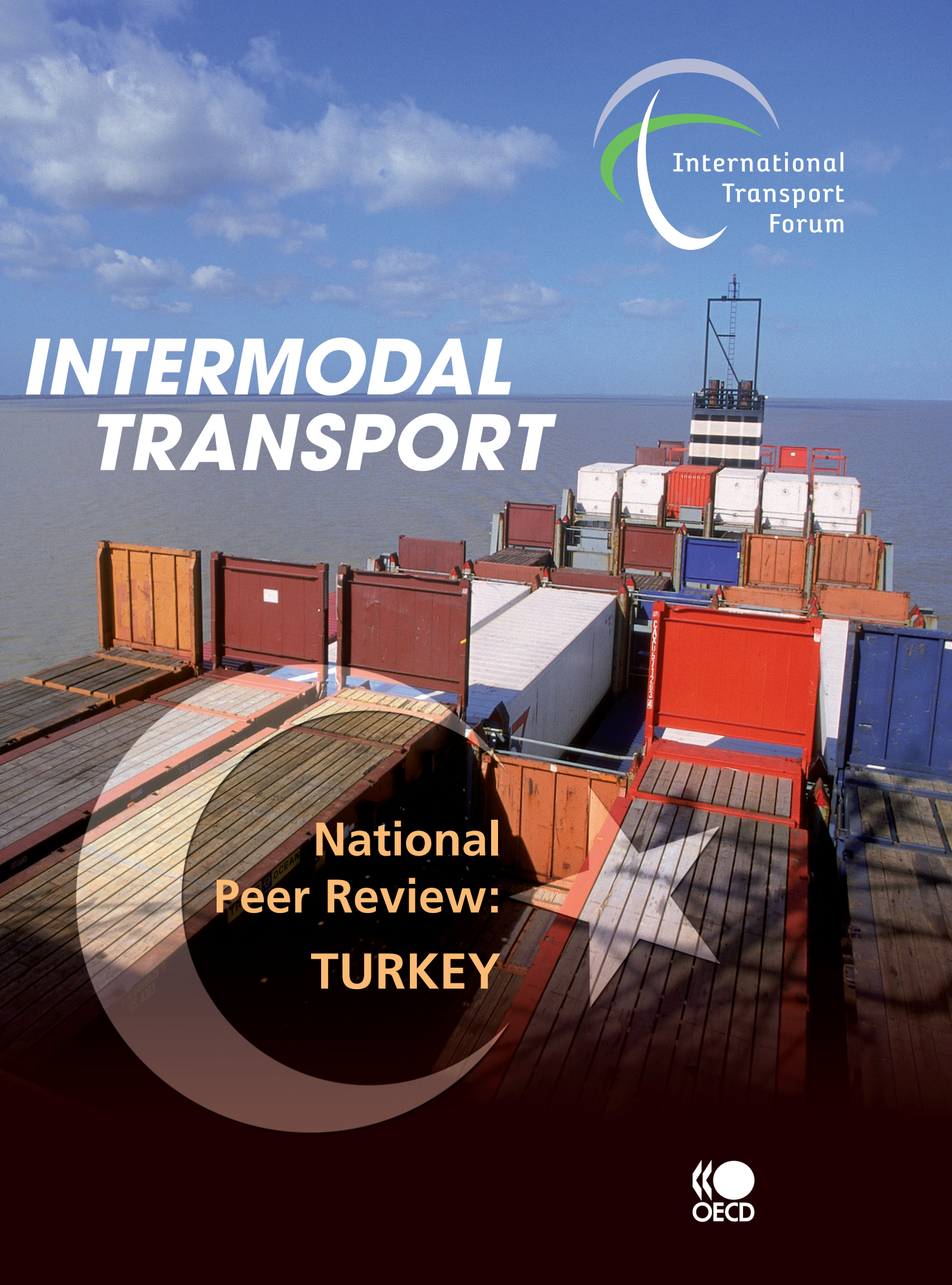

International Transport Forum

INTERMODAL TRANSPORT

National Peer Review: TURKEY

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INTERMODAL TRANSPORT

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INTERNATIONAL TRANSPORT FORUM

The International Transport Forum is an inter-governmental body within the OECD family. The Forum is a global platform for transport policy makers and stakeholders. Its objective is to serve political leaders and a larger public in developing a better understanding of the role of transport in economic growth and the role of transport policy in addressing the social and environmental dimensions of sustainable development. The Forum organises a Conference for Ministers and leading figures from civil society each May in Leipzig, Germany.

The International Transport Forum was created under a Declaration issued by the Council of Ministers of the ECMT (European Conference of Ministers of Transport) at its Ministerial Session in May 2006 under the legal authority of the Protocol of the ECMT, signed in Brussels on 17 October 1953, and legal instruments of the OECD. The Forum's Secretariat is located in Paris.

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The OECD and the International Transport Forum established a Joint Transport Research Centre in 2004. The Centre conducts co-operative research programmes addressing all modes of transport to support policy making in Member countries and contribute to the Ministerial sessions of the International Transport Forum.

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LIST OF ACRONYMS

AETR	The European Agreement Concerning the Work of Crews of Vehicles Engaged in International Road Transport
AGC	European Agreement on Main International Railway Lines
AGR	European Agreement on Main International Traffic Arteries
AGTC	European Agreement on Important International Combined Transport Lines and Related Installations
ATS	Air Traffic Service
BSEC-URTA	Union of Road Transport Associations in the Black Sea Economic Cooperation Region
BOT	Build-Operate-Transfer
BOTAS	Turkish Petroleum Pipeline Corporation
BSEC	Black Sea Economic Cooperation
CEI	Central European Initiative
CEN	European Committee for Standardisation
CIM (COTIF)	Uniform Rules Concerning the Contract for International Carriage of Goods by Rail (Appendix B to The Convention Concerning International Carriage by Rail)
COTIF	Convention Concerning International Carriage by Rail
CPC	Caspian Pipeline Consortium
DC	Dual Carriage Way
DHMI	General Directorate of State Airports Authority
DLH	General Directorate of Railways, Harbors and Airports Construction
EC	European Commission
ECAC	European Civil Aviation Conference
ECMT	European Conference of Ministers of Transport (presently the International Transport Forum (ITF))
ECO	Economic Cooperation Organization
EU	European Union
EUROSTAT	Statistical Office of the European Communities

FIR	Flight Information Region
FCL	Full Car Load Conveyance
FYROM	Former Yugoslav Republic of Macedonia
GAP	Southeastern Anatolia Regional Development Project
HST	High Speed Train
IMF	International Monetary Fund
ITF	International Transport Forum (formerly ECMT)
INOGATE	Interstate Oil and Gas Transport to Europe Programme
ISO	International Organisation for Standardisation
KGM	General Directorate of Highways
KUGM	General Directorate of Road Transport
LCL	Less than Car Load Consignments
LNG	Liquefied Natural Gas
NG	Natural Gas
NIC	Nabucco International Gas Pipeline
NIS	New Independent States
NNC	Nabucco National Companies
PA	Privatization Administration
PPP	Public Private Partnership
Ro-La	Rollende Landstrasse (Rolling Road)
Ro-Ro	Roll-On Roll-Off
SC	Single Carriage Way
SEE	State Economic Enterprise
SHGM	Directorate General of Civil Aviation
SPO	State Planning Organisation
TCDD	Turkish State Railways
TDI	Turkish Maritime Administration
TEM	Trans-European Motorways
TEN	Trans-European Networks

TER	Trans-European Railway Project
TEU	The Twenty feet Equivalent Unit
TINA	Transport Infrastructure Needs Assessment Study
TIR	Transports Internationaux Routiers
TL	Turkish Lira
TPAO	Turkish Petroleum Corporation
TRACECA	Transport Corridor Europe-Caucasus-Asia
TÜDEMSAŞ	Turkish Railway Machines Industry JS Company
TÜLOMSAŞ	Turkish Locomotive and Engine Industry JC Company Inc.
TÜVASAŞ	Turkish Wagon Industry JS Company
UIRR	The International Union of Combined Road-Rail transport companies
UN	United Nations
UNDP	United Nations Development Programme
UNECE	United Nations Economic Cooperation for Europe
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNSTAT	United Nations Department for Economic and Social Information and Policy Analysis Statistical Division
VAT	Value Added Tax
WB	World Bank
WTO	World Trade Organization

EXECUTIVE SUMMARY

The purpose of this Peer Review is to provide a general description and assessment of Turkey's intermodal transport operations. The Review also makes recommendations that are considered necessary to further promote and improve intermodality in Turkey. It has been carried out by a review team supported by the International Transport Forum/ITF Secretariat (formerly ECMT) upon the request of the Turkish Ministry of Transport.

Turkish Economy and International Trade

Turkey enjoys a strategic location, with the potential to play a pivotal role in regional and global integration. The important energy, trade and transport networks which connect west to east and north to south are keys to unleashing this potential. Recent economic and political developments throughout neighbouring regions -- the Balkans, the Black Sea, the Mediterranean Basin, the Caucasus, Central Asia and the Middle East -- have further emphasized Turkey's role.

In recent decades, Turkey has benefited from a favourable economic environment, which has supported a broad and continuous reform allowing the country to strengthen its position on international markets.

Turkey is fast becoming one of the leading actors in foreign trade in the region, and has extensive trade relations not only with the EU and OECD Member Countries but also with the Black Sea Economic Cooperation (BSEC), the Economic Cooperation Organization (ECO) and with Central Asia and the Middle East. Political progress in opening markets and borders will facilitate Turkey's trade and economic growth.

Turkey has grown rapidly, with an average of nearly 7% growth in GDP per year over the period 2002-2007. Based on the recent increases in foreign trade volumes, it is expected that the share of foreign trade in GDP will grow steadily.

Turkey's Transport System

A dynamic logistics industry, combined with a large international road vehicle fleet, underscores Turkey's potential to become one of the most significant logistics hubs and transit countries in the region. Turkey has an extensive and well-maintained east-west road network. Among the important international networks and corridors passing over its national territory are TEM Network, BSEC, ECO and TRACECA Corridors, Euro-Asian Transport Linkages and Pan-European Corridor IV.

Following a package of legislative reforms, the legal framework for international road transport is now consistent with the EU policy. The market is fully liberalized, and the private sector is highly involved in road transport operations.

Some 96% of passengers and 92% of freight are transported by road in Turkey. This dependence on road transport creates vulnerabilities. Indications such as congestion, environmental downsides, border-crossing problems, road taxation, restrictions on road traffic, permit shortages and customs constraints are some examples.

In order to overcome this vulnerability and become more sustainable, Turkey needs to develop intermodal transport solutions that can rapidly yield results without losing the advantages of its competitive road transport system.

International road transport operators have adapted to the international context by implementing innovative solutions which combine road, sea and Roll-on Roll-off (RO-RO) transport. This is partly explained by the fact that, despite a 138% increase in Turkish exports to the EU, this sector has seen only a 50% increase in the quota of permits received in the last five years. Turkish operators have started acquiring companies in Europe to overcome permit problems and have also developed RO-RO services to provide alternatives. In addition to this, through the additional and multi-entry permits (such as ECMT permits) obtained during the year, it is targeted to partially minimise the shortage of permit quota in the country.

Other transport modes, however – especially rail -- have shown less inclination to adapt. Despite its geographical features and years of experience, the railway network lacks sufficient capacity and many parts of the infrastructure have not seen new investment. Since the existing railway network is concentrated on a few major routes, the railway services are available only in certain areas and between certain cities. With the recent public investment projects, the quality and technical facilities are being improved.

Turkey recognizes the need for a balanced transport system rather than one which is overly dependent on road transport. Regulatory reform and investments in a range of infrastructure projects are beginning to bridge this gap in its railway system. Nevertheless, it is important that these go hand in hand with a clear vision on market needs and opportunities.

Maritime transport is one of the most liberalized sectors in Turkey, with a strong private shipping sector. All of the major ports are accessible by railways with a storage capacity of 2 million tonnes and total throughput around 46 million tonnes per year. With over 8000 km of coastline, Turkey has five ports which have been registered as international ports, ferry links and container terminals by the European Agreement on Main International Combined Transportation Lines and Related Facilities (AGTC).

In recent years, container traffic at the ports showed a 20% increase annually. This situation has made it clear that public ports could not accommodate the increasing demand within their current infrastructural capacities.

Public ports are thus undergoing a fundamental change in status, at a time when growing demand for service is creating pressure. Consequently, Turkey is pursuing a port privatization process with the aim of increasing efficiency and infrastructure capacity. The continuation of this process of commercialization and privatisation of ports is recommended and should subsequently improve service capacity and efficiency.

In a few years' time, private ports are expected to handle around 50% of the container traffic. In the long term, port developments should certainly comply with more global land use strategies, particularly in dense areas, such as the industrial base in the Marmara Region.

Turkey has a large airspace (almost 1 million km²) with a total length of controlled ATS routes of over 50 thousand km, over the three continents: Europe, Asia and Africa. The sector has grown significantly in the past four years, in part owing to the successful application of build-operate-transport (BOT) models which contributed to the opening of several new modern airports. The combination of new regulatory measures and new infrastructure policies using BOT, along with the entry of new airlines into the market, has helped make the Turkish air transport system meet a rapidly growing demand.

Turkey has significant potential, and several projects are underway to develop intermodal transport. Among these are the Kars-Tbilisi project, Marmaray Project, Mersin Container port project, and Çandarlı and Filyos port projects.

Current Intermodal Systems

Intermodal transport is the set of technologies that facilitates the transfer of loading units from one mode of transport to another. Intermodal transfer allows *en route* change from a given transport mode (such as road transport) to another (such as train or ship) in order to carry larger volumes in one transport operation.

The changing context of international transport has prompted Turkish international road hauliers to adopt innovative solutions to expand their intermodal fleets and develop new RO-RO lines between Turkey and several European ports. At present, these solutions typically combine road, sea and RO-RO and Ro-La transport.

There are frequent and regular domestic RO-RO ferry services across the Marmara Sea linking the industrialized north with the Asian side of Turkey. The increasing traffic congestion in the İstanbul metropolitan area, together with the abolition of the excise tax on fuel prices for ferry vessels, has led to a rapid increase of competitive RO-RO ferry services in this region.

International RO-RO ferry boat operations to Western European markets have existed since the early 1990s. Originally, they were a result of the conflicts that arose in the Balkan area which made road transport by Turkish operators to and from Western European markets increasingly difficult.

There are a considerable number of RO-RO services plying the Black Sea. Regular RO-RO services exist between the Turkish, Ukrainian, Russian and Georgian Black Sea ports. The volume transported by road on these Black Sea links is estimated at 20 000 vehicles annually.

A regular intermodal transport service using swap-bodies operates four weekly block trains in both directions between Germany and Turkey. There is also a market for automobile transport on special railway wagons. Two weekly block trains that carry around 200 automobiles each have operated between Romania and Turkey since 2006.

Regular rail-ferryboat services operate with the Russian Federation and Romania. Another domestic rail-ferry link crosses Van Lake and is part of the important international railway and intermodal line to Iran. Intermodal transport by rail in the form of containers is undertaken by the TCDD, which also operates regular container block trains to and from Europe and Central Asia.

In national transport, railways do not carry intermodal transport units, such as containers, swap-bodies or semi-trailers. Partly because of the strong position of long-haul domestic road transport in Turkey, there does not seem to be a market for such intermodal services, even though distances between main economic centres within Turkey are often more than 500-600 km. At these distances, intermodal transport operations are considered to be viable in Western European countries.

In terms of intermodal services, air transport does not have an important share in cargo transport volume. New strategies are being developed for the transport of high-value goods, express transport and the transport of perishable goods for export. Logistics services are developing in major airports to adapt to the expected high demand for specialized air market segments.

Recent incentives in Turkey, such as those for conventional block train operations, imply that there are potential supply and demand factors in the market in favour of an intermodal system, provided that there are several options which can sufficiently meet the needs of stakeholders in terms of speed, reliability and flexibility. A 20% increase in the use of rail ferries for national transport between 2005 and 2006 offers another example of the potential demand for intermodality in Turkey.

At present, there is no specific national legal framework or provisions in Turkey to govern national and international intermodal transport or to facilitate a shift from long-haul road transport to rail and/or coastal shipping.

Turkey also does not yet have financial or regulatory incentives in place to foster intermodal transport operations, such as the tax exemptions and subsidy schemes in Western European countries that provide contributions to investments and initial operational costs for intermodal transport and terminal operations considered as "public services". The only exception seems to be the exemptions from excise tax on fuel for RO-RO vessels plying the Marmara Sea.

What should be done?

While it is clear that Turkey is already operating intermodal transport, whether as road-rail, Ro-La, RO-RO and rail ferry services in its international transport and logistics activities, the country still needs a comprehensive intermodal strategy and framework. In other words, a roadmap is needed which would allow a more efficient and sustainable growth of intermodal operations.

Turkey has a great potential to build up intermodal solutions engaging maritime and railway resources with other modes of transport to increase its international freight volumes and viability. What remains to be done is to promote and maintain emerging intermodal demands through the provision of a legal framework and financial/regulatory incentives so as to foster intermodal transport.

To achieve these objectives, this Review has established the following policy recommendations:

1. The Turkish Government should elaborate a National Master Plan providing a framework for the introduction of intermodal transport and logistics, in cooperation with all public and private stakeholders and interest groups. This Master Plan should define a network of intermodal corridors, nodes and gateways for inland transport and for transit through Turkey.

2. The establishment of a clear policy and legal framework would ensure a level playing field for the private sector. Financial and regulatory measures and incentives to promote intermodal transport can be very effective.

3. The creation of an intermodal transport and logistics department under the Ministry of Transport could fill the gap to oversee and co-ordinate the activities of all stakeholders, including both public organizations and private companies, in an equitable manner.

4. The development of intermodal transport would be ill-served by a process of isolated decision-making; it should instead be part of a progressive and global transport policy. It is therefore necessary to involve all the public and private stakeholders in the promotion and facilitation of a sustainable intermodal system for Turkey.

5. Regulatory and financial measures can be implemented by the Turkish government in order to attract private capital for the development of intermodal transport services.

6. Intermodal transport requires long distances and high cargo volume corridors in terms of commercial viability. Such corridors in Turkey should be identified by a market analysis.

7. The infrastructural capacities of the major ports should be increased to respond to future demand, which could grow significantly in the next 15 years.

8. Owing to the uncertainty of the commercial viability of Ro-La services to and from Turkey, this technique is not recommended for Turkey's intermodal transport operations. Therefore, it should not be a priority for public intervention.

9. The Turkish RO-RO system and its connection to Southern Europe are highly successful. Turkish transport authorities should therefore encourage its extension, particularly for domestic trade flows, to other areas of Mediterranean and Black Sea trade.

10. Domestic RO-RO coastal shipping should be able to make an inroad into the domestic road transport markets in Turkey for longer distance operations and for destinations along the Turkish coasts. Such a concept would be in line with the "Motorways of the Sea" initiatives pursued and supported in the framework of the European Union.

11. In creating an extensive and competitive intermodal transport system for Turkey, the essential connections from and to the maritime and air freight logistics centres and their integration to urban distributions should also be taken into account.

12. One of the primary measures should be to maintain and improve the hinterland connections of ports with the other modes of transport, in particular railways which would provide advantages for logistics markets.

13. To improve railways' share in intermodality, the railway network should be upgraded, not only for high-speed passenger transport, but also to allow for competitive and reliable goods transport services. Financial support for rolling stock and terminals should also be prioritized.

14. While six locations have been selected as rail freight logistic centres, prospects to develop such services are not yet very clear. Thus, the uncertainties which affect the perspective of development of intermodal services need to be solved.

15. The trade and transport promotion policy could include a supportive attitude towards transit traffic. Transit trade could be further used as an instrument for additional economic growth.

16. The active participation of Turkey in international organizations has resulted in a series of agreements that identify transport corridors. Because of Turkey's size, more national links should be included, in addition to these corridors.

17. A schedule and a monitoring process should be set up to ensure necessary changes are implemented and to highlight areas where special efforts must be made.

If the above-mentioned recommendations are acted upon, Turkey will greatly facilitate its own trade and will play a central role in providing access to Europe on Middle East, Asian and Caucasian markets. Progress in and promotion of intermodal transport will also contribute to Turkey's aim to achieve a sustainable and more balanced national and international transport system.

INTRODUCTION

The process of globalization has greatly enhanced the scope of intraregional and interregional trade, requiring closer and more effective cooperation between countries. The growing economic interdependence of countries worldwide leads to ever increasing volumes and varieties of cross-border transactions in goods and services.

Transport is one of the most important elements within the framework of such interdependent economic co-operation. Without effective, reliable and efficient transport systems, international investments and trade are seriously hampered. Moreover, infrastructure, which directly affects the volume of trade as well as transport costs, is one of the most vital aspects of transport. Poor quality of infrastructure leads to poor quality of transport services.

Turkey is situated along the main artery of traffic between Asia and Europe, sharing borders with Bulgaria, Greece, Iran, Iraq, Syria, Georgia, Armenia, and Azerbaijan. Since it is surrounded by the Black Sea in the north and the Mediterranean Sea in the south, it connects the Balkans to the Middle East; Central Asia to the Caucasus; and the Black Sea countries with the Mediterranean countries. The country has a total area of 814.578 km², 8 333 km of which is coast line.

With a average growth rate of 6.9% during the last five years, (well above the EU average which is 2.5%), an annual foreign trade value of 277 billion dollars in 2007 and a consumer market of 70 million, a strategic location, a low cost but highly-qualified labour market, a young and dynamic population, the advantages of a logistics industry, and one of the largest international road fleets in Europe, Turkey has the opportunity to become one of the most significant transport logistics hubs and transit countries in the region.

Prior to committing investments for transport infrastructure, it is crucial for nations to analyse thoroughly the requirements of global markets and the efficiency and profitability of transport systems. Intermodal transport, making use of the inherent advantages of road, rail, inland water as well as maritime transport, is part of any modern and environmentally friendly transport system. Forward looking transport policies should take this into account.

The White Paper of the Commission of the EU: "European Transport Policy for 2010: Time to Decide"[1] offers a comprehensive picture of the challenges to be met by a forward-looking sustainable transport policy. It contains, in particular, references to important transport policy issues and problems also faced by Turkey, such as the interconnection and interoperability between transport modes (for example, the interconnection between maritime and land transport -- motorways of the sea) that could provide solutions for growing road congestion and air pollution on important transport corridors in Turkey.

In its mid-term review of the 2001 White Paper[2] the European Commission (EC) stressed that the 2010 transport policy objectives remain valid and states that: "Shifts to more environmentally friendly modes must be achieved where appropriate, especially on long distance, in urban areas and on congested corridors. At the same time each transport mode must be optimised. All modes must become more

environmentally friendly, safe and energy efficient. Finally, co-modality, i.e. the efficient use of different modes on their own and in combination, will result in an optimal and sustainable utilisation of resources."

In October 2007, the EC released a package of logistic measures "Keeping Freight Moving"[3] to promote the freight transport logistics, make rail freight more competitive, create a framework which will allow European ports to attract investment for their modernisation, put maritime freight transport on an equal footing with other transport modes and review progress made in developing Motorways of the Sea.

Similarly, in 2002, the European Conference of Ministers of Transport (ECMT/ presently ITF) underlined in a Consolidated Resolution on Combined Transport[4] that the development of combined transport is not only one of the important objectives of transport policy in many countries, but is also an integral part of sustainable transport policy. The increase in goods traffic in recent years and the forecasted growth may lead, in many countries, to bottlenecks, that already exist on certain links, on the principal international and national roads.

The ECMT also stressed that the competitiveness of combined transport must, in any case, be effectively improved, both in terms of quality and of costs or prices. Finally, Ministers recommend that national and international bodies should reinforce both at national and international levels, coordination between environmental, land use and transport policies and should create the framework for a sound development and promotion of combined transport.

In line with this approach, the United Nations Economic Commission for Europe (UNECE), through its Working Party on Intermodal Transport and Logistics, is translating this policy approach at the pan-European level into concrete legal and technical action. Examples are the European Agreement on Important International Combined Transport Lines and Related Installations (AGTC)[5] to which Turkey has been a Contracting Party since 1996, and the Model Action Plans and Partnership Agreements[6] for the promotion and benchmarking of intermodal transport services at the international level.

The purpose of peer reviews are to assist the State under review to improve its policy making, adopt best practices and comply with established standards and principles.

Peer reviews are not intended to resolve differences among States, but they may contribute to the settlement of disputes, by encouraging an open dialogue that can help to clarify positions in a friendly and constructive atmosphere. The key to the effectiveness of peer reviews depends on the willingness of the State concerned to accept it. In other words, it is up to the country under the microscope to put into effect the proposals made in the framework of the study.

This peer review study, carried out by the ITF Secretariat with the help of recognised intermodal experts upon the request of the Turkish Ministry of Transport and Communications, illustrates the current situation as well as the future perspectives of intermodal transport in Turkey, and evaluates its development in the context of Euro-Asia links.

This study consists of four major parts. In the first part, the main economic indicators of Turkey are provided and the Turkish socio-economic context is presented. In the second part, the current situation of Turkish transport modes and their future perspectives are analyzed. The current status of intermodal transport is also contained in this section. The third part examines the requirements for an efficient intermodal transport system whilst the advantages provided by intermodal transport and freight container transport models by mode are explored. Finally, recommendations to build up an intermodal transport system and the strategies needed for its development are presented in Part IV.

NOTES

1. Brussels, 12.09.2001 (COM(2001)370).

2. Brussels, 22.06.2006 (COM(2006) 314 final).

3. European Commission (2007), "Keeping Freight Moving", http://ec.europa.eu/transport/logistics/freight_logistics_action_plan/index_en.htm

4. Consolidated Resolution No 2002/2 on Combined Transport, CM(2002)3/Final

5. www.unece.org/trans/conventn/agtce.pdf

6. www.unece.org/trans/wp24/wp24-official-docs/documents/TRANS-WP24-2005-07e.pdf

PART I. TURKEY: AT THE CROSSROADS OF EUROPE, ASIA AND THE MIDDLE EAST

CHAPTER 1. MAIN ECONOMIC INDICATORS OF TURKEY

1.1. Turkey's Foreign Trade

In 1980, Turkey changed its economic development policy from a strategy of "import substituting industrialization" to "export led growth". Various export promoting incentives were initiated (including tax exemptions, rebates and favourable credit terms), direct import controls were eliminated, and quantity restrictions were dismantled. At the same time state intervention in the economy was reduced to a minimum. As a consequence the economy opened up to world trade and Turkey's shares in the world markets rose from 0.15% in 1980 to 0.78% in 2007[1]. Export levels increased from 2.9 billion dollars in 1980 to 107 billion dollars in 2007.

Turkey has achieved substantial progress in macroeconomic stabilization and institutional reform, which constituted the foundation for strong GDP growth between the years 2002 and 2007. Despite challenges stemming from the increasing competition in global trade system, foreign trade performance of Turkey played a crucial role in the attainment of macroeconomic stability and sustainable growth.

The main economic indicators of Turkey have recovered and stability has been achieved in many areas, especially in the last five years. Structural reforms within the framework of the International Monetary Fund (IMF), the EU Harmonization Laws and sectoral regulations along with improvements in the investment environment have provided a more favourable business environment.

Within this period, the ratio of foreign trade volume to national income has increased significantly. Besides, sectoral and regional composition of exports and imports has changed in such a way that Turkey managed to turn into an increasingly high-tech and capital-intensive goods exporting country. In this way, Turkey has re-emerged among the developing economies as one of the key players.

In short, Turkey's foreign trade has shown significant development in terms of quantity and quality since the 1980s. Export performance has been spectacular especially in the last five years, due to both domestic and international developments.

The main economic indicators of Turkey are shown in Table 1.1.

Table 1.1. **Main Economic Indicators of Turkey**

Year	FOREIGN TRADE - ANNUAL ($ Million)						Exp./Imp. %	Exchange rates ($/TRY)	% Chg.	Exchange rates (Eero/TRY)	% Chg.	Euro/$	WPI %	Rate of cap. util.	Growth rates %
	Export	% Chg	Import	% Chg	Balance	Volume									
1990	12 959	11.5	22 302	41.2	-9 343	35 261	58.1	0.0026	24.3	-	-	-	49.2	74.4	9.4
1991	13 593	4.9	21 047	-5.6	-7 454	34 640	64.6	0.0042	60.2	-	-	-	59.2	75.6	0.3
1992	14 715	8.2	22 871	8.7	-8 156	37 586	64.3	0.0069	64.8	-	-	-	61.4	77.3	6.4
1993	15 345	4.3	29 428	28.7	-14 083	44 773	52.1	0.0111	60.5	-	-	-	60.3	80.5	8.1
1994	18 106	18.0	23 270	-20.9	-5 164	41 376	77.8	0.0299	169.9	-	-	-	149.6	72.9	-6.1
1995	21 637	19.5	35 709	53.5	-14 072	57 346	60.6	0.0460	53.9	-	-	-	64.9	78.5	8.0
1996	23 224	7.3	43 627	22.2	-20 402	66 851	53.2	0.0818	78.0	-	-	-	84.9	78.0	7.1
1997	26 261	13.1	48 559	11.3	-22 298	74 820	54.1	0.1528	86.8	-	-	-	91.0	79.4	8.3
1998	26 974	2.7	45 921	-5.4	-18 947	72 895	58.7	0.2622	71.6	-	-	-	54.3	76.5	3.9
1999	26 587	-1.4	40 671	-11.4	-14 084	67 258	65.4	0.4222	61.0	0.4478	-	1.06	62.9	72.4	-6.4
2000	27 775	4.5	54 503	34.0	-26 728	82 278	51.0	0.6267	48.5	0.5767	28.8	0.92	32.7	75.9	6.1
2001	31 334	12.8	41 399	-24.0	-10 065	72 733	75.7	1.2313	96.5	1.0990	90.6	0.89	88.6	70.9	-9.4
2002	36 059	15.1	51 554	24.5	-15 495	87 613	69.9	1.5131	22.9	1.4367	30.7	0.95	30.8	75.4	7.9
2003	47 253	31.0	69 340	34.5	-22 087	116 593	68.1	1.5003	-0.8	1.6934	17.9	1.13	13.9	78.4	5.9
2004	63 167	33.7	97 540	40.7	-34 373	160 707	64.8	1.4292	-4.7	1.7762	4.9	1.24	13.8	81.7	9.9
2005	73 476	16.3	116 774	19.7	-43 298	190 251	62.9	1.3473	-5.7	1.6776	-5.6	1.25	2.7	80.7	7.6
2006	85 535	16.4	139 576	19.5	-54 041	225 111	61.3	1.4380	6.7	1.8087	7.8	1.26	11.6	81.7	6.9
2007	107 214	25.3	170 057	21.8	-62 844	277 270	63.0	1.3078	-9.1	1.7868	-1.2	1.37	5.9	81.2	4.5

Source: Turkish Undersecretariat of Foreign Trade.

Quantitative and qualitative developments in Turkey's exports have played a leading role for the acceleration of the economic growth process in the 2000s. As an illustration, Turkish exports increased by 24%, while the global growth in exports grew only 16.8% between 2002 and 2006. Turkish exports continued to grow in 2006-2007 and reached 107 billion dollars in 2007.

The sectoral composition of exports has also undergone qualitative changes owing to recent structural transformation. In total exports, the share of "machinery and transport equipment", a product group comprising of high value-added and high-tech products, increased from 7.1 billion dollars to 34 billion dollars from 2001 to 2007. Indeed, machinery and transport equipment has been the largest component of Turkish exports since 2004, surpassing the traditional export leader, textiles and clothing.

The record rate of export growth in the last five years is due to many factors. First of all, Turkish industrial production became more competitive as a result of low real wages and stagnant energy prices (mainly electricity), despite the appreciation of the Turkish Lira (TL). Secondly, low real interest rates, in comparison to previous years, lowered the borrowing costs for producers and exporters. Thirdly, technological improvements increased as a result of joint ventures (especially in the automotive industry) or technology imports. Finally, the accelerated productivity of the latter years, relative to the stagnant consumption until mid 2003, created excess supply, which was then in turn directed towards exports.

Another contributing factor was the depreciation of the US dollar against the Euro and the Turkish Lira (TL). Because imports of intermediate and capital goods are crucial to production, Turkey benefited by importing cheaper intermediate goods from countries where prices are set according to the US dollar (such as the East Asian countries, especially China) and then exporting final products mainly to EU countries.

Turkey has set a goal to attain 500 billion dollars in exports by 2023 which will require an annual growth rate of almost 11% until this target date. For this purpose, Turkey recently implemented new production and trade strategies to further diversify exports and imports on a regional and sectoral basis. This aim should be seen as a driving force for a pressing need to diversify the use of transport modes.

Turkey's imports grew by an average of 10% annually between 1990 and 1995, while the average annual growth rate between 1995 and 2000 was 8.8%. Turkey's membership of the World Trade Organization in 1995, arrival at the final stage of the Customs Union with the European Union in 1996 and its growing economy were the major reasons behind Turkey's rapid import growth rate during these years.

Intermediary and capital goods constitute the bulk of Turkey's imports and are necessary to the country's industrial development. This leads to and accelerates development by creating cost advantages for national export goods producers and consequently increases productivity.

A breakdown of imports and exports is provided in Table 1.2.

Table 1.2. **Breakdown of Foreign Trade in Turkey (million $)**

EXPORTS	ANNUAL								
	2000	2001	2002	2003	2004	2005	2006	2007	07/06 Ch.%
Agriculture and forestry	1 659	1 976	1 754	2 121	2 542	3 329	3 481	3 725	7.0
Fishery	25	30	51	81	103	140	131	158	20.6
Mining and quarrying	400	349	387	469	649	810	1 146	1 661	44.9
Manufacturing	25 518	28 826	33 702	44 378	59 579	68 813	80 246	101 023	25.9
Others	173	153	165	204	294	384	531	646	21.7
TOTAL	**27 775**	**31 334**	**36 059**	**47 253**	**63 167**	**73 476**	**85 535**	**107 213**	**25.3**

IMPORTS	ANNUAL								
	2000	2001	2002	2003	2004	2005	2006	2007	07/06 Ch.%
Agriculture and forestry	2 123	1 409	1 703	2 535	2 757	2 801	2 902	4 641	59.9
Fishery	2	1	1	2	8	24	33	31	-6.1
Mining and quarrying	7 097	6 577	7 192	9 021	10 981	16 321	22 034	25 314	14.9
Manufacturing	44 200	32 686	41 383	55 690	80 448	94 208	110 379	133 933	21.3
Others	1 081	726	1 275	2 092	3 346	3 419	4 229	6 139	45.2
TOTAL	**54 503**	**41 399**	**51 554**	**69 340**	**97 540**	**116 774**	**139 576**	**170 057**	**21.8**

Source: Turkish Statistical Institute.

1.2. Exports and Imports by Country Groups

1.2.1. Exports

Turkey has been implementing an export-oriented strategy since the 1980s. The basic objectives of this strategy are to constitute an outward oriented economic structure in the framework of a free market economy, and to be integrated in world markets. In line with this new strategy, export intensive measures which contain various supportive components and arrangements are directed towards foreign trade liberalization.

In addition to these liberalizing arrangements designed to improve exports, some support programs have been put into effect. The main supports provided to exporters had been corporation tax exemptions, tax refunds, premiums to the Resource Utilization and Support Fund, subsidies obtained from this Support Fund and the Price Stabilization Fund. However, the above mentioned support systems have been gradually eliminated in compliance with Turkey's international commitments (as a signatory to certain international agreements) since the second half of the 1980s.

On the other hand, with the establishment of the Turkish Eximbank in 1987, supported exports gained a new dimension. In order to increase the competitive strength of Turkish exporters in foreign markets, some credits and guarantee programs under the international commitments began to be applied to the sectors with high export potential.

With regard to export support, the foreign trade policies that were set up under the conditions of the 1980s have been reviewed and modified following world developments of the 1990s. State aids, prepared in compliance chiefly with the World Trade Organization (WTO) and the Turkish international commitments, were put into practice as of 1st June 1995.

The most significant development in Turkey's foreign trade policy was the establishment of the Customs Union between the EU and Turkey as of 1st January, 1996. This agreement initiated a time period for the legal infrastructure of foreign trade strategy to be made consistent with the EU norms; therefore both import and export regimes have been made consistent with the regulations of the EU. The Free Trade Agreements signed with the Central and Eastern European Countries and Israel, should be regarded as factors directly affecting how Turkish trade conforms to the Community's Common Trade Policy.

EU member countries in particular, constitute the most important market for Turkish exports. The EU share is 56.4% in Turkey's total exports with 60.4 billion dollars in 2007.

In Asian Countries, Near and Middle Eastern countries are another important market for Turkey's exports. From 2001 to 2007, exports to this region rose from 3.2 billion dollars to 15 billion dollars with a 29% increase approximately. During this period, the share of these countries in Turkey's total exports rose from 10.4% to 14% (*see Table 1.3.).*

On the other hand, the share of exports to North America (especially the USA), in total exports of Turkey, increased during the 2001-2007 period and levelled off soon afterwards. Exports to the USA, which were 968 million dollars in 1990, increased to 1.5 billion dollars in 1995 and 3.1 billion dollars in 2000, doubling in five years. Turkey's exports to the USA have been calculated at 4.1 billion dollars for 2007.

Following the collapse of the Soviet Union and the formation of the Newly Independent States (NIS), Turkey had the opportunity to sell and enhance its exports to these countries. Until 1998, Turkish exports to NIS countries consistently grew every year. However the economic crisis in the Russian Federation in 1998 pulled down the total demand of the NIS countries. After this crisis, Turkish exports to this region declined and then remained stagnant. As of 2001, exports to the NIS reached 1.9 billion dollars and rose in 2007 to 10 billion dollars with the average annual increase of 31.2%.

Exports to Russia from 2001 to 2007 increased from 924 million dollars to 4.7 billion dollars, and Russia became the fifth biggest export market for Turkey. The good performance of Turkish exports to the Maghreb region revealed Turkey as a major economic partner in the Mediterranean.

Today, Turkey's biggest export trading partner is Germany with 12 billion dollars, followed by UK, Italy, France and the Russian Federation (*see Table 1.3 and 1.4.).*

Table 1.3. **Exports by country groups (million $)**

	2001	2002	2003	2004	2005	2006	2007
Total	**31 334**	**36 059**	**47 253**	**63 167**	**73 476**	**85 535**	**107 213**
E U countries (27)	17 546	20 415	27 394	36 581	41 365	47 935	60 397
Free zones in Turkey	934	1 438	1 928	2 564	2 973	2 967	2 943
Other countries	12 854	14 206	17 931	24 022	29 137	34 633	43 873
Other European countries	2 094	2 607	3 362	4 507	5 855	7 962	10 843
African countries	1 521	1 697	2 131	2 968	3 631	4 566	5 976
North African countries	1 150	1 267	1 577	2 203	2 544	3 097	4 030
Other African countries	371	430	554	765	1 087	1 469	1 947
American countries	3 685	3 914	4 269	5 733	5 960	6 328	5 601
North America countries	3 297	3 596	3 973	5 207	5 276	5 439	4 538
Central America and Caribbean	201	197	166	334	411	548	549
South America countries	186	121	131	193	274	341	514
Asia countries	4 592	5 230	7 813	10 465	13 213	15 257	20 254
Near and Middle Eastern	3 261	3 440	5 465	7 921	10 184	11 316	15 027
Other Asian countries	1 331	1 790	2 348	2 544	3 029	3.942	5 227
Australia and New Zealand	98	122	158	264	271	327	343
Other countries	864	637	197	84	208	192	856
Selected country groups							
OECD countries	20 616	23 551	30 425	40 518	44 355	54 481	65 671
EFTA countries	316	409	538	667	821	1 189	1 328
Organization of Black Sea Economic Co-operation	2 932	3 599	5 044	6 779	8 619	11 584	16 784
Economic Co-operation Organization	972	1 042	1 569	2 206	2 670	3 341	4 646
New Independent States	1 978	2 279	2 963	3 962	5 057	6 993	10 088
Turkic Republics*	557	619	899	1 194	1 409	1 982	2 874
Organization of Islamic Conference	4 197	4 725	7 205	10 214	13 061	15 007	20 256

* Turkic Republics = Azerbaïdjan, Kazakstan, Kyrgystan, Turkmenistan, Uzbekistan.
Source: Turkish Statistical Institute.

Table 1.4. **Leading Export Markets for Turkish Merchandise Trade, 2007**

Rank	EXPORT MARKETS	Value (Million $)	Share (%)	(%) Change
1	Germany	11 993	11.2	23.8
2	United Kingdom	8 626	8.0	26.6
3	Italy	7 480	7.0	10.8
4	France	5 974	5.6	29.8
5	Russian Federation	4 727	4.4	46.0
6	Spain	4 580	4.3	23.1
7	U.S.A.	4 168	3.9	-18.0
8	Romania	3 644	3.4	55.3
9	United Arab Emirates	3 241	3.0	63.2
10	Netherlands	3 019	2.8	18.9
	Total of Above	**57 452**	**53.6**	**22.9**
	Total of Turkey	**107 213**	**100.0**	**25.3**

Table 1.5. **Turkey's Exports by Sector (million $)**

	2001	2002	2003	2004	2005	2006	2007	Ch.%
1- AGRICULTURAL PRODUCTS	4 349	4 052	5 257	6 501	8 309	8 633	9 768	13.1
i Food	3 997	3 668	4 735	5 891	7 714	7 932	9 006	13.6
ii Agricultural Raw Materials	352	384	522	610	595	702	762	8.6
2- MINING PRODUCTS	1 236	1 497	2 011	2 895	4 564	6 511	9 005	38.3
i Metalliferous ores and metal scrap	406	455	573	801	1 006	1 497	2 078	38.8
ii Mineral fuels. Lubricants and related materials	445	691	980	1 429	2 641	3 566	5 148	44.4
iii Non-ferrous metals	386	351	458	664	917	1 448	1 779	22.9
3- MANUFACTURES	25 661	30 288	39 594	53 487	60 116	69 325	86 949	25.4
i Iron and steel	2 500	2 831	3 342	6 050	5 827	7 239	9 562	32.1
ii Chemicals	1 367	1 523	1 893	2 566	3 060	3 923	4 733	20.6
iii Other semi-manufactures	2 625	3 139	4 143	5 490	6 589	7 583	9 815	29.4
iv Machinery and transport equipment	7 153	8 632	12 370	18 275	21 609	26 386	34 095	29.2
v Textiles	3 943	4 268	5 262	6 428	7 076	7 585	8 941	17.9
vi Clothing	6 661	8 094	9 962	11 193	11 833	12 052	13 885	15.2
vii Other consumer goods	1 413	1 800	2 622	3 483	4 122	4 557	5 917	29.8
4- OTHER PRODUCTS	89	222	391	285	488	1 065	1 491	40.0
TOTAL	31 334	36 059	47 253	63 167	73 476	85 535	107 213	25.3

Source: Turkish Undersecretariat of Foreign Trade.

Turkey's biggest export trading good is chapter 87-vehicles other than railway/tramway rolling followed by chapter 84-nuclear reactors, boilers, machinery, 72-iron and steel, 61-articles of apparel and clothing accessories. *(See Table 1.6.)*

Table 1.6. **Leading Merchandise Exports of Turkey, 2007**

Rank		EXPORT	Value (Million $)	Share (%)	(%) Change
1	87	Vehicles other than Railway/Tramway Rolling	15 904	14.8	33.8
2	84	Nuclear Reactors, Boilers, Machinery	8 777	8.2	34.3
3	72	Iron and Steel	8 352	7.8	33.1
4	61	Articles of Apparel and Clothing Accessories	8 022	7.5	15.6
5	85	Electrical Machinery and Equipment	7 421	6.9	17.3
6	62	Articles of Apparel and Clothing Accessories	5 444	5.1	15.6
7	27	Mineral Fuels, Mineral Oils and Products	5 148	4.8	44.3
8	73	Articles of Iron or Steel	4 125	3.8	23.9
9	39	Plastics and Articles Thereof	2 818	2.6	27.4
10	08	Edible Fruit and Nuts	2 671	2.5	11.8
		Total of Above	**68 682**	**64.1**	**26.8**
		Total of Turkey	**107 213**	**100.0**	**25.3**

Source: Turkish Undersecretariat of Foreign Trade.

1.2.2. Imports

Several factors explain the growth in imports between 2002 and 2007, foremost among which the rising demand for intermediary and capital goods driven by sustained economic growth combined with a stronger Turkish Lira. Meanwhile, a dramatic increase in oil prices saw the value of energy imports increase sharply throughout the world.

A new import regime came into force as of 1st January 2005, reflecting Turkey's international rights and obligations, as well as the country's economic needs. This regime was prepared taking due account of the agreement establishing the WTO, the Customs Union Agreement between Turkey and the EU, the free trade agreements that Turkey signed with various countries and the preferential treatments granted by Turkey to the least developed countries; it also acknowledged the specific needs and requirements of the agricultural and industrial sectors.

A liberalized import regime, new foreign investment and export promotion policies have enabled Turkey to take its place in the global economy. In this context, steady economic growth has been accompanied by a significant change in the breakdown of the GNP, marked by an important increase in the share of industry and services.

European countries have an important share in Turkey's imports, largely due to their geographical proximity and their level of economic development. Among the country groups of Europe, EU member states are in the first rank. The EU is followed by NIS countries due to crude oil and natural gas imports from that region.

Table 1.7. **Imports by Country Groups (million $)**

	2001	2002	2003	2004	2005	2006	2007
Total	41 399	51 554	69 340	97 540	116 774	139 576	170 057
EU countries (27)	19 823	25 689	35 140	48 103	52 696	59 401	68 611
Free zones in Turkey	303	575	589	811	760	944	1 224
Other countries	21 273	25 290	33 611	48 626	63 318	79 198	100 223
Other European countries	5 738	7 487	10 342	15 757	20 386	25 695	34 253
African countries	2 819	2 696	3 338	4 820	6 047	7 404	6 784
North African countries	2 115	2 138	2 519	3 231	4 212	4 878	3 616
Other African countries	704	558	820	1 589	1 835	2 526	3 168
American countries	3 841	4 065	4 922	6 595	7 857	9 397	12 150
North America countries	3 390	3 421	3 741	5 114	5 823	6 932	9 030
Central America and Caribbean	41	103	169	209	287	335	448
South America countries	410	541	1 012	1 271	1 747	2 130	2 671
Asia Countries	7 901	9 716	14 099	21 085	28 548	36 201	46 298
Near and Middle Eastern	3 016	3 186	4 455	5 585	7 967	10 568	12 640
Other Asian countries	4 884	6 530	9 644	15 500	20 581	25 634	33 658
Australia and New Zealand	232	313	247	302	321	399	672
Other countries	741	1 013	662	67	158	105	66
Selected country groups							
OECD countries	26 011	32 985	43 899	59 650	66 107	77 738	91 854
EFTA countries	1 481	2 512	3 396	3 911	4 440	4 520	5 775
Organization of Black Sea Economic Co-operation	5 553	6 588	9 298	15 368	20 480	27 017	34 809
Organization for Economic Co-operation	1 238	1 548	2 736	3 218	5 108	8 101	9 971
New Independent States	4 630	5 555	7 777	12 927	17 252	23 372	31 263
Turkic Republics	283	468	623	754	1 267	1 968	2 669
Organization of Islamic Conference	5 540	6 072	8 195	10 631	14 459	19 108	21 523

Source: Turkish Statistical Institute.

Near and Middle Eastern countries hold third place due to crude oil imports, while North America is in fourth place due to Turkey's extensive trade relationship with the USA. Turkey's biggest import trading partner in 2007 was Russia, followed by Germany, China, Italy and USA (*see Table 1.8.).* However, the performance of Chinese imports should not go unnoticed since it has tripled in the past three years, creating an important trade deficit in the Turkish economy. As a result, China has become Turkey's third biggest import partner as of 2007.

Table 1.8. **Leading Importers in Turkish Merchandise Trade, 2007**

Rank	IMPORTERS	Value (Million $)	Share (%)	Change (%)
1	Russian Federation	23 508	13.8	32.0
2	Germany	17 540	10.3	18.8
3	China	13 234	7.8	36.9
4	Italy	9 968	5.9	15.1
5	U.S.A.	8 164	4.8	30.3
6	France	7 850	4.6	8.2
7	Iran	6 614	3.9	17.5
8	United Kingdom	5 477	3.2	6.6
9	Switzerland	5 269	3.1	31.2
10	Ukraine	23 508	2.7	47.7
	Total of above	**102 143**	**60.1**	**24.2**
	Total of Turkey	**170 057**	**100.0**	**21.8**

Source: Turkish Undersecretariat of Foreign Trade.

Table 1.9. **Turkey's Imports by Sectors (million $)**

	2001	2002	2003	2004	2005	2006	2007	Ch.%
1- AGRICULTURAL PRODUCTS	3 079	3 995	5 265	6 059	6 480	7 286	9 813	34.7
i Food	1 487	1 912	2 791	3 089	3 284	3 486	5 167	48.2
ii Agricultural raw materials	1 593	2 083	2 474	2 969	3 196	3 800	4 646	22.2
2- MINING PRODUCTS	9 859	11 656	15 248	20 177	28 101	38 601	46 932	21.6
i Metalliferous ores and metal scrap	709	1 362	2 262	3 531	3 840	4 863	6 693	37.6
ii Mineral fuels lubricants and related materials	8 339	9 204	11 575	14 407	21 255	28 859	33 881	17.4
iii Non-ferrous metals	811	1 090	1 411	2 239	3 006	4 880	6 358	30.3
3- MANUFACTURES	27 153	34 023	45 831	67 417	78 045	89 254	107 389	20.3
i Iron and steel	1 803	2 198	3 283	5 325	6 747	8 141	11 341	39.3
ii Chemicals	6 243	7 909	10 427	14 211	16 438	18 407	22 100	20.1
iii Other semi-manufactures	2 108	2 681	3 489	4 790	5 796	7 177	8 564	19.3
iv Machinery and transport equipment	12 701	15 610	21 510	33 705	38 028	43 039	49 746	15.6
v Textiles	1 921	2 844	3 441	4 170	4 441	4 687	6 014	28.3
vi Clothing	239	283	422	651	788	1 098	1 567	42.7
vii Other consumer goods	2 138	2 498	3 258	4 565	5 807	6 705	8 058	20.2
4- OTHER PRODUCTS	1 308	1 880	2 997	3 888	4 148	4 435	5 923	33.6
TOTAL	41 399	51 554	69 340	97 540	116 774	139 576	170 057	21.8

Source: Turkish Undersecretariat of Foreign Trade.

Turkey's biggest import trading good is chapter 27- Mineral Fuels, Mineral Oils and Products followed by chapter 84-nuclear reactors, boilers, machinery, 72-iron and steel, 85- Electrical Machinery and Equipment. (*see Table 1.10.)*

Table 1.10. **Leading Merchandise Imports of Turkey, 2007**

Rank		IMPORT	Value (Million $)	Share (%)	(%) Change
1	27	Mineral Fuels, Mineral Oils and Products	33 881	19.9	17.4
2	84	Nuclear Reactors, Boilers, Machinery	22 570	13.3	18.9
3	72	Iron And Steel	16 182	9.5	40.4
4	85	Electrical Machinery and Equipment	13 295	7.8	22.2
5	87	Vehicles other than Railway or Tramway Rolling	12 397	7.3	8.7
6	39	Plastics and Articles Thereof	8 688	5.1	25.5
7	71	Natural or Cultured Pearls	5 906	3.5	34.1
8	29	Organic Chemicals	3 995	2.3	9.7
9	30	Pharmaceutical Products	3 524	2.1	16.1
10	74	Copper and Articles thereof	3 152	1.9	27.7
		Total of Above	**123 592**	**72.7**	**21.0**
		Total of Turkey	**170 057**	**100.0**	**21.8**

Source: Turkish Undersecretariat of Foreign Trade.

Prospects

Trade has become the engine for growth in an increasingly interdependent and competitive world. In fact, the expansion in global trade has been greater than the increase in world output for years. The countries that have implemented sound export policies in a consistent manner were able to experience an edge in development. Thus, devising the right policy tools is of utmost importance to securing a growing share for Turkish exports.

The policies currently being implemented aim at achieving both short and medium term performance gains as well as a long structural transformation of Turkey's export market. Turkey's avowed ambition is to reach 1.1 trillion dollars of foreign trade volume, with 500 billion dollars of exports by the end of 2023, the 100th year of the establishment of the Republic of Turkey and efforts have been stepped up to further engage Turkey with the global trade system.

1.3. Market Shares of Transport Modes in Foreign Trade

According to the 2007 figures, maritime transport held first place in Turkish foreign trade volume with 86.4%, followed by roads with 11.4% and railways with 1.2%. With respect to foreign trade value, the share of maritime transport is 50.4%, roads 36.3%, airways 10.1% and railways 1.1%.

Table 1.11. **Market Shares of Transport Modes in Foreign Trades (2007)**

Modes	TOTAL		
	Tonnes	**%**	**US$ '000**
Maritime	190 309 000	86.4	153 300 825
Roads	22 330 000	11.4	82 785 408
Railway	2 758 000	1.2	3 630 269
Air	712 000	0.1	23 851 645
Others	387 000	0.9	13 664 370
TOTAL	**216 946 000**	**100**	**277 232 517**

Source: Turkish Statistical Institute.

These figures reflect that bulk products with lower unit values are mainly transported by sea. For high value products, air transport has attained a significant share and is expected to increase at a high growth rate. For road transport, it should be pointed out that an important share of traffic with the EU is indeed RO-RO transport with high performance services. This is also the case across the Black Sea, due to new services open to Russia and Ukraine.

1.3.1. Foreign Trade Journeys by Border Gates

Before discussing Turkish foreign trade journeys by border gates, it is helpful to note the location of Turkey's main border gates. The map below does this.

Map 1.1. **Main Border Gates**

Source: Turkish Undersecretariat of Customs.

Representing foreign trade journeys by road from/to the border gates in Turkey, Table 1.12. also indicates that in 2007 the greatest number of foreign trade journeys took place at Kapıkule (Turkish-Bulgarian border) in the West, and at Habur (Turkish-Iraqi border) and Gürbulak (Turkish-Iranian border) in the East. Kapıkule is the most important border crossing point in the Europe-Asia transit trade flow, and accommodates a high number of lorries transporting goods under the TIR Customs transit regime.

Since 2000, reconstruction and modernisation operations are being carried out at the land border gates so as to increase the trade volumes, service quality as well as to decrease waiting times at borders. The reconstruction works for Kapıkule and Sarp border gates are to be finalized in December 2008 and the reconstruction process for Gürbulak (Iran), Habur (Iraq), Cilvegözü (Syria), İpsala (Greece) have already been completed.

To sum up, Turkey's export-oriented foreign trade, together with the advantages of intermediary and capital goods imports, provide a suitable basis to strengthen its competitive position in international trade.

NOTE

1. Undersecretariat of Foreign Trade, www.dtm.gov.tr

Table 1.12. **Foreign Trade Journeys by Border Gates in Turkey**

	2005				2006				2007			
	EXPORT		IMPORT		EXPORT		IMPORT		EXPORT		IMPORT	
	Turkish vehicles	Foreign vehicles	Turkish vehicles	Foreign vehicles	Turkish vehicles	Foreign vehicles	Turkish vehicles	Foreign vehicles	Turkish vehicles	Foreign vehicles	Turkish vehicles	Foreign vehicles
WEST BORDER GATES	282 270	85 981	216 552	68 270	308 481	83 989	239 568	64 096	375 459	102 483	280 768	70 678
ÇEŞME-TRIESTE	16 376	646	11 198	799	17 302	797	11 366	710	19 616	694	14 751	645
HAMZABEYLİ	4 007	1 813	3 402	2 234	21 148	12 247	15 769	12 594	32 831	32 333	27 175	24 693
PENDİK-TRİESTE	50 729	2 212	48 472	1.949	53 632	3 207	55 522	3 051	59 288	3 121	64 374	3 686
İPSALA	37 589	9 352	29 279	2 772	38 741	6 439	26 316	2 028	49 963	11 486	27 459	3 755
KAPIKULE	157 236	70 130	111 588	58 509	158 535	59 195	115 851	43 359	196 052	51 842	130 149	34 927
AMBARLI-TRIESTE	16 333	1 828	12 613	2 007	19 123	2 104	14 744	2 354	17 709	3 007	16 860	2 972
EAST BORDER GATES	360 465	51 772	27 533	9 639	317 749	47 623	25 447	10 955	415 628	44 668	64 400	19 219
CİLVEGÖZÜ	34 147	2 405	1 432	1 093	47 190	6 846	2 319	1 484	37 406	4 160	4 823	530
DİLUCU	10 548	0	1 275	0	17 032	1	642	1	22 146	26	1 589	1
GÜRBULAK	36 220	10 914	15 569	5 613	37 962	13 648	17 342	7 892	44 685	15 899	21 885	12 858
HABUR	260 700	33 754	2 736	0	191.582	23.792	540	0	251 154	17 556	28 559	12
SARP	18.307	4 577	6 449	2 904	23.475	3 193	4 154	1 510	46.906	4 046	5 234	1 148
TÜRKGÖZÜ	543	122	72	29	508	143	450	68	347	108	265	45
BLACK SEA PORTS	20 197	4 040	19 126	3 600	20 792	4 739	21 066	4 089	17 489	4 738	17 225	3 334
RİZE-POTİ	2 561	41	1 045	0	470	10	258	3	0	0	0	0
SAMSUN-NOVOROSSISK	11 731	1 513	11 760	1 196	12 134	1 358	11 726	1 116	8 022	1 478	8 018	1 249
TRABZON-SOCHİ	1 553	0	1 850	0	2 957	0	3 617	0	2 845	0	3 612	0
ZONGULDAK-KIRIM	4 352	2 486	4 471	2 404	5 231	3 371	5 465	2 970	6 622	3 260	5 625	2 085
TOTAL	**662 932**	**141 793**	**263 211**	**81 509**	**647 022**	**136 351**	**286 081**	**79 140**	**808 576**	**151 889**	**362 393**	**93 231**

Source: RO-RO Operator Company (RODER).

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CHAPTER 2. THE SOCIO-ECONOMIC AND TRANSPORT CONTEXT

After a long period of economic growth interrupted by periodic financial and economic crises, Turkey has enjoyed steady growth since the year 2000; with average GDP growth reaching 7%.

In the analysis of trade figures, it has been noted that this consolidation of Turkey's economic foundations has occurred at a time when:

- Transition neighbouring countries such as Russia and the Central European Initiative (CEI) countries have confirmed their economic expansion through the opening of their markets.

- Trade with Asian countries, and in particular trade between Asian and the EU countries, has been growing at an unprecedented rate, making China the first trade partner of Europe in 2006, ahead of the USA.

However, political tensions and conflict in the Middle East and Iraq continue to have a significant negative effect on trade relations and on transport links between Turkey and these areas.

It is necessary to understand the socio-economic context of the international and national environment in order to assess the future of the Turkish transport sector and its role in international exchange development, especially between the EU and Asia. Throughout history Turkey has been at the crossroads of major international routes from the West to the East and from the North to the South: between Europe and Asia, the Middle East, the Black Sea and the Eastern Mediterranean as well as providing connections towards India and South East Asian countries.

This context should be analyzed from an internal and external point of view, showing how the Turkish transport sector can facilitate trade between countries while contributing to national cohesion and expansion. Therefore, appraisal of the future must not disassociate the performance of the transport sector within the large Turkish territory from the performance of Turkish international transport.

The development of major infrastructure corridors across Turkey will complement the improvement of transport services along these corridors, whether they are provided by Turkish or foreign operators. Geographic realities demand intermodal transport solutions; combinations of land, sea and air transport modes are required in order to provide more efficient transport chains.

2.1. The Socio-Economic Context and Transport Needs

Turkey's steady and robust growth in recent years can be explained by steady favourable macro-economic framework and environment for investments and trade. It stands to reason that Turkey could take advantage of world trade growth in the near future and diversify its international trade.

However, Turkey remains a country of contrast: from densely populated areas, to remote regions which face significant emigration rates, to coastal regions which face the challenge of the competition for land by tourism and industrial activity, to large internal mountainous regions which struggle with

connection problems. On a national scale, the contrast is observed between the more developed western parts of the country and less developed eastern parts.

2.1.1. The Basis for Sound Economic Growth

There are many factors currently at play which could contribute to sustained economic growth.

Since Turkey is a country with a young population, the first factor is demographic.

Turkish population growth rates are much higher than EU population growth rates. Although the population is growing annually at a high rate, this rate is expected to decrease progressively to 2% over the next twenty years.

Decreasing population growth rates, as observed in many emerging countries, are due to decreases in fertility rates. Fertility rates drop as the percentage of the population living in urban areas increases and as income levels per household rise.

During the last decade, Turkey has faced significant migration from rural to urban areas, and from the east to the west, in particular to İstanbul and the Marmara industrial region. Large Mediterranean coastal cities as well as other large cities such as İzmir, Mersin, Antalya and Ankara, have also been affected by migration.

At the same time, there is also an international migration flow from Turkey toward the EU countries, to Germany in particular. This has created new opportunities for privileged economic and social links which are reflected in the volume of international trade and passenger flow.

To ensure sound economic growth, education policies should be adapted to population growth and the engagement of the younger generation in the dynamic economy should be fostered. Turkey should develop its reforms and actions with this approach in mind.

A second very important factor is the achievement of macro-economic stabilization policy. Inflation and successive financial crises hindered Turkish economic growth and made it difficult to implement a solid banking system which could respond to financial needs. During this volatile period Turkey failed to attract international investment funds, and as a result such funds maintained a low level of business volume within the country.

This situation is changing rapidly and Turkey is becoming an attractive country for investment in industrial activities and services. This will have an influence on investment in the transport sector as soon as the relevant regulatory frameworks are implemented.

A third factor is Turkey's size. Benefits due to size could be improved and supported by both national and international markets, as is the case with other large emerging countries of the world.

Over the last five years, Turkey's GDP grew on average by almost 7%, much higher than the EU average GDP growth of 2.5%. In many economic studies, the GDP growth of Turkey ranks high among Mediterranean countries; it is also very close to the GDP growth of Asian emerging countries.

2.1.2. Diversified International Trade: A Strong Asset for Future Turkish Development

The diversification of Turkish international trade could be analysed from a geographic and economic point of view.

a) Geographic: a large diversification of economic partners

When looking at the structure of Turkey's international trade, the importance of relations with the EU is clearly revealed by a long history of economic cooperation, trade, and customs agreements. In terms of transport, Turkey has been a member of the European Conference of Ministers of Transport (ECMT – now transformed into the International Transport Forum (ITF)) since its foundation, and has always participated actively in the multilateral work of the United Nations (UN).

Trade has also developed with most Mediterranean countries and many former communist bloc countries currently undergoing transition:

- Central and Eastern European countries which are now integrated in the EU.
- CEI countries such as Russia and Ukraine that are also part of the Black Sea Economic Cooperation (BSEC), as well as Central Asian countries around the Caspian Sea.
- Middle East countries such as Iran and Arab countries.

The rapid expansion of trade is due mainly to Turkey's central geographic position.

In this context, Turkish transport operators and in particular Turkish road hauliers have always been particularly dynamic. Historical and cultural relations and the ability to communicate in various languages have facilitated trade relations; Turkish operators have been able to take advantage of the opening markets in the long run, both nationally and internationally.

However, until recent years, Turkish trade relations with South East and Eastern Asian countries followed a slower pace than the EU.

b) Economic: weaknesses and strengths in world competition

Although the diversification of Turkish trade is an important asset, there are structural weaknesses in its international transport network that have to be overcome in order to face world competition.

Strengths and weaknesses:

- Dependency on energy products; petroleum, in particular. This dependency has been limited in part by hydraulic energy production; but this level of production is not sufficient to meet the demands of the transport industry. Transport will always remain very dependent upon petroleum: road, maritime and air transport as well as rail diesel traction rely on petroleum. However, Turkey's geographic proximity with oil producing regions - the Arabian Gulf and the Caspian Sea – translates into indirect benefits from these resources through trade with neighbouring countries in need of imports of industrial products and services.
- Emerging countries can now compete in traditional sectors, such as textile, clothing and shoe production with lower production costs and prices, which creates a challenge in the market. Turkey's objective is to maintain a strong position within these traditional sectors.
- In agricultural production, Turkey has obtained a strong position by pursuing new developments for the food industry. The effects of large investments made in the GAP (South

Eastern) region, help strengthen the position of Turkey in the agricultural industry, especially for exports towards the Middle East and "Maghreb" countries.

- For basic industries, such as steel and basic chemicals, production within Turkey does not appear greatly diversified. Turkish international trade is an example of the "old economy" trade with significant exports of basic and intermediate products.

- The production and export of "white" goods for household equipment has developed rapidly. This development is occurring in parallel to the support of the internal market, which plays a significant role.

- The rapid development of the automotive industry with the support of key foreign investments concerns exports primarily and the internal market secondarily Turkey is a country of almost 70 million inhabitants, where the rate of motorization is fairly low compared to the average income per inhabitant. Recent success in the automotive industry, a sector which demands highly qualified personnel and logistic performance, confirms the fast pace at which Turkey is adapting to the new type of industrial production.

- Finally, sectors of high technology markets, such as information and office equipment, are also developing in Turkey.

In conclusion, Turkey's industrial structure could show vulnerability in some traditional sectors of production such as textile, steel, clothing, in a globally competitive market. Recently, however, new high technology production has been developing successfully, and new modern industrial plants have been introduced.

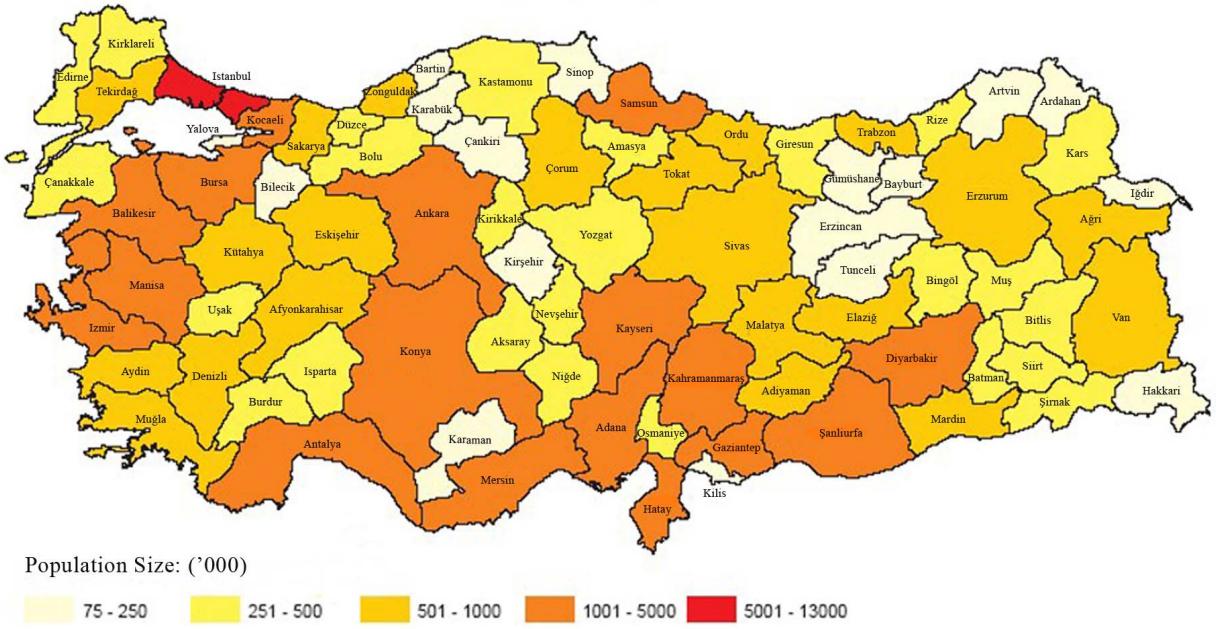
Furthermore the Turkish internal market is very promising and this alone could be an important basis for international competitiveness, but only if the proper transport and industrial policy framework is provided.

2.2. The Spatial Development of Turkey

The problem of spatial development within Turkey is reflected in the locations of activities and in the population movements mentioned earlier. These have a direct influence on the development of networks across Turkey. For the development of Turkish and transit trade, it is essential to respond to the needs of the concentrated population in the western part of the country, and also to provide proper connections between regions, from the east to the west, and from the north to the south, as well as connections with neighbouring countries.

The first major problem to overcome is the concentration of population, along the İstanbul Strait, Marmara Sea, Mediterranean coast and the western part of the Black Sea coast.

Map 2.1. **The problem of spatial development and cohesion of Turkey (Census 2007)**



Source: Turkish Statistical Institute.

Crossing the İstanbul Strait is known to be fairly difficult; therefore the ongoing construction of a new tunnel for rail "Marmaray" will certainly improve the capacity for connections between the European and Asian sides of Turkey. The Project of Marmaray is also of vital importance for radically solving the urban transport problem of İstanbul as a world city. Moreover, a new road bridge that is planned to be constructed in İstanbul Strait will also contribute to tackle the transport problems of İstanbul.

However congestion around the Marmara Sea is not due simply to the difficulties associated with crossing the İstanbul Strait. İstanbul is a megapolis of almost 13 million inhabitants which expands far beyond the İstanbul Strait and around the Marmara Sea, a zone which contains a large number of highly populated industrial cities.

Therefore, in addition to improvements made to ease crossing the İstanbul Strait, alternative routes should be found to connect cities across the Marmara Sea: for example RO-RO services or ferry services across the Çanakkale Strait.

Furthermore, the ports of the Marmara Sea have become important gateways for maritime foreign trade; an increasing number of private ports have responded to the growing demand that the public ports could not satisfy.

But in the long run, the saturation of the entire Marmara Sea, including access to the various ports, remains a risk.

Thus the problems of entry to and exit from Turkish territory should be tackled on a large scale. Factors to consider can be categorized as "East-West connections" which refers to the connections

between Turkey and the EU, the EU and Asia, and other entry ports along the Aegean coast or the South Mediterranean coast (İzmir, Mersin); and "North-South connection" which involves alternative routes to the İstanbul Strait that could include a bridge link between the Mediterranean and the Black Sea, connecting for example, Mersin and Samsun. Other dimensions of this situation are discussed below:

The Western part of the Anatolian Plateau

The density of population of the Anatolian plateau is much lower than the density of population along the coasts.

However, the Anatolian plateau contains a network of interconnected large cities with important historical and administrative roles. Ankara is in the centre of this network in relation to Konya, Afyon, Eskişehir, Kayseri, and Sivas, which are the main regional cities.

Connections between the Anatolian plateau and costal regions are sometimes difficult, and the number of routes through the mountains is limited by topographic constraints. This is the case for connections to Antalya and Adana along the southeast Mediterranean coast as well as connections to some North-Western regions of the Black Sea where major ports should develop.

The Eastern Regions

The Eastern regions of Turkey have less developed ports and high rates of emigration to foreign countries.

The rate of demographic growth is not always related to economic growth and it differs from one region to the other; the fast growing population in the South-Eastern regions is due mainly to the high fertility rate and the decreasing population in the mountainous North-Eastern region is due in part to the high rate of emigration.

In the Eastern part of Turkey, a differentiation should be noted:

- In spite of the rail corridor towards Iran across the Van lake, it remains difficult to cross the high mountainous areas in the South-Eastern region of Turkey towards Iraq, Syria and the connections to the North and to Iran.

- The Central Eastern regions of Turkey, between the Black Sea coast and the South-Eastern regions abovementioned are connected to the Anatolian plateau through the East-West axis from Kars to Sivas.

- North-Eastern Black Sea regions, connected through ports to other Black Sea countries (Bulgaria, Romania, Ukraine, Russia, Georgia) are also East-West transit regions for road transport towards Georgia, Azerbaijan, and the Caspian Sea, as part of the "Silk Road".

To conclude, in addition to the East-West connections between the regions of Turkey, there are also major East-West international transit corridors towards the Middle East, Iran and Caucasian countries. North-South connections across the mountains of the Eastern Anatolian plateau face difficulties because of the topography. These difficulties pose significant constraints for Turkish land networks and for the development of transit corridors.

PART II. FREIGHT TRANSPORT AND THE CHALLENGES AHEAD

CHAPTER 3. TRADITIONAL FREIGHT TRANSPORT IN TURKEY

3.1. Road Transport

3.1.1. Road Network

National

Turkey has an extensive network of approximately 64 236 km of well-maintained main roads. Of this network, 31 333 km consist of state roads, 30 579 km of provincial roads and 2 471 km of motorways. The breakdown of these roads according to surface type as of 1st January, 2008 is as follows.

Table 3.1. **Road Network in Turkey**

TYPE			SURFACE TYPE							
			ASPHALTIC ROAD CONCRETE	*SURFACE TREATMENT*	*CONCRETE*	*STONE BLOCK*	*STABILIZED*	*EARTH*	*OTHER*	*TOTAL*
Motorway	Motorway	DC	1 652	-	-	-	-	-	-	1 652
	Access Road	DC	335	-	-	-	-	-	-	335
		SC	25	-			-	-	-	25
	Junction Leg	SC	459	-	-	-	-	-	-	459
	TOTAL		2 471	-	-	-	-	-	-	2 471
State Roads	DC		3 996	6 381		11				10 388
	SC		2 542	17 824		38	213	106	222	20 945
	TOTAL		6 538	24 205		49	213	106	222	31 333
Provincial Roads	DC		99	561		18				678
	SC		769	25 853		91	1 583	841	764	29 901
	TOTAL		868	26 414		109	1 583	841	764	30 579
TOTAL	DC		6 082	6 942		29				13 053
	SC		3 795	43 677		129	1 796	947	986	51 330
	TOTAL									64 236

DC: Dual carriageway, SC: Single carriageway

Source: General Directorate of Highways, 2008.

The length of the dual carriageway is 13 053 km, of which 1 987 km is motorways, 10 388 km is state roads and 678 km is provincial roads.

There are 1 987 km of publicly owned toll roads. Collected tolls are contributed to the Treasury. The location of roadside facilities on toll roads is predefined and their set-up is based on specific guidelines. These facilities are granted to *concessionaires* for operation periods of 20-30 years.

Map 3.1. **Turkish Road Network**

Source: Turkish General Directorate of Highways.

The density of the Turkish road network, excluding urban roads, is approximately 47 km/100km². In the European Union (EU 25), the average density of the overall road network is 110 km/ 100km².

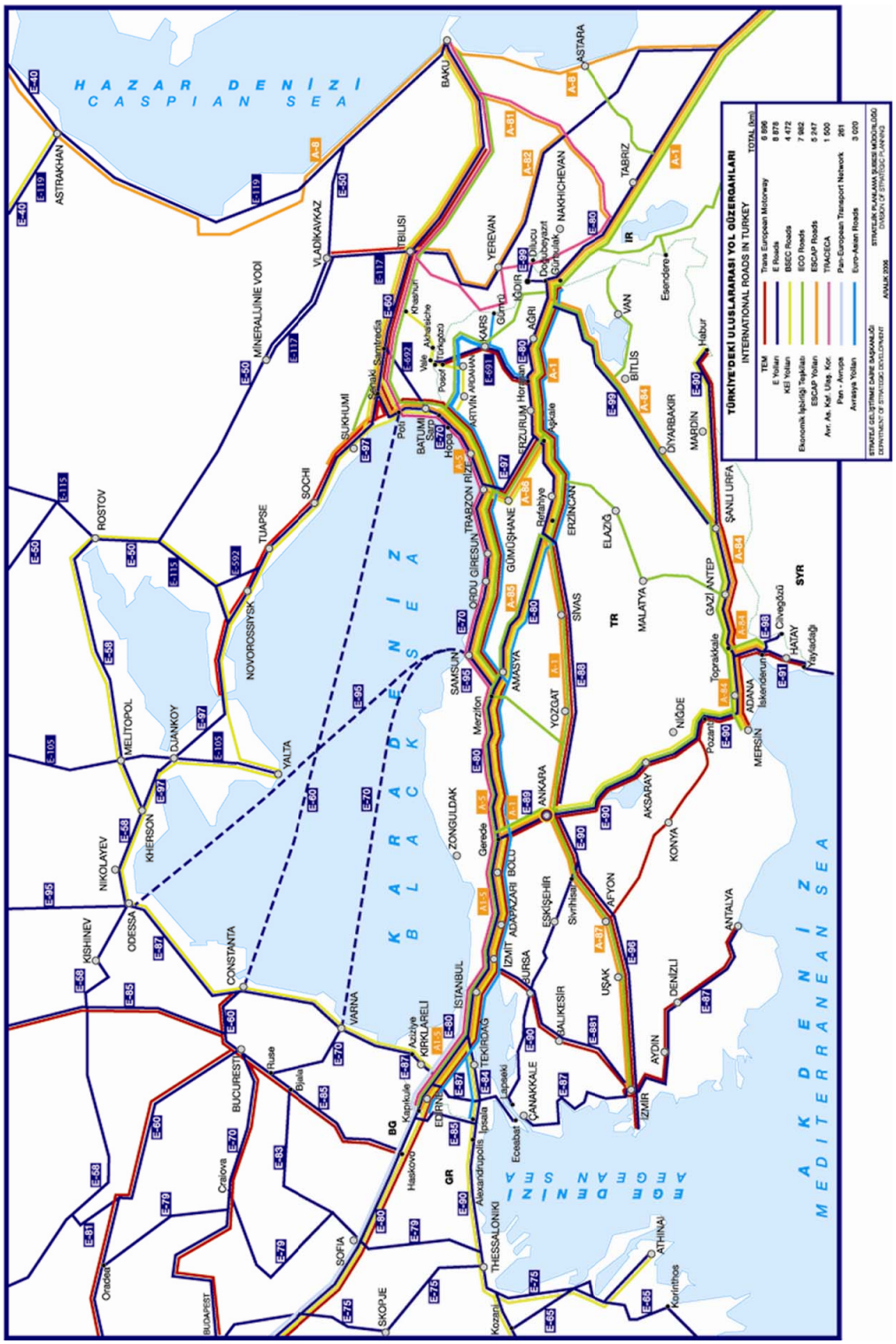
International

The approximate length of the international road network, important for international traffic running through Turkey, is about 9 000 km.

8 878 km of the main road network consist of E-Roads which connect the east and west through the Anatolian mainland and have high standards. The E80 and E90 are the two main roads leading to Turkey from European borders; they also link the Iranian and Iraqi borders.

International routes passing through Turkey, by length, are as follows.

Map 3.2. **International road corridors in Turkey**



Source: Turkish General Directorate of Highways.

Table 3.2. **International Road Network in Turkey**

International Road Network In Turkey	Length (Km)
Trans European Motorway (TEM)	6 896
Agreement on Main International Traffic Arteries (AGR) E – ROADS	8 878
Black Sea Economic Cooperation – BSEC	4 472
Economic Cooperation Organisation – ECO	7 982
UN - ESCAP	5 247
TRACECA	1 500
Euro - Asian Linkages	3 020
Pan – European Corridors (Corridor IV)	261

Source: Turkish General Directorate of Highways.

3.1.2. Road Operations

National

Ninety six percent of passengers and 92.9% of freight are transported by road in Turkey. Transport demand has grown significantly over the past five decades. Overall, demand (measured in passenger-kilometres and tonne-kilometres) has grown at an annual rate of nearly 8% since 1950.

Turkey's road transport policy in is consistent with the EU policy. Access to the road freight and passenger transport industry has been greatly liberalised. The private sector is highly involved, both in national and international goods and passenger transportation. In other words, the market is free and open to competition; incentives are not provided by the State.

With regard to its large and active international fleet (details in the tables below) Turkey has restructured the sector with two new legislative initiatives: Road Transport Law No. 4925, which entered into force in 2003 and is a framework law for access to the market and the profession, and the by-law of 25 February 2004, which defines the application details of this aforementioned Law.

Through these initiatives, the three main conditions of the EU on access to the profession, namely good repute, financial standing and professional competence have been transposed to the system. Also, a new licensing system was introduced in the domestic freight transport market for the first time. As a result, as of May 2008, roughly 288 000 licenses have been issued to domestic haulers - nearly 97% of the registered commercial road vehicles.

Table 3.3. **Trucking Companies' Fleet**

	Number of Vehicles
Trucks	32 187
Lorries	3 927
Trailer	2 332
Semi-trailer	35 984
Tank trailer	729
Total Capacity (tonnes)	**131 366**

Source: RODER 2007.

Table 3.4. **Capacity Employment**

	2004	**2005**	**2006**	**2007**
Number of Trucks	29 577	31 990	32 055	32 187
Export Exits	353 863	402 232	456 235	406 321
Annual Export Exits Capacity	384 501	415 870	434 458	451 743
Capacity Employment Ratio	92.3	96.7	97	97.8

Source: RODER 2007.

In addition to the rules on the access to the professions and markets as well as certain road safety requirements, social, fiscal and technical rules have also been put into effect in this new licensing system. As part of these rules, the requirements for higher level of capital to obtain licences have received some criticisms from Turkish road operators. Nevertheless, these critics did not hinder the process of harmonizing the Turkish road transport sector with the EU Acquis and an EU Twinning Project for the assistance to Turkish road transport sector have been introduced.

International

International road transport operations are carried out with permits obtained in bilateral negotiations or with licences from the European Conference of Ministers of Transport. Around 200 000 truck loads per year (both directions) are operated by road, but the restricted number of permits granted to Turkish truckers along the transit corridors to Western Europe (particularly in Hungary, Austria, Italy and Slovenia) creates difficulties for international transport. Although there has been a 138% increase in Turkish exports to the EU, this sector has seen only a 50% increase in the quota of permits received in the last 5 years. This problem is further aggravated by difficulties to obtain visas for Turkish truck drivers in a timely fashion, as well as transit border bottlenecks with high transit charges in countries along the Central Asian route. Hence, Turkish operators have started to buy companies in Europe to overcome permit problems and have developed RO-RO services to provide alternatives.

Table 3.5. **Fleet configuration of the international road haulage sector in Turkey, 2007**

International Road Transport Fleet in Turkey	Number
Tractors + Trailer - trucks	43 618
Lorries	16 894
Trailers/Semi-trailers	53 902
Refrigerated	1 914
Conventional – Dry cargo	5 524
Textiles	735
Car carriers	883
Glass carriers	65
Low beds	190
Platforms	415
Silo tankers	59
Liquid fluid tankers	831
Liquid gas tankers	140
Other	
Total	**125 170**

Source: Turkish General Directorate of Road Transport.

With regard to international conventions, Turkey is a contracting party of many important organisations that significantly simplify international road transport such as the United Nations Economic Commission for Europe (UNECE), the Customs Transit Convention (TIR), the European Agreement concerning the Work of Crews of Vehicles Engaged in International Road Transport (AETR) and the Agreement on the International Occasional Carriage of Passengers by Coach and Bus (INTERBUS).

Table 3.6. **Transit Traffic by Road Vehicles in 2007**

BORDER GATES	NUMBER OF TRANSIT VEHICLES ENTERING IN TURKEY						NUMBER OF TRANSIT VEHICLES EXITING TURKEY					
	Empty			Loaded			Empty			Loaded		
	Turkish	Foreign	Total	Turkish	Foreign	Total	Turkish	Foreign	Total	Turkish	Foreign	Total
KAPIKULE	0	1 143	1 143	9 856	7 332	17 188	0	621	621	912	4 222	5 134
İPSALA	0	754	754	54	2 974	3 028	0	587	587	19	2 745	2 764
CİLVEGÖZÜ	0	1 055	1 055	6 847	4 555	11 402	0	984	984	3 354	2 188	5 542
GÜRBULAK	0	989	989	1 487	10 137	11 624	0	345	345	8 774	9 177	17 951
SARP	0	1 631	1 631	103	661	764	0	254	254	1 656	2 798	4 454
TÜRKGÖZÜ	0	38	38	12	0	10	0	0	0	55	8	63
TOTAL	0	5 610	5 610	17 994	25 160	44 016	0	2 791	2 791	14 770	21 138	35 908

Source: RODER.

3.1.3. Road Administration and the Legal Framework

Responsibilities regarding the road transport sector are dispersed among different ministries and authorities in Turkey. The following institutions play roles of a varying scale in the road transport sector. These roles and responsibilities are indicated below.

INSTITUTION	RESPONSIBILITY
Ministry of Transport, General Directorate of Road Transport	• Licensing of operators • Issuing permits • Regulating market access conditions • Collecting data on international road transport
Ministry of Transport, General Directorate of Highways	• Collecting traffic data on motorways, state and provincial roads • Regulating and collecting toll roads (motorways) • Planning, design, construction, maintenance of motorways, state and provincial roads
Ministry of Interior/Road Traffic Police, General Directorate of Security	• Regulating and road side enforcement • Issuing of vehicle registration certificates • Driving licences
Ministry of Work and Social Security/ Labour Inspection	• Regulating and enforcing at premises of operator by labour inspection • Regulating driving times and rest periods
Ministry of Finance	• Regulating and collecting Taxes VAT Excise duties Annual vehicle tax
Ministry of Agriculture	• Live animal transport • Veterinary checks
Ministry of Industry and Trade	• Regulating technical standards • Tachograph • Speed limiters
Ministry of Education	• Training of drivers • Examination of drivers
Undersecretariat of Treasury	• Regulating general state aid principles • State aids
Undersecretariat of Customs	• Excise duties • Import of fuel in tanks • TIR

There is a wide body of law covering various areas of the sector. The two main public authorities with jurisdictional overview of road transport issues, each responsible for the laws and regulations in their respective domain, are:

- General Directorate of Road Transport (KUGM)

  This Directorate works within the Ministry of Transport to manage the regulation of market access conditions and the administration of operating licences for both national/international

freight and passenger transport. Further responsibilities include roadworthiness tests, road side inspections and the regulation of dangerous goods. The KUGM is headed by a General Director and is assisted by two Deputy General Directors who each manage different departments. There are 8 departments and 25 sections managed by the heads of departments and the directors of sections respectively.

- General Directorate of Highways (KGM)

  The General Directorate of Highways, which is affiliated with the Ministry of Transport, planning, design project, is in charge of research, construction and maintenance of state and provincial highways and motorways; municipalities are responsible for inner-city roads, and special local administrations (governorships) are responsible for village roads. This directorate is not autonomous and revenues come from the general budget. It includes 17 regional divisions, 117 district offices, 286 sub-district offices, 21 motorway maintenance and operation offices, 3 motorway tunnel-maintenance and operation offices, 2 motorway bridge maintenance – operation offices, 1 motorway bridge traffic management centre.

3.1.4. Road Infrastructure Development

In 2003, the General Directorate of Highways began implementing a program involving the extension of dual carriageway length to 15 000 km, in accordance with Government Road Action Plan. The main objectives are to reduce the number of traffic accidents and improve the pavement quality of the road infrastructure on main road network. In addition to this, the other policy is to increase the physical quality of the road network with respect to heavy vehicle use.

The length of dual carriageway which was constructed and opened to traffic reached 13 053 km at the beginning of 2008. Initially, the roads will undergo surface treatment in order to ensure traffic safety. They will then be repaved with asphalted concrete in line with budget allocations. Construction to improve existing two-lane roads as dual carriageway is ongoing.

The current and planned projects on roads are as follows.

Black-Sea Coastal Dual Carriageway

The Black Sea Coastal Road (Samsun –Trabzon-Sarp) - 542 km in length - was tendered as dual carriageway and is about to be completed. The surface type is bituminous hot mix (asphalted concrete).

This project is of great importance for the Turkish arterial network to Central Asia and further East, via the Caucasian and Caspian Sea Ferry-boat services. 535 km of this road, of which 524 km with bituminous hot-mix pavement and 11 km with surface treatment, was opened to traffic. Opening of 18 km as a bituminous hot-mix pavement road to traffic is programmed in 2008.

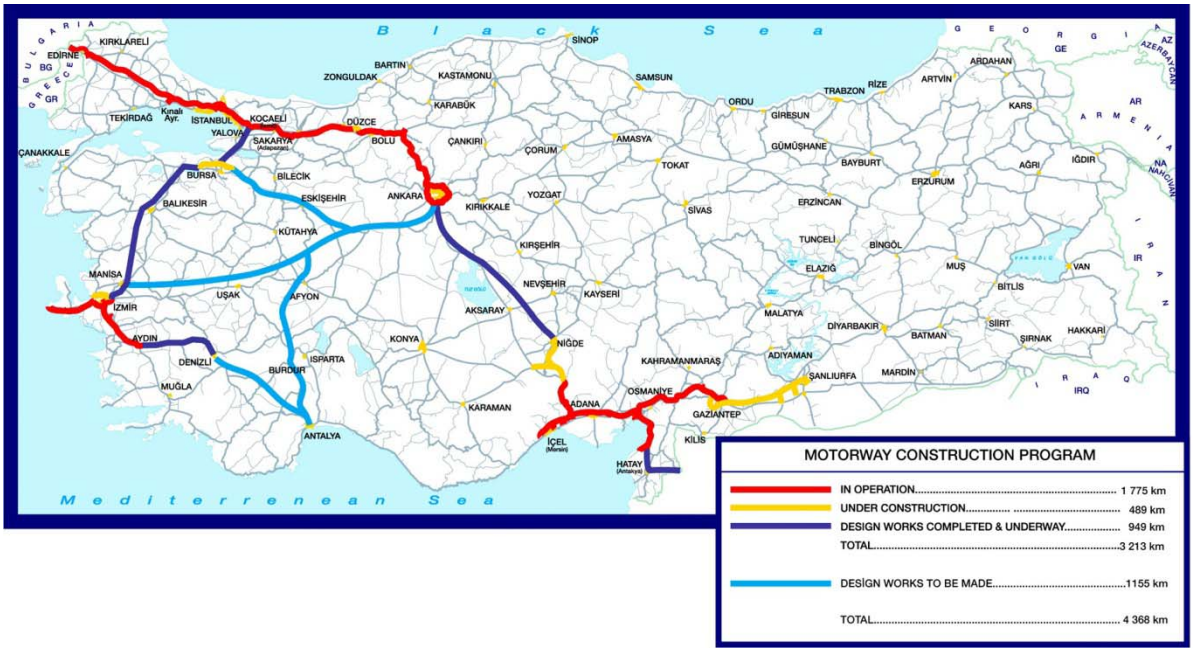
Map 3.3. **Black Sea Coastal Dual Carriageway**

Source: Turkish General Directorate of Highways.

Ongoing Motorway Projects

Turkey has medium and long term motorway construction programs. These programs plan a total 4 368 km of road construction. 1 775 km of this network is already in operation, while 489 km is under construction. The design works for 949 km of roads have been either completed or are underway; 1 155 km of roads are still to be designed.

Map 3.4. **Motorway Construction Program**



Source: Turkish General Directorate of Highways.

Gaziantep- Şanlıurfa Motorway

This project was designed as a continuation of TEM Motorway and Tarsus-Pozantı Junction-Adana-Toprakkale-Gaziantep motorway providing future connections to GAP and Habur Border Gate in the future.

Gaziantep-Şanlıurfa Motorway (Gaziantep Bypass Road included) was tendered for 4 sections on the base of external credits (some expropriation and engineering services included, expropriation excluded in Gaziantep Bypass Highway) during June 1998.

The period for the construction of 179.4 km of motorway and 36 km of connecting roads, totaling 215.4 km, has been extended to 2009.

In total, 162.5 km, of which 126.5 km consisting of motorways and 36 km of connecting roads, were opened to traffic at the end of 2006. In addition, the binder course of a 5.5 km section on Gaziantep Bypass Highway was completed in 2007 and opened to traffic at the end of February 2008. The other sections are expected to be completed within 2008.

This project provides an important connection to Middle Eastern countries. The total planned motorway length for this project is 219 km in 2x3 and 2x2 design, of which 70% has been completed.

Gerede-Merzifon State Road Project

Gerede-Merzifon Road Project, which is of a 309 km long route, is in the core highway network defined as a result of TINA Turkey Project and among 15 highway improvement projects. This project will enhance the connection between Black Sea, Caucasian and Asian countries.

3.1.5. Future Developments and Challenges

3.1.5.1. The dominant position of road transport

Turkish national and international transport is dominated by road transport. International road transport has been able to adapt to an international context by implementing innovative solutions which combine road, sea and RO-RO transport; domestic road transport still needs improvement.

On the other hand, the adaptation of other modes, especially rail transport and port development, has occurred more slowly. This is in spite of the expected developments and modernisation planned for the upcoming years.

Turkey is currently entering a critical period, when the transport system must adapt promptly to national and international transport demands. The development of new private ports as well as the successful development of new airports, including air freight transport, reflects this situation.

The dominant position of road transport is clearly seen in the figures on modal split in Turkish transport. However, a distinction should be made between national and international road transport. Unlike national road transport, Turkish international road transport has been a dynamic sector for many years, with significant improvement in the 1970s, when road transit was emerging between Europe, Iran and the Middle Eastern countries.

3.1.5.2. The importance of Turkish road transport

The dominance of international road transport can be illustrated from various points of view:

- Road transport has the highest modal share of bilateral and transit markets in east-west and north-south connections.

- The organisations of intermodal road transport hauliers, both small or medium sized, have adapted to international administrative constraints concerning customs, goods in transit, and the use of electronic data exchanges.

- The implementation of RO-RO services is often presented as one of the most successful experience from "Motorways of the Sea", for both the EU and Black Sea countries. In consequence, almost 50% of Turkish of non-bulk product transport to the EU uses maritime routes, presently concentrated at the Trieste port in Italy. New RO-RO lines are expected between Turkish and European ports in order to diversify the actual routes. Turkish road haulier organisations are currently taking initiatives to expand their fleets.

- The new RO-RO services will help create new opportunities and routes between the EU and Turkey. This will mitigate the most congested part of this network, in particular İstanbul Strait, and perhaps in the future, the crossing points in the Alps.

- Recent initiatives taken:

  - the construction of a new border crossing point between Turkey and Iran, with modern facilities for administrative and transport organisations, with Public Private Partnership (PPP) financing;
  - the Ro-La experience between Turkey and Austria (although the competitiveness of this solution remains to be seen with regard to other intermodal solutions).

Turkish international road transport has certainly benefited from the support of the administration which:

- Regularly negotiates permits in bilateral meetings and often advocates the liberalisation of road markets between countries, as is the case, for example, with Iran.

- Maintains the road network in good condition and adapts it to traffic changes.

Moreover, there is a well established culture of the road "master plan" in the Turkish administration, supported by structured regional and local units. Little has been said about the quality of this road network for international transport. The average speed on this network appears to be fairly high. A road network development plan is regularly adapted, with a proposal to develop a 2 x 2 road infrastructure along major axes under public initiative.

In addition, motorways could be developed, particularly in the western part of the country where traffic density is higher. For such motorways PPP schemes are open.

The administration is currently implementing a new law for national road transport which will reduce the differences between companies operating at national and international levels, and will to modernise the road haulage industry. This will also have an impact on domestic transport.

In recent years, Turkey has improved its road transport network through several infrastructure projects and adopted a law package which has provided a legal and institutional framework that is in line with the EU Acquis for the market. These initiatives have strengthened Turkey's competitiveness in international road operations.

3.1.5.3. The limits of Turkish road transport

Road congestion is obviously the first factor which limits the success of Turkish road transport. For the moment, international road haulers have been able to adapt to critical situations, such as transit across the Balkans, by opening new routes with RO-RO services. Soon enough, these new routes will affect the crossing of the Marmara Sea, employing ferry services more intensively than the İstanbul Strait between Europe and Asia. This could also affect national short sea shipping lines along the Mediterranean coast, or between the Mediterranean and Black sea ports, if new regulation facilitates the launch of such lines with fast transit passages through ports. The impact of road transport on the environment also poses a significant challenge.

Beyond these factors, road transport also has negative implications for:

- The capacity of road transport operations to adapt quantitatively and qualitatively to new requirements on demand.
- Logistics operations, including storage, supply chain management, and to some extent, urban transport distribution which is the terminal leg of the transport chain.
- Forwarding operations and customs operations; for example, the waiting time necessary to accomplish customs formalities at the Kapıkule border crossing point.

Problems in achieving a smoothly functioning transport chain, door-to-door transportation, and the integration of supply chain management, are due partly to inadequacies in Turkish regulation. Forwarding operations are greatly affected by customs constraints, and logistic operations sometimes face difficulties in the operation of logistics centres.

It is clear that such limits pertain not only to road transport but to other transport modes as well. These issues should not be treated through road transport legislation alone, as will be discussed later.

3.1.5.4 The need for cooperation between modes of transport

Innovative solutions which have already been mentioned could be used generally in maritime or rail transport with regard to RO-RO and Ro-La transport. But these solutions always develop under a road transport chain, through the initiative of road transport hauliers and their associations. Cooperation schemes between road operators and other rail or maritime operators are however, limited.

This is probably one of the reasons why other intermodal solutions, such as the transport of swap bodies, or the inland transport of maritime containers, have not been sufficiently developed. However, it is important that road hauliers not be held solely responsible for such limits.

Intermodal services for the transport of swap bodies and maritime containers require advanced logistic transport solutions, which often do not exist in Turkey, especially in rail transport of maritime containers to/from ports.

Therefore, cooperation between modes also requires a framework by which partners are able to share and achieve common objectives and interests through negotiation.

To create such a framework and see the emergence of new actors and strategies, appropriate regulation is crucial. Road legislation has made significant progress on this front; the same is also necessary for other modes of transport.

3.2. Railway Transport

3.2.1. Railway Network

National

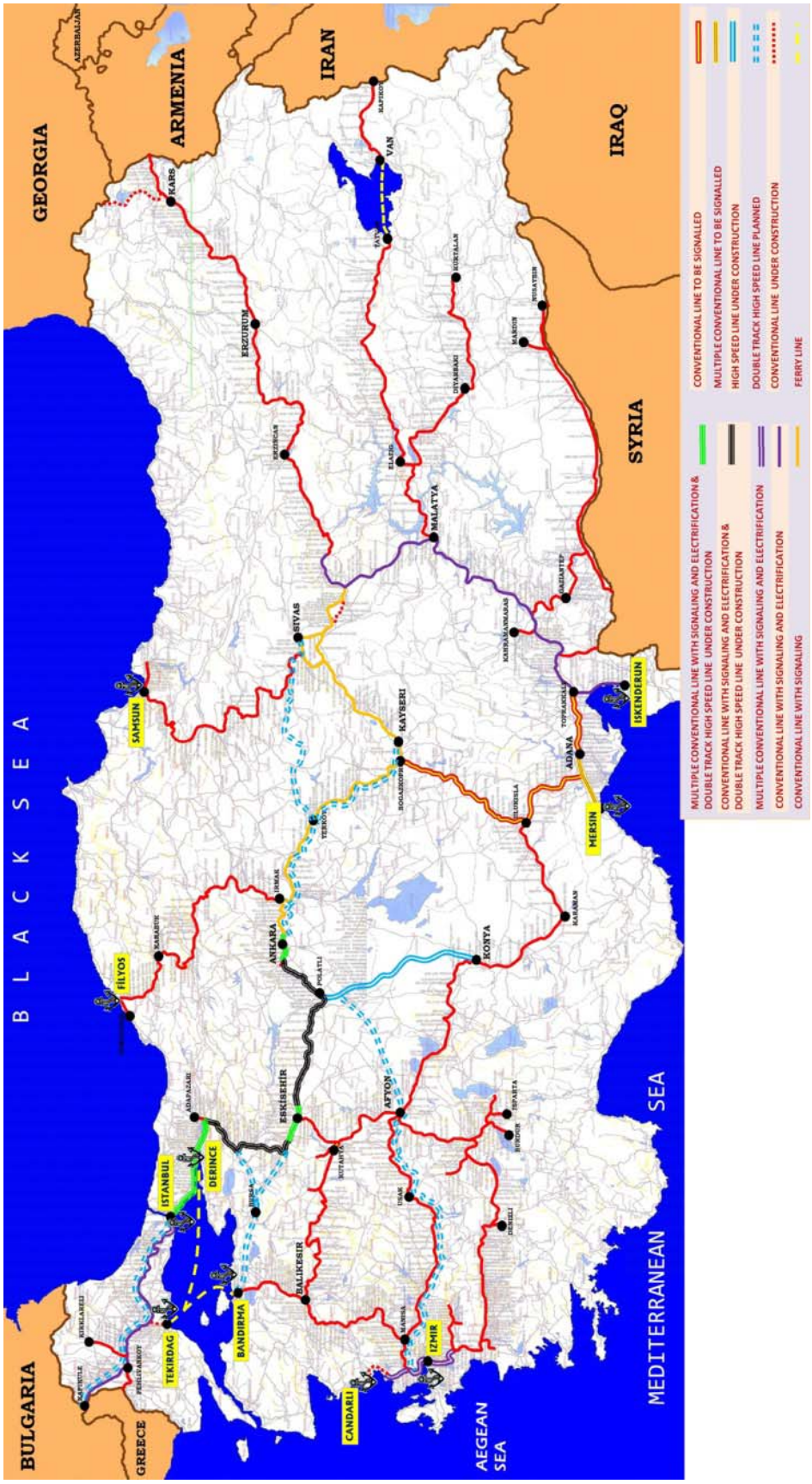
The existing railway network is concentrated on a few major routes. Thus the railway network is available only in certain areas and between certain cities.

The length of the rail network in Turkey is 10 984 km, of which 8 697 km are main lines, 2 287 km are branch lines. The network is predominantly single-tracked (95%) and is characterised by mountainous terrain, tight curves and steep gradients. 2 336 km of the railways which correspond to 21% of the network, are electrified at 25kv, 50Hz; 3 111 km of the railways, corresponding to 28% of the existing network, are composed of signalled lines. The permitted axle load is 20 tonnes on about 61% and 22.5 tonnes on about 37% of the network.

The length of electrified and non electrified lines in main and subsidiary lines is seen in the table below.

With projects currently underway and to be pursued in upcoming years, the length of the electrified lines will increase to 2 956 km. Thus the percentage of electrified main lines, out of all of main lines, will rise from 21% to 34.8%. The Turkish rail system is both jointed and welded, with concrete sleepers used on around 60% of the network.

Map 3.5. **Turkish Railways Network**



Source: Turkish State Railways (TCDD).

Table 3.7. **Length of Lines**

		2002	2003	2004	2005	2006
Mainlines	Non Electrified	6 778	6 778	6 693	6 693	6 693
	Electrified	1 479	1 479	1 564	1 564	1 564
	Total	8 257	8 257	8 257	8 257	8 257
2nd,3rd, 4th Mainlines	Non Electrified	141	167	84	84	84
	Electrified	273	273	356	356	356
	Total	414	440	440	440	440
Total Mainlines	Non Electrified	6 919	6 945	6 777	6 777	6 777
	Electrified	1 752	1 752	1 920	1 920	1 920
	Total	8 671	8 697	8 697	8 697	8 697
Subsidiary lines	Non Electrified	1 907	1 917	1 902	1 871	1 871
	Electrified	370	370	385	416	416
	Total	2 277	2 287	2 287	2 287	2 287
Total lines	Non Electrified	8 826	8 862	8 679	8 648	8 648
	Electrified	2 122	2 122	2 305	2 336	2 336
	Total	10 948	10 984	10 984	10 984	10 984

Source: Turkish State Railways, Annual Statistics 2002-2006.

International

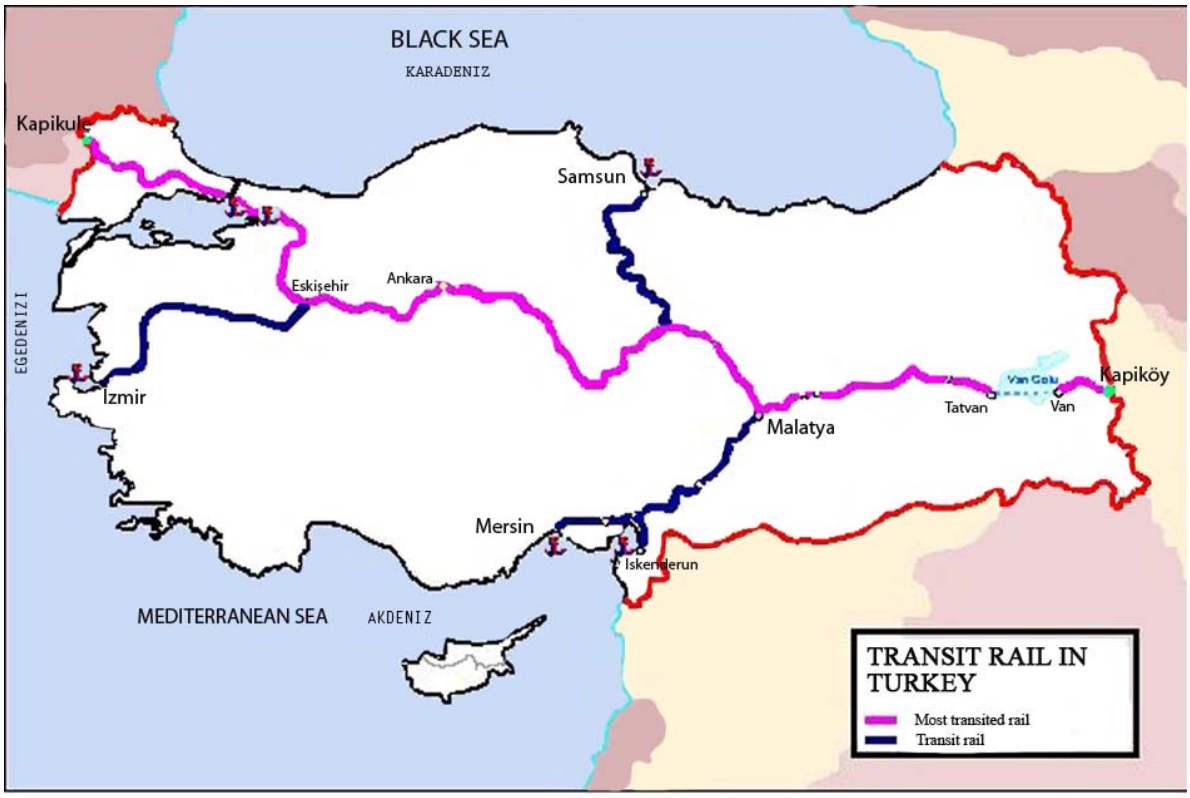
Existing rail transport corridors

For rail corridors, the railway connections between main cities and borders are listed below:

- Sirkeci (İstanbul) – Pehlivanköy – Greek border
- Sirkeci – Pehlivanköy – Bulgarian border
- Haydarpaşa (İst.) –Arifiye- Adapazarı
- Haydarpaşa (İst)–Arifiye- İzmit – Eskişehir – Ankara
- Ankara – Kayaş – Irmak – Karabük – Zonguldak
- Ankara –Kayaş-Irmak- Kayseri – Sivas – Samsun
- Sivas –Çetinkaya- Erzincan – Erzurum – Kars –Akkaya
- Sivas – Çetinkaya – Malatya –Yolçatı-Elazığ – Muş – Tatvan – Van – Iranian border

- Malatya – Yolçatı – Kurtalan
- Kayseri – Ulukışla – Adana
- Adana – Toprakkale – İskenderun
- Adana – Toprakkale – Fevzipaşa- Narlı - Gaziantep – Nusaybin - Syrian border
- Eskişehir-Alayunt-Kütahya-Balıkesir
- Bandırma – Balıkesir – Manisa – Basmane (İzmir)
- Manisa-Uşak-Afyon - Alsancak (İzmir) – Aydın - Goncalı – Denizli
- Denizli – Goncalı – Karakuyu – Afyon
- Afyon-Karakuyu-Gümüşgün (Burdur)-Bozanönü (Isparta)-Eğirdir
- Eskişehir – Afyon – Konya – Karaman – Ulukışla – Adana

Map 3.6. **Most Transited Railways in Turkey**



Source: Turkish State Railways.

3.2.2. Rail operations

National

The Turkish railway system consists of a State railway company, Turkish State Railways (TCDD), a State Economic Enterprise (SEE) with monopoly rights. The State owns all railway assets, manages the infrastructure and directly operates rail services based on productivity, not profitability. There is no separation of accounts between infrastructure management and train operations. Fares and investments are generally regulated by the State and some operating losses are compensated by the State, as well. Current efforts are concentrated on opening up the sector for competition, separating infrastructure management from train operations and establishing the necessary bodies in accordance with the EU Acquis.

To this end, an action plan was adopted by the Ministry of Transport in 2003, which sets out a road-map for achieving railway reform by 2008. As part of this plan, a twinning project, namely "Turkish Rail Sector Restructuring and Strengthening Project", funded by the EU and Turkey, will help establish the legislative and institutional framework of the Turkish rail sector in accordance with the EU Acquis. This project, conducted in collaboration with Germany, was concluded in November 2006.

Within this twinning project, a general railway framework law and a TCDD law have been drafted. Being introduced on July, 14th 2008, these draft laws which were harmonized with the EU Acquis provides a framework so as to release the monopoly in the railway market and liberalize the sector as well as creating a liberal, transparent and competitive basis for introduction of private railway services. In addition, four implementing regulations on railway safety, interoperability, licensing and access to railway infrastructure (allocation and charging for the use of infrastructure) have been also drafted.

Through the implementation of this law package, the railway sector will be open for fair, equal and non-discriminatory competition. A regulatory body, safety authority and railway accident investigation body will be established to ensure improvements in competition, safety and transparency. The incumbent railway TCDD will be reorganised in compliance with the EU Acquis.

In restructuring the Turkish railways, the Ministry of Transport has chosen that the ownership of the land remains in the government's hands. Port grounds will also remain in government possession.

Moreover, TCDD operates 7 ports, İskenderun, Mersin, İzmir, Bandırma, Derince, Haydarpaşa and Samsun, which will be discussed later.

International

It is feasible to carry out direct international freight transportation by railways through the following border crossing points:

- To Bulgaria and other European countries through Kapıkule border connection.
- To Greece and other countries through Uzunköprü.
- To Iran and the Central Asian countries through Kapıköy border connection.
- To Syria and Iraq through Islahiye border connection.

- To Syria and Iraq through Nusaybin border connection.

To enable railway transportation to compete with other transport modes and retain its share in the international freight transportation market as an alternative transportation system, different transportation projects have been conducted and implemented.

3.2.3. Railway Administration and Legal Framework

There are two authorities in charge of the railways, the General Directorate of Railways, Ports and Airports Construction (DLH) and the General Directorate of Turkish State Railways (TCDD).

- General Directorate of Railways, Ports and Airports Constructions (DLH)

  DLH, being one of the central units under the Ministry of Transport, is responsible for overall planning programming, design and construction of public railways (including urban rail mass transport), ports and airports infrastructure and the approval of private sector projects in these related fields.

- General Directorate of Turkish State Railways (TCDD) Administration

  TCDD is affiliated with the Ministry of Transport and functions as an autonomous, budgeted public enterprise, within the framework of Decree Law number 233.

  The Ministry of Transport carries out the coordination and supervision of the TCDD. The Board of Directors is composed of five members, who have the Director General as chair. In addition to the Departments of Inspection, Legal, Public Relations and Defence Units at Headquarters, there are 18 specialized departments and 7 Regional Directorates countrywide.

There are 3 affiliated corporations active in the railway industry:

- TÜLOMSAŞ (Turkish Locomotive and Engine Industry Joint Stock Company), located in Eskişehir, manufactures locomotives under licence.

- TÜVASAŞ (Turkish Wagon Industry Joint Stock Company), located in Adapazarı, manufactures passenger coaches.

- TÜDEMSAŞ (Turkish Railway Machines Industry Joint Stock Company), located in Sivas, manufactures freight wagons.

Turkish authorities believe that the flexible organizational structure of TCDD enables change in accordance with varying operational demands. TCCD functions in the following areas:

- To operate, enlarge and renew the railways, ports and piers granted by the state.

- To guide and coordinate its affiliated corporations and shares, in accordance with laws and regulations, within the framework of development plans and annual programmes.

- To carry out complementary activities regarding rail transport, i.e. maritime and land transport, including ferry operations, when necessary.

- To manufacture rolling stock and similar vehicles, set up warehouses, depots and passenger facilities.

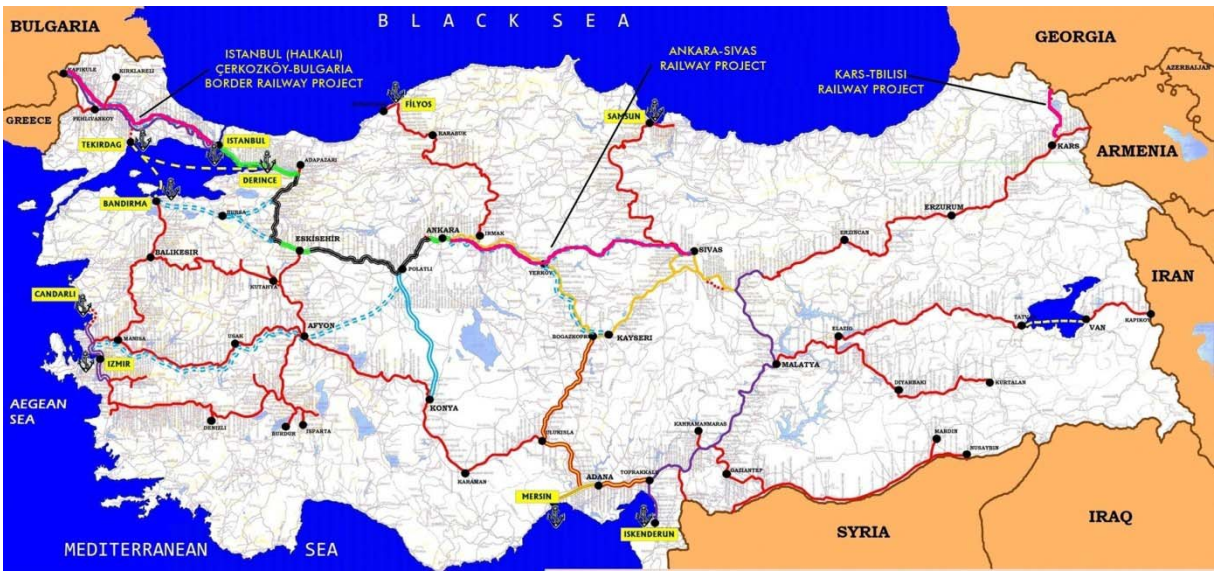
- To undertake railway construction work at home and abroad.

Despite its geographical features and years of railways experience, the railway network has not been sufficiently modernized and the infrastructure is quite old. With the recent major public investment project, the quality and technical facilities are being improved. However it is important to keep the focus on the aim to transform railways into a competitive component of national and international transport activities in a long-term and holistic manner.

3.2.4. Rail Infrastructure Developments

Priority is given to new railway construction projects as indicated below:

Map 3.7. **Priority railway projects**



Source: Turkish State Railways.

Kars-Tbilisi-Baku Rail Link

The rail line will link the eastern Turkish city Kars with the Azerbaijani capital, Baku, on the Caspian Sea. A protocol is signed between parties to implement the Project. The construction of this line was started in 2008. With this project the construction of a new line between Kars-Akhalkalaki (Georgia) and rehabilitation of the present line between Akhalkalaki and Tbilisi (Georgia) will be carried out.

Creating this new route will be the only way to re-establish the Silk Road railway line between İstanbul and Baku. From here begins a trans-Caspian rail-ship link to the port of Aktau in Kazakhstan.

Turkish authorities have commenced preparation work for the project, following their recent approval of the plan. Construction in Kazakhstan is scheduled to begin in June.

With the completion of this project, a new line to connect Europe to the Caucasus and Middle Asian Countries will be ensured.

Map 3.8. **Kars-Tbilisi Railway Project**

Source: Turkish State Railways.

Ankara-Sivas Railway Project

This project is divided into the "Ankara-Sivas "and "Sivas–Erzincan-Erzurum-Kars" Railway Projects. It involves the construction of a new 466 km stretch of railway and the upgrading of the existing Ankara-Kırıkkale line. Currently trains between Ankara and Sivas run via Kayseri, a detour of over 300 km.

The present railway line between Ankara–Sivas is 602 km long and travel time is 12 hours. This project will shorten the most important link between the east and west, the Ankara-Sivas line, by 136 km. Freight and passenger transport capacity will be increased by raising the standards. Plans call for a speed of 250 km/h, double tracks and electrified and signalled railways.

The technical study was started on 5th October 2004. The mapping and route studies, the preparation of feasibility study, ground study works, the environmental impact assessment and the preparation of plans for bridges, tunnels, superstructure studies, and expropriation have been completed.

Map 3.9. **Ankara-Sivas High Speed Train Project**

Halkalı (İstanbul)-Kapıkule (Edirne) Project

A high standard railway, as a continuation of the Ankara–İstanbul Speed Railway Project, is planned for implementation. (250 km/h, two tracks; electrified and signalled). Route studies are ongoing and will be completed shortly.

Map 3.10. **İstanbul-Edirne Project**

Source: Turkish State Railways.

Sivas-Erzincan-Erzurum-Kars-Railway Project

This project is divided into 3 parts: Sivas-Erzincan; Erzincan-Erzurum; and Erzurum-Kars, The bid for the feasibility study and the preparatory works are completed.

Because the Ankara-Sivas line forms the most important section of the east-west corridor, this project aims to increase passenger and freight transportation capacity by reducing 131 km of length and raising its standards. It also aims to provide high standard railway routes between Europe-Caucasus-Central Asia via Turkey in the east-west axis, by integration with the Kars-Tbilisi Railway Project. The project is financially supported through foreign credits. Completion is planned within 2008.

Map 3.11. **Sivas-Erzincan-Erzurum-Kars Railway Project**

Source: Turkish State Railways.

Ankara- İzmir Railway Project

The largest of the four projects involves the creation of a new high speed line between the Turkish capital, Ankara and the main Aegean port, İzmir. This project, expected to be completed by 2011, involves the construction of 554 km of new rail line linking Polatlı with Afyon. Few trains currently run between Ankara and İzmir, as the journey takes more than 15 hours. Once completed, travel time between Ankara and İzmir will be reduced to 3 hours and 20 minutes. The line will allow for the easy transit of freight between the port facilities of Turkish Railways (TCDD) at İzmir, Afyon, and Ankara.

Map 3.12. **Ankara-İzmir Railway Project**

Source: Turkish State Railways.

Ankara-İstanbul High Speed Train Project
(Project cost: 1 433 000 000 Euros)

The Ankara-İstanbul High Speed Train Project, which is amongst the biggest projects to be implemented by the Ministry of Transport, aims to decrease the travel time between Ankara and İstanbul by 3 hours, create a fast, safe and comfortable means of transportation, and increase the share of railways in transportation. The project will be implemented in two phases.

The first phase of the project consists of a 206 km section between Esenkent and Eskişehir. The infrastructure works between Esenkent and Eskişehir, which cover the first phase of Ankara-İstanbul High Speed Train Project, began on 5th December, 2003 and are proceeding at a fast pace. The first phase is expected to be operational in 2008. The tender for the construction of the second phase (Inönü-Köseköy) has been awarded in 2006 and the works will start after the conclusion of the loan agreement, expected by the end of 2007, and are planned to be completed in two years.

On the other hand, improved lines between Ankara and Eskişehir, which is the second railroad passenger transport artery of the Turkey, will decrease the travel time between Ankara and İzmir, by approximately 1.5 hours.

Moreover, 10 units of high speed train sets will be procured for the project. These train sets can reach a speed of 250 km/h, are equipped with air-conditioning, pressure balance, paging, music, visual broadcasting, and passenger information systems. The hope is to increase the railway share in passenger transportation between Ankara and İstanbul from 10% to 78%.

The existing railway line between Ankara and İstanbul is 562 km in length, 198 km of which is double-line and 364 km of which is single-line. These lines are completely signalled and electrified. Travel time by conventional express trains is 6 hours and 30 minutes, by road 5 hours and 30 minutes and approximately 50 minutes by air.

Map 3.13. **Ankara-İstanbul High Speed Train Project**

Source: Turkish State Railways.

Construction of a High Speed Railway Line between Ankara and Konya

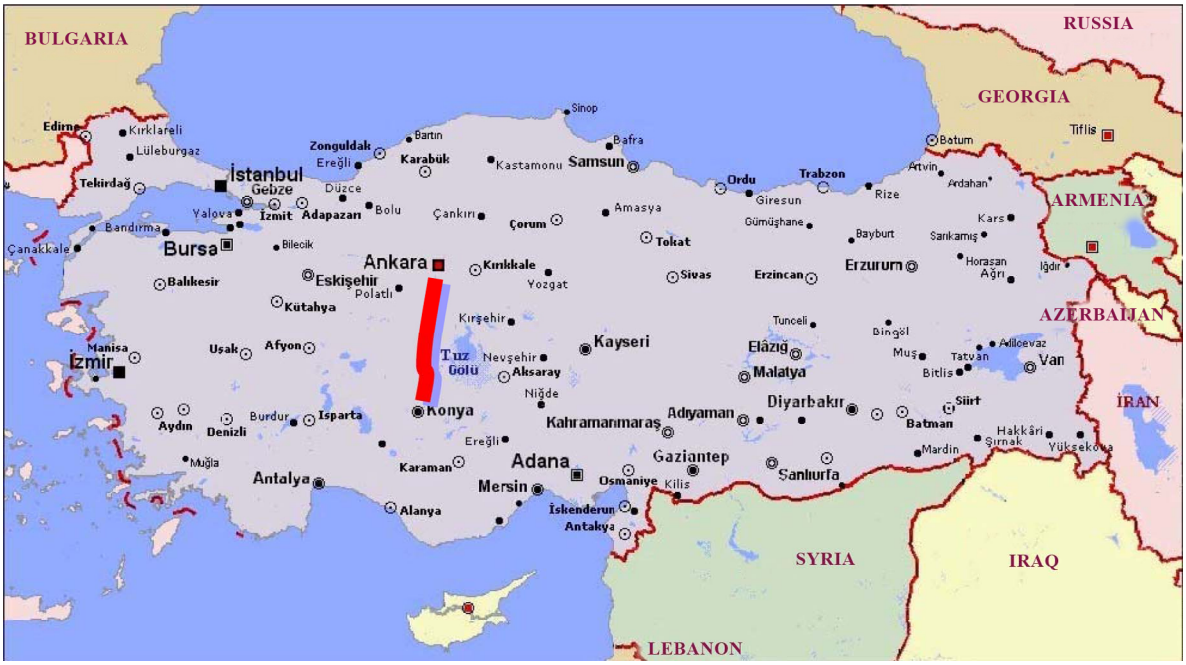
Another important project for Turkey is the Ankara-Konya high speed train project. Konya is of the major cities in Turkey in terms of population, agriculture and industry. Travel time from Konya to Ankara and İstanbul will be shorter once this project is completed.

The existing railroad between Ankara and Konya is 987 km in length, through the Ankara-Eskişehir-Afyon corridor while the highway between Ankara and Konya is just 258 km in length. Since passenger and freight transport by rail between Ankara and Konya is very time consuming, road transport means are preferred. The construction of the Ankara-Konya railway will connect Konya with the three big cities of İstanbul, Ankara and İzmir; this high speed railway connection will ensure faster transportation.

Once completed, Ankara-Konya travel times will drop from ten and a half to one and a quarter hours; travel times from İstanbul to Konya will drop from twelve and a half to three and a half hours.

The infrastructure works together with electro-mechanical works are expected to be completed by the first quarter of 2009.

Map 3.14. **Ankara-Konya High Speed Railway Project**



Source: Turkish State Railways.

Marmaray Project

The most challenging infrastructure project in Turkey, and perhaps one of the most interesting projects in the world, is the Marmaray Rail Tube Tunnel Project.

The project will provide an upgrading of the commuter rail system in İstanbul, connecting Halkalı on the European side with Gebze on the Asian side with an uninterrupted, modern, high-capacity commuter rail system. Railway tracks on both sides of the İstanbul Strait will be connected by a railway tunnel connection under the İstanbul Strait. The line goes underground at Yedikule, continues through the new Yenikapı and Sirkeci underground stations, passes under the İstanbul Strait, connects to the new Üsküdar underground station and emerges at Söğütlüçesme, as seen in the map below.

The Marmaray Project is the upgrading of approximately 76 kilometres of commuter rail from Halkalı to Gebze. The red line on the map shows the parts of the railway that are above ground; the white line shows the new railway system that will be constructed in tunnels under the İstanbul Strait.

The most important objectives of this project are to:

a) Provide a long-term solution to the current urban transportation problems of İstanbul.

b) Relieve existing operating problems on the mainline railway services.

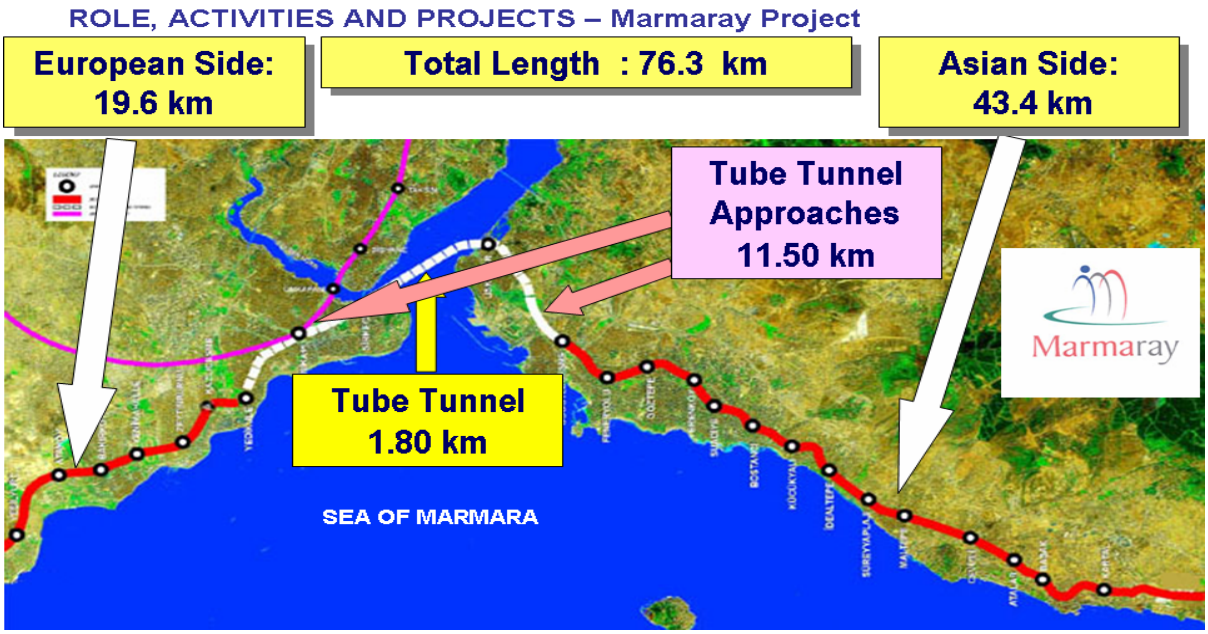
c) Provide a direct, railway system connection between Asia and Europe.

d) Increase the capacity, reliability, accessibility, punctuality and safety on the commuter rail services.

e) Reduce travel time and increase comfort for a large number of commuter train passengers.

f) Provide uninterrupted passenger and freight transportation across the İstanbul Strait.

Map 3.15. **Marmaray Project**



Source: Turkish Ministry of Transport.

This project is currently one of the world's major transportation infrastructure projects. The entire railway system, upgraded and new, will be approximately 76 km long. The main structures and systems include: the immersed tube tunnel, bored tunnels, cut-and-cover tunnels, grade structures, 3 new underground stations, 37 surface stations (renovation and upgrading), operations control centre, yards, workshops, maintenance facilities, upgrading of existing tracks, including a new third track on ground, completely new electrical and mechanical systems and the procurement of modern railway vehicles.

The capacity of the new commuter rail system for moving people across the İstanbul Strait will be 10-12 times higher than the capacity of one of the existing bridges.

Signalization Projects

- The signalling project on Irmak-Karabük-Zonguldak, Bandırma-Menemen, Cumaovası–Karakuyu and Samsun-Kalın, Kars-Divriği line

The signalization will increase the line capacity and ensure the faster transport of industrial and agricultural products as well as passengers on the line.

Irmak-Karabük-Zonguldak	415 km
Bandırma – Menemen	341 km
Cumaovası-Karakuyu	369 km
Samsun-Kalın	378 km
Kars-Divriği	578 km

The signalization of the Eskişehir- Kütahya- Balıkesir line

The signalization of this line will increase the line capacity and capability by 25-30%. The final plans for the infrastructure have been completed and the project is included in the mid-term programme of the 2007-2009 periods.

Signalling, Electrification and Telecommunication Project on Pehlivanköy-Uzunköprü Line

The objective of this project is to provide a safe and reliable high speed journey between İstanbul and Thessalonica. It includes the installation of a signalling, electrification and telecommunication system on a 30 km line between Pehlivanköy-Uzunköprü. The feasibility study is completed. It is included in the investment programme.

Map 3.16. **Signalized Lines**

Source: Turkish State Railways.

Electrification Projects

Electrification of Irmak-Karabük-Zonguldak, Samsun-Kalın, Kırıkkale-Çetinkaya, Kayaş-Irmak–Kırıkkale, Kars-Divriği lines.

Electrification will increase the line capacity and the rapid transport of industrial, agricultural products as well as passengers on the line section will be ensured.

Irmak-Karabük-Zonguldak	415 km
Samsun-Kalin	378 km
Kırıkkale-Çetinkaya	622 km
Kayaş-Irmak-Kırıkkale	80 km
Kars-Divriği	578 km

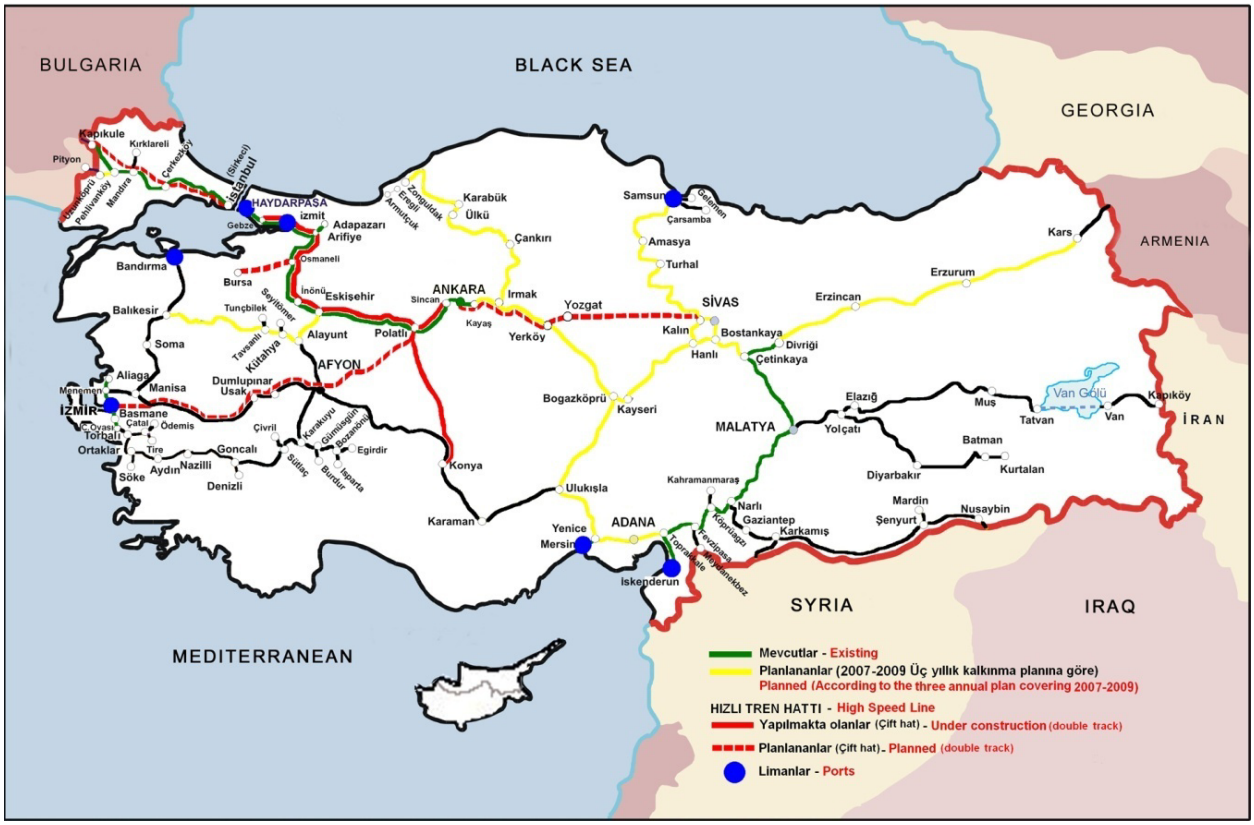
It is planned for inclusion in the 2007-2010 period of the programme.

Electrification and Signalisation of Boğazköprü-Ulukışla-Yenice Line and Mersin-Yenice-Adana Toprakkale Line

To meet the increasing transport demand in the Cilicia region and enhance economic value in Turkey, plans are underway to upgrade the physical and geometrical standards of existing railway lines and to provide economic operations.

The electrification of 285 km of single track line and 146 km of double track line (Adana-Toprakkale) is planned. The feasibility study is done.

Map 3.17. **Railways Electrified Lines**



Source: Turkish State Railways.

3.2.5. Future Developments and Challenges

3.2.5.1 An "expected" modernisation of rail transport

Rail transport in Turkey developed early in the past century, parallel to the integration of the country linking east-west and north-south regions. Rail transport at that time was an important mode of transport for passengers as well as for bulk products. Rail transport was therefore strongly integrated in the administration; eventually the state became involved in the ownership of major Turkish ports. However, the fact is that railways are not very strong in such a large country, which in theory should be a competitive and strong transport mode.

Presently, the rail modal share is very low and actions pertaining to three aspects should be taken into consideration:

- Regulatory aspects.
- Organisational aspects.
- Infrastructural aspects.

Various policy options have been discussed in recent years, and the privatisation of ports was the first to be implemented. All ports except Haydarpaşa, have been put on the privatisation agenda. Mersin Port was finally privatised in 2007, after having been granted the operation rights for 36 years. The privatisation process for other ports is ongoing. The legal structure of the rail company is the first element that new regulation will address and affect.

No decision has been yet taken concerning the structure of a new rail company. The "Holding" model appears attractive. As required by the first EU Railways Package of 1991, the accounts of rail infrastructure management will be separated from the rail operations of TCDD.

Liberalization of the rail market is expected in the upcoming years along with the arrival of new entrants. However, as soon as decisions are taken concerning separation between infrastructure management and rail operations, and once the system of regulation on infrastructure capacity allocation and charging is determined, modalities will need to be defined.

Meanwhile, new strategies have been proposed by the rail administration and international rail cooperation organizations.

a) The strategy for freight and passenger transport by rail

For passenger transport, new high speed line projects are being developed in the western part of the country between İstanbul and Ankara, and future lines are planned between Ankara-Konya and Ankara-İzmir. This will affect freight transport on the old lines as well as the new lines designed for mixed traffic.

In recent years, train operation has been improved by the implementation of block train operation schemes to wagon load operations: the quality of services and average transport speed and reliability, in particular, has improved considerably.

A further goal is to develop logistic services and to implement rail freight logistic centres. Several locations across the country have been explored for such centres, which will be directly connected to the rail network.

Another objective is to increase cooperation within the railway companies of neighbouring countries in order to provide new intermodal services:

b) Cooperation with Balkan railway companies to launch the aforementioned Ro-La services and develop intermodal transport services between the EU and Turkey.

c) Cooperation with Middle East railway companies to commence container services between Turkey and Iran up to Kazakhstan, as well as services between Turkey, Syria and Iraq.

Currently, there is regular container service along these corridors, in particular between Ankara and Almaty. Although these services comprise only a small share of the market, efforts are being made to improve the reliability or their transport time. This is in comparison to road transport, which has to endure long waiting times at borders between Iran and Turkmenistan, and between Turkey and other Middle Eastern countries, along the route across Syria and Iraq.

To ensure the future success of the railways, infrastructure investments are critical. The Turkish railway network is old, mainly single track, only partly electrified and with tight curves. The outdated signalling system considerably limits the capacity of the tracks.

Therefore, even though the construction of some new lines has started, rehabilitation of the network does not necessarily imply the construction of new lines. For example, with the rail tube tunnel under the İstanbul Strait and HST lines, freight transport by train at night will be possible.

The rehabilitation of this network entails the realignment of the old network, doubling the lines when necessary, and improving the electrification and signalling systems.

The Transport Infrastructure Needs Assessment Study (TINA) has identified many railway projects, in parallel with road projects, for consideration over the next ten to twenty years. In scenarios for rail and road network development, the emphasis is placed on major international corridors which are complemented by international cooperation organizations.

3.3. Maritime Transport and Ports

3.3.1. Maritime Network

The total coastline of Turkey is 8 333 km long. There are approximately 290 shore facilities including ports and piers. The ports and piers are divided into three groups: ports and piers operated by public sectors; by private sectors; and other piers operated by regional municipalities.

The total quay length of the 7 largest ports in the country, operated by Turkish State Railways (TCDD), is over 16 000 metres, with a storage capacity of 31.5 million tonnes per year. Total throughput is around 40 million tonnes of general cargo. The vast majority of cargo volume - liquid and dry bulk (petroleum, coal, minerals, fertilizers, etc.) - is handled either by the special private ports or by municipalities.

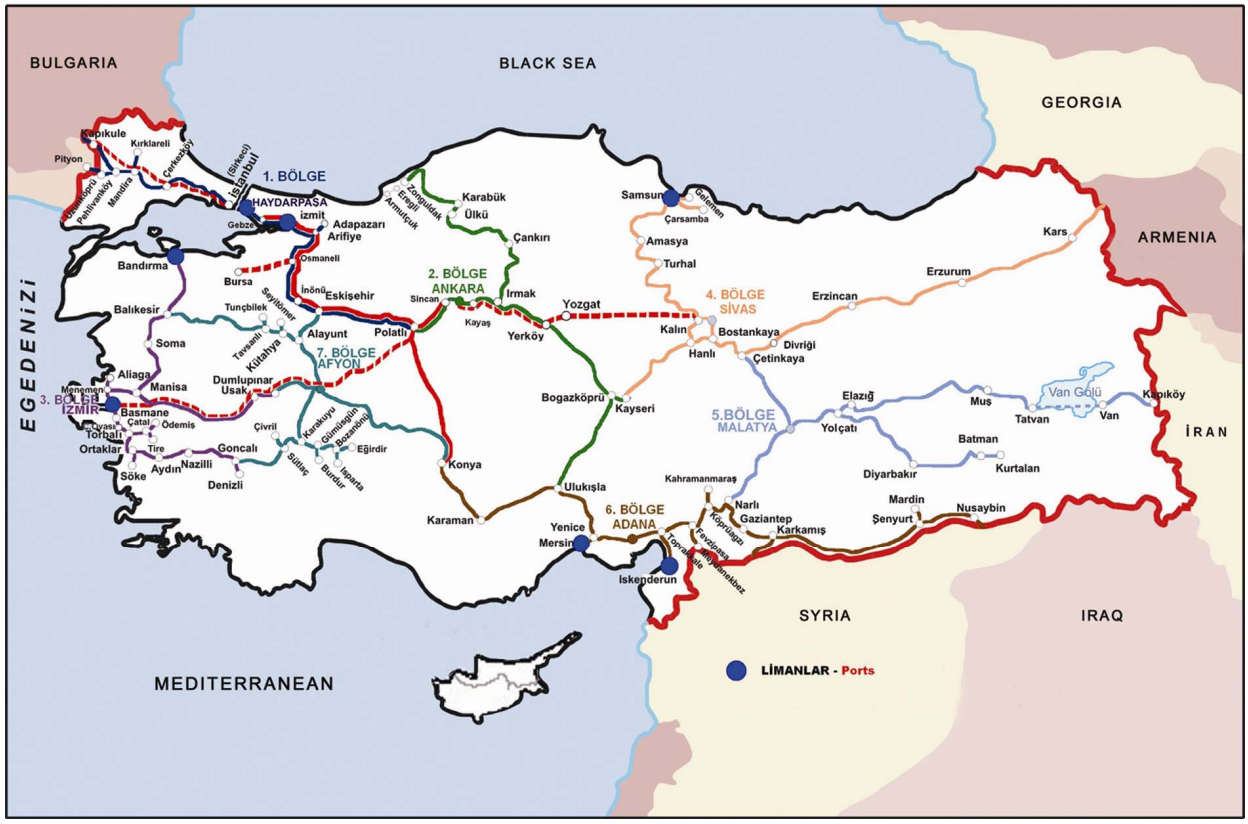
3.3.2. Maritime Operations

Turkey's approach to maritime transport is consistent with the broad European principles of free circulation of shipping, fair competition, enhanced maritime safety and pollution prevention. The maritime sector is one of the most liberalized sectors in Turkey, with a largely free market oriented economy. The shore facilities, including 29 main ports, are operated by various types of organizations: 10 harbors belong to different State owned organizations and 19 harbors belong to municipalities; there are also 34 private operators. Moreover, 14 yacht harbors belong to the Ministry of Tourism and the private sector, while 128 fishing shelters belong to co-operatives, municipalities and provincial administrations. Each port, whether state or privately operated, is free to determine its own tariffs in accordance to the port service tariffs that has been published on 1st August 2003 by the Ministry of Transport, in which the highest limits of these tariffs have been determined.

Turkish ports can be classified into three groups according to their operators:

- Those run by the Turkish State Railways (TCDD).
- Those run by the Turkish Maritime Administration (TDI).
- Special private ports, and those run by municipalities.

Map 3.18. **Main Ports in Turkey**



Source: Turkish Undersecretariat for Maritime Affairs.

Developed in the early years of the past century, Turkey's rail transport at that time was an important mode linking east-west and north-south regions. Hence, rail transport was strongly integrated in the administration; eventually the state became involved in the ownership of 7 major Turkish ports.

By the Law on "The Organisation and Duties of Turkish State Railways and Ports" dated 1927 numbered 1042, TCDD has been entrusted with the task of operating, expanding and renovating the ports which have railway connections.

Since then, TCDD was operating the seven largest ports in the country: Haydarpaşa, Derince, İzmir, Samsun, Mersin, Bandırma and İskenderun. Now this number has been decreased to six main ports since the privatization of Mersin port has been accomplished. The privatization process for Derince, Bandırma and Samsun Ports are in the final approval stage by the relevant public authorities. All of these ports are accessible by road and railway.

They are the country's most strategically important ports, handling the greatest cargo volume in Turkey. The major commodity groups handled are: dry bulk, container, liquid bulk and general cargo.

Haydarpaşa, İzmir and Mersin ports are the biggest ports of Turkey in terms of annual handling and traffic capacity. Haydarpaşa, Mersin, İskenderun, Samsun and Derince ports have been registered as international ports/ferry links and container terminals by the European Agreement on Main International Combined Transportation Lines and Related Facilities (AGTC).

TDI ports, the second group, have less importance: they serve local areas such as communities, and cities. Thirteen ports exploited by TDI have been privatized while two ports are still operated by this organization. Both enterprises are under the control of the MoT.

The third group is special private ports. These serve primarily the particular needs of industrial plants but may also be used by third parties. Municipal quays are managed by municipalities. They are comparatively small and generally limited to a small volume of coastal traffic serving the local needs of the provinces.

The ten major ports which belong to the State have a handling capacity of 250 million tonnes/year, of which 3 millions TEU is for container transport.

Map 3.19. **State owned and private ports**

Source: Turkish Undersecretariat for Maritime Affairs.

3.3.3. Ports

TCDD operates the six largest ports in the country with over 17 856 metres of total quay length and a storage capacity of 2 million tonnes per year. All of these ports are accessible by railways. Total throughput is around 46 million tonnes of general cargo. The number of containers handled in these ports is about 1 000 000 and 892 000 TEUs (2006).

TCDD ports are overseen by the ports departments in railway headquarters, which is responsible for the management, overall planning, functioning of ports and their coordination.

In general, each port manager is in charge of operations, including all services to ships and cargoes using their own labor and equipment. Each port also consults with headquarters concerning plans and port development.

As mentioned earlier, the ports operated by TCDD are the most important ports of Turkey, handling a large share of cargo volume. These port's capacities are as follows:

Haydarpaşa Port: The port of Haydarpaşa is situated on the Anatolian side of the İstanbul Strait. Located in the most industrialized area of Turkey, it has great importance as a gateway to the world. It is the biggest container port in the Marmara region. The port has two breakwaters to protect vessels from untoward effects of the sea. A container land terminal outside the port in Göztepe is used for stacking empty containers. It covers an area of 55 000 m^2 and has a capacity of 52 800 TEU.

Table 3.8. **Cargo Capacity of Haydarpaşa Port**

DISTRIBUTION OF THE MAIN CARGO GROUPS HANDLED AT HAYDARPASA PORT
(tonnes end of 2006)

Port	Years	General cargo	Container	Dry bulk	Liquid bulk	Total
	1998	2 828 327	3 103 304	237 888	0	6 169 519
	1999	2 730 447	2 713 449	244 721	0	5 688 617
	2000	2 611 153	2 879 172	93 987	0	5 584 312
	2001	2 540 788	2 202 474	45 750	0	4 789 012
HAYDARPAŞA	2002	2 769 618	2 338 146	5 121	2 073	5 114 958
	2003	3 203 175	2 503 643	16 085	65	5 722 968
	2004	3 320 515	3 128 689	8 421	306	6 457 931
	2005	1 143 968	3 470 111	160	0	4 614 239
	2006	74 091	3 711 503	0	0	3 785 594

Derince Port: The port of Derince is situated on the northern shore of the Gulf of İzmit; it is the multipurpose general cargo port of the Gulf. The port provides service to the automotive industry (cars, tractors, other vehicles etc.) and all other types of general cargoes. The port is also connected with the state railway and highway network.

İzmir Port: This is the port for the Aegean region's industry and agriculture; it serves a vast agricultural and industrial hinterland, and plays a vital function in the country's exports. Many different types of commodities and cargo groups are handled here. The port is also connected with the state railway and highway network. The capacity of the container washing facility is 20 TEU per day. Port expansion studies are continuing.

Mersin Port: This is the main port for the Eastern Mediterranean region's industry and agriculture. The port's rail link and its easy access to international highways, make it an ideal transit port for trade to the Middle East. With its modern infrastructure and equipment, efficient cargo handling, vast storage areas and proximity to the free trade zone, Mersin is one of the most important ports in the East Mediterranean. The facilities handle general cargo, containers, dry and liquid bulk and RO-RO.

Table 3.9. **Cargo Capacity of Derince Port**

DISTRIBUTION OF THE MAIN CARGO GROUPS HANDLED AT DERİNCE PORT
(tonnes end of 2006)

Port	Years	General cargo	Container	Dry bulk	Liquid bulk	Total
DERİNCE	1998	623 678	37 054	653 956	50 438	1 365 126
	1999	422 899	37 585	238 377	58 088	756 949
	2000	473 088	6 071	194 635	26 977	700 771
	2001	406 840	4 988	127 913	8 479	548 220
	2002	692 529	5 232	400 042	51 172	1 148 975
	2003	765 798	15 667	603 025	67 149	1 451 639
	2004	1 090 900	11 184	799 990	65 377	1 967 451
	2005	1 307 715	5 476	849 036	62 117	2 224 344
	2006	1 374 072	4 915	1 073 113	92 662	2 544 762

Table 3.10. **Cargo Capacity of Izmir Port**

DISTRIBUTION OF THE MAIN CARGO GROUPS HANDLED AT İZMİR PORT
(tonnes end of 2006)

Port	Years	General cargo	Container	Dry bulk	Liquid bulk	Total
İZMİR	1998	506 728	3 907 047	1 668 727	239 455	6 321 957
	1999	412 033	4 244 775	2 236 687	290 918	7 184 413
	2000	488 184	4 614 209	2 795 771	266 306	8 164 470
	2001	496 005	4 671 425	2 986 219	272 420	8 426 069
	2002	567 725	5 439 787	3 457 351	187 851	9 652 714
	2003	614 348	6 478 213	3 765 593	251 445	11 109 599
	2004	673 254	7 659 365	3 947 449	220 197	12 500 265
	2005	554 296	7 789 102	3 130 959	337 122	11 811 479
	2006	586 881	8 274 042	3 044 234	364 776	12 269 933

Table 3.11. **Cargo Capacity of Mersin Port**

DISTRIBUTION OF THE MAIN CARGO GROUPS HANDLED AT MERSİN PORT
(tonnes end of 2005)

Port	Years	General cargo	Container	Dry bulk	Liquid bulk	Total
MERSİN	1998	1 698 209	2 640 169	3 369 472	6 147 102	13 854 952
	1999	1 557 706	2 756 118	2 767 508	6 947 815	14 029 147
	2000	1 343 248	3 114 412	3 418 807	5 504 013	13 380 480
	2001	1 609 420	2 982 231	2 977 333	6 059 698	13 628 682
	2002	1 004 885	3 858 623	3 073 544	5 825 813	13 762 865
	2003	1 102 223	5 128 919	3 128 805	6 116 431	15 476 378
	2004	1 064 862	5 924 054	2 679 438	7 514 939	17 183 293
	2005	1 264 205	6 462 500	2 444 871	6 114 732	16 286 308

İskenderun Port: This port is situated on the north-east coast of the Mediterranean Sea. It serves the Southeast and East Anatolian regions as well as transit traffic to Middle Eastern countries. It also plays an important role as a transit port. The port has a breakwater of 1 400 meters. The depth at the port entrance is 12 m. The port is also connected to the state railway and highway network. As a multi-purpose port, it serves different types of commodities and cargo groups, such as general cargo, dry/liquid bulk, container handling, and RO-RO vessels.

Table 3.12. **Cargo Capacity of İskenderun Port**

DISTRIBUTION OF THE MAIN CARGO GROUPS HANDLED AT İSKENDERUN PORT
(tonnes end of 2006)

Port	Years	General cargo	Container	Dry bulk	Liquid bulk	Total
İSKENDERUN	1998	202 251	5 940	1 187 885	248 001	1 644 077
	1999	155 874	2 309	1 210 852	371 886	1 740 921
	2000	283 355	5 739	982 503	944 503	2 216 100
	2001	262 989	317	465 350	968 369	1 697 025
	2002	223 185	303	492 317	886 200	1 602 005
	2003	468 848	3 646	557 331	1 226 892	2 256 717
	2004	173 214	8 282	630 519	1 421 583	2 233 598
	2005	192 444	0	812 578	1 126 684	2 131 706
	2006	241 133	0	842 184	905 051	1 988 368

Samsun Port: This is the most important port in the north of Turkey. The port has ample storage areas for containerized cargoes. Containers are loaded and discharged by a general purpose shore crane of 35 tonnes capacity. The port has a ship to shore bridge system to serve the railway-maritime-road combined transport among North European, NIC and Middle East countries.

Table 3.13. **Cargo Capacity of Samsun Port**

DISTRIBUTION OF THE MAIN CARGO GROUPS HANDLED AT THE PORT OF SAMSUN
(tonnes end of 2006)

Port	Years	General cargo	Container	Dry bulk	Liquid bulk	Total
SAMSUN	2000	827 306	12 048	1 693 414	4 468	2 537 236
	2001	1 005 852	11 941	1 523 142	3 000	2 543 935
	2002	838 999	7 880	1 750 028	13 988	2 610 895
	2003	619 153	0	2 127 347	22 236	2 768 736
	2004	756 183	0	2 318 711	37 340	3 112 234
	2005	821 262	0	2 212 130	33 816	3 067 208
	2006	879 027	0	1 149 035	18 229	2 046 291

3.3.3.1. Port Privatization in Turkey

In line with the globalization process in the world economy and the liberalization movements in several countries, economic liberalization has also been the focus of the Turkish government since the early 1980's.

The stabilization and structural reform program decisions taken on 24th January, 1980 were supported by international financial institutions such as the International Monetary Fund (IMF) and the World Bank (WB).

The main objective of this program was the liberalization of the economy, which included primarily: foreign trade liberalization, fiscal liberalization, liberalization of the international capital movements, and diminishing the role of the public sector in economic activities by privatizing the state economic enterprises.

Within this context, privatization started in the Turkish economy as a part of the economic reforms begun in 1984. The primary goal was to minimize the involvement of the state in industrial and commercial activities, and develop a competitive environment in a free market economy.

The current objective is the integration of the Turkish economy with the global economy. Consequently, privatization (including ports), has been an important issue in the Turkish economy from legal, economic, political and social points of view.

The IMF Program, started in 2000 and following stand-by agreements, had ambitious privatization targets. This resulted in large scale SEE privatizations, including those maintaining monopolistic conditions in the market.

The privatization of ports started in 1995 through the transfer of operational rights of some ports. Besides TDI and TCDD, some other ports which serve specifically to SEEs, are also being privatized.

The current Privatization Law (4046), ratified in 1994, forms the institutional basis for privatization. Furthermore, the Constitutional Amendment in 1999 (Articles 47 and 125), included the concept of privatization in the Constitution, and has allowed for international arbitration; this assumes equal footing in international competition, stimulating direct foreign investments and the formation of alliances with foreign partners. Privatization decisions are taken by the Privatization Higher Council headed by the Prime Minister and five ministers, and implementation is carried out by the Privatization Administration (PA).

Within the framework of the Constitution and Privatization Law, and with consideration given to the nature of the business, the monopolistic condition of the sector, and the concept of public goods, the privatization of the ports can be implemented by the transfer of ownership or lease of the port asset to the private sector. Similar privatization strategies may also be considered.

According to an article in the law; ports are considered public service organizations; therefore, it is required that ports "... *shall be privatized under the provisions of this Law through the transfer of operational rights, leases or similar methods*".

Therefore, the privatization of ports in Turkey is partial; such as the Private I type or landlord port model, where operation rights are transferred to the private sector; or methods like Build-Operate-Transfer (BOT) and leasing are utilized, and ownership and regulation is held by the state, as also stipulated by the Constitution.

A bidding process is used to select the private enterprise which will take over operation rights. The result is then submitted to the Privatization Higher Council for approval. The decision is announced in the Official Gazette in accordance with the accountability principle. Then a contract for the transfer of

operational rights is signed between the PA and the selected enterprise. The maximum operation period that may be offered to the private company is 49 years, depending on the conditions of the port.

The TCDD ports, İzmir, Mersin, İskenderun, Derince, Bandırma and Samsun, have been included in the privatization portfolio, by decision of the Privatization Higher Council, on 30th December 2004.

Haydarpaşa Port is not included in the portfolio since it will be part of a tourism complex. The six ports within the portfolio are the most important ports in Turkey in terms of location, size of investments, infrastructure and superstructure, and connection to railways, highways and hinterland.

The main reason for privatizing TCDD ports is the need to make the necessary infrastructure and superstructure investments, since the container traffic at these ports increases at about 20% per year.

The privatization strategy has been organized as a transfer of operational rights, in which the ownership of the ports, port assets and land will remain public property. The operational rights are based on the transfer to the private sector for a period of 49 years for İzmir Port, and 36 years for other ports. TCDD will be further responsible for post-privatization performance and monitoring of the private sector performance of the port operations.

Mersin Port was privatized on 11th May 2007, through granting the operational rights for 36 years. With regards to Derince, Bandırma and Samsun Ports, the tender procedures have been finalized and are planned to be transferred to the relevant Consortiums.

The State Council has reached a decision in the case brought by the Ports Labour Union who demanded the cancellation of the tender of the privatization of İskenderun Port; the High Council of Privatization has decided to cancel due to the insufficiency of bids.

3.3.4. Administration and legal framework

Undersecretariat for Maritime Affairs

Maritime activities are administered mainly by the Undersecretariat for Maritime Affairs, which is directly attached to the Ministry of Transport. The main objectives of the Undersecretariat for Maritime Affairs, as a principle authority in the field of maritime issues at the national and the international level are: to adopt measures which encourage maritime trade, the maritime commercial fleet and the shipbuilding industry; to ensure the management and development of the shipping industry; and to determine and plan the demands and requirements of the maritime sector.

The central organizations of the Undersecretariat consist of three General Directorates, eleven departments which are attached to these directorates, seven independent departments and other auxiliary units, seven regional directorates and seventy harbor-master offices (attached to the regional directorates on the coasts of Turkey.) The Undersecretariat is composed of main service units, which are the General Directorate of Maritime Transportation, the General Directorate of Merchant Marine, the General Directorate of Shipbuilding and Shipyards, and the Department of Foreign Affairs. Advisory units include the Legal Department, Consultancy of the Undersecretariat and auxiliary units.

In terms of legal status, the Undersecretariat operates under the Decree Law of the Organisation and Duties of The Undersecretariat for Maritime Affaires of 19th August, 1993.

3.3.5. Port infrastructure developments

Turkey's major port projects concern Mersin, Çandarlı, Derince and Filyos ports. The aims of these projects are as follows.

Map 3.20. **Planned Ports**

Source: Turkish Undersecretariat for Maritime Affairs.

Filyos Port Project

This Project is intended to decrease the number of vessel passages through the Straits and to provide access for potential cargo among the Black Sea countries, where high cargo traffic is expected.

The project will create a capacity of 9 million tonnes per year within the first 3 years of investment; this will increase to 25 million tonnes per year within 10 years. Connected to the railway, the facility will accomodate bulk and container vessels, provide deep berths, and serve the free trade industrial area that will be established behind the port facility.

The feasibility study for this project has been completed; it is planned for implementation as a BOT model.

Filyos Port Project will create dynamic trade activity among Black Sea countries. Cargo traffic will find the shortest route via existing railway, motorway extending to Mersin Container Port to reach Mediterranean boundary, to North Aegean or İzmir Port to reach Aegean boundary or to connect directly Middle East markets.

Çandarlı Port Project (North Agean sea port)

This port is planned as an alternative new Hub Port of the west Anatolian hinterland and as a trans-shipment centre for traffic between Europe, the Middle East and the Black Sea countries. It will be operated generally as a container terminal with ensured dry and liquid bulk and break-bulk terminal facilities.

The feasibility study has been completed and the port is expected to operate with 2 million TEU capacities. The project is planned to be completed either as a BOT model or through credit.

Çandarlı Port is an important component of the international multimodal transport system thanks to its railway connection. It will be a gateway not only for the Black Sea countries, but also for Caucasian, landlocked Asian countries, and the NIC.

Mersin Container Port

The present capacity of existing port facilities on the Turkish Eastern Mediterranean coastline is insufficient to respond to future demands for marine bound traffic via Turkey. Thus the Mersin Container Port is planned to act as a gateway facility between Mediterranean container shipping lines and Central Asian landlocked countries.

This port is planned as a hub port and provides a sufficient number of berths to accommodate postpanamax container vessels of 16m depth.

The project will be implemented as a BOT model or through loan agreements.

Mersin Container Port will comprise an important component of the international multimodal transportation system and due to railway connection; it will present a gateway position not only between Euro-Med and Black Sea Countries but also Caucasian, landlocked Asian and Commonwealth of Independent States. By combination of rail, and maritime transport also a decrease in the traffic on Bosphorus will be achieved.

Derince Container Terminal Project

Designed as a container terminal, this port is planned to serve transport to Kocaeli Bay and the Central Anatolia hinterland. It will also lighten the burden on Haydarpaşa Port. The importance of this port is also due to its road and railway connections which help decrease the traffic volume of the İstanbul Strait.

Turkey considers containerisation and container ports a high priority. The establishment of new container terminals (Nemrut – Marmara Ereğlisi - Derince) and container port projects (Ambarlı – Mersin – İzmir) are considered important as container transportation under Turkish and foreign operators continue to grow.

Derince Container Terminal Project will meet the future demand of Marmara Region and constitute an alternative gate for Haydarpaşa Port which is planned to be closed.

3.3.6. Future Developments and Challenges

3.3.6.1. Weaknesses of transport nodal points

Efficient nodal points are essential in transport systems; however this still appears to be a weakness in many ports, at least partly due to issues of ownership status i.e. public and private shared ownership of some ports. In recent years it became clear that public ports could not accommodate the increasing demand owing to their current infrastructural capacities. Container traffic in particular, has seen a very high growth rate. Public ports are thus undergoing a fundamental change in status, at a time when growing demand for service is creating pressure.

The privatisation process has not hindered modernisation, considering the increased capacity of the administration; the objective is to grant global concessions to private operators.

However, the Mediterranean hosts "multi purpose" ports and it is not easy for an individual operator to integrate such a diversity of services.

Port accessibility must be considered not only in negotiations with the TCDD which is formally responsible for the ports, but also when dealing with public local or national authorities.

One major problem with the privatisation process is the risk of conflict between public and private interests. The direct and rapid transfer of ports from TCDD to private owners, should involve the opportunity to strengthen the "port community"; in this way, conflicts between public and private interests arising from the quick privatisation of business units within the port, may be dealt with more effectively a status of "port autonomy" could introduce the flexibility necessary for the definition of a port strategy.

High demand is the direct stimulus behind the development of private ports. Such an initiative in itself has positive aspects. However, the main concerns will be: the impact on land use policy, the rationality of future extensions and the quality of network access.

In the short term, the creation of private ports has contributed to the high level of demand in the Turkish transport system. In a few years time, private ports are expected to handle around 50% of the container traffic. In the long term, port developments should certainly comply with more global land use strategies, particularly in dense areas, such as the Marmara region.

The weakness of nodal points is also revealed by the slow development of logistic centres and inland terminals; this is explained by the absence of adopted regulations concerning the implementation of land use policy, and by the weaknesses of intermodal and logistic actors.

3.4 Air Transport

3.4.1. Air network

Turkey has a large airspace (982 096 km²) with a total length of controlled ATS routes of 50 797 km, situated among the three continents, Europe, Asia and Africa.

Due to its special geographical location, Turkish airspace includes crossroads of north-south and east-west traffic flows between Europe-Asia and the Middle East. İstanbul FIR is bordered by four ECAC and one non-ECAC FIRs, while Ankara FIR is bordered by three ECAC and six Non-ECAC FIRs.

3.4.2. Air operations

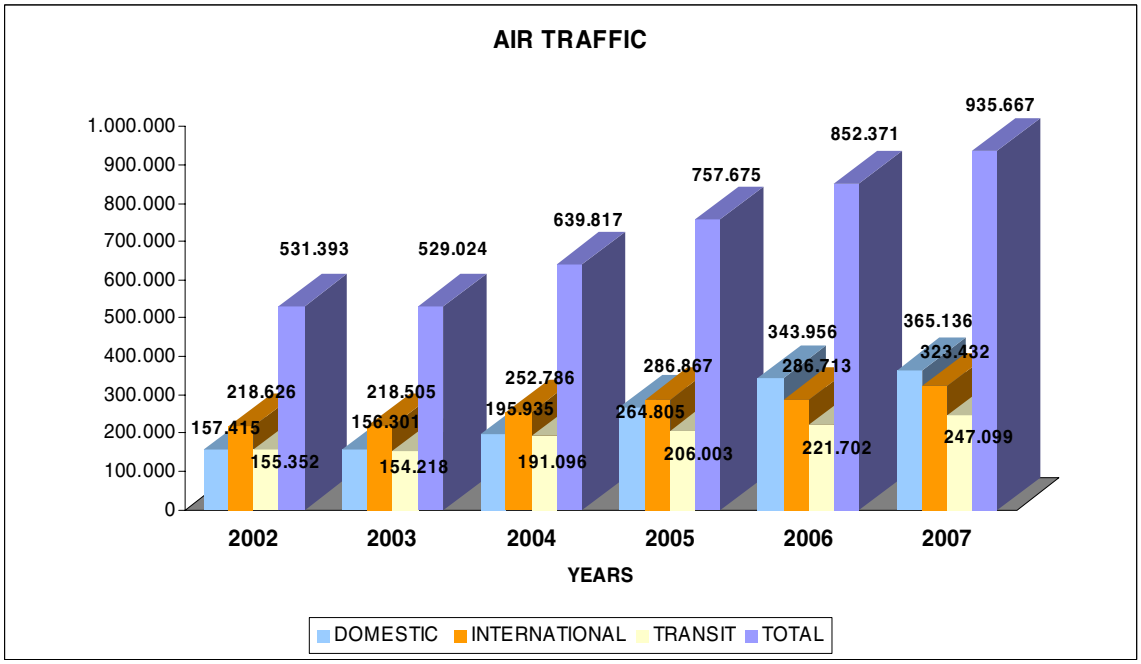
There has been a significant increase in aircraft movement and passenger traffic in recent years, affecting air navigation and airport management services. The increased volume in international aircraft and passenger traffic through Turkish international airports, especially İstanbul/Atatürk and Antalya airports, have placed them among the most important airports of Europe.

The sector has grown significantly in the past 3 years, in part due to the successful application of BOT models which contributed to the opening of several new modern airports. These developments were achieved with the liberalisation of air transport, causing unprecedented air traffic growth, particularly in domestic air transport due to price reductions. The combination of new regulatory measures and new infrastructure policies using BOT along with the entry of new airline companies into the market have helped make the Turkish air transport system meet the demand that is growing rapidly.

The overall traffic increase in the Turkish airspace during 2005 approached 15%, well above the European average. The chart below shows the evolution of air traffic over the past years.

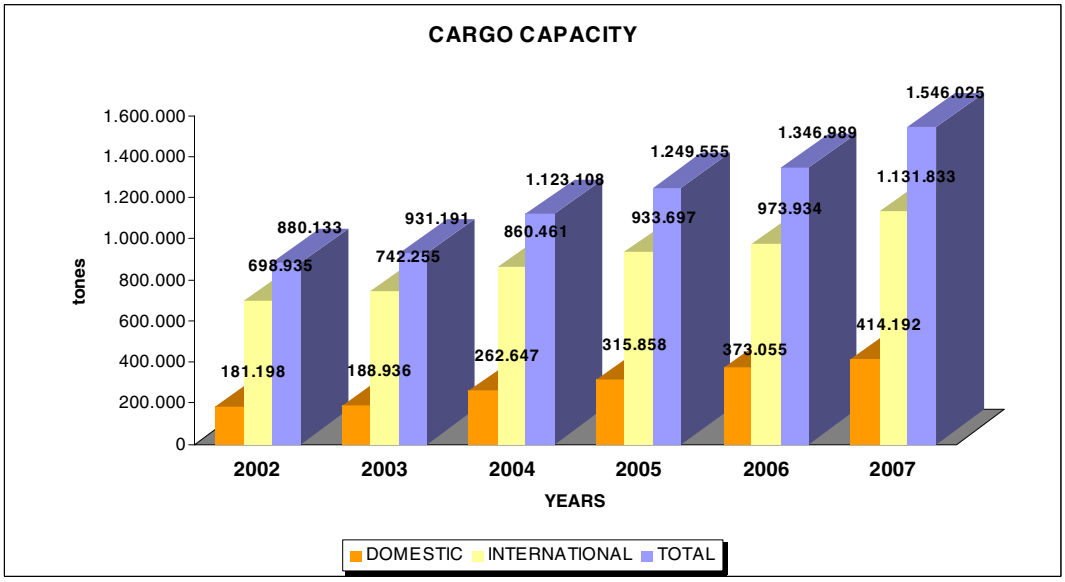
Turkey's flag-carrier airline company Turkish Airlines is not yet a member of the International Air Transport Association's (IATA) quality management initiative, Cargo 2000, but the airline intends to join. Preparations are proceeding rapidly. The carrier is also participating in IATA's e-freight initiative, despite the fact that Turkey is not one of the pilot countries. But Turkish Airlines Cargo is taking part in the Message Improvement Program. The freight division is certified and compliant with the ISO 9001-2000.

Figure 3.1. **Air Traffic Increase**



Source: Turkish General Directorate of Civil Aviation.

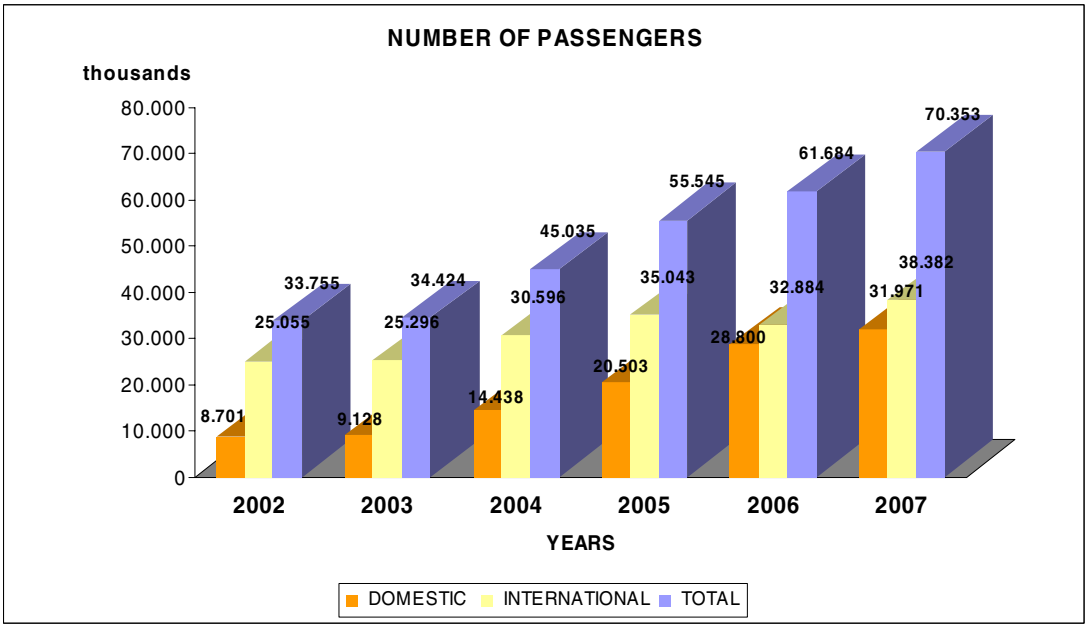
Figure 3.2. **Cargo Capacity**



Source: Turkish General Directorate of Civil Aviation.

In terms of intermodal transport, air transport does not have an important share in cargo transport volume. İstanbul Airport is the most important airport for cargo transport, even though it is not at competitive levels compared to other important European airports. Nevertheless, the freight terminal at the Atatürk International Airport is currently undergoing a face-lift to prepare for additional freight volumes. Turkish Airlines Cargo will begin to operate four full-freighters to play a greater role in transporting freight to/from its home base in the future.

Figure 3.3. **Air Passenger Traffic**



Source: Turkish General Directorate of Civil Aviation.

3.4.3. Administration and Legal Framework

Three state administrations are in charge of the civil aviation sector in Turkey. These are: General Directorate of Civil Aviation (SHGM), General Directorate of State Airports Authority (DHMİ) and General Directorate of Railways, Ports and Airports Construction (DLH).

General Directorate of Civil Aviation (SHGM)

The General Directorate of Civil Aviation is the National Civil Aviation Authority of Turkey. It is a financially autonomous and affiliated body of the Ministry of Transport. It performs its duties in accordance with the "Law on the Duties and Structure of General Directorate of Civil Aviation" number 5431. SHGM is directly responsible for regulation, training assessments, certification and development of the civil aviation sector in accordance with international standards.

General Directorate of State Airports Authority (DHMİ)

The DHMİ is a publicly-owned enterprise set up to produce and market services of a monopolistic nature, deemed privileged by nature of its public service status. It is associated with the Ministry of Transport and financially dependant on the State. The objective, activities and administration of the DHMİ is governed by Decree-law number 233, and the amendments thereto, and by its Statutes that came into force on the basis of the aforementioned Decree, by law number 2920 (Civil Aviation Code), by law number 2677 on the execution of functions and services at commercial airports, ports and border posts, and by law number 3832 on defence and security of certain bodies and organizations.

The goals and the activities of the organization determined by its principle statute are:

- Air transportation required with the civil aviation activities.
- Management of the airports.
- Supervision of the ground handling services.
- Execution of the air traffic control services.
- Establishment and operation of the air navigation systems and facilities.
- Establishment and operation of other installations and systems related to the above activities.
- Improvements in aeronautical activities.

3.4.4. Airport Developments

The Turkish civil aviation sector has successfully established BOT model in the last 5 years. The Atatürk Airport International Terminal is one of the most important projects created using this model. In the first application, following the tender, the operational rights of the airport have been transferred to TAV, a private company, for 15.5 years with a lease amount of 3 billion dollars.

Another important BOT model project is Antalya Airport International Lines Terminal Building and complementary units. The total cost of this project is 85.5 million dollars. The operative company, ÇELEBİ, will operate the terminal for 3 years, 5 months and 26 days. The terminal will return to DHMİ on 28th September 2009.

As the airport of the capital, Esenboğa Airport plays an important role. This is another example of a BOT model. The total cost of this project is 188.7 million dollars; completion is expected within 36 months.

Construction of a new international terminal building for Adnan Menderes Airport in İzmir, under the BOT model, has been completed and service began on September 9th, 2006. The total cost of this project is 125 million dollars. The project comprises a 107 899 m² enclosed area, with an annual 5 million passenger capacity, a terminal building with 9 passenger gates, 60 check-in-desks and a 2 200 car park capacity.

The Dalaman Airport New International Terminal Building has been constructed and began service in July 2006. The operation period is 6 years, 5 months and 20 days. The total cost of the project is 72.4 million dollars. The project comprises a 95 587 m² enclosed area, with an annual 5 million passenger capacity, a terminal building with 7 passenger gates, 60 check-in-desks and a multi-story, 1 000 car park capacity.

The tender process for the Milas-Bodrum Airport's International Terminal Building, as a BOT model, has been completed.

3.4.5. Future developments and challenges

Air transport development in Turkey has been quite spectacular in recent years due to the conjunction of various favorable economic and administrative factors.

Economically, the rapid increase of Turkish GDP during the recent years explains the 15% air activity growth, given the high elasticity of air transport activity to GDP growth (elasticity approximately 2).

Growth of the internal market (demand) has been stronger than the growth of the international air market; internal passenger volume almost equals that of international demand in 2006 and 2007.

This evolution is also largely due to regulatory reforms of the air transport sector, with the liberalization of the internal market and the arrival of new private operators for long and short distance services.

The service supply has increased considerably from east to west and north to south, with competitive prices and short travel times. Domestically, air transport is competing with road transport, and has certainly induced new demand.

At the same time, the airport capacity of major airports has increased as the new BOT procedures enabled them to quickly adapt to demand. New and large airports across Turkey therefore became hubs for shorter distance services.

In line with these important domestic changes, the Turkish position in international air transport has been also reinforced. Demand for international tourism in Turkey is still high, with an expected annual growth of more than 5% per year over the next twenty years according to UNDP (Plan Bleu). Turkish airports are becoming international hubs, not only for central Asia as was already the case, but also for Europe and Asia: alliances with European and Asian companies (Turkish Airlines entering STAR Alliance) reflect such an evolution.

For freight transport, the low share of air traffic is rapidly increasing. New strategies are being applied for the transport of high value goods, express transport and the transport of perishable goods for export. Logistics equipment is developing in nearby major airports to adapt to the high expected demand for specialized air market segments.

3.5. Pipelines

3.5.1. Pipeline Network

National

Turkey has an extensive network of approximately 10.000 km of pipelines. Of this network, 3 373 km consist of crude oil pipelines and 8 467 km of natural gas pipelines.

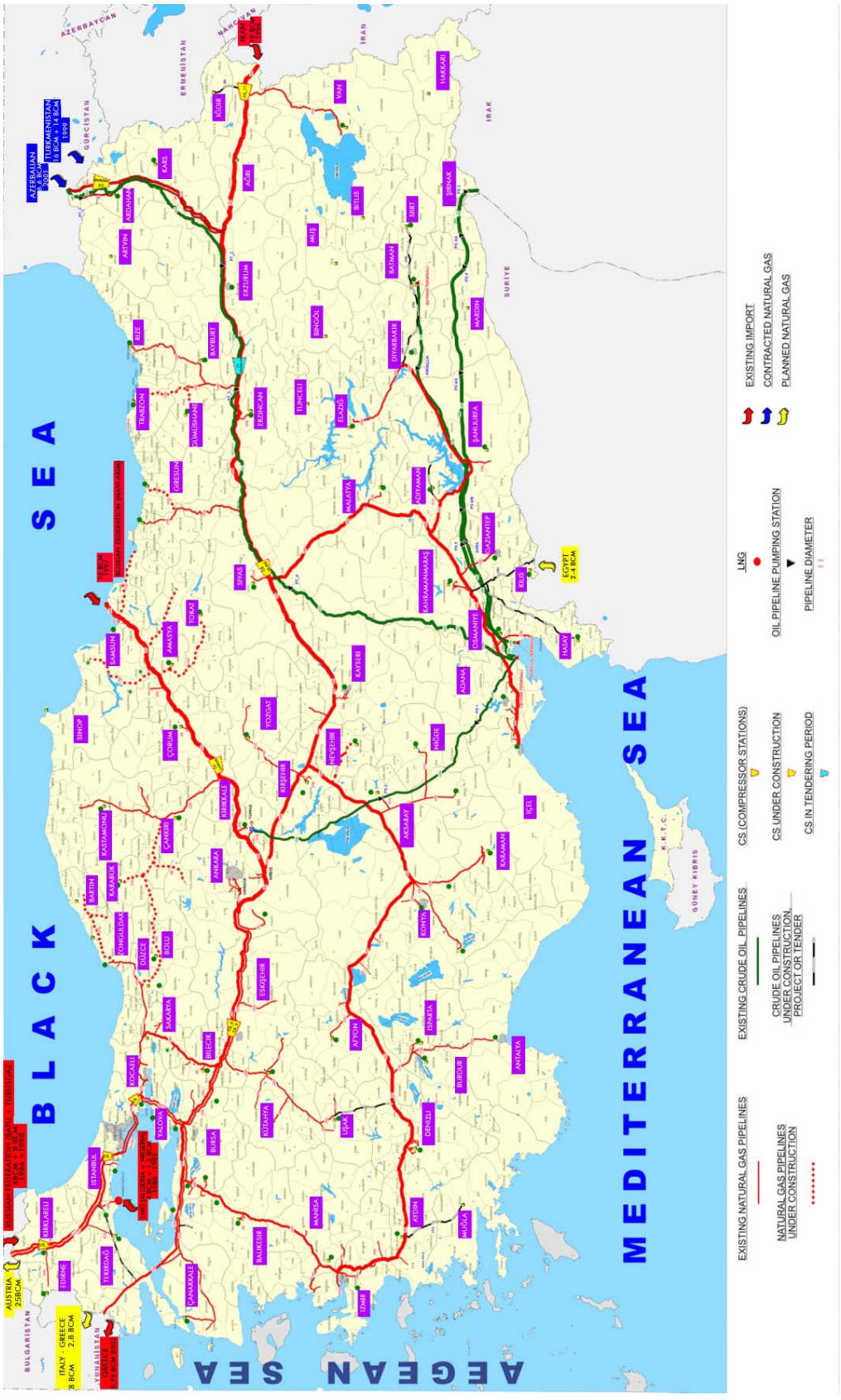
Table 3.14. **Natural Gas Pipeline Network in Turkey**

NAME OF THE PROJECT	LEN. (km)	DIA. (inch)	FINISH DATE
RUSSIAN FEDERATION - TURKEY NGTPL + OFFSHORE	845	24-36	07.1989
RUSSIAN FEDERATION - TURKEY NGDPL PHASE 1	190	Various	05.1991
RUSSIAN FEDERATION - TURKEY NGDPL PHASE 2	178	Various	07.1992
METEKSAN - BİLTEPE NATURAL GAS DISTRIBUTION PIPELINE	7	3-12-18	12.1992
KÖSEKÖY NATURAL GAS DISTRIBUTION PIPELINE	19	4-8-12-18	12.1994
ESKİŞEHİR NATURAL GAS DISTRIBUTION PIPELINE	31	2-3-4-6-12-18	09.1995
PAZARCIK (İZMİT) - KARADENİZ EREĞLİ NGTPL	210	16-24	06.1996
BURSA LOCAL NATURAL GAS DISTRIBUTION NETWORK	-	-	06.1996
BURSA - ÇAN NATURAL GAS TRANSMISSION PIPELINE	213	8-12-16	12.1996
ANKARA(SİNCAN) OSB NATURAL GAS DISTRIBUTION PIPELINE	10.5	10	03.1997
ESKİŞEHİR LOCAL NATURAL GAS DISTRIBUTION NETWORK	-	-	06.1997
TÜPRAŞ NATURAL GAS CONNECTION PIPELINE	0,5	8	10.1997
SİLİVRİ NATURAL GAS TRANSMISSION PIPELINE	7.6	10-14-24	04.1998
MALKOÇLAR LOOP, ÖNERLER - İSTANBUL, HERSEK YUMURTATEPE	160	24-36	09.1998
PENDİK - KURTKÖY DEPLACE WORK	6	24-36	11.1998
ÇAN-ÇANAKKALE NATURAL GAS TRANSMISSION PIPELINE	116	12	07.2000
KARADENİZ EREĞLİ DEPLACE WORK	6	-	10.2000
DOĞUBEYAZIT - ERZURUM NATURAL GAS TRANSMISSION PIPELINE	291	48	06.2001
ERZURUM - (SİVAS) İMRANLI NATURAL GAS TRANSMISSION	306	48	06.2001
İMRANLI (SİVAS) - KAYSERİ NATURAL GAS TRANSMISSION PIPELINE	256	48	06.2001
KAYSERİ - ANKARA NATURAL GAS TRANSMISSION PIPELINE	320	40	06.2001
KAYSERİ - KONYA - SEYDİŞEHİR NATURAL GAS TRANSMISSION	317	40-16	06.2001
ESKİŞEHİR - BOZÜYÜK NATURAL GAS LOOP LINE	75	40	01.2002
MİHALIÇÇIK - ESKİŞEHİR NATURAL GAS LOOP LINE	76	40	01.2002
BOZÜYÜK - ADAPAZARI NATURAL GAS LOOP LINE (PHASE 1)	63	36	01.2002
KARACABEY - İZMİR NATURAL GAS TRANSMISSION PIPELINE	240	36	05.2002
BOZÜYÜK - ADAPAZARI NATURAL GAS LOOP LINE (PHASE 2)	63	36	06.2002

NAME OF THE PROJECT	LEN. (km)	DIA. (inch)	FINISH DATE
SAMSUN - ANKARA NATURAL GAS TRANSMISSION PIPELINE	501	48	10.2002
ADAPAZARI EARTHQUAKE DWELLING NATURAL GAS DISTRIBUTION	1.5	16	10.2002
KIRKLARELİ - ÖNERLER, BURSA KARACABEY LOOP LINES	99-75	36	07.2003
EREĞLİ - AKSARAY - NİĞDE NATURAL GAS DISTRIBUTION PIPELINE	199	Various	07.2003
ÇORLU DERİCİLER ORGANIZED INDUSTRY ZONES DISTRIBUTION	6	Various	07.2003
KIRIKKALE - KIRŞEHİR - YOZGAT - POLATLI DISTRIBUTION PIPELINE	173	Various	09.2003
SAMSUN - ÇORUM NATURAL GAS DISTRIBUTION PIPELINE	31	6	10.2003
MANİSA-AKHİSAR-BALIKESİR-SUSURLUK DISTRIBUTION PIPELINE	30	Various	10.2003
KAYSERİ-SİVAS NATURAL GAS DISTRIBUTION PIPELINE	85	Various	12.2003
İZMİR-ALİAĞA-ATATÜRK INDUSTRY ZONES DISTRIBUTION PIPELINE	37	Various	03.2004
KONYA-KARAMAN NATURAL GAS DISTRIBUTION PIPELINE	185	Various	03.2004
İZMİR - PINARBAŞI - TORBALI - TURGUTLU NATURAL GAS ISTRIBUTION PIPELINE	132	Various	06.2004
BİLECİK - KÜTAHYA - UŞAK NATURAL GAS DISTRIBUTION PIPELINE	260	Various	08.2004
TPAO SİLİVRİ NATURAL GAS DISTRIBUTION PIPELINE	4.5	Various	03.2005
GAZİANTEP-OSMANİYE-ADANA-MERSİN TRANSMISSION PIPELINE	287	16-24-40	04.2005
MALATYA - GAZİANTEP NATURAL GAS TRANSMISSION PIPELINE	240	16-24-40	05.2005
KONYA - ISPARTA NATURAL GAS TRANSMISSION PIPELINE	258	16-40	05.2005
PT-2 - PT-3 PUMP STATION CONNECTION, RMS CONSTRUCTION	23	6	05.2005
PT-4 PUMP STATION CONNECTION, RMS CONSTRUCTION	17	6	05.2005
İSTANBUL SERAMİK NATURAL GAS DISTRIBUTION PIPELINE	50	Various	06.2005
EMET - ETİ HOLDİNG BORIC ACID FOUNDATIONS DISTRIBUTION	39	Various	07.2005
PT-1 HORASAN NATURAL GAS DISTRIBUTION PIPELINE PART 1	72	8	07.2005
PT-1 HORASAN NATURAL GAS DISTRIBUTION PIPELINE PART 2	72	8	07.2005
PT-1 HORASAN NATURAL GAS DISTRIBUTION PIPELINE PART 3	72	8	07.2005
SİVAS - MALATYA NATURAL GAS TRANSMISSION PIPELINE	195	24-40	08.2005
KIRKA - ETİ HOLDİNG BORON FOUNDATIONS DISTRIBUTION LINE	50	Various	08.2005
AKYAZI - PAMUKOVA – CELVİT DISTRIBUTION PIPELINE	41	Various	09.2005
SORGUN YOZGAT NATURAL GAS DISTRIBUTION PIPELINE	67	Various	09.2005
YOZGAT – SORGUN NATURAL GAS DISTRIBUTION PIPELINE	67	Various	09.2005
ISPARTA - NAZİLLİ NATURAL GAS TRANSMISSION PIPELINE	363	16-24-40	11.2005
NAZİLLİ - AYDIN - DENİZLİ NATURAL GAS DISTRIBUTION PIPELINE	70	Various	11.2005
BURDUR - ISPARTA - ANTALYA - AFYON DISTRIBUTION PIPELINE	59	Various	11.2005
TARSUS - MERSİN DISTRIBUTION PIPELINE (TARSUS SECTION)	70	Various	08.2006
MALATYA - K.MARAŞ - G.ANTEP DISTRIBUTION PIPELINE	60	6	08.2006

NAME OF THE PROJECT	LEN. (km)	DIA. (inch)	FINISH DATE
EASTERN BLACKSEA REGION TRANSMISSION PIPELINE PHASE 1	96	16-24	11.2006
KARACABEY - M.KEMALPAŞA DISTRIBUTION PIPELINE	91	Various	11.2006
AZERBAIJAN - TURKEY NATURAL GAS PIPELINE PHASE-1	113	42	12.2006
ADANA - İSKENDERUN - OSMANİYE DISTRIBUTION PIPELINE	94	Various	12.2006
NAZİLLİ - İZMİR NATURAL GAS TRANSMISSION PIPELINE PHASE 1	57.2	40	02.2007
NAZİLLİ - İZMİR NATURAL GAS TRANSMISSION PIPELINE PHASE 3	57.2	40	03.2007
AZERBAIJAN - TURKEY NATURAL GAS PIPELINE PHASE 2	113	42	03.2007
NAZİLLİ - İZMİR NATURAL GAS TRANSMISSION PIPELINE PHASE 4	53.2	10-40	04.2007
ADIYAMAN-Ş.URFA-ELAZIĞ-DİYARBAKIR PIPELINE PHASE 1	123	12-40	06.2007
ADIYAMAN-Ş.URFA-ELAZIĞ-DİYARBAKIR PIPELINE PHASE 2	130	16-40	06.2007
ORDU-GİRESUN NATURAL GAS TRANSMISSION PIPELINE PHASE 2	59	10	06.2007
ORDU-GİRESUN NATURAL GAS TRANSMISSION PIPELINE PHASE 1	99	14	07.2007
TURKEY - GREECE NATURAL GAS PIPELINE PHASE 1 (ON-SHORE)	188.6	36	07.2007
TURKEY - GREECE NATURAL GAS PIPELINE PHASE 2 (OFF-SHORE)	16.9	36	07.2007
NAZİLLİ - İZMİR NGTPL PHASE 2	76.5	12-40	08.2007
TURKEY - GREECE PHASE-3 MERİÇ/EVROS RIVER CROSSING	0.42	36	08.2007
EDİRNE - TEKİRDAĞ NATURAL GAS DISTRUBUTION PIPELINE	79	14-12	11.2007
I. KERKUK – CEYHAN CRUDE OIL PIPELINE (TURKISH SECTION)	641	40	-
II. KERKUK – CEYHAN CRUDE OIL PIPELINE (TURKISH SECTION)	656	46	-
CEYHAN – KIRIKKALE CRUDE OIL PIPELINE	641	40	-
BATMAN – DORTYOL CRUDE OIL PIPELINE	511	18	-
SELMO – BATMAN CRUDE OIL PIPELINE	41	6-8-12	-
BAKU – TBILISI – CEYHAN CRUDE OIL PIPELINE (TURKISH SECTION)	1076	30-42-46	-

Map 3.21. **National Pipeline Network of Turkey**



Source: Turkish Ministry of Energy and Natural Resources.

International

Turkey's existing crude oil pipelines are as follows:

- Iraq-Turkey Crude Oil Pipeline
- Baku – Tbilisi – Ceyhan Crude Oil Pipeline

And also existing natural gas pipelines are as follows:

- Russian Federation-Turkey Natural Gas Main Transmission Line
- Eastern Anatolia Natural Gas Main Transmission Line
- Samsun-Ankara Natural Gas Transmission Line (Blue Stream)
- Azerbaijan Natural Gas Pipeline (Shah Deniz)
- Turkey-Greece Natural Gas Pipeline

Map 3.22. **International Pipeline Network of Turkey**

Source: Turkish Ministry of Energy and Natural Resources.

Iraq-Turkey Crude Oil Pipeline

The Iraq-Turkey Crude Oil Pipeline System has been constructed under the Iraq-Turkey Crude Oil Pipeline Agreement that was signed on 27 August 1973 between the Governments of the Republic of Turkey and the Republic of Iraq for the purpose of transporting the Iraqi crude oil produced mainly in the Kirkuk Region and other production fields in Iraq to the Ceyhan (Yumurtalık) Marine Terminal. The 986 km long, 40" pipeline was commissioned in 1976 and the first tanker was loaded on 25 May 1977. The projects aiming at increasing the capacity of the pipeline system are as follows:

- The First Expansion Project: the construction started in 1983 was completed in 1984, which allowed increasing the initial annual transportation capacity of 35 mtpa to 46.5 mtpa.

- The Second Expansion Project: the construction of the second pipeline (parallel to the first line) started in 1985 was commissioned in 1987. This 46" pipeline allowed an increase of annual capacity to 70.9 mtpa.

Due to Iraq's inability to export its oil production and unavailability of free capacity in Ceyhan Terminal storage facilities, the Iraq-Turkey Crude Oil Pipeline operations were halted again on 9 April 2003. Transportation of oil has resumed, though below full capacity, since 22nd February 2004. Over 43 million barrels of oil were transported in 2007 by Iraq-Turkey Crude Oil Pipeline.

Baku-Tbilisi-Ceyhan Crude Oil Pipeline

The Baku-Tbilisi-Ceyhan Crude Oil Pipeline Project is aimed at transporting crude oil produced in Azerbaijan via Georgia to a marine terminal in Ceyhan, Turkey, with marine access to international markets. The maximum capacity of the Baku -Tbilisi - Ceyhan Crude Oil Pipeline, starting from the Sangachal Terminal near Baku, traversing Georgia and reaching the marine terminal built in Ceyhan on the Mediterranean shoreline of Turkey, is 50 million tonnes per year (1 million barrels per day). The total length of the pipeline will be 1 776 km while the Turkish Section will be approximately 1 076 km long.

The Turkish section of the pipeline was constructed in three lots. Part of the pipeline in Turkey, Lot A starts from Georgia / Turkey Border and lies to northeast of Erzurum and has a length of 278 km. Lot B, which is 466 km long, extends from Erzurum to KP 744. Finally, Lot C serves to Ceyhan Marine Terminal through a route of 332 km.

It is anticipated that, the Kazak oil will be transported via the BTC Pipeline to the World Market in a short time. To transport more crude oil with pipeline, studies of increasing the capacity of the pipeline gradually to 1.2 million barrels per day and then 1.6 million barrels per day are ongoing.

Russian Federation-Turkey Natural Gas Main Transmission Line

As a consequence of studies to search for alternative energy sources, an Intergovernmental Agreement was signed on 18th September 1984 for transmission of natural gas between the Governments of the Republic of Turkey and the Former Soviet Union. Subsequently, in 1985, BOTAŞ carried out a "Natural Gas Utilization Study" in view of determining Turkey's potential natural gas demand and the possible route for the pipeline. Based upon the results of this Study, a Natural Gas Sale and Purchase Agreement was signed on 14th February 1986 between BOTAŞ and SOYUZGAZEXPORT for 25 years. According to this Agreement, supply of natural gas to Turkey started in 1987 and the volume transported gradually increased to reach 6 bcma (billion cubic metres per annum) in the plateau period in 1993.

The 845 km long Russian Federation-Turkey Natural Gas Main Transmission Line enters Turkey at Malkoçlar at the Bulgarian border and then follows Hamitabat, Ambarlı, İstanbul, İzmit, Bursa, Eskişehir route to reach Ankara. The pipeline, designed for a maximum operating pressure of 75 bar.

The construction of the pipeline started on 26th October 1986 and reached Hamitabat on 23rd June 1987. Since then, imported natural gas has been used together with domestic gas for power generation at the Trakya Combined Cycle Power Plant in Hamitabat. The pipeline reached Ankara in August 1988. Natural gas started to be delivered to İstanbul Fertilizer Industry Co. (IGSAS) in July 1988, to the Ambarlı Power Plant in August 1988 and to Ankara for residential and commercial usage in October 1988. The use of natural gas by the industrial sector started in August 1989. Following Ankara, residential and commercial usage of natural gas started in İstanbul in January 1992, in Bursa in December 1992, in İzmit in September 1996, in Eskişehir in October 1996 and in Adapazari in December 2002.

Eastern Anatolia Natural Gas Main Transmission Line

The Eastern Anatolia Natural Gas Main Transmission Line is aimed at transporting natural gas produced mainly in Iran and other countries in the east of Turkey. In this context, a Natural Gas Sale and Purchase Agreement was signed on August 8, 1996 between the Republic of Turkey and the Islamic Republic of Iran according to which natural gas delivery to Turkey would start at a volume of 3 bcma to reach 10 bcma in the plateau period. Approximately 1 491km-long Eastern Anatolia Natural Gas Main Transmission Line with diameter varying from 48" to 16" starts from Doğubeyazıt and reaches to Ankara through Erzurum, Sivas, and Kayseri, and another branch thereof reaches to Seydişehir through Kayseri and Konya. The complete pipeline system was ready for gas transportation as of June 2001. The natural gas deliver from Iran was started on 10th December 2001 with the completion of Bazargan Metering Station in Iran.

Samsun-Ankara Natural Gas Transmission Line (Blue Stream)

Natural gas is transmitted from the Russian Federation to Turkey via Black Sea under the Natural Gas Sale and purchase Agreement executed between BOTAŞ and GAZEXPORT with a term of 25 years on 15th December 1997. Under the Agreement, the annual quantity will increase to 16 Bcm during the plateau period. The Russian Federation-Black Sea-Turkey Natural Gas Pipeline includes:

- Total 370 km long pipeline system, with 56" 308 km long pipeline and 48" 62 km long pipeline within the Russian territory between Izobilnoye-Djubga.
- The Black Sea crossing, two parallel 24" lines approximately 390 km long each between Djubga and Samsun.
- 501 km long 48" pipeline system, within the Turkish territory between Samsun and Ankara.

Within the context of the project, the pressure reduction and metering station was constructed at Durusu/Samsun and completed on 15th October 2002. The construction of the Turkish sections of the pipeline system from Samsun to Ankara via Amasya, Çorum and Kırıkkale was completed and the line was connected to the Russian Federation-Turkey Natural Gas Main Transmission Line near Polatlı. The pipeline was put into operation on 20th February 2003, and the official inauguration was on 17th November 2005.

Azerbaijan Natural Gas Pipeline Project (Shah Deniz Project)

This Project is aimed at transporting the natural gas produced in Azerbaijan via Georgia to Turkey. Regarding the Project Natural Gas Sale and Purchase Agreement was signed on 12th March 2001 by BOTAŞ and SOCAR. According to the 15 years agreement natural gas delivery would start with 2 bcma and reach 6.6 bcma on plateau period.

The construction works of 225 km long pipeline section in Turkey between Georgia/Turkish border and Erzurum-Horasan were completed. The pipeline became operational in July 2007 and gas deliveries from Azerbaijan are on-going. 1.474 million bcm natural gas is imported in 2007.

Turkey-Greece NG Pipeline Project

In the scope of the Southern Europe Gas Ring, which was developed in the frame of the INOGATE (Interstate Oil and Gas Transport to Europe) of the EU Commission, and with the aim of transporting natural gas to be supplied from sources located in the Caspian Basin, Russian Federation, the Middle East, Southern Mediterranean countries, and other international sources through Turkey and Greece, the Natural Gas Sale and Purchase Agreement was signed between BOTAŞ and DEPA (Greek State Natural Gas Company) on 23rd December 2003. In parallel to the mentioned agreement, the Turkish section of the Turkey-Greece Natural Gas Pipeline Project was contracted out in three lots. The contract of the Land Section (Lot-1) was signed on 30th June 2005, the contract of the Sea Section (Lot-2) was signed on 24th October 2005 and the contract of the Meriç-Evros River Section (Lot-3) was signed on 30th March 2007.

The total length of the 36" pipeline is 296 km, 211 km of the pipeline is the Turkish Section and 85 km is the Greek Section. The length of the section between Karacabey and the Sea of Marmara (Değirmencik) is 121 km, the Sea Section (Kızılcaterzi) is 17 km and the Thracian Section is 73 km. Furthermore, the 420 m long Meriç-Evros River was crossed by the horizontal drilling system. The pipeline enters Greece at İpsala Border Crossing and ends in Komotini. The constructions of the Land Section (Lot-1) were completed on 30th July 2007. Sea Section (Lot-2) was completed on 5th July 2007 and Meriç-Evros River Crossing (Lot-3) was on 18th August 2007. After the completion of the project, natural gas will be also supplied to Keşan and İpsala districts of Edirne province.

Accordingly, natural gas delivery to Greece would start in 2006 at a level of 250 mcma and then would reach 750 mcma, on plateau period. The construction works of the lines that have been initiated on July 2005, have already been completed and the gas delivery to Greece was initiated on 18th November 2007.

3.5.2. Pipeline Operations

National

In Turkey, all the transmission lines are owned by BOTAŞ, which is the only corporator that is responsible for transmission of natural gas. In the past years BOTAŞ was also responsible for distribution of natural gas but by privatization, distribution rights are started to be given to private distribution companies. In the next years the privatization of transmission rights is considered. Licenses of distribution and transmission of natural gas are issued by Energy Market Regularity Authority. Distribution Companies owns the pipelines that they construct.

There are a few national oil pipelines in Turkey. National oil pipelines and their rights are owned only by BOTAŞ.

Table 3.15. **Annual Natural Gas Consumption (million m^3)**

	ELECTRICITY	FERTILIZER	HOME-USE	INDUSTRY	TOTAL
1987	522	-	-	-	522
1988	1 034	152	0.05	-	1 186
1989	2 759	382	7	5	3 153
1990	2 599	501	50	222	3 373
1991	2 908	485	190	547	4 132
1992	2 633	652	375	861	4 521
1993	2 595	797	549	1 011	4 952
1994	3 037	612	647	955	5 251
1995	3 857	732	1 014	1 190	6 793
1996	4 174	830	1 526	1 376	7 906
1997	5 019	761	2 041	1 899	9 721
1998	5 491	493	2 247	2 041	10 271
1999	7 950	144	2 429	1 858	12 382
2000	9 733	113	2 806	1 914	14 566
2001	10 994	121	2 849	2 063	16 027
2002	11 631	496	2 973	2 277	17 378
2003	13 513	469	3 944	3 012	20 938
2004	13 226	528	4 463	3 892	22 108
2005	15 435	594	5 843	4 993	26 865
2006	16 642	157	7 259	6 435	30 493
2007	19 658	-	7 836	7 569	35 064

International

International pipeline projects are implemented by consortiums. Consortiums consist of several natural gas and/or oil companies or the companies of the countries that pipeline passes through. In the most of the projects, the pipelines passing through Turkey is owned by BOTAŞ. But in some projects, all pipeline is owned by Consortium. For example Turkey part of Turkey-Greece-Italy is owned by BOTAŞ. But, on the contrary Baku-Tbilisi-Ceyhan (BTC) Crude Oil Pipeline is all owned by BTC Co.

Table 3.16. **Annual Natural Gas and LNG Imports (million m^3)**

	RUSSIA (West Pipeline)	IRAN	RUSSIA (Blue Stream)	AZERBAIJAN (Shah Deniz)	NIGERIA (LNG)	ALGERIA (LNG)	SPOT (LNG)	TOTAL
1987	433	-	-	-	-	-	-	433
1988	1 136	-	-	-	-	-	-	1 136
1989	2 986	-	-	-	-	-	-	2 986
1990	3 246	-	-	-	-	-	-	3 246
1991	4 031	-	-	-	-	-	-	4 031
1992	4 430	-	-	-	-	-	-	4 430
1993	4 952	-	-	-	-	-	-	4 952
1994	4 957	-	-	-	-	418	-	5 375
1995	5 560	-	-	-	-	1 058	240	6 859
1996	5 524	-	-	-	-	2 436	80	8 041
1997	6 574	-	-	-	-	3 300	-	9 874
1998	6 539	-	-	-	-	3 051	644	10 233
1999	8 693	-	-	-	77	3 256	332	12 358
2000	10 079	-	-	-	780	3 962	-	14 821
2001	10 931	115	-	-	1 337	3 985	-	16 368
2002	11 603	669	-	-	1 274	4 078	-	17 624
2003	11 422	3 520	1 252	-	1 126	3 867	-	21 188
2004	11 106	3 558	3 238	-	1 034	3 237	-	22 174
2005	12 857	4 322	4 969	-	1 030	3 851	-	27 028
2006	12 246	5 691	7 403	-	1 118	4 203	80	30 741
2007	13 799	6 158	9 346	1 474	1 420	4 277	170	36 450

Table 3.17. **Annual Transported Crude Oil (x1000 barrels)**

	IRAQ-TURKEY PIPELINE	**CEYHAN-KIRIKKALE PIPELINE**	**BATMAN-DÖRTYOL PIPELINE**	**ŞELMO-BATMAN PIPELINE**	**BTC PIPELINE**
1990	339 939	21 130	22 544	1 526	
1991	-	17 697	27 944	1 332	
1992	-	20 374	25 732	1 295	
1993	-	24 210	23 041	804	
1994	-	22 648	22 289	1 088	
1995	-	24 887	20 146	832	
1996	5 215	29 642	16 979	751	
1997	134 562	27 644	18 753	703	
1998	277 671	23 435	17 128	644	
1999	305 603	28 897	17 767	611	
2000	285 716	24 751	18 904	825	
2001	230 855	24 779	19 836	793	
2002	175 667	26 510	18 482	691	
2003	60 824	26 357	9 417	851	
2004	37 685	24 601	9 488	767	
2005	13 166	25 986	10 108	634	
2006	12 930	27 381	10 822	535	57
2007	43 699	23 003	10 147	507	210 352

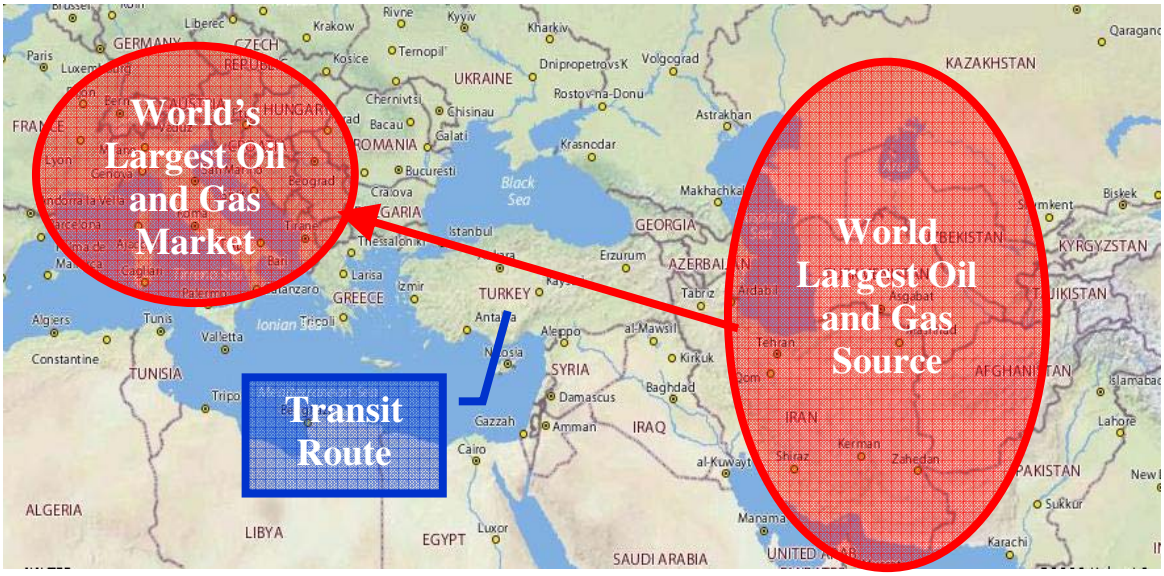
3.5.3 *Pipeline Administration and the Legal Framework*

Turkey's pipeline administration and the legal framework are as follows.

INSTITUTION	RESPONSIBILITY
Ministry of Energy and Natural Resources	• Defining the Strategies of International Pipeline • Determining the Policies of International Pipelines • Implementation of the International Agreements about Pipelines
BOTAŞ Petroleum Pipeline Corporation	• Projecting, Constructing, Operating, Selling, Buying, Lending, Tendering National or International Pipelines • Transporting Petroleum or Petroleum Products
Energy Market Regulatory Authority	• Regulating and Supervising

3.5.4 *Pipeline Infrastructure Development*

Map 3.23. **Transit Route Between World's Largest Oil and Gas Markets**



Source: Turkish Ministry of Energy and Natural Resources.

Turkey's planned / on construction pipelines are as follows:

- Egypt-Turkey Natural Gas Pipeline Project
- Samsun – Ceyhan Crude Oil Pipeline Project
- Turkey-Greece-Italy Natural Gas Pipeline Project
- Turkey-Bulgaria-Romania-Hungary-Austria Natural Gas Pipeline Project (Nabucco)
- Iraq-Turkey Natural Gas Pipeline Project
- Trans-caspian Turkmenistan-Turkey-Europe Natural Gas Pipeline Project

Egypt-Turkey Natural Gas Pipeline Project

Egypt – Turkey Natural Gas Pipeline Project is developed for transmitting the Egypt Gas to Turkey via Jordan – Syria and also to Europe via Turkey. With this project 10 bcm natural gas will be transported annually in the plateau period. 3.4 bcma of this capacity will be allocated to Jordan and remaining 6.6 bcm gas will be transported to Turkey via Syria.

The Arab Natural Gas Pipeline Project is composed of following three phases:

- *Phase I*: Egypt (Al-Arish) - Jordan (Akabe)
- *Phase II*: Jordan (Akabe)-Jordan (Rehab) and Jordan (Rehab)-Jordan/Syria Border
- *Phase III:* Syrian border -Rayan and Rayan—Syria/Turkey border

First two phases and half of the third phase are finished at Arab Gas Pipeline which is 1236 km long. At present, the pipeline has reached the city of Homs in the middle of Syria. Aleppo-Turkey Border section of pipeline which is 62 km long will be constructed by Syria. By constructing the 90 km part of pipeline in Turkey borders, at the end of 2010 natural gas pipeline networks of both countries will be connected.

Samsun – Ceyhan Crude Oil Pipeline

Each year, the amount of transported crude oil via the Turkish Straits gradually increases. Although in 2003 transported crude oil amount was 134 millions tonnes, by the end of 2006 this reached to 140 millions tonnes and it is expected to reach some 190-200 million tonnes in the year 2009. This trend so seriously brings about environmental and social risks on the Turkish Straits and especially on historical, cultural and world heritage city of İstanbul.

In this respect, Samsun – Ceyhan Crude Oil Pipeline Project developed for decreasing the oil tanker traffic on Turkish Straits. With in the context of this project a pipeline system will be constructed between Samsun to Ceyhan which will transport 70 million tonnes of crude oil annually. This amount is planned to meet the 67.8 million tonnes/year planned capacity of CPC Pipeline in the future.

The pipeline project has been 2 shareholders which are ENI from Italy and Çalık from Turkey. Pipeline will be constructed 42” and 48” moreover 512 km length and the cost of pipeline is assumed to be 2 billion dollars. The groundbreaking ceremony of the project has been performed at 24th April 2007 in Samsun.

Turkey-Greece-Italy Natural Gas Pipeline Project

Turkey-Greece-Italy Natural Gas Pipeline is the extension of the Turkey-Greece Natural Gas Pipeline that has been developed to connect the natural gas systems of Turkey and Greece and to realize the first step of INOGATE Program (Interstate Oil and Gas Transport to Europe). Accordingly, the line would extend from Greece to Italy beneath the Adriatic Sea. BOTAŞ signed an agreement with DEPA and EDISON in order to participate in the feasibility studies on Greece-Italy connection. On 31th January 2007, the authorities of Italy and Greece signed an agreement in Athens about the Adriatic crossing. Intergovernmental Agreement of Turkey-Greece-Italy Natural Gas Pipeline (ITGI) was signed by the Ministry of Energy and Natural Resources of Turkey and the relevant ministries of both countries on 26th July 2007 in Rome.

According to the Project studies; natural gas volume to be transported to Italy by the Turkey-Greece-Italy Line would be approximately 12 bcma of which 3.6 bcma would be transported to Greece and rest would be to Italy. The Line is planned to become operational in 2012.

Turkey-Bulgaria-Romania-Hungary-Austria Natural Gas Pipeline Project (Nabucco)

Turkey-Bulgaria-Romania-Hungary-Austria Natural Gas Pipeline (Nabucco Line), which is envisaged to transport Caspian and Middle East gas to European Markets, will supply natural gas to the countries on its route in the first phase. The target for the following years is to reach the Western European market to cover their demand through Austria, which is a gas hub at the European natural gas transportation system. The total capacity of 3.300 km pipeline will be 25.5-31 bcma and the line will become operational in 2012.

The total length of the line will be:

Total Length of Nabucco Pipeline (excluding feeder lines): 2 841 km
Total Length of Nabucco Pipeline (including feeder lines): 3 282 km
Turkey: 1 558 km
Bulgaria: 392 km
Romania: 457 km
Hungary: 388 km
Austria: 46 km

Feeder Lines

Georgian Border – Horasan: 226 km
Iranian Border – Horasan: 214 km
Turkey Total: 1 908 km

The gas to be produced in Azerbaijan, Turkmenistan and the other Caspian sources and Iran will be the sources for the line. The natural gas from Iraq and Egypt through Syria is planned to be transported in the long term. The studies on project were started in February 2002 by initiative of BOTAŞ with the working group formed by OMV Erdgas (Austria—today OMV Gas), BULGARGAZ (Bulgaria), TRANSGAZ (Romania) and MOL (Hungary) with BOTAŞ. Five partners of the Project established "Nabucco Company Study Pipeline GmbH" in Vienna in order to develop project finance model, to search suitable incentives for the investors, to coordinate the marketing activities as well as to negotiate the contracts with the possible suppliers. Afterwards "Cooperation Agreement" was signed in 2004 by partners. This Agreement would enable the formation of extended descriptions of project engineering, construction and financing studies. Considering the developments and the needs of the Nabucco Project, the partners have transformed the company to Nabucco Gas Pipeline International (NIC) in order to be able to materialize the investments and to provide finance. The partners also have agreed to establish Nabucco National Companies (NNC) in each particular country. The national companies are obliged to develop, construct, operate and maintain the part of the line in their territories. National companies in Austria, Romania, Hungary and Bulgaria have already been established while the legal procedures in Turkey are currently under way.

On 5th February 2008, RWE Midstream Gmbh joined the Nabucco Project as sixth partner. The studies are ongoing for the Intergovernmental Agreement among participant States.

Iraq-Turkey Natural Gas Pipeline Project

Iraq-Turkey Natural Gas Pipeline Project is developed for the purpose of transporting Iraq gas to Turkey. The project studies were first initiated by the agreements that were signed by the Ministry of Energy and Natural Resources of Turkey and the Iraqi Petroleum Minister in 1996 after the studies of Working Group formed by TPAO, TEKFEN and BOTAŞ. This project is an integrated one including field development, production, and processing and pipeline transportation of gas of northeastern part of Iraq. Accordingly 10 bcma of gas to be produced in five gas fields would be transported to Turkey. As a result of the sanctions imposed on Iraq by the United Nations, the Project has delayed and negotiations were held and therefore the investment phase of the project could not be initiated. Considering the developments in Iraq and gas demand increase trend of Europe, currently TPAO, TEKFEN and BOTAŞ are taking necessary steps in order to take further the project. The ultimate purpose of the Project is to transport Iraqi gas to Turkey at first hand and later on to Europe through Turkey.

On 7th August 2007 a MoU was signed by Ministry of Energy and Natural Resources of Turkey and Iraqi Oil Minister in Ankara. With this MoU parties have declared their intention of the transportation of Iraqi gas to Europe through Turkey and their decision to form a group by the Iraqi Petroleum Ministry BOTAŞ and TPAO in order to initiate the related feasibility studies.

Transcaspian Turkmenistan-Turkey-Europe Natural Gas Pipeline Project

The Turkmenistan – Turkey – Europe Natural Gas Pipeline Project is aimed at transporting natural gas produced in Turkmenistan via the Caspian Sea to Turkey and then to Europe. A Frame Agreement was signed by the Presidents of the Republic of Turkey and the Turkmenistan on 29th October 1998 for the implementation of the Turkmenistan- Turkey-Europe Natural Gas Pipeline Project. According to this Agreement, 30 bcma of Turkmen gas would be transported through this pipeline, with 16 mcma being supplied to Turkey and the remaining to Europe. A Natural Gas Sale and Purchase Agreement valid for 30 years was signed on 21th May 1999 by BOTAŞ and the Competent Body for the Use of Hydrocarbon Resources at the President of Turkmenistan. Accordingly, 16 bcma of Turkmen gas would be supplied to Turkey.

3.5.5. Future Developments and Challenges

Due its unique position, Turkey provides crucial export routes for the transportation of oil and gas resources to the world markets. In this context, Turkey has been studying gas pipeline projects to transit around 40 bcm natural gas to Europe in the short and medium term. In the long term it is estimated that as much as 100 bcm gas could be supplied through Turkey.

In short, Turkey is destined to become a major hub and transit country for hydrocarbon reserves of Middle East and Central Asia to Europe in the upcoming few years.

In line with this goal, Turkey is actively implementing the transit projects. In this way, gas to be pooled in Turkey from different sources would be delivered to Europe through diversified pipeline routes thereby enhancing the supply security of Europe.

In addition, approximately 200 million tonnes of crude oil will be transferred to the world market after the Samsun – Ceyhan Crude Oil Pipeline construction is completed.

3.6 Logistic Centres: Freight Villages and Intermodal Terminals

European logistic planning often successfully combines freight villages and intermodal terminals, despite their different logistic needs.

Freight villages are sites with multiple logistic businesses that generate improved efficiency by local concentration and spatial neighbourhood groupings. Their main function is to act as an interface between less-than-carload-consignments (LCL) and full –car-load conveyance (FCL). The process can be described as follows: forwarders organise their depots. During the day small trucks collect LCL consignments all over the region, and bring them to the depot. The consignments are sorted and put together for car loads for certain directions. This can be, in principle, done at any point in the outer city space. Freight villages offer the advantage of side by side services for several forwarders. Although these forwarders might be in strict competition, there will usually be cause for cooperation: when one forwarder has to collect a parcel from a far away shipper and knows that the long distance travel is not worth one consignment, he asks a nearby colleague working that area, to deliver and collect for his specific customers. The forwarder will ask him to move his itinerary nearby and will take over the consignment for him.

Another case is possible cooperation in FCL transport: when one forwarder has more cargo than a truck load, while his colleague, going to a nearby place, has empty space on his truck, they balance their volume.

Most of these cooperation cases make sense only if the parties are close to each other. Otherwise, the additional mileage to re-organise shipments will negate the savings of balanced tasks.

Freight villages offer additional logistical functions, such as customs treatment, cargo processing (like roasting coffee beans, ironing import clothing etc.) that create their economy mainly on spatial organisation, i.e. by being next to each other.

Intermodal terminals mainly transfer unit loads from road to rail transport or from road to inland waterway transport systems. In addition, they may organise to pick up and deliver over the road, deposit empty containers, clean and repair containers, and in some cases, even strip and stuff containers. In such cases the value of having a freight village in the neighbourhood is clear: most services that are needed when, for example, stripping an import container, are grouped in the freight village. Such services might include processing import items for local retail sales; an example of this is adding user manuals in the national language, taking them into depot, sorting them for national distribution in consolidation truck loads, etc.

The other advantage of such neighbourhoods is the intermodal offer for the LCL distribution of consolidated cargo: the transport operation from the collection depot to the distribution centre is mostly undertaken by road transport because the next intermodal terminal is too far away to be included into this freight organisation. If a part of a logistic centre is next to the freight village, the possibilities for use are much better. The forwarder puts together his consolidated long distance consignments in the evening, and then is offered an intermodal facility about 800 m away and a daily night train in the same direction. In such cases, the forwarder will most likely choose the intermodal offer and shift the FCL voyage from road to rail.

Interesting examples of such integration of freight villages can be found in Bremen (Germany), Bologna (Italy) and Budapest (Hungary). In all these cases the inland terminal for transfer of containers, swap bodies and semi-trailers between road and rail are situated within a greater logistic area, accompanied by many service providers for transport and logistics nearby. All these intermodal terminals draw great profit from such neighbourhoods.

In order to establish such a system in Turkey, TCDD has included in its priorities the transformation of six locations into freight villages, namely Halkalı (İstanbul), Köseköy (İzmit), Boğazköprü (Kayseri), Gelemen (Samsun), Hasanbey (Eskişehir), Gökköy (Balıkesir), as a first step. The objective is to ensure the enhanced attractiveness of combined transport, an increase in the customer satisfaction and the share of freight transportation as well as the prevention of pollution.

In Samsun, the first freight village of Turkey was partly put into service on 6th July 2007 and the construction works have almost been finalized. Project works for Köseköy, Boğazköprü, Hasanbey and Gökköy have been concluded, while the construction works in Halkalı are underway.

Additionally, establishment of logistic villages has been included in "The TCDD Investment Programme for 2007". Moreover, applications have been submitted to the State Planning Organisation (SPO) to establish logistic villages in Uşak, Yenice (Mersin), Palandöken (Erzurum) and Konya where there is a high demand for transport.

The initiative to establish logistic villages in Turkey can be seen as a positive response to meet recent trade needs. It also reflects Turkey's willingness to facilitate intermodal operations by enhancing the logistics supply and demand chain.

To conclude, freight villages and intermodal terminals are logistic nodes with differing functions. The transport system often will operate much more efficiently if both are integrated into one place where they can offer their specific services to each other.

CHAPTER 4. INTERMODAL TRANSPORT OPERATIONS IN AND WITH TURKEY

4.1. Definitions and Context

"Intermodal transport" is generally defined as the movement of goods in one and the same loading unit or road vehicle, which uses successively two or more modes of transport without handling the goods themselves in changing modes[1]. By extension, the term intermodality describes a system whereby two or more modes of transport are used to transport the same loading unit or truck in an integrated manner, without loading and unloading, in a door-to-door transport chain.

In the present peer review, intermodal transport is used in a slightly more narrow definition, which is substantively in line with the term "combined transport".

Intermodal transport in this sense includes the policy objective of using, for the major part of a transport operation, as appropriate and if available, rail, inland water transport or sea/maritime transport. Only initial and/or final hauls should be carried out by road. This approach is supported by the ITF and the UNECE to promote a sustainable transport system that can benefit from the specific advantages of each mode of transport by facilitating trans-shipment operations among the modes without loading or unloading of the cargo, except for bulk cargo on specific transport relations.

As there are no navigable rivers in Turkey, the long-haul transport operations involving intermodal transport services in Turkey, are rail and sea/maritime transport, including short-sea and ferry operations.

The terms "multimodal transport" and "co-modality" are not used in this Peer Review. Multimodal transport defines very generally the carriage of goods by two or more modes, often under one and the same contract. It therefore refers to the contractual situation in modern logistics chains where, one person or legal entity is responsible for the organization of the total door-to-door transport operation. Similarly, the term co-modality, recently coined by the European Commission (EC) in its mid-term review of the 2001 White Paper on sustainable transport, is not pursued in this peer review. This term is used in the specific context of the European Community transport policy which goes considerably beyond the intermodal concepts pursued in this review, and may downgrade efforts towards a modal shift away from road transport on the long-haul.[2]

In Turkish national and international operations, different forms of intermodal transport can be distinguished:

(a) Road-rail operations refer to the transport of containers, swap-bodies, semi-trailers or lorries that are carried on specially adapted railway wagons. A special form of road-rail transport is the so-called "rolling road" or Rollende Landstrasse (Ro-La) technique, where complete road vehicles, using roll-on roll-off techniques, are transported on low-floor wagon trains.

(b) Roll-on-roll-off (RO-RO) maritime operations refer to the transport of lorries, semi-trailers, containers or swap-bodies to ships on their own wheels or on wheels attached to them for

this purpose. This also covers national and international ferry services, including railway ferries as well as national short-sea shipping.

Air cargo services are normally not in competition with road, rail or short-sea shipping as they cover different clients and markets. Therefore, air cargo transport is not covered in this chapter. It is however recognized that on certain long international and even domestic transport links, such as between İstanbul and major cities in southern or eastern Turkey, air cargo services may compete with road transport in some small market segments, such as newspapers, perishable foodstuffs, etc.

This section provides an overview of the present situation of intermodal transport in Turkey, both within the country and with its main trading partners. It also provides information on intermodal services that are being developed or planned within the next few years.

4.2 Road-Rail Intermodal Transport Operations

4.2.1 National road-rail transport

At present, railways in Turkey do not carry intermodal transport units, such as containers, swap-bodies or semi-trailers in pure national transport. Partly because of the strong position of long-haul domestic road transport in Turkey, there does not seem to be a market for such intermodal services, even though distances between main economic centres within Turkey are often beyond 500 and 600 km apart. At these distances intermodal transport operations are considered to be viable in Western European countries.

Conventional block trains, operating without shunting *en route*, have been launched in 2004 by TCDD. Such services were put into operation on a regular basis in 2005, and this has led national rail transport to grow faster.

While in traditional rail transport in Turkey, freight trains moved at an average speed of 5 km per hour, block train operations increased this speed to 25 km per hour, covering a distance of 1 815 km within 3 days. This has led to a significant increase in cargo volumes transported by TCDD and made an inroad into the market share held so far by domestic road transport. Between 2002 and 2006, volumes transported by domestic block trains increased from 14.4 to 19.6 million tonnes (36% increase) and revenues from this type of service jumped during the same period from 151.4 million TNL[3] to 317 million TNL with a 109% increase. Presently, 138 block trains operate daily on the Turkish rail network.

The recent success of domestic block train operations in Turkey is a good indicator of the market potential that may be tapped by railways if they perform in line with the market demands in terms of transport quality i.e. speed, reliability, flexibility tracking and tracing, etc. These factors will become increasingly decisive in modern transport chains, and also in purely national transport markets.

4.2.2. International road-rail transport

At present, 66 block trains operate weekly to and from Turkey. The large majority of these international trains operate between Turkey and the Middle East (47 weekly departures) and in particular to and from Syria and Iran (22 and 17 weekly departures respectively). Seventeen trains operate weekly between Turkey and EU countries such as Austria, Germany, Hungary and Romania.

The following table provides an overview of conventional and intermodal block trains that currently operate on a regular basis between Turkey, the EU, the Middle East and Central Asia.

Table 4.10. **Block Trains Transport**

Block trains Transport relation Status: 9 April 2007	Loading units/ wagons	Frequency (weekly departures)	Additional information
European Union		**17**	
Köseköy-Cologne	Swap-bodies	4	Dedicated automobile service Difficulty in securing cargo on Köseköy-Cologne relation
Köseköy-Bucharest	Automobiles	2	Dedicated automobile transport
Çukurhisar-Vienna	Containers	2	
Çukurhisar-Sopron	Containers	1	
Halkalı -Sopron	Containers	4	
Halkalı -Vienna	Containers	1	
Halkalı -Lambach	Containers	1	
Halkalı -Nürnberg/Wanne	Containers	1	
Halkalı -Ljublijana	Rail wagons	1	
Halkalı -Wells	Lorries (Ro-La)		Pilot operation as of 21.09.2006 6 trains with 20 lorries each
Middle East		**47**	
Manisa-Iran	Rail wagons	1	
Köseköy-Iran	Rail wagons	3	
Ankara-Iran	Rail wagons	3	
Mersin-Iran	Rail wagons	1	
Torbalı-Iran	Rail wagons	1	
İskenderun-Iran	Rail wagons	4	
Bandırma-Iran	Rail wagons	1	
Samsun-Iran	Rail wagons	2	
Burdur-Iran	Rail wagons	1	
Mersin-Iraq	Rail wagons	4	
Manisa-Iraq	Rail wagons	2	
Amasya-Iraq	Rail wagons	1	
Samsun-Iraq	Rail wagons	1	
Mersin-Syria	Rail wagons	5	
Haydarpaşa-Syria	Rail wagons	1	
Arifiye-Syria	Rail wagons	1	
Ankara-Syria	Rail wagons	2	
Samsun-Syria	Rail wagons	2	
Tatvan-Syria	Rail wagons	2	
Konya-Syria	Rail wagons	1	
Adana-Syria	Rail wagons	5	
İskenderun-Syria	Rail wagons	2	
Kaklik-Syria	Rail wagons	1	
Central Asia		**2**	
Haydarpaşa-Almaty	ISO containers	1	Difficulty in securing cargo on Almaty-Haydarspaşa relation
Haydarpaşa-Turkmenistan	ISO containers	1	Difficulty in securing cargo on Turkmenistan-Haydarpaşa relation
Total		**66**	

International container trains

The large majority of the block trains between Turkey and the EU countries carry containers. Also all trains to Central Asia are container block trains (*see box below*). On the other hand, none of the 47 weekly international block trains to the Middle East carry containers or other intermodal loading units.

In total, transport of containers by TCDD increased from 1.75 million tonnes in 2005 to 3.02 million tonnes in 2006.

Container Block Trains to Central Asia

Since 22nd June 2002, there exists a regular weekly container block train between Haydarpaşa, Tehran, Tashkent and Almaty. The train covers a total distance of 6722 km, crossing Iran, Turkmenistan and Uzbekistan with the transhipment of containers at the border station Sarakhs, between Iran and Turkmenistan. The maximum train length is 420 m and the maximum number of containers carried per train is 20; these are 40 feet long ISO containers with maximum gross weight of 32 tonnes. The total journey lasts 12 days with an average daily transport distance of 594 km.

The containers are transhipped at Sarakhs station due to different axle gauges. A change of boogies is not possible. Transfer from CIM (COTIF) to SMGS consignment notes is made at Razi border station between Turkey and Iran.

So far, 1035 containers have been shipped (497 to Uzbekistan, 369 to Kazakhstan, 120 to Turkmenistan, 28 to Tajikistan and 21 to Kyrgyzstan).

On 26th December 2003, another weekly container block trains was inaugurated between Haydarpaşa and Sarakhs at the Iran -Turkmenistan border. So far 610 containers have been carried on this transport route.

All containers transported by TCDD must be provided by the shipper, as TCDD does not own or operate containers. While the transport of these containers can be tracked and traced on the Turkish and Iranian networks, the other railways involved cannot provide such information. In addition it seems to be extremely difficult to obtain cargo for the westward journeys.

Swap-body and European Container Trains

While the majority of international block trains operating between EU countries and Turkey carry ISO maritime containers, a limited number of non-ISO European containers with an external length of 13.6 m (around 45 ft) and a width of 2.50 m, allowing efficient stowage of pallets side-by-side, are being carried between Germany, Austria and Halkalı.

There also exists a regular intermodal transport service using swap-bodies. This service, covering a distance of 2 754 km, operates four weekly block trains in both directions between Cologne (Germany) and Köseköy on the Asian side of Turkey, using the rail ferry across the İstanbul Strait. Each block train carries 30 swap bodies (internal dimensions: height 2.98 m; length 13.39 m and width 2.41 m) loaded on special low-loader rail wagons. These trains carry mainly automotive parts for the Ford Otosan plant in Kocaeli. These block trains replace annually around 10,400 truckloads between Germany and Turkey.

Rail Transport of Automobiles

There is also a market for automobile transport on special railway wagons. Two weekly block trains that carry around 200 automobiles each, have operated on the 890 km journey between Bucharest (Romania) and Köseköy since August 2006, again, using the rail ferry across the İstanbul Strait. These trains link up with domestic automobile trains from Köseköy to Yenice (Adana) and Köseköy-Borçova (İzmir), providing through- transport to the respective automobile factories in Turkey.

Rolling Motorway (Ro-La)

As of 16th September (from Wels) and 21st September 2006, (from Halkalı) six trial runs of a rolling road motorway (Ro-La) have been undertaken linking the terminals at Halkalı with Wels (Austria) over a distance of 1 979 km. This project has been launched by Austrian and Turkish partners, and involved the railways of Bulgaria, Serbia, Croatia and Slovenia. The special rail wagons were owned by Ökombi. This Ro-La is unaccompanied and therefore does not provide sleeping wagons for drivers; they take a plane from İstanbul to Vienna and vice versa. Customers are Turkish road transport companies.

These journeys take 72 hours, which is comparable to the time of road transport. Each train could carry 20 trucks. The charge for the carriage of the lorry is approximately 1 100 euros. Pilot operations have now been suspended, but in the case of sufficient demand, it is planned to operate daily trains in both directions.

4.3. Roll-On-Roll-Off (RO-RO) Ferry Services

4.3.1. National RO-RO ferry services

There are frequent and regular domestic RO-RO ferry services across the Marmara Sea linking the industrialized north with the Asian side of Turkey. The increasing traffic congestion in the İstanbul metropolitan area, together with the abolition of the excise tax on fuel prices for ferry vessels, has led to a rapid increase of competitive RO-RO ferry services between Eskihisar-Topçular, İstanbul-Bandırma and Ambarlı-Bandırma as seen in the map below.

These services are provided by public and private ferryboat operators. Given the high demand, the RO-RO ferry services from Bandırma-Haydarpaşa, as well as from İstanbul-Bursa have been already launched.

Table 4.2. indicates the RO-RO transport operations in the most industrialized region of the country namely Marmara region. It also shows that Çanakkale and Erdek are the preferred points for passenger transport while Bandırma comes first in RO-RO transport in 2006.

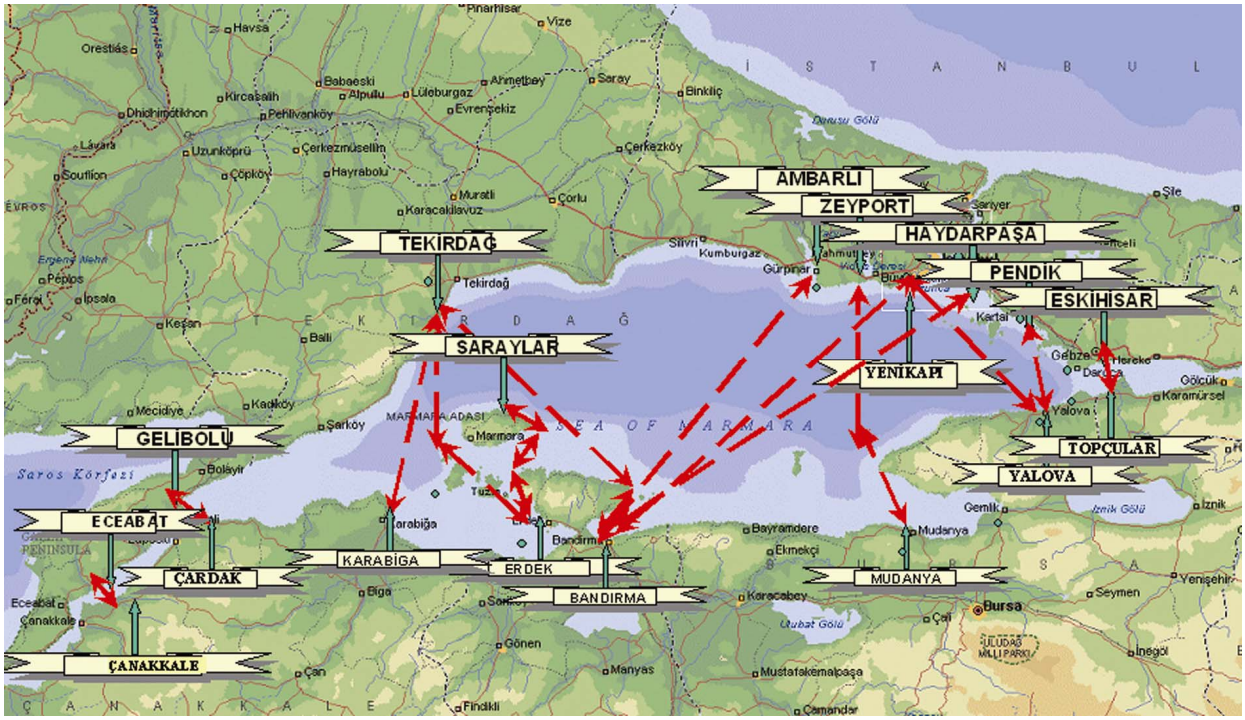
In spite of the very long and heavily industrialized coastal regions, there are no other regular domestic coastal RO-RO ferry services in Turkey. Despite there are plans to operate such domestic RO-RO services between the northern side of the Marmara Sea and Bursa and/or İzmir, concrete projects still need to be worked out.

Table 4.2. **RO-RO Transport in Marmara Region (2006)**

COMPANY	PORTS	TYPE	PASS.	TIR	LORRY	LIGHT LORRY	BUS	MINIBUS	AUTO	OTHER	TOTAL
SS Erdek Taş. Koop.	Erdek-Saraylar	Ferry	0	8 511	23 261	1 186	0	303	1 006	6 107	40 374
Bodrum Feribot İşl. Ve Tic. A.Ş.	Bodrum-Datca	Ferry	35 890	0	0	0	44	660	5 431	306	6 441
Kale Nakliyat Seyahat ve Tur. A. Ş .	Bandırma-Ambarlı	Ro-Ro	3 277	3 324	5 151	7	0	2	7	0	8 491
NG Deniz Taş. Ltd. Şti.	Gelibolu-Cardak	Ferry	0	3 394	5 302	4 703	548	727	10 574	79	25 354
Kara Hasan Den. Nakliyat	Gelibolu-Cardak	Ferry	0	664	2 057	431	100	74	833	0	4 159
Kilitbahir Den. Ltd. Şti .	Çanakkale - Kilitbahir	Ferry	83 748	0	0	29 741	0	6 119	61 275	0	97 135
Orsa Sea Gemi İnş. A.Ş.	Bandırma-Ambarlı	Ferry	0	1 684	11 101	566	0	0	0	0	13 351
İstanbul Den. Ltd. Şti.	Mudanya-Zeyport	Ro-Ro	5	460	394	71	0	9	0	10	944
Karagözler Den. Ltd. Şti.	Gelibolu-Cardak	Ferry	158	2 257	4 618	1 019	514	208	1 294	30	9 940
Kerem Den. Ltd. Şti.	Gelibolu-Cardak	Ferry	0	5 132	11 650	4 004	1 764	488	7 635	0	30 673
Serhat Fer. A.Ş.	Haydarpaşa-Bandırma	Ferry	0	0	0	0	0	0	0	0	0
Tramola Nakliyat A.Ş.	Bandırma-Ambarlı	Ro-Ro/Pass	59 743	3 787	32 437	3 463	0	0	0	141	39 828
Tramola Tas. A.Ş.	Bandırma-Ambarlı	Ro-Ro/Pass	61 350	4 234	33 302	3 246	0	0	0	89	40 871
Tuncer Yıldız	Erdek-Turkeli	Ferry	1 000	5	109	1	0	3	250	0	368
Dört Kardeşler Ltd. Şti.	Gelibolu-Cardak	Ferry	642	4 915	11 149	4 805	1 523	77	8 207	4	30 680
Dört Kardeşler Ltd. Şti.	Karabiga-Barbaros	Ferry	0	759	6 006	310	0	9	88	0	7 172
Erdemler Den. Ltd. Şti.	Gelibolu-Cardak	Ferry	17 818	2 904	9 279	4 816	991	517	14 973	353	33 833
Erdemler Den. Ltd. Şti.	Tekirdag-Bandırma	Ferry	0	4 841	18 217	1 985	202	217	2 837	132	28 431
SS Tur. Yol. Koop	Miscellaneous	Ferry	162 870	0	0	0	0	0	0	0	0
TDİ A.Ş.	Miscellaneous	Ferry	2 048 794	38 371	70 614	52 522	41 921	8 427	292 175	293 623	797 653
İDO A.Ş.	Miscellaneous	Ferry	7 148 145	0	161	42 022	197	47 239	1 105 224	94 625	1 289 469
İstanbulLines Marmara Den. A.Ş.	Haydarpaşa-Bandırma	Ferry	0	0	2 084	0	0	0	0	0	2 084
Erdemir Lojistik A.Ş.	Uzunkum-Zonguldak	Train Ferry	0	0	0	0	0	0	0	7 880	7 880
	TOTAL		9 623 440	85 242	246 892	154 925	47 804	65 079	1 511 809	403 380	2 515 131

Source: Turkish Undersecretariat for Maritime Affairs.

Map 4.1. **RO-RO services in Marmara region**



Source: Turkish Undersecretariat for Maritime Affairs.

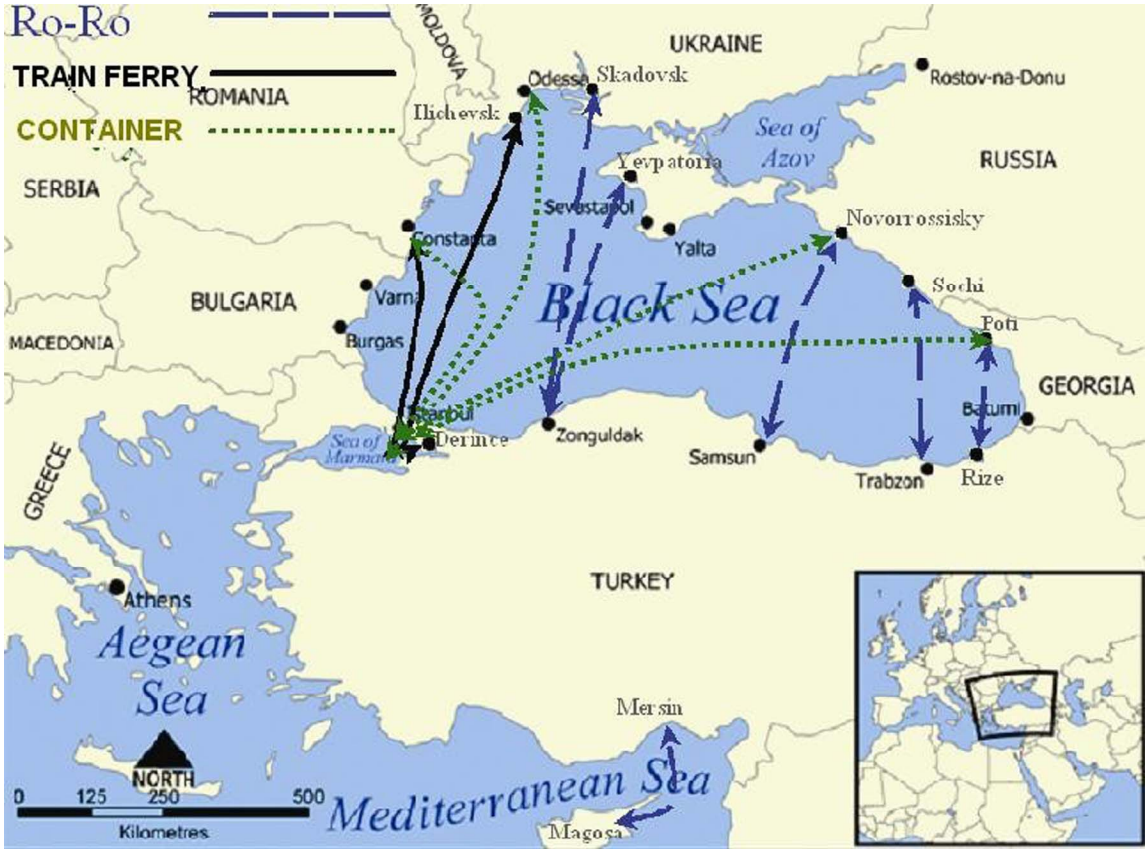
4.3.2 International RO-RO ferry services

On the international level, RO-RO ferry boat operations to Western European markets have existed since the early 1990s. Originally they were a result of the conflicts that arose in the Balkan area which made road transport by Turkish operators to and from Western European markets increasingly difficult.

At present, the largest company operating in this market (Roder) operates 9 vessels, four of which have a capacity of 240 road trailers and lorries each. In 2006 around 97 000 truck loads (only full and export loadings) were carried from its RO-RO terminals in Pendik as of April 2005, Ambarlı and Çeşme to Trieste (Italy). As the number of truck loads shipped in the opposite direction (from Trieste) is in the same order of magnitude, it can safely be said that around half of the 400 000 truck operations between Turkey and Western Europe are carried out by this RO-RO shipping line alone. Roder offers at present 6 weekly departures from Pendik on the Asian side of the Marmara Sea, 3 departures from Ambarlı on the northern side and 3 weekly departures from Çeşme close to İzmir. The journey from Pendik to Trieste lasts around 55 hours.

While road transport operators or their associations are not yet engaged in road-rail intermodal transport, as is the case in most Western European countries[4], Turkish road haulers have been the founders of the most important international RO-RO ferryboat operations linking Turkey with Europe, the Ukraine and the Russian Federation. Roder (UN RO-RO) was founded in 1993 by 48 road transport operators, who looked for alternatives to the unreliable and costly land transport routes to Western Europe. Since 1993 the drivers of the trucks carried by the RO-RO vessels from Turkey to Trieste were flown to Trieste. Since April 2005, Roder has operated a private port at Pendik with a capacity of 650 trailers, offering several auxiliary services. More than 200 shareholders, who comprise the major players on the Turkish road transport markets, recently decided to put the company up for sale so as to achieve a corporate growth for the company.

Map 4.2. **Black Sea Region Ro-Ro, Ferry and Container Lines**



Source: Turkish Undersecretariat for Maritime Affairs.

Map 4.3. **Lines in Marmara, Aegean and Mediterranean Region**

Source: Turkish Undersecretariat for Maritime Affairs.

Ninety five percent of all truckloads carried by these RO-RO ferryboats belong to Turkish transport operators. 68% of the vehicles carried are semi-trailers without tractor units. The truck drivers of the lorries carried on-board are not accommodated on-board the vessel, but take a chartered plane that operates between İstanbul and Ljubljana. While the large majority of semi-trailers are picked up by tractor units operating from Trieste and pursue their journey by road to their final destinations, mainly Germany, Roder also offers daily onward Ro-La services from Trieste to Salzburg for 60 lorries. Roder plans to start services to Marseille/Fos (France) and is also considering additional triangular RO-RO ferry services to Algier (Algeria) or Haifa (Israel).

Since 3rd December 2006, another ferry boat company (ItalRoRo) operates 3 weekly journeys between Çanakkale (Kepez) at the western entrance of the Çanakkale Strait and Brindisi (Italy). The journey takes 34 hours where the lorries make their onward journeys by road, mainly to France, Spain and Portugal. The company expects to transport around 22 000 vehicles per year on this new RO-RO route and considers extension of its services also to Northern Africa.

While the large majority of RO-RO operations target the markets in Western Europe, there are also a considerable number of RO-RO services plying the Black Sea. Regular RO-RO services exist between the Turkish Black Sea ports of Zonguldak, Samsun, Trabzon and Rize and the Ukrainian ports of Evpatoria, Skadovsk and Odessa as well as the Russian ports of Novorossisky, Sochi and the Georgian ports of Poti. The number of goods transported by road on these Black Sea links, is estimated to be in the order of 20 000 vehicles annually. All of these lorries continue their onward journeys by road.

A number of additional RO-RO services are planned for launch in the next few years. This includes the operation, possibly by the end of 2009, of new RO-RO lines organized by UND in cooperation with an Italian company that plans to operate six vessels between the ports of Tekirdağ or Gebze and Marseille (France). These RO-RO services may be extended also to Koper (Slovenia). Furthermore, in the framework of BSEC-URTA, it has been agreed to start operation of the three additional RO-RO ferry services on the Black Sea between Zonguldak, and ports in the Russian Federation and the Ukraine as well as between Samsun and a port in the Russian Federation.

4.4 Rail Ferry Services

4.4.1. National rail ferry services

The rail ferryboats crossing the İstanbul Strait, linking Haydarpaşa and Sirkeci, carried around 1 million tonnes of cargo in both directions in 2006. This indicates a 22% increase compared to 978 000 tonnes in 2005. Traffic volume in the north-south direction (i.e. from Sirkeci) is around 25% higher than the traffic from Haydarpaşa, reflecting the large industrial output of the northern side of the Marmara Sea and the cargo flows going to automobile factories on the Asian side of Turkey. With the opening of the Marmaray tunnel, possibly in 2011, these rail ferry services across the İstanbul Strait may cease to operate.

Another domestic rail ferry link crosses Van Lake and is part of the important international railway and intermodal line to Iran (C-E 70). Traffic volume between Tatvan and Van was in the order of 613 000 tonnes in 2006, compared to 506 000 tonnes in 2005 (17% increase). There is no alternative to this ferry service at present, as the long planned rail line along the northern shore of Van Lake is not yet in sight.

4.4.2. International rail ferry services

Regular rail ferryboat services operate on the Black Sea between Derince and Ilyichevsky (Russian Federation) as well as between Derince and Constanta (Romania). In 2005 there were 25 departures from Derince towards Ilyichevsky with a total of 58 000 tonnes loaded. Only 9 000 tonnes were unloaded. On the Derince-Constanta link, there were 23 departures from Derince in 2005 with a more balanced cargo flow of 80 000 tonnes inbound and 99 000 tonnes outbound.

4.5. International Maritime-Pipeline Transportation

The oil that produced in Shah Deniz Area of Azerbaijan is transported about 1 800 km by Baku-Tbilisi-Ceyhan Crude Oil Pipeline to Ceyhan Port and sent to the world markets by loaded to the tankers. The capacity of pipeline is 50 million tonnes per year. About 378.3 million barrel oil has been transported by loading 481 tankers so far as of 28 May 2008.

The LNG from Algeria and Nigeria is transported to Marmara Ereğlisi by tankers and gasified in the facilities. Then, the gasified LNG is given to the national natural gas network. From 1994 to 2007, 82.5 million m^3 LNG is exported by 690 LNG tankers. (1 m3 LNG = 600 sm^3 natural gas)

4.6. Intermodal Transport Actors in Turkey

Intermodal transport by rail in the form of containers is undertaken by the TCDD, which together with an intercontainer, operates regular container block trains to and from Europe and Central Asia. The same holds true for the Ro-La trials that have been carried out by the TCDD and Austrian OKOMBI in cooperation with the other concerned railway companies that provided traction on their respective territories, namely Bulgaria, Serbia, Croatia, Slovenia and Austria.

The only existing 2 regular swap-body and automobile rail transport services are organized by private logistics companies that also provide the special wagons for these services.

The Köseköy-Cologne swap-body rail transport service is organized by OMFESA, which is a joint company founded by the largest Turkish logistics company Omsan Logistics and the Spanish TRANSFESA. OMFESA has also rented from TCDD 8 000 sqm of terminal space at Köseköy for storage, handling and customs clearance procedures. This project has received 1 million euros from the EU Marco Polo Fund for its contributions to reduce road congestion and to promote intermodal transport.

The Köseköy-Bucharest automobile transport in specialized rail wagons is organized by VEVA Logistics, a joint venture between Austrian Vega Logistic Company, the French State railway foundation STVA and a Turkish project partner.

Picture 4.1. **Loading Crude Oil Tanker at Ceyhan Port**

Picture 4.2. **View of Ceyhan Port**

4.7. Existing Legal Framework

4.7.1. National level

At present, there is no specific national legal framework or provisions in Turkey to govern national and international intermodal transport or to facilitate a shift from long-haul road transport to rail and/or coastal shipping.

There are also no particular financial or regulatory incentives in place to assist in the promotion of intermodal transport in Turkey, neither nationally nor internationally, such as the various national vehicle tax exemption and subsidy schemes in Western European countries that provide contributions to investments and initial operational costs for intermodal transport and terminal operations considered as "public services" or the EU wide Marco Polo programme. The only exception seems to be the exemptions from excise tax on fuel for RO-RO vessels plying the Marmara Sea.

Turkey also does not yet have regulatory incentives in place to foster intermodal transport operations, such as exemptions on maximum payload, driving bans during certain hours and days (rush-hours, night, weekend) or bonus systems for road transport operators utilizing intermodal transport (exemption from permits for initial and terminal hauls, supplementary permits, etc.).

4.7.2 International level

At the international level, Turkey ratified the European Agreement on Important International Combined Transport Lines and Related Installations (AGTC) on 4th September 1996, joining 30 other European countries that have agreed to make international combined and intermodal transport in Europe more efficient and attractive to customers. In acceding to this treaty of the UNECE, Turkey has committed to alleviate the burden on the European road network and to mitigate environmental damages. The Contracting Parties to the AGTC Agreement are convinced that it is essential to establish a legal framework, which lays down a co-ordinated plan for the development of combined transport and the infrastructure necessary for their operation, based on internationally agreed performance parameters and standards.[5] As Contracting Party to the AGTC Agreement, Turkey has subscribed to the designation of a network of important international combined rail transport lines, terminals, border crossing points and ferry links/ports that should conform to or be brought into conformity with the infrastructure and performance standards and targets stipulated in the Agreement (*see Annex 1*).

In the framework of the International Transport Forum, Turkey has subscribed to its provisions in the ECMT Consolidated Resolution on Combined Transport (No. 2002/2) that was adopted by the ECMT Ministers in Bucharest in May 2002. This Resolution underlines that the competitiveness of combined transport must be effectively improved in terms of quality and costs/prices. It recommends specific measures in the field of costs and prices, networks, interoperability, financial support measures, regulatory measures and controls, operations, monitoring of the market and innovations.

Finally, the ECMT Ministers of Transport approved, in 2006, the Recommendations on Model Action Plans and Partnership Agreements for the Development of Intermodal Transport at the Pan-European Level, including benchmarks to measure performance and identify responsibilities that had been prepared by the joint ECMT/UNECE Working Party on Intermodal Transport and Logistics. These models should allow ECMT and UNECE member states to make better use of intergovernmental cooperative arrangements among neighbouring countries and to foster private-public partnerships as a key for the development of competitive intermodal transport services.

Bearing all these factors mentioned in mind, it is clear that Turkey is already heavily involved in intermodal transport, whether as road-rail, Ro-La, RO-RO and rail ferry services. But still a comprehensive intermodal strategy is needed because the developments in the market are not conducted systematically. In other words a "road map" is needed which would allow a more efficient and sustainable growth for the market.

Since road transport remains the preferred mode in national transport, Turkey needs to find solutions to use its existing infrastructural and market resources to better benefit from other transport modes. Intermodality can serve as a cost-effective, environment-friendly and time-saving alternative for both national and international freight operations.

Recent incentives such as conventional block train operations implies that potential supply and demand exist in the market in favor of an intermodal system, provided that there are several options which can sufficiently meet the needs of trade markets in terms of speed, reliability and flexibility.

A 20% increase in the use of rail ferries for national transport between 2005 and 2006 offers another example of the potential demand for intermodality in Turkey. Given the fact that around 90% of exports are being performed via maritime transport in Turkey, intermodal transport appears as the most favorable course. Following the efforts to increase the volume and the quality of intermodal services, road-rail operations in particular, have acquired the greatest share in transport between Turkey and Central Asia in the recent years.

As a peninsula which has coastal lines in Mediterranean, Aegean and Black Sea, Turkey naturally has the potential to maintain a more balanced transport system by integrating road, rail and maritime transport coherently.

What remains to be done are to promote and maintain emerging intermodal demands through the provision of legal framework and financial/regulatory incentives so as to foster intermodal transport in Turkey.

To this end, it is highly recommended that relevant authorities should first create a master plan which lays down the strengths, needs and long-term strategies of Turkey to further promote intermodality. The establishment of a clear policy and legal framework would ensure the level playing field for the private sector. Financial and regulatory measures and incentives to promote this system is another factor which should not be underestimated. In setting up these measures, learning from the best practices in European and OECD countries will also be helpful.

NOTES

1. UNECE, ECMT, EC Terminology on Combined Transport, 2001.
2. The European Commission co-modality concept describes the complementary and efficient use of modes in an optimal European transport system, looking at each mode individually and at their integration in logistics chains.
3. Turkish New Lira.
4. The International Union of Combined Road-Rail transport companies (UIRR), was founded in 1970 and is still owned today to a large extent by road transport operators. Compared to 2005, UIRR has increased its traffic in 2006 by 12% for unaccompanied and by 16% for its Ro-La. It operates annually 2.4 million consignments in container, swap-body and semi-trailer traffic. This represents around 60% of total European intermodal road-rail transport.
5. www.unece.org/trans/conventn/agtce.pdf

PART III. REQUIREMENTS FOR EFFICIENT INTERMODAL TRANSPORT SYSTEMS

CHAPTER 5. WHY CHOOSE INTERMODAL TRANSPORT?

Many countries, such as Ireland, Portugal and Greece, have practically no intermodal transport systems and still seem to enjoy a positive, general economic situation with a functioning transport system. Before Turkey decides to invest in an intermodal transport system, the economic conditions and possible development schemes, with and without intermodal transport should be discussed.

5.1. Main Scenarios for Future Development

Turkey is, without a doubt, a viable candidate for future growth. Given the steady acceleration in economic growth achieved, with an average growth rate of nearly 7% per year over the period 2002-2007[1], and based on recent increases in foreign trade volumes (*see Chapter 1*) the recent increases in foreign trade volumes it is expected that the GDP per capita and the share of foreign trade in GDP will grow steadily. The steady growth in population is another factor to expect an increase in demand for many sectors.

It can be estimated that these factors would result in a high growth of international and national freight transport. This increase may also create a chain reaction and lead to a similar increase in other countries, especially for the landlocked NIS countries in the Caucasus, east side of the Caspian Sea and the neighbouring countries in the Middle East, with their international connections through Turkey.

Until today, internal freight transport operations and transit operations through Turkey have been executed mainly by road transport.

If the road transport system continues to absorb internal and transit cargo flows at today's rate, the following undesirable effects are expected to occur:

- The demand for fuel will grow, while the supply of petroleum based fuel will become more and more problematic.
- The emissions of CO_2 will increase considerably.
- Private mobility as a function of personal income per family will grow at a similarly high rate, as will commercial road traffic; this will cause continuous competition for road capacity, provoking political problems regarding the distribution of capacity resources.
- Increasing personal wealth and salary levels will limit the labour market for drivers, who currently are prepared to be at home only for the weekend; this will cause shortages of reliable personnel for certain sectors of road haulage.

These developments are not fictional; they are the current problems experienced by European and North American freight transport systems.

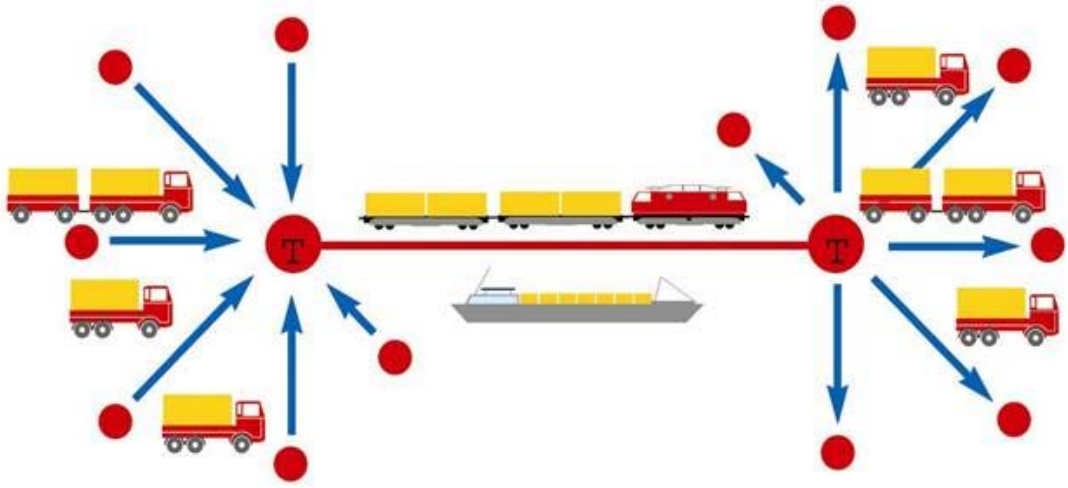
5.2. The Functions of Intermodal Transport

Intermodal transport is the set of technologies that facilitates the transfer of loading units from one mode of transport to another. Intermodal transport could easily transfer cargo flows from road to rail, to inland waterway transport and to maritime transport.

Furthermore, intermodal transfer allows *en route* change from a given transport mode (such as road transport) to another (such as train or ship) in order to carry larger volumes in one transport operation:

- An intermodal train in Central Europe will carry around 80 TEU, i. e. the load of 40 trucks. The Transfesa train from Köln to Halkalı carries 32 Mega swap bodies, which is the equivalent of 32 articulated trucks.
- An intermodal barge on the Rhine River carries approximately 400 TEU, i. e. the load of 200 trucks.
- A coastal trade ship may carry 1 200 TEU, i. e. the load of 600 trucks.
- A deep sea container ship may carry 10 000 TEU, i. e. the load of 5 000 trucks.

Figure 5.1. **Intermodal transport: collect, move as a concentrated load, distribute**



When such a carrier takes over the concentrated load from the road, considerable savings often result:

- Intermodal transport considerably decreases the use of traffic infrastructure capacity: A train covers only 1 slot in the rail network, but takes 40 truck movements off the road.
- This train will use much less energy than the 40 trucks would have consumed.
- This train movement will cause far lower CO_2 emissions than the 40 trucks would have created.
- This train needs, for the long haul operation, only 1 locomotive engineer, while the 40 trucks would have needed a minimum of 40 drivers.

- The movement of 1 train is normally cheaper than the cost to operate 40 trucks.

5.3. The Commercial Basics of Intermodal Transport

The commercial background of intermodal transport consists of:

- A pick-up operation that might be more expensive than pick-ups in long haul road transport.
- A terminal transfer that will create additional costs.
- A line haul that should be much cheaper than the line haul in road transport.
- A second terminal transfer with its additional costs.
- A final delivery operation that might be more costly than delivery after direct road transport.

These factors demonstrate the pros and cons of intermodal transport: all potential savings concentrate in the line haul, and these increase with distance. The longer the distance of an intermodal transport operation, the bigger the savings. On the other hand, the additional costs do not depend on the distance, but are additional costs per operation. So a certain minimum mileage is necessary for a commercial intermodal operation to be viable. The minimum transport distance for commercially viable intermodal transport is, in most European countries, around 400 – 600 km. If an intermodal operation starts in a seaport, the minimum (commercially viable) distance is often reduced to 250 – 300 km because the loading units are already concentrated on one end of the journey, and the cost of assembling them into the larger transport unit can be saved.

Another issue, demonstrated above, refers to "concentrated traffic flows". Concentrating cargo movement from a single truckload (with some 20 tonnes of cargo) to a train load (with some 700 tonnes of cargo or more) means that such a large trade volume should be available on a given corridor.

Under normal logistic quality conditions, a shipper or forwarder expects, for an intra-European operation, an offer of 5 departures per week in both directions. If we assume that:

- Each train must carry an average of 60 – 65 TEU to be commercially viable.
- Each TEU contains some 12 tonnes of cargo.

We can conclude that a corridor should offer a volume of approximately 3 600 tonnes of cargo in each direction to justify a commercial intermodal transport operation.

Commercial experience shows that the movement of containers between a seaport and the hinterland is operated under similar conditions, but eventually a frequency of 3 departures per week could be sufficient for logistic quality. In consequence, a volume of some 180 TEU containers per week and per direction would be sufficient to build up a commercial operation.

Clearly, the economies of scale work in favour of large and concentrated cargo transport corridors.

An example for such a corridor is the operation between the centre of the Rhine valley and North Italy. The Intermodal operator HUPAC operates 5 block trains per day and per direction between the terminals of Ludwigshafen and Busto Asizio. This results in an extremely high usage of rolling stock and terminal capacity, resulting in low costs per unit. The high frequency leads to higher quality: if a train is booked up, wait for the next one; it will depart in three hours.

5.4. The Basic Techniques of Intermodal Transport

All intermodal transport systems rely on one, of three technical possibilities:

The load carrying part of a freight vehicle is designed to be separated from the vehicle and transferred from one vehicle to the other. Examples are freight containers, swap bodies, removable tanks etc. The transfer can be executed either by vertical (lifting) equipment such as cranes or reach stackers, or by horizontal transfer equipment.

Figure 5.2. **A swap body is transferred from road to rail**

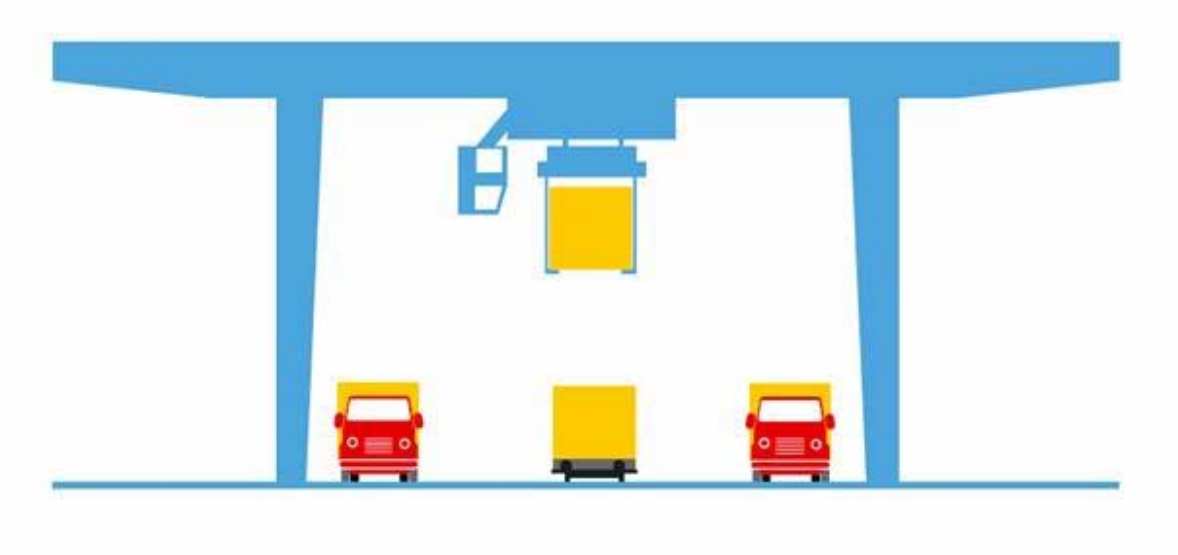
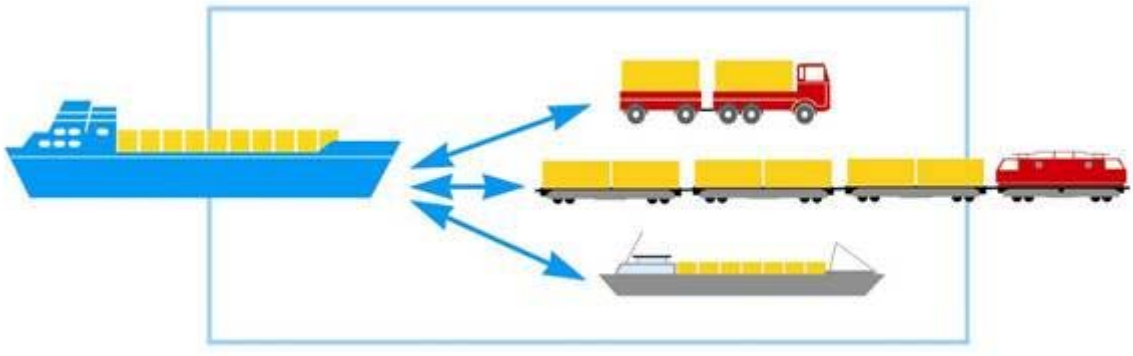
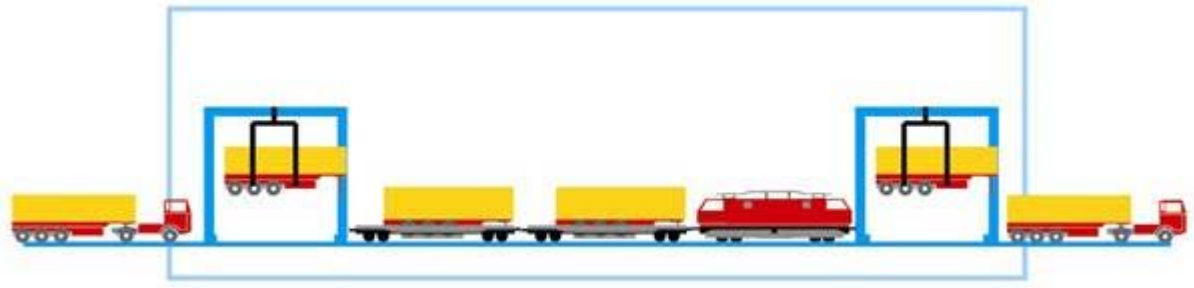


Figure 5.3. **Containers are transferred from deep sea ship to road, rail, or coastal shipping**



Secondly, the entire load carrying vehicle is lifted from one transport system onto a vehicle of another using a vertical transfer system. Examples are semi-trailers lifted onto rail pocket cars either by a gantry crane or by a reach stacker.

Figure 5.4. **Semi-trailers are transferred between road and rail**



Finally, the entire load carrying vehicle is rolled on its own wheels onto the vehicle of another, using a horizontal transfer system. Examples are Rollende Landstrasse (Ro-La), semi-trailers loaded on platform railcars via a circus ramp, semi-trailers rolled on board a ship, and rail-cars rolled on board a ship (roll on/roll off-transport).

Figure 5.5. **The Ro-La system carries complete road vehicles on rail**

As mentioned above, intermodal transport needs considerable transport distances to become commercially viable. This means that under European conditions, international transport is a more likely candidate for commercial intermodal transport, because national transport distances might be too short.

If an actor wishes to enter international intermodal transport he must streamline his equipment to international standards in order to smoothly join the transport systems elsewhere. As national and international transport systems become interconnected, it will be desirable to apply such standard equipment to both, rather than to invest in two different technical systems.

5.5. The Choice of Technique

The intermodal transport system can be built on a technique of semi-trailer carriage or a technique of container or swap-body carriage.

The traditional means of transport in Turkey is the semi-trailer. Any alternative will be confronted with severe resistance from conservative transport operators, industries that have invested in this specific market. Resistance may also come from politicians, laymen and journalists who have no expertise in the complicated details of intermodal transport systems.

There is no doubt that a system based on ISO containers and on European containers would better fit the economic and infrastructure needs of Turkey, than a system based on semi-trailers. But if the

intermodal transport system is to develop in the ISO/European direction (*see chapter 3.3 and 3.4*) policy decisions will require strong leadership.

France tried this a decade ago and established a political program to subsidise the technical move from semi-trailers to swap bodies. This program for an efficient intermodal transport system using swap bodies, had a successful start up. Currently, the French intermodal operator Novatrans organises a network of intermodal trains carrying swap bodies.

5.6. Recommendations

To be commercially viable, intermodal transport requires long distances and high cargo volume corridors. Such corridors should be identified by a market analysis. A market research project, organised and financed by the government, could provide the results to all potential investors and actors.

Intermodal transport offers various alternative techniques. Before choosing, techniques should be considered very carefully, taking into account international trends, national conditions, and – most importantly - economies of scale, i.e. it should use equipment produced in mass production and readily available on all markets that the trade serves.

Intermodal transport should be based on internationally standardised equipment. Special solutions and equipment adapted to particular national needs will almost certainly fail.

Five Levels of the Logistics Trade

- 1PL - First party logistics : sub-contracting transport operations
- 2PL – Second party logistics : externalising transport operations and warehousing
- 3PL– Third party logistics : achieving logistic operations and implementation of relevant methods, competencies and systems
- 4PL – Fourth party logistics: externalizing and chain optimization, including the client, the client's clients and suppliers.
- 5PL – Fifth party logistics: conception, organization and implementation, using a principal of logistic solutions (including information technology systems) with all appropriate technological means.

NOTES

1. OECD Economic Surveys, TURKEY Volume 2008/14 (www.oecd.org/publishing/corrigenda).

CHAPTER 6. THE CHOICE OF THE BEST INTERMODAL TRANSPORT SYSTEM

Earlier chapters have shown that various techniques are available for intermodal transport and those international standards and national conditions are the criteria that should guide the choice for the best system.

6.1. The Potential Markets for Freight Container Transport

Freight containers are the paramount means for all international trade and transport systems, except for bulk materials such as petroleum, iron ore and coal. Considering Turkey's rapid integration into world trade, and that this will certainly augment, Turkey should be more prepared for participation in container trade.

6.1.1. Container ports

First of all, Turkey's maritime policy should include decisions on the manner in which the country wishes to participate in future container trade. Turkey can serve its national needs, and still remain outside the major world trade traffic flows. This would result in maritime container transport mainly executed by feeder vessels that serve the Turkish ports from some main ports in the Eastern Mediterranean, such as Port Said, Piraeus, Malta and Constantia.

If Turkey wishes to offer port facilities for direct connections to world trade, especially Far East trade, which can serve simultaneously as regional gateway ports, it should enhance its port facilities. Basic features necessary for container trade include:

- A minimum capacity of 1 – 2 million TEU containers p. a.
- Sea-side access and berths with minimum 15 m draught.
- Sea-side container cranes to serve post-Panamax container ships.
- Efficient customs treatment and off-duty areas for international feeder operations.
- Excellent hinterland connections including road, rail and short sea shipping (inland waterway transport is not viable option as no deep water rivers are available).

Development policies should always keep in mind the fact that ocean carriers are free to select any port as their gateway. They will make their selection without great concern for the national interests of any of the actors; efficient operation is their primary consideration. Thus, any port at a convenient location offering efficient operation and modern facilities could qualify for a commercial centre.

The success story of Dubai port located in the desert but built and extended to an ultra-modern facility, shows how such developments can occur.

6.1.2. Hinterland Transport – Road

Road continues to be the most important mode of transport for the hinterland. Furthermore, road transport will be needed to carry containers between the sea-side terminals and import and export facilities in the port area. Certainly road transport of containers will be the main mode in an area of up to 200-300 km around the port. A large part of the cargo volume imported by containers will be unloaded in this area and either directly consumed or processed for logistic sales. Such activities include inland packaging, addition of user manuals in the national language, ironing ready-to-wear textiles, roasting coffee beans, etc., and are usually grouped in the greater port area. Containers are carried from sea-side terminals to such areas normally by road. This means that road access to the sea-side of ports should be kept free, and planning should foresee the need for future capacity increases to a considerable extent. The world is full of ports that were once successful, but have not been able to enlarge their road access capacity to meet increased traffic demand. Very often, port and road capacity enlargement compete with the interests of local housing and leisure installations. Such conflicts could be avoided by long term development thinking that plans for future capacity needs.

A striking example is the development of the international airport in Frankfurt, Germany. In the late 1960s, the airport served around 1 million passengers and planned a new terminal for some 4 – 7 million passengers. Conservative politics and newspapers accused the airport planners of megalomania and of wasting public funds. Nevertheless, the terminal was realised. Since then, this terminal has had to be continuously enlarged; today it serves more than 45 million passengers, and the need for further enlargement is obvious.

6.1.3. Hinterland Transport - Rail

Most of the large European container ports offer rail hinterland connections. Some large ports that had not traditionally considered rail capacity, such as Antwerp, Zeebrugge and Rotterdam, are currently building new rail access facilities and are enlarging their old ones.

The traditional rail connection of modern container ports is integrated into a logical flow of containers: the import containers are lifted by a crane out of the ship and set down on the ground at the quayside. From there, they are carried into one or more big import container stacks. The movement, quay-to-stack is done either by van carriers, reach stackers, automatic guided vehicles, semi-trailers, or (in small ports) by the inland extension of the crane.

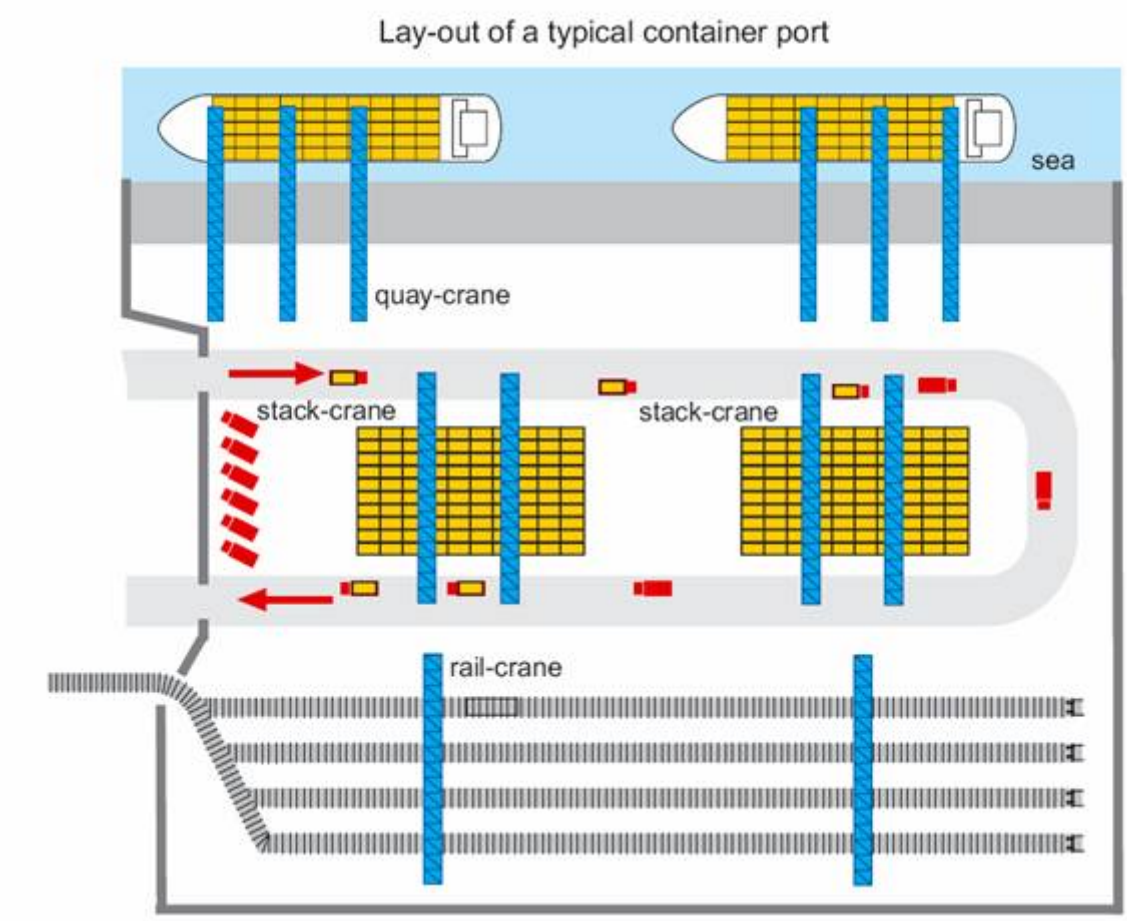
The container stack is operated by one or more rail mounted gantry cranes. In some cases these gantry cranes are equipped with rubber tires.

If the container is moved off by road, the road carrier with the empty semi-trailer comes to the stack to load the container on to the semi-trailer and leaves the terminal.

Rail operation is more complicated, and therefore often neglected by terminal authorities. Normally, a group of rail tracks is located inland behind the import stack, with a gantry crane that covers the entire rail track group. Often four rails are grouped side by side, and the length of the group is based on the normal train length for freight trains moving inland; in many cases, and in Europe in general, the length is around 750 m. A series of empty railcars is shifted onto each of these rails and each of these, in our case, four groups will, later, make up a block train to a certain inland destination. The container destined for on-carriage by rail is moved by a van carrier or reach stacker off the import stack under the work area of the rail gantry crane. This crane lifts the container onto a railcar on the train scheduled for its final

destination. Once the trains are loaded (or partly loaded) with a sufficient number of containers, they are moved over the hinterland rail network to their final destination, i. e. to a rail/road terminal in the hinterland. If the rail volume generated in this port does not justify the operation of a dedicated block train to a single hinterland terminal, railcar groups are made up in the port, and shunted under way together with other railcars to build a dedicated train for a hinterland destination.

Figure 6.1. **Ideal organisation of a deep sea container terminal**



Export containers are carried into the terminal by road transport, unloaded from the semi-trailer by reach stacker, taken to the van carrier of the export stack by gantry crane, and then stacked into the export container stack.

Similarly, export containers that arrive by rail are taken off the rail group and transferred to the export stack. Once the transport ship has arrived, the containers from the export stack are sorted according to the pre-planned loading sequence of that ship and then carried to the crane area.

Another method is a model that is used in Rotterdam and the Los Angeles/Long Beach Port area: The railway transfer unit is not located directly within the port area, but is situated instead, some miles inland where there is a better space configuration. Once containers arrive on land, they are carried to the rail service centre over the road. They are set on semi-trailers, transferred, and continue on by rail. Since this method of linking rail to container hinterland transport is, in most cases, somewhat costly, it should only be considered if the port area does not allow for the building of rail facilities. Unfortunately, many

conventional ports are in such a situation: container handling needs ample and wide space behind the quayside, and many older ports do not offer such space. Thus the construction of a rail facility behind the container stacking area is often not possible.

In addition to transfer facilities in or at the sea-ports, a network of intermodal transport terminals inland is needed. At least one terminal for each major industry or consumption area should be established. According to its size and design, each terminal would need 15 – 50 million euros in investment. Such terminals could be built as commercial infrastructure, through public/private partnership. Successful models for such a procedure exist in Central Europe.

If a considerable volume of containers will travel by rail into the hinterland, such terminal facilities are necessary. If the economic development of Turkey with its growing population, increasing GDP, increasing participation in world trade and globalisation continues, such rail facilities are crucial. The number of containers moving inland will be so large that it will overwhelm the road network. This will be especially true if Turkey intends to become a major partner in container transit movements between the Mediterranean Sea and the countries south of the Caucasus, North Iran and North Iraq.

6.1.4. Hinterland – Coastal services

Big container ships with 10 000 TEU capacity do not serve smaller ports in direct call. Normally, they serve only gateway ports; the containers are re-loaded from here into smaller ships and brought into smaller ports further away. Today, practically all of northeast Europe is served this way: the big container ships unload the containers in a North Sea port, and the containers are carried from there by feeder ships to the Baltic region or to Scandinavia and Finland.

The port of Hamburg transfers some 30% of all containers that arrive from overseas, into such feeder ships for Great Britain, North and East Europe.

Normally, if a port can handle a deep sea container ship, it can handle a feeder ship as well without extra investments. However, if the port grows and capacity bottlenecks occur, competition between deep sea trade and feeder trade for scarce berthing and crane capacity could create problems.

In addition, customs formalities can be problematic. The great European transit ports have found various solutions to the problems of customs formalities. But all agree that an efficient customs administration is necessary to ensure efficient feeder operations. The main problem in ports where containers for import or export mix are immediately re-exported is that customs officers will be tempted to install bureaucratic solutions under the pretext that they have to shelter the economic situation of their home country. Meanwhile, as security measures are added to the economic issues of customs clearance, complicated and time consuming procedures have increased.

6.2. Semi-Trailers in Intermodal Transport

6.2.1. The standard semi-trailer

The main operation in long distance freight transport in Turkey is executed by articulated road vehicles consisting of 1 truck and 1 semi-trailer. Such combinations are quite common in Europe and even in Central Europe, with its long tradition of truck + trailer road/train combinations. Today the operators involved in international transport are changing over to the articulated combination.

Another tradition is changing. Earlier, the 3 axle truck + the 2 axle semi-trailer had been the common way of operating; today the entire market has changed to a 2 axle truck + 3 axle semi-trailer

combinations. This combination is perhaps worse in road/driving performance and safety, but certainly is considerably cheaper than the former.

The problem with these standard trailers is that they cannot be lifted because their structural building design renders them too weak. If grappler arm lifting equipment were to lift the semi-trailer on 4 lifting pads, the vehicle most probably would break.

Traditionally, these semi-trailers, when introduced into intermodal transport, had been driven via circus ramp on rail flat cars, fixed there (mostly with chains), and moved into a destination terminal to be unloaded there via anther circus ramp. While such technique was quite common in the USA, it could not be applied in Europe because of the limited rail gauge: a full height (i. e. 4 000 mm) semi-trailer was loaded on a flat car with a standard height of 1100 mm above rail. This would lead to a combination that cannot be carried within the loading gauge of practically all European railway networks.

Thus, all test and pilot operations with semi-trailers rolled onto flat cars have been abandoned in European rail. Today, all networks concentrate on pocket railcars. The semi-trailers are lifted by a crane or some reach stackers, from the terminal ground on to such cars; the axle and suspension arrangement is accommodated in the pocket. Such a technique allows all full height semi-trailers (4 000 mm overall height) to operate in the rail networks of Central and Eastern Europe. Unfortunately, the networks of France, South and Central Italy, Spain and Portugal have further gauge restrictions so that even this lowered down combination cannot operate.

6.2.2. The semi-trailer with lifting capacity

The main problem with this transport technique is that the semi-trailer must be reinforced to be lifted. This would add some 1 000 – 2 000 euros to building costs and some 200 – 300 kg to its tare weight. Most road operators refuse to spend that extra money because they do not foresee the need to eventually switch over to intermodal transport. Even in Germany, which has established a premium offer of intermodal transport services with pocket railcars, only 2% of the annual production of semi-trailers is designed for lifting; the remaining 98% of all semi-trailers are built in a way that does not allow them to fit into intermodal transport.

In consequence:

- Techniques to enable or adapt semi-trailers for intermodal transport have proved highly ineffective and have been abandoned in Europe and North America. It is strongly recommended that Turkey's transport policy avoid such a program.

Intermodal transport in the USA started in the 1960s with semi-trailers that were driven on platform railcars via a circus ramp. This has been practically abandoned now. In the late 1960s, intermodal transport operators in France and Germany designed railcars that could take semi-trailers in roll on/roll off transfer on board. But all these systems have been, as well, abandoned because of their inefficiency. Various techniques and machines to lift semi-trailers that are not specially designed for crane transfer have developed. None of these techniques are currently in commercial operation.

- The vast majority of Turkish semi-trailers are not designed for lifting, so the "semi-trailer in pocket railcar" version of intermodal transport cannot be applied in Turkey at the moment. Data on the rail gauge in the Anatolia part of Turkey leads to the assumption that full height semi-trailers (total height 4 000 mm) on pocket railcars will create gauge difficulties in rail transit.

This will be aggravated in the future because logistic managers often ask for a transport vehicle with an inside height clearance of 3 000 mm. Such vehicles are likely to lead to semi-trailer construction that is higher than 4 000 mm which will aggravate the gauge problem in the Asia network of Turkey. Incidentally, the European side of the railway connection, Halkalı to the Bulgarian border, offers a more generous gauge, so this zone should pose fewer difficulties for intermodal transport.

- Thus, it is recommended for Turkey to form a fleet of pocket railcars which could be built in a way to carry either containers or semi-trailers for the flexibility of their operation.

- If Turkey wishes to introduce intermodal transport based on semi-trailers, national policy should create a political program to promote the use of semi-trailers prepared for lifting. All other options are not feasible.

In addition, Turkish railways would need a fleet of pocket railcars. Such railcars can be built in a way to carry either containers or semi-trailers for the flexibility of their operation.

- At the same time, the establishment of a network of intermodal transport terminals with lifting equipment is essential for Turkey. This might sound more difficult than it is in reality: if the Turkish rail network establishes an inland terminal network for container transport, these terminals can easily be used for semi-trailer transfers too. The lifting equipment in the terminals needs to be designed in a way that it is adaptable to semi-trailer lifting provided that this sort of arrangement does not bring about prohibitive costs. Consequently, cranes can be designed to have a lifting capacity of preferably 38 tonnes, but again, ways to avoid specific cost burdens need to be sought while adapting this kind of state-of-the-art technology.

However, as a working hypothesis, it can be assumed that these two cargo flows are rather similar given that local industry and trade normally follow same patterns. As a result, containerised cargo flows normally end up in the industrial regions in which imported goods are processed and upgraded while they proceed either towards re-exportation or natural consumption. Thus, the logistical basics of both trade flows have to be evaluated before planning a network of inland terminals that can transfer ISO containers and semi-trailers alike.

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6.3. The European Domestic Container

Fifteen years ago, the European Standardisation Organisation (CEN) established Technical Committee 119 on swap bodies for intermodal transport. The units that have been standardised by this committee are designed for European trade. They reflect European road regulations, especially the dimensions allowed in European road transport under European Directive 96/53, and the need for the efficient transport of cargo loaded on European standard pallets.

TC 119 has, as far as sizes and dimensions are concerned, standardised two basic sizes:

- The 7 450 mm long swap body; 2 of them fit on a road train offering similar space as a conventional road train.
- The 13 650/13 720 mm long swap body that fits on a semi-trailer chassis. This swap body offers the same interior space as a conventional semi-trailer used in international transport in Europe.
- Once these swap bodies are built for top lifting and stacking features, they could be regarded as European containers.

Both lengths of swap bodies have been standardised in a stackable version and in a "light" version that does not allow for stacking.

Both types of swap body offer the same logistic conditions to the shipper and the forwarder as conventional road vehicles – articulated trucks or road trains - with rigid superstructure.

Compared to an intermodal transport system based on semi-trailers these length types of intermodal loading units, now described here under the term "European container", offer many advantages which can be summarized as follows:

- The European container is prepared for top-lifting.
- The European container is prepared for stacking.
- The European container does not create problems with railway gauge limitations.
- The European container adds less tare weight to intermodal transport systems.
- The European container fits better in systems of equipment pools, multi-ownershop and leasing organizations.

In order to fully conceive these advantages introduced by European containers, a more detailed evaluation is represented below.

6.3.1. The top lifting capability

While semi-trailers can only be lifted in terminal transfer if they have been especially designed for this feature, a European container offers lifting capability as a basic "built-in" feature. No political program is needed to promote lifting capability; it is, so to speak, automatically included.

However, lifting of semi-trailers is executed by grappler arm lifting devices. The grappler arms take the semi-trailer at the lower side rails of their loading compartment. These side rails must be reinforced to be able to withstand the force of this lifting operation (mass of unit + acceleration of lifting process).

The lifting of ISO containers and of European containers is done by a spreader that grasps the containers at the top corner fittings. The contact of the mass and acceleration forces into the box design is much easier; this piece of equipment is more robust and considerably cheaper. The ex-factory price of an ISO 40 ft. container is less than 2 000 dollars; a 13.7 m European container is less than 3 000 dollars.

Finally, top lifting in terminals by spreader, grasping the box at its corner fittings, is safer and quicker than a lifting operation by grappler arms. If, at a later stage, terminal automation comes under discussion, a further advantage will arrive: the box – whether ISO or European container – is already prepared for such lifting features. We assume that the top lift method, with a normal transfer by crane or reach

stacker, will require half the time than that needed by the lift by grappler arms device grasping the box or the semi-trailer at its bottom side rails.

As a result, it can be stated that European container system offers an easier, safer, faster and cost-effective lifting operation technique.

6.3.2. The stacking capability

Except for the semi-trailer, a container could also be built for stacking. Normally, the top lifting feature and the stacking feature are realised together. The box is built as a framework of steel rails that supports the construction and the walls. The roof and the floor construction is based on steel plates (partly corrugated) that mainly shelter the cargo inside while also assuming some load force. Lifting castings are on top of the corner posts, and stacking forces are assumed by the same feature, i.e. the castings and the corner post. Thus a European container fitted for top lifting will include the stacking capability as a by-product.

Stacking features are almost mandatory for depots that handle empty containers. These features are most welcome in terminals and in depot businesses: almost all terminals have problems with space, especially when they are successful. Putting one container on top of the other automatically doubles the container capacity of the terminal, per square metre open space; by stacking three on top of each other the capacity is tripled, etc.

The most important advantage of stacking arises in maritime transport. The capacity of a ship that carries containers in stacks is more than double the capacity of a RO-RO ship of similar size. Even when calculating that the RO-RO transfer might be cheaper, the overall savings in transport costs through higher ship productivity will more than compensate for this. Plus, the longer the distance over sea, the higher the significance of this saving. Central European RO-RO transport on medium distance coastal itineraries, such as Rotterdam-Hull, Zeebrugge-Waterford, and Helsinki-Lübeck are changing over from RO-RO transport with semi-trailers to container operation.

Stacking features can be even more productive when operating RO-RO ships. Two European 45 ft. containers with 2 890 mm height each could be stacked, one on top of the other, on a low bed MAFI trailer and rolled on board ship. The overall height of such a combined unit will be 600 mm (trailer height) + 2 890 mm + 2 890 mm, equals the 6 380 mm. The loading height on the main deck of the ships that operate today on the Haydarpaşa – Trieste line is 6 800 mm and can easily take such units on board. Using double stacks will double the productivity of loading and unloading the ship.

6.3.3. Avoiding gauge problems

Most European railways have gauge problems when they carry semi-trailers on flat railcars. The standard flat railcar has a loading height of 1 100 mm above rail. A European semi-trailer has an overall height of 4 000 mm, so the assembled unit comes to 5 100 mm height above rail, which is too much for most railway networks. Meanwhile, even if the future height is increased, as Mega trailer heights come into service, conflicts will arise on the Anatolian rail network.

On the other hand, if we eliminate the wheels and running gear, we can easily lower the total unit height – railcar + container – to some 4 000 mm, which will fit into most railway networks.

The European automotive industry has streamlined its logistics to a system of small containers inside the semi-trailer or freight container. These smaller units have standard pallet length and width

(800 x 1 200 mm) and a height of 1 000 mm. The logistic service providers demand vehicles that can carry 3 of such boxes in stack, i.e. that offer an inside clearance of 3 000 mm. This results high cube containers with a 3 200 mm outside height. This may create some problems with rail gauge. But as platform railcars with 850 mm platform height above rail become available, most of these problems could be solved (including those of Anatolian rail gauge) – if we remain with a box system for road/rail intermodal transport. Over-height semi-trailers would certainly surpass the rail gauge capacity.

6.3.4. Tare weight gains

An empty 45 ft. European container will have a tare weight of around 3 500 – 4 000 kg. A semi-trailer has a tare weight of 6 000 – 8 000 kg. The pocket rail cars that are needed for rail carriage of semi-trailers are normally heavier that the platform railcars. Over all, the system "container on platform railcar" will incur some 5 000 kg less tare per unit than the system "semi-trailer on pocket railcar". A standard intermodal train in Central Europe can carry around 40 road vehicle units (80 TEU). The system "container on platform railcar" will result in savings of tare of up to 20 tonnes per train. This might become particularly advantageous if a train operation bottleneck is created by total weight, or if the trains are moving in mountainous regions.

6.3.5. Easy pooling and leasing

Leasing of equipment has become wide-spread in commercial operations in the transport business. Half of the world's ISO containers are owned and operated by leasing companies.

Leasing or equipment pooling creates additional productivity. They contribute to flexibility in operation and to a better balance in trade flows.

But leasing – especially short-term leasing – can create a severe problem: an operator tends to handle leased equipment less carefully than his own. If the driver knows that this specific semi-trailer will be delivered back to an anonymous leasing company tomorrow, he will be unlikely to take proper care of the brakes, tires and other parts of the vehicle. So short-term leasing will inevitably create a considerable bill for equipment maintenance.

Here a simple truth comes into play: it is much easier to abuse a semi-trailer than a container. While the semi-trailer has many moving parts that can be overloaded, neglected, etc., a container sits either on a chassis or railcar or in a depot. The only real handling is executed by equipment that cannot do much damage to the container. The risk of running up a disproportionately high maintenance bill is diminished.

In consequence, if the logistics industry uses containers as the main means of transport, then lease and pool business models could be managed more easily than models that are based on semi-trailers.

To sum up, container systems possess many benefits in terms of convenience for lifting operations, time-savings, cost-effectiveness, and particularly for elimination of geographical bottlenecks. For all these reasons further development of container transport is essential.

6.4. Ro-La Operation

The Ro-La operation puts complete road trains or articulated vehicles, including trucks, on the platform of railcars. As the unit railcar + road vehicle must fit through the tunnel gauge of the railway line, the platform of the railcar must be extremely low above rail. Such specialised Ro-La railcars are

equipped with very small diameter wheels to keep the platform low. Small diameter wheels incur specific problems that add to costs and maintenance needs:

- The small wheel may derail in certain extreme situations, e. g. when the train passes over a switch.
- The small wheel must be equipped with extremely high quality steel on its running surface, because the hertz flat pressure with small wheels is very high.
- The small wheel must produce many more revolutions per mile, so maintenance needs (bearings, running surface) are much higher.
- The small wheels create difficulties in transmitting the braking power from vehicle mass to rail surface; therefore, the braking system of a Ro-La railcar should have a sophisticated and expensive design.
- The Ro-La railcar should be able to carry a complete road vehicle, i. e. 44 t in Europe. This load must be distributed on many axles when such small wheels are employed. Since the price of a railcar and the maintenance costs mainly depend on the number of axles, this is another factor that increases cost.

Ro-La railcars not only create costly technical problems in rail operations; their typical mode of operation inhibits intermodal transport operators from achieving a truly successful commercial operation.

Some approximate commercial figures from experience with Ro-La operations in Central Europe through the 1980s, demonstrate this commercial problem:

The standard Ro-La train in Central Europe offered space accommodation for some 18 – 20 trucks. Normally the driver accompanied the train with his road vehicles; for this reason the trains had a sleeping railcar (couchette) attached.

The cost to operate such trains was in the range of 0.65 – 0.75 euro per truck and per km carried. We assume that this cost level is based on rough calculations by the railways, leaving some overhead costs uncovered in order to promote this operation. The truck operator would pay per truck and per km of transport on the train, 0.15 to 0.25 euro; this cost is balanced by his savings in fuel and tire usage.

Further savings were theoretically possible when the Ro-La operation could be included in the driver's schedule in such a way that the legally mandated driver resting time could be covered while the driver was in the railway sleeping car.

A typical operation would have looked like this: for a truck run from the British Midlands to South East Europe, the driver starts in Birmingham in the morning and arrives in Harwich in the late afternoon. Then he spends around 8 hours on a ferry boat run that he could use as resting hours. In the morning, the boat arrives in Zeebrugge and the driver continues over the road to Köln, arriving in the afternoon. He would then enter the Ro-La Köln-Zagreb, and arrive in Zagreb the next day. In this way, the driver would have had all legal rest periods as he started the final road run in Central Croatia.

Normally, such features could be used to improve the operational figures of the road vehicle, or the road operator could apply the savings to a second driver. Taking into account all these figures, it would seem that the road operator would be prepared to pay more per km for Ro-La usage than he would save in fuel and wheel usage. But unfortunately, the markets demonstrated the opposite behaviour. Obviously,

most road operators simply ignored the legal framework for driving periods in their international operations, since the risk of being fined was nearly zero. In fact, no-one paid more than they saved; and any further savings that could have been realised by Ro-La were disregarded.

But Ro-La operation was promoted by another feature: beyond savings in fuel and tire usage, the road operator could benefit from exemptions on road usage fees by escaping various restrictions in certain countries that were imposed on foreign trucks using their road network. That is, a given country could try to charge a road usage fee of some 0.50 euro per vehicle and per km. This is the exact amount needed to cover the commercial gap between Ro-La operating costs and revenues from truck savings.

Incidentally, the main Ro-La offer was transit through Austria using the Brenner axis. The Austrian road fee for this axis was around 0.50 euro per truck and per km. To complete the picture: the operation was executed by an Austrian company using mainly Austrian railway capacity, rolling on railcars made in Austria; the operation terminated on Austrian territory some 60 m before the Italian border.

A typical Ro-La operation can only survive if the fees charged on the parallel road corridor are very high and if road use is hampered by additional restrictions such as time consuming transit customs procedures, the need for a visa for the driver, limited access to road usage permits, etc. As long as such restrictions apply, Ro-La may stand a commercial chance.

Yet we should keep in mind that the EU road usage policy aims toward liberal market access. EU members have to offer their road network to other members without artificial restrictions. If a road toll is charged, it should be a reasonable amount, and 0.50 euro per truck/km certainly exceeds a reasonable fee. A brief guide to intermodal transport road/rail cost and price calculation is given in Annex V.

In other words, a high usage fee and a restrictive road transit corridor in the territory of the EU can only be organised vis-à-vis road operators of non-member states. This applies today to the Turkish road operators. This situation must end however, when Turkey receives either membership or privileged association with the EU. Whenever the European Union brings in additional members, local Ro-La operations (if installed) become immediately commercially unviable.

Another problem has contributed to the termination of many Ro-La operations in Central Europe: the normal Ro-La carries some 24 – 28 road vehicles in a flat country, and 18 – 20 road vehicles when operating over a mountain range. Most Ro-La operations have been installed for crossing such mountainous corridors. Converted to TEU carrying capacity, the mountain Ro-La carries a maximum of 40 TEU while a normal container block train on the same corridor offers double capacity, i. e. 80 TEU. This is mainly due to the disastrous tare mass to payload ratio of the Ro-La. Estimated roughly; a Ro-La carries per slot on the railway network, half the commercial volume than a train with containers or swap bodies. Many European railways have scarce capacity on their main corridors so political planning prefers intermodal transport with containers, semi-trailers or similar unit loads that grant better usage of network capacity.

Some of these commercial considerations may change when the political environment changes. If the European Union enforces driving hours in long distance road transport more efficiently, the old calculations based on illegal overtime driving will no longer be valid and a new commercial environment may emerge. Similar changes can occur when a general sharp increase in road usage fees and of diesel fuel prices occur. If this becomes a realistic scenario, a sensitivity analysis based on these changes should be produced, to learn whether a new chance for commercially viable Ro-La operation may eventually emerge.

PART IV. STRATEGY FOR A COMPETITIVE INTERMODAL TRANSPORT SYSTEM IN TURKEY

CHAPTER 7. A SYSTEM ADAPTED TO NETWORK PERSPECTIVES AND TRANSPORT PROJECTION FOR EURO-ASIAN TRANSPORT LINKS

Turkey's road and rail networks have been developed at different periods of the country's history. Planning for public ports, (and involving at times other interests such maritime development, the private sector, etc.) was dependent upon TCDD.

Air transport developed early due to the country-wide coverage of the airport network; airport capacity has been able to adapt quickly to demand.

In recent years, most of the public investments have concentrated on the road network with few investments made in the rail network.

Today this situation is changing, with the construction of a rail tunnel under the İstanbul Strait and the construction of new HST lines. However, these investments in the rail network primarily concern the transport of passengers, on a limited number of lines in the western parts of Turkey. It is still difficult to assess what the consequences of these investments will be for freight.

It is the same for ports. Projects to expand public ports exist, but the privatisation process has just started. It is difficult to assess how the capacity of public ports will increase when a very high growth of container traffic is expected and RO-RO services become essential for connections with EU countries. Private ports are not really included in the network development policies, although they represent an important part of the traffic.

One success story of network development in Turkey is the rapid development of airport capacity with PPP financial schemes. Once again, however, this development concerns mainly passengers. Air freight logistic centres should develop accordingly. Two major problems remain: connecting these centres with their respective hinterlands, and integrating them in urban distribution schemes, as is the case for freight in ports.

A Turkish intermodal network or "master plan", including infrastructure of different modes and the most important nodes of interchange, does not exist yet.

However, a comprehensive approach to transport is progressing and "intermodal concepts" are more and more often integrated in the definition of strategies.

The membership of Turkey to international organisations, such as the International Transport Forum and the UN, as well as the requirement to align with the EU Acquis in accession negotiations, has

contributed to this evolution. This participation has also underscored Turkey's importance along international routes which combine sea and land modes.

The recent Transport Infrastructure Need Assessment Project (TINA), whose objective is to prepare the extension of the TEN network in a phase of pre-accession negotiation, is based on an intermodal approach and provides the first global traffic projections for Turkey. The definition of a TINA network should consist of major international and transit corridors, which have been agreed upon by Turkey in international negotiations, as well as other major national connections between large cities.

Along the corridors which are to become intermodal corridors, demand and supply should be evaluated in order to define priority actions; the promotion of intermodal transport should be among these priorities.

7.1. The International and Transit Corridors Across Turkey

The active participation of Turkey in international organisations has resulted in a series of agreements that identify these corridors and often specify objectives for the transfer of operations within them.

The first are the TEM, TER corridors of UN, as well as the TRACECA corridor. There are also the AGR, AGC and AGTC agreements of the UN. The AGTC agreement relating to intermodal transport should include terminals. These agreements include quality of service as an objective.

Finally, the priority corridors specified by the High Level Group (HLG), in which representatives of neighbouring countries have discussed the identification of such corridors with the EU. The technical details of the HLG Report, (which, in the view of the review team, fall short of reflecting the actual conditions and priorities of Turkey) are being specified and elaborated within the framework of TINA Study. The HLG has also progressed toward the identification of a few priority projects.

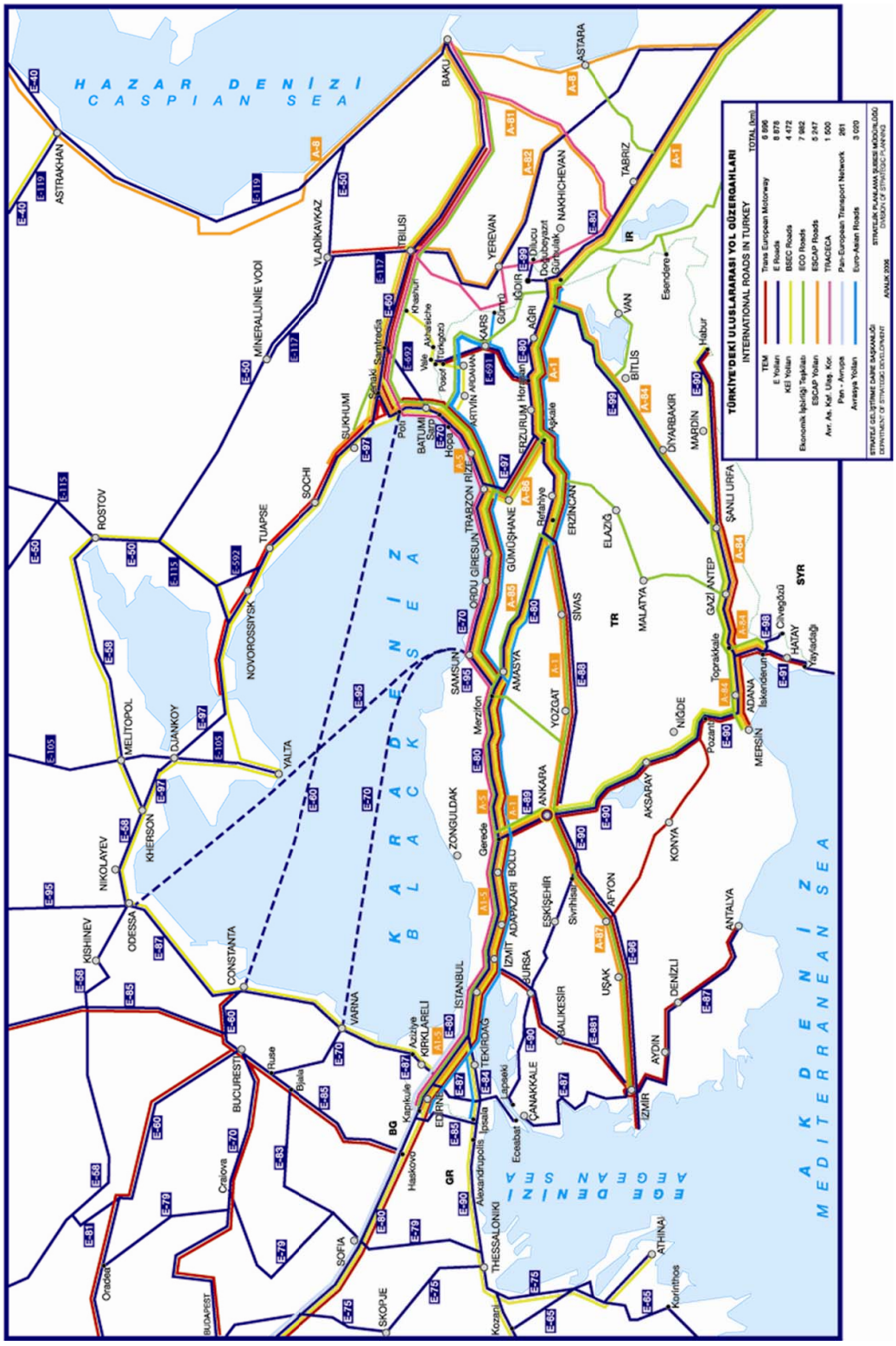
Part of the Turkish rail network is also mentioned in the final report of the High Level Group, set up by the European Commission to look at transport connections between the newly enlarged European Union and its 26 neighbours. The report submitted on 7th December 2005, identifies five important trans-national transport axes, some specific parts of which do not reflect (as indicated earlier) the actual situation and priorities of Turkey. The south-eastern axis links the European Union across the Balkans and Turkey with the Caucasus, the Caspian Sea as well as with the Middle East through to Egypt.

In addition, the agreements of regional concertation should also be taken into account: concertation with the BSEC countries as well as the Tbilisi declaration for relations between Turkey, Georgia and Azerbadjan.

In some cases, the regional concertation agreements deal with more technical aspects of international transport operations: for example, the concertation between the Middle East countries. Railway companies have opened regular rail services for container transport between Turkey, Iran, Turkmenistan and Kazakhstan.

Turkey is actively participating in international projects that have developed and identified networks linking Europe with Asia through important railway and intermodal transport lines. Some examples are the Trans-Asian Railway Network, established in an Intergovernmental Agreement prepared in the framework of the United Nations Economic and Social Commission for Asia and the Pacific (UN ESCAP), and the UNECE/UNESCAP Joint Project on Developing Euro-Asian Transport Linkages that identified Turkish railway lines C-E 70 and C-E 97 as important transport links between Europe and Asia.

Map 7.1. **International Roads in Turkey**



Source: Turkish General Directorate of Highways.

The Transport Corridor Europe-Caucasus-Asia (TRACECA) aims to retrace the ancient Silk Road. It has also identified the AGTC railway lines C-E 70 and C-E 692 (İstanbul-Sivas-Kars) as important corridors: the ports of Samsun and İstanbul have been designated as TRACECA ports.

7.2. The TINA Project on Major National and International Corridors

Turkey has completed the Transport Infrastructure Needs Assessment (TINA) Project which aims for the inclusion the new EU members into the EU transport networks. Started on 2nd December 2005 and concluded on 23rd May 2008 with a final meeting, the TINA Project for Turkey aims to develop a multimodal transport infrastructure network within Turkey and integrating the country with Trans-European Networks.

Through the TINA project, international priority corridors are connected to major national links for the purpose of forming a kind of core network; this network is intended to become part of the "extended Trans-European-Network", when Turkey joins the EU.

In the case of Turkey, whose population and size are greater than the new EU member countries, more national links have to be included, in addition to the international corridors above mentioned. The links of particular concern are those with connections between the major cities of the western part of the Anatolian plateau, especially İzmir, Bursa, Antalya and Konya; also of concern are the connections to the south Mediterranean coast with important towns such as Adana, or ports such as Mersin.

Beyond their role within the Turkish network, these connections could also become important international transit links in the future, when greater international traffic may require more diverse entry points along the Turkish Mediterranean coast. Such an evolution would provide alternative intermodal routes across Turkey, avoiding the congested area of İstanbul and the Marmara Sea.

Therefore the TINA project provides a global framework in which infrastructure projects could be evaluated, with regard to their relevance for national and international transport. In such a perspective, intermodal transport and transit through ports will play a major role as intermodal traffic increases.

7.3. Transport Prospective and Traffic Projections

In the assessment of transport needs, it is clear that traffic projections are critical and yet have always been problematic; such was the case for the definition of priority corridors within the TEN networks, including the revision of their guidelines in 2004.

When looking at ECMT figures on the evolution of transport volumes, Turkey appears as one of the countries with the highest growth, mainly due to road transport.

If we consider the actual growth of the Turkish economy and foreign trade, one might expect that such growth will continue.

Traffic projections of EU trade with neighbouring countries, including Turkey, are clearly indicated in the TINA Project. These projections depend upon future economic as well as transport scenarios. Plus, they include different sets of hypotheses for investment in infrastructure, rail-road networks, ports, airports and logistic terminals. But the expected performance of Turkish transport transit corridors should also be considered with regard to competition among itineraries.

7.3.1. Socio economic scenario

Regarding transport projections: the two studies mentioned concentrate on the choice of one central scenario, which represents a "trend" scenario. When variants are mentioned, they are more of a "sensitivity analysis" of macro economic variables such as GDP, and not really an exploration of changes in trade patterns.

Table 7.1. **GDP growth forecasts, Medium Growth 2000-2025 from EUROSTAT Study**

Nr	Name	00-05	05-10	10-15	15-20	20-25
		%	%	%	%	%
1	Morocco	3.2	3.0	3.0	3.0	3.0
2	Algeria	1.9	3.0	3.0	3.0	3.0
3	Tunisia	4.8	4.0	4.0	4.0	4.0
4	Malta	3.7	3.7	3.7	3.7	3.7
5	Egypt	3.4	3.0	3.0	3.0	3.0
6	Israel	4.0	4.0	4.0	4.0	4.0
7	Palestinian Territories	4.1	3.50	3.5	3.5	3.5
8	Jordan	5.0	4.0	4.0	4.0	4.0
9	Lebanon	5.0	4.0	4.0	4.0	4.0
10	Syria	5.3	4.0	4.0	4.0	4.0
11	Turkey	4.7	4.7	4.7	4.7	4.7
12	Greece	4.0	4.0	3.2	3.2	3.0
13	Italy and Slovenia	2.4	2:4	2.2	2.2	2.1
14	France	2.4	2.4	2.2	2.2	2.1
15	Iberian Peninsula	3.0	3.0	3.0	3.0	2.7
16	British Isles	2.6	2.6	2.5	2.5	2.4
17	Benelux	2.3	2.3	2.1	2.1	2.0
18	Germany and Austria	2.1	2.1	2.1	2.1	1.9
19	Denmark, Sweden and Finland	2.3	2.3	1.9	1.9	1.8
20	Baltic Countries	4.7	4.7	3.3	3.3	2.2
21	Czech and Slovak Republic, Hungary and Poland	3.8	3.8	3.7	3.7	3.0
22	Norway	2.3	2.3	2.3	2.3	1.9
23	Iceland, Greenland and Faeroe Islands	2.3	2.3	2.3	2.3	2.3
24	Switzerland	2.0	2.0	2.3	2.3	2.0
25	Croatia, Bosnia and Herzegovina, Yugoslavia, FYROM, and Albania	3.9	3.9	3.9	3.9	3.9
26	Bulgaria	3.9	3.9	3.9	3.9	3.9
27	Romania	3.9	3.9	3.9	3.9	3.9
28	Ukraine, Belarus and Moldova	5.2	5.2	5.2	5.2	5.2
29	Russia	3.8	3.8	3.8	3.8	3.8
30	Iran	3.4	3.4	3.4	3.4	3.4
31	Iraq	3.4	3.4	3.4	3.4	3.4
32	Arabic Peninsula	3.4	3.4	3.4	3.4	3.4
33	Africa (except specified countries)	4.0	4.0	4.0	4.0	4.0
34	Asia and Oceania (except specified countries)	4.0	4.0	4.0	4.0	4.0
35	Americas (except United Stated)	4.0	4.0	4.0	4.0	4.0
36	United States of America	3.0	3.0	3.0	3.0	3.0
37	Libya	3.4	3.4	3.4	3.4	3.4
38	Caucasus	4.0	4.0	4.0	4.0	4.0

Source: EUROMED Transport Infrastructure project (ref MEDA Freight Forecasting Model, January 2005).

In such a scenario, the role of the Turkish corridors in international transit will also be very dependant upon hypothesis of development of Turkish neighbouring countries, such as Iraq, Iran, Syria and countries of central Asia; these could benefit from petroleum resources, while still being vulnerable to political tensions.

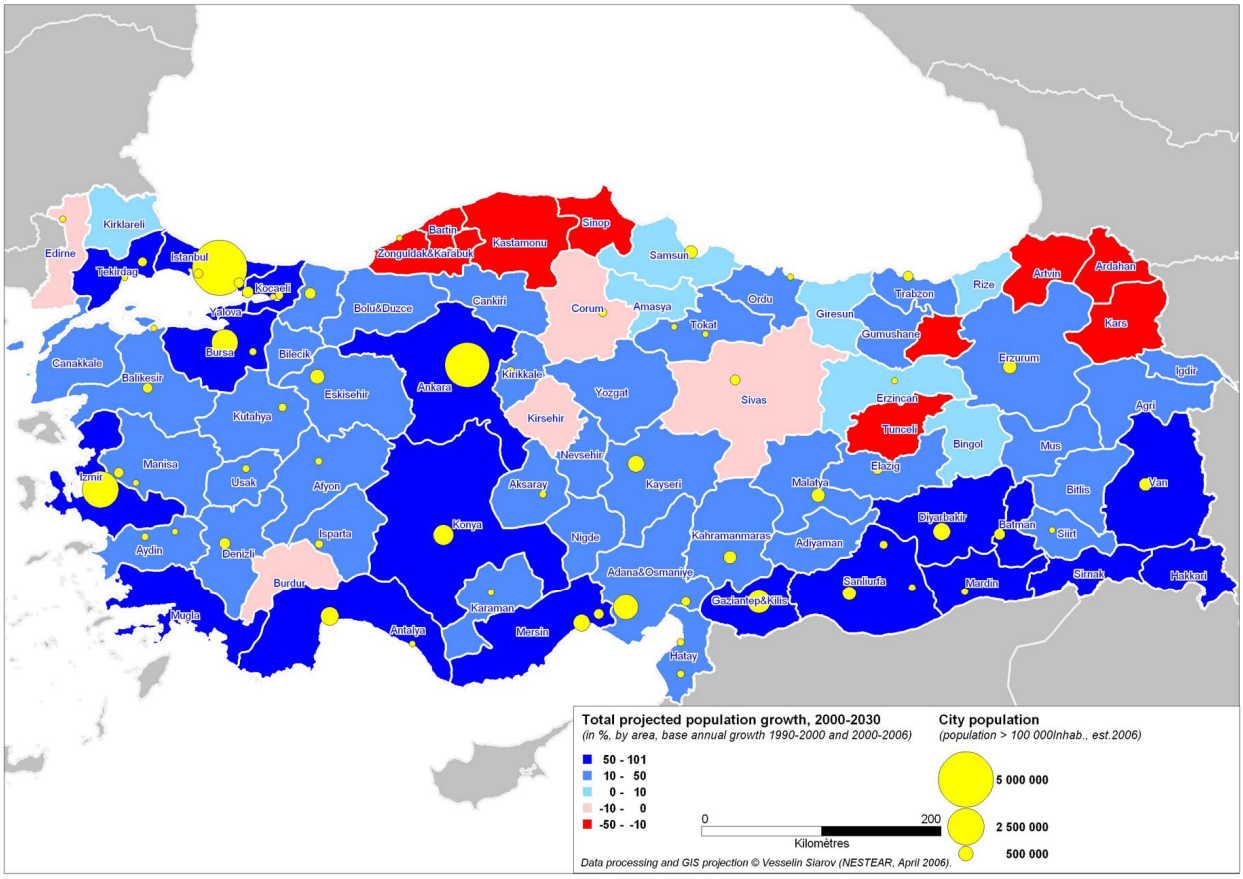
With respect to east-west relations beyond Central Asia, it is remarkable to investigate the conditions under which Turkey could be a transit country towards China along the Silk Road or towards India across Iran.

The central variable for socio economic scenarios is indeed the GDP. In the EUROSTAT[1] study, a hypothesis of almost 5% growth for Turkey over the next twenty years is indicated; the TINA[2] study indicates this ratio as 6%. This increase is justified by the observation of strong economic growth during recent years and with the reference provided by the SPO. International transport is expected to be higher, with elasticity greater than 1 with regard to GDP. The expected growth of containers through ports could even multiply by 4 or 5 during the next 20 years.

Table 7.2. **Production per sector: rate of growth**

		RFS	NTS	AGS
	95 - 2003 %	2003 - 2030 %	2003 - 2030 %	2003 - 2030 %
Agriculture, Mining	2.6	2.5	2.5	2.5
Iron, Steel, Clothing	7.5	2.5	3	5
Other	19	6.3	8	11
Chemicals	9	8	10	14
Other semi-manufactured	13	4	5	9
Consumption materials	24	6.2	8	11.3
Automotive	28.6	6	7	10
Office machinery and communication equipment	30	7	10	13
Other machinery and transport equip.	16.8	5	7	10
Other consumption materials	24	8	9.1	13.30
Total	**10.4**	**4.7**	**6**	**9**

Map 7.2. **Total projected population growth, 2000-2030**



Source: NESTEAR.

7.3.2. The intermodal transport scenario

Intermodal transport scenarios are based upon infrastructure scenarios that concern road and rail transport as well as ports and intermodal centres.

They are also based on RO-RO services across the Mediterranean Sea, Black Sea and the Caspian Sea, container services for maritime and inland transport and combined transport services.

Transport infrastructure scenarios for Turkey are detailed in the TINA study. These include: a "reference scenario" including ongoing projects or projects already decided up to 2013; a "long term investment" scenario up to the year 2020; and a "long term alternative investment scenario". An additional investment project has been identified in order to face expected capacity needs.

The long term scenarios were defined after consultation with the Turkish administration, and were adapted to the expected growth of demand, in order to be validated and confirmed under the structure of a core TINA Network. Some additional projects have been considered in the long term alternative scenarios to address future issues - for example, when more capacity is necessary because of traffic growth or better regional connections are required.

The main characteristic of these scenarios could be summarized as follows:

- Upgrading includes construction and modernization of all elements on major highways and converting into minimum 4 lanes with bituminous hot mix pavement. In addition to this network in these scenarios, some toll motorways could be constructed, mainly in the dense areas of Turkey. However the objective is to have a basic toll-free network for major connections between regions. Important transit road corridors are included in this network, with possible alternative routes across the Marmara Sea using ferries, in order to bypass congested areas in İstanbul.

- The development of rail HST lines between İstanbul, Ankara, Konya and İzmir.

- A new line between Ankara and Sivas, with the realignment of the old line beyond Sivas towards Kars.

There should be connections to new ports, including connections to Çandarlı, close to İzmir on the Agean coast, and Filyos, close to Zonguldak on the Black Sea coast.

Investment for modernisation, with widespread electrification, new signalling, and the realignment of curves will also improve the performance of the rail network.

Freight transport should benefit from these investments, with improved national and international network connections, including connections to ports with access for freight to new mixed lines.

A new rail connection will open in the eastern part of Turkey, between Kars and Tbilisi, linking Turkey with Georgia and Azerbaijan, with possible RO-RO connections across the Caspian Sea.

An alternative scenario for the long run is a proposed new rail line, between Trabzon and the Syrian border, which would open a new link between the Black Sea and the Middle East.

In addition, the two rail connections below were proposed to improve east-west connections:

- From İstanbul to the Caucasus (HLG).
- From İstanbul to the Iran border across Van lake, with improved rail operations and rail ferry services.

And below are the proposed networks to improve north-south connections:

- From the Aegean coast to the Black Sea (İzmir, Çandarlı to Filyos).
- From the Mediterranean coast to Samsun.
- From Trabzon to the Middle East.

Two of these connections could be “land bridges” between the Mediterranean and the Black Sea, as an alternative to the congested Strait of İstanbul.

- Investments in public ports with a special emphasis on container handling.

These investments will need to respond to the strong increase of container traffic, which is expected to multiply by more than 3 in 15 years. This need cannot be met by the current public ports alone, thus the infrastructural capacities of these ports needs to be increased. At the moment, there is a lack of information about capacity development in the Turkish ports.

It has already been pointed out that 50% of container traffic in Turkey is handled by private ports such as Ambarlı and Gemlik.

Concerning private ports, many investment projects have been proposed for specialised ports. In particular, projects to serve the transport needs of the automotive industry, or for container ports having the strong backing of foreign investors such as Dubai or Singapore port authority, currently being implemented in Mersin. This demonstrates that the Middle East and Asia are very much interested in Turkish development, which will probably reinforce the role of Turkey in East-West trade.

- Investments in airports.

Airports have seen a surge in investment in recent years for passenger traffic, as mentioned earlier. As for air cargo, investment in logistic equipment has also developed accordingly.

At the international level, Turkey is reinforcing its "hub" role for lines towards central Asia, and to some extent, to the Middle East. It is also reinforcing its role towards Europe.

- Investments in logistic centres.

Although Turkey obviously needs such centres, this is a weak point in the current situation. Prospects for future development are not very clear.

Possible implementation locations linked to the rail network exist, but there is no adequate institutional and regulatory framework for such implementation. This underlies the difficulty in making progress in this domain.

Such uncertainties affect the perspective of development of intermodal services.

The perspectives regarding intermodal services infrastructure investments could be summarised as follows:

- Strong perspective for the development of RO-RO services across the Mediterranean Sea, the Black Sea and the Caspian Sea for Europe-Asia links.

  This would be in the line with existing services; further opportunities may be explored by opening a new line between Europe and Turkey.

- Strong increase in container traffic imports, but the perspective is weak on inland transport of these services. Currently, road transport is the main chain and it is difficult to imagine how rail will take a significant share of this market which links major ports with major inland cities.

- Tables 34, 35 and 36 indicate the alternative scenarios for 2020 on total imports, exports and domestic freight transport by transport modes respectively. It may be observed that these scenarios under TINA Study emphasize that maritime transport is expected to raise its market share almost 94% in imports, 85% in exports while road transport is estimated to have around 80% market share in total domestic freight transport by 2020.

Table 7.3. **Total imports by transport mode, million tonnes, base year 2004-ALT scenario 2020**

Mode	Base year 2004 (million tonnes p.a.)	Market share	Forecasts 2020	Market share	Growth rate
Road	3.62	3.18%	9.85	3.73%	2.72
Rail	1.26	1.11%	3.09	1.17%	2.45
Sea	107.12	94.11%	247.87	93.79%	2.31
Other	1.73	1.52%	3.2	1.21%	1.85
Unknown	0.09	0.08%	0.28	0.11%	3.11
Total	**113.82**	**100.0%**	**264.29**	**100.0%**	**2.32**

Table 7.4. **Total exports by transport mode, million tonnes, base year 2004-ALT scenario 2020**

Mode	Base year 2004 (million tonnes p.a.)	Market share	Forecasts 2020	Market share	Growth rate
Road	9.35	15.45%	25.16	13.46%	2.69
Rail	0.74	1.22%	2.30	1.23%	3.10
Sea	50.25	83.04%	159.00	85.08%	3.16
Other	0.15	0.25%	0.39	0.21%	2.61
Unknown	0.02	0.03%	0.04	0.02%	2.04
Total	**60.51**	**100.0%**	**186.89**	**100.0%**	**3.09**

Table 7.5. **Total domestic freight transport by transport mode, million tonnes, base year 2004- ALT Scenario 2020**

Mode	Base year 2004 (million tonnes p.a.)	Market share	Reference scenario 2020 (million tonnes p.a.)	Market share	Growth factor
Road	123.32	81.2%	305.22	84.3%	2.48
Rail	14.14	9.3%	31.50	8.7%	2.23
Sea	14.34	9.5%	25.31	7.0%	1.76
Total	**151.80**	**100.0%**	**362.03**	**100.0%**	**2.38**

7.4. AGTC

The objective of The European Agreement on Important International Combined Transport Lines and Related Installations (AGTC), ratified by Turkey on 4th September 1996, is to make international combined and intermodal transport at the Pan-European level, more efficient and attractive to customers. In addition to infrastructure and performance standards, the AGTC Agreement also designates a network of important international combined transport lines and related installations at the Pan-European level, covering more than 30 of the European member countries of UNECE. Work is continuing to extend the

AGTC network to Central Asia, the Caucasus, the Middle East and to Asia (*see Annex I for Turkish AGTC network*).

Globalisation and the development of world trade have increased international traffic considerably, in particular along the east-west routes: maritime transport, with improved performances, has been the first to take advantage of this evolution.

In recent years, more and more countries, as well as new routes have opened up to world trade. Because of its central location, Turkey has a strong opportunity to play an important role in the international transport.

So far, road transport has adapted very quickly. More opportunities will open up with RO-RO services and extended networks to the east, probably to China, along the "Silk Road". However it is not possible to speak about a quick adaptation as such for other modes of transport.

Despite the dominance of road transport, Turkey aims to achieve a more balanced transport system through recent major railway projects and a port privatization process. This way, it is anticipated that modernization and capacity improvements for the existing infrastructures and services will be attained. This would also have positive impacts for the emerging intermodal transport activities. In Turkey, air transport capacity is developed sooner than railways and maritime and showed a rapid increase in recent years. Consequently, there is now a potential to establish air freight logistics centers in Turkey. In the long run, this can also be seen as another alternative for facilitating freight transport and logistics.

But it is also important to explore the role that the intermodal transport chain, combining rail and sea, could take on. On this point, two scales could be used:

- The scale of relations among Europe, Central Asia and the Middle East.
- The scale of relations between Europe and Asia.

In creating an extensive and competitive intermodal transport framework plan for Turkey, the essential connections from and to the maritime and air freight logistics centers and their integration to urban distributions should also be taken into account. Because no matter how successfully a legal framework or set of strategies are being set, it is the choice of private companies which determines the overall sustainability of intermodal operations. Hence it is necessary to take into account whether such plans meet market needs.

NOTES

1. The EUROSTAT Study was completed in 2005.

2. TINA Study was completed in 2008.

CHAPTER 8. PROMOTION OF INTERMODAL TRANSPORT OPERATIONS AND LOGISTICS

National and international road transport is presently the backbone of Turkish transport and trade. In order to make rail transport and in particular intermodal road/rail transport more competitive, a number of policy measures are required.

8.1. National Transport

8.1.1. Improvement of the national rail transport infrastructure

The Turkish railways have carried out considerable infrastructure works and have made improvements in service quality (for example the introduction of block trains in 2004). And yet it is difficult to see how the Turkish railways could be in a position to ensure, in the short and medium term, the transfer of a considerable amount of cargo from road to rail, in order to provide relief to road congestion and thus contribute to the sustainability of the Turkish transport system in general. The Turkish rail network is simply not advanced enough to cater to such demands. Also, many rail links are still single-track lines and and will remain so for quite some time. Furthermore, they are not built for fast and heavy freight trains passing at frequent intervals.

In the long term, the Turkish railway network must be upgraded, not only for high-speed passenger transport, but also to allow for competitive and reliable goods transport services. The AGTC infrastructure and train performance standards provide the international reference and basis for efficient and competitive intermodal rail/road transport operation.

Table 8.1. **Recommended infrastructure standards in the AGTC Agreement**

	Existing railway lines Target values	**New railway lines Target values**
Number of tracks	(not specified)	2
Loading gauge	UIC B	UIC C
Minimum distance between track centres	4.0 m	4.2 m
Nominal minimum speed	120 km/h	120 km/h
Authorized mass per axle		
Wagons <100 km/h	22.5 tonnes	22.5 tonnes
Wagons <120 km/h	20 tonnes	20 tonnes
Maximum gradient	(not specified)	12.5 mm/m
Minimum useful siding length	750 m	750 m

Table 8.2. **Recommended performance standards for intermodal trains in the AGTC Agreement**

	Existing railway lines Target values	New railway lines Target values
Nominal minimum speed	120 km/h	120 km/h
Length of train	600 m	750 m
Axle load		
Wagons <100 km/h	22.5 tonnes	22.5 tonnes
Wagons <120 km/h	20 tonnes	20 tonnes
Priority rating	High	High
Block trains	Often	Often

8.1.2. Promotion of national container transport by rail

As a result of the installation of efficient container transhipment facilities in the rehabilitated and newly constructed Turkish ports, and the construction of inland logistical centres undertaken in cooperation with TCDD (*see above*), container block train hinterland operations could be developed on rail corridors linking these inland terminals with major Turkish container ports

This concern in particular, the rail links between the logistics centres or freight village at Halkalı (serving the İstanbul area), Köseköy (serving the İzmit area), Boğazköprü (serving the Kayseri area), Gelemen, (serving the Samsun area), Eskişehir (serving Hasanbey), Balıkesir (serving Gökköy) as well as rail links to and from the İzmir and Mersin container ports.

If targeted container volumes could justify the introduction of regular shuttle train services, such services should be introduced in cooperation with concerned parties (maritime lines, road transport operators, shippers, freight forwarders, etc.). Feasibility studies and specific start-up costs might need to be supported financially by the government. Such regular container transport by rail could provide considerable relief for the overburdened road networks along such corridors.

Turkey might also consider promoting these developments by assisting TCDD and private sector interests in the construction of adequate facilities (berths with rail tracks, sidings, etc.) and temporary storage areas at ports and inland terminals, and by the procurement of cranes, wagons and other mobile transfer equipment. It might also ensure the construction of adequate access road and rail links to inland terminals or logistics centres. Turkey might also wish to encourage, with financial and regulatory means, the engagement of private capital and know-how through BOT arrangements or leasing out of property for longer periods.

Turkey should not invest in national Ro-La operations. For the present and in the near future, there seem to be no markets for which such services could be operated at competitive quality and costs. This situation could change however, if traffic limitations, such as night or weekend traffic bans, are introduced on specific road corridors.

For purely domestic transport operations, a market does not seem to exist at the moment, for successful rail operations with swap-bodies or similar loading units offering loading capacities,

comparable to road transport. Turkish shippers and freight forwarders have no experience with such complex domestic intermodal transport services. The present volume, quality and flexibility of service as well as prices offered by purely national road transport, cannot be met by such domestic rail transport operations, which would require two transhipment operations as well as initial and terminal road haulage. It is also unlikely that Turkish road transport companies would be willing to invest in the required intermodal equipment, such as swap-bodies, as long as there are no compelling road traffic restrictions (i.e. very long detours or driving bans). The same applies to national rolling highways.

8.1.3. Promotion of domestic RO-RO coastal shipping

In contrast to national intermodal transport operations by rail, domestic RO-RO coastal shipping could make a difference; it should be able to make an inroad into the domestic road transport markets in Turkey for longer distance operations and for destinations along the Turkish coasts. Such a concept would be in line with the "Motorways of the Sea" initiatives pursued and supported in the framework of the European Union.

RO-RO transport services allow road haulers to use their existing vehicle fleet and drivers efficiently. They do not require the adoption of new logistical arrangements or investments in new equipment, such as swap-bodies or European containers offering the same loading capacity as standard road semi-trailers.

It does not seem necessary to provide additional financial assistance to promote short distance RO-RO transport services in the Marmara Sea area. However the framework conditions to allow private RO-RO transport to expand their services in this region would need to be set appropriately, in order to relieve the highly congested roads in and around the İstanbul agglomeration. Important elements of these framework conditions are the provision for fair competition among the various operators, both public and private, and the provision of adequate space for RO-RO ports. This would include parking areas that are in line with municipal land development plans and the requirements of domestic transport and logistics. The preparation and adoption of the above mentioned regional master plan, together with the participation of concerned interest groups, could play an important role in this respect.

However, Turkey may wish to promote and financially support the development of domestic, long-distance coastal RO-RO transport services, focusing on maritime linkages beyond the Marmara Sea area. Commercially viable destinations from the İstanbul agglomeration, especially from the northern coast of the Marmara Sea, could be the region of Bursa and the İzmir area. The 620 km from İstanbul to İzmir would require around 12 hours by road and around 24 hours by RO-RO vessels. In such a case, vessels and lorries would leave İstanbul in the morning hours. Both means of transport would take one working day, to allow for unloading – as the lorry would arrive in the evening and would need to wait for the next day for unloading. Such operations would integrate smoothly into the supply chain and could relieve road traffic along this heavily used road corridors.

Other promising locations to and from the İstanbul agglomeration, could be the economic centres around Mersin in the south (with possible onward journeys to Syria) and, possibly, Trabzon or Samsun on the Black Sea (with possible onward journeys to the Caucasus countries and beyond).

To promote such domestic RO-RO shipping services, Turkey must ensure that cumbersome customs formalities, such as export declarations, would not be required for long-distance domestic RO-RO operations. This could be achieved by reserving certain port areas exclusively for domestic RO-RO ferry boat services.

In addition to support facilities in the building and the operation of suitable RO-RO terminals on the northern side of the Marmara Sea (*see above*), Turkey might also consider financial support measures/incentives for such RO-RO services. These might include: measures similar to the VAT tax reduction accorded to RO-RO operations in the Marmara Sea, temporarily reduced fees for pilotage and the guarantee of fair competition among competing RO-RO enterprises.

8.1.4. Development of ports and inland terminals to logistic centres

The development of Turkish ports and inland terminals, with connections to logistic centres or freight villages and to logistical hubs, as currently studied, will be an important step towards a modern and competitive international transport and trading system. This progression will be in tune with market demands and the rapid economic development of the country. It is also necessary for the development of a competitive intermodal transport system. Logistic centres can reduce transport and transhipment costs considerably, by providing auxiliary services such as customs, banking and insurance services, and by consolidating or distributing cargo flows into competitive volumes for long-haul transport or for final distribution and delivery.

It is vital that such centres or hubs are managed by an autonomous and impartial legal institute through which all major parties involved, both public and private, develop a sense of ownership. As has been shown in many instances, private-public partnership arrangements, not only for the construction, but also for the administration and management of such logistic centres, can cater to these needs and provide the required synergies in operation.

Such centres must also comply with international best business practices for transport, freight forwarding, warehousing and other logistic services. If necessary they must provide efficient import, export and customs transit procedures on a 24 hour basis. They must be located close to, and have good access to, important roads, rail and maritime transport lines. Current efforts made in Turkey in this respect, for example in Halkalı, should be pursued vigorously, and the role of road and maritime transport operators, as well as freight forwarding companies and logistics providers, in the construction and operation of these centres, should be increased already at the conceptual level.

Table 8.3. **Recommended performance standards for intermodal terminals in the AGTC Agreement**

	Target values
Average time for formation of trains	Max. 60 minutes
Average waiting time for lorries	Max. 20 minutes
Accessibility by road	Good
Accessibility by rail	Good
Capacity bottlenecks	None or seldom

8.2. International Transport

8.2.1. International cooperation and Public-Private Partnerships

To develop intermodal transport services that offer competitive services, governments, railways and intermodal transport operators must work together. At the inter-governmental level, the infrastructure and service standards provided in the AGTC Agreement, form a good basis for cooperation and ensure, if implemented, a minimum level of effective operations.

Based on the standards stipulated by the international community in the AGTC Agreement, the following minimum performance standards are recommended for border crossing points.

Table 8.4. **Recommended performance standards for border crossing points**

	Target values
Average length of stop	Max. 30 minutes
Joint border stations	Yes
Use of common CIM/SMGS consignment note for transport of Central Asia	Yes

More specifically, interoperability needs to be ensured between the railway undertakings providing intermodal rail transport to and from Turkey[1].

In addition ECMT and UNECE have developed model action plans and partnership agreements. These models, together with the performance benchmarks contained therein and reproduced in Annex III, could provide the framework for inter-governmental and public-private partnership arrangements along the long intermodal rail transport lines from Turkey to Europe, Ukraine, the Russian Federation, to Central Asia and to the Middle East.

Project CREAM

Some 40 actors have jointly launched an intermodal research program under the acronym CREAM in April 2007. The project concentrates on improvement of intermodal transport on the European east-west corridor between the North Sea Ports and Black Sea respectively Turkey. Members are railways and intermodal operators and some consultants specialized in rail and intermodal transport. The project will be organized with the same method as the previous BRAVO program that covered the North South corridor between Italy and Central Europe. The concrete intermodal transport service on this corridor are observed and analyzed with regard to their shortcomings. Then, an analysis on the reasons of such shortcomings is made and a strategy for improvement is elaborated and introduced into practical operation step by step.

8.2.2. Promotion of international container transport by rail

As stated earlier in Chapter 4, there are increasing number of container block trains operating between Turkey and the EU countries via Southeastern Europe. These services need to be further extended to offer regular and reliable transport links.

This means that these intermodal rail services must be able to compete with road transport in terms of reliability, flexibility, speed and price. To achieve these objectives there must be effective cooperation among the railway undertakings along this corridor, including the tracing and tracking of cargo and containers and the reduction or abolition of customs related border crossing stops.

Apart from these container transport services, there are only two weekly container block trains between Turkey and Central Asia. Due to operational difficulties, such as difficulties in the tracking and tracing of cargo and containers beyond Iran, the required transhipment at the Iran-Turkmenistan border due to different axle gauges, and due to the lack of return cargo from Central Asia, there seems to be little chance for the rapid development of this type of transport on the Asian route in the near future.

8.2.3. Promotion of international swap-body transport by rail

International rail services using swap-bodies could be extended to national terminals beyond Halkalı, in particular once the Marmara Tunnel allows through railway transport to the Asian side of Turkey. The example of international rail services with swap-bodies from Köseköy to Cologne, organized for the moment by a single company and for a single client, could be replicated by TCDD and other private interests, possibly in cooperation with experienced intermodal transport operators in the EU (such as UIRR members).

Transport of cargo using swap-bodies provides comparable capacity to transport by road. In the coming years it is possible that EU countries which are the final destination for, or origin of, Turkish road transport operators, may not appreciate that Turkish road haulers use intermodal transport operations (either RO-RO and/or Ro-La) until their borders, and then continue by road to their final destinations within the European Union. In addition, it can be safely predicted that road tolls as well as local and time-specific traffic restrictions will further increase road transport costs in these countries (the German motorway toll has already increased road transport costs up to 15% for these trips). While the introduction of Ro-La, to and from these countries might be a short-term solution, the more viable long-term solution is the use of swap-bodies (unaccompanied combined transport) with only initial and terminal haulage by road within a possible radius of 70 km that is usually exempt from traffic restrictions.

It is likely that swap-body intermodal transport operations over these long distances would be eligible for start-up funding by concerned EU countries or international funds, such a Marco Polo, as has been the case for the present Cologne-Köseköy. But such operations must be well-conceived and innovative, and should be organized in cooperation with Turkish road transport operators, TCDD and experienced intermodal transport operators in the EU.

Ro-La services may play a niche role in international transport, especially on the route between Turkey and Central Europe. Ro-La economics rely heavily on political decisions; and because such decisions are difficult to predict, Ro-La transport competitiveness is a very uncertain issue. Thus, long term investments in this intermodal transport service should be avoided. Railcars leasing and easy to build and operate terminals are the preferred choice.

The special case of the Rolling Highway (Ro-La) Halkalı -Wells

The trials undertaken in 2006 to establish an international rolling highway (Ro-La) have revealed the considerable difficulties in establishing such a technically complex system on a permanent and competitive basis. It is estimated that the operating costs for the 1979 km long Ro-La, with 20 trucks per train (drivers are not carried) would be in the order of 1 euro per lorry-km. The average price for pure trucking on this corridor is estimated at 20-40 centimes per lorry-km. Thus, the operating costs of this Ro-La, at approximately 2000 euros per journey, must be compared with operating costs for pure road transport, in the order of 400 to 800 euros per journey. The Ro-La operation takes around the same time as a truck journey, but eliminates the driver - who can be used otherwise.

This advantage, along with the elimination of permits and possible border-crossing problems in transit, including delays and complications in obtaining visas for the drivers, should be balanced against the additional costs incurred by flying the drivers in and out of Vienna.

Given the competitive environment for Turkish truckers in pure road transport or in mixed RO-RO road operations on this transport link, it is difficult to see how such a Ro-La can operate competitively, without considerable subsidies. It may only provide short-term solutions in case of the non-availability of transit permits or in exceptional bottleneck situations along this transit corridor, to and from Turkey.

8.2.4. Promotion of international RO-RO services

The international commercial RO-RO services operated between Turkey and Italy are apparently very successful and profitable. Thus they do not seem to warrant, at present, any particular intervention by public authorities, as long as the competitive environment within this RO-RO sector is upheld.

8.3. Reorganisation of Customs Treatment in the Gateways

A problem common to all gateways is that they mix international and national cargo flows. If such a place is organised under bond, i. e. as an international customs free zone, national cargo flows that use this port for transhipment only, must also undergo customs treatment. For example, cargo transported by maritime transport from Ceşme to Samsun with a change of vessel in a port in the İstanbul area, would need to undergo complicated customs procedures twice. As the customs procedures for the shipment of national cargo make no sense and are time consuming and costly, for customs authorities and transport operators alike, a re-organisation of such gateways or ports is necessary.

In principle, port operations can be organised in such a way as to separate international traffic and cargoes from domestic operations which do not require customs treatment.

Some free-ports along the North Sea operate under such dual systems

For example, a terminal in Hamburg-Wilhelmburg is organised so that import/export containers are transferred between ships and railways in the bonded port area on its north side, while European loading units are delivered from road transport to the intermodal trains in customs free inland operations on its south side.

A problem which can impede such a re-organisation is the organisational structure of relevant public authorities. The Customs Authority is a part of the Ministry of Finance, while the Ministry of Transport is responsible for port organisation. It is highly recommended that a carefully designed strategy and co-ordination mechanism be established to overcome such problems.

8.4. Regulatory and Financial Support Measures for the Development of Intermodal Transport

Many countries in Europe have already adopted a number of regulatory and financial policy measures to promote the development of intermodal transport services as part of a sustainable transport policy and with a view to increase the competitiveness of intermodal transport vis-à-vis other modes. A detailed description of the instruments available is provided in the ECMT Consolidated Resolution on Combined Transport that has been adopted by the ECMT Council of Ministers in 2002 and that are still valid today[2].

These measures primarily address National and International Bodies as far as co-ordination of the interaction between environmental, land use and transport policies are concerned. They also concern costs and prices, networks, interoperability, financial measures, regulatory measures and controls, operations, monitoring of the market and innovation.

In the field of regulatory measures, the following instruments can be used in Turkey:

1. Granting of exceptions from restrictions and spatial and time-related traffic bans that are applied to road transport.
2. Liberalisation of initial and terminal hauls by road if intermodal transport services are utilized.
3. Granting of higher weight limits from road vehicles transporting containers and swap-bodies on initial and terminal hauls.
4. Support efforts to reduce, standardize and simplify documents required for intermodal transport.
5. Make provisions to allow the required Customs and other border control operations at loading and unloading points only.
6. Enforce rigorously existing road transport regulations, particularly with regard to driving and rest periods, speed limits and vehicle weights and dimensions.

In the field of financial measures, the following instruments can be used by Turkey:

1. Facilitating the initial purchase of transport equipment, such as rolling stock and intermodal transport units through financial and/or fiscal support measures.
2. Granting of financial assistance for certain operational costs during the start-up phase of new intermodal transport services.
3. Providing support for measures designed to improve the efficiency and quality of intermodal transport services.
4. Granting part or total exemption from taxes, tolls and fees relating to the used of road infrastructure by vehicles engaged in intermodal transport, particularly for initial and terminal hauls.
5. Attracting private capital for the development of intermodal transport services.

With a view to translating these regulatory and financial measures into concrete actions, Annex IV of this report provides an example of how these measures are implemented in Austria.

NOTES

1. EC Directive 2001/16EC and ECMT Resolution CEMT/CM (2002)2/FINAL on railways.

2. Document CEMT/CM(2002)3/FINAL.

CHAPTER 9. RECOMMENDATIONS FOR AN INTERMODAL TRANSPORT SYSTEM

Turkish transport, national and international, is presently dominated by the road system. At the national level, there are numerous small firms, whereas at the international level, major consortia seem to have a prominent role. Moreover, there seem to be few freight forwarders in Turkey who do not own at least one means of transport.

Turkey should seriously consider building an intermodal transport system that takes into account these factors and that will serve three main areas: domestic traffic, transit and the promotion of foreign trade flows. Road transport alone is not a long- term viable option.

The trade and transport promotion policy should include a highly positive attitude towards transit traffic: Transit traffic helps form friendly links with neighbouring countries through interdependence. Transit trade could be further used as an instrument for additional economic income and growth, labour growth and welfare. Some of the wealthiest regions of the world started their economic careers as a focal point for trade flows.

Turkey is ideally located to become an international hub for transport between Europe–Asia (East–West), and NIS countries-Middle East (North-South). This location should be used to attract traffic and trade coming from distant countries as well. To play this role as an intersection and hub between EW/NS routes in an efficient manner, the entire basis for logistic centres should be developed simultaneously.

9.1. Development of an Intermodal and Logistics Master Plan

Turkey should prepare and adopt a national intermodal and logistics master plan in order to provide government authorities, the industry, private and public sectors as well as national and international finance institutions, with a realistic and concrete policy; a regulatory framework for the development of intermodal transport and logistics should be prepared and adopted as well.

This National Intermodal and Logistics Master Plan (NILMP) for Turkey could make an important contribution to an efficient and sustainable transport system and should allow Turkey to become the logistical hub of three continents within the next decade.

The national master plan should be complemented subsequently by regional master plans which address the specific transport and logistics problems of Turkey's main industrial areas, in particular the Marmara Sea region and the urban conglomeration in İstanbul.

The preparation of the master plan should be undertaken in a transparent, open and participatory process, to ensure that the objectives and actions of the plan are shared by all concerned governmental and industry actors. The implementation of the plan within the agreed upon timeframe, should be considered a joint undertaking by the government, industry and concerned civil society groups.

The master plan could contain an analysis of the current transport and logistic situation in Turkey, focusing on efficient intermodal and sustainable transport developments. It could take account of international and global trends and future transport and trade scenarios. It could also contain

requirements that a modern transport system would need, taking into account economic, social and ecological requirements. The plan could then identify concrete action items that would need to be addressed by government and industry, in order to bring transport and logistics developments in line with these requirements. Of particular concern are the location of important intermodal logistics centres and port areas, and their linkages with important national and international transport corridors.

At the national level, the preparation of such a master plan could be coordinated by a newly created Department of Intermodal Transport and Logistics.

Work on such master plans or similar mechanisms addressing intermodal transport and logistics are currently under way in several European countries and in the European Commission. Turkey may wish to participate in an international consulting mechanism among interested governments in the region, in order to exchange experiences and best practices in the preparation of such plans.

While the content of such a master plan depends on the specific objectives, scope and stakeholders involved, the following basic elements could be included:

a) Objectives to be achieved on some principal issues such as increased efficiency, modal shift, reduction of road congestion, etc.

b) Requirements for efficient intermodal transport services to allow Turkey to become a logistical hub for Euro-Asian transport.

c) Identification of the intermodal transport network for rail and short-sea shipping in Turkey.

d) Regulatory support measures for intermodal transport such as exemptions from restrictions and traffic bans, liberalization of initial and terminal haulage, height weight limits on roads for initial and terminal haulage, etc.[1].

e) Financial support measures for intermodal transport such as assistance in the procurement of intermodal loading units, new and efficient intermodal transhipment and IT technologies, feasibility studies and capacity building, assistance in the construction of terminals, assistance in the initial operation costs of intermodal transport services, etc.

f) Monitoring procedures, statistics and benchmarks to measure performance and responsibilities[2].

g) Institutional aspects of the system including the actors involved, transparent, participatory, up-to-date working mechanisms, time-frames, etc.

9.1.1. The Network

As indicated above, the Intermodal and Logistics Master Plan should first lay out the intermodal network. Because intermodal transport is based on the concept of grouping goods in one loading unit which then uses several successive modes of transport, traffic volumes are generally concentrated on a few routes for long hauls. Therefore, based on their feasibility, the master plan must make a distinction between the corridors to be served by intermodal transport, and others which will only be served by road transport.

Developing Intermodal Transport in the Netherlands

Between 1985 and 1990, the Ministry of Transport of Netherlands received urgent signals from the transport industry that the flow of containers through the Rotterdam port was growing rapidly. During the same period the association, "Netherlands, a Distribution Country", was established. Companies from all transport and logistic sectors established this association, together with various NGO's and governmental institutions. The goal of the association is to promote the Netherlands as the gateway to Europe, with a further role in the logistical and distribution sectors. In 1989/1990, the Ministry of Transport was ordered to develop a new policy to promote intermodal and combined transport. On the institutional level a project team was established with a small dedicated staff and participating, responsible departments: road transport, rail transport, inland waterways and short-sea shipping. At the time, it was clear that the government should implement accompanying measures to promote the use of intermodal and combined transport, where necessary and possible. The team was assigned to develop this policy in two years, based on the master plan elaborated by "Netherlands Distribution Country" and its consultant. Several measures were adopted. The master plan became legally binding; a subsidy scheme was applied to meet the criteria of this plan.

More detailed information on the development of intermodal in the Netherlands is given in Annex II of the report.

Transport policy makers should be prepared for difficult public discussions. Phrases such as "equal treatment of all regions", "development of neglected areas", "balanced and fair distribution of infrastructure investments" normally dominate the political debate. Intermodal transport is a concept contrary to such principles: Intermodal transport cannot treat all regions on an equal basis. It is a concept designed for trade and transport of high volumes and value, usually located in industrial regions. Intermodal transport therefore cannot contribute to the development of remote areas. An area with only agricultural activity and a decreasing population cannot be commercially connected to an economically viable intermodal transport system, because such a system depends on high volume traffic flows that cannot be generated in remote areas. Intermodal transport and its related infrastructure investments cannot be organised by "balance and justice"; they must be organised around a clear center of gravity in highly developed and densely populated areas.

A Turkish intermodal transport network plan should be based on efficient rail and coastal shipping networks. These networks must consist of national hubs (gateways) and regional terminals. The national gateways are best located in major foreign trade sites. The re-distribution of container flows and the organisation of import and export using semi-trailers or containers, thus can be managed hand-in-hand with global container flows. Finally, such places will be the starting point for transit cargo moving into neighbouring countries. As the report shows, Turkey has at least three sites that seem suitable to become such gateways; namely İstanbul, İzmir/Çeşme and Mersin areas.

Currently, these three sites provides gateways to national imports and exports, as well as transit trade flows. The master plan must identify corridors where more efficient and more environmentally friendly alternative solutions are available, and begin a process to realise these solutions.

9.1.2. Legal environment

It was emphasized that multi and intermodal transport operations have encountered many problems in practice; one of these concerns the determination of the law to be applied to a specific transport operation, when several transport modes with different civil liability regimes are used. Even transport operators are not always aware of which liability regimes apply to their operations.

As intermodal transport increasingly takes place in containers, it becomes extremely difficult to determine the leg in which damages have occurred. The question of liability for non-localized loss has not been solved at the international or national level.

It would yet seem appropriate for Turkish authorities to consider the problems in advance which occur in two specific cases.

9.1.2.1. Liability for delay

Traditionally, a carrier (i. e. a commercial actor who contracts for the carriage of goods and their delivery in good condition to the contracted consignee) is liable for the delivery of the consignment, but not necessarily for its timely delivery. Specifically, railways have never accepted responsibility for the delivery of goods at a given date and hour. Transport was performed "as much as circumstances allow" and delivery of the consignment in good condition, at any date and time, was perceived as fulfilment of the transport contract. Even today, the new International Rail Transport Convention (COTIF) does not foresee a liability for late delivery to the consignee. Road transport on the other hand, developed another approach. Because they have always operated in a competitive environment, road transport operators accepted the obligation to deliver consignments on time and agree to penalty payments for goods *not* delivered on time.

Even if delivery time is not included in the conditions of a transport contract, the road transport operator knows very well that frequent delays in delivery will lead to a situation in which the client will switch over to a more reliable transport operator. On the other hand, railways often display the traditional commercial attitude of monopoly service providers. Since the client cannot switch to another railway, if the country has no alternative to the national railway operator, the railway operators are not motivated to make quality a specific priority.

In short, these divergent attitudes toward reliability have not changed in decades and thus have created a severe legal problem for intermodal transport. A typical scenario works like this: a freight forwarder takes over a consignment for carriage by road, and decides to use intermodal transport services for a part of the total carriage. The client receives the usual road transport contract. The forwarder expects that the intermodal transport operator will assume the same responsibility/liability for timely delivery to the client, as the forwarder has taken on himself. But the reliability of the intermodal transport operator is mainly dependent on the railway enterprise that performs the transport between the terminal of origin and the terminal of destination. If the railway company suffers a delay, they will usually refuse any liability, because railways traditionally do not guarantee timely delivery. Thus the intermodal transport operator may have to pay a penalty for a quality problem for which he is not responsible; furthermore, he will not be compensated for such a penalty payment by his main sub-contractor, the railway.

This legal gap of responsibility-coverage has been discussed for years among the intermodal transport operators. Some solutions have begun to appear: Kombiverkehr has contracted with Deutsche Bahn for a network of daily block trains that Kombiverkehr has to pay, for irrespective of their commercial usage, i. e. even if they operate half empty. But Kombiverkehr has the right to cancel a train

connection on short notice if clients have preferred to return to road transport because of frequent, severe delays during rail transport. Furthermore, such "quality agreements" between other intermodal transport operators and railways are under way, and they all try to enforce quality standards, i. e. reliability and timeliness of rail operations even by juridical sanctions.

But even if railway operators understand and appreciate the difference between an intermodal block train, with its high need for reliability, and a traditional iron ore train, the problem of reliability resurfaces immediately when international transport is involved, i. e. if several railway companies have to interconnect and share responsibility for reliable transport. Every interface from rail to rail incurs a risk for a failure; and the greater the number of railways involved, the worse the quality of rail transport gets. The intermodal transport operator is often helpless in such a situation because it is not clear who is responsible for the delay.

In sum, the issue of quality in intermodal transport poses a severe obstacle in this market. A legal solution for liability has not been found, and the fact that many international operations occur in a pattern of distributed reliability means that it is almost impossible to identify the agent to blame when poor performance occurs. In such cases, not even an improvement of the legal situation would help. The only solution seems to require that one railway operator accept liability for the entire distance (including the movement on neighbouring networks), enforcing sub-contractors to fulfil their quality obligations. This would mean that quality problems become organisational and commercial issues rather than legal.

Therefore, if intermodality is to be accepted as a long-term transport strategy for Turkey, such a system should involve a holistic quality management framework which would replace the complex legal arrangements that are difficult to adapt for transport operators.

9.1.2.2. The damage problem

Another major problem of intermodal transport is the continuous change of responsible actors: for example, a road operator will perform the drayage from the ramp of the shipper to the intermodal terminal, a terminal company will organise the transfer by crane, a rail company will organise movement over the rail network, the terminal operator at the destination will organise another crane transfer, and another road transport company will perform the drayage to the final destination. Further actors such as customs brokers, shipping lines, warehouse companies etc. might be involved as well.

Experience reveals that actors do not usually treat the equipment of third parties as carefully as they would treat their own equipment. Therefore, damage to transport equipment, mainly the loading units, and even to the cargo does occur. Given the number of actors involved in an operation, and the number of places where damage can occur, (in a terminal, during rail transport, during drayage, etc.) the question arises: when damage occurs, how to attribute responsibility and determine who must pay for the repair or for compensation of loss. One way to organise liability in such a complicated situation is to control the loading of units at each interface: the intermodal transport operator would place an agent at each interface to look after each loading unit as it arrives, and then write a protocol on eventual failures and damages. This idea might prove rather costly. It is also possible that the actors in the intermodal transport chain would claim that it is too difficult to find proof to support damage claims against a particular party and then to receive compensation.

There are some technical procedures that should be considered to help solve the problem of identification of the party responsible for damage. Some operators produce a video scan of the loading unit when it enters their area of responsibility (e.g. at the gate-in procedure of the departure terminal) and when it leaves (e.g. at the gate-out procedure in the arrival terminal). If a client requests compensation

for eventual damage, the operator can compare the two pictures and determine if the damage has occurred within his area of responsibility.

The overall solution to this problem will require a carefully balanced legal environment that considers the interests of all parties, including owners of the loading units, carriers and terminals, and insurance companies.

9.1.2.3. The consignment note

While most international railway transport in and with Turkey is based on the International Convention Concerning International Carriage by Rail (COTIF), railway transport to and from the countries of Central Asia is governed by the so-called SMGS regime. In order to improve transparency and efficiency in international container rail transport operations to and from these countries, it is recommended that TCDD as well as concerned railway companies *en route* allow the use of the new common CIM/SMGS consignment note, applicable under both railway law systems. This single transport document, developed by CIT and OSJD, could also be accepted as a Custom declaration and a bank document, as is already the case in the European Union and some Eastern European countries.

9.2. Creation of a Department of Intermodal Transport and Logistics

Turkey should consider creating a department on intermodal transport and logistics under its Ministry of Transport. This department should have a coordinating function for the promotion of intermodal transport in Turkey, including infrastructure development and transport operations.

The Department of Intermodal Transport and Logistics should have close links with and focal points in all involved Ministries and Departments concerned, including the (1) General Directorate of Highways (responsible for the planning, design, construction, maintenance and operation of motorways and state and provincial roads); (2) TCDD (railways and port construction and operations); (3) Undersecretariat for Maritime Affairs (UMA); DHMİ; (3) Undersecretariat of Foreign Trade; (4) Undersecretariat of Customs (responsible also for the operation of ports); and (5) SPO.

In addition, the department should have close, possibly institutionalized, links with and focal points in private sector organizations representing all major transport operators, freight forwarders, shippers and logistic providers as well as competent universities and transport research institutions in Turkey. The Department should also have close links with and focal points in national and international projects that are related to or are dealing directly with intermodal and logistics operations, such as the Marmaray Project, the TINA Project or TRACECA.

Lastly, the Department should be responsible for the international (bilateral and multilateral) dimension of intermodal transport and logistics operations and, if not directly mandated, should have an observer or consultative status in the respective Turkish delegations undertaking international consultations or negotiations.

The Department of Intermodal Transport and Logistics should have adequate staffing, should report to a high-level general transport policy office, and should be independent from specific modal interests.

In parallel, the above authorities and projects should create, as appropriate, intermodal transport and logistics units, or designate specialists in the field that will also liaise as focal points, with the above Department of Intermodal Transport and Logistics in the Ministry of Transport. This holds particularly true for TCDD which should consider creating a business unit for intermodal transport. Also, possibly at a later stage, the Turkish road haulers may wish to consider setting up an intermodal business unit or

company, similar to what has already been done in many Western European countries who have become members of the International Combined Road-Rail Transport Companies (UIRR).

Since co-ordination and harmonized flow of operations between different modes are crucial for an efficient intermodal system, creation of such a department could fill the gap to oversee and co-ordinate the activities of all stakeholders including both public organizations and private companies in an equitable manner.

It should not be forgotten that in Turkey's liberal transport market, the establishment of the necessary intermodal framework should prepare a favourable environment in which the transport actors would perform its activities in a reliable and effective manner. Thus the department should mainly serve as an impartial co-ordinator among all national and international stakeholders.

NOTES

1. Consolidated Resolution No 2002/2 on combined transport, ECMT.
2. "Model" Action Plans and Partnership Agreements for the Development of Intermodal Transport at the Pan-European Level, Joint ECMT/UNECE Working Party/Group on Intermodal Transport and Logistics.

CONCLUSIONS

Turkey plays a central role in providing opportunities to Europe for access to the Middle East, Asian and Caucasian markets. It has the potential to be the centre of a multi-dimensional economic network in the 21st century and can build upon its historic role as a bridge between the East and the West.

Turkey enjoys a strategic location with the potential to play a pivotal role in regional and global integration. The important energy, trade and transport networks which connect west to east and north to south are keys to unleashing this potential.

Echoing a worldwide trend towards liberalization and free movements of goods, economic liberalization has been a focus of successive Turkish governments since the early 1980s. Consequently, the privatization of state assets – such as Turkey's seaports – has become an essential element of the country's economic and social reform process.

Turkey has made significant progress to integrate the global economy, and has particularly strengthen links with western European countries. Over the past two decades, Turkey has undergone a profound economic transformation. Combined with an outward oriented trade policy, the Turkish economy has recorded substantial growth and the transport sector has grown significantly.

A dynamic logistics industry combined with a large international road vehicle fleet underline Turkey's potential to become one of the most significant logistics hubs and transit countries in the region.

Moreover, the developments in the Balkans, the Black Sea, the Mediterranean Basins, the Caucasus, Central Asia and the Middle East, have brought new dimensions and dynamism to Turkey's role in the region.

To achieve enhanced integration in the global economy, Turkey must cope with rising competition from low-cost countries, rapidly changing international trends and increasing global standards for trade. In this regard, Turkey will need to rapidly respond to global changes. With this in mind, a multimodal, internationally viable and competitive transport system should be accepted as an essential component of Turkey's trade objectives.

Turkey has significant potential and several projects for the development of intermodal transport. Among these are the: Kars-Tbilisi project, Marmaray Project, Mersin Container port project, and Çandarlı and Filyos port projects.

The Kars-Tbilisi project, the Turkish-Georgian railway connection, will enable the integration of Turkish transport infrastructure with TRACECA routes. The landlocked NIS countries will then have easier access to Europe via Turkey.

The Mersin Container port (hub) on the Mediterranean Sea, the North Aegean Port Çandarlı (hub) on the Aegean Sea, and the Zonguldak Filyos Port on the Black Sea, are new port facilities planned as gateways for traffic flow axes, which will also provide direct access for Caucasian and Asian markets.

Filyos Port will create the opportunity for a dynamic trade activity among the Black Sea countries. Cargo traffic will follow the shortest route from Filyos Port via existing railways, highways and motorways to: the Mersin Container Port to reach the Mediterranean boundary; the North Aegean or İzmir Ports to reach the Aegean boundary; or towards connections to the Middle East markets.

In addition, the Marmaray Rail Tube Tunnel Project, which will establish the direct connection of railway systems between Asia and Europe in the Marmara Sea, will provide for uninterrupted passenger and freight transportation across the İstanbul Strait.

The following intermodal links will be introduced as candidate arteries, via Turkey, to create accessibility between the Trans European Network and related markets:

1. Mediterranean Shipping lines – Mersin Container Port - railway connection - Filyos Port (or Samsun Port as declared by the HLG Wider Europe Study) - Black Sea.

2. Mediterranean – Mersin container Port - Railway - Caucasian markets.

3. Mediterranean – Mersin Container Port, Mersin Port, İskenderun Port - Railway – the Middle East Countries.

4. Aegean Sea - İzmir Port or North Aegean Candarlı Port - Railway - Caucasian, Central Asian markets.

5. Corridor IV - Marmaray İstanbul Strait Tube Tunnel Project - Railway – Kars Tbilisi project - Caucasian Asian markets.

These links will also provide alternative routes for the congested Strait passages which currently experience environmental threat and delay.

For Turkey to become an international intermodal and logistics hub, it is crucial to promote the intermodal system with necessary infrastructural investments. Successful investment in the transport sector could thrust Turkey into a significant role in the region. Turkey could maximise this role by directing its investments more towards intermodal transport, and by acknowledging its beneficial effects upon trade with neighbouring countries.

Turkey's location requires intermodal transport solutions; the effective combination of road, maritime and air transport solutions are needed in order to provide seamless and more efficient transport chains.

Intermodal transport offers various alternative techniques. Before choosing, techniques should be considered very carefully, taking into account international trends, national conditions, operational costs and – most importantly - economies of scale.

Turkey should seriously consider building up an intermodal transport system that takes into account these factors and that will serve three main areas: domestic traffic, transit and the promotion of foreign trade flows. Turkey could then also play a central role in providing opportunities to Europe for access to the Middle East, Asia and Caucasus and vice-versa.

It is therefore recommended that:

1. As a first step, an **"Intermodal and Logistics Master Plan"** which lays out the intermodal network should be drawn up. Definition of a network of intermodal corridors, nodes and gateways for inland transport and for transit through Turkey, both for the import and export of maritime containers and for European loading units is essential.

   The master plan should make a distinction between corridors to be served by intermodal transport, and others which will only be served by road transport. Of particular concern are the location of important intermodal logistics centers and port areas, and their linkages with important national and international transport corridors.

   The preparation of the master plan should be undertaken in **a transparent, open and participatory process**, to ensure that the objectives and actions of the plan are shared by all concerned governmental and industry actors. The implementation of the plan within the agreed timeframe should be considered a joint undertaking by the government, industry and concerned civil society groups. Isolated decision-making leads to inconsistency and overlapping policies. Intermodality should instead be part of a progressive and global transport policy.

   The master plan needs to take into account **the containerization** of the intermodal markets simultaneously with European containers and swap bodies for trade flows in domestic trade as well as for international trade operations. The master plan must therefore take this into account.

   The master plan should involve a holistic **quality management framework** which would provide the essential compatibility and coordination between each transport mode in an intermodal operation.

2. The establishment of a clear **policy and legal framework** would ensure a level playing field for the private sector. Financial and regulatory measures and incentives to promote this system can be very effective.

   The framework should also address and provide effective solutions to operational and reliability problems. This way, the system could reduce transport actors' economic and operational damage and losses greatly. In setting up these measures, learning from the best practices in European and OECD countries will also be helpful.

3. Turkey should consider creating **a department of intermodal transport and logistics** under its Ministry of Transport. This department should have a coordinating function for the promotion of intermodal transport in Turkey, including infrastructure development and transport operations.

   Since co-ordination and harmonized flow of operations between different modes are crucial for an efficient intermodal system, creation of such a department could fill the gap to oversee and co-ordinate the activities of all stakeholders including both public organizations and private companies in an equitable manner.

4. To develop a competitive, sustainable and viable intermodal transport system for Turkey; public authorities and intermodal transport operators must **work together**. The development of intermodal transport would be ill-served by a process of isolated decision-making; it should instead, be part of a progressive and global transport policy.

   It is therefore necessary to involve all the public and private stakeholders in the promotion and facilitation of a sustainable intermodal system for Turkey. At the intergovernmental level, the

infrastructure and service standards provided in the AGTC Agreement, form a good basis for cooperation and can ensure effective operation, if implemented.

5. In order to **attract private capital** for the development of intermodal transport services, both regulatory and financial measures can be implemented by the Turkish government.

   In the field of **regulatory measures**, instruments such as granting of exceptions from restrictions and traffic bans (spatial and time-related); liberalization of initial and terminal hauls by road if intermodal transport services are utilized; and support efforts to reduce, standardize and simplify documents required for intermodal transport can all be considered.

   In the field of **financial measures**, the following instruments can be used: providing support for measures designed to improve the efficiency and quality of intermodal transport services; granting exemption from taxes, tolls and fees relating to the used of road infrastructure by vehicles engaged in intermodal transport.

6. To be commercially viable, intermodal transport requires long distances and high cargo volume corridors. Such corridors should be identified by a **market analysis**. A market research project, organized and financed by the government, could provide the results to all potential investors and actors.

7. The rapid increase in container traffic, which could grow significantly in the next 15 years, cannot be met by the current public ports alone, thus the **infrastructural capacities** of these ports need to be increased to respond to future demand.

8. **Ro-La services are not recommended** as a policy priority for Turkey due to the uncertainty of commercial viability and the fact that these services create costly operational problems for rail operations. At present and in the near future, there seem to be no markets for which such services could be operated at competitive quality and costs.

9. The Turkish **RO-RO system** and its connection to Southern Europe are highly successful. Turkish Transport Authorities should **encourage its extension**. This extension should be particularly developed for domestic trade flows, to other areas of Mediterranean and Black Sea trade, with gateway points in the main Turkish ports of İstanbul, İzmir/Ceşme and Mersin.

10. For purely **domestic transport operations**, a market does not seem to exist at the moment, for successful rail operations with swap-bodies or similar loading units offering loading capacities, comparable to road transport. The present volume, quality and flexibility of service as well as prices offered by purely national road transport, cannot be met by such domestic rail transport operations, which would require two trans-shipment operations as well as initial and terminal road haulage.

    In contrast to national intermodal transport operations by rail, **domestic RO-RO coastal shipping** could make a difference; it should be able to make an inroad into the domestic road transport markets in Turkey for longer distance operations and for destinations along the Turkish coasts. Such a concept would be in line with the "Motorways of the Sea" initiatives pursued and supported in the framework of the European Union.

11. In creating an extensive and competitive intermodal transport system for Turkey, the essential **connections** from and to the maritime and air **freight logistics centers** and their integration to urban distributions should also be taken into account.

12. Maintaining and improving **links between ports with the other modes** of transport, particularly railways, as well as enhancing their **hinterland connections** should be prioritized in order to provide advantages for logistics markets.

13. As far as rail transport is concerned, among the various means identified for the initial promotion of intermodal transport, **financial support** for rolling stock and terminals should be prioritized.

    Having an old railway infrastructure is a barrier to fully integrate railways to intermodal activities. In order to improve railways' share in intermodality, **the railway network should be upgraded**, not only for high-speed passenger transport, but also to allow for competitive and reliable goods transport services. The AGTC infrastructure and train performance standards provide the international reference for efficient and competitive intermodal rail/road transport operations.

14. Another barrier is the lack of **rail freight logistic centers**. Locations which will be directly connected to the rail network are now being studied. It is recommended that Turkish authorities continue to keep their focus on this highly important topic in order to achieve the smooth functioning of its intermodal and logistics services.

    Turkey´s geographic location could be used to foster trade from distant countries as well through logistic centers. Turkey has set a goal to develop logistic services and to implement rail freight logistic centers in six locations. However, prospects for future development are not yet very clear and the uncertainties which affect the perspective of development of intermodal services need to be solved.

15. The trade and transport promotion policy could include a supportive attitude towards **transit traffic.** Transit traffic helps form friendly links with neighboring countries through interdependence. Transit trade could be further used as an instrument for additional economic growth.

16. The active participation of Turkey in international organizations has resulted in a series of agreements that identify transport corridors. Because of Turkey's size and population which are greater than the new EU member countries, **more national links have to be included**, in addition to the international corridors.

    In such a scenario, the role of the Turkish corridors in international transit will also be very dependent upon hypothesis of development of Turkish neighboring countries, such as Iraq, Iran, Syria and countries of central Asia.

    Hence, with respect to east-west relations beyond central Asia, it is valuable to investigate the conditions under which **Turkey could be a transit country towards China along the Silk Road or towards India across Iran.**

17. **Monitoring** achievements and progress at regular intervals will ensure changes where necessary and will highlight areas where special efforts must be made. **A time schedule** should be set up and a monitoring process set out to ensure concrete objectives are met.

ANNEX I. AGTC AGREEMENT

The European Agreement on Important International Combined Transport Lines and Related Installations (AGTC) has been negotiated under the auspices of the United Nations Economic Commission for Europe (UNECE)[1]. Turkey has ratified the Agreement on 4 September 1996 joining 30 other European countries that have agreed to make intermodal transport in Europe more efficient and attractive to customers. The AGTC Agreement provides a legal framework for the promotion of intermodal transport at the pan-European level providing also links to the Asian rail network. It promotes the use of block trains in international services and improves coordination and cooperation in planning and setting of priorities for the development of a coherent international intermodal transport system. The AGTC Agreement also stipulates technical and operational parameters and targets.

The following Turkish railway lines are part of the AGTC network:

C-E 70 (Svilengrad-) Kapıkule-İstanbul-Haydarpaşa-Ankara-Boğazköprü-Kalin-Malatya-Kapıköy [-Razi (Iran)]
Nusaybin [-Kamishli (Syrian Arab Republic)]

C-E 74 Bandırma -Balıkesir-Kütahya-Alayunt- Afyon - Konya-Ulukışla
Izmir-Manisa Eskişehir Uşak-Manisa

C-E 97 Samsun-Kalin- Boğazköprü-Ulukışla -Yenice- Adana –Toprakkale-Mersin
Fevzipaşa -Islahiye-Hudut [-Meydan Ekbez (Syrian Arab Republic)]
İskenderun

C-E 692 Çetinkaya-Erzurum-Kars- Doğu Kapı (-Akuryan)
(-Akhalkalaki)

C 70/2 Pehlivanköy-Uzunköprü (-Pythion)

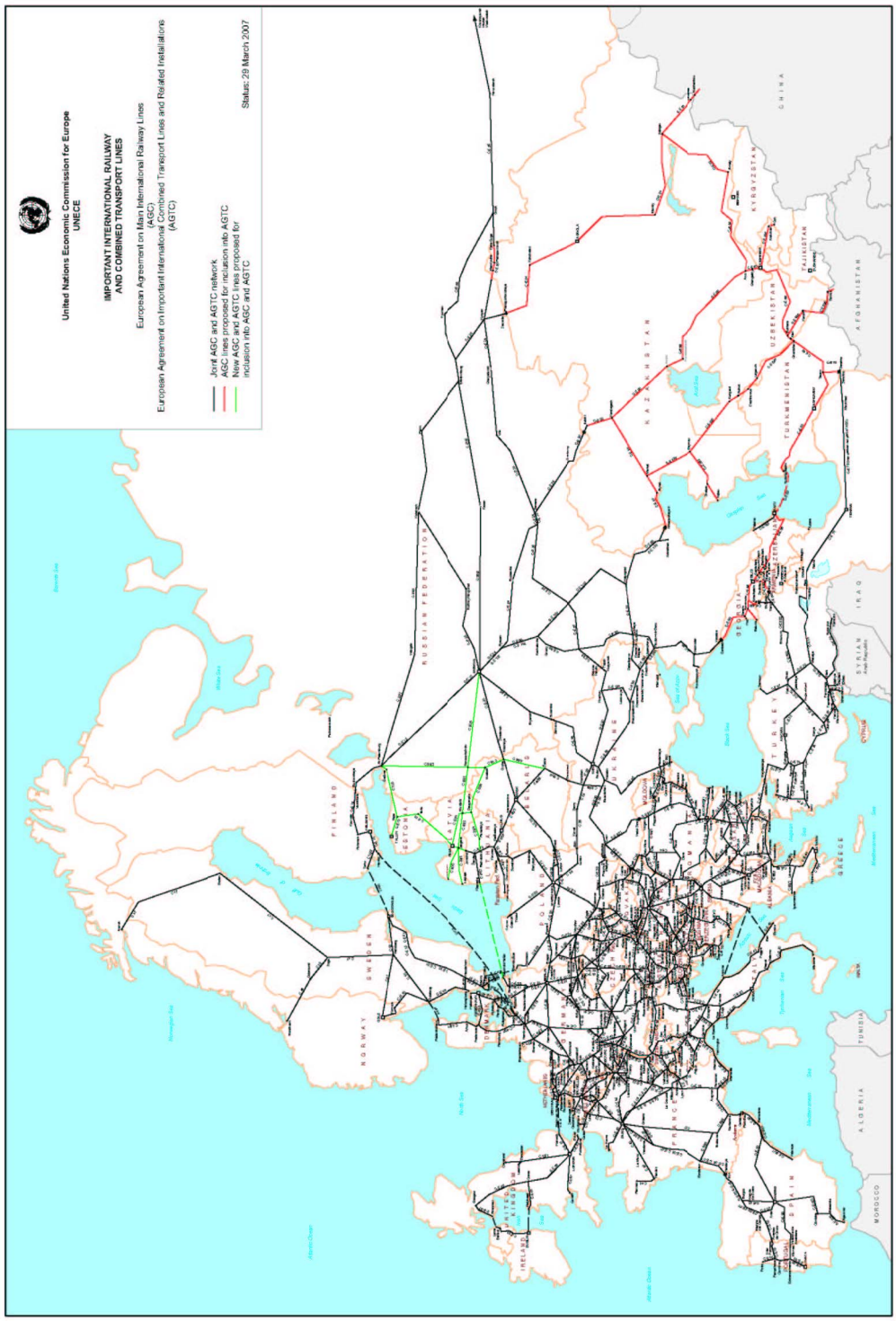
The following intermodal terminals are, at present, part of the AGTC network:

Bandırma Derince İskenderun İstanbul İzmir Mersin Samsun

The following ferry link is, at present, part of the AGTC network:

Mersin – Venezia (Turkey-Italy)

1. Austria; Belarus; Belgium; Bulgaria; Croatia; Czech Republic; Denmark; France; Georgia; Germany; Greece; Hungary; Italy; Latvia; Luxembourg; Kazakhstan; Montenegro; Netherlands; Norway; Poland; Portugal; Republic of Moldova; Romania; Russian Federation; Serbia; Slovakia; Slovenia; Switzerland; Turkey; Ukraine.


United Nations Economic Commission for Europe
UNECE
IMPORTANT INTERNATIONAL RAILWAY
AND COMBINED TRANSPORT LINES
European Agreement on Main International Railway Lines
(AGC)
European Agreement on Important International Combined Transport Lines and Related Installations
(AGTC)
Joint AGC and AGTC network
AGC lines proposed for inclusion into AGTC
New AGC and AGTC lines proposed for inclusion into AGC and AGTC
Status: 29 March 2007
RUSSIAN FEDERATION
KAZAKHSTAN
CHINA
KYRGYZSTAN
TAJIKISTAN
UZBEKISTAN
TURKMENISTAN
AFGHANISTAN
IRAN
IRAQ
SYRIAN
TURKEY
GEORGIA
FINLAND
ESTONIA
LATVIA
POLAND
SWEDEN
NORWAY
GREECE
CYPRUS
TUNISIA
ALGERIA
MOROCCO

ANNEX II. "MODEL" ACTION PLAN AND PARTNERSHIP AGREEMENT FOR THE DEVELOPMENT OF INTERMODAL TRANSPORT AT THE PAN-EUROPEAN LEVEL [CEMT/CM(2005)10]

The Council of Ministers of the European Conference of Ministers of Transport (ECMT);

Having regard to the European Agreement on Important International Combined Transport Lines and Related Installations (AGTC Agreement) of 1991[1];

Having regard to the Consolidated Resolution No. 2002/2 on Combined Transport adopted by the Council of Ministers of the European Conference of Ministers of Transport (ECMT), meeting in Bucharest on 29 and 30 May 2002;

Emphasizing that intermodal and combined transport must play a significant role as an alternative to pure road haulage in future transport systems in order to meet the environmental, safety, security and economic requirements of sustainable transport systems;

Wishing to contribute to the development of intermodal transport at the pan-European level,

Convinced that effective inter-governmental and private sector cooperation is one of the key factors for the development of competitive intermodal transport services;

Noting with satisfaction the programmatic and institutional cooperative arrangements that have been made between ECMT and UNECE in the field of intermodal transport and logistics that are fully in line with the Declaration on the Future Direction of ECMT adopted during the Brussels session of the Council of Ministers in 2003 and the exchange of letters between ECMT and UNECE on this subject and had led, in 2004, to the establishment of the Joint ECMT/UNECE Working Group on Intermodal Transport and Logistics;

Recalling that the terms "multimodal", "intermodal" and "combined" transport have been defined in the framework of a Terminology on Combined Transport agreed upon in 2001 by the ECMT, UNECE and the European Commission[2];

Recommends that all ECMT and UNECE member Governments make more use of Action Plans and public/private partnerships agreements;

Recommends in particular that they make use of the "Model" Action Plan, set forth in the annex to this recommendation:

"The Action Plan provides an agreed basis for Governments to cooperate with each other on a bilateral or multilateral basis with a view to improving the competitiveness of international intermodal transport services on specific intermodal transport lines.

The purpose of such Action Plan is to set a political signal of Governmental commitment and support for the development of intermodal transport and to provide a framework for the conclusion of Partnership Agreements among the various public and private parties involved to collaborate towards efficient and competitive intermodal transport services along specific intermodal transport lines. The specific form, the detailed provisions and the Authorities involved in the preparation and conclusion of such Action Plans are to be decided by the parties involved."

Recommends further that intermodal transport operators and concerned Governmental Authorities make use of the "Model" Partnership Agreement set forth in the annex to this recommendation:

"Within the general framework of the Action Plans to be agreed upon by Governments, the Partnership Agreement should provide an agreed basis for intermodal transport operators, railway undertakings, freight forwarders, rail infrastructure managers, terminal operators, border crossing Authorities and other parties involved in intermodal transport to engage in cooperative arrangements with a view to improving the competitiveness of international intermodal transport services on specific intermodal transport lines.

The purpose of such Partnership Agreement is to define clearly the responsibilities and performance standards expected from the various parties involved in intermodal transport. It should also enhance transparency about the indispensable roles played by each of the parties involved. The specific form, the detailed provisions and the Authorities involved in the preparation and conclusion of such a Partnership Agreement are to be decided by the parties involved."

Invites all competent inter-governmental and non-governmental organizations, in particular those cooperating already closely with the Joint ECMT/UNECE Working Group on Intermodal Transport and Logistics, such as the European Commission (EC), Committee of the Organization for Cooperation of Railways (OSJD), Intergovernmental Organization for International Carriage by Rail (OTIF); International Union of Railways (UIC); International Union of Combined Road/Rail Transport Companies (UIRR); European Intermodal Association (EIA); "Groupement Européenne du Transport Combiné" (GETC); European Association for Forwarding, Transport, Logistics and Customs Services (CLECAT) and the International Road Transport Union (IRU) to assist ECMT and UNECE member Governments and the private sector involved in intermodal transport to implement this recommendation;

Recommends also that all ECMT and UNECE member Governments and in particular the Contracting Parties to the AGTC Agreement assess at regular intervals the implementation of this recommendation on the railway network on their territory;

Requests, as far as this recommendation is concerned, that the Joint ECMT/UNECE Working Group on Intermodal Transport and Logistics continues to monitor the development of this transport sector and reports, at regular intervals, on the implementation of this recommendation.

NOTES

1. Contracting Parties to the AGTC (as of 1 January 2005): Austria, Belarus, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, France, Georgia, Germany, Greece, Hungary, Italy, Luxembourg, Kazakhstan, Netherlands, Norway, Poland, Portugal, Republic of Moldova, Romania, Russian Federation, Slovakia, Slovenia, Switzerland and Turkey.

2. www.unece.org/trans/wp24/wp24-terminology/24term.html

APPENDIX

"MODEL" ACTION PLAN AND "MODEL PARTNERSHIP AGREEMENT FOR THE DEVELOPMENT OF INTERMODAL TRANSPORT AT THE PAN-EUROPEAN LEVEL

OBJECTIVES AND IMPLEMENTATION PROCEDURES

"Model" Action Plan

The "Model" of an inter-governmental Action Plan given below represents good practice endorsed by the member Governments of the European Conference of Ministers of Transport (ECMT) and the United Nations Economic Commission for Europe (UNECE). This "Model" provides an agreed basis to cooperate with each other on a bilateral or multilateral basis along specific intermodal transport lines with a view to improving the competitiveness of international intermodal transport services along these lines.

The purpose of such an Action Plan is to set a political signal of governmental commitment and support for the development of intermodal transport and to provide a framework for the conclusion of Partnership Agreements among the various public and private parties involved to collaborate towards efficient and competitive intermodal transport services on specific intermodal transport lines.

The specific form, the detailed provisions and the Authorities involved in the preparation and conclusion of such Action Plans are to be decided by the parties involved.

"Model" Partnership Agreement

The "Model" of a Partnership Agreement given below represents good practice endorsed by the member Governments of ECMT and UNECE. Within the general framework of the above Action Plan to be agreed upon by Governments, this "Model" provides an agreed basis for intermodal transport operators, railway undertakings, freight forwarders, rail infrastructure managers, terminal operators, border crossing authorities and other parties involved in intermodal transport to engage in cooperative arrangements with a view to improving the competitiveness of international intermodal transport services on specific intermodal transport lines.

The purpose of such a Partnership Agreement is to define clearly the responsibilities and performance standards expected from the various parties involved in intermodal transport. It should also enhance transparency about the indispensable roles played by each of the parties involved.

The "Model" of a Partnership Agreement does not address issues of a strictly commercial nature for reasons of confidentiality, variety of circumstances, and the type and number of parties involved.

The specific form, the detailed provisions and the Authorities involved in the preparation and conclusion of such a Partnership Agreement are to be decided by the parties involved.

Legal Form

The member Governments of the ECMT and UNECE are convinced that the "Models" given in this Annex could also provide important elements to facilitate the coherent implementation of the technical characteristics of the network of important international intermodal transport lines as referred to in Annex III to the AGTC Agreement[1] and of the performance parameters of trains and minimum infrastructure standards as referred to in Annex IV to the AGTC Agreement.

While the "Models" contain a number of specific provisions and measures, such as key performance indicators, some of these provisions may not always be required, appropriate and acceptable. For these reasons the "Models" do not put forward literally binding provisions to Governments and concerned industry groups. The objective of these "Models" is rather to describe elements and tools that could be used within a common Pan-European framework as a basis for negotiations among interested countries and parties involved in intermodal transport.

These elements and tools should facilitate an agreement on required actions and mechanisms targeted to specific intermodal transport lines, at agreed times and in line with the specific needs of the Governments and business interests involved. Thus, no strict obligation to engage into negotiations, on the basis of these "Models", can be construed for the member Governments of ECMT and UNECE.

International Evaluation Procedures

In order to determine progress in the implementation of this recommendation and, with regard to Contracting Parties to the AGTC Agreement, to verify the existing technical characteristics of the network set out in Annex III to the AGTC Agreement as well as the performance parameters of trains and minimum infrastructure standards referred to in Annex IV to the AGTC Agreement, ECMT and UNECE member Governments are invited to undertake regular surveys on the railway networks and installations as referred to below.

These surveys should be carried out on the following basis.

The surveys should cover the railway lines and installations of importance for international intermodal transport, particularly those contained in Annexes I and II to the AGTC Agreement (if applicable).

The surveys should be undertaken at regular, preferably five-year intervals.

To the extent possible, the surveys should be undertaken in parallel with similar surveys undertaken on the European Agreement on Main International Railway Lines (AGC), the European Agreement on Main Inland Waterways of International Importance (AGN) and the Protocol on Combined Transport on Inland Waterways to the AGTC Agreement [2].

The surveys should address the provisions and benchmarks contained in the "Model" Action Plans and Partnership Agreements contained in this annex. They should also cover, particularly for Contracting Parties to the AGTC Agreement, the infrastructure characteristics set out in Annex III to the AGTC

Agreement as well as the performance parameters and minimum standards for intermodal transport trains and related installations referred to in Annex IV to the AGTC Agreement.

With a view to ensuring comparability of survey results over time and, in particular, along important international intermodal transport lines, the surveys should be prepared, evaluated and its results disseminated under the auspices of the international organ referred to in paragraph 2 of articles 14, 15 and 16 of the AGTC Agreement; i.e. the Working Party on Combined Transport of the United Nations Economic Commission for Europe.[3]

NOTES

1. European Agreement on Important International Combined Transport Lines and Related Installations (AGTC) of 1 February 1991.

2. Protocol on Combined Transport on Inland Waterways to the European Agreement on Important International Combined Transport Lines and Related Installations (AGTC) of 17 January 1997 (not yet in force).

3. The name of this Working Party has been modified in 2004 to read: Working Party on Intermodal Transport and Logistics.

"MODEL" ACTION PLAN FOR THE DEVELOPMENT OF INTERMODAL TRANSPORT AT THE PAN-EUROPEAN LEVEL

An inter-governmental Action Plan for the development of intermodal transport should contain the following elements:

A. GENERAL PROVISIONS

General and political background

Description of the political and economic motivations of Governments to coordinate transport policies, to share technical know-how and to coordinate all relevant activities with a view to promoting intermodal transport in line with sustainable transport policies.

Definitions

The definitions used for technical terms should be in line with the definitions contained in the "Terminology on Combined Transport" prepared in 2001 by the United Nations Economic Commission for Europe (UNECE), the European Conference of Ministers of Transport (ECMT) and the European Commission (EC).

Scope of work

Description of the area of cooperation, for example, by identifying relevant intermodal transport lines, related installations (intermodal terminals, border crossing points, gauge interchange stations and ferry links/ports), areas of activity (infrastructures, operations, regulations, etc.) and concerned parties involved in intermodal transport.

B. COMMON PROVISIONS

Actors involved

Identification of Governments and, where appropriate, regulatory Authorities responsible for negotiating and approving the Action Plan at bilateral, trilateral or multilateral levels.

Objectives

Description of the expected results of the Action Plan addressing specific and general issues. A recommendation to conclude a Partnership Agreement among concerned parties in intermodal transport could be included.

Analysis of the situation

Identification of the problems and its causes on the basis of interviews, feasibility studies and/or experiences made on specific intermodal transport lines. This could include an analysis of the consistency of regulatory texts.

Activities to be undertaken and results to be achieved

Detailed description of the specific tasks and outputs to meet the agreed objectives and identification of criteria to measure impact. The infrastructure and services standards and parameters stipulated in Annexes III and IV to the AGTC Agreement should be explicitly referred to as minimum benchmarks.

Government commitment

Identification of all regulatory and other public measures that could facilitate the accomplishment of the agreed activities.

Working mechanism(s)

Description of how to undertake the agreed activities and to achieve the expected results (work plan and working procedures).

Time schedule

Determination of the start and end of the agreed activities as well as of intermediate steps. A continuing process without specific timeframes could be established, but individual projects and tasks should be undertaken in accordance with specific deadlines.

Assessment and follow-up

Establishment of assessment and reporting systems to analyze unequivocally and efficiently the achieved results allowing, if necessary, for the introduction of corrective measures, if required, at high political level.

Evaluation

Evaluation of the achieved results as compared to the agreed objectives. If necessary, this could lead to modification of the commitments made by the parties involved in order better achieve these objectives.

Other elements

Agreement, if appropriate, on actions to be taken in case of infringements by intermodal transport operators in data protection measures, emergency arrangements, etc.

C. FINAL PROVISIONS

Entry into force/Denunciation/Termination/Duration

Provisions on the start of the Action Plan, possibilities for denunciation by the parties involved, termination of the Action Plan and/or its duration and possible extension.

Safeguard clause

Provisions to avoid possible conflict between the Action Plan and other legal commitments made and engaged in, such as those arising from membership in the European Union.

"MODEL" PARTNERSHIP AGREEMENT FOR THE DEVELOPMENT OF INTERMODAL TRANSPORT AT THE PAN-EUROPEAN LEVEL

A Partnership Agreement for the development of intermodal transport should contain the following elements:

A. GENERAL PROVISIONS

Content

- An inter-governmental Action Plan has been concluded beforehand:

Description of the objectives of the Action Plan.

- An Action Plan has not been concluded beforehand:

Description of the general objectives agreed upon by all parties interested in the resolution of the identified intermodal transport problems (the conclusion of an Action Plan may be envisaged in case some activities are difficult to implement).

In both cases, the type of partnership and the level of commitment should be determined. The Agreement could take the form of a charter, letter of intent, contract, etc.

Definitions

The definitions used for technical terms should be in line with the definitions contained in the "Terminology on Combined Transport" prepared in 2001 by the United Nations Economic Commission for Europe (UNECE), the European Conference of Ministers of Transport (ECMT) and the European Commission (EC).

Scope of work

Description of the field of cooperation (type of business, cargo, traction, etc.) and its geographical scope (transport lines, related installations, etc.).

B. COMMON PROVISIONS

Actors involved

Identification of the active and/or passive, public and/or private parties and their involvement in the activities to be established.

These parties may be intermodal transport operators, railway undertakings, freight forwarders, rail infrastructure managers, terminal operators and border crossing Authorities, such as sanitary, veterinary, phyto-sanitary and other control organs at borders.

Objectives

Description of the expected results of the Partnership Agreement and clear definition of the responsibilities and performance expected from each of the parties involved in intermodal transport. At the international level, this type of agreement would, in particular, enhance transparency about the roles and responsibilities of the parties involved.

Analysis of the situation

Identification of the problems and its causes on the basis of interviews, feasibility studies and/or experiences made on specific intermodal transport lines. This could include an analysis of the consistency of regulatory texts.

Activities to be undertaken and results achieved

Detailed description of the specific tasks and outputs to meet the agreed objectives and identification of criteria to measure impact. The infrastructure and services standards and parameters stipulated in Annexes III and IV to the AGTC Agreement should be explicitly referred to as minimum benchmarks. In order to measure impact and compliance with the commitments made, the key performance parameters and responsibilities at national and international levels as listed below may be utilized.

Working mechanism(s)

Description of how to undertake the agreed activities and achieve the expected results (work plan and working procedures). Work could be entrusted to ad hoc task forces or standing working groups depending on the objectives to be achieved. In addition to the parties directly concerned, other representatives or experts, including public Authorities, could be involved in this work, possibly as observers.

Responsibilities

Description of each task and identification of the person or persons responsible for each of the tasks to be carried out.

Financing

Identification of all parties required for the financing of the agreed activities. Determination of the level of participation of each of these parties and establishment of a financial plan.

Time schedule

Identification of a calendar for the implementation of the tasks, possibly including stages. Such stages would make it possible to compare permanently progress made with the agreed objectives. Results at the various stages should be transmitted to the signatories of the Action Plan, if available. A continuing process without specific timeframes could be established, but individual projects and tasks should be undertaken in accordance with specific deadlines.

Assessment and follow-up

Establishment of a Steering Committee to ensure follow-up to the implementation of the activities adopted, compliance with the financial plan (assessment of possible extra costs) and modification of the programme of work, if necessary. The Steering Committee may solicit expert advise on specific issues. The financial partners may have the right to supervise the correct use of the financial means provided.

Sanctions

Sanctions could be agreed upon in areas, such as:

- Non-attainment of agreed services, performance standards and other specifications by any of the parties involved.
- Non-compliance with agreed data protection measures.
- Non-fulfillment of agreed emergency measures.

Arbitration

Provisions for referral to the political or institutional actors if consensus cannot be reached among the parties, either in the preparation of the Partnership Agreement or in its application.

Evaluation

Evaluation of the achieved results as compared to the agreed objectives. If necessary, this could lead to modification of the commitments made by the parties involved in order to better achieve the objectives.

C. FINAL PROVISIONS

Entry into force/Denunciation/Termination/Duration

Provisions on the start of the Partnership Agreement, on possibilities for denunciation by the parties involved, termination of the Partnership Agreement and/or its duration and possible extension.

D. KEY PERFORMANCE INDICATORS AND RESPONSIBILITIES

The following key performance indicators at the national and international level should be regarded as a basic set of benchmarks to evaluate the efficiency of intermodal transport services in general and compliance with the performance parameters of trains and minimum infrastructure standards. These indicators, the values attributed to them and the responsibilities for the underlying activities are based on good practice. They constitute an important part of the Partnership Agreement as they would allow for constant monitoring of compliance with the commitments made and for an evaluation of the performance of intermodal transport services and the individual parties involved.

Depending on the specific situation (lines, regions, etc.) identification of other and/or additional performance indicators may be appropriate.

Key Performance Indicators and Responsibilities - NATIONAL Level[1]

		Freight forwarder	Customs Authority	Intermodal Transport Operator	Railway undertaking	Terminal operators
Intermodal Transport Activity	Key Performance Indicator	Responsibility of the parties				
1) Administrative and technical compliance of intermodal transport units (ITUs)	– Number of ITUs and % of total number per train. – Total per month per train.			✓		
2) Compliance with road hand-over deadlines	– Number of ITUs handed over with 15 minutes maximum delay and % of total number of ITUs per train.			✓		
3) Compliance with railway hand-over deadlines	– Delay in minutes compared to scheduled time and as % of trains per month.	✓		✓		
4) Administrative and technical compliance of railway wagons and their loads	– Number of compliant wagons and as % of total wagons delivered by trains. – Accumulated total per month per train.			✓	✓	
5) Compliance with departure time of trains	– Delay in minutes in relation to scheduled time by train and as % of compliant trains per month.				✓	
6) Compliance with arrival times of trains	– Delay in minutes in relation to scheduled time by train and as % of compliant trains per month.				✓	
7) Compliance with rail delivery	– Delay in minutes in relation to scheduled time by train and as % of compliant trains per month.			✓	✓	
8) Compliance with road delivery	– Number of ITUs delivered within 30 minutes following arrival of client and as % of total number per train; – Accumulated total per month and per train.	✓		✓		
9) State of ITUs delivered to clients	– Number of damaged ITUs and % of total number of ITUs delivered by train. – Total number per month and per train.	✓		✓		
10) Compliance with traffic volumes provided for trains, by route	– Number of multimodal ITUs carried by train and by route. – Total number per month and per train compared to previous year.			✓		
11) Compliance with train loading	– Loading rates per train. – Monthly averages per train in comparison with previous year.				✓	
12) Average time for train formation [AGTC, Annex IV, D a)]	Max. 60 minutes.					✓
13) Average waiting time for lorries [AGTC, Annex IV, D b)]	Max. 20 minutes.					✓
Others						

Key Performance Indicators and Responsibilities - INTERNATIONAL Level[2]

		Freight forwarder	Customs authority	Intermodal transport operator	Railway undertaking	Terminal operator
Intermodal Transport Activity	Key Performance Indicator	Responsibility of the Parties				
1) Compliance with reservation system on international trains	If applicable – Yes/No			✓		
2) Compliance with arrival and departure times at borders and changeover stations	No stops at borders (if unavoidable: max. 30 minutes) (AGTC, Annex IV, E. b))		✓		✓	
3) Compliance with data transmission (quality-timing-content) according to European Rail Traffic Management System (ERTMS)	Yes/No			✓	✓	
4) Compliance with Customs, health and dangerous goods inspections	Yes/No	✓	✓	✓	✓	✓
5) Compliance with transmission of documentation in international rail transport (consignment note, technical documents, etc.)	Yes/No			✓	✓	
6) Acceptance of arriving ITUs by the terminal operator	Yes/No			✓		✓
Others						

1. The values mentioned are indicative, to be agreed on a case-by-case basis.

2. The values mentioned are indicative, to be agreed on a case-by-case basis.

ANNEX III. DEVELOPING INTERMODAL TRANSPORT IN THE NETHERLANDS

A. PERIOD 1970 – 1990

Road

Road transport is the most important mode in the Netherlands. The share however is lower than in many other countries: just 50%. Since the Netherlands has a lot of rivers and canals, the transport by inland waterways is very important (39% of total). Average domestic distance of transport is 50-60 km.

Rail

Until 1995 rail transport played only a marginal role in the transport business (4%).

Inland waterways

Short-sea

Short sea shipping started in this period to develop its ability to transport containers. After some measures of the public authority deleting or simplifying administrative rules and regulations (most important: 1 stop-shop for electronic customs declaration) this sector developed rapidly. In recent years, short-sea shipping accounts for approximately 40-45% of the total international traffic.

Development indicator

	2000	2001	2002	2003	2004	2005	2006	Target
Short sea from NL intra Europe *[million tonnes]*	24.5	22.8	24.7	26.7	31.1	35.1	-	40 in 2010

B. GOVERNMENTAL ACTIONS 1990 – 2000

Decision to build a new dedicated rail freight line

In the years 1985-1990 the Ministry of Transport received urgent signals from the transport industry that the flow of containers through the port of Rotterdam was growing rapidly. It was pointed out that the infrastructure for road and rail was not sufficiently adapted to the forecasted flow of containers.

Notwithstanding the fact that the river Rhine has an enormous capacity for the transport of containers, it was clear that several market segments required faster modes of transport.

In order to avoid the roads to be filled with long lines of road vehicles transporting containers and given the fact that the rail network in the Netherlands had by far no capacity to cope with the growing flow of containers, it was decided to construct a complete new railway line to the German hinterland dedicated solely for freight transport.

"Netherlands, a Distribution Country"

In the same period the association "Netherlands Distribution Country" was established. Companies from all transport and logistic sectors established this association. The aim of the association is to promote the Netherlands as the Gateway to Europe and the accompanying function in the logistic and distribution sector. The Ministry of Transport supported the establishment whole-heartedly in order to have a platform for discussion to develop the right intermodal policy.

In 1989-1990 the Ministry ordered a consultant bureau to elaborate together with this association a Master Plan Intermodal Transport for the Netherlands. The report was thoroughly discussed and finally accepted by all parties.

Project team Intermodal promotion

In the same period it was clear that the government should implement accompanying measures to promote the use of intermodal and combined transport where necessary and possible.

In 1989/1990 the Ministry of Transport was ordered to develop a new policy to promote intermodal and combined transport. On the institutional level a project team was established with a small dedicated staff and with participation of all departments responsible for: road transport, rail transport, inland waterways and short-sea shipping.

The team was assigned to develop this policy in two years based on the Master Plan elaborated by "Netherlands Distribution Country" and the consultant.

The team developed the following measures.

Subsidy schemes

- Based on the Master Plan the team identified the criteria for investment in new terminals (rail, inland waterways and short sea). A financial supporting scheme was developed and several inland terminals from the Master Plan were created with the support of the Ministry. An important requirement was financial participation of private transportation and logistic companies. This would reassure public authorities that the terminal would be commercially viable.

- Although the max gross weight on the roads in the Netherlands of 50 tonnes allowed already an efficient terminal haulage by road, it was in 1998 decided, as a trial, to allow a max gross weight of 60t and a longer max length for road vehicles in order to make the terminal haulage of 60 TEU on one vehicle possible. Restriction was a maximum distance of 50 km to/from a terminal.

- Another measure to promote intermodal transport was a reduction of the motor vehicle tax for terminal haulage.

Railway policy

In 1991 the government supported the adoption of the Directive 91/440 requiring a liberal railway market. Between 1995 - 2000 the Dutch Railways (NS) were restructured as the Directive and the following railway packages required. Infrastructure management was transferred to a public body

ProRail performing maintenance, capacity management and traffic control. A new company as railway undertaking took charge of the passenger transport. The freight transport division was sold to German Railways (DB-Railion).

Access to the market of new railway undertakings was made possible. As from 1995 several new companies entered the market providing much better service to clients than ever experienced before in the railway business according to shippers. In container transport most companies introduced the concept of shuttle services which are block trains not requiring costly shunting anymore. This concept made rail transport of containers economically viable.

Infrastructure charges were introduced. However, at the start a lower level growing over the following years was introduced allowing the railway system to grow to mature ness and the railway undertakings to attract their share of the market.

Between 1994 –2004 the market share in international rail transport of containers grew from 8% to 11% (t/km). The tonnage transported grew form 16 million tonnes in 1995 to 36 million tonnes in 2006.

Intermodal Infrastructure Inland Waterways

Several inland waterway terminals were constructed with governmental support allowing the inland waterway transport to play an important role in the domestic container transport. This attracted new innovative investments in this market and made this kind of transport grow considerably. Between 1994 and 2004 the market share of inland waterways in container transport grew form 2% to 33% (t/km).

C. AUTONOMOUS GROWTH 2000 – 2006

As from 2000 the supporting schemes by the public authorities were terminated based on the idea that after a starting period the transport industry should be able to do its business without any governmental support. To a large extent this proved to be possible. Some new railway undertakings disappeared; other new ones entered the market. Some inland waterway connections disappeared, others were introduced. The market decided what was feasible. The Government and the Ministry of Transport took the position that governmental support is good in a starting phase, but after that, the market has to do the business on its own. The development of intermodal and combined transport developed positively from that moment on.

In 2007, the new railway freight line to the German hinterland will be opened. The market is waiting that moment desperately since container flows are growing rapidly.

Maritime container flows

The total number of TEU's handled in the port of Rotterdam increased to 9.3 mln in 2005. The number of land mover increased to 4.1 mln in 2005. Modal split: road 59%, inland waterways: 31.1%; rail: 9.3%.

Continental combined transport

Continental combined transport increased by 19% in the years 2001 – 2005.

Short Sea

Increased of almost 60% in 2000-2005.

D. CONCLUSION

Intermodal transport can only develop when the necessary physical and administrative infrastructure is available. In most market circumstances these facilities do not emerge by themselves, since their costs cannot be covered by the price paid by the shipper when compared to through going road transport. Road transport alternative is in most cases more advantageous.

After ten years of support to the development of intermodal/combined transport by the Government it is clear that after the initial period this market has developed independently. This was the Government's goal as from the beginning. Now, the market and the transport industry has to do its own business, the government is not in the position nor has the responsibility to organize this business wise. With the starting support and infrastructure facilities the Government has laid the basis for this positive development.

ANNEX IV. NATIONAL MEASURES TO DEVELOP COMBINED TRANSPORT THE CASE OF AUSTRIA (JULY 2005) [CEMT/CS/TIL(2007)1/REV1]

1. IMPORTANCE OF COMBINED TRANSPORT IN THE GENERAL TRANSPORT POLICY

In the framework of Austrian transport policy, combined transport is considered to be of central importance for solving present and future problems with regard to freight transport by road caused by Austria's geographical and topographical situation.

Due to increased traffic flows both within and through Austria, in particular on the roads, Austria has been introducing early measures for the support of environment-friendly modes, such as rail or combined transport.

2. FINANCIAL SUPPORT FOR INVESTMENT

2.1. Programme for the promotion of combined goods transport by road/rail/ship[1]

The "Programme for the promotion of combined goods transport by road/rail/ship" contains substantial measures for the financial promotion of combined transport in Austria. The main characteristics of this programme are as follows.

Objective

Development of combined transport in order to encourage the shift of goods transport from road to environment friendly modes of transport and to reduce the growth of road transport.

Duration of the programme

1/1/1999 to 31/12/2002.

What is supported

Investments in installations, systems and equipment, which are necessary for the transport or handling of goods in combined transport by road/rail/ship.

Applications

Applications may be submitted by physical and legal persons as well as unincorporated firms of civil and commercial law; regional administrative bodies are, however, not entitled to submit applications.

Projects eligible for aid

- Plants and installations for combined transport (in particular combined transport terminals and loading equipment, e.g. cranes and stackers).

- Combined transport equipment (in particular containers and swap bodies, vehicles and boxes specially fitted for the use of combined transport).
- Implementation of innovative technologies and systems for the improvement of combined transport services.
- Feasibility studies in connection with implementing measures.
- Costs for training in specific EDP-systems or techniques.

Expected results

Improved co-operation between road, rail and shipping as well as optimised traffic flows, thereby reducing the strain of heavy goods transport on the road network, less environmental damage and increased road safety.

Amount of aid

The amount of aid is based on the expected reduction in road traffic and reaches up to max. 30% of the accountable investment costs for physical investments and up to max. 50% of the accountable costs for feasibility studies and training measures.

Financial dimension

Approximately 2.9 million Euros per year.

2.2. Financing of terminal infrastructure

According to paragraph 2 of the Austrian Federal Railways Act, the Republic of Austria pays for the provision and the improvement of the rail infrastructure. While this also includes infrastructure for combined transport terminals, it does not cover warehouses and loading equipment. Terminals, where the rail infrastructure has been financed with public money, have to be open for third parties according to the law on railways, even if the infrastructure is operated and additional equipment (e.g. loading equipment) is financed by the Austrian Federal Railways. Public financing for a part of the terminal infrastructure is also possible if the terminals are operated by private owners, on the condition that these private owners are licensed railway companies. When public funding is provided, open access to the private combined transport terminal has to be guaranteed.

3. FINANCIAL SUPPORT FOR OPERATION

Paragraph 3 of the Austrian Federal Railways Act of 1992 states that, according to Regulation (EEC) No. 1191/69 issued by the Council on 26 June 1969, and as amended by Regulation (EEC) No. 1893/91 issued by the Council on 20 June 1991, transport which is considered to be of public interest, e.g. for environmental reasons, may be ordered as "public services".

A preliminary remuneration of 800 million ATS was agreed upon for public service operations carried out in the framework of combined transport (unaccompanied combined transport in transit through Austria and all rolling road connections) for the year 2001. The final remuneration depends on the results achieved (i.e. the number of consignments transported). This system is also foreseen for 2002. In the context of public services in combined transport, special tariff reductions amounting to

100 million ATS and concerning only rolling roads were granted in 2001, also due in particular to the tunnel catastrophes.

4. FISCAL INCENTIVES

4.1 Incentives regarding vehicle tax

- All national vehicles (i.e. motor vehicles and their trailers) exceeding 3.5 t are exempt from vehicle tax, if -- during that calendar month -- they are used exclusively for initial and terminal haulages for combined transport rail/road, i.e. the pick-up from and delivery to the nearest technically suitable terminal of containers of at least 20´ length, swap bodies or semi-trailers transported by rail.

- On request, national vehicles exceeding 3.5 t which make use of rolling roads or (in the case of semi-trailers) unaccompanied combined transport on Austrian soil are reimbursed 15% of the monthly vehicle tax for each combined transport journey effected by rail. This reimbursement may rise to 100% of the annual vehicle tax.

4.2 Incentives regarding road usage fee

For accompanied (rolling road) and unaccompanied combined transport, road usage fees for initial and final road hauls to/from the nearest terminal in Austria are refunded. The refund amounts at present to 8 Euros (= daily road usage fee) per transport of a motor vehicle, semi-trailer or a swap body at least 12 m long or of a container of at least 40 foot. It amounts to 4 Euros per transport of a semi-trailer or a swap body under 12 m, or of a container under 40 foot, but with a minimum length of at least 20 foot. The refund is shown separately on the combined transport invoice and directly credited to the transporter (which means, for example, that the price paid by the transporter for the rolling road service is reduced by 8 Euros).

5. OTHER SUPPORT MEASURES

5.1 Payload adjustment

According to the Austrian "Motor Vehicle Act" ("Kraftfahrgesetz") the sum of the total weight and the sum of the axle weight of motor vehicles and their trailers are laid down as follows:

- Transport of goods by road generally 38 t

- Initial and final road hauls in combined transport to/from the nearest technically suitable terminal in Austria:
  - For semi-trailers which can be handled by crane: 39 t
  - For the carriage of containers and swap bodies: 42 t

These weights are increased by 5% for motor vehicles registered within the European Union (i. e. 40 t for transport of goods by road in general, and for initial and final road hauls in combined transport, 41 t for semi-trailers which can be handled by crane and 44 t for the carriage of containers and swap bodies). The limit values indicated for vehicles registered in an EU State are also valid for vehicles registered in countries which have a transport agreement with the EU and where full reciprocity is granted.

5.2 Liberalised initial and final combined transport hauls

For combined transport operations, the initial and final road leg is liberalised for motor vehicles registered within the European Union or the European Economic Area and holding a Community licence, taking into account the relevant legal provisions of the European Union (in particular also regulation (EC) 881/92).

5.3 Liberalised corridors for rolling roads

According to a decree of the Austrian Federal Ministry for Transport, Innovation and Technology specific road corridors for initial and final hauls of rolling road connections to the terminals quoted below do not require permits (i. e. no bilateral road permit for goods transport is necessary on these corridors, provided that the journey is an initial or final road haul of rolling road connections):

- Corridors to Terminal Wels:
  - Wels - border crossing Suben (Germany)
  - Wels - border crossing Braunau (Germany)
  - Wels - border crossing Schärding-Neuhaus (Germany)
  - Wels - border crossing Walserberg/Autobahn (Germany)
  - Wels - border crossing Wullowitz (Czech Rep.)

- Corridors to Terminal Villach Süd:
  - Villach Süd - border crossing Thörl-Maglern/Autobahn (Italy)
  - Villach Süd - border crossing Karawankentunnel (Slovenia)
  - Villach Süd - border crossing Lavamünd (Slovenia)
  - Villach Süd - border crossing Bleiburg (Slovenia)

- Corridor to Terminal Wörgl:
  - Wörgl - border crossing Kiefersfelden

- Terminal Brennersee:
  No corridor arrangement exists for the Ro-La Brennersee – Manching, but free approach is possible from the border crossing Brennerpass to the loading place. Control is effected by the customs authorities.

5.4 Liberalised areas for rolling roads

Initial and final hauls used for loading and unloading do not require any permit within a radius of 70 km around the terminals of Wels and Salzburg, if rolling roads are used.

5.5 Exemption from the Weekend and holiday driving ban on lorries

Journeys with motor vehicles and trailers exceeding 3.5 t as well as motor vehicles and tractors exceeding 7.5 t are forbidden on Saturdays from 3 p.m. to 12 p.m. and on Sundays and holidays from 00 a.m. to 10 p.m. Journeys, which are carried out in the context of combined transport only and do not exceed a radius of 65 km to or from the following terminals, are exempted from that ban:

- Brennersee
- Graz - Ostbahnhof
- Salzburg - Hauptbahnhof

- Villach - Fürnitz
- Wels - Verschiebebahnhof
- Wien - Südbahnhof
- Wien - Nordwestbahnhof
- Wörgl

5.6 Exemption from the Summer holidays driving ban on lorries

On every Saturday from 1 July to 31 August each year, journeys with motor vehicles and trailers exceeding 7.5 t are forbidden from 8 a.m. to 3 p.m. on certain roads. Journeys, which are carried out in the context of combined transport rail-road from and to the nearest suitable rail loading station, are exempted from that ban.

5.7 Exemption from the Night driving ban

Motor vehicles exceeding 7.5 t which do not comply with the noise emissions standards for the so called "lärmarme KFZ" ("low noise vehicles") are not allowed to circulate from 10 p.m. to 5 a.m. Journeys, which are carried out in the context of combined transport from and to the following rail stations on clearly specified road corridors, are exempted from that ban in both directions:

- Wien Südbahnhof - border crossing Nickelsdorf (Hungary)
- Wien Südbahnhof - border crossing Klingenbach (Hungary)
- Graz Ostbahnhof - border crossing Spielfeld (Slovenia)
- Graz Ostbahnhof - border crossing Heiligenkreuz (Hungary)
- Villach-Fürnitz - border crossing Rosenbach (Slovenia)
- Villach-Fürnitz - border crossing Arnoldstein (Italy)
- Verschiebebahnhof Wels - border crossing Suben (Germany)
- Verschiebebahnhof Wels - border crossing Walserberg (Germany)
- Verschiebebahnhof Wels - border crossing Wullowitz (Czech Rep.)
- Bahnhof Salzburg - border crossing Walserberg (Germany)
- Bahnhof Brennersee - border crossing Brenner (Italy)
- Terminal Wörgl - border crossing Kiefersfelden (Germany)

5.8 Exemption from Eco-points system

According to Protocol 9 of the Accession Treaty between Austria and the European Union transit-journeys, which are carried out in the context of combined transport and whereby the Austrian border is crossed once by rail and once by road, are exempted from the Eco-Point System.

5.9 Supplementary permits for the use of combined transport

Numerous bilateral agreements on road goods transport (for example with Hungary and Slovenia) have been drawn up with additional protocols for the promotion of combined transport. These additional protocols state, amongst other specific measures, that supplementary permits for road goods transport will be issued if rolling roads in, to and from Austria are used.

5.10 "Bonus" Eco-points ("Belohnungsökopunkte") for the use of combined transport

On 1st January 1997, a "bonus" system for eco-points was introduced for the use of combined transport. Austrian hauliers, who use rolling roads, are entitled to additional eco-points. On request, one

journey with eco-points is credited for each round-trip (or for 2 single journeys) on a rolling road in Austria.

5.11 Rest periods on rolling/floating roads

According to Austrian labour legislation, the time a lorry driver spends on a rolling road train will be regarded as a rest period.

6. MEASURES TO BE TAKEN IN THE FUTURE

The measures for the support of combined transport quoted above are regularly revised and updated according to the latest developments. Apart from the measures indicated above, the Austrian measures for the promotion of rail and combined transport include clearly defined measures for infrastructure on the following main axes:

- Brenneraxis (München - Verona - Bologna)
- Tauernaxis (München - Salzburg - Villach - Tarvisio - Udine/Rosenbach-Ljubljana)
- Axis Phyrn-Schoberpass (Regensburg - Graz - Spielfeld/Straß - Maribor)
- Donauaxis (Nürnberg - Wien - Nickelsdorf/Sopron (Ödenburg)/Bratislava)
- Pontebbana-axis (Prag - Wien - Tarvisio - Pontebba - Udine)

NOTES

1. For further information:
ERP-Fonds, Renngasse 5, 1010 Wien, Tel. 53 464/4002, Fax 53464/4015 or on the Website http://www.erp-fonds.gv.at/erp/richtlinien/erp_verk.htm.

ANNEX V. GUIDE TO INTERMODAL TRANSPORT ROAD/RAIL COST AND PRICE CALCULATION

Based on typical case studies in West and Central Europe, the following costs are incurred in intermodal transport.

Pre-carriage and final delivery road operation

Operated between the shippers ramp or forwarders freight centre, and gate-in or gate-out of an intermodal terminal.

A road vehicle normally carries either:

- 1 x 40 ft. container or similar length class European Intermodal Loading Unit
- 2 x 20 ft. containers or similar length class European Intermodal Loading Unit
- 1 x 20 ft. or 7 m tank or bulk container laden with liquids or bulk

A road vehicle with one driver carrying the above described units in short haul must earn 250 – 300 euros in revenue per day to survive and stay in the market. The number of paid operations this driver could achieve varies according to the distance to be covered, waiting time at the terminal and at the shipper's ramp, the distribution of loading points in the region, road congestion, etc. if the driver can sell 3 operations per day, he must charge a minimum of 100 euros per operation.

Inland terminal transfer

All terminal transfer costs are per box (and not per TEU).

Simple operation: 1 loading unit delivered in terminal for same day dispatch:

- In Germany (subsidised terminals) 20 euros
- Most other countries 35 – 40 euros

Depot operation: 1 empty loading unit delivered for taking over, setting into depot, reporting to owner or leaser about availability: 30 – 50 euros per operation for a time period in depot of up to 14 days.

Rail line haul

Most railways charge 12.50 – 15 euros per km for a train, including traction and network fees. Such a train may carry up to 80 TEU (half in the case of Ro-La operation) and is normally commercially calculated at an average capacity use of 75 – 80%.

The rail wagons must be leased and the cost for a 4 axle platform wagon with a capacity of 60 ft. loading (3 TEU) is 22 euros per day. A full length train will consist of 26 such railcars and cost 572 euros per day in leasing fees.

(Ro-La wagons are considerably more expensive: 6 axle wagons with 2 x 15 m loading length are much more expensive; pocket wagons for carriage of semi-trailers are more expensive; and multi-fret wagons with loading platform that are considerably lower than 1 100 mm above rail, are more expensive.)

Hence, a full length train moved from terminal A over 600 km to terminal B will cost about 9 500 euros. In the case of 80% capacity use, the rail carriage will cost about 150 euros per TEU.

These figures apply typically for intermodal transport in Central Europe. The Turkish rail network is more limited in train length. While a Central European standard train will offer a train length of 750 m, Turkish rail is limited to 550 m train length (including the locomotive). This will reduce the number of railcars that make up the train, but it will also reduce the per train revenue.

Example

A 45 ft. pallet wide container from a North Sea Port to South East Germany (600 km):

- Import
  - Take over in Port: 50 €
  - Line haul to München: 300 €
  - Final delivery: 100 €
  - Return empty to terminal: 100 €

- Export
  - Take empty over from terminal to shipper's ramp, wait 2 h for loading
  - Return to terminal1: 20 €
  - Line haul to Hamburg: 300 €
  - Delivery in Hamburg at normal
  - Port handling charge: 77 €

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INTERMODAL TRANSPORT

National Peer Review: TURKEY

Turkey is growing fast, owing mainly to rapidly increasing trade. In order to facilitate this trade, efficient logistics and transport services are crucial. Yet Turkey is at an early stage in developing sophisticated and modern logistic services and at present is too dependent on road transport. This book argues that Turkey's continuing economic expansion depends on the diversification of its transport modes and especially on the development of efficient multimodal services.

Turkey's role as a hub for Europe, Asia, and the Middle East and as a facilitator of global exchange will be enhanced with a strategy and measures to support a range of intermodal logistic and transport services. This work analyses the current situation and sets forth some of the actions and policies needed to stimulate the development of a truly multimodal transport system.

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