination between the two administrations is weak, and the actual function of the Federal Ministry almost purely formal. The description below relates to the transport organisation in Serbia, the Montenegr one being solely of smaller size, but with the addition of a joint-stock company for running the only major sea port in the Federation, the Port of Bar.

Highways

In Serbia (including the autonomous regions of Kosovo & Metohija and of Vojvodina), the administration of roads is under the Road Directorate of Serbia, with a Department for Motorways and another for Main and Regional Highways. Road maintenance is carried out for the main and regional roads by an association of State owned companies called Serbia Put (Crna Gora Put in Montenegro), and for the motorways, it is contracted to public works companies, either private or State-owned. Local roads are the responsibility of the Municipalities.

The budget for road maintenance, routine and periodic combined, has fallen from € 194.5 million in 1990 to only 26.1 million in 2000. This is clearly insufficient for a network of 14,500 km of main and regional roads and 22,500 km of local roads. As a consequence, the road infrastructure has dramatically deteriorated over ten years, and on many road sections, the pavement has now to be totally reconstructed. The present lack of sufficient resources for the road system has arisen from institutional deterioration through the recent period. A Road Fund existed before 1992, financed by a fuel tax representing roughly 36 % of the selling price. The Fund has been progressively used for other purposes, and anyway experienced declining revenues from taxes, as the blockade of the country and the petroleum shortage led to the development of a black market for the provision of fuel. The new tax on petroleum products now represents less than 10 % of the selling price. However it is envisaged to raise this progressively to 30 %. Taxes on vehicles are only for registration, and are considered too low for heavy vehicles. There is no tax on axles, nor seemingly for the utilisation of vehicles. The toll levied on the motorway network, even on “half motorways”, is now the main resource for financing maintenance and development of the road system. It will raise some € 30 million in 2001 (It is worth noting that the toll for foreign vehicles is at present 15 times more than that for Serbian vehicles).

The specific problem of road funding has been purposely presented to underline that the reform of road user charging in Yugoslavia should be promptly initiated, and probably supported by an immediate road user charge study.

Railways

The railways are operated by Yugoslav Railways, a member of UIC, and under the control of the Federal Ministry of Transport. Infrastructure, as well as operations, is under two State-owned companies, JTP Belgrade for Serbia and JTP Podgorica for Montenegro. Internal organisation distinguishes rolling stock, movement and infrastructure. As recommended by
the EU, it is presently envisaged to divide Yugoslav Railways into two companies, one being in charge of infrastructure. Many believe that such a move would be premature, considering the present catastrophic financial situation of Yugoslav Railways. The railway system has long been financed by its direct sales (which represent now only 31% of its total costs) and through the federal budget by a general tax of 3% on all sales in the country, earmarked for the Railways. This tax has been cancelled recently and the deficit of Yugoslav Railways is now fully subsidised by Government.

The Yugoslav Railways maintain low tariffs for domestic traffic, and in this way remain competitive with other modes, particularly road transport. Obviously many passenger services survive only because of this socially oriented policy, which clearly cannot be abandoned overnight.

**Inland waterways**

River ports are State-owned joint-stock companies, usually operated by the Municipalities and/or the Chambers of Commerce, whereas the river equipment and maintenance are under the responsibility of a Federal Agency, Plovput, attached to the Federal Ministry of Transport. The main transport operator is private, the Yugoslav Shipping Company. It handles 95 percent of international traffic. The domestic traffic represents most of the movements, 63 percent in 1998, with low value commodities. Port tariffs are approved by Government, but the control is considered as loose for the moment.

**Port of Bar**

The Port of Bar handles more than 95 percent of FRY maritime transport. It is a joint-stock company with 80 percent ownership by the Republic of Montenegro and 20 percent distributed amongst its employees. The company owns infrastructure, buildings and equipment. Handling operations are carried out by the port itself.

The port is now largely operating below capacity, by comparison with historic traffic levels. Its quasi monopolistic situation has resulted in modest tariffs, monitored by the Republic of Montenegro. The recent reductions in traffic have nevertheless seriously deteriorated the Port’s financial position.

**Civil Aviation**

Belgrade Airport is the only operational international airport in Serbia, while two airports in Montenegro are open to international traffic, Podgorica and Tivat. The Federal Republic is responsible for civil aviation administration, air traffic management and international co-operation. The Serb and Montenegro Republics are the owners of aviation infrastructure, national carriers and airports.

Former Yugoslavia was a major transit corridor for all traffic from North West Europe to South East Europe and beyond. At that time, Belgrade Airport operated as a hub connecting all other airports of the Federation to the international network. Air Traffic Control was efficiently organised and supported by adequate equipment. At present, as for all transport modes in the country, the FRY civil aviation infrastructure and facilities are suffering from years of inadequate maintenance and renewal of assets, made worse of course by the selective destruction of key strategic facilities in the spring of 1999. The lack of co-ordination between
the two administrations of Serbia and Montenegro contributes to the present disorganization of Air Traffic Control.

### 3.1.6 Former Yugoslav Republic of Macedonia

The FYROM transport sector is monitored by the Ministry of Transport and Communications, which also covers urban planning. The other Ministry directly involved in the management of the sector is the Ministry of Finances, responsible for development planning and relations with international donors.

**Highways**

Under the Ministry of Transport and Communications, the highway sector is handled by the “Fund for National and Regional Roads” (FNRR), which is responsible for the construction and maintenance of all roads throughout the country. Under the control of FNRR, a State owned company, “Makedonia Pat” (Macedonian Roads) deals with the maintenance of 4,400 km of national and regional roads, the municipalities (123 in total) being directly responsible for the maintenance of local roads, with funds attributed through FNRR.

Highway development and maintenance is financed from the State budget (57.6% of revenues), which derives its revenues mainly from a tax on sales of petroleum products (20% of selling prices). Additional resources come from a tax on registration of vehicles (19.2% of total revenues), tolls (20.9%) and a tax levied on foreign vehicles entering the country (1.7%). Total yearly revenues amount to some € 48 million at present, which are spent mostly on new construction or rehabilitation, routine and periodic maintenance, absorbing some € 22.3 million, including € 13.9 million for national and regional roads. This figure, although insufficient, compares favourably with neighbouring FRY: € 3,160 per km-year instead of € 1,800.

**Railways**

Railways are managed by Macedonian Railways (MZ), a State-owned company under the control of the Ministry of Transport and Communications. The company is in charge of all aspects of infrastructure management and operational provisions, development and maintenance of facilities and equipment, as well as all transport operations. According to the Law, the State should pay a subsidy, when required, for maintaining the public service aspects of the railway. This subsidy is funded from the general budget.

Prior to the break-up of Yugoslavia, freight and passenger traffic levels were significantly higher than today. There were a large number of transit trains from Greece to Western Europe. The blockades experienced by the country during the 1990s and the political unrest in the region have resulted in a dramatic lowering of traffic, with freight declining from 769 million net tkm in 1990 to 380 million in 1999, and passenger traffic from 355 million pkm in 1990 to only 150 million in 1999 (only 1 million as international transit compared to 177 million ten years ago). Costs however have not reduced in the same proportions. Tariffs remain nevertheless low; passenger fares for social reasons (it is assessed that fares cover less than 15% of the total costs) and freight tariffs to allow competition with road transport (25% less than the latter) and to compensate for the additional costs at both ends of a trip.
Traffic on the central line of the railway system, which corresponds to Corridor X, represents 80% of the net tkm realised by the company.

Some of the branches are reported to cover only 4% of their total costs with their traffic revenues.

Civil Aviation

The entity responsible for civil aviation in Macedonia is the Directorate General of Civil Aviation (DGCA), which is part of the Ministry of Transport and Communications. It acts as both the air traffic service provider and the regulatory body for civil aviation. The main airport in FYROM is Skopje International Airport. The second, Ohrid Airport, serves also as an international airport, but mainly for tourist traffic. Public Enterprise for Airport Services (PEAS) is responsible for managing and operating the airports in the country, operations being financed by government. Management and maintenance of the facilities, runways, taxiways, aprons, lighting system and air navigation facilities, are provided by DGCA.

The independence of FYROM has totally changed the vocation and the utilisation of Skopje Airport. Passenger traffic has multiplied by a factor of 2.3 and the previous provincial airport is now to be restructured and expanded to meet growing demand.

3.1.7 Romania

The transport infrastructure, according to the Romanian Constitution, is public property of the State. These assets therefore are administered by national entities, or companies or corporations under the jurisdiction or the monitoring of the Ministry of Public Works, Transport and Housing which may award these assets for concession, in accordance with the provisions of Romanian laws.

The Ministry, through general directorates, is in charge of setting up the general transport strategy and policy, defining the needs in terms of network development, dealing with international organisations and monitoring transport activities through licensing of operators and setting up rules and regulations for the transport sector.

Road transport

National roads are managed by the National Administration of Roads (NAR), which is an autonomous entity under the Ministry of Public Works, Transport and Housing. They represent approximately 14,800 km out of a total of 78,600 km of public roads in the country.

Rail transport

Rail transport organisation has been modified in 1998 and the National Railway Company has been split into three main entities:

- Rail Infrastructure Company
- Passenger Rail Transport Company
- Freight Rail Transport Company
Maritime transport

In the maritime and inland waterways transport sector, similar principles have been adopted where State owned bodies or entities are in charge of port infrastructure (quays, breakwaters, landfill, etc.) These in turn award concessions to private bodies for port operations. The ports and navigation infrastructure are administered by:

- APMC-SA National Company Maritime Ports Administration Constantza S.A.,
- ACN-SA National Company Navigable Canals Administration Constantza S.A.
- APDF-SA National Company River Danube Ports Administration Giurgiu S.A.
- APDM-SA National Company Maritime Danube Ports Administration Galati S.A.
- AFDJ-RA Low Danube River Administration Galati Autonomous Regie

The port of Constantza on the Black Sea shore is the largest port of the Balkans countries with depth up to 19m and with berths and specialised equipments for all range of goods.

Air Transport

In this sector, the project of restructuring and preparing for privatisation the national airline, TAROM, is ongoing.

Air transport infrastructure (airports) are managed by entities which are of the “National Company” type for the international airports and the other airports (accepting mainly national air traffic but also international air traffic) are organised as “regie autonoma”, which are public companies depending of the Local Councils.

3.2 International Transport Patterns in the Region

Because of limited statistical information being available, the description given in this section mainly derives from the experience of forwarding agents involved in the transportation of goods in the region.

The traffic crossing the region (mainly to and from Istanbul and Turkey or to and from Thessaloniki and Greece) or travelling to or from the Balkans uses all modes: railway, road, inland waterways, sea and possibly containers.

Mass transportation of goods (in bulk and in large quantities, for instance: fertilizers, oil, chemicals, coal, etc.) are mainly made by train if it goes to or from western and northern Europe and by sea and inland waterway (Danube) if it is to or from Russia and the Ukraine. Nevertheless transportation by trucks remains the most common form of transport, particularly when it concerns general cargo, because of the flexibility of that mode and the poor conditions offered by the railways in the region.

Main operators comprise the railway companies, large road transporters (generally western companies) and sea and inland waterway transport companies (local and foreign).

Transportation is organised according to international agreements and practice.
3.2.1 Railways

Railway transportation has been affected by the economic crisis and by the war. Inadequate maintenance and relatively old equipment make the service offered rather poor. On the other hand the economic crisis has also resulted in a decrease in the quantities of imported or exported goods.

The transportation by rail to (and from) the Balkans or in transit to (and from) Turkey and Greece benefited from the rate of exchange of the local currency against international ones, mainly the Swiss Franc in the field of transport services. According to agreements signed with Western European railways, the regional railway companies were paid in Swiss Francs. The prices were reasonable if compared with the tariff applied by western companies but very high when expressed in local currencies and compared with local prices. As a result the local railway companies tried to attract western traffic, granted tariff reductions and commissions and even had to compete with each other. This explains the relative success of the railway in carrying goods to (or from) the region or across it.

The most important routes were through or to (or from) Yugoslavia. For some years, because of the war, traffic moved to Romania and Bulgaria. In 2000, following the tariff increase decided by Romanian railways and also because of the worse conditions on offer, traffic moved once again to Yugoslavia.

Railway traffic only consists of train loads or possibly train sets of about 10 wagons. Shipments of isolated wagons are exceptional. Maximum gross weight does not exceed 1 000 t (corresponding to a net weight of 500 t to 600 t).

Average commercial speeds are low.

The following map shows the main routes taken by international railway transportation of goods at the present time. As mentioned above, arrangements may change rapidly in response to particular difficulties or changes in the tariffs applied by different countries.

Bosnia and Herzegovina and Albania have relatively small international traffic. In addition their railway systems are in a particularly poor condition and are unable to offer through services within their respective countries at this time.

3.2.2 Roads

The map page 27 shows the main road transport routes in the region, as they are presently identified by the forwarding agents.

Because of the difficulties faced by the railway companies in the region (lack and poor maintenance of wagons and engines, maintenance of the infrastructure, etc.), road transport is playing an increasing role.

Most of the traffic is undertaken by Western European transporters (Betz in RFA, Fixemer in RFA, Dentressangle in France, etc.) as small transporters cannot afford to have local representatives or subsidiaries. In the meantime local transporters are trying to increase their share of this traffic.
3.2.3 The Danube

This is the only waterway in the region (with its tributary, the Sava).

Whilst navigation was almost completely interrupted by the destruction of bridges in Yugoslavia, the Danube has a considerable potential for the transportation of goods. Five countries of the Balkans are concerned: Romania, Bulgaria, Yugoslavia, Croatia and Bosnia and Herzegovina. The river also accommodates the trade of these countries with Russia and the Ukraine and also some transit between Western Europe and countries on the Black Sea.

The German road transporter Betz operates barges on a regular line between Passau (at the border of Germany and Austria) and Vidin in Bulgaria. Trucks are loaded onto barges (50 per barge) and are transported about 1 400 km on the river. It is a good example of what can be successfully undertaken on the Danube. Present traffic is about 200 trucks per week, in spite of a rather difficult section in Yugoslavia (destroyed bridges).

3.2.4 Sea Transport

The Balkan region has several sea ports on the Adriatic and Black Sea.

On the Adriatic, Rijeka, Bar, Split, Ploce and Durres are small ports. Rijeka the most important has handled 8.1 Mt in 1999 (of which oil and petroleum products represent 5.6 Mt). A large part of their traffic consists of imports from Italy and Greece (short sea shipping). It can be said that this traffic is largely due to poor infrastructure for land transport and services in the Western part of the Balkans.

The ports of Constantza (42.6 Mt in 1997), Burgas (13,257 Mt in 1998) and Varna (6,261 Mt in 1998) are much more important. They have a diversified activity and receive large sea vessels coming from other Black Sea countries, the Mediterranean and even further afield.

The port of Varna is equipped with a facility for changing rail car axles to the Russian gauge.

The Danube enlarges the hinterland of the port of Constantza due to the low cost of inland waterway navigation. It is a real opportunity to enlarge the hinterland of the port and to facilitate the integration of neighbouring countries into world trade.

3.2.5 Containerization and Intermodal Transport

At the time being few containers are sent to the countries of the region. The figures quoted by the ports or by the combined transport terminals are always very small.

It is reported that shipping companies are unable to trace their units once they have entered the region and most of the containers are lost whether they are disposable containers or not. Then the goods are often shipped as conventional general cargo or possibly the containers are unpacked in the ports for ongoing shipment by road or train.

When the shipping companies have to relocate their empty containers they sometimes use direct train loads from Thessalonica or Constantza to Western economic centres.
The fast and sustainable development of container traffic is a remarkable feature of modern international trade. Sooner or later the economic centres within the Balkans will need to send or receive containers in a satisfactory way (a quick, safe and cheap transport service). Adequate facilities must be provided in ports and combined transport terminals. Railway and inland waterway container transport must be prepared and encouraged for cost and environmental reasons.

The transport of other ITU (swap bodies and trailers carried on trains) remains a very small activity in the Balkans, too small to make the corresponding terminals and even the associated rail transport profitable.

3.3 Border Crossings and Regional Cooperation

With the dismantling of the former Yugoslavia, the number of borders in the region has been raised from 14 to 22, and borders newly created have often been immediately the most difficult and time consuming to be crossed.

Traders in South East Europe have to face excessive logistical costs for their operations. Such logistical costs come in part from the poor quality of the majority of transport infrastructure and from the transport services offered. They also come from the dimension of international trade in the region, which includes the act of crossing borders, the preparation of requested documentation and the clearance of goods at terminals. The effects of such impediments may be such that freight forwarders prefer to avoid routes with too many border crossings and thus by-pass the region using Ro-Ro ferries between Turkey and Italy. Section 3.2 above gave a few examples of other historic traffic diversions resulting from cumbersome procedures and transport safety. The main issues for trade facilitation include:

- international and internal transit issues,
- performance of Customs Administrations and border agencies.

When checking for transport agreements and conventions adhered to by the different countries in the Balkans at the UNECE, it is surprising to discover the number of conventions not yet signed, yet alone those enforced by many countries in the region. If the TIR Convention (November 75) has been approved by all countries, it is sometimes not applied in practice. Conventions to facilitate the crossing of frontiers for passengers, baggage or goods carried by rail are not yet approved by most countries, such as the recent customs convention on containers, or the convention on customs treatment of pool containers used in international transport. All of these “non-recognitions” result at some point in additional delays at border crossings in the region.

UNECE is playing an active role in supporting all initiatives towards facilitation of international road transport of goods in the region, in particular in the framework of SECI (Southeast European Cooperative Initiative). In April 1999, all member States of SECI, including the countries of the region (with the exception of FRY) agreed on practical measures to simplify and harmonize procedures, formalities and documentation (maximum permissible weights and dimensions and weighing procedures, charging policies, granting of visas for professional drivers, etc.).
In addition to country frontiers, some internal check points have been re-established in FRY between Montenegro and Serbia, because of differential duties applied by the two republics. Such check points create further bottlenecks.

To help improve the performance of customs administrations and border agencies, the World Bank has developed a Trade and Transport Facilitation Project in the region, centred around the following actions:

- institutional development of the Customs, re-engineering and automating procedures and provision of training to ensure uniform dissemination of these procedures,
- development of management information systems and provision of computer equipment and telecommunication means,
- infrastructure development, particularly in FRY, Bosnia and Herzegovina and Croatia.

Present customs laws must be revised to enable modern customs procedures to be introduced. An attempt is presently being made in Bulgaria to introduce a simplified custom clearance system developed by CNUCED.

Existing infrastructure at border crossings on the Pan-European Transport Corridors are, in most cases, adequate. They may become insufficient if trade activity recovers, as expected. Bottlenecks may appear and may have to be eliminated. Necessary works may include new buildings, additional traffic lanes and parking, control booths, utilities and truck terminals. The Trade and Transport Facilitation Project will finance such improvements at a number of border crossings.

It is understood that Government representatives are, in general, fully conscious of the problems raised by border crossings. Many inter-regional initiatives exist to facilitate trade as well as inter-regional transport operations, for instance pooling railway rolling stock and simplifying the procedures for crossing borders by train. Such initiatives have to be strongly supported by Governments, to overcome the traditionally conservative reactions of Customs administrations.
4 MAIN TRANSPORT INFRASTRUCTURE

4.1 Identification of the Network of Regional Importance

One of the objectives of the study is “to establish the basic inter-regional transport infrastructure networks needed in the Balkan region, in line with the TINA exercise”. This has already been done in two countries, Bulgaria and Romania, covered by the Transport Infrastructure Needs Assessment exercise itself. In these two countries, the “basic inter-regional transport infrastructure” is considered as given.

In the five other countries covered by the TIRS exercise, the Terms of Reference of the study request “to begin to define a coherent medium term network to be used as a framework for planning, programming and co-ordinating infrastructure investments”. For that purpose, an inventory had to be made of the main infrastructure in the region, starting from the EIB’s “Western Balkans Transport Infrastructure Inventory”, June 2000, completed when necessary by links between modes and access routes to the major axes.

The establishment of the “basic interregional transport infrastructure networks” is thus a progressive exercise. The Consultant has, as indicated, started from the so-called TINA network in Bulgaria and Romania and from the inventory made by EIB in the five other countries. A few additional elements have been made to this network which appeared necessary for continuity reasons or because of their importance, as a result of either local authorities emphasising their relevance or considering the importance of transport activities supported by those elements.

The result of the juxtaposition of the above networks and of the additional links may be called the Study Network. It is represented on Map 1. At a smaller scale, Map 2 also indicates the topographic relief in the region. In order to clearly show the differences between the so-called study network and the most important concepts of basic transport infrastructure developed in the region, Map 3 shows the Pan-European Corridors and Maps 4 and 5, similarly, the Strategic Networks recently defined by the European Commission for Highways and Railways respectively, including the TINA networks in Romania and Bulgaria.

The inventory and the analysis of transport activities have been undertaken only on this study network, in order to make a better assessment of the network capacity and its functionality, and to identify all infrastructure projects under consideration or needing to be considered on this study network. All master plans, transport studies or investment programmes established in past years have, in general, adequately covered all the possible ways of developing or modernising the infrastructure on this study network and possible new suggestions are rare; in the latter case this would sometimes be to merely downsize a few projects.

In parallel to the analysis of the study network and of the traffic, the Consultant has developed traffic generation models to help assess the importance of traffic to be supported by the networks at the horizon of 2015. The description of the methodology that has been utilised is given in Chapter 5. Traffic forecasts for 2015 are shown on Map 20 for the highway network. Capacity constraints for highways, when they exist, have been determined and are identified by representation of the ratio of traffic flow to capacity on Map 8. Rail capacity is not an issue. The type of necessary infrastructure has been defined for the 2015 horizon and the
resulting networks are represented on Maps 23 and 24 for Highways and Railways respectively.

The concept of a “coherent medium term network” derives from this pragmatic approach. This network may be considered as the study network from which links have been deleted which appear to have less importance for traffic and are distant from the main “lines of desire”, or more simply those links on which no upgrading appears necessary in the medium term. This evaluation has led to the proposed basic inter-regional transport infrastructure network shown on Map 22.

4.2 Status of the Infrastructure and Facilities

4.2.1 Highways

Throughout the Region highway infrastructure may be characterised by essentially six types of carriageway profile, although historically the terminology to describe a similar category of carriageway may be different from one country to another. Certainly in the majority of the countries, the concept of motorway standard is misunderstood and what is essentially an expressway is often labelled a motorway. For the purposes of TIRS however the following definitions have been adopted and infrastructure categorised accordingly on the accompanying figures and schedules given in this report:

- Sub-standard 2 lane: 5-6m pavement on a 8-9m platform
- Standard 2 lane: 7m pavement on 11m platform reflecting EU norms
- Standard 2 lane + (crawler lane): As standard above plus 3rd lane of 3.5m
- Half Motorway profile (2x 3.75m lane carriageway with shoulders)
- Expressway: 4 lane divided carriageway (4x3.5m lane carriageway with shoulders) plus partial grade separation for junctions
- 2x2 lane Motorway (TEM recommended profile and grade separation junctions

Geometric standards within each category inevitably vary from one country to another although when differences are examined these tend to be small and detail is often similar. Much of the region reflects historic standards adopted under the former Yugoslavia Republic, Albania, Romania and Bulgaria adopting somewhat different norms. EU grant finance and future prospects of membership of the European Community have encouraged adoption of EU norms for infrastructure improvements. The interpretation of these standards can be misleading, particularly for modest highway improvement schemes, where the adoption of TEM standards for establishing the reference to EU norms, may be inappropriate.

Map 6 graphically shows the distribution of this typology for the network. As seen on this map, the majority of the study network is dominated by 2 lane highways, much of it in its original form with limited profile improvement in recent years.

The lack of coherent maintenance policies has in the main been disastrous for the network selected for examination for TIRS. The failure by the various administrations to provide routine and periodic maintenance has resulted in a general degradation of pavements, as the adverse effects of deteriorating drainage and protection of the sub-grade has led to an increasing reduction in the level of serviceability. Bridges and other associated highway
structures have also failed to have been maintained and as a consequence exhibit varying degrees of distress particularly in relation to joints, waterproofing and drainage details.

Large areas of the region have also suffered from the devastating effects of war. Damaged infrastructure still remains to be repaired although considerable efforts have been made in recent years in Bosnia Herzegovina to restore the country’s basic highway infrastructure. Elsewhere, in Yugoslavia, the task has barely started.

As infrastructure improvements and development has begun to occur in recent years on the prioritised national networks in each country, this appears to have exacerbated the problem of highway maintenance on the remaining elements of the network. Furthermore, administrations, rather than establishing proper and disciplined maintenance regimes, have seemingly adopted policies whereby new or upgraded infrastructures are regarded as not requiring maintenance for a number of years following construction. Indeed in some cases the construction contract Defects Liability Periods are seen as being a legitimate opportunity to make those construction contractors responsible for maintenance, other than that which would normally be argued under construction defects.

The principle reason for lack of maintenance has been the inadequate budgeting applied by administrations to this essential requirement for ensuring a country’s assets are properly preserved. The region’s governments generally have not adopted fiscal measures, which may provide the necessary funds for maintenance activities quite apart from those required for capital development of transport infrastructure. The continuing conduct of inadequate maintenance programmes will result in a decline in asset values and serviceability levels as the effects of increasing traffic usage takes its toll on the infrastructure. It is encouraging to note that in a number of instances of late, donors are placing conditions on governments to demonstrate that proper maintenance policies are in place before further loans for development of new infrastructure can be concluded.

With the exception of Yugoslavia (largely as a result of the effects of sanctions), the countries of the region have embarked on ambitious plans for the development of transport infrastructure, encouraged by the prospects of closer ties and eventual union with the rest of Europe and indeed supported by a number of international financial institutions.

The Pan-European Corridor network has clearly been a focus for these countries in the definition of their national highway improvement programmes. The designated routings of these Corridors do not necessarily accord with the most trafficked highways in a country. Furthermore, political agendas quite often dictate infrastructure improvements, irrespective of real traffic demands and as a result road improvement schemes are undertaken, which would not normally be justified by the levels of traffic usage. National interests for highway infrastructure improvements and those relating to the Region therefore are not necessarily the same. One nation’s priorities adjacent to a border may not accord with the perceived requirements of its neighbour’s border infrastructure. As a consequence infrastructure improvements adjacent to borders are developed at different time scales with consequential loss of coherence to the network.

As a result clear strategies and prioritisation for infrastructure development have not been apparent. In some countries it has been the donors who have made the suggestions for the direction of development of the sector in the last decade or so. This has particularly applied in Albania as the country has emerged from years of isolation and where donor
recommendations have largely been adopted as the strategy for infrastructure improvement. In several of the countries grandiose schemes have been undertaken including the construction of motorways, where modern 2 lane highways would have sufficed, given the levels of traffic evidenced on the highway.

Infrastructure improvements, where the strategy has been to upgrade existing highways, has invariably been undertaken “on line” where sub-standard carriageways have been widened to modern two lane highways including localised re-working of horizontal and vertical curvature to improve the geometric alignment. In some instances however such existing highways have been improved “on-line” to produce inappropriate expressway or motorway category type highways resulting in sub-standard geometry and removing distributor access for local communities.

Appropriate timing and the financial arrangements for undertaking some infrastructure improvements appear misguided, quite apart from the type of scheme selected, which has been discussed above. Where financial resources are scarce and when future economies are being burdened with servicing loans, it is essential that viable investments are made. Some earlier improvement ventures clearly have disregarded actual needs; schemes have been designed to cater for traffic levels far in excess of realistic traffic projections, when more modest schemes or phased development would have been appropriate. Tolled Motorways and BOT and Private Concessionaire arrangements sometimes accompany these grandiose schemes, only to be discredited at some future date as the financial returns fail to materialise.

The status of development of the region’s infrastructure selected for TIRS, has been described in some detail for each country in Appendix 4. In particular those sections of the network still to be developed to an adequate level of serviceability are identified. Appendix 5 determines the capacity of the different types of highways mostly seen in the Balkans, and Map 8 shows a measure of the possible capacity constraint of the existing highway system.

4.2.2 Railways

Map 7 shows the extension of the railway network in the region, and the type of facilities met. Basically, they are three:

- Double track electrified,
- Single track electrified,
- Single track diesel.

Most of the lines have been constructed between 1870 and the second world war, and a few sections after the war up to 1970. Their alignment does not usually allow high speeds, particularly in hilly and mountainous terrain. Day speed restrictions are often imposed on most lines. Structures, bridges and tunnels, are old and a few of them do not reflect EU standards. These standards have been defined by two UN agreements, AGC in 1985 and AGTC in 1991. They have been adapted to the railway systems in Central and Eastern European countries by the Trans European Railway agreement (TER), with lower parameters (e.g. nominal minimum speed at 120 km/h instead of 160 km/h or platform and siding length). Vehicle loading gauge is conversely often generous, as they followed Soviet or German standards. Thus, existing structures may often accommodate gauges B+ and C.
The infrastructure more or less follows European practices and incorporates extensive welded rail, increasing use of concrete sleepers, cast manganese hearts and asymmetric switch points. Signalling has been modernised on the main lines, which are often electrified. Unfortunately, infrastructure modernisation is in the main incomplete. It lacks completion of train dispatching radio for both train operations, and maintenance coordination. It also lacks remote control of stations by CTC installation. Much of the railways’ efforts at modernisation are now ageing and the basic infrastructures are slowly moving towards obsolescence. The regular decrease of traffic for the last 15 years, which has, by far, not been accompanied by a similar reduction in operating costs, has resulted in an endemic lack of funds for all railways in the region. Lack of maintenance machinery, lack of spare parts and insufficient materials for regular maintenance have aggravated the state of repair of the track and of other facilities. Corrugated rails are often found, which reduces sleeper life. Failure to grind rails increases the risk of cracking and failures. As a consequence of the lack of appropriate equipment, maintenance of the infrastructure is often done manually, with low efficiency and even higher costs.

The situation obviously varies according to the countries, the Federal Republic of Yugoslavia being in one of the worst positions. The condition of the track has seriously deteriorated during the last ten years, especially on curves, and there are now 122 speed restrictions on the main lines, including on 87 km where the maximum speed is 40 km/h. For the moment, the Yugoslav Railways can afford renewing 20 km of track every year, when they should be undertaking 200 km. Elsewhere in Albania the very basic network permits only limited operations at speeds far lower than comparative journeys by road whilst in Bosnia Herzegovina only a few local services have been re-established at reduced speeds, following virtual destruction of the network, traction vehicles and rolling stock during the war over the first half of the last decade.

Facing this situation, Railways Directors still react with an engineering point of view, and compulsively wish to restore what existed in the past, despite the fact that the market has drastically changed.

Romania only has reorganized its Railway National Company in 1998, in accordance with EU recommendations, breaking it into five new entities with separate budgets. The three main entities are infrastructure, freight and passengers, the two others being in charge respectively of (i) surplus equipment and the company’s properties, and (ii) financial management and information systems. Tariffs and investment plans are determined by Government. It is worth noting that, in this country, five private freight companies have been recently created.

Other national railway companies in the region are all studying or envisaging some restructuring, but have not yet started to implement such arrangements. Bosnia & Herzegovina, where limited international rail traffic is slowly being re-established, has created two companies, one for the Federation of BiH and the other for the Republika Srpska, coordinated by a Bosnia and Herzegovina Railways Public Corporation. There is now an attempt to make this corporation responsible for managing the development of the main railway infrastructure of the country, and let new companies, private or semi-private, handle the operations on such or such a line.

Almost in every part of the world, the railway’s share of surface transport has constantly been reduced. For freight, the tough competition for the railways comes from inland waterways, road transport and pipelines; for passengers, the competition is from road and air transport.
Infrastructure developed in the past still nevertheless exists and is fully amortized. The conservative attitude of most politicians or senior transport officials towards the railway derives from the evidence that the railway, as it is, has played an essential role in the economic development of their country, and that its rehabilitation would restore the role of the railway. Actually, in general, other modes have improved the quality and the attractiveness of their services more rapidly whereas the main clients of the railway, heavy industries and mining, have regularly deteriorated or even collapsed. Under these circumstances, it is widely recognised that railways have to concentrate services for which they are really competitive when compared with other modes, namely:

- sub-urban passenger traffic,
- long distance passenger traffic,
- international freight transit,
- block trains of freight.

The Balkans have experienced such an evolution, aggravated by the internal political turmoil, the blockades and the disappearance of its industry. A few figures are quite representative:

- In Yugoslavia, passenger traffic has been reduced from 4,794 million pkm in 1990 to 1,600 in 1998 (-67%), whereas over the same period freight traffic was reduced from 7,745 million ntkm to 2,300 only (-70%).
- In Macedonia, the same figures are respectively 355 and 150 million pkm (-58%) for passengers, and 769 and 408 million ntkm (-47%) for freight.
- In BiH, the decline has been even more dramatic, passenger traffic being reduced from 1,318 million pkm in 1990 to 52 million in 1999 (-96.1%), and the freight traffic from 3,892 million ntkm to 168 million in 1999 (-95.7%).

As railway traffic collapsed, road transportation was regularly increasing. In FRY, the mix of international transport during the same period has evolved as follows:

- In 1990, 22%, 32% and 43 % existed respectively for road, rail and river transport,
- In 2000, 52%, 17% and 31 % existed for the same modes.

Many consider that in most countries, the railways still keep a market because of their low costs. For many operations, traffic is only passenger trains, and this is the only available service. Fares are kept low for social purposes.

This picture appears gloomy, and there may be scepticism about the recovery of the railways. Forecasts presented by the railway companies and sometimes by consulting firms regularly show a change in the tendency at the date of the forecast or for the purposes of the report. More realistically, it seems difficult to foresee, with some reliability, the future of specific railway systems as a whole without a comprehensive market study being undertaken, as has been done in Bosnia and Herzegovina by Swederail.

Conversely, it is clear that the most trafficked lines will be used for a considerable period to come and may be operated with some success provided that the quality of service is improved. Railway companies are thus focusing their effort increasingly on upgrading their main line infrastructures, which correspond in general to the Pan-European Corridors. Such efforts will probably have to be compensated by the closure or by the privatisation of some less trafficked lines.
A few remarks about average capacities and the feasibility of a few typical investments are developed below.

**Capacity of lines**

- Capacity of a single track line is roughly 60 trains a day two directions together. When CTC systems are used, this capacity may be raised to 100 trains a day,
- Capacity of a double track line is around 250 trains of mixed traffic a day, with appropriate signalling systems. This capacity takes into account the necessary idle time for maintenance. It may be raised to higher figures, 350 or even 400 trains a day, for passenger traffic with regular frequency.

As shown in Map 11, the existing traffic within the region is sometimes close to such capacities. Nevertheless, in general there is still some room to accommodate higher traffic by making some small technical improvements, such as adding crossing sections or short stretches of double-track or modernising signalling. In addition, the present stagnation or decrease of the traffic suggests that capacity problems should not appear rapidly.

**Maintenance**

On many lines in the region, traffic is at the level of a couple of trains a day, mostly passenger trains. It is interesting to reflect that in Western Europe, in France for instance, it is considered that the traffic should at least pay for its marginal cost, i.e. the routine maintenance of the track. This corresponds to 2 or 3 trains a day.

**Renewal of the track**

Because of the poor level of routine maintenance, sleepers, ballast and rails last less than they should normally, and complete renewal of the track has therefore to be done. Such operations have in fact become an actual method of maintenance in the region. Many lines are in such a poor state of repair that renewal of the track has to be rapidly planned for at this time. This type of operation is costly: roughly € 500,000 per km, but normally it should be done only once in every 40 years if the track is normally maintained. Whenever we compare such costs with the discounted revenues expected from the traffic, we find that the traffic should be close to 20 trains a day to justify it economically. This is worth keeping in mind when looking at the opportunity of such operations: if the traffic is higher, the renewal of the track can be considered with little risk. If it is not, a more precise assessment of the viability of the line should be recommended.

**Electrification**

Electrical haulage implies a sizeable investment, the amortization of which is independent of the traffic. Conversely, advantages for operating costs depend directly on the traffic volumes. Electrical haulage is thus feasible only above a traffic threshold, which is estimated in Western Europe at some 50 trains a day. Concerning Diesel haulage, both expenses of investment and operation are proportional to the traffic volumes.

Among the countries in the region, Bulgaria and Romania only are mainly electrified, although a number of sections in Bosnia and Herzegovina had been electrified prior to the
war. Considering the advantages of achieving homogeneity in rolling stock, proceeding with electrification may be relevant within these countries. In other countries, it may be more appropriate to retain diesel operations for some time, whilst awaiting an increase in traffic. Such a policy would allow investment to be kept for more urgent improvements such as, signalisation, alignment modifications, rehabilitation of structures, etc. Trying to achieve homogeneity of the haulage system throughout the length of an international link actually has little meaning when it is necessary in any event to change the locomotive at the border crossing.

4.2.3 Inland waterways

Navigation on inland waterway in the region is dominated by the Danube, a remarkable river which flows in Croatia, Yugoslavia, Romania, Bulgaria and Ukraine over about 1350 km, after Germany, Austria, Slovakia and Hungary. Its tributary, the Sava is also navigable in Yugoslavia, Croatia and in Bosnia and Herzegovina.

The traffic has experienced a significant decline due to the economic crisis and the war. Navigation was also almost completely interrupted in Yugoslavia after the destruction of bridges by NATO bombing in 1999. Indeed as a result of this damage navigation on the Danube is still restricted.

The inland waterway navigation presents many advantages: the transportation cost is lower than that of the trucks and even of trains, particularly when large distances are concerned; the effects on the environment are much less detrimental.

The potential was studied and seems very large but again much lower than the theoretical capacity of the infrastructure.

Although there are some improvements, which could be implemented on the river, the urgent bottlenecks to be removed are:

- the river ports which need rehabilitation, modernisation and sometimes expansion (mainly to cope with new traffic in development: containers, Ro-Ro vessels, bulk materials such as grain, etc.),

- The status of the river Sava, tributary of the Danube, is not covered by the international agreements for the Danube and this may hamper effective navigation of this waterway system. Since the breakup of the former Yugoslavia the Sava has become an international waterway and thus requires similar arrangements to that for the Danube to be made between the countries through which the Sava flows, and beyond. A letter of intent concerning the International Sava Basin Commission Initiative has been signed in Sarajevo on November 29th, 2001, by representatives of Bosnia and Herzegovina, Croatia, Slovenia and Federal Republic of Yugoslavia and a Sava Working Group has been established that should among other tasks make all preparatory work necessary to finalise, before June 2002, a draft international framework agreement on the Sava Basin.

Inland navigation is a very efficient way to help the integration of the Balkan region in the world economy. It is also an interesting way to provide an alternative to road and rail transport and to stimulate the competition between transportation modes. Finally its development requires much less financial resources than other modes for similar results.
4.2.4 **Sea Ports**

The traffic in the sea ports of the Balkans has known a significant decrease since 1990 due to the economic crisis and war. Nevertheless the traffic still exists and gives some signs of stability and indeed even steady development.

Ports may be divided into two groups:

- **the ports on the Adriatic sea.** There are many of them but they are small ports involved in short sea shipping between other Adriatic ports of Italy, Greece, Slovenia, Croatia, Bosnia and Herzegovina \(^2\). The larger ports, Rijeka (8.1 Mt in 1999) and Ploce (1.1 Mt in 1999) may also receive deep sea vessels.

  The traffic includes petroleum products, some solid bulk cargo in small quantities (cement, minerals, coal and ore for nearby industries, general cargo). Containers are exceptional. Ports receive some Ro-Ro vessels and are equipped with ramps.

  Almost all of the ports also have important passenger traffic (Split: 1 600 000 in 1999) who are not just foreign tourists but also people living on the numerous islands along the coast.

  Because of inadequate maintenance, port infrastructure and equipment requires rehabilitation, modernisation and even sometimes expansion of selected facilities. The existing capacities, as a general rule, exceed present needs,

- **the ports on the Black Sea,** on the contrary are larger and are involved in deep sea and short sea traffic. Their greater importance, compared with the Adriatic ports, is due to more industrialised hinterlands and also easier connections with their respective hinterlands. In particular for the port of Constantza (Romania), the Danube (and the Danube – Black Sea canal) provides a means of very efficient mass transport over short and long distances. For the port of Varna (Bulgaria), the link Rousse-Varna is worth noting since it connects the River Port of Rousse on the Danube with the Black Sea both by road and by rail.

  Traffic mainly consists of bulk cargoes (petroleum products, ores, coals, grains) but also general cargo. Containers are handled in small but increasing quantities and are carried by feeder vessels connecting the Black Sea ports with Malta and Gioia Tauro.

  These ports have identified modernisation and development projects. Even if the present traffic is below the theoretical capacities of the respective infrastructure, the ports have to modernise equipment and adapt to new traffic (mainly container traffic and Ro-Ro vessels).

4.2.5 **Airports and Civil Aviation**

In reviewing the situation of airports and civil aviation in the region, the Consultant has referred generally to the comprehensive study (ATIRS) carried out in the spring of 2001 by

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\(^2\) Bosnia and Herzegovina has no port itself but uses the Croatian port of Ploce where the majority of traffic has historically been focussed at Bosnian activities.
Nordic Aviation Resources AS under the auspices of EIB. The reader is referred to that report for specific details.

All airports considered in the study (the international airports), have experienced either stagnation or significant reductions in traffic during the nineties, with the exception of Skopje Airport and Tirana (Rinas) Airport, the latter starting indeed from a very low base. For the time being all of the studied airports are suitable for the traffic volumes they attract, and need only in the mid term, like most airports in the world, to undergo modest improvements and modernisation, to respond to the evolving nature of traffic or to improve the efficiency or safety of selected operations. Sofia and Sarajevo airports have been reconstructed recently, whilst Bucharest-Otopeni is being extended. Only Skopje and Tirana (Rinas) airports require rapidly more important works of reconstruction and/or extension.
5 POTENTIAL TRANSPORT DEMAND AND TRAFFIC FLOWS

5.1 Methodological Approach

The evaluation of the potential transport demand is required for the long term planning of transport networks at both the macro and micro levels, particularly when it is necessary to take decisions regarding the capacity of the various links constituting the transport network; be it roads, railways or waterways or even a mixture of the three.

Also, an understanding of the modal choice determinants is deemed necessary in order to enable the formulation of predictions regarding for example future rail-road or rail-waterway shares as well as the determination of the policy instruments for altering these shares (tariff regulations, competition facilitation, promotion of combined transport, etc.)

Two aspects of the demand must be considered as they do not respond to the same “generation” criteria:

- Passenger transport demand on one side,
- Freight transport demand on the other side.

Therefore in the development of a tool which would enable us to work out predictions regarding future transport demand, we have distinguished between passengers transport demand and freight transport demand.

5.1.1 Passengers transport demand

For passenger, the demand for transport is considered to be a derived demand which means that the demand elasticity will be influenced by the elasticity for the activity for which the travel has been initiated.

After careful examination of the data available it appeared that these data for the various countries in the study area were finally very scarce because the type of data that would be useful, such as motorization rate, travellers behaviour, micro economic parameters, etc. were just inexistent in one or several countries, preventing the use of sophisticated tools. It has been therefore decided to go with a single equation demand model in which the demand function is written directly.

The details of the model implemented are provided in Appendix 6.

After the type of model has been decided upon, two more important choices were left:

- Which economic activity variables would be used?
- What would be the geographical zoning that could be used with the model?

It was necessary for the development of the model that the basic data required should be consistent for all the countries within the study area, including the neighbouring countries. After examination of the data available and taking also into consideration the time frame of the study, it was decided to estimate the passenger transport demand at the country level.
which proves to be the only geographical entity for which sufficient data was available for both the demand estimation and the overall calibration of the tool.

A zoning system matching the borders of all European countries has been established and therefore each zone represented one single country. Montenegro and Kosovo have been added at the Steering Committee’s request as extra regions and also, the Adriatic Coast has been added to accommodate the tourist flows which are observed every year in this area (cf. Appendix 3 ); Asian Turkey has been added because the concentration of the entire Turkish traffic generation in Istanbul was distorting the model. With these extra zones, the total number of zones considered in the model is 42.

Dealing with passenger transport and without specific knowledge of the passengers’ general behaviour in each country because of the lack of appropriate studies, it was still problematic to estimate the passengers’ generation for one country as well as the passengers’ attraction for the other countries. To circumvent the problem we used the results of pilot studies carried out in several European countries which dealt with long distance travelling habits in these countries and which could provide sufficient basic data to establish a decent start for the estimation of the generation part of the passengers transport demand. The estimation has been translated into a number of persons per year who will travel abroad using ground transport. It appeared also from the results of these studies that the maximum distance travelled using ground transport was around 400 km.

The estimation of the attraction was based on the number of visitors per year\(^3\) of each country and the generalized cost or the “impedance” factor having a restricting effect on travel has been selected as the total driving travel time between capitals to which was added the time lost at each border crossing along each trip between country “\(i\)” and country “\(j\)”.

With these data, the gravity model was applied and a rough preliminary trip matrix has been obtained, providing the number of passenger trips between country-wide zones. The number of passenger trips has been transformed into a number of vehicles by using an average rate of occupancy of 2.5 (source: results from various OD surveys)

In order to calibrate this trip matrix a matrix estimation procedure from actual traffic data has been setup.

To this end, the study road network has been digitized and for each link of the digitized network (see Map 16a) the following attributes: length, number of lanes, average free flow speed has been taken into consideration. The prevailing present road condition as well as the topographic environment of the road (flat, hilly mountainous) have been used to elaborate the free flow speed by road type. Centroids have been devised for each country capital and for the four extra zones: Montenegro, Kosovo, Adriatic Coast, and Asian Turkey. Each centroid has been connected to one or several entry points into the network, depending on the geography and European road network topology.

Once the network was ready, the trip matrix obtained from the gravity model and expressed into a number of vehicles has been used as a “seed” for the process of matrix estimation and the observed traffic flows were the constraints that the matrix estimation procedure was supposed to match. After several iterations were the values of some parameters has been

\(^3\) In “Statistical yearbook on candidates and South-East European countries” by EUROSTAT (2000)
adjusted, we have obtained a trip matrix for passengers which, when applied to the network was producing traffic flows on the network which were fairly close from the observed counts for the car category at the various border crossings, between the seven Balkan countries themselves and between the Balkan countries and their other central European neighbours (Hungary, Greece, Turkey, Slovenia, Ukraine, Moldova, etc.).

5.1.2 **Freight transport demand**

Estimation of general freight transport demand is much more complex than passengers because the factors governing the demand and also modal choice are depending on the type of freight. Therefore it was not possible to develop a general freight transport demand since certain categories of commodities are hauled only by boat or pipelines (crude oil) or by trains or boats (coal), or commodities movements might be restricted to certain destinations (grain), etc.

The NSTR classification of commodities has been retained for trade statistics analysis and this classification on the digit-1 level has the following commodity categories:

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Agricultural product and life animals</td>
</tr>
<tr>
<td>1</td>
<td>Foodstuff and animal fodder</td>
</tr>
<tr>
<td>2</td>
<td>Solid mineral fuels</td>
</tr>
<tr>
<td>3</td>
<td>Petroleum products</td>
</tr>
<tr>
<td>4</td>
<td>Ores and metal waste</td>
</tr>
<tr>
<td>5</td>
<td>Metal products</td>
</tr>
<tr>
<td>6</td>
<td>Crude and manufactured minerals, building materials</td>
</tr>
<tr>
<td>7</td>
<td>Fertilizers</td>
</tr>
<tr>
<td>8</td>
<td>Chemicals</td>
</tr>
<tr>
<td>9</td>
<td>Machinery, transport equipment, manufactured articles and miscellaneous articles</td>
</tr>
</tbody>
</table>

Further aggregation may lead to only four key categories:

- **Agriculture products** (aggregation of above categories 0, 1 and 7)
- **Industry products** (aggregation of above categories 2, 4, 5 and 10)
- **Miscellaneous products** (aggregation of above categories 6 and 9)
- **Petroleum products**

The rationale behind this further aggregation is that, in terms of growth, agricultural products or commodities are heavily linked to the overall level of the agricultural production of a given country, the industry products or commodities are linked to the level of the industrial production and finally, the miscellaneous products and the petroleum products are linked to the GDP level.

It also can be considered that, in terms of road transport, category 9 of the NSTR classification represents the largest share of the hauled cargo.

From these grounds, a tentative model development for commodities belonging to category 9 of the NSTR classification has been undertaken. The model has been devised from the same basis as the passenger model, with the following economic activities variables:
• Emission has been chosen as the overall class 9 production of a given country,
• Attraction was in inverse proportion to the GDP
• Generalized cost was again the total travel time increased by the time lost at each border crossing without travel duration (trips limited to 400 km) as in the passengers’ model.

The calibration of the model has been performed by using the same matrix estimation procedure described in paragraph 5.1.1 ‘Passengers transport demand’ with the number of trucks counted at the various border crossings, assuming that each truck was loaded with an average of 15 tons of goods. Despite technical difficulties such as different number of trucks at a given border point according to each of the neighboring countries, it can be considered that the described approach will provide an order of magnitude of the traffic which would be sufficient to estimate the overall capacity needs for the various network sections.

5.1.3 Expression of the passengers and freight transport demand

This trip matrices obtained after the exercised described in the previous paragraph represent the number of international trips (both passengers and goods) expressed in vehicles per day for 2000 since it results from the addition of the passenger and freight matrices both expressed in number of vehicles/day

5.1.4 Network assignments

After the estimation of the international passenger and general freight demands, the next logical step was the assignment of this demand on the network. The estimated matrices have been assigned to the digitized network using an “all-or-nothing” assignment procedure and taking into account the total travel time from zone to zone as impedance factor. The results of these traffic assignments are presented on Map 16b.

The local traffic share on these routes has been identified as the remaining of the traffic volumes once the international traffic was subtracted.

5.2 Definition of the Three Scenarios

Three growth scenarios have been retained for the long term regional development:

• A medium growth scenario
• A low growth scenario
• A high growth scenario

The medium growth scenario represents an average reasonable scheme, based on the OECD forecasts in terms of GDP\(^4\) for the next 20 years. The low growth scenario can be considered as the pessimistic scenario with little economic growth.

\(^4\) The world in 2020 : Towards a new global age, ISBN 9264156275
The high growth scenario is the optimistic scenario, envisioning a rather high economic growth in the Balkan region.

For each scenario, it has been considered that the seven Balkan countries will grow at the same rate as no rationale could reasonably justify differentiation amongst these countries.

The description of these three scenarios is presented in the following “Table 5-1: Scenarios definition”, with the various growth assumptions which have been selected for each scenario: GDP, population, Industrial production, agricultural production and local traffic.

Table 5-1: Scenarios definition

<table>
<thead>
<tr>
<th>Percentages per annum</th>
<th>Low Scenario</th>
<th>Medium Scenario</th>
<th>High Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP growth, 7 Balkan countries</td>
<td>2%</td>
<td>3.5%</td>
<td>5%</td>
</tr>
<tr>
<td>Population growth, except Albania</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Population growth, Albania</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>GDP growth, EU15</td>
<td>1.8%</td>
<td>1.8%</td>
<td>1.8%</td>
</tr>
<tr>
<td>GDP growth, Russia/CEI</td>
<td>3.5%</td>
<td>3.5%</td>
<td>3.5%</td>
</tr>
<tr>
<td>GDP growth, Middle East</td>
<td>2.2%</td>
<td>2.2%</td>
<td>2.2%</td>
</tr>
<tr>
<td>GDP growth, USA</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
</tr>
<tr>
<td>GDP growth, rest of the world</td>
<td>2.5%</td>
<td>2.5%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Industrial production growth in the 7 Balkan countries</td>
<td>-3%</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td>Agricultural production growth in the 7 Balkan countries</td>
<td>0%</td>
<td>1.5%</td>
<td>3%</td>
</tr>
<tr>
<td>Local traffic growth</td>
<td>1.25 x GDP</td>
<td>1.25 x GDP</td>
<td>1.25 x GDP</td>
</tr>
</tbody>
</table>

All forecasts have been made for year 2015.

Besides these general assumptions for the socio-economic variables, some more minor ones have been made, dealing with travel time and border crossing delays. It has been generally assumed that travel times would be reduced substantially over the next 15 years as overall network rehabilitation which is presently in progress would be completed or near completion at that time. Therefore, it has been assumed that for the medium scenario, travel time will be reduced by 5% and for the high scenario, it will be reduced by 10%; for the low scenario, no time reduction has been expected. In the mean time, border crossing delays will be substantially reduced although no provision has been considered in the case of all countries would have joined the European Union; in the low scenario there is no delay reduction; in the medium scenario, these delays are divided by two and in the high scenario, they are divided by four.

Trip matrices for 2015 are given in appendix 6. The image of the 2015 international traffic flows pattern (total vehicles per day including passengers and freight) is represented on Map 16c.

The series of Maps 14 and 15 present, country by country, the inbound and outbound traffic flows for passengers (Maps 14) and for freight (Maps 15). These flows are international traffic volumes (‘000 passengers/year or tens/year) for which travel distance of greater than 100 km, since the traffic generation is based on figures derived from long distance transport.
behavior surveys and studies. Short distance cross border trips (between two villages a few km away from the border) are not taken into account.

5.3 Main Conclusions on Potential Traffic Flows

After running the model in its present status, the following main conclusions can be formulated:

**International traffic:** this part of the traffic is limited and will never be the preponderant factor for deciding road capacity increases. However, it might be interesting to facilitate traffic flows and particularly the international traffic on certain link or routes to develop and facilitate trade and people movements between countries by giving priority to the development of these links or routes such as motorway construction, development of service sites along these motorways, with accommodation and food facilities, shops, repair shop, etc.

**Overall traffic growth:** the traffic multiplication factor depending on the scenario varies from 1.68 in the low scenario to 2.60 in the high scenario, the medium scenario having a traffic multiplication factor of 2.10 over the period 2000-2015.

5.4 Transport Capacity Requirements

a. **Highways**

We have developed above traffic forecasts for the main highway network, combining the international traffic and the local traffic, and assessing the influence of border crossings improvements. The table provided in Appendix 6 indicates the volumes of road traffic expected to be reached by section of the basic international network in 2015. Road traffic appears to have the best chances to continue its regular growth in parallel with the economic restoration of the region. The comparison of the traffic forecasts with the practical capacities of the existing network (see Map 8 in the maps volume), shows that we should experience noticeable capacity requirements (traffics higher than 1.5 times the theoretical capacity) before 2015 on the roads indicated below:

1. Albania
   - Fier-Tepelene
   - Durres-Rrogozhine-Lushnje
   - Tirana-Elbasan-Qafe Thanes:

2. Bosnia and Herzegovina
   - Sarajevo-Konjic
   - Sarajevo-Tuzla-Orasje
   - Banja Luka-Bosanski Gradiska
   - Doboj-Modrica
   - Banja Luka-Doboj-Tuzla-Zvornik
3. Bulgaria

- Sofia-Kulata
- Sofia-Kalotina
- Sofia Ring Road
- Stara Zagora-Burgas-Varna
- Montana-Vraca
- Stara Zagora-Veliko Tarnovo
- Orizovo-Haskovo

4. Croatia

- Karlovac-Vrbovsko
- Karlovac-Gracac-Knin-Sinj
- Rupa-Rijeka-Senj
- Zveti Rok-Zadar-Biograd
- Sinj-Split-Ploce
- Rijeka-Pula
- Ploce-Dubrovnik

5. Federal Republic of Yugoslavia

- Horgos-Subotica-Nov Sad-Belgrade
- Novi Sad-Srem.Mitrovica
- Belgrade-Cacak
- Krusevac-Kraljevo-Pojate
- Kraljevo-Raska
- Leskovac-Presevo
- Kosovska Mitrovica-Pristina-Blace
- Bar-Podgorica-Uzice
- Podgorica-Niksic
- Nis-Pirot-Gradina

6. Macedonia

- Skopje-Blace
- Tabanovce-Kumanovo
- Kafasan-Struga-Ohrid

7. Romania

- Bucharest-Ploiesti-Brasov-Sibiu
- Alba Julia-Cluj Napoca
- Bucharest-Buzau
- Bucharest-Constanta
- Ploesti-Sibiu-Alba Julia-Orastie
- Timisoara-Lugoj
b. Railways

Conversely, we do not expect significant increases in railway transportation in the coming years. As already stressed, this traffic is highly dependant on the mining and on the industrial activities, which are mostly under restructuration or privatization. As observed in the past in Western Europe, the raise in the revenues of the population profits at first to the road sector, with a rapid increase of the motorization rate. Railways participate to the increase in the mobility of the population and take their share of it only when better services are provided. There is here a typical hen-and-egg problem. The state of repair of the existing railway network, even in a country well equipped like Romania, is poor or very poor and necessitates some urgent and important rehabilitation works. Such works, even if they are accompanied by some upgradings, are justified to maintain or to restore an adequate level of service and safety on the most important lines. Heavy investments for raising the capacity of lines, like doubling single-track lines, do not appear necessary when the traffic is not expected to increase significantly. Raising the practical capacity of single-track lines by 30 or 40 % may be obtained by a better organization of the traffic, even when it is mixed, by introducing CTC systems. Capacity may also be seriously improved by adding crossing sections or even short double track sections at the most critical points.

We should nevertheless consider that some single-track lines are close to their capacity whenever the traffic is already higher than 60 trains a day. Their actual utilization should be carefully monitored to decide doubling them when proved necessary. These lines are the following:

- Sofia-Radomir, Vidin-Montana-Vraca-Mezdra and VelikoTarnovo-Stara Zagora in Bulgaria
- Ogulin-Zagreb and Zagreb-Koprvnica in Croatia
- Stara Pazova-Subotica-Kelebia, Nis-Tabanovce and Bar-Podgorica-Belgrade in FRY
- Arad-Timisoara-Lugoj-Caransebes and Cluj Napoca-Alba Julia in Romania.

c. Ports and Waterways

Seaports and river ports support for the moment traffics far from their capacity, as assessed by past utilisation of these facilities which has been often more than two times higher than now. They do not justify any capacity investments in the short and middle term, but only some modernization of their equipment or some rehabilitation or protective works.
6 TRANSPORT DEVELOPMENT OBJECTIVES

6.1 Master Planning: National Objectives vs Regional Objectives

Master planning consists of the definition of medium or long term objectives for the development of a system. Objectives may be physical or institutional. Physical planning may be summarised by the representation of future infrastructure to be achieved, which will serve as a framework for bringing coherence in the selection, definition and programming of individual infrastructure development projects and when necessary related equipment projects. Institutional objectives are usually mixed with physical objectives to provide the required organisational, administrative, legal and regulatory frameworks through which development of the system has to take place, and which may significantly influence physical development.

In the TIRS exercise, master planning implies some specific meanings. First of all it concerns only the network of infrastructure of regional importance. Transport master plans already exist in some countries, and within each country, there may be several master plans, at the level of individual transport modes or at the level of specific facilities, airports or sea-ports. Obviously national transport master plans cannot be a mere juxtaposition of multiple individual master plans, as some parts of them may be mutually exclusive, and also because, at the national level, co-ordination and trade-offs have to be achieved between the different modes to meet social and economic objectives of the country in the best possible way.

Master planning for the region faces identical issues if there is a wish to aggregate various national transport plans, whenever they exist. Every country would certainly agree on favouring development of the market economy, generating sustainable economic growth in the region to limit unemployment and expanding the purchasing power of the population, and finally providing safety, health protection and education to their respective populations. More and more governments now recognise that such objectives would be more easily attainable when pursued by all countries of the region in close co-operation amongst themselves. In such circumstances what would the specific objectives of the transport sector then be? Such specific objectives could be expressed as follows, in line with the Terms of Reference of TIRS:

- Raise or keep the transport communication system between the main economic and demographic centres in the region at technical standards and with the quality of service required by transport demand,
- Facilitate, improve and shorten whenever possible the connections between different national transport networks,
- Facilitate access to the region and transit through the region, of foreign traffic, with required standards of comfort and safety,
- Rationalise, simplify and accelerate the procedures at border crossings throughout the region,
- Introduce inter-regional agreements to co-ordinate development of the main transport infrastructure and to improve transport services in jointly operating equipment or rolling stock whenever feasible.
Such objectives at the level of the region do not contradict the national objectives of internal accessibility and distribution. They would only be inconsistent with either prestige policies, which may consist of restoring systems as they were under previous conditions and developing over-dimensioned infrastructure, or protectionist policies.

National objectives for the transport sector may rapidly evolve in the critical situation faced by many countries in the region for the time being. Through discussions with senior officials in the sector, and when examining investment programmes as they stand, the Consultant may identify the basic following objectives as being predominant:

1. Reconstruction of destroyed or damaged facilities,
2. Rehabilitation of existing facilities severely deteriorated by lack of maintenance,
3. Upgrading main facilities to offer better levels of service,
4. Development of heavy and modern transport infrastructure on the main communication axis to meet expected long-term requirements.

The present objectives for each country are a mix of the above and depend directly on the time when their transition process started and on their involvement in the recent crises in the Balkans. Typically, for example, FRY has the first two objectives in mind, with an attempt to upgrade their facilities as far as they can; Bosnia & Herzegovina has in the main attained the first objective and is at present preoccupied with the two following ones; Bulgaria, Romania and to some extent FYROM are concerned by the two last objectives whereas Croatia shows mainly concerns of the fourth objective type. Albania on the other hand is developing from many years of under-investment, and is concentrating, like BiH, on the second and third objectives.

Self-financing sustainability of the transport system is usually the first cause of such orientations. In the above examples, by contrast FRY has still to develop an adequate system for financing the operations and maintenance of its transport system, whereas Croatia established such a system a long time ago and is no longer concerned by a backlog of maintenance and rehabilitation operations with routine maintenance operations being regularly planned and executed.

6.2 Master Planning

The main outputs and conclusions of the master planning exercise carried out at this time by TIRS are presented in the following paragraphs.

6.2.1 Highways

The road sector is undoubtedly the easiest to evaluate in a master planning exercise. Traffic forecasts are rather simply assessed from the growth of the economy and infrastructure requirements derive easily from them. As explained above in Chapter 5, the Consultant has introduced traffic generation models in his forecasting method in order to assess that traffic not directly related to the local economy namely passenger traffic from abroad and international general cargo traffic. Such transport demands have been evaluated separately, giving consideration to the likely development of the surrounding regions, the constraints of transport links, i.e. the difficulty to transport, and inter-modal allocation. These have been
allocated to the basic network and combined with the expected local traffic to which the Consultant has simply applied an assumed growth rate. In this way traffic has been assessed on all sections of the study network for the year 2015. These traffic forecasts are represented in Map 20. It should be emphasised that the estimated share of local traffic in the total highway traffic, will hardly change in the future, ranging across the region from between 75% and 96%, despite the anticipated increase in international traffic from the joint effects of infrastructure improvement and political stabilisation. This growth in international traffic will be more than matched by a rapid increase of motorisation and usage of cars in the region from the effects of the accompanying development of the economy.

Comparison of traffic forecasts with the existing capacities of the different sections of the network indicates where traffic congestion may appear before 2015, and thus where upgrading existing infrastructure has to be envisaged before this horizon is reached. The resulting network is represented in Map 23, which may be considered as the coherent medium term highway network.

Developing the main highway infrastructure towards this objective bears some meaning only if the means to maintain it at the level of service required are mobilised in parallel. This raises the general issue of adequately funding development and maintenance of highway infrastructure, at the level of the whole network as well as at the level of individual sections of highway. This problem is addressed further under Chapter 9, “accompanying measures”.

6.2.2 Railways

As stated previously in the report, Railway Companies in the region are losing traffic, particularly freight traffic, whilst railway infrastructure is continuing to deteriorate due to lack of appropriate maintenance.

Railway freight traffic is closely tied with industry, and comprises in the main bulk cargo or liquids, semi-processed and other industrial products. Forecasting the development of industry in each of the Balkan countries is a high risk exercise, and the Consultant has opted to consider that railway traffic, related to industry and construction activities, will remain stable in the medium term.

The small share taken by the railways of the movement of international general commodities is not supposed to vary a great deal, even if containerisation is better organised and supported by the Administrations in the region. According to the Consultant’s gravity model, movements of international general cargo on the most trafficked links should not represent more than 6,000 tons per day by 2015. Even if half of this were accommodated by the railways, such traffic would be less than four trains a day.

In conclusion, and probably most realistically, railway traffic should, in general, at best remain stable or increase quite slowly in the coming 15 years. There are of course some exceptions, such as the suburban traffic of the largest metropolitan area, Bucharest. Systematic prospective studies on the present market for each railway system are necessary in order to arrive at sounder forecasts.

This does not mean that railways should be abandoned to their tendency to natural decline. Reorganization and cost cutting policies would certainly improve the strength and
competitiveness of this mode. Concentration on the most profitable lines and services will also obviously improve the financial situation of the companies and their ability to find better marketing prospects.

In every country in the world, railways cannot compete for the time being with road for most traffic because road transportation does not pay and is not about to pay for its real economic cost. Such costs are actually enormous, if due account is correctly taken of all “external costs”: noise, pollution, accidents, time lost in traffic congestion, space occupation, etc. These external costs were recently estimated for France at nearly € 44 billion in a year, to be compared with € 0.7 billion for rail and other public transport. No country may seriously envisage charging road transport at its real economic cost, as it would immediately result in freezing all economic activities. To compensate for the advantages given to road transport indirectly, and to keep some demand on a safer and environmentally sound means of transport, most Governments have no alternative than to subsidise the railway to some extent, one way or the other.

To allow improvement in the financial and marketing management of the companies to occur, such subsidies should not automatically compensate for the losses when they appear, but should be interpreted as a fixed contribution from the State for the development and operations of the railways, negotiated and contracted regularly with the companies.

Beside this basic institutional problem and in the perspective of focusing marketing efforts on the most profitable services and lines, the infrastructure associated with these lines has to be rehabilitated and improved. Continuous improvement is a usual process for all railways and as such become profitable as soon as traffic reaches some importance. Correcting curves allows a significant increase in the life of rails and track and reduces travel time. Raising the base speed to 120 or 130 kmph on some lines may be an objective, but more generally railway improvements consist firstly of track overhaul on the most deteriorated sections and of progressive elimination of black-spots or dangerous structures.

For the moment there is no necessity to double the track on some single-track lines; nor is there a need to electrify lines, except in circumstances where completing the homogeneity of the fleet of locomotives is important. A physical Master Plan for railways would therefore have little significance in the present exercise. But planning rehabilitation projects on the main lines should be considered favourably, in particular along the most trafficked Pan-European Transport Corridors.

The development of new types of railway infrastructure, rapid trains or rail-roader systems (special infrastructure to accommodate trains with trucks and trailers on flat wagons), may be considered in the long term along the most utilised lines, but not in the present situation of the railways and with their low levels of transport demand.

6.2.3 Waterways

The Danube and the Sava are obviously quite important assets in the transport system of the region and retain a promising future for the transport of bulk commodities or local agricultural products. A prerequisite for finding the past levels of utilisation of these rivers is to restore their permanent access and safety. Cleaning, rehabilitation and appropriate marking of transport channels have yet to be undertaken on those stretches affected by war or inadequate
maintenance during the last ten years. The status of the Sava river as a means of international transport has also to be determined quickly. Adaptation of inland waterways to inter-modal transport operations will necessitate a number of investments in the main river ports.

6.2.4 Seaports

There are no visible prospects for important reallocation of traffic among the international routes serving the Balkans. Utilisation of seaports will grow with international trade, probably at a slower pace in the Adriatic seaports whilst competitive long distance surface routes will keep improving. Medium term objectives for seaports, which still have important spare capacity, are to renovate or regularly adapt their facilities and equipment to meet required levels of productivity as well as the development of demand.

6.2.5 Airports

Airports play the role of local access and seldom enter into competition with each other or with alternative modes. Development objectives thus remain mainly of a local nature and will correspond to those of various individual master plans.

6.2.6 Intermodal Transport

The use of only one mode for the transport of goods is not always possible. When it is possible, it may not be the best solution. When a shipment sent from a shipper to a consignee utilises more than one mode, it is usually referred to as multi-modal transport. As a matter of fact, air and sea transport are usually part of a multi-modal transport system acting as terminal links (from shipper to port or airport or from port or airport to the premises of the consignee) with final delivery being made frequently by truck or train.

The transfer of commodities from one mode to another requires handling and sometimes warehousing operations which may be costly, time consuming and unsafe. In certain cases it is possible to use specially designed boxes in which the goods are packed. Boxes are handled and possibly stored. They are standardised and the transfer from one mode to the other is then much cheaper, safer and faster, particularly when large numbers of boxes are concerned. The boxes, usually called ITU (inter-modal transport units) are sea containers, swap bodies and special road trailers. This type of multi-modal transport is usually called combined transport\(^5\). There are various types of inter-modal transport:

- When there is a maritime segment. In this case the ITUs are mainly sea containers and the sea vessels are container ships. Because of the tremendous development of intercontinental trade of general cargo and of container traffic, this form of transport has become particularly important.

- When the sea segment is made in Ro-Ro (roll-on/roll-off) vessels. In this case the ITUs may be sea-containers loaded on special trailers (port trailers) or trucks or road

\(^5\) Sometimes the designation combined traffic only refers to the case where the main transport section is made on rail or inland waterway.
trailers. The sea transport is relatively costly and this type of transport is more suitable when sea distances are short and the volume transported is small⁶.

- When there is no maritime segment. This is a case of intra-continental transport; the three following types can be distinguished:
  - rail - road combined transport,
  - inland waterway – road combined transport,
  - short sea shipping – road combined transport.

In these 3 cases, road transport is used to collect and distribute ITUs over relatively short distances.

Compared with mono-modal transport, multi-modal transport appears much more complicated as it requires co-ordinating the various modes involved. Nevertheless combined transport successfully competes with road transport the potential difficulty of co-ordination is compensated by:

- direct economic advantages. The intermediate transport segment (rail, inland waterway, short sea shipping) may be cheap compared with mono-modal road transport, particularly if it consists of mass transport: block trains, large container barges, etc.. The money saved due to the intermediate mass transport may be larger than the additional cost of the inter-modal transfers;

- indirect economic advantages. These advantages are not taken into account in transport prices (externals): less detrimental effect to the environment, security, less traffic congestion, improved land development, etc..

There is wide agreement that consideration should be given to the development of combined transport as a political objective and effectively supported by Governments and appropriate legislation.

Beyond governmental measures to progressively charge road transport more in accordance with real costs, operators engaged in combined transport must find resources themselves to develop their activity, to improve the services they offer and increase productivity.

In the countries of South-Eastern Europe, inter-modal transport is still limited, sometimes for safety reasons, and specific inter-modal facilities, when they exist, are largely under-utilised. Most of the inter-modal transfer operations are accommodated in seaports or river-ports, or in railway stations, with equipment and personnel under the responsibility of those companies/agencies. Development of inter-modal transfer capabilities are thus generally included in individual development plans of ports and railways.

⁶ It is also of particular interest when the ports are not well developed with few berths and limited platform area. Ro-Ro vessels require small mooring infrastructure and unloaded trucks can be directly sent to inland terminals some km from the port and do not need parking areas within the port itself.
6.3 **Long list of Infrastructure Projects**

Appendix 7 of this report provides, for each of the seven countries, a list of proposed projects, which have been identified at this time, relevant to strategic transport infrastructure development in all of the studied countries. Projects have been identified through a number of sources:

- Master Plans, national or individual
- Public Investment Programmes
- Donor and Consultant Reports
- Discussions with Authorities responsible for infrastructure development

In a number of cases projects have been referenced in more than one source. Where it has been possible, the current intention for project development has been established through discussion with the relevant authority and priority intentions for investments identified.

The status of Master Plans for development of the sector as a whole and those for specific transport modes are varied. In some cases plans exist and these are being applied. Others are in varying stages of preparation or are obsolete. In some cases, specific development of infrastructure is un-planned; this is particularly applicable for railways, given the present operational difficulties and the uncertain future viability of the railways.

A number of individual Master Plans do however exist for specific modes and these it is understood are generally being taken as the point of reference for current and future development. Important sources of reference, for identifying the projects listed for this Study, have also been a number of recent reports prepared by the major donors. These reports reflect material included in the above referenced documents but usefully summarise the proposed future development of infrastructure in respective countries. Projects listed in documentation for the EIB Balkan Task Force, Regional Project Review have also been examined and the revised status of selected projects noted. All of this extracted material has been used in subsequent discussions with the respective authorities in the Ministries of Transport or with representatives of each mode of transport at the State level. Such discussions have established the current and future status of those projects as integral elements of ongoing infrastructure development and for identifying the definitive long list of projects for each mode of transport. This long list has been presented in the Interim Report, and the different countries have had the opportunity to comment and propose modifications to the list when deemed necessary. Projects presently under execution or already fully financed are not included in this list.

Appendix 7 provides for each project a fiche containing a short description of the project, the status of the technical studies, the cost estimate available so far, the expected implementation programme and a few remarks, when possible, on the definition and on the implementation of the project. Maps designated 21 by country, give the location of the projects for each country. These fiches have been reviewed with the authorities concerned in each country, under the supervision of the official correspondent of TIRS in the local administration.
7 EVALUATION OF INFRASTRUCTURE PROJECTS

7.1 Multi-criteria Analysis

The definition status of infrastructure projects on the long list is quite varied. A few projects have already been studied in detail and their costs assessed accurately; the effects of such projects may therefore be quantified easily. Conversely, many other projects have been either defined very roughly and empirically, or have been defined some time ago and as a result their scope and costs need review and updating. The effects of such projects are therefore often difficult to quantify, or sophisticated approaches adopted in the process: this is the case whenever the quality of services, safety or environmental impacts are required to be assessed.

Conventional cost-benefit analysis of the listed projects is not realistically applicable in the TIRS exercise, considering the very preliminary level of project definition, and the lack of quantified information on their background and on their effects. Such analysis may also be questionable, as it will not reflect the particular importance that the Consultant wishes to attribute in the TIRS exercise to the facilitation of international and regional communications. Finally it may be argued that, in a traditional economic evaluation, the most important parameter, the opportunity cost of capital, is often difficult to assess, particularly in countries in transition like those of South Eastern Europe. Furthermore this parameter reflects the scarcity of available financial resources and directly determines economic indicators like the C/B ratio as well as the minimum acceptable level of the Internal Rate of Return (IRR). It is now commonly admitted that an IRR at 12 or 15 % is acceptable, whereas, in over-indebted countries or in countries with limited reimbursement capacity, the actual opportunity cost of capital could easily reach levels of 25 or 30 %, or even higher levels.

The still very preliminary level of definition of most projects, the lack of precise information on the present situation, the imperfect knowledge of transport demand perspectives, the large array in types of projects as well as the specific objectives of TIRS, mitigate in favour of utilising a Multi-Criteria Analysis to compare proposed infrastructure projects.

Such a method will allow available information to be taken into account on projects, even at their very preliminary level of definition, as well as background data. At the same time some specific elements of particular interest for the decision-makers may be introduced. In the case of the TIRS exercise, the Consultant will endeavour to identify the importance of each project in facilitating exchanges between countries in the region and the economic integration of the region in the rest of Europe.

7.2 Selection of Criteria

The Consultant has largely adopted and maintained the selection principles for projects, elaborated by ECMT in its paper “Transport Infrastructure in Central and Eastern European Countries/ Selection Criteria and Funding” (1995). The criteria to be evaluated have been defined according to two basic concerns:

- the socio-economic return on investment,
- the functionality and the coherency of the network.
Under these two fundamental orientations of the evaluation process, the following criteria have been introduced, which are aimed at covering all of the objectives and specifics relating to the TIRS exercise.

**Socio-economic return on investment:**  
- level of transport demand,  
- cost effectiveness,  
- degree of urgency,  
- relative importance of investment cost,  
- environmental effects,  
- financing feasibility.

**Functionality and coherency of the network:**  
- type of relation,  
- relative importance of international demand of traffic/passengers,  
- relative importance of international demand of traffic/goods,  
- interconnection of existing networks,  
- meeting EU standards of service.

It may be considered that some of the above criteria are partly redundant. This is evident when considering embracing criteria, like cost effectiveness. Each criteria is aimed at both highlighting a particular aspect of a project yet underlining its importance in the assessment of the global interest of that project. Two projects may for instance have the same return on investment (including impact on the environment), the first one having a positive effect on the environment, while the second one has some detrimental effects. Introducing criteria on the environment will allow the special interest placed on environmental effects to be emphasised, which in detailed analysis are quite often largely underestimated.

For each of the above mentioned eleven criteria, the actual substance is as follows:

*Level of transport demand* is aimed at giving an indication of the relative level of traffic using the infrastructure. It is determined according to ranges of existing traffic, with adjustment when such existing traffic is evidently biased by temporary circumstances (interruption of traffic, institutional constraint, etc.).

*Cost effectiveness* is aimed at giving an indication of the likely level of Internal Rate of Return (IRR) for the project. It is determined basically according to the type of investment, the importance of the demand and the relative magnitude of the advantages expected from the implementation of the project. When an IRR has already been estimated and is known, its value is directly taken into account, provided the assumptions made on costs and demand appear realistic. In most cases, the IRR has been estimated from the experience of the Consultant.

*Degree of urgency* is aimed at indicating whether a project has to be implemented as soon as possible or whether its implementation may be postponed somewhat. Typically, the most urgent projects are those which will lead to the highest economic losses if implementation is postponed. This is the case when the optimal date for implementation has already passed, or when non-implementation may result in serious disturbance to trade or economic activity.
Relative importance of investment costs is aimed at indicating whether the project is expensive or cheap considering its type and the usual cost of similar projects, taking due account of its magnitude (e.g. its length for linear infrastructure).

Environmental effects are aimed at assessing the importance of the project for protection/improvement of the environment or conversely detrimental effects.

Financing feasibility is aimed at giving an indication to potential financing institutions of (i) the capability of the project to generate the necessary additional resources for its own operations (including maintenance) and to facilitate the reimbursement of funds, when those funds are not grants, and (ii) the reliability of the cost estimate and of the definition of the project, to limit the risks of either unexpected increases in investment costs or an overestimation of potential revenues.

Type of relation is aimed at showing the international importance of the link or the itinerary associated with the project, politically as well as economically.

Relative importance of international demand of traffic (one criteria for passengers and one for goods) indicates the amount of international transport in the total transport demand associated with the project.

Interconnection of existing networks is aimed at indicating the extent to which the project is improving communications between one regional/national network with another one, thus facilitating the development of trade between two regions/countries.

Finally meeting EU standards of service indicates whether the existing facility provides a level of service close to or far from the standards defined by the European Union, or generally accepted, in terms of comfort, speed or safety.

7.3 Quantification of the Criteria

Criteria have been quantified for each of the projects under consideration either by direct classification according to measurable characteristics, or by “quality attributes”, assessed by expert judgement. Such subjective measurement is unavoidable in a multi-criteria analysis, whenever available information is not precise or reliable enough.

The actual quantification for the different criteria has been set as follows:

1. Level of transport demand
   - B: Very high, C: High, D: Medium, E: Low
   - Highways: B, present traffic more than 10,000 vpd/ C, from 6,000 to 10,000 vpd/ D, from 3,000 to 6,000 vpd/ E, less than 3,000 vpd
   - Border crossings: B, present traffic more than 2,500 vpd/ C, from 1,500 to 2,500/ D, from 800 to 1,500/ E, less than 800 vpd
   - Railways: B, present traffic more than 100 trains a day/ C, from 60 to 100 trains a day/ D, from 25 to 60 trains a day/ E, less than 25 trains a day
   - Ports: B, present traffic more than 8 million ton per year/ C, from 4 million to 8 million ton/ D, from 1.5 million to 4 million ton/ E, less than 1.5 million ton per year
- River ports: B, present traffic more than 2 million ton per year/ C, from 1 to 2 million/ D, from 0.5 to 1 million ton/ E, less than 0.5 million ton per year
- Airports: B, present traffic more than 3 million passengers a year/ C, from 2 to 3 million/ D, from 1 to 2 million/ E, less than 1 million passengers a year

2. Cost effectiveness
   A: Excellent (IRR higher than 30 %), B: Very good (24/30 %), C: Good (18/24 %), D: Acceptable (12/18 %), E: Low (7/12 %), F: Insufficient (IRR less than 7 %)

3. Financing feasibility
   B: Good, C: Medium, D: Low and risky

4. Degree of urgency
   A: Immediate requirement, B: Very urgent, C: Urgent, D: May be postponed for a couple of years, E: To be reconsidered later

5. Environmental effects
   A: Excellent, B: Very high, C: High, D: Medium, E: Low, F: Detrimental

6. Relative importance of investment cost
   B: Low, C: Average, D: Expensive, E: Very Expensive
   - Rehabilitation/upgrading of highways: B, less than € 500,000 per km/ C, from €500,000 to €750,000/ D, from €750,000 to €1 million/ E, more than € 1 million per km
   - New 2 lane highway or single carriageway: B, less than € 1.2 million per km/ C, from €1.2m to €1.6m/ D, from €1.6m to €2m/ E, more than € 2 million per km
   - Complete four lane motorway: B, less than € 2.2 million per km/ C, from €2.2m to €2.8m/ D, from €2.8m to €3.5m/ E, more than € 3.5 million per km
   - Rehabilitation/upgrading of railways: B, less than € 0.45 million per km/ C, from €0.45m to €0.7m/ D, from €0.7m to €0.9 million/ E, more than € 0.9 million per km
   - New single-track rail line: B, less than € 1 million per km/ C, from €1m to €1.5m/ D, from €1.5m to €2.2m/ E, more than € 2.2 million per km

7. Type of relation
   B: Pan-European transport corridor, C: Other link from TINA network or EU strategic network, D: Other link of international or interregional importance, E: Link of regional or local importance

8. Relative importance of international demand of traffic (passengers)
   B: Very high, C: High, D: Medium, E: Low
   B, more than 25 % of total traffic/ C, from 15 to 25 %/ D, from 7 to 15 %/ E, less than 7 % of total traffic

9. Relative importance of international demand of traffic (goods)
   B: Very high, C: High, D: Medium, E: Low
B, more than 25 % of total traffic/ C, from 15 to 25 %/ D, from 7 to 15 %/ E, less than 7 % of total traffic

10. Interconnection of existing networks
   A: Missing connection, C: Improve the connection, E: No influence

11. Meeting EU standards of service (with the existing infrastructure)
   B: Inadequate, C: Medium, D: Adequate

Aggregation and the classification procedure is based on the ELECTRE TRI method. This method is described in Appendix 8. Projects are automatically classified by the method into four categories:

- I: projects which may be funded and implemented rapidly,
- IIa: projects requiring some additional investigations for final definition before likely financing,
- IIb: projects requiring further investigations for final definition and scheduling before possible financing,
- III: projects to be discarded for the time being.

The classification of the projects by ELECTRE TRI has been made through:

- threshold values,
- consolidation of the differences between favourable and unfavourable criteria,
- gravity factors for those criteria of particular importance.

Appendix 1 presents the evaluation tables for all projects under consideration, and the different tests conducted, particularly regarding budgetary envelopes.

Projects which are not on the TINA networks nor on the EU strategic networks are clearly identified in this Appendix by rating D or E under criteria 7.

7.4 Results of Analysis

a. Budgetary Constraint

The first problem that needs to be solved when selecting investment projects is the size of the budget that can be afforded. In a classical cost-benefit analysis, this size is directly determined by the selection of the opportunity cost of capital (for the country, for the sector or for any decision-making entity), which reflects the relative scarcity of funds. A project will be considered feasible when its internal rate of return is higher than the opportunity cost of capital. The project should then be implemented when its first year benefit/cost ratio becomes higher than the opportunity cost of capital.

In the present exercise, the selection of projects will derive from the budget envelop which may be allocated to transport infrastructure projects of international and regional importance in the region. To keep within the objectives of the TIRS exercise, the region shall be considered as a whole, and the projects, in the first instance, classified irrespective of the
country they come from. An examination shall then be made as to whether each country can theoretically afford financing the projects selected within its boundaries.

The total cost of all projects listed in this exercise amounts to €27.5 billion. The selected projects should be implemented in the short to mid term range, i.e. during a period of eight years from now. In recent years, International Funding Institutions have considered that the acceptable proportion that internationally-relevant transport investment costs represents, compared with GDP for a country, should not be higher than 1.5 per cent per year in the long term, in order to limit the risk of over-indebtedness. This level was recommended by the ECMT Resolution no 97/1 on Transport and Infrastructure Development adopted in Berlin on 21-22 April 1997. It was also used by the TINA project.

For the region as a whole, GDP amounts to some €107.9 billion. 1.5% of this regional GDP is thus equivalent to €1.62 billion on an annual basis. It appears then that, with all countries taken together, an investment of €13 billion may be reasonably envisaged over a period of eight years, i.e. roughly half of the total amount of projects under consideration. The Consultant has accordingly tailored the budgetary envelopes for the four categories of projects defined above. Categories I and IIa should represent a total of around €13 billion, with Category I (urgent projects to be implemented or launched within 3 to 4 years) accounting for approximately €5.5 billion and Category IIa (other projects likely to be financed in the forthcoming eight years) for €7.5 billion. Categories IIb and III will therefore represent a total of some €14.6 billion, which will be split between the two categories. Classifying all projects into these four categories has been done by a process of trial and error, to arrive at the respective budgetary limits determined for each category.

b. Presentation of Results

Appendix I provides the grading of the 223 projects according to the eleven criteria. The final table in the Appendix identifies the number and cost of projects by mode and by country. The two tables reproduced below summarise the results.

### DISTRIBUTION OF PROJECTS ACCORDING TO MODE

<table>
<thead>
<tr>
<th>Category</th>
<th>By</th>
<th>Highways</th>
<th>Railways</th>
<th>Ports</th>
<th>Waterways</th>
<th>Airports</th>
<th>Intermodal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Number</td>
<td>35</td>
<td>31</td>
<td>7</td>
<td>17</td>
<td>4</td>
<td>0</td>
<td>94</td>
</tr>
<tr>
<td></td>
<td>Cost in € Mio</td>
<td>1,019</td>
<td>3,009</td>
<td>425</td>
<td>846</td>
<td>68</td>
<td>-</td>
<td>5,368</td>
</tr>
<tr>
<td>IIa</td>
<td>Number</td>
<td>35</td>
<td>8</td>
<td>6</td>
<td>3</td>
<td>7</td>
<td>-</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>Cost in € Mio</td>
<td>4,454</td>
<td>2,164</td>
<td>327</td>
<td>49</td>
<td>566</td>
<td>-</td>
<td>7,560</td>
</tr>
<tr>
<td>IIb</td>
<td>Number</td>
<td>21</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Cost in € Mio</td>
<td>4,321</td>
<td>1,750</td>
<td>-</td>
<td>-</td>
<td>49</td>
<td>55</td>
<td>6,175</td>
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<tr>
<td>III</td>
<td>Number</td>
<td>18</td>
<td>11</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>-</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Cost in € Mio</td>
<td>5,139</td>
<td>2,988</td>
<td>52</td>
<td>200</td>
<td>64</td>
<td>-</td>
<td>8,442</td>
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<td>Total</td>
<td>Number</td>
<td>109</td>
<td>59</td>
<td>15</td>
<td>21</td>
<td>17</td>
<td>2</td>
<td>223</td>
</tr>
<tr>
<td></td>
<td>Cost in € Mio</td>
<td>14,932</td>
<td>9,911</td>
<td>804</td>
<td>1,096</td>
<td>748</td>
<td>55</td>
<td>27,545</td>
</tr>
</tbody>
</table>
DISTRIBUTION OF INVESTMENT COSTS BY COUNTRY (€ MILLION)

<table>
<thead>
<tr>
<th>Country/ Category</th>
<th>I</th>
<th>IIa</th>
<th>IIb</th>
<th>III</th>
<th>I+IIa+IIb+III</th>
<th>I+IIa</th>
<th>8x1.5%GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albania</td>
<td>136</td>
<td>260</td>
<td>67</td>
<td>342</td>
<td>805</td>
<td>396</td>
<td>470</td>
</tr>
<tr>
<td>Bosnia and Herzegovina</td>
<td>305</td>
<td>838</td>
<td>186</td>
<td>488</td>
<td>1,817</td>
<td>1,143</td>
<td>683</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>1,364</td>
<td>1,257</td>
<td>767</td>
<td>951</td>
<td>4,339</td>
<td>2,621</td>
<td>1,882</td>
</tr>
<tr>
<td>Croatia</td>
<td>347</td>
<td>554</td>
<td>1,416</td>
<td>474</td>
<td>2,791</td>
<td>901</td>
<td>3,097</td>
</tr>
<tr>
<td>Fed. R. of Yugoslavia</td>
<td>1,373</td>
<td>60</td>
<td>504</td>
<td>57</td>
<td>1,994</td>
<td>1,413</td>
<td>2,459</td>
</tr>
<tr>
<td>FYROM</td>
<td>173</td>
<td>155</td>
<td>319</td>
<td>418</td>
<td>1,064</td>
<td>328</td>
<td>516</td>
</tr>
<tr>
<td>Romania</td>
<td>1,669</td>
<td>4,436</td>
<td>2,916</td>
<td>5,713</td>
<td>14,735</td>
<td>6,105</td>
<td>5,131</td>
</tr>
<tr>
<td>Total</td>
<td>5,368</td>
<td>7,560</td>
<td>6,175</td>
<td>8,442</td>
<td>27,545</td>
<td>12,928</td>
<td>14,238</td>
</tr>
</tbody>
</table>

The classification of projects however may be considered somewhat flexible, given the way the categories have been defined. Some projects may be switched from one category to another depending on the threshold values set up in the ELECTRE TRI programme. Whilst projects in the first category should definitely be considered for immediate financing and implementation, the feasibility of some projects in Category IIa may, after complementary analysis, not be adequately proven, whereas it may be justified to retain a few projects in Category IIb for rapid financing. All projects in Category III should nevertheless be discarded for the time being.

The following comments may be drawn from a global review of the results of the analysis by transport mode:

- Among the projects to be considered seriously for rapid implementation (Categories I and IIa), the budgets to be allocated to the two land modes, highways and railways, are approximately the same. This is as a consequence of (i) the importance given in the Consultant’s analysis to environment effects and (ii) to the advantage given to international traffic.

- Inland waterways projects are in general well demonstrated, as a result of their environmental attractions and cost effectiveness.

With regard to the results of the country analysis, the present institutional and financial situations of countries have had a direct consequence on the type of projects that respective countries have considered, at this time, for external financing. The results may therefore be interpreted as follows:

For **Albania**, the projects under Categories I and IIa are consistent with the potential financing abilities for the country.

For **Bosnia and Herzegovina**, projects under Category I, which are mostly rehabilitation projects, may be fully supported, but projects under Category IIa have to be carefully examined, as the country may have some financial difficulty in financing them all in the mid term.

For **Bulgaria**, many projects listed in Category IIa should be launched only after due consideration has been given to the country’s capacity for reimbursing the associated funding.

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7 Over the period 2002/2010, with an annual increase of 3.5%
Croatia has obviously stabilised its institutional problems and finances including those associated directly with regular and periodic maintenance of its transport infrastructure. It is now considering external or private finance, mainly for large development projects, in particular for its motorway system. Such projects still have limited cost effectiveness and often fall into either Category IIb or III. The country seems nevertheless to have the capability to reimburse the associated finances.

The Federal Republic of Yugoslavia has built up a serious backlog in addressing maintenance issues and adapting its transport infrastructure. Its present institutional problems in addition do not allow the country to rapidly mobilise the necessary financial resources for rehabilitating this infrastructure. It is therefore waiting for external assistance for a series of small rehabilitation projects, covering all transport modes. Most of these projects concern major international routes, have a fair cost effectiveness and are urgently needed. Considering the potential financing capabilities of the country, these projects should be supported, provided institutional reforms are introduced in parallel, by the country, to create self sustaining financing systems.

For Macedonia, projects under Category I and IIa are largely within the financing capabilities of the country.

For Romania, projects in the first two categories are a mix of rehabilitation and reconstruction, particularly in the railways and waterways sectors. New infrastructure in particular new motorways, for the moment are too expensive for the potential demand and fall within the two last categories. Projects in the two first categories represent a budget only 20% higher than the budget that is theoretically affordable by the country.
8 SHORT TERM AND NEAR TERM PROJECTS AND FUTURE NETWORK

8.1 Prioritisation of Actions

The evaluation of the projects carried out in the previous chapter has led to the ranking of all 223 investment projects under consideration, within four categories, as previously mentioned:

- I: projects which may be funded and implemented rapidly,
- IIa: projects requiring some additional investigations for final definition before likely financing,
- IIb: projects requiring further investigations for final definition and scheduling before possible financing,
- III: projects to be discarded for the time being.

Projects of Category I are all supposed to be implemented in the short or medium term, and should therefore be launched as soon as possible. A number of projects of Category IIa and a few projects of Category IIb, after additional analysis, may be added to the projects to be implemented in the medium term, but because of their uncertainty, should not be finally decided upon and launched before at least two years.

Short term and near term investment programmes will thus involve only projects selected from Category I for the moment.

Prioritising projects within Category I is an imprecise exercise, implying an assessment of the relative urgency of these projects. To achieve consistency with the ranking of projects, it is necessary to reconsider, for this further assessment, the evaluation made of their degree of urgency in the multi-criteria analysis and give a precedence to all projects quoted A and B. The terms of reference specified that short term actions should be implemented within 24 months. The time necessary for the implementation of the project should thus also be taken into account.

Top priority projects should obviously include all actions which "could realistically solve or substantially and rapidly alleviate severe problems areas", including bottlenecks when they exist. Actually, most of these severe problems have already been alleviated in the recent past, particularly those resulting from recent events in the former Yugoslavia. Physical bottlenecks remain only on the inland waterway system (Danube and Sava rivers) and with some damaged structures in FRY.

All the above considerations have led to the development of short and near term investment programmes indicated in the following sections of this report. In order to arrive at balanced budgets for these two programmes, we have considered that the short term programme should include all projects with a high degree of urgency and which could at the same time be implemented in less than 3 years, together with the preparation of all other projects with a longer implementation time.
8.2 Short Term Investment Programme

The proposed short term programme consists of two components:

- actual implementation of infrastructure works and secondly
- immediate activities to prepare for works implementation identified for the proposed near term programme.

a. Project Implementation

The reader is reminded that, in the numbering of projects, the indication of the mode is as follows: H= highways, R= railways, P= ports, W= waterways, A= airports, IM= inter-modal.

<table>
<thead>
<tr>
<th>Country</th>
<th>Project Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albania</td>
<td>Al-H-01</td>
<td>Rehabilitation of Durres-Plepa</td>
</tr>
<tr>
<td></td>
<td>Al-H-02</td>
<td>Rehabilitation of Rrogozhine by-pass</td>
</tr>
<tr>
<td></td>
<td>Al-R-01</td>
<td>Rehabilitation of Shkoder-Hani Hotit</td>
</tr>
<tr>
<td>Bosnia and Herzegovina</td>
<td>Bo-W-01</td>
<td>Reconstruction of Brcko port</td>
</tr>
<tr>
<td></td>
<td>Bo-W-02</td>
<td>Reconstruction of Samac port</td>
</tr>
<tr>
<td></td>
<td>Bo-W-03</td>
<td>Clearance of the Sava river</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>Bu-H-04</td>
<td>Rehabilitation of Vidin-Montana</td>
</tr>
<tr>
<td></td>
<td>Bu-H-05</td>
<td>Reconstruction of Dimovo-Bela-Roujintzi</td>
</tr>
<tr>
<td></td>
<td>Bu-H-09</td>
<td>Rehabilitation of roads on PET corridors/ 1st phase</td>
</tr>
<tr>
<td></td>
<td>Bu-R-02</td>
<td>Resignaling Sofia-Kulata</td>
</tr>
<tr>
<td></td>
<td>Bu-R-09</td>
<td>Modernisation of Sofia-Dragoman-Dimitrovgrad</td>
</tr>
<tr>
<td>Croatia</td>
<td>Cr-R-04</td>
<td>Railway information equipment</td>
</tr>
<tr>
<td></td>
<td>Cr-W-01</td>
<td>Regulation of Sava river</td>
</tr>
<tr>
<td>Federal Republic of Yugoslavia</td>
<td>Yu-H-01</td>
<td>Rehabilitation of Ljig-Cacak</td>
</tr>
<tr>
<td></td>
<td>Yu-H-02</td>
<td>Rehabilitation of Petrovaradin-Ruma *</td>
</tr>
<tr>
<td></td>
<td>Yu-H-04</td>
<td>Rehabilitation of Pojate-Kraljevo *</td>
</tr>
<tr>
<td></td>
<td>Yu-H-05</td>
<td>Rehabilitation of Bujanovac-Presevo</td>
</tr>
<tr>
<td></td>
<td>Yu-H-08</td>
<td>Border crossing at Presevo</td>
</tr>
<tr>
<td></td>
<td>Yu-H-12</td>
<td>Upgrading Nis-Pirot-Gradina</td>
</tr>
<tr>
<td></td>
<td>Yu-H-14</td>
<td>Rehabilitation of Pancevo-Romania</td>
</tr>
</tbody>
</table>

* Projects out of the EU strategic networks
Yu-H-15  Removal of bottleneck at Ovcar Banja
Yu-H-20  Rehabilitation of highways North of Podgorica
Yu-R-01  Priority rehabilitation on Belgrade-Sid-Tovarnik
Yu-R-02  Priority rehabilitation on Belgrade-Nis-Tabanovce
Yu-R-03  Priority rehabilitation on Stara Pazova-Kelebia
Yu-R-04  Priority rehabilitation on Nis-Pirot-Gradina
Yu-R-05  Upgrading Vreoci-Valjevo
Yu-R-06  Rehabilitation of Vrbenica-Podgorica-Bar
Yu-R-07  Repair of Danube bridges at Belgrade
Yu-R-08  Reconstruction of Zezelj bridge at Novi Sad
Yu-W-01  Clearance of the Danube
Yu-W-02  Clearance of the Sava
Yu-W-03  Improvement of Belgrade port
Yu-W-04  Improvement of Pancevo port
Yu-W-05  Improvement of Novi Sad port
Yu-A-01  Functional improvements at Belgrade airport
Yu-A-02  Extension of facilities at Belgrade airport

**FYROM**

Ma-H-03  Upgrading of Struga-Kafasan
Ma-H-10  Rehabilitation of Kumanovo-Veles
Ma-H-17  Border crossing at Blace
Ma-H-18  Completion of Motorway Tabanovci-Kumanovo
Ma-R-04  Marshalling yard at Trubarevo
Ma-A-01  Extension of passenger terminal at Skopje airport
Ma-A-02  Extension of facilities at Skopje airport

**Romania**

Ro-R-17  Consolidation of Iron Gates crossing
Ro-W-03  Rehabilitation of Danube ports

*b. Preparation or updating of studies, design and tender documents*

**Albania**

Al-H-07  Rehabilitation of Shkoder-Lezhe
Al-H-08  Rehabilitation of Lushnje-Fier
Al-H-09  Rehabilitation of Fier-Vlora *
Al-H-14  Link road to Tirana Airport *
Al-P-01  Rehabilitation and Development of Durres Port

**Bosnia and Herzegovina**

Bo-H-03  Reconstruction of Samac-Seslije
Bo-H-04  Reconstruction of Seslije-Doboj

* Projects out of the EU strategic networks
Bo-H-05  Reconstruction of Doboj-Zenica
Bo-H-06  Construction of Jablanica detour
Bo-H-09  Upgrading of Tarcin-Konjic
Bo-R-01  Reconstruction of Bosanski Samac-Samac-Doboj
Bo-R-02  Reconstruction of Konjic-Mostar
Bo-R-05  Modernisation of signalling on Vc and East-West line

Bulgaria

Bu-H-06  Completion of Sofia ring road North
Bu-R-01  Upgrading Plovdiv-Dimitrograd-Svilengrad-K. Andreevo
Bu-R-03  Rehabilitation of Vidin-Sofia
Bu-R-04  Upgrading Sofia-Dupnitsa
Bu-R-08  Additional railway rehabilitation
Bu-P-01  Ro-Ro ferry terminal at Burgas
Bu-P-02  Terminal 1 at Burgas
Bu-P-04  Rehabilitation of oil terminal at Burgas
Bu-P-08  New grain terminal at Varga
Bu-W-02  Extension of Rousse port

Croatia

Cr-R-01  Upgrade Corridor Vc
Cr-R-02  Upgrade Corridor Vb
Cr-P-01  Rehabilitation of Rijeka port

Federal Republic of Yugoslavia

Yu-H-03  Reconstruction of Mataruska Banja-Raska *
Yu-H-06  Improvements on Leskovac-Bujanovac
Yu-H-09  Rehabilitation of Belgrade-Nis
Yu-H-10  Reconstruction of Rzav-Nova Varos
Yu-H-11  Completion of motorway Belgrade-Hungary
Yu-H-19  Rehabilitation of highways South of Podgorica
Yu-R-09  Completion of Belgrade railway junction
Yu-R-10  Rehabilitation of main lines

FYROM

Ma-H-12  New Motorway Podmolje-Struga
Ma-R-05  Rehabilitation of Tabanovci-Gevgelija

Romania

Ro-R-01  Rehabilitation of Bucharest-Brasov
Ro-R-13  Rehabilitation of stations on PE Corridors
Ro-R-14  Upgrading the interlocking system
Ro-R-16  Upgrading telecommunication network

* Projects out of the EU strategic networks
Ro-R-18  Upgrading of Videle-Craiova  
Ro-P-04  Passenger terminal at Constanta  
Ro-W-01  Strengthening Danube-Black Sea canal  
Ro-W-02  Consolidation of P. Alba-Midia-Navodari canal  
Ro-W-04  Improvement of Danube navigation channel  
Ro-W-05  Bank protection on Sulina channel/Phase 1  
Ro-W-06  Bank protection on Sulina channel/Phase 2  
Ro-W-07  Improvement of Iron Gates crossing

Cost of finalisation of design, preparation of tender documents and expropriation is estimated at 15% of total project cost.

The short term programme represents a cost of some €1.43 billion.

8.3 Near Term Investment Programme

With preparation completed under the short term programme activities as set out in “b” above, the near term investment programme may be launched. This will basically consist of the actual implementation of all projects listed above under "Preparation or updating of design and tender documents".

The near term investment programme represents a cost of approximately €3.94 billion.

8.4 Envisaged Transport System

a. General

If all links, which have been shown to bear reduced potential for international exchanges are deleted from the study network, a simplified network, the basic inter-regional infrastructure network is arrived at. It is this network which is recommended for further planning exercises for the region as a whole. It is represented on Map 22 and merits three remarks:

- In Romania and Bulgaria, only the key infrastructure identified and agreed during the TINA exercise has been retained.

- The two parallel roads Rijeka-Novigrad-Split along the coast and Zagreb-Split inland will both become secondary roads when the Adriatic-Ionian motorway (classified in Category IIb) is constructed. In the meantime, both roads should be kept within the basic network, as they support sizable traffic flows.

- The proposed basic inter-regional infrastructure network contains a few links which are not in the EU strategic networks. These links should be regarded as recommended additional accesses to these networks, to be eventually further analysed for their inclusion or their non-inclusion in the strategic networks.

Maps 23 and 24 present the envisaged highway and railway infrastructure of this basic network at the horizon of 2015, namely the coherent medium term networks. They result from the consideration of all recommended projects (within categories I and IIa) and from the
likely or natural further evolution of the main routes, as assessed through the transport demand.

b. Review by Main International Route

To check the coherence of the actions envisaged in the middle term, it appeared useful to review the medium term networks and the related infrastructure projects along the main recognized international routes and around new important projects (new structure across the Danube). We must keep in mind that the justification and the timing of the projects is highly dependent on the volume of local transport. It is thus logical that some routes present different types of infrastructure depending on the sections. The following exercise is only aimed at checking that there is some continuity in the development of the routes, particularly when passing from one country to another one.

1. Corridor IV

The highway infrastructure along Corridor IV\(^8\) is supposed to be progressively raised to a four lane divided motorway/expressway, with the exception of connecting section Arad-Nadlac with the Hungarian road system, which may remain a two lane standard highway. The so-called branch IVa may also remain a two lane standard highway in the 15 coming years. Branches IVb and IVc should be upgraded to four lane divided motorway/expressway.

It is foreseen to fully rehabilitate in the middle term the main railway line on Corridor IV from the Hungarian border up to Bucharest (projects Ro-R-01/02/03/04). Rehabilitation of branches IVa and IVb in Bulgarian territory is also included in the recommended set of urgent actions (projects Bu-R-02/03/04), as well as the rehabilitation of the single-track portion of the line Sofia-Turkish border (Project Bu-R-01).

The new structure at Vidin (Project Bu-H-01) is on Corridor IV (Branch to Istanbul). All projects associated with this new structure are examined further under (8).

2. Corridor V

Branch Vb will be completed as a four lane divided motorway with two projects, Cr-H-01 and Cr-H-02 (the later mainly for continuity reasons). On branch Vc, a continuous upgrading is expected, to at least a standard two lane highway, and to four lane divided motorway on the most trafficked sections, in BiH as well as in Croatia, but at a later stage (Projects Bu-H-03/04/05/06/09/10/11/13 and Cr-H-08). It is worth noting that the existing road beyond the Hungarian border has for the moment sub-standard characteristics.

The rehabilitation of railway lines along Corridor Vb and Vc is foreseen within the first two categories of projects, in Croatia as well as in Bosnia & Herzegovina (Projects Bo-R-01/02/03 and Cr-R-01). Rehabilitation of Corridor Vc will be fully justified when a special arrangement will be agreed between Croatia and BiH on facilitating the utilization of the port of Ploce for the traffic to or from BiH.

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\(^8\) See Map 03. Branches of Corridor IV are also referred to as (see TINA report, February 2000)
- Corridor IV = up to Arad (railway) or Lugoj (road)
- Branch to Constanta = Arad (Lugoj)-Bucuresti-Constanta
- Branch to Istanbul = Arad (Lugoj)-Sofia-Istanbul
- Branch to Thessaloniki = Sofia-Kulata-Thessaloniki
3. **Corridor VIII**

Corridor VIII may be clearly split into two different parts:

- Eastern of Sofia, it is composed by continuous highway and railway lines, supporting important traffics to and from Turkey and/or the Bulgarian ports on the Black sea.

- Western of Sofia, it is composed by a succession of heterogeneous sections of roads and railways, continuous for roads and discontinuous for railways. Potential through traffic or international transport demand is low. This part of Corridor VIII is like a juxtaposition of short transport links of local or national interest.

Expected development of Corridor VIII reflects this duality. The Eastern branch should continue to develop high capacity and standard infrastructures, but according to the actual level of traffics: further construction of motorways may still be postponed, whereas upgrading of railway infrastructure (projects Bu-R-01 and Bu-R-07) should be rapidly implemented. On the Western branch, the different highway projects considered in the first categories will result in the middle term in a continuous highway infrastructure at standard level (projects Al-H-03 and Ma-H-03/07/10/12). Conversely, the implementation of a continuous rail link still appear to remain a long term perspective, except perhaps between Kumanovo and Sofia (projects Ma-R-01 and Bu-R-05) if complementary analysis recommended for TIRS 2 are conclusive.

4. **Corridor IX**

As from Focsani to the South, all highway alignment of Corridor IX should be rapidly upgraded to standard two-lane highway, with the construction of an important tunnel at Shipka for crossing the Balkan range. Upgrading to four lane divided motorway will be justified only after ten years between Veliko Ternovo and Focsani (Project Ro-H-16).

5. **Corridor X**

Corridor X was clearly the most utilized route across the region ten years ago. The stabilizition of the situation and the recent political changes have already allowed the Corridor to take back part of its original traffic which had been diverted to other competitive routes. The classification of all projects envisaged along this corridor concur to a systematic rehabilitation and upgrading of this corridor in the middle term, for both road and railway infrastructures, on the main corridor route. Upgrading of only one section on the road infrastructure may be postponed for a while, in waiting for higher traffic levels to be reached: Slavonski Brod-Lipovac/ project Cr-H-07 (close to the FRY border) in Croatia. At the Southern end of the corridor, the construction of a two-lane carriageway with motorway characteristics on Demir Kapija-Udovo-Gevgelija in Macedonia (project Ma-H-05) will allow to handle the expected traffic for some time before completing a fully fledged motorway.

Branch Xb should also be completed as a standard motorway (Project Yu-H-11). Conversely, branch Xc (Nis-Pirot-Sofia) should be upgraded to a standard two lane highway, without moving immediately to motorway standards (such perspective should be analysed for branch Xc in a pre-feasibility study to be conducted during TIRS 2: Project Yu-H-12). Branch Xd necessitates only some local upgradings, and its connection with the Greek road system remains poor in Greek territory (Projects Ma-H-11, Ma-H-14).
Progressive rehabilitation and upgrading of the railway line is recommended on the trunk corridor, from Hungary to Greece, and on branch Xb on both sides of the border (projects Bu-R-09 and Yu-R-04/10/11).

6. Bar-Belgrade

Systematic rehabilitation and upgrading of the worst sections of the surface infrastructure is recommended among the most urgent actions, on highways (projects Yu-H-01/10/15/19/20) and on railways (projects Yu-R-05/06).

7. Adriatic Motorway

Two highways serve at present the Adriatic hinterland in Croatia: Karlovac-Knin-Zadar and Rijeka-Senj-Zadar. The volume of the combined traffic of these two highways has led to envisage the construction of a motorway in between, with a branch from Senj to Rijeka. Transport demand justifies to construct this motorway up to Split in the 15/20 coming years. It could be considered as the first section of a long-term "Adriatic Motorway" (Project Cr-H-06).

8. New structure at Vidin

The envisaged construction of a new structure on the Danube at Vidin (Project Bu-H-01) is to be considered within the framework of surrounding projects: five highway projects, 2 in Bulgaria (Bu-H-04 and Bu-H-05) and 3 in Romania (Ro-H-01/05 and 06) and two railway projects (Bu-R-03 and Ro-R-05). With the exception of Ro-R-05, all these projects are among the two first categories of projects. One river port project at Vidin is also recommended. The rehabilitation of the road Lugoj-Drobeta Turnu Severin is on the other hand already launched. It is thus clear that the construction of the new structure is fully coherent with the development of the surrounding transport infrastructure.

There is for the moment no important project considered by the two directly interested countries on the link Vidin-Paracin, neither on the Bulgarian side nor on the Yugoslav one. We may nevertheless expect that the construction of the new structure will rapidly attract some international traffic on this link and that at least an upgrading of the existing road will have to envisaged in the middle term to develop adequate level of transport services on this natural connection between Constanta/ Bucharest on the one hand and Belgrade/ Zagreb/ Sarajevo on the other.

9. Sava river

The rehabilitation of the Sava navigation channel and its utilization for international transport is clearly one of the most urgent actions to be done on the transport system in the Balkans. We know that a prerequisite for such a rehabilitation is for the riparian countries to officially agree on its utilisation and on the sharing of its maintenance and operation. Many projects are related to the Sava river: Bo-W-03, Cr-W-01 and Yu-W-02 for the river infrastructure itself, but also Bo-W-01, Bo-W-02 and Cr-W-03 for the reconstruction or the rehabilitation of ports on the river (Brcko, Samac and Slavanski Brod). All the above projects appear as urgent and are classified under categories I or Iia. Obviously, the river port projects have their full meaning only when the Sava river may be safely and officially utilized.
9 ACCOMPANYING MEASURES AND TIRS PHASE 2

9.1 Accompanying Measures

There are a number of issues, which currently affect the establishment of a modern and effective network of regional transport infrastructure. Some difficulties are specific to individual countries; others are common to the region. The latter largely relate to the planning and decision-making processes and management of the involved institutions, coupled with budgetary and fiscal measures necessary for the implementation of infrastructure development and its maintenance.

- Some studies have recently been undertaken throughout the region for the introduction of road user pricing measures which would enable Road Funds or similar such fiscal arrangements to be established for example. The Federal Republic of Yugoslavia and Croatia seem to be the only two countries where such studies are missing. Considering the existing maintenance requirements of the first country, a road user charge study should be conducted urgently and its recommendations enforced. The region as a whole suffers from the fact that none of the countries have yet established sound fiscal measures which may provide the necessary funds for sustainable development of transport infrastructure on the one hand and the maintenance of those assets on the other. Until such measures are implemented, the capacity of those countries to conduct a coherent and sustainable strategy for the development of transport infrastructure will be limited, relying largely on loans and grants for capital development. This will lead to ever increasing burdens on those economies for servicing borrowing requirements.

- The financial situation of most railway companies in the region raises the question whether these companies, even with strong financial support from Government, may survive very long without restructuring and refocusing on their most profitable lines and services. Such an issue is not easy to address, considering the social consequences of staff reductions or the closure of some secondary lines. Comprehensive market studies should be conducted for many railway companies to better assess their development prospects and accordingly define their restructuring strategy. Albania, FRY and FYROM are surely among the countries where such an approach should be conducted rapidly. Urgent and obvious rehabilitation or improvement works should not be delayed in the meantime.

- Information systems on transport infrastructure and transport activities are in general insufficient to support adequate planning and programming of development and maintenance.

- Governmental policies towards facilitation of border crossing, regional co-operation and utilisation of inter-modal equipment should be more straightforward. Already there have been many initiatives to improve the utilisation of transport infrastructure, facilities and equipment in the region, either bilaterally or multilaterally. Actual progress of such initiatives often remains unclear, as discussions are still continuing. The following are among the most critical issues, and require rapid decisions in order to give to some infrastructure projects a real sense of purpose:

  - The international status of the Sava river, together with the distribution of responsibilities between the riparian countries (BiH, Croatia and FRY) for
maintenance and other operations on the channel, need to be determined. This status may be envisaged within the Danube Commission. The last meeting in November 2001 in Sarajevo addressing this subject has concluded only with a declaration of intent.

- The utilisation by Bosnia and Herzegovina of the port of Ploce, which before the war accounted for 90% of its traffic by this country needs to be formalised. To restore its natural interest for BiH, the port should have a free zone under a special customs regime allowing indefinite warehousing, with reduced control by the Croatian administration for safety reasons alone. BiH commodities should be allowed to freely enter and/or exit the zone, under TIR arrangements or with sealed wagons or containers, with customs operations being handled at the point of origin (or destination).

- The pooling of railway equipment should be implemented, which may be generalised when FRY re-enters the International Union of Railways (UIC).

- For border crossing customs control, generalisation of operations should be arranged for passengers within the train and between two stations, and for the cargo at a single point, with a single forwarding agent.

9.2 Proposed Scope for Phase 2

a. Taking Advantage from Phase 1

Phase 1 of the TIRS exercise was by nature ambitious. It was supposed, in the framework of the region as a whole, (i) to review the basic transport infrastructure in the Balkans, the traffic flows presently using it and their potential growth, (ii) to define medium term objectives for the development of this infrastructure and (iii) to identify priority projects and accompanying actions to meet these development objectives.

Phase 2 should be considered as a natural continuation of Phase 1 and should normally elaborate on the findings, the preliminary conclusions and the recommendations of this first phase, taking advantage of the information collected and of the analyses already made to progress in the definition of a long term development strategy for the transport system in the Balkans and to assist in its timely preparation. Phase 2 should take over some specific tasks on the critical path for implementation of the selected strategy, in line with the recommendations developed above. It should in particular assist in the following fields:

- Complementary definition and scheduling of some major projects,
- Developing an appropriate information system for transport planning in the region,
- Prospective analysis,
- Financing and institutional issues

b. Complementary definition and scheduling of some major projects

As specified above in Chapters 7 and 8, projects ranked under Category I should be considered as recommended as they stand and their implementation may proceed without delay. Any complementary studies, or any updating of existing studies, should be included in their financing. Conversely, most of the projects under Category IIa and some under Category IIb are considered as necessitating complementary analysis before being launched, and some of the critical or largest ones could be incorporated in Phase 2 as pre-feasibility studies.
• Comparison of major alternatives for important highway projects, in the definition of the project as well as in its implementation scheduling (e.g. substantial pavement rehabilitation works with some upgrading on a deteriorated highway and postponement of major new works, versus light resurfacing and construction, possibly staged, of a double carriageway expressway on the same alignment, or even construction of a motorway on a new alignment). The following projects are recommended for such pre-feasibility studies:

- Bo-H-10: Motorway development on sections of Corridor Vc,
- Bu-H-02: Motorway Maritza,
- Bu-H-07: Construction of Struma motorway,
- Bu-H-08: Upgrading Rousse-Veliko Turnovo-Makaza,
- Cr-H-06: Construction of Bosiljevo-Sveti Rok-Zadar-Split motorway\(^9\),
- Cr-H-08: Completion of motorway on Corridor Vc,
- Yu-H-12: Upgrading Nis-Pirotski Gradina (motorway alternative),
- Yu-H-13: Completion of Belgrade by-pass,
- Ma-H-02/04/08/15/16: Rehabilitation/upgrading of Veles-Crna Skala,
- Ro-H-07: Nadlac-Timisoara-Lugoj-Deva motorway,

• Selection of the design speed for the important railway upgrading projects, i.e. 100/120/160 km/h, according to the volume and type of demand and to the investment costs, and review of the optimum scheduling. The following projects should be analysed in such a sense:

- Bo-R-03: Completion of Samac-Capljina,
- Yu-R-10: Rehabilitation of main lines,
- Ma-R-01: Completion of Kumanovo-Beljakovce-Deve Bair (with Bu-R-05),
- Ro-R-02: Rehabilitation of Simeria-Deva-Arad-Hungary,
- Ro-R-03: Rehabilitation of Simeria-Alba Iulia-Coslariu-Sighisoara,
- Ro-R-04: Rehabilitation of Sighisoara-Brasov,
- Ro-R-08: Rehabilitation of Ploiesti-Focsani,
- Ro-R-12: Rehabilitation of Bucharest-Videle-Giurgiu.

c. Developing an appropriate information system

Assistance of Phase 2 will be particularly useful in setting up format and procedures for a regional information system on the basic inter-regional infrastructure networks, as recommended by Phase 1. All countries in the region are actually collecting and keeping their own information system(s) on their transport system and on its utilisation, but in various formats and sometimes erratically. It is of paramount importance to have a coherent and up-to-date data base on the basic networks, to continuously monitor development of these networks and to better assist in their future upgrading when it is needed. In this context, Phase 2 may be of particular assistance by conducting the following tasks:

\(^9\) Adriatic-Ionian motorway
- Reviewing the situation of the information system that exists for the different modes of the transport sector in the seven countries (organisation, actual performance and utilisation), and recommendations for their improvement.
- Defining the base and the format of the data required for the basic networks (i) on the infrastructure, its characteristics and its state of repair, (ii) on its utilisation, i.e. the traffic and its composition, (iii) on the volume and composition of international exchanges at ports or border crossings and (iv) on the financing and on the execution of rehabilitation and development projects.
- Issuing relevant instructions for the seven countries to regularly (once a year or once every two years) collect, prepare and communicate the data requested to a documentation centre (see below) for verification and processing.
- Assisting during the first year and whenever necessary the entities in charge in the seven countries to set up a self-sustainable system of collection and transmission of information.

d. **Prospective analysis**

Phase 2 will also be an appropriate framework to conduct some prospective analysis on the transport market in the region, whenever the evolution of transport demand appears unpredictable at first sight. Two such analyses which are of paramount importance for the evolution of the transport system in the Balkans are:

- Study of the market of some Railway Companies in the region (Albania, Federal Republic of Yugoslavia, FYROM, Romania) and
- Prospective analysis of their financial situation.

One of the findings of Phase 1 is the difficulty to make reliable forecasts for transport operations related to industrial or mining activities. Such activities represent usually around 60 to 80 % of cargo transport by railways or by inland waterways, even when they are still under restructuring as a result of the changing pattern of external trade and of privatisation of the economy. Transport of general cargo, construction materials or fuel is directly correlated with the evolution of the economy, and may be accordingly forecasted from the perspectives of GDP. The transport of industrial or mining products (or inputs) have to be analysed branch by branch and sometimes even company by company, as the four or five largest customers of the railways may represent more than 50 % of the traffic. Albania, FRY and FYROM are countries where the future pattern of industrial and mining activities is still unclear. Romania is the country in the region where the railway system has been the most developed and where huge investments are now needed for maintaining the standards of the existing network or for raising them. A realistic analysis of the future market of the Romanian Railways is advisable before defining the rehabilitation/upgrading projects on the major lines. Prospective analysis of the financial situation of the companies will be made, taking into account the expected revenues schedules and the restructuring actions already envisaged. Capacity of the companies to reimburse investments and necessary support from the State will be assessed accordingly.

- Study of Containerisation (and other inter-modal or combined transport techniques) market in the region, its present situation, existing institutional and technical difficulties, its development perspectives and recommendations to support them.
Containerisation, and more generally inter-modal techniques, has often been referred to have important potential in the region. Its relative volume in the transport pattern of the region is nevertheless still limited, and it appears interesting to verify whether its development is hampered by institutional shortcomings or by deficiencies in infrastructure or in equipment (insufficient clearance of structures and tunnels on some lines, lack of handling equipment at major transfer points). The magnitude of the traffic potentially interested by such inter-modal techniques should be assessed.

\[\text{e. \ Financing and institutional issues}\]

One of the recognized institutional deficiencies in the region relates to the capacity of some countries to set up a self-sustainable financing system to operate and maintain basic infrastructure, particularly highways. Phase 2 may contribute to help reducing such deficiencies with the following studies:

- Road user charge study in those countries where they have not been carried out recently (FRY, Croatia) and review of the implementation of the recommendations made for the other countries by the RUC project (1998) in the 13 Phare countries;
- Perspectives of BOT arrangements: possible levels of tolls and involvement of the State according to the size of investment, operating costs and expected traffic. Examples may be drawn from the motorway projects envisaged in the region, in particular from those identified for pre-feasibility studies.

\[\text{f. \ Assistance in the creation of a \textit{“documentation centre”}}\]

The Transport Sector in the Balkans has been the subject of numerous studies in the recent past, including Reviews of the Sector, Development Plans, Master Plans, Project Appraisal Documents, Feasibility Studies, etc. Many official documents also exist in different countries on transport statistics, trade, national accounts, national plans, etc., all of which are essential for a comprehensive assessment of transport activities. Any future analysis will be greatly facilitated, and its quality will also be improved, if the above information or documentation is readily available. An important task to be initiated in Phase 2 therefore could be to identify a suitable and willing host for a self-sustainable documentation centre, to assist if necessary in providing its equipment, and to create a specific web site hosting all major documentation in Acrobat format enabling on-line consultation or downloading of documents. An additional requirement would include making selected documents available in electronic form when such documents are currently available only in hard copy. The web site should provide a list of all available documents with a brief history and summary of each stored record.

The documentation centre should also be responsible for keeping and maintaining the regional information system defined under (c) above and developed during Phase 2.

\[1\] ECMT Resolution n° 97/1 on Transport and Infrastructure Development adopted in Berlin on 21-22 April 1997.
\[1\] Bosnia and Herzegovina has no port itself but uses the Croatian port of Ploce where the majority of traffic has historically been focussed at Bosnian activities.
\[1\] In “Statistical yearbook on candidates and South-East European countries” by EUROSTAT (2000)
\[1\] The world in 2020 : Towards a new global age, ISBN 9264156275
\[1\] Sometimes the designation combined traffic only refers to the case where the main transport section is made on rail or inland waterway.
It is also of particular interest when the ports are not well developed with few berths and limited platform area. Ro-Ro vessels require small mooring infrastructure and unloaded trucks can be directly sent to inland terminals some km from the port and do not need parking areas within the port itself.

Over the period 2002/2010, with an annual increase of 3.5%

- Projects out of the EU strategic networks

- Projects out of the EU strategic networks

- Projects out of the EU strategic networks

See Map 03. Branches of Corridor IV are also referred to as (see TINA report, February 2000)

Corridor IV = up to Arad (railway) or Lugoj (road)

Branch to Constanta = Arad (Lugoj)-Bucuresti-Constanta

Branch to Istanbul = Arad (Lugoj)-Sofia-Istanbul

Branch to Thessaloniki = Sofia-Kulata-Thessaloniki

Adriatic-Ionian motorway