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MONITORING OF DEVELOPMENTS RELEVANT FOR PAN-EUROPEAN TRANSPORT CORRIDORS AND AREAS

THE RELATIONSHIP BETWEEN THE UNECE TRANSPORT INFRASTRUCTURE AGREEMENTS (AGR, AGC, AGTC, AGN) AND THE UNECE PROJECTS (TEM AND TER) WITH PAN-EUROPEAN TRANSPORT INFRASTRUCTURE NETWORK PLANNING PROCEDURES

Biennial report on a coherent European system of international transport infrastructure

Note by the secretariat

I. Mandate

1. The Programme of Work of the Inland Transport Committee (ITC) specifies that a biennial report on a coherent European system of international transport infrastructure is to be submitted to the Working Party on Transport Trends and Economics in 2008 (ECE/TRANS/WP.5/42, annex I, activity D). The report should explore the relationship between the UNECE Agreements (AGR, AGC, AGTC and its Protocol, AGN) and projects (TEM, TER) with the pan-European transport network planning procedure, aiming to identify the major international transport routes to be considered for improvement and modernization, to establish priorities and a timetable taking into account those parts of the network where there are bottlenecks and missing links, to assess the underlying cost and to make suggestions for financing it.

2. This report is organized as follows. Section II provides a brief introduction. Section III considers the main United Nations transport infrastructure agreements administered by the UNECE and their impact on the planning of pan-European networks. Section IV reviews the ITC work concerning bottlenecks, missing links and priorities. Section V discusses the Trans-European Motorway (TEM) and Trans-European Railway (TER) projects and their relevance to other sub-regional and inter-regional infrastructure planning exercises. Section VI focuses on the financing of priority projects. Section VII concludes.

II. Introduction

3. The transport infrastructure planning process usually starts with an estimation of prospective traffic levels. The next step is the identification of bottlenecks as well as missing links and prioritization of routes and infrastructure projects within the transport network analyzed while considering pertinent economic and political constraints. The planning process thus provides a link between estimated demand levels, political objectives and technical conditions.

4. In the UNECE context the international transport infrastructure planning has been carried out on the basis of four major infrastructure agreements, a common methodology for the identification of bottlenecks, data collection, and the prioritization of the infrastructure investments needed to improve pan-European traffic flows and links to peripheral countries. Whereas detailed planning processes take place at the national level, the UNECE process entails intergovernmental coordination within the Inland Transport Committee and its subsidiary bodies dealing with infrastructure agreements, transport statistics and economics, sub-regional and interregional projects.

III. Main transport infrastructure agreements administered by UNECE

5. The main UNECE transport infrastructure agreements specify relevant routes as well as minimum technical and operational parameters for pan-European inland transport networks**.** The European Agreement on Main International Traffic Arteries (AGR) provides the international legal framework for the construction and development of a coherent international E-road network. The AGR underwent a major revision in recent years in order to also include international roads of member countries in the Caucasus and Central Asia. States that become Contracting Parties to the AGR commit themselves to its implementation, including the construction or upgrading of the E-roads on their territories within the framework of national investment programmes, although they are given complete latitude as to the timing for the completion of construction works. The AGR entered into force on 15 March 1983. To date, 37 States have become Contracting Parties to the AGR.

6. Resembling the AGR, the European Agreement on Main International Railway Lines (AGC) provides the international legal framework for the development of a coherent E-rail network in Europe, aiming to facilitate international rail traffic throughout the continent. The AGC has undergone a major revision in recent years in order to include international railroads of member countries in the Caucasus and Central Asia. In becoming Contracting Parties to the AGC, UNECE States commit themselves to its implementation, including the construction or upgrading of the E-rail lines in their territories, within the framework of their national

programmes but without any time constraints. The AGC had been open for signature from 1 September 1985. Until now 27 States have become Parties to the AGC.

7. The European Agreement on Important International Combined Transport Lines and Related Installations (AGTC) provides the technical and legal framework for the development of efficient international combined road/rail transport infrastructure and services. In addition to the performance parameters of trains and minimum infrastructure standards required for efficient international combined transport services, the Agreement also contains technical characteristics of the network of Important International Combined Transport Lines as well as the list of terminals, border crossing points and the gauge interchange stations of importance for international combined transport. European States that become Contracting Parties to the AGTC commit themselves to its implementation, including the construction or upgrading of the railway lines and related combined transport installations on their territories, within the framework of their national programmes but without any time constraints. The AGTC entered into force on 20 October 1993. To date, 30 States have become Parties to the Agreement.

8. The 1997 Protocol on Combined Transport on Inland Waterways to the AGTC establishes uniform requirements to be met by the infrastructures and services of combined transport using inland waterways. This Protocol has been signed by 12 States, of which 8 have already deposited an instrument of ratification or acceptance. The Protocol will come into force upon ratification or acceptance by five States, three of which are linked in a continuous manner by the waterways identified in the Protocol. This is expected to happen after the ratification by Serbia in 2008 or 2009.

9. The European Agreement on Main Inland Waterways of International Importance (AGN) defines the E waterways network, consisting of navigable rivers, canals and coastal routes. The network extends from the Atlantic to the Urals, connecting 37 countries. The Agreement identifies inland navigation ports as well as technical and operational characteristics of inland waterways of international importance. The AGN has been ratified by 14 States to date.

10. The UNECE agreements mentioned above outline long-term perspectives for infrastructure development at the pan-European level. Furthermore, they have also contributed to the development of road and rail networks in the SPECA region that includes Azerbaijan, five UNECE member States in Central Asia and Afghanistan. The SPECA road and rail networks and their respective maps had been adopted by government representatives in 2006.[1]

IV. Planning tools

11. UNECE Governments have agreed on common methodologies for transport planning and statistics. In the 1990s cost-benefit analysis became an increasingly important planning tool for the assessment of transport infrastructure projects in North America and Western Europe. UNECE (2003) provides a set of guidelines for applying cost-benefit analysis in the specific institutional context of the CIS. This contribution, based on so-called “TINA Guidelines” developed earlier for the EU-candidate countries, is important in the sense that it presents a planning tool that can facilitate considerably the appraisal and selection of transport

[1] For details see ECE-ESCAP (2008), pp. 31-37.

infrastructure projects in countries of a large ECE sub-region with specific history of economic and social transition. The 2003 UNECE guidelines were published in English and Russian and distributed to all member States.[2]

12. International transport planning needs to be based on comparable and reliable data. UNECE collects a large number of annual inland transport indicators of its member States, in co-operation with the statistical office of the European Communities (Eurostat) and the International Transport Forum (ITF). Every five years UNECE also undertakes a census of traffic on E-roads, including an inventory of infrastructure standards and parameters. In 2005 in addition to the E-road census, the first E-rail census was carried out jointly with Eurostat.

13. Given the growing volume of international and transit traffic, comparable data on traffic and infrastructure on E-roads and E-rail lines can be very important, if released on a timely basis. In addition to serving as an input in infrastructure planning, the census data could also be used to analyze the environmental, health and safety issues related to traffic congestion. The 2005 census results should be available in the second half of 2008. This information may be helpful in the identification of bottlenecks in pan-European rail and road networks. In addition to the 5-year censuses, an electronic inventory of standards and parameters of the AGC and AGTC Agreements is continuously updated on the website of the UNECE Transport Division (http://unece.unog.ch/wp24/agtc.aspx).

14. UNECE developed a robust methodology for the identification of bottlenecks and missing links in the early 1990s (UNECE, 1994), while using a pragmatic performance indicators/links profile approach. This approach leaves the task of identification to national authorities on the basis of shared and technically explicit guidelines. The methods used to identify bottlenecks are mode specific. The focus should be primarily on bottleneck identification because methodology for recognizing missing links is less well developed and because their identification is better done from an overall (pan-European) network perspective rather than link-by-link or country-by-country. The recent update of the methodology (UNECE, forthcoming) emphasizes that border crossings and modal interchanges are equivalent to links in the networks.

15. The 1994 methodology was used to identify bottlenecks on the E road, rail and inland waterway networks in 15 UNECE member States that responded to the questionnaire prepared by the secretariat. The results were reported to the Working Party on Transport Trends and Economics in UNECE (2006a). Bottlenecks in sub-regional road and rail networks were identified by the UNECE TEM and TER projects that are discussed in the next section.

16. Bottlenecks and missing links along the E waterway network are monitored on a regular basis in a so-called “Blue Book.” The latest edition indicates that missing links amount to some 5% of the network and bottlenecks exist on 30% of the network (UNECE, 2006b). A comparable monitoring of E road and rail networks is not available on a regular basis, given the considerable difficulty of identifying traffic-related performance bottlenecks in these networks.

[2] Both versions are available at the website of the Working Party on Transport Trends and Economics <http://www.unece.org/trans/main/wp5/wp5.html>.

In contrast, the identification of bottlenecks on inland waterways is relatively straightforward, being determined by capacity indicators that are independent of traffic levels.[3]

17. A number of applied studies of bottlenecks have been broadly consistent with the performance indicators/links profile approach articulated by the UNECE. The EU-commissioned Northern Transport Axis study (WSP, 2007) can be viewed as the state-of-the art benchmark. This axis, identified by the EU High Level Group (see European Commission, 2005), connects Northern Europe with Belarus and Russia. The 2007 study has developed an analytical support framework for monitoring of the implementation of the measures proposed by the High Level Group for the Northern axis. The study broadens the traditional list of performance indicators to identify bottlenecks to include not only capacity measures but others, primarily with a quality of service orientation. Relative to the performance criteria recommended in UNECE (1994), the use of outcome-based indicators in the Northern axis study can be seen as an extension in scale, but not in principle.

18. Another interesting example of recent analysis of bottlenecks is provided by the European Rail Infrastructure Masterplan (UIC, 2007) that relies on the UIC database of national rail infrastructure plans and available traffic projections. The UIC Masterplan has specified infrastructure upgrading targets for the international network serving 32 European countries. The upgrading targets, based on the identification of line sections with projected capacity bottlenecks, are closely aligned with the technical and operational parameters defined in the AGC and AGTC agreements.

V. Trans-European Motorway (TEM) and Trans-European Railway (TER) Projects

19. Ideally, the cost-benefit analysis should be used to develop optimal transport networks. This is, however, not feasible at the pan-European level due to insufficient data. Therefore, the ITC work on international networks has been based on a multi-criteria approach that complements the quantitative analysis of the available data with the qualitative evaluation of strategic and political concerns. Tsamboulas (2007) provides a detailed description of the multi-criteria model applied in the TEM and TER projects' Master Plan. A modified version of this planning tool has been used in the joint UNECE-UNESCAP project on the development of Euro-Asian transport links.[4] TEM and TER networks as well as Euro-Asian linkages within the ECE region coincide to a large extent with the pan-European transport corridors and axes identified by the European Commission.

20. TEM and TER projects are sub-regional cooperation frameworks established in 1977 and 1990 respectively by Governments of the Central, Eastern and Southeast European countries under the aegis of the UNECE for the development of coherent road, rail and combined transport infrastructure networks and the facilitation of international traffic in Europe. The projects are self-sustaining, supported by direct contributions from member countries to the TEM and TER

[3] There are two types of bottlenecks in the E waterways network. "Basic bottlenecks" are defined as sections whose parameters do not meet the basic minimum requirements (Class IV). "Strategic bottlenecks" are sections that satisfy Class IV requirements but need to be modernized to improve the structure and capacity of the E network. See UNECE (2006b), p. 2.

[4] For details see ECE-ESCAP (2008), part V.

Trust Funds established by the UNECE. At present (May 2008), 17 countries are members of TER[5] and 15 countries are members of TEM.[6] Belarus is expected to join both projects in 2008.

21. Project teams have helped to coordinate the development of the TEM Network extending 23,797 km, out of which some 7,200 km are in operation and another 1,700 km under construction. They also offered assistance in the reconstruction and upgrading of national rail links among the TER member countries and between them and their immediate neighbours, the identification of the TER Network extending over 24,000 km, and contributed to the interoperability of the European railway system enabling the integration of respective national systems. Both project networks form backbones of the Pan-European Road and Rail Corridors in the CEE region (the TEN-T in the EU member countries), providing valuable contribution to new strategic transport plans of Europe and the extension of the TEN-T to the neighbouring countries and regions.

22. In September 2005, the TEM and TER Projects completed the elaboration of the Master Plan, including the identification of the backbone networks for road and rail transport in 21 Central, Eastern and Southeast European countries as well as a realistic investment strategy to gradually develop these networks. The Master Plan was presented to the EU High Level Group chaired by Ms. Loyola de Palacio and explicitly acknowledged in its final report (European Commission, 2005). This report examines the most promising extensions of the major trans-European transport axes to neighbouring countries and regions following the enlargement of the EU. The Group identified five major transnational axes, spreading in all directions, essential for fostering regional cooperation and integration and enhancing trade relations**.**

23. A detailed comparison of the TEM and TER Master Plan Backbone Networks with the major trans-European transport axes defined by the EU High level Group mentioned above has demonstrated a high degree of consistency (UNECE, 2007). The exceptions include a few links in a few countries. Representatives of these countries may wish to consider proposing the inclusion of these sections into the TEM and TER Backbone Networks during the planned review in 2008.

24. The TEM and TER Master Plan report emphasizes that border-crossing bottlenecks are of utmost importance.[7] So-called ‘soft’ investments would apparently entail high payoffs in terms of cost and time savings for the commercial traffic on pan-European inland transport routes.

VI. Euro-Asian transport linkages (EATL)

25. Soon after countries of the Caucasus and Central Asia became UNECE member States in the mid-1990s, the ITC decided to include their main road and rail routes in the E-road, E-rail and E-combined transport networks. Moreover, UNECE started to develop in 2003 Euro-Asian Transport Linkages (EATL) in close co-operation with the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP).

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[5] TER member countries: Armenia, Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Greece, Hungary, Italy, Lithuania, Poland, Romania, Russian Federation, Slovakia, Slovenia and Turkey.

[6] TEM member countries: Armenia, Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Hungary, Italy, Lithuania, Poland, Romania, Slovakia, Slovenia and Turkey.

[7] Similarly, the EATL and Northern Axis studies conclude that non-physical obstacles present major problems in the respective networks.

26. The joint EATL project has used a robust infrastructure planning tool, derived from the TEM-TER multi-criteria model, to identify a number of rail and road routes between Europe and East Asia and prioritize infrastructure investments in 15 participating countries.[8] Having completed Phase I of the project (2003-2007), UNECE and UNESCAP proposed its continuation in Phase II (2008-2011). Experts from two other United Nations Regional Commissions, the Economic Commission for Africa (ECA) and Economic and Social Commission for Western Asia (ESCWA) concluded that the TEM/TER and EATL projects could play a useful role in their own regions.

VI. Financing options

27. The prioritization of planned transport infrastructure investments by TEM, TER and EATL projects implies large financing gaps in participating countries. In case of the TEM-TER Master Plan, secured funding (€46 billion) accounts for 45% of the total implementation cost. With respect to the projects submitted by 15 countries participating in the Euro-Asian project (EATL-15), secured funding amounts to $21 billion, accounting for 49% of planned investment. Financing deficits cannot be calculated exactly, due to the insufficient documentation of a number of submitted projects. Assuming that one-half of such projects have no secured financing, the infrastructure investment gap by 2020 amounts to €36 billion (TEM-TER) and $19 billion (EATL-15), respectively. There are some overlaps, especially between the TEM, TER and TEN-T investment plans, given the significant number of EU member States among the TEM and TER countries.[9] Relative to the level of economic activity (GDP), financing shortfalls in the non-EU TEM, TER and EATL countries tend to be higher than in the EU member States.

28. In a number of countries in Western Europe, significant infrastructure financing and pricing reforms have taken place over the last two decades (ECMT, 2005). Private funds now finance a noteworthy portion of transport infrastructure investment, amounting on average to some 15% of total expenditure (ITF, 2008). Nevertheless, EU-wide infrastructure development programmes continue to be financed mainly by national Governments and long-term lending by the European Investment Bank (EIB).

29. The implementation of the trans-European transport network (TEN-T) implies investment spending of €389 billion over the period 2007-13, including €271 billion for priority projects. The TEN-T budget, cohesion and structural funds are projected to finance some 14% of total investment funds while the EIB loans and guarantees account for another 14%. The remaining 73% of planned investment is to be provided by public budgets and private financing (European Commission, 2008b). Public Private Partnerships (PPP) could close the financing gap between the investment needs and available national and regional fiscal outlays, providing that suitable risk-sharing schemes can be developed and effectively used in the trans-national context of TEN-T projects.

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[8] The following countries submitted data on EATL investment projects: Armenia, Azerbaijan, Belarus, Bulgaria, China, Georgia, Iran, Kazakhstan, Kyrgyzstan, Moldova, Romania, Tajikistan, Turkey, Ukraine and Uzbekistan.

[9] European Commission (2008a) estimates the cost of TEN-T priority projects at €271 billion over the time period 2007-2020. Community institutions and member States plan to provide €151 billion during the period 2007-13.

30. The bulk of transport infrastructure investment continues to be financed by the general Government sector in CIS and SEE countries, mainly in the form of explicit budget outlays but also in the form of loan guarantees. Governments in some of these countries are also involved in public-private partnership (PPP) projects. Over the period 1990-2006, airport and seaport projects accounted for 100% of PPP financing in the CIS and over 80% in SEE (Table 1). Land transport infrastructure, with the exception of pipelines, continues to be financed almost exclusively by Government entities and international financial institutions.

31. For instance, the Russian federal programme for transport infrastructure development entails investment expenditure of 13 trillion roubles ($570 billion at current exchange rates) over the period 2010-2015. The federal budget will finance directly 36% of the total amount.[10] The bulk of remaining investment funds are likely to be provided by extra-budgetary funds as well as retained earnings and bonds issued by State-owned transport corporations that would be guaranteed by a major State-controlled bank. The parallel Government initiative to improve the legal environment for doing business could also improve prospects for PPP financing.

32. Weak legal environment poses a major obstacle to road and rail PPP projects in the majority of ECE emerging market economies. Some Governments have pursued ambitious PPP projects that could create or upgrade important inland transport links. Nevertheless, the legislation governing concessions has been adopted only recently in a number of CIS and SEE countries. Moreover, the quality of concession laws has remained inadequate, ranging from very low (3 countries) and low (5 countries) to medium (7 countries).[11] Closing the infrastructure gap and attracting more private investment, including FDI, to the transport sector are likely to remain major policy challenges in the CIS and SEE in the foreseeable future.

33. Even if Governments improve the quality of the legal framework in order to involve the private sector, investors are certain to price in the extra risk. Therefore, a careful comparison of costs and benefits of PPP projects could provide a valuable guide to decision makers in the ECE emerging market economies. Over the period 1990-2006, transport accounted for a relatively low portion of PPP investment expenditure, ranging from 2% in the CIS to 8% in new EU-member States and 16% in Southeast Europe. Two countries, Hungary and Turkey, accounted for over 60% of PPP transport investment in all ECE emerging market economies (Table 1).

34. In Western Europe, the separation of transport infrastructure from services has become a norm, implemented fully in the road sector and increasingly in the rail sector. Financing of the rail infrastructure has become a complex task in the new regulatory environment. The considerable tax revenues generated by road transport (e.g. excises on fuel) are typically not earmarked to be reinvested in the sector. In contrast, in North America the rail sector is dominated by vertically integrated private freight operators that own infrastructure and finance infrastructure investment on their own. Further, there is a statutory linkage between highway revenues and funding of the highway network in the United States.[12]

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[10] The programme objectives include the building of 17,000 km of roads, 3,000 km of railroads and over 100 airport runways as well as boosting port capacity by 400 million tons of cargo per year <http://www.government.ru/content/85ac2f94-ed9b-4388-9717-e35fc3449aaf.htm>.

[11] For details, see the 2007 EBRD transition indicators <http://www.ebrd.org/country/sector/econo/stats/sib.xls>.

[12] For details, see ITF (2008), pp. 184-9.

35. Given the wide range of financing arrangements in advanced ECE economies, it is not obvious which model should be followed by their emerging market counterparts. The countries that plan to join the EU are likely to adopt the model prevailing in Western Europe. Other countries could emulate the North American approach to infrastructure financing or develop hybrid forms. Given the ultimate responsibility of Governments for assuring provision of basic transport infrastructure, the choice of financing mode has to reflect policy priorities as well as the constraints imposed by medium-term public expenditure programmes and the degree of social acceptance of user charges. Since PPP projects create contingent liabilities for the general government and financial markets tend to reward fiscal prudence, there is no obvious shortcut that would eliminate infrastructure gaps in the national and pan-European transport networks rapidly.

VII. Conclusions

36. The principal conclusion is that UNECE has contributed significantly to the pan-European infrastructure planning process. Direct contributions include the administration of major transport infrastructure agreements and projects as well as the development and application of operational planning tools to identify key international transport linkages and prioritize investments. In particular, UNECE has contributed to the coordinated development of transport infrastructure in the framework of TEM, TER and EATL projects while prioritizing investments and elaborating master plans. Indirect contributions entail the development of a sound methodology for the identification of bottlenecks and missing links on inland transport routes.

37. The secondary conclusion is that the new, less rigid and less interventionist role of the public sector and the increasing involvement of the private sector in the planning stages as well as in the financing and management of transport infrastructures could enhance noticeably the efficiency of investment and operations. To reap benefits of the private sector involvement in the provision of transport infrastructure it is, however, necessary to improve further the legal environment for doing business, especially in CIS and SEE countries.

Table 1. Transport infrastructure projects with private sector commitments in selected ECE economies, 1990-2006

	Number of projects	*US$ million*	*Subsector (number of projects)*
CIS	**18**	**929**	**Airport (7), Seaport (11)**
Armenia	1	63	Airport (1)
Georgia	2	169	Airport (1), Seaport (1)
Moldova	1	38	Seaport (1)
Russian Federation	14	659	Airport (5), Seaport (9)
Southeast Europe	**17**	**6202**	**Airport (7), Road (3), Seaport (7)**
Albania	1	308	Airport (1)
Croatia	3	1123	Road (3)
Turkey	13	4771	Airport (6), Seaport (7)
New EU member states	**31**	**7780**	**Airport (10), Road (6), Railroad (6), Seaport (9)**
Bulgaria	3	534	Airport (1), Seaport (2)
Czech Republic	6	390	Airport (3), Railroad (3)
Estonia	3	299	Railroad (3)
Hungary	6	4437	Airport (3), Road (3)
Latvia	3	210	Seaport (3)
Poland	8	1845	Airport (2), Road (3), Seaport (3)
Romania	1	23	Seaport (1)
Slovakia	1	42	Airport (1)
Memorandum item:			
United Kingdom	***59***	***37895***	***Airport (1), Road (38), Railroad (16)***

Sources: World Bank Public-Private Participation Infrastructure Database <http://ppi.worldbank.org/index.aspx>, Bank of England (exchange rates), PartnershipsUK <http://www.partnershipsuk.org.uk/PUK-Projects-Database-advanced-search.aspx>.

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