



Port Network Plan and Improvement  
Programme:  
Renovation of the Ferry Terminals of Baku and  
Turkmenbashi

**Phase 3, Economic and Financial Evaluation  
Report - Turkmenbashi  
March 1997**

---



**PHASE 3, ECONOMIC AND FINANCIAL EVALUATION REPORT - TURKMENBASHI  
MARCH 1997**

**Table of Contents**

0.	INTRODUCTION AND EXECUTIVE SUMMARY	1
1.	MACROECONOMIC TRENDS AFFECTING THE FERRY LINK MARKET	6
1.1	The Baku and Turkmenbashi Ferry Hinterland	6
1.2	Macroeconomic Developments in the Local Hinterland States	9
1.2.1	Turkmenistan	9
1.2.2	Azerbaijan	13
1.3	The Economic Development in the Regional Hinterland - Central Asian Republics	17
1.3.1	The Republics of Georgia and Armenia.	17
1.3.2	The Other Central Asian Republics	18
2.	TRANSPORT SECTOR DEVELOPMENTS IN THE FERRY HINTERLAND	21
2.1	The Central Asian Transportation Infrastructure and System	21
2.1.1	Railway Transportation Infrastructure and System	23
2.1.2	Highway Infrastructure and System	23
2.1.3	The Waterway System	24
3.	TRANSPORT COST BY MODE ON ALTERNATIVE ROUTES	24
3.1	Shipments to and from the Black Sea Region	27
3.2	Northern Europe and the Baltic Region	28
3.3	Western Europe Represented by Frankfurt, West Germany.	29
3.4	Southern Europe Represented by the Adriatic Sea	30
3.5	The United States	31
3.6	Cost Impact of Elimination of Draft Restrictions on the Volga Don Waterway	32
3.7	Overall Observations and Conclusions	34
4.	THE FERRY LINK - ITS ROLE IN THE TRANSPORTATION INFRASTRUCTURE	35
4.1	History of the Ferry Link	35
4.2	Cargoes Handled by the Ferry Link	37
4.3	Commodity Statistics of Cargoes Carried on the Ferry Service	42
4.4	Origin/Destination Analysis of Cargo Flows on the Ferry	44
4.4.1	Origin/Destination of Rail Cargoes	45
4.4.2	Origin/Destination of Truck Cargoes	48
4.5	The Regulatory, Legislative Environment and Invisible Trade Barriers	50
4.6	Institutional Requirements	51
5.	GENERAL DEVELOPMENTS IN TRANSPORTATION AND INFRASTRUCTURE INFLUENCING THE FERRY TERMINALS AND FERRY SERVICE ROUTE.	51

5.1	General Trends and Developments in the Transportation Industry	52
5.2	Developments in the Short Sea and Ferry Transportation	53
5.3	General Developments in Transportation Influencing the Ferry Operations and the Modal Split on the Ferry Route	54
5.3.1	Rail Transportation	54
5.3.2	Truck Transportation	55
5.3.3	Intermodal Transportation of Containers	56
5.3.4	Ship Transportation	57
5.3.5	Passenger and Automobile Transportation	58
5.3.6	Air Transportation of Cargoes	58
5.4	New Business Opportunities for the Ferry Terminals in Baku and Turkmenbashi	58
5.4.1	Establishment of a Ferry Route Between Baku and Aktau, Kazakhstan	58
5.4.2	Establishment of a Ferry Route Between Baku and Astrakhan/Olya, Russia	60
5.4.3	Establishment of a Ferry Route Between Turkmenbashi and Astrakhan/ Olya, Russia	60
5.5	Recent Developments and Planned Projects Influencing the Cargo Flows on the Baku - Turkmenbashi Ferry	61
5.5.1	Baku - a Transportation Gateway on the Caspian Sea	61
5.5.2	Baku - the Emerging Oil Capital in the Caspian Sea Region	61
5.5.3	Baku as a Regional Oil Supply Center	63
5.5.4	Baku as a "Container Freight Yard" (CY)	63
5.5.5	The Port of Baku as a "Free Port" and Sumgait as an "Industrial Free Zone".	64
5.5.6	Uzbekistan Cotton Exports	65
5.5.7	Guaranteed Safe Transport Through Georgia	65
5.5.8	Container and Ferry Transportation via Georgian Ports	66
5.5.9	Far East Rail Landbridge Link	68
5.5.10	Europe - Far East/Peoples Republic of China Landbridge Link via Central Asia	69
5.5.11	Major Turkmenistan Development and Export Projects	69
5.5.12	Major Azerbaijan Export Cargoes with Potential for the Ferry	71
5.6	Key Prerequisites for Successful Terminal and Ferry Operations	74
5.6.1	Improvements of the Operation of the Ferry Service	75
5.6.2	Establishment of the Ferry Link as a Joint Service Between Azerbaijan and Turkmenistan	76
5.7	Professional Operation of and Cooperation Between the Railroads of the Central Asian Nations	77
5.8	Operation of the Gateway Ports in Georgia	78
6.	CARGO FORECASTS FOR THE FERRY LINK	79
6.1	Trade Routes and the Current Market Potential of the Ferry	79
6.2	Modal Split of Cargoes	81
6.2.1	The Factors Influencing the Growth of Containerization of and the Modal Split on the Central Asian Trade Routes	82



	6.2.2	Truck and Trailer Traffic on the Ferry	87
	6.2.3	Rail Transportation	87
	6.2.4	Expected Modal Split on the Ferry	88
6.3		Forecasts of Future Cargo Potential for the Ferry Using Scenario Analysis	
	6.3.1	Likely Scenario	89
	6.3.2	Optimistic/High Growth Scenario	90
	6.3.3	Pessimistic/Low Growth Scenario	105
			109
7.		<b>FINANCIAL AND ECONOMIC IMPACT ANALYSES</b>	
	7.1	Background and Methodology	117
	7.2	The Current Financial Situation of the Port	117
	7.3	The Proposed Future Corporate Structure of the Port	118
	7.4	Basic Assumptions and Inputs	118
	7.4.1	Revenues	119
	7.4.2	Proposed Investments	119
	7.4.3	Operating Costs	122
	7.5	Projection of the Feasibility of Investments in Facilities and Equipment	123
	7.5.1	Feasibility Analysis of the Proposed Investments in the Ferry Terminal	126
	7.5.2	Financial Analysis of the Proposed Investment Projects	126
7.6		Economic Impact Analysis	128
	7.6.1	Overall Economic Impact of the Ferry Terminal of the Port of Turkmenbashi	130
			131

## **APPENDICES**

Appendix 1	List of Project References
Appendix 2	List of Financial Sheets



## 0. INTRODUCTION AND EXECUTIVE SUMMARY

The present project, being part of the EC financed Tacis-TRACECA programme for facilitation of trade on the TRACECA corridor, is concerned with the rehabilitation of the ferry terminals in Baku and Turkmenbashi. The project is divided into four phases:

Phase 1 - Determination of basic designs

Phase 2 - Design of renovation works

Phase 3 - Tender documents preparation

After issue of the Inception report in May 1996, a draft report covering activities of Phase 1 of the project was prepared and issued in August 1996. Like all reports, this was submitted to the following organizations for comments:

- Tacis Management Team, Brussels
- Tacis M&E Unit
- Tacis CU in Baku and Ashgabat
- Port Authorities in Baku and Turkmenbashi
- EBRD, London

The Phase 1 Final Report, ref. /1/, was distributed in January 1997 having taken into account and incorporated comments received from the above mentioned organizations as appropriate.

Following submission of the Phase 1 draft report last August, the second phase of the project concerned with the design of the rehabilitation measure was initiated. For practical reasons this second phase has been divided into two parts, viz. a conceptual design part and a detailed design part, with the clear intent in a structured way to obtain agreement on the development strategy and the general layouts of the different components of the project before the final detailed design would be carried out.

The conceptual design phase was concluded by the preparation of the Phase 2, Pre-Design and Feasibility Note, ref /2/, which was issued in December 1996. In addition to describing a development plan for the terminal and an outline of the first phase renovation measures, the note presents an assessment of the proposed measures with respect to technical, operational, environmental and financial implications. In addition the viability of the ferry service itself is discussed.

The present Phase 3 report constitutes the reporting of the activities and outcome of the economic and financial evaluation of the study.

The present report concerns the development of the ferry terminal in the port of Turkmenbashi. A separate report has been prepared for the port of Baku.

Following this introduction and executive summary presenting the major conclusions the present volume is divided into seven chapters as follows:

- Chapter 1 - "Macroeconomic Trends Affecting the Ferry Link Market" - presents the market area and thus the hinterland on the ferry link and describe the recent macroeconomic developments in this area.
- Chapter 2 - "Transport Sector Developments in the Ferry Hinterland" - describes the development of the transportation and cargo flows in the hinterland of the ferry service between Baku and Turkmenbashi. The origins and destinations of cargoes are also analyzed in this section.
- Chapter 3 - "Transport by Mode on Alternative Routes" - reviews the cost of transportation for cargoes originating in and destined for Azerbaijan as well as transit cargoes to and from the Central Asian Republics.
- Chapter 4 - "The Ferry Link - Its Role in the Transportation Infrastructure" - describes the role of the ferry link, its importance in the trade and flow of cargoes to and from the Central Asian region. At the same time factors that may divert cargoes from the ferry service are also discussed.
- Chapter 5 - "General Developments in Transportation and Infrastructure Influencing the Ferry Terminals and Ferry Service Route" - describes the general developments in the world transportation industry that may influence the future development of the ferry link and the terminals in Turkmenbashi and Baku, and also introduces business opportunities that may present themselves to the terminals and the ferry service as a result of these developments.
- Chapter 6 - "Forecast of Future Cargo Potential of the Ferry Link" - presents forecasts of the expected cargo flows under three different scenarios - "The Most Likely Scenario", "The Optimistic Scenario" and "The Pessimistic Scenario".
- Chapter 7 - "Financial and Economic Impact Analyses" - presents an overall financial and economic evaluation of the proposed investments to be made in the Ferry Terminal in the port of Turkmenbashi, Turkmenistan.

The general status of the project may be summarized briefly as follows:

- Phase 1 of the project has been completed and reported
- All inspections (diver, facilities), surveys (topographic) and investigations (soil) intended during the study phases of the project have been completed and reported.
- Phase 3 of the project is completed with the submission of this report. As result of delays in making final decisions and reaching an agreement on the general layouts and phasing of project components, the completion of this phase is considerably delayed compared to the original plan (as previously announced already in the Phase 2, Pre-Design and Feasibility Note). The submission of the report follows an initial presentation and discussion with the EBRD.
- An agreement with the railway authorities on the railway components has not yet been obtained.

- Simultaneously with the conclusion of the present Phase 3, a separate report presenting the detailed design of the project has been presented and distributed as conclusion of Phase 2, see ref. /2/. That report was linked to the completion of the present Phase 3 through the provision of cost estimates and planning of implementation of construction activities.
- Phase 4 has been initiated following confirmation of the EBRD requirements with respect to the procurement documents.

Presently and under the condition that no changes to layouts are introduced by the local administrations, the present assignment is expected to be completed in May 1997 by preparation of the tender documents. The time required for final approvals by the public authorities and thereafter by the bank is at his time difficult to estimate.

An extension of the present assignment comprising among other the tendering and contracting phases of the present project has been awarded by Tacis to the consultant.

The major findings and conclusions of the Phase 3 report can be summarized as follows:

- The economic activity in the Central Asian republics, which constitute the hinterland for the ferry between Baku and Turkmenbashi, has since the break-up of the Soviet Union showed a dramatic decline and the GDP in most of the countries have been more than halved in the period from 1991 to 1995. The Central Asian republics are, however, well endowed with natural resources, particularly oil and gas, which will contribute to create future growth of the economies.
- Although truck transportation will become more prevalent in the future, rail transportation will continue to dominate long haul transportation in the Central Asian region. Water transportation on the Caspian Sea and the Russian inland waterway system will also play a role in the transportation system.
- An analysis of the cost of transportation for alternative routes have indicated that the routes feeding to the ferry are in most cases the lowest cost alternative for both general and bulk cargoes. In those cases where the transportation routes using the ferry are not the lowest cost alternative, they are highly competitive both in terms of cost and transit time.
- The ferry link between Azerbaijan and Turkmenistan has since its inception in 1981 been an important part of the overall transportation infrastructure of the Central Asian region. In recent years the cargo flows have shown a dramatic decline from 6.5 million tons in the peak year 1986 to 863,000 tons in 1995. Currently intraregional transportation dominate the current trading pattern, although in 1996 transit of imported grain to Uzbekistan and export of cotton from Uzbekistan via Georgian ports are becoming increasingly important cargoes for the ferry link.
- Baku is in the process of becoming a transportation gateway to and from the Central Asian region and at the same time there are significant new business opportunities emerging in the region, all of which bode well for the future cargo potential of the ferry.

- While there are many physical and invisible trade barriers that may influence the future traffic growth on the ferry link, the single most important threat to the future existence of the ferry service between Baku and Turkmenbashi is the arbitrary scheduling of the departure times combined with the reported extensive unofficial pricing and additional fares to reduce the waiting time for users of the ferry service. The total unofficial fares are reported to amount to more than 100% of the official fare, and the average waiting time for trucks is five days, both of which are strong incentives for users to find alternate routes.
- Three different scenarios, i.e. Most likely, Optimistic and Pessimistic, have been developed to forecast the future cargo volumes on the ferry link. Key issues for scenario description of potential developments are:
  - General macroeconomic developments. Major issues in this respect influencing this development will be:
    - Liberalization of the economic policies.
    - Political stability and the ability to create peace.
  - Direction of the trade.
  - Development of alternative transportation patterns and routings including transportation infrastructure.

The total expected cargo flows under the three scenarios are as follows:

**Summary of forecast for the ferry service to the year 2015 (cargoes in '000 tons, passengers and automobiles in '000)**

<b>Most likely scenario</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>
Cargoes	365	360	579	2197	2602	3143	3868
Automobiles	N.A.	5.2	6.4	9	11	15	20
Passengers	93	52	48	64	86	115	154
<b>Optimistic scenario</b>							
Cargoes	365	360	579	2327	3236	4768	7349
Automobiles	N.A.	5.2	6.4	11	18	30	51
Passengers	93	52	48	81	136	230	387
<b>Pessimistic scenario</b>							
Cargoes	365	360	579	1512	1632	1767	1921
Automobiles	N.A.	5.2	6.4	7	8	9	10
Passengers	93	52	48	54	61	70	79

- The investments to be made include rehabilitation and construction of the basic infrastructure of the port as well as rehabilitation, replacement and acquisition of new equipment has been presented in the technical report in two options, which can be summarized as presented in the table below:

**Summary of investments in the ferry terminal in Turkmenbashi. (in '000 USD)**

Type of activity:	Option 1		Option 2	
	Phase 1	Additional Final stage	Phase 1	Additional Final stage
Terminal area arrangement	3,174	230	3,400	0
Marine works	9,018	190	9,070	0
Ramp rehabilitation	3,890	0	3,890	0
Railway works	62	954	984	0
Terminal building works	639	220	859	0
<b>Subtotal</b>	16,783	1,594	18,203	0
Contingency - ramp work <sup>1</sup>	1,500		1,500	
<b>Total works</b>	18,283		19,703	
Additional activities:				
Site surveys, toto, bathy	30		30	
Site surveys soil	100		100	
Supervision of works	890		890	
<b>Total Additional Services</b>	1,020		1,020	
Contingency for price variations	1,930		2,072	
<b>GRAND TOTAL</b>	21,233		22,795	

- The investment analysis with the Option 1 investments and the expected cargo flows of the "Most likely scenario" indicate that the ferry terminal operations of the port can be expected to be highly profitable:
  - The NPV is as follows:
    - With a 10% discount rate: USD 13.1 million
    - With a 15% discount rate: USD 4.8 million
  - The IRR is 20%.
- Even if the "Pessimistic scenario" should occur the investments with the Option 1 investments will yield and acceptable return:
  - The NPV is expected to be as follows:
    - With a 10% discount rate: minus USD 0.5 million
    - With a 15% discount rate: USD minus 4.7 million
  - The IRR is expected to be 8%.
- The financial analysis show that the under both the "Most likely" and the "Pessimistic" scenarios the port will be able to service the loans on the terms indicated by the EBRD.
- The economic and employment impact on the regional hinterland of the port as a result of the ferry link is expected to be substantial. Under the "Most likely scenario" the overall added value of the cargo flows to the economy is expected to increase from USD 218 million in the year 2000 and increase to an estimated USD 498 million in 2015, while the number of jobs that will be supported as a di-

<sup>1</sup> This contingency cost has not been included as part of the investment and financial feasibility analysis, since it is assumed to be highly unlikely that this investment will be required.

rect result of the ferry terminal activities in the port is expected to increase from approximately 2,300 in the year 2000 to more than 5,700 in the year 2015. Although the impact will be reduced under the "Pessimistic scenario", the overall impact will still be substantial.

In the following the analysis and the findings summarized above are presented in more detail.

## **1. MACROECONOMIC TRENDS AFFECTING THE FERRY LINK MARKET**

The purpose of this section is to define the market area and thus the hinterland on the ferry link and describe the recent macroeconomic developments in this area.

### **1.1 The Baku and Turkmenbashi Ferry Hinterland**

The market area of the ferry link and thus the hinterland, from which cargoes can be generated, can be defined on three dimensions:

- Local trade and traffic flows to and from the immediate hinterland in Turkmenistan and Azerbaijan.
- Regional trade and transit traffic flows to and from an expanded region behind the two ports. In a narrow definition this would extend to the other TRACECA states i.e. in the main between Georgia and Armenia behind the port of Baku on the western side of the link and the Central Asian nations of Uzbekistan, Kazakhstan, Kyrgyzstan and Tajikistan behind the port of Turkmenbashi on the Eastern side.
- Trade and transit traffic flows extending beyond the regions. This would include traffic to and from the countries of the CIS (primarily Russia and Ukraine, but also the Baltic states and Belorussia) in addition to Europe and the United States via the TRACECA route via Poti and the Far East and China via the rail land-bridge link.

The latter is expected primarily to comprise cargoes traded to and from the TRACECA states, although it is recognized that in the future true transit traffic can be developed between Europe and the Far East and China using a combination of the TRACECA route and the rail landbridge link between the Central Asian republics and the Russian Far East ports or The People's Republic of China.

The hinterland republics are characterized by a relatively low population and with the exception of Armenia by a very low population density, as is illustrated in Table 1.1. . As shown in Table 1.2, the GDP per capita is also very low in these countries. The figures in this table relates to figures for 1993. In the ensuing years, the overall GDP and also the GDP per capita has declined even further. To put these figures in perspective, the GDP per capita is lower than many developing countries (e.g. Mexico with USD 3300 per capita and Tunisia with USD 1800).



**Table 1.1 Population and area of TRACECA states**

Country	Population (mill)	Area ('000 sq. km)	Inhabitants per sq. km
Georgia	5.4	66.7	77.5
Armenia	3.5	29.8	116.7
Azerbaijan	7.3	86.6	84.6
Kazakhstan	16.9	2717.3	6.3
Turkmenistan	3.9	488.1	8
Uzbekistan	21.6	447.4	48.8
Tajikistan	5.6	143.1	39.2
Kyrgyzstan	4.5	198.5	22.8

Source: Stat. Bundesamt

**Table 1.2 GDP and per capita income in TRACECA states 1993**

Country	GDP per capita 1993 (USD)	GDP 1993 (billion USD)
Georgia	500	2.8
Armenia	700	2.5
Azerbaijan	600	4.4
Kazakhstan	1500	24.9
Turkmenistan	1400	5.3
Uzbekistan	900	17.8
Tajikistan	400	2.3
Kyrgyzstan	700	3.1

Source: Prognos

A key characteristic for developing countries is a high share of agriculture and a relatively low share of service industries. With the exception of Kazakhstan, which has a relatively high share of industry and services, all the countries are characterized by relatively high shares of agriculture as a proportion of its GDP. This is illustrated in Table 1.3. The major agricultural products of these countries are presented as Table 1.4.

**Table 1.3 Distribution of GDP in percent at current prices - 1993**

Country	Agriculture	Industry	Other (services)
Georgia	52.3	23.7	22.9
Armenia	49.3	25.8	15.0
Azerbaijan	27.1	32.4	35.6
Kazakhstan	12.9	40.2	51.0
Turkmenistan	n.a.	n.a.	n.a.
Uzbekistan	28.7	26.8	34.1
Tajikistan	19.0	47.7	34.4
Kyrgyzstan	34.7	28.0	30.9

Source: World Bank: Statistical Handbook 1995

**Table 1.4 Major agricultural products of the TRACECA states.**

Country	Products
Georgia	Tea, citrus, citrus product
Armenia	Grain, potatoes, vegetables, grapes
Azerbaijan	Grapes, cotton, tobacco, fruits, vegetables
Kazakhstan	Grain, wool, meat
Turkmenistan	Cotton, grain, vegetables, fruits, livestock
Uzbekistan	Cotton, grain, vegetables, fruit, silk cocoon
Tajikistan	Cotton, fruit, grapes, wheat
Kyrgyzstan	Livestock, cotton, wool, silk, hemp, fodder, vegetables, fruits, grain

Source: World Bank: Statistical Handbook 1995, States of the Former USSR

Another common characteristic of the hinterland states is their abundant natural resources, all of which have the potential of being exported to earn hard currency to pay for the imports of capital goods to renew their industrial plants and further exploit their resources, renew and rebuild their run-down industrial infrastructure and for various consumer goods. The main natural resources of the various nations is presented as Table 1.5.

**Table 1,5 National Resources of the TRACECA states**

Country	Resources
Georgia	Manganese, coal, timber
Armenia	Agricultural land
Azerbaijan	Agricultural land, oil, gas, iron ore
Kazakhstan	Chrome, lead, wolfram, copper, zinc, gold, iron ore, coal, oil
Turkmenistan	Gas, oil, iodine bromide, sodium, sulfate, salts
Uzbekistan	Gas, oil, coal, gold, silver, copper, lead, zinc, wolframite, tungsten
Tajikistan	Cotton, wheat
Kyrgyzstan	Hydroelectric power, coal, gold, mercury, uranium

Source: World Bank: Statistical Handbook 1995, States of the Former USSR

Until the break-up of the Soviet Union the Central Asian republics were part of the COMECON system of labor and trade distribution, whereby every region or individual countries were given certain specialties. The industrial structure of the Central Asian region reflect that pattern, whereby oil and petrochemical, chemical, textile and metallurgy were major industries of this region. The main industries of the respective states are presented as Table 1.6. While the level of industrialization in some of the countries is high and the range of industries is extensive, the industrial plant is in a dire state being technologically outdated, technically run down due to lack of maintenance and operating with relatively low productivity. The finished products often fall short of international standards. With few exceptions the overall industrial plant is in need of repair and maintenance, modernization and renovation.

**Table 1.6 Main industrial activities of the TRACECA states**

Country	Industrial activities
Georgia	Light industry, iron, steel, teak, tobacco
Armenia	Light industry, metallurgy, machine building, food processing, chemical production
Azerbaijan	Oil production, oil exploration and production equipment, petrochemicals, food and beverages, textiles, electrical equipment
Kazakhstan	Metallurgy, heavy machinery, machine tools, petrochemicals, food processing, textiles
Turkmenistan	Textiles, oil and gas, chemicals, generation of electricity
Uzbekistan	Cotton, harvesters, textile machinery, chemicals, metallurgy, aircraft
Tajikistan	Agroprocessing, labor intensive industries, machine building
Kyrgyzstan	Metallurgy, agricultural machinery, food processing, tobacco processing, textiles, sugar refineries, leather

Source: World Bank: Statistical Handbook 1995, States of the Former USSR

## 1.2 Macroeconomic Developments in the Local Hinterland States

### 1.2.1 Turkmenistan

The two dominant sectors of the Turkmenistan economy are gas and cotton. Turkmenistan ranks with proven gas reserves of over 3 trillion cu. meters as among the ten largest in the world. The Turkmenistan economy is highly dependent upon the gas sector, which in 1995 accounted for approximately half of the GDP, while cotton as the second largest sector accounted for one sixth. Key statistics on the recent development of the Turkmenistan economy is presented as Table 1.7.

**Table 1.7 Recent developments of the Turkmenistan Economy**

	1991	1992	1993	1994	1995
	(percentage change)				
Real growth GDP	-5.0	-5.0	-10.0	-18.8	-13.8
Retail prices	155.0	644.0	9743.0	1461.0	NA.
	(in percent of GDP)				
Industry	NA.	NA.	55.1	73.2	64.1
Of which: Gas	NA.	NA.	49.6	65.9	51.3
Agriculture	NA.	NA.	11.5	9.0	20.7
Of which: Cotton	NA.	NA.	9.8	7.6	17.6

Source: IMF, Recent Economic Developments, February 6, 1996

The production of major industries in Turkmenistan have shown a marked decline in recent years, as presented in Table 1.8.

**Table 1.8 Turkmenistan - Production of Selected Mineral and Industrial Commodities.**

Commodity:	1991	1992	1993	1994
(in millions of cu. meters)				
Natural gas	84,348	60,102	65,317	35,722
(in thousands of metric tons)				
Oil	4,827	4,653	4,301	4,083
First refinery fraction oil	7,132	5,754	4,760	4,800
Gasoline	855	949	731	739
Diesel fuel	2,236	1,942	1,562	1,588
Cement	904	1,050	1,118	690
Cotton fiber	420	440	426	388

Source: Turkmenistan - Recent Economic Developments, IMF, April 1996

As a result of the pipeline distribution system, the all gas exports have been directed to the FSU states. Payment problems in these states have reduced the value of the gas exports from 70% of all exports to under 60% in 1995. In 1993 almost 93% of the gas exports were paid through barter with goods imported from the FSU, while in 1995 this proportion had declined to 78%, while the remainder was paid with cash in hard currency.

To reduce its dependence on gas exports to the FSU, Turkmenistan has embarked upon an ambitious program to build new pipelines to diversify the exports of its main commodity. By 1997 the construction of a pipeline to the northern part of the Islamic republic of Iran will be completed. The initial export volume through this pipeline is estimated at one billion cu. meters per year. In a planned second stage this pipeline is to be extended to Turkey with an expected volume of 15 billion cubic meters, most of which will be exported to Turkey. Plans have also been made to extend the pipeline to Europe with a capacity of 30 billion cu. meters. Financing have, however, not been arranged for these expansion projects.

Alternative options have also been presented for pipelines through Afghanistan to Pakistan, a pipeline to China to supply LNG to Japan and the construction of domestic LNG plants.

Cotton is the second largest export product accounting for 24% of the total export volume or 56% of the non-energy exports. It is estimated by the IMF that close to 50% of the cotton exports were sold on a barter, part of which was payment for previous commitments to pay for cotton processing factories built in Turkmenistan. The government has retained a monopoly of the export of cotton, and all cotton is sold on an ex. works basis (i.e. the buyers have to pay for and are free to select the mode of transportation to be used). Table 1.9 presents the 1994 cotton exports of Turkmenistan by major buyers. As shown in this table virtually all the cotton export is sold to non-FSU countries, the major of whom are Turkey, Italy, Malta, USA, Switzerland, the Czech Republic, Germany and Hong Kong.

**Table 1.9 Turkmenistan Cotton Fiber and Cotton Export, by selected countries, 1994**

Country	Cotton fiber only		Value (USD '000)	Average value (USD per ton)	Cotton products Value (USD '000)
	Volume ('000 tons)	Volume (percent)			
Europe (incl. FSU)					
Austria	2,603.0	1.1	3,514.0	1,350.0	1,834.5
Bulgaria	784.0	0.3	894.1	1,140.4	523.3
Czech Republic	17,035.0	7.0	23,386.1	1,372.8	21,454.9
Estonia	890.0	0.4	228.5	256.7	1,388.9
France	2,056.9	0.8	2,603.0	1,265.5	2,480.7
Germany	16,479.8	6.7	23,094.0	1,401.4	27,230.1
Gibraltar	4,263.0	1.7	6,317.9	1,482.0	6,754.4
Hungary	1,590.5	0.7	1,514.6	952.3	
Latvia	2,528.0	1.0	4,186.5	1,656.1	5,424.9
Liechtenstein	2,250.0	0.9	2,475.0	1,100.0	216.6
Lithuania	1,993.0	0.8	987.6	495.5	3,117.2
Malta	24,028.0	9.8	30,201.5	1,256.9	31,270.0
Poland	3,124.5	1.3	3,737.5	1,196.2	3,369.1
Russia	580.0	0.2	784.9	1,353.3	21,870.4
Sweden	3,490.0	1.4	3,839.0	1,100.0	7,934.6
Switzerland	17,084.1	7.0	22,812.8	1,335.3	12,274.6
Great Britain	3,985.0	1.6	4,532.9	1,137.5	25,411.9
Yugoslavia	1,675.0	0.7	2,512.5	1,500.0	1,044.2
Italy	31,302.0	12.8	40,828.3	1,304.3	39,708.5
Subtotal	137,741.8	56.4	178,450.7	1,295.5	213,308.8
Far East					
Japan	1,303.0	0.5	1,518.0	1,165.0	
Hong Kong	12,209.0	5.0	14,835.7	1,215.1	13,412.1
Subtotal	13,512.0	5.5	16,353.7	1,210.3	13,412.1
Asia					
Afghanistan	233.7	0.1	299.1	1,279.8	2,128.6
India	5,131.0	2.1	6,061.5	1,181.3	1,411.7
Indonesia	5,358.0	2.2	7,501.2	1,400.0	0.2
Iran	2,124.9	0.9	3,070.9	1,445.2	11,731.5
Turkey	49,124.9	20.1	69,017.2	1,404.9	55,436.6
Pakistan	62.0	0.0	95.5	1,540.3	0.2
Bangladesh	1,973.8	0.8	2,462.8	1,247.7	3,094.6
Subtotal	64,008.3	26.2	88,508.2	1,382.8	73,803.4
Others					
UAE	6,304.0	2.6	7,880.0	1,250.0	0.2
USA	22,771.0	9.3	28,997.6	1,273.4	14,245.0
<b>Subtotal</b>	<b>29,075.0</b>	<b>11.9</b>	<b>36,877.6</b>	<b>1,268.4</b>	<b>14,245.2</b>
<b>Grand Total</b>	<b>244,337.1</b>	<b>100.0</b>	<b>320,190.2</b>	<b>1,310.4</b>	<b>314,769.5</b>

Source: Turkmenistan State Customs Office as reported in Feasibility Study: Turkmenbashi Port Development, Phase 1 Draft Report, Louis Berger International, Inc. et al, March 1996

Table 1.10 presents the 1995 exports of cotton by mode of transport and by destination.

**Table 1.10 Turkmenistan Cotton Exports by Country of Destination and Mode of transportation - 1995 (tons).**

<b>Destination:</b>	<b>Water</b>	<b>Rail</b>	<b>Truck</b>	
Actual and potential ferry cargoes:				
Italy	5,000			
Iran	5,000			
Ukraine	5,000			
Turkey			60,000	
Russia (West)		10,000		
Western Europe		100,000		
USA		10,000		
Eastern Europe		20,000		
UAE			5,000	
<b>Total</b>	<b>15,000</b>	<b>140,000</b>	<b>65,000</b>	
Cargoes for which ferry not applicable:				
Pakistan			40,000	
Far East		30,000		
Russia (East)		10,000		
<b>Total</b>		<b>40,000</b>	<b>40,000</b>	
<b>Grand total</b>	<b>15,000</b>	<b>180,000</b>	<b>105,000</b>	<b>300,000</b>

Source: Feasibility Study: Turkmenbashi Port Development, Phase 1 Draft Report, Louis Berger International et. al., March 1996

According to data collected by the IMF the import volumes of Turkmenistan declined significantly in 1994 and 1995. The main reason for the decline in volumes were trade and exchange controls imposed by the government to reduce imports. IMF has estimated import volumes to have declined 10% in 1994 and more than 13% in 1995. The import values of the major import commodity groups are presented as Table 1.11. The reason for the increase in value from 1993 to 1994 is due to a shift in price levels to world market levels; however, the volumes decreased. As shown in this table consumer goods accounted for approximately 40% of the imports, while industrial goods and raw materials for the remaining in terms of value.

**Table 1.11 Turkmenistan - Imports by Product Groups - 1992 - 1995.** (in millions of USD)

	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995 (9 months)</b>
Consumer goods	542	623	594	441
Of which food products	426	322	247	282
Producer and industrial goods	583	970	1,096	661
Of which:				
Chemicals etc.	355	338	263	241
Building materials	24	41	99	3
Metal structures	285	229	141	185
Machinery and equipment	227	632	834	420
<b>Total</b>	<b>1,125</b>	<b>1,593</b>	<b>1,690</b>	<b>1,102</b>

Source: Turkmenistan - Recent Economic Developments, IMF, April 1996

### 1.2.2 Azerbaijan

The Azerbaijan economy has experienced a continued and dramatic decline of output since 1989, which is due to dislocation in trade links with the Former Soviet Union (FSU) Republics, reduced oil production as a result of depletion of existing field and the effects of the continued conflict with Armenia over the Nagorno Karabak. According to Government estimates, Armenian forces currently occupy territory that used to produce more than 15% of the national output and had a population of 820,000. In addition the conflict with Armenia is estimated to have inflicted material costs of USD 5 billion on Azerbaijan. The economic difficulties were worsened by the closure by Russia of the border to Chechnya in September 1994, which further disrupted external trade with the FSU. The inflation has consistently been high, and despite constant wage increases, real wages have fallen dramatically.

The government has embarked upon a program to liberalize the economy and also to promote a transition to a market economy. Albeit the progress has been slow and piecemeal, a growing and buoyant private sector has also emerged.

Azerbaijan is rich in natural resources, and has vast reserves of oil and natural gas. Although a program has been implemented to stop the decline in oil and gas production through the use of modern technology and to explore new offshore fields in the Caspian Sea, several years will pass until the oil and gas industry will reverse the decline in production and ensure a positive economic growth.

The recent economic development of the Azerbaijan economy is summarized in Table 1.12.

**Table 1.12 Recent developments of the Azerbaijan economy.**

	1990	1991	1992	1993	1994
GDP (% change)	-11.7	-0.7	-35.2	-23.1	-21.9
GDP index (1990=100)	100.0	99.3	76.9	59.1	46.2
Industry	100.0	99.3	75.4	59.2	43.9
Agriculture	100.0	97.1	72.8	61.2	53.1
Construction	100.0	102.7	76.5	51.1	27.1
Transp./communic.	100.0	90.3	43.0	28.8	23.0

Source: State Committee on Statistics, Republic of Azerbaijan

For 1995 it is reported that the GDP experienced another decline of 15.8% to an index of 39.2 compared to 1990 being 100.

The percentage distribution of the GDP between sectors of the economy (current 1993 prices) according to the World Bank Statistical Handbook is as follows:

- Agriculture 27.1%
- Industry and oil 32.4%
- Other (services) 35.6%

The production of virtually all agricultural products have dropped dramatically due to a serious lack of inputs such as fertilizers, agricultural chemicals and not the least equipment

and machinery. As a result the need for imports of grain, meat and dairy products has increased, while the exports of cash crops such as cotton and grapes, fruits and vegetables have declined, the latter as a result of the blockade of Chechnya closing the access to its major customer for these products, i.e. Russia. The production statistics are presented as Table 1.13.<sup>2</sup>

**Table 1.13 Azerbaijan - Production of Selected Agricultural Products. (thousands of tons)**

Product/Year	1989	1990	1991	1992	1993	1994
Grain	861	1,414	1,291	1,285	1100	1038
Cotton	581	543	540	336	284	284
Tobacco	50	56	57	52	45	21
Potatoes	184	185	180	156	152	150
Other vegetables	915	856	805	555	488	471
Grapes	1,057	1,196	1,126	607	411	317

Source: Goskomstat/World Bank, Azerbaijan, Economic Update, April 24, 1995

The industrial base of Azerbaijan, which is well-diversified and extensive encompassing metallurgy, metal processing and machine building, forest products and woodworking, building materials, chemical and petrochemical products and agroindustry, has been even harder hit by the breakdown of trade in the FSU. The decline in selected industries for 1993 and 1994 is presented in Table 1.14. As shown in this table, the hardest hit industries are iron ore (99% decline), plywood (95% decline), heavy duty pipes (90% decline) and fertilizer (86% decline).

---

<sup>2</sup>It should, however, be noted as pointed out by the World Bank, that the decline may have been overstated by the statistics, since most of the reduction has occurred in the government owned sector of the agricultural industry, and the failure of the statistics to cover the rapidly emerging private agricultural sector. Large volumes of fruits vegetables, meat, milk and other dairy products are supplied by the private sector. During the harvest season it has also been noted an increase in traffic on the ferry between Baku and Turkmenbashi of cars and small trucks carrying fruits and vegetables to be sold in the markets of the other Central Asian republics. According to the World Bank this augurs well for the emergence of private enterprise in the agricultural industry being able to produce large volumes of products on the small plots without access to the resources of the large state owned agricultural complexes.



**Table 1.14**  
**Azerbaijan: Changes in Output for Selected Industries (percent change)**

	1993	1994		1993	1994
Refined oil	-16.4	-6.6	Furniture	-44.2	-72.0
Iron ore	3.9	-99.6	Cement	-24.8	-25.3
Steel	-45.2	-82.0	Bricks	-19.3	-23.9
Heavy duty pipes	-45.9	-90.7	Construction glass	-57.6	-76.4
Air conditioners	-33.1	-31.6	Cotton fabric	27.2	-22.7
Transformers	-68.3	-56.1	Wool fabric	20.8	-59.8
Cable	-40.0	-38.0	Silk fabric	-48.5	-58.8
Electric lamps	-72.0	-38.0	Carpets	-62.1	-54.2
Looms	-34.4	-84.0	Fish	-29.2	-13.2
Sulfuric acid	-47.7	-61.1	Meat	-32.7	-45.1
Synthetic rubber	-66.7	-65.6	Dairy products	-40.7	-27.8
Fertilizers	-60.2	-85.7	Non-alcoholic drinks	-38.3	-74.9
Plywood	-75.4	-94.7	Beer	-20.3	-26.7
Timber	-86.6	-43.8	Wine	-58.7	-48.2

Source: Goskomstat, reported in Azerbaijan: Economic Update, The World Bank, April 24, 1995

The oil and gas industry, which alone accounts for approximately 15% of the GDP, also declined in 1993 and 1994 as shown in Table 1.15. It is expected that the decline in the oil and gas production will continue over the next few years until the production from enhanced recovery techniques and new developments by foreign oil companies are coming on stream.

**Table 1.15 Azerbaijan: Oil and Gas**

	Oil Million tons			Gas Billion cubic meters		
	1992	1993	1994	1992	1993	1994
Production	11.1	10.3	9.5	9.3	8.2	7.4
Gas venting	na	na	na	1.4	1.4	1.2
Imports	1.4	0.2	1.0	5.3	2.5	2.3
Exports	4.0	2.1	1.9	1.0	0.0	0.0
Consumption	8.6	8.4	8.6	13.6	10.8	9.7

Source: World Bank staff estimates reported in Azerbaijan: Economic Update, The World Bank, April 24, 1995

The possibly most positive development for the national economy of Azerbaijan, is the establishment of the Azerbaijan International Oil Consortium (AIOC) and its signing of a 30 year oil exploration agreement with the government in September 1994. This is a consortium comprising British Petroleum, Statoil, Amoco, Pennzoil, Ramco, UNOCAL, McDermott, Turkish Petroleum, Lukoil and SOCAR, the Azerbaijan national oil company. The agreement comprises both existing fields and exploration of new oil tracts offshore in the Caspian Sea encompassing the Azeri and Chirag fields and the undeveloped portion of the Guneshli field. The output of the latter accounts for 60% of the oil output of Azerbaijan. Currently the consortium is engaged in the upgrading of the Chirag production field through the installation of single production platform, which in 1999 will bring new produc-

tion of between 4 and 5 million tons per year on stream (vs. Azerbaijan's total production of 9.5 million tons in 1994). Full developments of all the fields are expected to bring total oil production in Azerbaijan to 33 million tons by the year 2006.

The consortium is also upgrading a semisubmersible drilling rig to undertake drilling in the Caspian Sea. The latter is expected to be starting exploration drilling within a relatively short time. There are also plans for a second rig to be upgraded and outfitted for exploration drilling.

"First oil" (the initial major production volume in the terminology of the oil industry) from the fields developed by the AIOC is expected to start flowing in the next few years. For this purpose the decision has been made to upgrade and use an existing pipeline terminating in Novorossisk on the Russian Black Sea coast. A new pipeline will be constructed from Shangashaz via Tblisi in Georgia to connect with the exiting pipeline to Novorossisk. The construction work will be completed in about 1.5 years from the present time (i.e. the spring of 1998). The construction and upgrading of this pipeline is also expected to generate substantial cargo volumes. The construction team will be headquartered in Baku.

The pipeline route for the "main oil" (full production of the fields) is still to be decided. The preference of the AIOC is reported to be from Baku through Azerbaijan and Georgia to the Black Sea and across Turkey to the oil terminal in Ceyhan on the Turkish Mediterranean coast. Other routes are also being considered. This pipeline will be constructed between the years 2000 to 2005, and the total cost is expected to reach USD 1.5 billion. The total investments of the AIOC is estimated to be about USD 7.5 billion with planned annual investments of between USD 500 million to USD 1 billion per year up to year 2004.<sup>3</sup> At least 50% of the investments will be in the form of imported equipment and supplies, which will give a major boost to the cargo volumes imported to Azerbaijan. At the same time significant purchases will be made in the local economy, which also will spur the development of the Azerbaijan economy also during the construction and development period.

Recently three other oil consortia has been established in Baku. The first of these consortia to receive exploration and production concessions from the Azeri government, the Caspian International Petroleum Co. (CIPCO), whose main participants are Pennzoil and Agip, are currently in the process of starting exploration. CIPCO will initially drill three wells. The investments to be made, if production quantities of hydrocarbons are found, are uncertain.

As indicated above the trade of Azerbaijan is heavily weighted in favor of the FSU states. This is illustrated in Table 1.16.

---

<sup>3</sup> Investment estimates presented by the World Bank in their report "Azerbaijan - Economic Update, April 24, 1995

**Table 1.16 Azerbaijan foreign trade 1993 - 1994 (millions of USD)**

	<b>1993</b>	<b>1994</b>
Total exports	718	637
Non-FSU	349	363
FSU	369	274
Total imports	817	814
Non-FSU	334	328
FSU	483	486

Source: Goskomstat

### **1.3 The Economic Development in the Regional Hinterland - Central Asian Republics**

As described above, the regional hinterland can be defined as the trade and transit traffic flows to and from an expanded region behind the two ports of Baku, Azerbaijan and Turkmenbashi, Turkmenistan. In a narrow definition this would extend to the other TRACECA states i.e. in the main between Georgia and Armenia behind the port of Baku on the western side of the link and the Central Asian nations of Uzbekistan, Kazakhstan, Kyrgyzstan and Tajikistan behind the port of Turkmenbashi on the Eastern side.

#### **1.3.1 The Republics of Georgia and Armenia.**

The major trading partners of Georgia are presented as Table 1.17. Although the trade is an important feature of the Georgian foreign trade and the fact that the CIS countries constitute the major part of the trade, Georgia is not a major trading partner of the Central Asian republics east of the Caspian Sea. The primary import of Georgia from Central Asia consist of gas from Turkmenistan, which is primarily paid through barter trade.

**Table 1.17 Major trading partners of the Republic of Georgia**

<b>Country/region</b>	<b>% of import trade value</b>	<b>% of export trade value</b>
Russia	13.6	30.8
Europe	14.0	17.2
Turkey	21.0	22.8
Armenia		12.4
Azerbaijan	11.1	12.4
Turkmenistan	13.7	

Source: TEWET/Tractabel preliminary report, September 1995.

On the other hand the Georgia and the ports of Poti and Batumi are significant for transit export and import cargoes to and from the Central Asian Republics. The cargoes through the Georgian ports are presented as Table 1.18. As shown approximately 1/3 of the cargoes were transit cargoes.

**Table 1.18 Cargoes handled by the Georgian Ports 1993 (thousands tons)**

	<b>Imports</b>	<b>Exports</b>	<b>Transit</b>	<b>Total</b>
Dry bulk cargoes	709	305	891	1,905
Liquid bulk cargoes	496	238	-	734
General bulk cargoes	267	43	64	364
<b>Total</b>	<b>1,462</b>	<b>586</b>	<b>955</b>	<b>3,003</b>

Source: HPC - Reorganization of the Georgian ports preliminary report, December 1996.

Recent detailed economic and trade statistics on Armenia are not available. With the exception of gas imports from Turkmenistan the trade has been oriented to Georgia, Russia and Ukraine rather than the Central Asian republics. The conflict with Azerbaijan with respect to Nagorno Karabak has made transit of cargoes via Azerbaijan virtually impossible restricting Armenia's trade with Central Asia via the ferry link.

### 1.3.2 The Other Central Asian Republics

The most important country in terms of the ferry link is the Republic of Uzbekistan. Although the Uzbek economy has suffered macroeconomic set-backs following the breakup of the Soviet Union, the decline has been relatively modest compared other FSU countries. One of the main reasons is that Uzbekistan is endowed with rich natural resources in the form of oil, gas and coal reserves, and major deposits of gold, silver, copper and other strategic metals. Following the breakup of the FSU Uzbekistan has been able to form new trading patterns. Key statistics on the Uzbek economy is presented as Table 1.19, while Tables 1.20 and 1.21 presents the traditional and non-traditional trading patterns.

**Table 1.19 Uzbekistan - key macroeconomic indicators**

<b>Economic indicator</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>
Real GDP % change	-0.9	-11.0	-2.4	-2.6
<u>Distribution of GDP:</u>				
Industry	30.9	32.7	34.1	18.6
Agriculture	45.0	41.4	28.1	33.9
Construction	12.3	11.3	11.2	8.4
Transp./communication	3.9	5.5	6.1	4.5
Net taxes	-	-	10.5	12.2
Other	7.9	9.1	10.0	22.4
<u>Foreign trade (mill USD):</u>				
Merchandise exports	677	869	1,438	1,828
Merchandise imports	1,386	929	1,280	1,846

Source: IMF Staff Country Report No. 95/23, March 1995

**Table 1.20 Uzbekistan - non-traditional trade patterns - 1992 - 1994**

	1991	1992	1993	1994 (Jan.-Sept.)
Total exports mill USD	667.0	869.3	919.2	705.5
Distribution, %:				
Western Europe		51.7	39.3	63.4
Current and former Socialist countries	20.0	21.3	14.9	
Dev. countries	22.9	22.7	16.3	
Other	5.4	16.7	5.4	
Total imports mill USD	1386.0	929.3	980.9	714.0
Distribution, %:				
Western Europe		33.5	49.1	55.1
Current and former Socialist countries		13.3	11.4	12.0
Dev. countries		9.9	31.9	15.8
Other		43.3	7.6	17.1

Source: IMF Staff Country Report No. 95/23, March 1995

**Table 1.21 Uzbekistan - traditional trade patterns - 1992 - 1994**

	1991	1992	1993	1994 (Jan.-Sept.)
Total exports mill SUM	19.5	123.2	1,409.4	4,805.7
Distribution, %:				
Russia and Ukraine		67.1	63.1	44.5
Central Asian Republics		23.2	32.3	52.1
Other		9.7	4.6	3.4
Total imports mill SUM	17.0	162.2	1476.3	4240.7
Distribution, %:				
Russia and Ukraine		66.5	71.4	50.0
Central Asian Republics		25.0	23.6	46.8
Other		8.5	5.0	3.2

Source: IMF Staff Country Report No. 95/23, March 1995

The agricultural sector of the economy has set three major objectives:

- Import substitution of meat, grain and sugar
- Export promotion of fruits and vegetables
- Development of the cotton sector

The domestic production of grain is currently approx. 2 mill tons, and imports account for another 3 million tons per year. The objective is to increase domestic production to between 3 and 4 million tons reducing the imports to between 1 to 2 million tons by the year 2000. Domestic production of meat is 820,000 tons, while 120,000 tons is imported.

Currently Uzbekistan is self sufficient in fruits and vegetables. The current yield is low, while the products are considered to be of high quality and with a potential for developing export markets for these products.

Cotton is the most important product in the Uzbek economy providing a significant proportion of the foreign exchange earnings of the country. The level of cotton production is expected to stabilize at approx. 4 million tons per year. A priority is developed to export finished products of cotton rather than only raw cotton. An agreement was made in the spring of 1996 to export approximately one million tons of cotton per year via the TRACECA route.

The economic decline of Kazakhstan has as shown in Table 1.22 been dramatic.

**Table 1.22 Kazakhstan - Key economic indicators**

	1991	1992	1993	1994	1995
Real GDP % chg.	-13.0	-14.0	-12.0	-12.0	-11.0
Origin of GDP:					
Industry	37.1	46.4	44.3	40.2	
Agriculture	34.1	30.4	31.4	38.8	
Construction	13.5	7.7	6.8	8.3	
Other	15.3	15.5	17.5	12.7	

Source: IMF Staff Country Report No. 96/22, March 1996

As shown in Table 1.23 there has also been a dramatic shift in the direction of trade away from the FSU towards non-FSU countries, primarily in Europe. In 1993 non-FSU trade accounted for 31% of the total, while in 1994 the share of the non-FSU trade increased to 41% of the total. Barter trade, primarily with the FSU countries still account for a large share of total trade (28% of exports and 22% of imports in 1994).

**Table 1.23 Kazakhstan - non-FSU trade (in mill. USD)**

	1992	1993	1994	1995 (8 months)
Exports	1,489	1,579	1,327	1,239
Of which:				
Wheat	1	123	63	147
Crude oil	480	58	70	75
Ferrous metals	229	243	291	250
Copper and products	224	244	249	200
Imports	1,523	1,508	1,694	900
Of which:				
Chemicals	25	34	272	173
Sugar	137	41	59	54
Tea	9	15	34	21

Source: IMF Staff Country Report No. 96/22, March 1996

As can be seen from Table 1.24 the economy of the Kyrgyz Republic has like most other FSU-countries declined sharply. As with the other smaller Central Asian republics the agricultural sector is the most dominant. The overall economic activity and the total trade is limited.

**Table 1.24 Kyrgyz Republic - Key economic indicators.**

	1991	1992	1993	1994
Real GDP, % chg.	-5	-19	-16	-27
Distribution of GDP:				
Agriculture	45	42	46	43
Industry	33	38	30	30
Other	22	20	24	27
Trade with FSU-countries (mill. USD):				
Exports			223	223
Imports			317	264
Trade with non-FSU countries (mill USD):				
Exports			112	117
Imports			178	172

Source: IMF Staff Country Report No. 95/38, May 1995.

Tajikistan has like the other FSU countries experienced marked declines in its GDP, and in 1994 the per capita GDP was USD 350. Although liberalization and developments of the Tajik economy has taken place, the country has been characterized by a civil war and political uncertainty. Reliable statistics on the recent economic developments are not easily available.

## **2. TRANSPORT SECTOR DEVELOPMENTS IN THE FERRY HINTERLAND**

The purpose of this section is to describe the development of the transportation and cargo flows in the hinterland of the ferry service between Baku and Turkmenbashi. The origins and destinations of cargoes are also analyzed in this section.

### **2.1 The Central Asian Transportation Infrastructure and System**

The current transportation infrastructure and system of the Central Asian republics is an inheritance from the former Soviet Union and was designed based on the centrally planned transportation requirements of the planners in Moscow. The system was designed to connect the Central Asian republics to the Central and European parts of Russia and the other European parts of the Union (i.e. the Baltic republics, Belorussia and Ukraine). Railway transportation was considered as the main mode of long distance transportation, while truck transportation was only considered for distribution and short distance transportation. The waterway system is also extensive and continues to play an important role in the transportation system. Major emphasis was, however, placed on the rail ferries across the Caspian Sea to serve the needs of the railway system.

The overall Central Asian transportation system is illustrated in Figure 2.1. (Include the TRACECA map) and is commented below.

Figure 2.1  
TRACECA Map



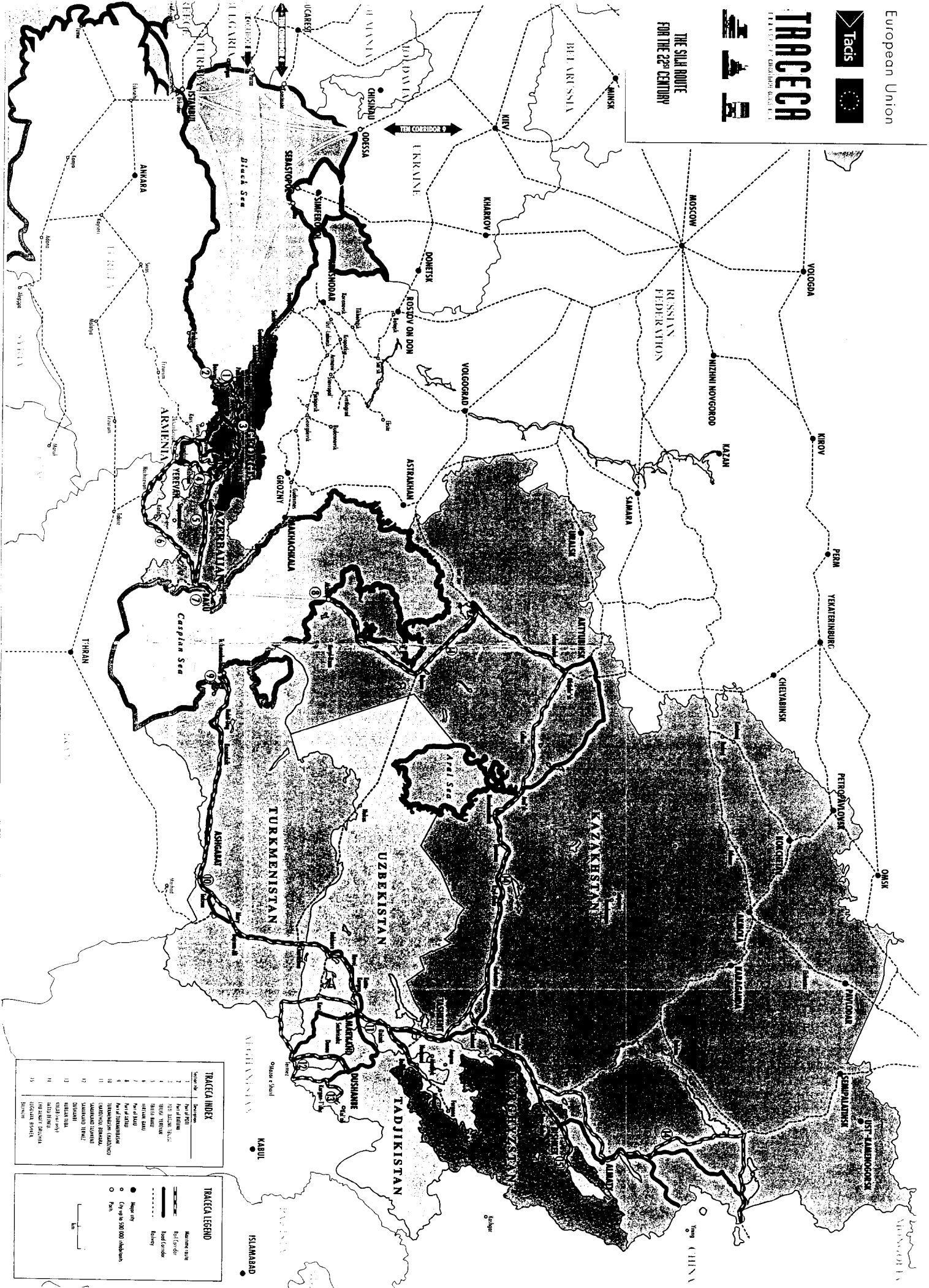


# TRACECA

TRANSIT OF CARGO AND PASSENGERS



THE SILK ROUTE  
FOR THE 21st CENTURY



**TRACECA INDEX**

Number	Description
1	Part of EU
2	Part of CIS
3	Part of CIS
4	Part of CIS
5	Part of CIS
6	Part of CIS
7	Part of CIS
8	Part of CIS
9	Part of CIS
10	Part of CIS
11	Part of CIS
12	Part of CIS
13	Part of CIS
14	Part of CIS
15	Part of CIS

**TRACECA LEGEND**

	Main route
	Part of route
	Part of route
	Part of route
	Major city
	City up to 500,000 inhabitants
	Port





### 2.1.1 Railway Transportation Infrastructure and System

Following the breakup of the Soviet Union, the rail system was divided between railway administrations in respective countries with the exception of Uzbekistan, Kyrgyzstan and Tajikistan, which retained the old system based on the Srednaja Aziatskaya system minus the Turkmenistan system. The Baku port rail terminal is served by three main rail lines:

- The rail system between Azerbaijan and Georgia between Baku and the Black Sea ports of Poti and Batumi via Tblisi. The system is also connected to the Russian rail system on the Black Sea coast and the ports of Sochi and Tuapse and further to the Russian rail system via Krasnodar. From Tblisi via Armenia it is also connected to the Turkish rail system.
- The rail system between Azerbaijan and Armenia between Baku and Yerevan, which at the Jolfa border station in Nagorno Karabak provides a link to the Iranian rail system. It is also connected to the Turkish rail system at Gumri.
- The rail system between Azerbaijan and Chechnya extending between Baku and Makhachkala and onto the Russian rail system both to the north to Astrakhan and to west to Grozny and Krasnodar.

The Turkmenbashi port rail terminal is connected to the Central Asian railway system via Ashgabat and onto the other Central Asian republics. The system is linked to the Russian system via Kazakhstan providing connections to the Russian Far East and also to the Peoples Republic of China. The Turkmenistan railway system was also connected to the Iranian system at Sarakhs, which provides a link to Teheran and the port of Bandar Abbas.

There are also several east-west rail lines through Kazakhstan providing alternate routes between the Central Asian republics and Central and European Russia and northern Europe.

Two planned railway infrastructure projects could, if they are constructed, divert cargoes that currently are being shipped via the Baku - Turkmenbashi rail ferry service:

- A rail line round Lake Van planned by the Turkish government to improve shipments of cargoes to and from Turkey via Iran and the Central Asian republics.
- A rail line along the east shore of the Caspian Sea connecting Bandar Torkmen, Kizyl-Artek via Turkmenbashi to Astrakhan would form a competitive alternative to shipping cargoes via the ferry and Baku connecting to the Russian rail system on the west side of the Caspian Sea.

### 2.1.2 Highway Infrastructure and System

Road transportation has not been considered an important mode of transportation for long haulage. This fact is also reflected in the status of the highway system with a major portion of the system incapable of handling axle loads of 10 tons, which is the normal standard in Europe. The roads are also in a poor state of maintenance. This is clearly illustrated using the most important road artery in Turkmenistan, M37 between Cardzev and Turkmenbashi as an example:

- This highway is a total 1,212 km
- Only 65 km is allowed a 10 ton axle load
- 121 km of the pavement was classified as "good", 336 km as "satisfactory" and 755 km as "unsatisfactory".

Nevertheless the road system is extensive, and long distance road haulage by truck is becoming increasingly important as more of the transport work is transferred from rail to road:

- Exports from Western Europe are trucked via Istanbul and through Turkey and Georgia to Azerbaijan and via the Baku - Turkmenbashi ferry link to Turkmenistan and the other Central Asian republics. Presently most of the trucks return empty either to Turkey or Southern Europe due to the lack of return cargoes.
- Exports from Turkey use the same route as the Western European trucks.
- Local cargoes to and from Iran and transit cargoes shipped through the port of Bandar Abbas in the Arabian Gulf are often trucked to and from all the Central Asian republics. The poor quality of the Central Asian road system prompted the Iranian government to construct a highway of international standard from Ashgabat, Turkmenistan to Gaudan to facilitate the use of modern trucks for cargo transportation between Iran and Turkmenistan. This road was completed in early 1995.

Georgian authorities has started to collect road taxes on foreign trucks transiting Georgian territory, the proceeds of which will be used to upgrade and maintain the road system.

### 2.1.3 The Waterway System

Cargo transportation on the Caspian Sea and onwards through the Russian inland waterway system enabling navigation through to the Black Sea and the Baltic Sea via the Volga-Don and Volga-Balt inland waterways has always been an important part of the transportation infrastructure of the Central Asian republics having ports in the Caspian Sea.

## 3. TRANSPORT COST BY MODE ON ALTERNATIVE ROUTES

The purpose of this section is to review the cost of transportation for cargoes originating in and destined for Azerbaijan as well as transit cargoes to and from the Central Asian Republics. Two alternative methods could be used for this purpose:

- Use current transportation tariffs and rates quoted by the operators of the various modes of transportation, i.e. rail, truck and water
- Estimate the actual production costs of the various modes of transportation.

An observation with respect to the transportation tariffs of the FSU countries is that these tariffs did not reflect the actual cost of the transportation work performed, and substantial subsidies or rebates compared to actual cost were reflected in these rates. As a result there have been numerous rate changes and increases in the transportation tariffs to eliminate the subsidies and to make the rates reflect the actual production costs. In addition it is difficult to obtain reliable quotes for transportation. Another factor to be considered in this connection is that cargoes may be transported on routes that currently are not available, but may be opened in the future. It was therefor concluded that this analysis should be based on estimates of the actual transportation costs rather than on existing tariffs. For this purpose the transportation costs were developed based on the evaluation of transportation costs performed for Louis Berger International Inc. for the port of Turkmenbashi using the Transportation Cost Module developed by the National Ports and Waterway Institute of the Louisiana State University.<sup>4</sup>

It will have to be recognized that cargoes will continue to be routed based on government fiat or decrees, or that transportation of some vital commodities will be subsidized and thus mode of transportation will be directed regardless of cost advantages or disadvantages. It is expected, however, that such activities will be gradually reduced to a minimum in the future.

The main assumptions made with respect to the development of the transportation costs are as follows:

### **Rail Transportation**

- The costs are based on non-specialized railcars operated in block trains between terminals, and both variable and fixed costs were included. It was assumed that 50% of the cars were returned empty, while 50% were loaded on the return leg.
- No border crossing charges other than to change the bogies from Russian to European gauge were included. Other charges are however considered to be negligible.
- The cost were based on standard rates of 1.58 cents (US) per ton -km in the FSU and 1.80 cents (US) in the EU countries based on German railway data.
- Routings were based on norms derived from railway specialists, while distances were obtained from railways and various railway publications

### **Truck Transportation**

- A typical Eurostandard tractor and semitrailer with a maximum payload of 25 tons driven an average of 80,000 km per year was used as the basis for the calculations.
- 20% empty hauls were assumed

---

<sup>4</sup> Feasibility Study: Turkmenbashi Port Development, Phase 1 Draft Report, submitted by Louis Berger International, Inc. et al. March 1996

- Distances were derived from transportation companies and from various publications, and the most common routings were used based on discussions with transportation companies.
- A transportation cost of USD 0.027 per ton-km was used for the basis of the calculations.

### **Water Transportation**

- The cost were calculated based on a typical vessel trading on the Russian inland waterway system, the Black Sea and the Caspian Sea of 2,700 dwt.
- Draft limitations on the Russian waterway system were considered for vessel voyages on these routes. These are:
- On the Volga river the draft is limited in the Niznyi Novgorod area. Due to low water level in the Cheboksary hydroelectric station, the maximum draft of 3.5 meters is only maintained once a day for several hours
- On the Don river system lack of maintenance and erosion at the Kochetovsky Lock and Dam built in 1920 allows passage of vessels with a draft of 3.0 meters or less.

As a result typical utilization rates of 0.6 for outbound shipments and 0.3 for inbound shipments were used for estimation of costs on the Russian waterway system. Significant cost advantages can be obtained if these "bottlenecks" are removed. There are, however, no indications that Russian authorities are planning to make the necessary investments to remove these obstacles to efficient water transportation.

- Shipping companies have indicated average utilization rates of 0.8 for outbound movements and 0.6 for inbound movements in other areas.
- Canal charges used in the calculations were USD 9,800 for the Volga-Caspian Canal, USD 13,300 for the Volga-Don Canal, USD 4,000 for the Azov Canal and USD 10,000 for the Volga-Balt Canal.
- Cargo handling charges vary considerably between the various ports. For the purpose of these calculations, handling charges of USD 5 per ton were assumed for bulk cargoes, while USD 20 per ton were used for general cargoes.
- Water transportation distances and thereby total transportation costs are assumed to be virtually the same for Baku and Turkmenbashi.

The costs for transit cargoes to and from the Central Asian republics represented by Ashgabat, Turkmenistan and to and from Baku, Azerbaijan were calculated for transportation of both bulk and general cargoes. The routes analyzed were only those where alternative transportation modes are available. Consequently cost calculations of movements within the Caspian Sea region where other modes of transportation will by definition not be competitive and can thus be considered "captive cargoes" for the ports on the Caspian

Sea were not included. The analysis was therefore limited to encompass transportation costs to and from the following regions:

- The Black Sea
- Northern Europe and the Baltic Region
- Western Europe represented by Frankfurt, West Germany
- Southern Europe represented by the Adriatic Sea
- The United States

In addition the impact of eliminating the "bottlenecks" on the Volga Don waterway was evaluated.

This is described below.

### **3.1 Shipments to and from the Black Sea Region**

The following transportation route alternatives were considered for transport to and from the Black Sea region:

- By water - Novorossisk
- By rail - Novorossisk
- By water - Odessa
- By rail - Odessa (Ashgabat only)
- Via the TRACECA route by rail - Novorossisk
- Via the TRACECA route by rail - Poti
- Via the TRACECA route by truck - Poti
- Via the TRACECA route by rail and water - Odessa
- Via the Transcaucasian route by rail - Odessa (Baku only)

The results of this analysis is presented as Table 3.1. As shown in this table the TRACECA route is highly competitive both for bulk and general cargoes to all destinations analyzed compared to all water transportation. The cost advantage of the TRACECA route by water and rail between Ashgabat and Novorossisk for bulk cargoes compared to all water transportation is USD 14, i.e. a cost advantage of 39 %, while for general cargoes on the same route the cost advantage of the TRACECA route is approx. 50% compared to all water transportation. With the exception of cargoes that cannot be moved overland and via the ferry, such as oversize and special cargoes, the all water transportation route to and from the Black Sea will not be able to compete with the TRACECA route.

**Table 3.1 Transportation costs for bulk and general cargoes between the Black Sea Region and Ashgabat**

Origin/destination	Mode of transportation	Distance (km)	Transit time (days)	Rate per ton - USD
Novorossisk	Water, bulk	3299	16	49.00
Novorossisk	Water, general cargo	3299	16	64.00
Novorossisk	Rail	3579	11	56.50
Novorossisk	TRACECA rail/ferry/rail via Poti	2165	8	35.80
Odessa	Water, bulk	3755	18	49.70
Odessa	Water, general cargo	3755	18	64.70
Odessa	Rail	4456	14	70.40
Odessa	TRACECA rail/ferry/rail via Poti/water	2685	8	43.20
Poti	TRACECA rail/ferry/rail	1685	7	28.20
Poti	TRACECA truck/ferry/truck	1685	6	43.90

**Transportation costs for bulk and general cargoes between the Black Sea Region and Baku**

Origin/destination	Mode of transportation	Distance (km)	Transit time (days)	Rate per ton - USD
Novorossisk	Water, bulk	3299	14	35.20
Novorossisk	Water, general cargoes	3299	14	50.20
Novorossisk	Rail	1330	5	21.00
Odessa	Water, bulk	3755	18	35.90
Odessa	Water, general cargo	3755	18	50.90
Odessa	TRACECA rail to Poti/water	1850	5	28.40
Poti	TRACECA rail	850	5	19.40
Poti	TRACECA truck	850	3	23.00

### 3.2 Northern Europe and the Baltic Region

The following routings were considered for shipments to and from Northern Europe represented by the port of St. Petersburg as the gateway to this region:

- By water via the Volga/Balt river and canal systems
- By rail through Kazakhstan and northern Russia
- By rail through Chechnya
- By rail ferry via Turkmenistan and Kazakhstan through northern Russia (Baku only)

As shown in Table 3.2 water transportation via Baku for both bulk and general cargoes to and from this region will be competitive only as long as the Chechnya rail link is closed. When and if this rail link is reopened, water transportation will still be competitive for bulk cargoes. For general cargoes on the other hand the rail link via Chechnya will have a cost advantage of approx. USD 11 per ton or 19% compared to water transportation.



**Table 3.2 Transportation costs for bulk and general cargoes between the Northern Europe/Baltic (St. Petersburg) Region and Ashgabat**

Origin/destination	Mode of transportation	Distance (km)	Transit time (days)	Rate per ton - USD
St. Petersburg	Water, bulk	5354	27	55.50
St. Petersburg	Water, general cargo	5354	27	70.50
St. Petersburg	Rail	4551	15	71.90
St. Petersburg	Rail- ferry - rail via Chechnya	3635	13	59.00

**Transportation costs for bulk and general cargoes between the Northern Europe/Baltic (St. Petersburg) Region and Baku**

Origin/destination	Mode of transportation	Distance (km)	Transit time (days)	Rate per ton - USD
St. Petersburg	Water, bulk	5354	25	41.70
St. Petersburg	Water, general cargo	5354	27	56.70
St. Petersburg	Rail via Chechnya	2800	9	44.20
St. Petersburg	Rail via ferry to Turkm. and Kazakhstan	5386	18	86.70

### 3.3 Western Europe Represented by Frankfurt, West Germany.

The following transportation routes were considered as alternatives for cargoes to and from Western Europe:

- By water via a north Adriatic port and by rail to Frankfurt
- By rail via Kazakhstan and Russia (Ashgabat only)
- By rail via Chechnya and Brest to Frankfurt
- By rail via the TRACECA route to Poti and then by water to a north Adriatic port and then onwards by rail to Frankfurt
- By truck via the TRACECA route to Poti and then by water to a north Adriatic port and then onwards by truck to Frankfurt

The results of the analysis is shown as Table 3.3. As long as the Chechnya rail corridor is closed, bulk water transportation is competitive for cargoes both to Baku and the Central Asian republics. If and when this route is reopened and considered safe by cargo owners, it will represent the low cost alternative and will have the potential to attract significant cargo volumes both to Baku and the Central Asian republics. In the latter case the Port of Baku will attract these cargoes through the ferry service.

It should be noted however that a cost effective transportation solution for both bulk and general cargoes to and from areas located close to the major ports of Western Europe and the UK would be to ship the cargoes by deep sea vessels to and from Poti and then use the TRACECA route to and from Azerbaijan and the Central Asian republics.

The cost of the alternative of shipping cargoes to and from Western Europe on the inland waterways systems, i.e. the Rhine, Main and Danube rivers and further across the Black Sea for transshipment in Poti or through the Volga Don waterway system, has not been evaluated in this analysis. Given that the conflict in the former Yugoslavia is resolved and

unrestricted navigation is possible, this route could represent an interesting routing alternative for cargoes to and from the central regions of Western Europe.

**Table 3.3 Transportation costs for bulk and general cargoes between the Western Europe Region and Ashgabat**

Origin/destination	Mode of transportation	Distance (km)	Transit time (days)	Rate per ton - USD
Frankfurt	Water, bulk Adriatic/rail	7355	28	89.50
Frankfurt	Water, general cargo d.o.	7355	28	119.50
Frankfurt	Rail	6700	19	109.30
Frankfurt	Rail- ferry - rail via Chechnya	4985	18	83.40
Frankfurt	TRACECA Poti/water Adriatic/rail, bulk	6235	23	94.80
Frankfurt	TRACECA Poti/water Adriatic/truck, bulk	6235	22	121.30
Frankfurt	TRACECA Poti/water Adriatic/rail, gen. cargo	6235	23	124.80
Frankfurt	TRACECA Poti/water Adriatic/truck, gen. cargo	6235	22	151.30

**Transportation costs for bulk and general cargoes between the Western Europe Region and Baku**

Origin/destination	Mode of transportation	Distance (km)	Transit time (days)	Rate per ton - USD
Frankfurt	Water, bulk Adriatic/rail	6800	26	75.70
Frankfurt	Water, general cargo d.o.	6800	26	105.70
Frankfurt	Rail via Chechnya	4150	15	68.60
Frankfurt	TRACECA Poti/water Adriatic/rail, bulk	5400	20	94.80
Frankfurt	TRACECA Poti/water Adriatic/truck, bulk	5400	19	100.30
Frankfurt	TRACECA Poti/water Adriatic/rail, gen. cargo	5400	20	124.80
Frankfurt	TRACECA Poti/water Adriatic/truck, gen. cargo	5400	19	130.30

### 3.4 Southern Europe Represented by the Adriatic Sea

The following routes were analyzed in relation to shipments to and from this region:

- By all water
- By all rail (from Ashgabat only)
- By TRACECA rail via Poti and onwards by water
- By TRACECA truck via Poti and onwards by water

As shown in Table 3.4 the all water route is competitive both for bulk and general cargoes compared to the TRACECA route. The cost advantage of the water route is, however, only 10% for bulk cargoes and 8% for general cargoes. With its reduced transit time and possibility of operating all year, the TRACECA route will most likely be considered as an alternative route for shippers and consignees of both bulk and general cargoes.

**Table 3.4 Transportation costs for bulk and general cargoes between the Southern Europe Region and Ashgabat**

Origin/destination	Mode of transportation	Distance (km)	Transit time (days)	Rate per ton - USD
North Adriatic	Water, bulk	6355	25	66.50
North Adriatic	Water, general cargo d.o.	6355	25	81.50
Venice	Rail	6145	17	99.30
North Adriatic	TRACECA Poti/water Adriatic rail, bulk	5035	17	73.20
North Adriatic	TRACECA Poti/water Adriatic truck, bulk	5035	16	88.90
North Adriatic	TRACECA Poti/water Adriatic rail, gen. cargo	5035	17	88.20
North Adriatic	TRACECA Poti/water Adriatic truck, gen. cargo	5035	16	103.90

**Transportation costs for bulk and general cargoes between the Southern Europe Region and Baku**

Origin/destination	Mode of transportation	Distance (km)	Transit time (days)	Rate per ton - USD
North Adriatic	Water, bulk	5800	23	52.80
North Adriatic	Water, general cargo	5800	23	67.80
North Adriatic	TRACECA rail Poti/water Adriatic, bulk	4200	14	58.40
North Adriatic	TRACECA truck Poti/water Adriatic, bulk	4200	13	68.00
North Adriatic	TRACECA rail Poti/water Adriatic, gen. cargo	4200	14	73.40
North Adriatic	TRACECA truck Poti/water Adriatic, gen. cargo	4200	13	83.00

### 3.5 The United States

In this respect two alternative transshipment ports were considered:

- St. Petersburg is the northern gateway to the FSU states for both bulk and general cargoes. From this gateway the following routes were considered:
  - All water via the port of St. Petersburg
  - All rail via Kazakhstan and northern Russia (Ashgabat only)
  - Rail via the Chechnya route
- Piraeus is one of the major transshipment points in the Mediterranean for containerized cargoes, and was therefore selected as the southern transshipment point for general cargoes. The following routes were analyzed:
  - All water via the Volga Don waterway
  - Transshipment by water to Poti and via the TRACECA route
- Poti was selected as the southern transshipment point for bulk cargoes. To and from Poti the cargoes would be carried via the TRACECA route

The results are presented as Table 3.5. For bulk cargoes the sailing distance and thus the deep sea transportation costs for cargoes via St. Petersburg and Poti to and from the United States is expected to be at a similar level. Given this fact, the lowest cost alterna-

tive by far is transshipment in Poti via TRACECA route with a cost per ton of USD 28.20 to Ashgabat and USD 13.40 to Baku. The cost difference for all water bulk shipments via the port of St. Petersburg compared to Poti is so significant that St. Petersburg would never be considered as the transshipment point for bulk cargoes as long as the TRACECA route is open for traffic.

For general cargoes the St. Petersburg can be a competitive transshipment port, if the rail route via Chechnya is operational. In this case the cargoes would under any circumstance be routed via the ferry link between Baku and Turkmenbashi to and from the Central Asian republics. When the Chechnya rail connection is unavailable, the lowest cost alternative route is the TRACECA route via Piraeus and Poti. The freight rates of the container lines serving the ports of Piraeus and St. Petersburg will also be a factor that may influence the routing of containerized cargoes.

**Table 3.5 Transshipment transportation costs for bulk and general cargoes between the United States and Ashgabat**

Transshipment via	Mode of transportation	Distance (km)	Transit time (days)	Rate per ton - USD
St. Petersburg	Water, bulk	5354	27	55.50
St. Petersburg	Water, general cargo d.o.	5354	27	70.50
St. Petersburg	Rail	4551	15	71.90
St. Petersburg	TRACECA ferry/rail via Chechnya	3635	13	59.00
Poti	Water, bulk	1685	7	28.20
Piraeus	Water, general cargo	4805	18	71.30
Piraeus	TRACECA ferry/rail via Poti, bulk	3485	16	51.20
Piraeus	TRACECA ferry/rail via Poti, gen.cargo	3485	16	66.20

**Transshipment transportation costs for bulk and general cargoes between the United States and Baku**

Transshipment via	Mode of transportation	Distance (km)	Transit time (days)	Rate per ton - USD
St. Petersburg	Water, bulk	4799	25	41.70
St. Petersburg	Water, general cargo d.o.	4799	25	56.70
St. Petersburg	Rail via Chechnya	2800	9	44.30
Poti	Water, bulk	850	4	13.40
Piraeus	Water, general cargo	4250	16	57.50
Piraeus	TRACECA rail via Poti, bulk	2650	13	36.40
Piraeus	TRACECA rail via Poti, gen. cargo	2650	13	51.40

### 3.6 Cost Impact of Elimination of Draft Restrictions on the Volga Don Waterway

As pointed out under the assumptions in the introduction to this section there are draft restrictions in the Niznyj Novgorod areas on the Volga River and at the Kotchekovsky lock and dam on the Don River, both of which reduces significantly the carrying capacity of vessels operated on the river system. The cost impact of these "bottlenecks" has been evaluated assuming that the vessels operating would achieve the same average utilization as if they were operated outside these obstructions. The results of this analysis is presented as Table 3.6. As shown in this table the transportation costs between

Baku/Turkmenbashi and the major origins and destinations would be reduced by between USD 9 and USD 13 equivalent to 25% of the ship transportation costs. If these "bottlenecks" were eliminated, the competitive situation of the all water transportation would be affected as follows:

- For bulk cargoes to and from the Black Sea region the competitive advantage of the TRACECA route will be reduced and water transportation will improve its competitive position, particularly to and from Odessa. For general cargoes on the other hand the competitive situation of the TRACECA route will not be changed in any significant way.
- For the Northern Europe and the Baltic Region water transportation both for bulk and general cargoes will be reduced by close to USD 10.50 and will become a highly competitive transportation alternative even when the Chechnya rail route is open.
- For transportation to and from Western Europe represented by Frankfurt, West Germany the ship transportation cost reduction will be more than USD 13 per ton, which will make water transportation the lowest cost alternative even when the Chechnya corridor is open. For general cargoes the Chechnya rail route will still remain the lowest cost alternative. As a consequence elimination of the draft restrictions will greatly enhance the competitive position of the water transportation route for general cargoes compared to the TRACECA route.
- To and from Southern Europe represented by the Adriatic Sea water transportation is the low cost alternative for bulk and general cargoes even with the draft restrictions. A cost reduction of more than USD 13 as a result of the elimination of the draft restrictions will greatly enhance the competitive position of all water transportation.
- For cargoes to and from the United States the removal of the "bottlenecks" will have no impact on the competitive situation.

**Table 3.6 Effect of restricted draft on the Russian river systems for vessels to and from Baku and Turkmenbashi**

**Cost with draft restrictions**

To/from	Kilo-meters	Vessel cost	Canal fees	Total cost	Out-bound utiliz. rate	Cargo tons	In-bound utiliz. rate	Cargo tons	Total cargo	Cost per ton	Cost per ton/km
St. Petersburg	4799	61768	39600	101368	0.6	1620	0.3	810	2430	41.72	0.0087
Novorossisk	2744	38528	47020	85548	0.6	1620	0.3	810	2430	35.20	0.0128
Odessa	3200	40320	47020	87340	0.6	1620	0.3	810	2430	35.94	0.0112
North Adriatic	5800	81200	47020	128220	0.6	1620	0.3	810	2430	52.77	0.0091

**Cost without draft restrictions**

To/from	Kilo-meters	Vessel cost	Canal fees	Total cost	Out-bound utiliz. rate	Cargo tons	In-bound utiliz. rate	Cargo tons	Total cargo	Cost per ton	Cost per ton/km
St. Petersburg	4799	61768	39600	101368	0.8	2160	0.4	1080	3240	31.29	0.0065
Novorossisk	2744	38528	47020	85548	0.8	2160	0.4	1080	3240	26.40	0.0096
Odessa	3200	40320	47020	87340	0.8	2160	0.4	1080	3240	26.96	0.0084
North Adriatic	5800	81200	47020	128220	0.8	2160	0.4	1080	3240	39.57	0.0068

### Reduction in vessel transport cost without draft restrictions

To/from										Cost per ton	Percent reduction
St. Petersburg										10.43	25
Novorossisk										8.80	25
Odessa										8.99	25
North Adriatic										13.19	25

Source for cost data: Feasibility Study: Turkmenbashi Port Development, Phase 1 Draft Report, submitted by Louis Berger International, Inc. et al, March 1996

### 3.7 Overall Observations and Conclusions

The observations and conclusions that can be drawn from this analysis for bulk cargoes are in the main:

- Water transportation is the competitive alternative for cargoes to and from the Southern European region represented by the North Adriatic and Northern Europe/Baltic region represented by St. Petersburg.
- The rail corridor through Chechnya is the lowest cost alternative for bulk cargoes to and from Western Europe represented by Frankfurt and is also a serious competitor to water transportation to and from St. Petersburg. Cargoes on this route to and from the Central Asian republics will use the ferry service between Baku and Turkmenbashi.
- The TRACECA route is the lowest cost transportation alternative for bulk cargoes to and from the Black Sea region and the United States, and will represent the best alternative transportation route for bulk cargoes to and from Southern Europe when the waterways are closed during the winter.
- Elimination of the draft restrictions will change the competitive position for bulk cargoes to and from Western Europe represented by Frankfurt and will make water transportation the low cost alternative for this region. Furthermore it will make water transportation to and from Northern Europe represented by St. Petersburg even more competitive.

For general cargoes the following observations and conclusions can be drawn:

- The TRACECA route is the lowest cost alternative for the Black Sea region and the United States. Like for bulk cargoes, the TRACECA route will be the alternative route to water transportation to and from Southern Europe.
- The Chechnya corridor is the lowest cost alternative for general cargoes to and from Northern Europe (St. Petersburg) and Western Europe (Frankfurt). In both cases the Baku - Turkmenbashi ferry will be used to and from the Central Asian republics.
- Water transportation is the most cost effective mode of transportation for general cargoes to and from Southern Europe represented by the North Adriatic region.

The TRACECA route will represent a competitive alternative when the inland waterways are closed during the winter.

- The elimination of the draft restrictions on the inland waterways will shift the competitive position of general cargoes to and from the Northern Europe/Baltic route in favor of water transportation and further increase the existing competitive advantage for general cargoes to and from Southern Europe. For the other regions the elimination of draft restrictions will not change the competitive situation.

It is impossible to evaluate all possible routes and origins and destinations. The analysis should nevertheless present an overview of and guideline to the competitive position of various routes and modes and transportation to and from typical destinations.

#### **4. THE FERRY LINK - ITS ROLE IN THE TRANSPORTATION INFRASTRUCTURE**

The purpose of this section to describe the role of the ferry link, its importance in the trade and flow of cargoes to and from the Central Asian region. At the same factors that may divert cargoes from the ferry service are also discussed.

##### **4.1 History of the Ferry Link**

The ferry link was started in 1961, at which time the ferry terminals were completed in Baku, Azerbaijan and Turkmenbashi (previously Krasnovodsk), Turkmenistan. The ferry service and the terminals were planned and the construction supervised by Kasmorni-proekt, the hydrotechnical and marine design and research institute for the Caspian Sea region headquartered in Baku, Azerbaijan.

The ferry service has since the inception been operated by the Caspian Shipping Company headquartered in Baku. The company can trace its history back to the formation of the "Kavkaz i Merkurii" joint stock company in 1858. During the Soviet regime the company was developed into a conglomerate marine transportation and operations company comprising a varied fleet comprising tankers, dry cargo vessels, ro-ro vessels, passenger-rail ferries, offshore oil support vessels and ice breakers operating both in the Caspian Sea as well as on the Russian inland waterways and in worldwide trading. The company also controlled the ports of Baku, Bekdash and Krasnovodsk (now Turkmenbashi, Turkmenistan), Makhachkala (Dagestan), Aktau and Bautino (Kazakhstan), and four major shipyards organized as Kaspormsudoremont. In addition the company also performed agency services through Transflot, dredging services through Kaspmorput and wholesale and retail trading through Torgmortrans.

Following the break-up of the former Soviet Union and the establishment of the independent republics of Azerbaijan, Turkmenistan and Kazakhstan the all encompassing influence of the Caspian Shipping Company was also divided between the respective newly independent republics. The company retained, however, control of most of its fleet of vessels, including the rail-passenger ferries operating in the Caspian Sea, the Port of Baku and the shipyards in Azerbaijan. The port of Baku was as of January 1, 1994 separated from the

Caspian Shipping Company as an independent entity and is now operating as the International Sea Port of Baku.

The first ferry vessels that were operated were two Danish built passenger-rail ferries, which were retired and replaced with eight "Dagestan" class vessels, of which a total of eight vessels were built and operated starting in 1970-71. These vessels, which were designed for the transportation of railcars, trailers, cars and passengers, have particulars as follows:

Particulars of the Dagestan Class Vessels (Caspian Shipping Company).

Length overall	154.5	metres
Breadth	18.3	metres
Loaded draught	4.5	metres
Deadweight	3,950.0	tons
Gross register tonnage	11,200.0	grt
Design speed	17.0	knots

The rail-passenger vessels of the "Dagestan" class were operated on three routes, all originating in Baku:

- Baku - Krasnovodsk (now Turkmenbashi, Turkmenistan): The sailing distance is 165 n. miles, and the transit time is approximately 13 hours. At the peak operations in the mid 1980's this link was served with six or seven sailings per day. Currently the link is served by four to five sailings per week at a highly irregular sailing schedule, which is based on cargo availability.
- Baku - Aktau (Kazakhstan): The sailing distance is 253 miles and the transit time is about 22 hours. Regularly scheduled sailings were performed until the service was stopped in 1992.
- Baku - Bekdash - Krasnovodsk: This ferry link of 280 miles sailing distance with a transit time of 22 hours was maintained with daily sailings in the 1980's. Currently this link is served on a sporadic basis.

The transportation philosophy and policy of the former Soviet Union was to use the inland waterways and the railroad system for long distance transportation, and trucks for short distance and local transportation and distribution. In line with this philosophy the rail ferry link between Baku and Krasnovodsk (Turkmenbashi) was considered an important strategic connection linking the European rail system to the Middle-Asian railroad system serving the Central Asian republics and Western Siberia and the Far East. As a consequence the terminals were constructed with the purpose of handling railcars, and facilities for trucks, automobiles and other rolling cargoes including containers are virtually non-existent.

At the present time the ferry service is characterized by an overall deterioration of both physical facilities and the overall service level:

- The sporadic and ad hoc schedule is creating problems for the users of the ferry service. The ferries' schedule is based on the availability of cargo rather than on a preplanned fixed schedule



- Priority on the ferries continues to be given to rail transportation, and the steadily increasing truck traffic experiences waiting time from two days up to seven to ten days.
- The lack of facilities for trucks, rolling cargo, containers and automobile transportation is causing congestion at the terminals.
- Users of the ferry service have aired complaints over the cleanliness and general maintenance levels of the ferries operated.

As described in the following the break-up of the Soviet Union and with it disruption of historical trading patterns without the establishment of new one has caused a dramatic decrease in the overall cargo volumes carried by the ferries.

#### 4.2 Cargoes Handled by the Ferry Link

The historical "Silk Route" between Europe and China passed through Azerbaijan and Turkmenistan, and the trans-Caspian ferry link can be regarded as the successor to and continuation of these old trading patterns. During the Soviet period old trading patterns were disrupted and new ones established, whereby extensive transit cargoes were shipped between the resource rich Central Asian republics and the European part of Russia.

In the 1980's the Central Asian republics were all part of the Soviet Union. In the Soviet Union each republic or region was designated specialized industries, all of which were operated on a large scale providing its products to the entire Soviet Union or major regions. Examples are Azerbaijan, which was given the task of producing air conditioners and oil production equipment, while Uzbekistan was given the task of specializing in the aircraft industry. As a result of this specialization large volumes of raw materials, semi-processed products and finished products were transported between the various production centers. As shown in the table below the total traffic on the ferry reached almost 6.6 million tons at the peak in 1986. Following the demise of the Soviet Union, the cargo flows have declined dramatically.

**Table 4.1 Ferry traffic 1980 - 1995 (thousand tons)**

	<b>Arriving</b>	<b>Departing</b>	<b>Total</b>
1980	1982.17	2024.04	4006.21
1981	1963.31	1967.34	3930.65
1982	1825.36	1884.44	3709.8
1983	1618.69	1786.16	3404.85
1984	1684.45	1841.19	3525.64
1985	2091.24	1960.24	4051.48
1986	3461.85	3107.59	6569.44
1987	3198.29	2604.98	5803.27
1988	2998.67	2266.84	5265.51
1989	2200.12	1908.31	4108.43
1990	1521.86	1116.72	2638.58
1991	1194.67	866.32	2060.99

	<b>Arriving</b>	<b>Departing</b>	<b>Total</b>
1992	765.84	481.12	1246.96
1993	452.46	402.8	855.26
1994	345.16	352.96	698.12
1995	382.06	481.24	863.3

Source: Turkmenbashi Port

The break-up of the Soviet Union, hostilities and outbreak of open warfare, political differences, deteriorating infrastructure and transportation equipment and an overall decline in economic activity in all the republics of the former Soviet union have all contributed to a dramatic decline in the trade of the former republics and thus also the cargoes available to be transported on the trans-Caspian ferry service.

With the liberalization of transportation policies and new trading patterns have also opened alternative routes for cargoes to and from the republics in the hinterland of the trans-Caspian ferry.

While local traffic always have been a feature of the trans-Caspian traffic, transit cargoes have been important and constituted the major cargo volumes. With the exception of the access of Azerbaijan and Turkmenistan to the Caspian Sea and to the international waterway system through the Russian river and inland waterway system, the Central Asian republics are landlocked and are dependent upon transit through neighboring countries to enable import and exports with the rest of the world.

During the former Soviet regime the Central Asian republics were regarded as valuable sources of raw materials including hydrocarbons for the industries of central Russia. At the same time that manufactured industrial goods and consumer products were shipped to the Central Asian republics.

The dependence on the other Soviet republics is indicated by the following statistics of trade with other republics of the Soviet Union in 1990 is presented in Table 4.2.

**Table 4.2 Central Asian Republics' trade with other Soviet republics 1990**

	<b>Export</b>	<b>Import</b>
Kazakhstan	89%	73%
Kyrgyzstan	98%	73%
Tajikistan	84%	75%
Turkmenistan	93%	81%
Uzbekistan	88%	84%

The exports and imports of the Central Asian republics in 1994 by major commodity is presented as Tables 4.3 and 4.4. As shown in these tables the CIS countries continue to be the major trading partners of these republics even after independence.

**Table 4.3 Central Asian Countries Exports by Major Commodities and Origin, 1994**

Country	Commodity	Unit	To CIS	To Other Countries	Total
Azerbaijan	Gasoline	Thousand tons	0.6		0.6
	Diesel	Thousand tons	386.0	1,083.0	1,469.0
	Furnace oil	Thousand tons	27.0	42.0	69.0
	Cotton fiber	Thousand tons	13.0	66.0	79.0
	Buses		25.0		25.0
Kazakhstan	Bread grains	Thousand tons	1,867.0	22.0	1,889.0
	Coal	Million tons	30.0	0.6	30.6
	Crude oil and gas cond.	Million tons	5.7	0.1	5.8
	Gasoline	Thousand tons	136.0	16.0	152.0
	Diesel	Thousand tons	61.0	873.0	934.0
	Furnace oil	Thousand tons	19.0	356.0	375.0
	Cotton fiber	Thousand tons		41.0	41.0
	Refined copper	Thousand tons		122.0	122.0
	Raw zinc	Thousand tons		91.0	91.0
	Tractors	Thousands	1.4	0.1	1.5
	Kyrgyzstan	Mineral or chem. fertilizer	Thousands		7.5
Cotton fiber		Thousand tons		9.7	9.7
Refined copper		Thousand tons		1.6	1.6
Unrefined aluminum		Thousand tons		1.8	1.8
Tajikistan	Cotton fiber	Thousand tons	7.0	64.0	71.0
	Unrefined aluminum	Thousand tons		205.0	205.0
Turkmenistan	Natural gas	Billion cu. meters	25.0		25.0
	Mineral or chem. fertilizer	Thousand tons	0.4		0.4
	Cotton fiber	Thousand tons	18.0	237.0	255.0
Uzbekistan	Crude oil and gas cond.	Thousand tons	636.0	28.0	664.0
	Mineral or chem. fertilizer	Thousand tons	220.0	288.0	508.0
	Cotton fiber	Thousand tons	530.0	563.0	1,093.0

Feasibility Study: Turkmenbashi Port Development, Phase 1 Draft Report, Louis Berger International Inc. et al, March 1996

**Table 4.4 Central Asian Countries Imports by Major Commodities and Origin, 1994**

Country	Commodity	Unit	From CIS	From Other Countries	Total
Azerbaijan	Bread grain	Thousand tons		149.0	149.0
	Grouts	Thousand tons	0.7	0.5	1.2
	Sugar	Thousand tons	69.0	4.7	73.7
	Vegetable oils	Thousand tons	1.8	12.7	14.5
	Potatoes	Thousand tons	1.1	28.0	29.1
	Crude oil and gas cond.	Million tons	0.7		0.7
	Mineral or chem. fertilizer	Thousand tons	12.0		12.0
	Cotton fabric	Million meters	2.0		2.0
	Leather shoes	Thousand pairs			0.0
	TV sets	Thousands	1.0	11.0	12.0
	Buses	Thousands	0.0	0.0	0.0
	Cars	Thousands	1.0	1.0	2.0
	Kazakhstan	Bread grain	Thousand tons		0.3
Vegetable oils		Thousand tons	5.2	15.0	20.2

Country	Commodity	Unit	From CIS	From Other Countries	Total
	Sugar	Thousand tons	40.0		40.0
	Gasoline	Thousand tons	332.0		332.0
	Diesel	Thousand tons	703.0		703.0
	Furnace oil	Thousand tons	380.0		380.0
	Leather shoes	Thousand pairs	0.1	0.2	0.3
	Refrigerators	Thousand tons	16.0	0.9	16.9
	TV sets	Thousand tons	23.0	11.9	34.9
	Buses	Thousands	0.6	0.1	0.7
	Cars	Thousands	4.2	0.5	4.7
	Trucks	Thousands	2.9		2.9
Kyrgyzstan	Vegetable oils	Thousand tons	3.6		3.6
	Sugar	Thousand tons	5.0		5.0
Tajikistan	Bread grain	Thousand tons		296.0	296.0
	Vegetable oils	Thousand tons	2.6		2.6
	Sugar	Thousand tons	0.1	8.4	8.5
Turkmenistan	Potatoes	Thousand tons	0.4		0.4
	Bread grain	Thousand tons		338.0	338.0
	Vegetable oils	Thousand tons	35.0	19.0	54.0
Uzbekistan	Potatoes	Thousand tons	9.7	71.0	80.7
	Bread grain	Thousand tons		1,478.0	1,478.0
	Sugar	Thousand tons	48.0	173.0	221.0
	Cotton fabric	Million meters	17.0	0.3	17.3
	Cars	Thousands	0.6	0.3	0.9
	Trucks	Thousands	0.4	0.1	0.5

Feasibility Study: Turkmenbashi Port Development, Phase 1 Draft Report, Louis Berger International, Inc. et al, March 1996

Traditional trade flow patterns have over the past few years been seriously disrupted due to outbreak of hostilities or as a result of political actions:

- Azerbaijan's armed conflict with Armenia, and Armenia's occupation of the territory of Nagorno Karabak has according to government estimated cost the Azeri economy losses of USD 5 billion. The region had a population of 820.000 and used to produce approx. 15% of the GDP of Azerbaijan.
- The very important border rail station between Azerbaijan and Iran located at Jolfa, which prior to the outbreak of hostilities had a throughput capacity of 300 railcars per day, is closed. At any point in time more than 3000 Soviet railcars were in operation inside the territory of Iran. Currently this border station is occupied by Armenian forces.
- The outbreak of hostilities in Chechnya caused Russia to close the border with Azerbaijan in September 1994. This caused a significant disruption of the transit rail traffic between Russia and the Central Asian republics via the Caspian Sea rail ferry.
- Internal disruptions and armed insurgents in Georgia has prevented Georgian authorities from guaranteeing the safe passage of rail traffic through its territory. Only recently (spring 1996) were Georgian authorities able to guarantee safe rail

passage through its territory. Large volumes of cargoes have already been shipped on this route due to both and cost savings compared to alternative transportation routes.

- Diplomatic differences between Azerbaijan and Russia concerning among other issues the rights to oil fields in the Caspian Sea basin caused Russian authorities to close the Volga-Don waterway system to Azeri vessels effective November 1995. It was reported that the sanctions against Azeri vessels were lifted on May 24 or 25, 1996, but this has not been confirmed.

Due to these disruptions of traditional transportation patterns, new transportation routes have been opened or enlarged:

- Cargoes to both Azerbaijan and Turkmenistan as well as the other Central Asian Republics have been shipped by ship through Bandar Abbas, Iran and then by truck to the ultimate destination. Cargoes to and from the United States cannot, however, be shipped on this route, and will have to be shipped on alternate routes.
- The Volga/Don waterway system is being used as an alternative. The major limitations are the fact that the system is closed six months of the year due to ice and draft limitations in the locks limiting the cargo carrying capacity of the vessels. An oil company engaged in oil exploration and production in Turkmenistan is reported to have shipped its supplies from Italian and Greek ports through the Black Sea and the Volga/Don river system to and from Turkmenbashi.
- Use of the Russian rail system through Kazakhstan. Food and other supplies to Azerbaijan from Europe and the European CIS countries have been shipped through Russia, Kazakhstan and Turkmenistan and then via the ferry from Turkmenbashi to Baku.

The upheavals and disruptions both in the regional economies and as a result of hostilities is also reflected in the cargo statistics of the ferry service. As shown in Table 4.5 there has been a dramatic decline in the ferry traffic up until 1994. From 1994 to 1995 the cargo volumes increased more than 27%. Despite the lack of facilities both at the terminal and onboard the vessels to handle truck traffic efficiently, the volume of trucks on the ferries has increased, which is illustrated in Tables 4.6 and 4.7.

**Table 4.5 Ferry statistics for 1989 to 1. qtr 1996 Baku - Turkmenbashi (in thousands of tons)**

Route	1989	1990	1991	1992	1993	1994	1995	1996 (First qtr.)
Baku - Turkmenbashi	1995.0	1312.0	913.0	525.0	208.0	241.0	314.0	114.8
Turkmenbashi - Baku	1722.0	903.0	712.0	333.0	314.2	309.6	458.0	188.9
Turkmenbashi - Bekdash	192.0	182.0	162.0	143.0	108.2	36.8	21.0	0.0
Bekdash - Turkmenbashi	203.0	254.0	277.0	236.0	180.3	83.3	55.0	3.5
Baku - Bekdash	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0
Bekdash - Baku	392.0	321.0	276.0	235.0	116.3	1.9	0.0	2.0
Baku - Aktau - Baku	17.0	12.0	20.0	10.0	0.0	0.0	0.0	0.0
Ferries total	4521.0	2984.0	2360.0	1482.0	927.0	673.2	858.0	309.2
Passenger traffic on ferry	315	205	178	103	93	52	48	14

Source: Caspian Shipping Company

**Table 4.6 Number of units carried by the ferry Baku - Turkmenbashi - Baku**

	1990	1991	1992	1993	1994	1995	1996 (First qtr.)
Railcars	32510	23510	11941	6431	7788	8173	1206
Trucks and trailers					6661	12446	2210
Cars					5154	6370	955
Total trucks and cars				20234	11815	18816	3165

Source: Caspian Shipping Company

**Table 4.7 Volumes of cargoes and passengers handled in the port of Baku**

	1992	1993	1994	1995	1996 (First qtr.)
Total in the port (1000 tons)	1783.3	1156.6	961.0	923.5	148.3
Ferry cargoes (1000 tons)	1094.8	638.5	553.7	781.5	116.2
Baku - Turkmenbashi (1000 tons)	533.5	234.9	232.7	317.7	22.8
d.o. Railcars	7113	2830	3277	3282	280
Turkmenbashi - Baku (1000 tons)	561.3	403.6	321.0	463.8	93.4
d.o. railcars	7531	4892	4532	4848	953
Number of vehicles leaving Baku					
Trucks	4524	5014	2767	6206	739
Cars	3745	5095	2423	4124	306
Number of passenger leaving Baku	54128	50213	23542	20715	2217

Source: International Sea Port of Baku

### 4.3 Commodity Statistics of Cargoes Carried on the Ferry Service

A review of the commodity statistics of the ferry traffic for 1993 through 1995 as presented in Tables 4.8 and 4.9 show that:

- The trade from Baku to Turkmenbashi (Table 4.8) increased consistently from 133,800 tons in 1993, 154,500 tons in 1994 to 234,800 tons in 1995. The increase is primarily accounted for by machinery and equipment, which increased from 11,200 tons in 1993 to 57,900 tons in 1994 and 134,100 tons in 1995. Other cargoes that increased significantly in this period are:
  - Various ores from 4,400 tons in 1993 to 25,400 tons in 1995
  - Meats and oils from nothing in 1993 to 15,500 tons in 1995
  - Chemicals, exc.. ammonia from nothing in 1993 to 10,600 tons in 1995. From 1993 to 1995 the transportation of raw textile fiber (primarily cotton) dropped from 67,000 tons in 1993 to 5,900 tons in 1995. Other cargoes showed a relatively stable pattern.
- The trade from Turkmenbashi to Baku (Table 4.9) has shown a more erratic pattern with the cargo volumes declining from 231,400 tons in 1993 to 204,700 tons in 1994. In 1995 the total volume increased dramatically to 344,400 tons. The commodities that caused this dramatic increase are in the main:
  - Cement increased from 16,400 tons and 11,400 tons in 1993 and 1994 respectively to 83,500 tons in 1995.
  - Machinery and equipment dropped from 77,800 tons in 1993 to 50,900 tons in 1994 and then increased to 106,500 in 1995.
  - Grain and milled products (flour) increased steadily from 23,600 tons in 1993 to 34,500 tons in 1994 and 39,400 tons in 1995.
  - Building materials, which increased from 1,500 tons and 1,000 tons in 1993 and 1994 respectively to 24,100 tons in 1995.
  - Chemicals excluding ammonia, which dropped from 13,400 tons in 1993 to merely 4,000 tons in 1994, increased to fully 27,300 tons in 1995.
  - Salt, of which nothing was transported in 1993, increased to 4,400 tons in 1994 and 7,300 tons in 1995.

At the same time two commodities showed a dramatic decline from 1993 to 1995:

- Oil and oil products, which in 1993 and 1994 accounted for a major share of the total westbound cargo volume (i.e. 46,400 tons or 20% in 1993 and 60,600 tons or 30% in 1994) dropped dramatically to merely 6,200 tons in 1995, which is merely 2% of the total westbound cargo tonnage carried by the ferry in that year.
- Industrial raw materials accounted for 12% of the total cargoes carried or 28,800 tons in 1993. In 1994 and 1995 these commodity group were but only 6,800 tons in 1994 and 8,700 tons in 1995.

The cargo statistics do not reflect the hypothesis presented by observers of the trade that the increase in cargo flows from 1994 to 1995 is a result of humanitarian aid and commercial food transportation volumes that will not be repeated in the future. The change is more a reflection of the change in the direction of the trade within the Central Asian republics, which has favored the ferry between Baku and Turkmenbashi. The closing of the Chechnya/Dagestan corridor has also contributed to increase the volumes of cargo shipped to Azerbaijan from Russia via rail on the Turkmenbashi to Baku ferry connection (e.g. machinery and equipment). At the same time closing of the northern corridor has resulted in an increase in the shipment of various industrial goods in addition to fruits and

vegetables to Russia, Ukraine, Belorussia and the Baltic states by truck via the ferry from Baku to Turkmenbashi.

**Table 4.8 Commodity statistics for the Caspian Sea ferry service from Baku to Turkmenbashi and Bekdash (in thousands of tons)**

Commodity:	Baku to Turkmenbashi			
	1993	1994	1995	1996/6mo
Grain	0.0	0.0	0.0	26.4
Perishable goods	1.3	8.8	0.8	1.4
Meat, oils etc.	0.0	8.6	15.5	
Raw textile fibers	67.0	2.9	5.9	0.3
Machines, equipment, etc.	11.2	57.9	132.1	50.2
Various ores	4.4	23.0	25.4	
Building materials	2.1	1.1	2.8	
Industrial raw materials	7.2	4.0	5.1	0.1
Chemicals, exc.. ammonia	0.0	9.4	10.6	1.8
Alcohol, wine, vodka, water	12.1	11.0	7.9	
Oil and oil products packed and in bulk	5.8	9.6	9.5	
Other cargoes	22.7	18.2	19.2	27.9
Weight of railcars/trucks	74.2	86.5	79.2	23.8
Total	208.0	241.0	314.0	131.9
Net cargoes	133.8	154.5	234.8	108.1

Source: The Caspian Shipping Company

**Table 4.9 Commodity statistics for the Caspian Sea ferry service from Turkmenbashi to Baku. (in thousands of tons)**

Commodity:	Turkmenbashi to Baku			
	1993	1994	1995	1996/6mo
Grain and milled products	23.6	34.5	39.4	7.1
Salt	0.0	4.4	7.3	0.6
Perishable goods	2.9	8.8	5.8	1.2
Meat, oils etc.	0.8	5.3	2.8	
Raw textile fibers (incl. cotton)	0.3	1.0	2.0	9.8
Misc. metals	5.6	9.8	11.5	
Machines, equip. etc.	77.8	50.9	106.5	
Cement	16.4	11.4	83.5	41.8
Building materials	1.5	1.0	24.1	
Industrial raw materials	28.8	6.8	8.7	11.7
Chemicals, exc.. ammonia	13.4	4.0	27.3	2.9
Alcohol, vodka, wine, water	0.3	1.9	3.6	
Oil and oil products, packaged and in bulk	46.4	60.6	6.2	
Wood products	0.0	0.5	1.3	0.2
Paper and pulp	0.0	0.6	0.9	0.2
Other cargoes	13.6	4.2	13.5	56.9
Weight of railcars/trucks	81.0	92.4	109.1	44.6
Total	312.4	298.1	453.5	177.0
Total cargoes	231.4	205.7	344.4	132.4

Source: The Caspian Shipping Company

#### 4.4 Origin/Destination Analysis of Cargo Flows on the Ferry

No official statistics or data are available on the origins and destinations of the cargoes transported on the ferry link. As a result it was necessary to go to the source data to ob-



tain information. With respect to the rail cargoes, the manifests for all ferry departures in both directions were analyzed for a six month period from May through October 1996. For cargoes carried by truck no manifests were available. The only records available on the cargoes carried by the trucks were kept by the border police. It was, however, not possible to review these records. As a result the data on the origin and destinations of trucks had to be collected by counting the number of trucks at the ferry terminal, interviewing the truck drivers and also representatives of the border police.

#### **4.4.1 Origin/Destination of Rail Cargoes**

The analysis of the 3164 loaded railcars transported in both directions has shown that the average net cargo loaded on each railcar is considerably higher than has been previously assumed. While in most analyses reviewed the average load of railcars in the Central Asian and FSU-countries' rail systems have been referred to as having an average load of between 40 to 45 tons, analysis of the manifests showed the average load to be 56 - fifty-six - tons. It was further found that there is little difference in the loads between the eastbound and westbound directions.

In the period of analysis the loaded rail cargoes were highly imbalanced with a total of 1409 railcars, of which 109 were empty, were transported eastbound in the six month period of 1996 that was analyzed. The total load of cargoes were 71,863 tons. In the westbound direction on the other hand a total of 1864 railcars were transported, all loaded, which is 32% more than in the eastbound direction. The total westbound load was 105,216 tons.

In the eastbound direction the cargoes transported were dominated by grain cargoes carried from the ports of Batumi and Poti in Georgia to Uzbekistan. In the period analyzed these cargoes accounted for fully 50% of the total number of loaded railcars and 67% of the total cargoes carried. In addition there were cargoes originating in Georgia destined for primarily Turkmenistan and Uzbekistan accounting for another 21% of the total railcars and 13% of the total cargoes. The major cargo was tea from Georgia primarily to Turkmenistan. This tea is reported to be payment for gas in a barter arrangement between Georgia and Turkmenistan. The total cargoes originating either in Georgia or in Georgian ports thus account for fully 71% of the total cars and 80% of the total loads. The remaining of the cargoes are accounted for by cargoes from Azerbaijan to Turkmenistan and to lesser extent to Uzbekistan. Cargoes to the other Central Asian republics (Kazakhstan, the Kyrgyz Republic and Tajikistan) and to Russia represented relatively speaking minimal volumes.

In the westbound direction the single largest cargo group was cement, which accounted for a total of 45% of railcars and 52% of the total cargo volume. This cement is primarily coming from Turkmenistan and also from Uzbekistan and is primarily destined for Azerbaijan. The second largest cargo was cotton, which accounted for 27% of the total cars and 23% of the total cargo volume. This cotton is primarily coming from Uzbekistan, but also from Turkmenistan, and virtually all of it were destined for the ports of Batumi and Poti in Georgia for shipment to overseas markets. Thus it can be concluded that the two major cargoes, cement and cotton, account for fully 68% of the total railcars and 75% of the total cargoes.

The analysis has clearly indicated the vulnerability and dependence of the rail transportation on relatively few high volume cargoes, i.e. imported grain to Uzbekistan in the east-

bound direction and transit of cotton via Georgian ports and cement to Azerbaijan in the westbound direction. To a large extent this is a reflection of the depressed state of industrial and agricultural production in the Central Asian republics.

The origin/destination statistics are summarized and presented as Table 4.10 for eastbound cargoes and Table 4.11 for westbound cargoes.

**Table 4.10 Rail ferry manifests from May - October 1996 - Eastbound.**

Origin	Destination	Type of cargo	No. of cars	% of total	Weight (kg)	% of total		
Azerbaijan	Kazakhstan	Oil eqpt./machinery	21		1,103,000			
		Oil and oil products	8		434,000			
		Misc. chemicals	1		43,000			
		Tea	1		30,000			
		Wine making eqpt./materials	9		336,000			
		Misc. general cargoes	1		15,000			
		Containers, HH and gen. cargoes	2		54,000			
Total Azerbaijan			43	3%	2,015,000	3%		
Azerbaijan	Kyrgyzstan	Oil and oil products	1		59,000			
		Containers, HH and gen. cargoes	2		26,000			
		Wine	1		28,000			
Total Azerbaijan			4	0%	113,000	0%		
Azerbaijan	Russia	Oil eqpt./machinery	15		728,000			
		Misc. general cargoes	8		351,000			
		Containers, HH and gen. cargoes	7		59,000			
Azerbaijan	Tajikistan	Tea	30	2%	1,138,000	2%		
Azerbaijan	Turkmenistan	Caustic soda	1		23,000			
		Oil and oil products	13		572,000			
		Electrical appl./equipment.	17		966,000			
		Polyethylene	5		51,200			
		Misc. chemicals	10		413,000			
		Misc. chemicals	2		64,000			
		Oil eqpt./machinery	79		4,791,000			
		Tea	1		21,000			
		Misc. general cargoes	21		870,000			
		Containers, HH and gen. cargoes	2		8,000			
		Empty tankcars/railcars	92		0			
		Total Azerbaijan			242	17%	7,756,200	11%
		Azerbaijan	Uzbekistan	Misc. general cargoes	1		63,000	
				Oil and oil products	5		279,000	
Misc. chemicals	3				135,000			
Oil eqpt./machinery	23				1,296,000			
Electrical appl./equipment.	4				27,400			
Butter	10				590,000			
Polyethylene	3				120,000			
Containers, HH and gen. cargoes	7				35,000			
Empty wagons/passenger cars	15				0			
Total Azerbaijan					71	5%	2,545,400	4%
Grand total	Azerbaijan				391	28%	13,590,600	19%
Finland	Turkmenistan	Oil and oil products	5		301,000			
Georgia	Tajikistan	Tea	1		10,000			
Georgia	Kazakhstan	Tea	4		154,000			
		Misc. chemicals	5		231,000			
		Polyethylene	1		16,000			
		Misc. general cargoes	5		134,200			
		Empty railcars	2		0			
		Total			17	1%	535,200	1%
		Georgia (port)	Kazakhstan	Frozen foods. chicken legs	18		758,000	
Georgia (port)	Kyrgyzstan	Tea	3		87,000			

Origin	Destination	Type of cargo	No. of cars	% of total	Weight (kg)	% of total
Total		Wine etc.	9		486,000	
Georgia (port)	Russia	Misc. chemicals	12	1%	573,000	1%
		Misc. general cargoes	6		277,000	
Total			4		142,000	
Georgia (port)	Tajikistan	Tea	10	1%	419,000	1%
Georgia (port)	Turkmenistan	Tea	3		71,000	
		Textiles	174		4,758,000	
		Misc. general cargoes	23		628,000	
Total			2		28,000	
Georgia (port)	Uzbekistan	Tea	199	14%	5,414,000	8%
		Misc. general cargoes	7		155,000	
		Misc. chemicals	24		949,000	
		Grain, in transit from Poti/Batumi	3		150,000	
		Total	710		48,750,000	
Grand total	Georgia		744	53%	50,004,000	70%
Rumania	Tu, Jebel	Misc. general cargoes	1,004	71%	57,784,200	80%
Ukraine	Tu, Ovjezberdi	Misc. general cargoes	1		42,000	
Unknown	Unknown	Containers, HH and gen. cargoes	2		134,000	
		Total	6		12,000	
		Empty	1,409		71,863,800	
			109		0	

**Table 4.11**  
**Rail ferry manifests from May - October 1996 - Westbound.**

Origin	Destination	Type of cargo	No. of cars	% of total	Weight (kg)	% of total
Kazakhstan	Azerbaijan	Cereals, flour, grain	13		842,000	
		Cement	2		130,000	
		Sugar	4		260,000	
		Steel products	6		376,000	
		Other building materials.	9		584,000	
		Misc. equipment and parts	4		54,000	
		Containers, HH and others	3		6,200	
		Misc. gen. cargo	1		15,000	
Total			42	2.3%	2,267,200	2.2%
Kazakhstan	Georgia	Cereals, flour, grain	6		384,000	
		Misc. gen. cargo	1		50,000	
Total			7	0.4%	434,000	0.4%
Kazakhstan	Russia	Containers, HH and others	1		3,000	
Total from	Kazakhstan		50	2.7%	2,704,200	2.6%
Kyrgyzstan	Azerbaijan	Containers, HH and others	3		8,700	
		Misc. gen. cargo	1		21,000	
Total from	Kyrgyzstan		4	0.2%	29,700	0.0%
Latvia	Azerbaijan	Misc. gen. cargo	1		20,000	
Total from	Latvia		1	0.1%	20,000	0.0%
P.R. of China	Azerbaijan	Steel pipes	3		135,000	
Total from	China		3	0.2%	135,000	0.1%
P.R. of						
Russia	Azerbaijan	Cement	1		64,000	
		Cereals, flour, grain	1		65,000	
		Fuel oil etc.	10		27,000	
		Sugar	6		390,000	
		Building materials	1		64,000	
		Steel products	11		698,000	
		Misc. equipment and parts	9		243,000	
		Containers, HH and others	27		97,400	
		Misc. gen. cargo	6		217,000	

Origin	Destination	Type of cargo	No.of cars	% of total	Weight (kg)	% of total
Transit via Nakhodka	Azerbaijan	Containers (HH and others)	1		7,200	
Total from Tajikistan	Russia		73	3.9%	1,872,600	1.8%
Total from Turkmenistan	Azerbaijan	Containers, HH and others	1		12,000	
	Tajikistan		1	0.1%	12,000	0.0%
	Azerbaijan	Cement	494		31,919,000	
		Building materials	35		2,090,000	
		Salt	4		261,000	
		Sulfur	121		8,294,000	
		Steel products	4		52,000	
		Containers, HH and others	21		67,960	
		Misc. equipment and parts	1		33,000	
Total Turkmenistan	Georgia	Fuel oil etc.	680	36.5%	42,716,960	40.6%
		Building materials	43		2,356,000	
Total Turkmenistan	Russia		1		20,000	
		Building materials	44	2.4%	2,376,000	2.3%
		Cotton	14		654,000	
		Misc. equipment and parts	4		180,000	
		Misc. gen. cargo	2		26,000	
		Misc. gen. cargo	2		26,000	
		Containers, HH and others	1		2,000	
Total Ukraine	Turkmenistan		23	1.2%	888,000	0.8%
Grand total Uzbekistan	Azerbaijan	Steel products	747	40.1%	45,980,960	43.7%
	Ukraine		13		844,000	
	Azerbaijan		13	0.7%	844,000	0.8%
		Building materials	86		5,184,000	
		Cement	355		23,386,000	
		Misc. equipment and parts	3		23,000	
		Cotton	1		49,000	
		Steel products	4		172,000	
		Containers, HH and others	9		51,600	
		Misc. gen. cargo	4		156,000	
Total Uzbekistan	Georgia	Misc. gen. cargo	462	24.8%	29,021,600	27.6%
Uzbekistan	Transit via Georgian ports		1		7,000	
	Uzbekistan	Cotton	509	27.3%	24,589,000	23.4%
Grand total Summary total			972	52.1%	53,617,600	51.0%
			1864	100.0%	105,216,060	100.0%

#### 4.4.2 Origin/Destination of Truck Cargoes

In the period that the survey of the truck transportation (i.e. October 1996) was undertaken, it was the peak of the fruit and vegetable export season in Azerbaijan. It was pointed out by observers that the volume of truck transportation is seasonal with peaks when the respective harvesting seasons of the Central Asian countries are going on. Another feature of the situation was the fact, as was pointed out by virtually all the truck drivers, that although the road through Dagestan is formally open to reach Russia, the road is virtually impassable and the danger of being hijacked by highway robbers is so prevalent that for practical purposes this road can be considered closed. As a result most of the trucks that were waiting for space on the ferry were local trucks with fruits destined for Russia (primarily western Russia) and the Ukraine to sell their goods. These trucks ranged from small distribution trucks with cargo capacity of 5 to 7 tons up to large used European semitrailers with loads of 14 to 16 tons up to 20 tons. These intrepid drivers, most of whom were local Azeris, drive through Turkmenistan and Kazakhstan to reach

their markets in Russia. Most find return cargoes in the form of agricultural products such as potatoes or various general cargoes such as tires, spare parts, steel products etc.

During the period observed in Baku more than 100 trucks were at all times waiting to be transferred by the ferry across to Turkmenbashi. According to reports from the truck drivers interviewed arriving from Turkmenbashi, the same situation existed there. It was reported that the average waiting time at either side was five to six days, although we found trucks that reportedly had been waiting up to 10 days to obtain space on the ferry.

According to statistics obtained from the border police in Baku and our observations the following comments with respect to the truck cargoes can be made:

- On average a total of 400 trucks leave in the eastbound direction per month, while 350 arrive in Baku from Turkmenbashi. Approx. 5% of the departing trucks are empty, while 15-20% of the arriving trucks are empty.
- The nationality of the trucks are distributed with 25% from the CIS countries, 65% from Azerbaijan and 5% from foreign countries. Most of the CIS trucks are Russian, while the foreign trucks are dominated by Turkish trucks followed by Iranian. Occasionally European trucks, i.e. British, Dutch, Bulgarian and other European nations' trucks are coming.
- The origin/destination of the trucks are in the main as follows:
  - Azeri trucks:
    - 70% Russia
    - 15% Ukraine/Belorussia/Baltic states
    - 15% Central Asia
  - CIS trucks:
    - 1/3 Ukraine
    - 1/3 Russia
    - 1/3 Belorussia/Moldova/Georgia/Baltic republics
  - Foreign trucks:
    - 100% Central Asian republics
- The CIS trucks arrive with various products that cannot be produced locally such as spare parts for machinery and cars/trucks, building materials, tires, steel bars etc. They return with fruits and vegetables or go back empty.
- The local trucks normally carry local fruits and vegetables and return with whatever cargoes can be found. In the season Azeri truck carry fruits to Russia, while Turkmen trucks carry watermelons and other fruits. These trucks also carry local industrial goods, such as air conditioners, refrigerators and various appliances, oil exploration and production equipment.
- The foreign trucks, dominated by Turkish registered vehicles, carry to a large extent project cargoes and various consumer goods to Turkish joint ventures in the Central Asian republics. Some recent major projects mentioned were reconstruction of a hotel in Alma Ata, for which virtually all building materials and construction equipment were transported by truck. In another project a Turkish company constructed a flour mill in Kazakhstan, for which everything was trucked by Turkish and Iranian truckers. Some of the European trucks carried

food aid, while others carried all types of general cargoes from vodka to machinery. It is reported to be from 2 to 3 up to 10 trucks per month from Europe in each direction.

An important observation is that in terms of number of units carried, trucks clearly dominate the overall cargo volumes transported by the ferries. It must, however, be recognized that the average load of cargoes carried by the trucks is considerably less than those of the railcars. From a revenue generating point of view on the other hand the trucks have the potential of generating substantially more revenues for the ferry operator compared to the railcars.

At the same time it has to be recognized that a major portion of the current truck traffic is destined for and originating in western Russia, Ukraine and the Baltic republics. These trucks are forced to divert their cargoes via the ferry and drive through Turkmenistan and Kazakhstan, which is an extensive diversion compared to the direct route through Dagestan and Chechnya. Once the truck route through Dagestan is reopened and can be declared to be safe for transit, or alternatively that a ferry route between Baku and Astrakhan/Olya in the Volga delta or between Baku and Aktau is opened, a major portion of the current truck traffic will most likely disappear from the ferry between Baku and Turkmenbashi.

#### **4.5 The Regulatory, Legislative Environment and Invisible Trade Barriers**

In addition to the physical barriers that may influence the development of the ferry services, there are also several other institutional and other invisible or intangible barriers that may act as obstacles to the development of the business and the future cargo flows of the ferry service.

All the executives of the freight forwarders, the trucking company executives as well as the truck drivers contacted have given positive comments and a consensus on the need for the ferry service between Baku and Turkmenbashi. They have also indicated a desire for new ferry links between Baku and Aktau, and also Baku and Astrakhan in the Volga delta of Russia, the latter to avoid the current problems of hijacking, highway robberies and a general lack of proper roads through Dagestan. There is also consensus on the potential for significant increases in the volume of cargoes to be transported on the ferry link in the future.

At the same time there is general dissatisfaction with the lack of schedules, sanitary conditions, the lack of proper terminal facilities, the lack of services and not the least waiting time to get on board the ferry. The worst of these is the waiting time, and we have received reports from virtually all interviewed that the normal waiting time with few exceptions at either end of the ferry link is five to six days, and may extend up to ten to twelve days, even though ferries may be available to make a crossing.

This reflects an exceptional bureaucratic process in assigning space on board vessels and delays in proding customs clearance. It also sets a framework whereby the payment of an extra, unofficial, tarriff will ensure a more speedy transit process. The total tariff paid can represent a premium of between 100% and 150% of the official rate. The official fare is USD 25 per meter, which for a tractor/eurotrailer of 16 meters will be USD 400.

For international transportation companies the efficient utilization of their fleet of vehicles is absolutely mandatory in order to remain competitive and operate at a profit. The waiting time at either end of the ferry means increased direct costs and opportunity costs in terms of lost revenues for the operators. These costs along with the official ticket price and unofficial payments have to be calculated into the cost of transportation for a trip using the ferry.

This has resulted in a negative impact on the truck traffic on the ferry:

- The international trucking companies with access to TIR carnets are increasingly diverting their trucks via two alternative routes depending on their destination in Central Asia:
  - The southern route via Turkey and Iran and then through Turkmenistan.
  - The northern route via Turkey and then by ferry from Turkish Black Sea port to Novorossisk, Russia and then by road to and from the place of discharge/loading in Central Asia.

Although these routes are considerably longer in kilometers than the direct route via the ferry, the cost of unofficial pricing combined with the extensive and unpredictable waiting time have prompted the truckers to select the longer routes.

- The ferry is primarily being used by local (Azeri) and CIS based truckers without access to TIR carnets, and who therefore have no possibility other than to use the ferry to transport their cargoes. Representatives of these truckers interviewed have clearly stated that they would have selected other routes if such were available to them to avoid the waiting time and additional unofficial tariff imposition.

#### **4.6 Institutional Requirements**

To eradicate the problems will require that new management structure is put in place to deal effectively with procedures, operations and pricing. It must also deal with the practice of the Caspian Shipping Company of operating the ferry service on an ad hoc schedule and not starting a voyage until the main deck is filled with railcars and trucks. Truckers are reported to have been forced to wait five to six days or more, which is a strong deterrent to use the services of the ferry.

Such factors can represent more serious deterrents to the future development of the ferry link than lack of proper infrastructure and terminal facilities.

### **5. GENERAL DEVELOPMENTS IN TRANSPORTATION AND INFRASTRUCTURE INFLUENCING THE FERRY TERMINALS AND FERRY SERVICE ROUTE.**

The purpose of this section is to describe the general developments in the world transportation industry that may influence the future development of the ferry link and the ter-

minals in Turkmenbashi and Baku, and also present business opportunities that may present themselves to the terminals and the ferry service as a result of these developments.

## 5.1 General Trends and Developments in the Transportation Industry

While it will be outside the scope of the present project to describe an overview of developments in the world transportation industry, there are, however, some general developments that will be highly pertinent and germane to the future development of the port of Baku:

- Focus on transportation and logistics. Industrial companies have increasingly recognized transportation as an important function in their overall cost structure. Physical distribution, transportation and logistics management using techniques such as "just in time" (JIT) and others are increasingly used to put focus on the material handling, warehousing and transportation costs of a company. Increasingly freight forwarders are being employed by the companies as specialists to assist in finding the best transportation and logistics management solutions.
- The freight forwarding industry. From being a highly fragmented industry with small entities operating locally or at most nationally within a country primarily providing documentary and customs clearance services, the freight forwarding industry is developing to be dominated by major international and multinational groups with offices and operations worldwide employing tens of thousand employees providing a wide variety of transportation and related services to their customers. These companies control vast volumes of cargoes, and are able on behalf of their customers, the users of transportation services, to negotiate favorable terms for transportation and other services. The industry is currently dominated by companies located in Germany, Switzerland, Japan and Sweden. Major forwarding companies working for the oil industry is already establishing a presence in Baku. Others are expected to follow as the volumes of cargoes transported to and from and also through Baku to and from the Central Asia Republics are increasing. The freight forwarders represent an important customer group for the ferry and the terminal operators.
- The unitization and containerization of the general cargo trades. In order to reduce the handling cost, reduce the need for packing, reduce the possibility of cargo damage and theft and to enable the multimodal handling of the cargoes, general cargoes shipped in national and international trades are increasing unitized in trailers or in containers. Currently an average of 80% of the general cargoes shipped in international trades is containerized.
- The international container transportation companies have changed from being merely shipping companies providing water transportation services to become providers of multimodal transportation services using all modes of transportation between ports and so called "Container Yard" (CY). Through bills of lading are often issued to such CYs. The port of Baku has the potential to become and should endeavor to establish itself as a CY. (Please see Section 5.5.4 below.)
- General cargoes that are shipped in large quantities to warrant shipment in full or partial shipload lots, also called neobulk cargoes, are often transported in purposebuilt or specially adapted vessels, such as ro-ro automobile carriers, spe-



cialized reefer vessels for perishable and frozen cargoes, "open hatch" bulk vessels for forest products etc. Such specialized may also be introduced on the Caspian Sea and the Russian waterways.

- Emphasis on road as opposed to rail transportation. The transportation philosophy and policy of the former Soviet Union was to use the inland waterways and the railroad system for long distance transportation, and trucks for short distance and local transportation and distribution. In the rest of the world use the inland waterways where available and navigable is important for the transportation of bulk cargoes. For land transportation trucking has increasingly captured market shares from the railroads and in most countries the truck transportation industry performs most of the transportation work performed.<sup>5</sup> The railroads have responded to the challenge posed by the truck transportation industry by providing services that can be competitive with or complementary to the trucking industry (e.g. TOFC (trailer on flat car) or COFC (container on flat car) services).
- Truck transportation companies and freight forwarders in their efforts to reduce the cost of transportation are increasing shipping unaccompanied trailers (e.g. 13.60 meter Eurotrailers) via ferries in short sea trades or by railroad (TOFC). At the port or railroad station of destination the trailers are met by a truck, which transports the trailer to the destination. Subsequently the trailer is reloaded and returned unaccompanied by ferry or rail. It is expected that such services will also develop on the ferry service between Baku and Turkmenbashi and other ferry links that may be developed to and from the port of Baku.

The successful terminal and ferry operators of the world, both large and small, have recognized and adapted to the requirements of the users of transportation services and the major participants in the transportation industry. For the ferry terminals in the ports of Baku and Turkmenbashi and the ferry operator it will be important to redefine its role in the transportation scene of the region in view of the general developments in the local, regional and worldwide transportation industry.

## 5.2 Developments in the Short Sea and Ferry Transportation

The Caspian Sea shipping services are comparable to the trades in the Baltic and North Sea and in the Mediterranean areas, and some observations of the developments of these trades may be relevant to the trades served by the port of Baku:

- The ferry transportation market has become more clearly segmented. The segments are:
  - Leisure/cruise/ recreational market - this market is served by modern passenger ferries with all types of facilities for passengers. The main source of income is the sale of tax free goods (e.g. alcoholic beverages, tobacco, chocolate and candy etc.). Transportation of trucks and trailers (and in some instances also railcars) is a supplementary source of revenues.

---

<sup>5</sup> In some European countries the use of truck transportation has become so pervasive as to congestion and pollution that laws and regulation have been imposed prohibiting truck transportation industry to operate during the weekends (e.g. Germany) or to limit the through traffic of trucks (e.g. Austria).

- The transportation market - this market is divided in two segments:
  - Passenger transportation with fast ferries - these services are provided by catamaran or monohull fast ferries capable of transporting up to 500 to 600 passenger in addition to automobiles (and in some cases buses)
  - Ferry transportation of trucks and trailers - this is performed by combination passenger and truck/trailer/container ro-ro vessels. The number of passengers/drivers that can be accommodated is generally limited (e.g. up to 12 to avoid the need for a passenger certificate and up to 250 - 300 passenger spaces). These vessels are generally referred to as ro-pax vessels by the ferry industry. The "Dagestan" type vessels of the Caspian Shipping Company serving the ferry link between Baku and Turkmenbashi would be considered typical ro-pax vessels.
- The liner transportation market - this market is served by small general cargo vessels (typical cargo capacity from 3,000 to 8,000 dwt) carrying general cargoes in break bulk and containers. Some vessels are also equipped to handle rolling cargoes (ro-ro vessels). In addition small ro-ro or lo-lo container vessels (from 100 up to 1000 TEU capacity) provide container feeder services on regular routes between major container ports functioning as load centers and smaller ports not served by the large container vessels.
- The neobulk market - this market is often served by specialized vessels carrying full or partial shipload lots of general cargoes. Examples would be small reefer vessels carrying frozen fish, ro-ro automobile carriers, specialized vessels for forest products etc.
- Liquid and dry bulk vessels - most of these vessels are similar to those operating in the Caspian Sea. For some dry bulk trades vessels have been equipped with specialized cargo handling equipment onboard - so called "selfunloaders" - to reduce cargo handling cost and time.

### **5.3 General Developments in Transportation Influencing the Ferry Operations and the Modal Split on the Ferry Route**

Although the heritage of the former Soviet Union transportation system and policies will linger, it is expected that the transportation developments in the rest of the world will increasingly influence the developments in this region and thereby also the traffic patterns and modal split of the cargoes transported on the ferry.

#### **5.3.1 Rail Transportation**

As a result of the heritage from the Soviet times of heavy investments in the railway infrastructure and rolling equipment for the long haul transportation, rail transportation will necessarily remain a major mode of transportation in the future. For long haul inland

transportation of liquid and dry bulk materials, rail transportation will dominate also in the future. Rail will however be challenged by other modes of transportation:

- General cargoes will, however, increasingly be shifted to truck transportation and to containers.
- For overseas transportation of general cargoes, a major share will be containerized within a time period of five to seven years.
- Long haulage of bulk cargoes where bulk water transportation is available will take over some of the long haulage bulk trades from.
- General cargoes shifted to containers may be transported by block trains or by truck. Major limitation of the Central Asian railroads is the limited availability of container handling facilities, which will imply that containers will be transported by truck until railroads have acquired equipment to handle containers. Major investments in container handling equipment will be required for the railroads to be able to compete for container shipments

On the other hand rail transportation will be an important mode of inland transportation of domestic, regional and international transportation of containers or trailers (so called "huckeypack", "piggyback" or "trailer on flatcar" (TOFC). In this connection it can be expected that specialized container and trailer transportation trains or block trains will be established between ports and major load centers in the region. These block trains will in the near future also be a major feature on the ferry between Baku and Turkmenbashi catering to international container transportation between the ports in the Black Sea and the major centers in the Central Asian region as well as for the interregional container transportation between inland load centers.

To ensure the easy intermodal transfer of containers between rail and truck as well as rail and ships, container yards (CY) and trailer yards (TY) equipped with equipment to transfer containers and trailers between modes of transportation will be established in all major inland load centers in the Central Asian republics. The first of these inland CY and TY will be established in the port of Baku and shortly thereafter in the port of Turkmenbashi in connection with the newly opened (November 1996) block train service between the port of Poti and Baku and the redevelopment of the ferry terminals in both Baku and Turkmenbashi. By the year 2000 or shortly thereafter the expected surge in containerized transportation and unaccompanied trailers on trains (TOFC) will prompt the establishment of a network of container and trailer block trains between load centers and the development of CYs also in the other major load centers in the region.

### **5.3.2 Truck Transportation**

In the FSU truck transportation was primarily used for local transportation requirements as a supplement to the long haul rail or inland waterway transportation. As a result the road infrastructure is poorly developed and in many cases inadequate for heavy duty long haul truck transportation.

In western Europe on the other hand trucking is the dominant mode of transportation. In moves to reduce road congestion and air pollution restrictions have been placed on the use of truck transportation in some European countries. As a result of these restrictions

and in efforts to reduce the cost of transportation, trucking companies and forwarders are increasingly shifting to the use of unaccompanied trailers both on the major ferry connections and on the railroads (TOFC).

Despite the lack of adequate transportation equipment and the poor road infrastructure a move in favor of truck transportation, particularly of general cargoes, are observed both on the ferry between Baku and Turkmenbashi and on the roads in the Central Asian region in general. Currently this move is dominated by local trucking companies using Russian and old European trucks. Increasingly Iranian and Turkish trucks are observed on the roads, and also a few trucks from Western Europe. The Iranian trucks are carrying containers to and from the port of Bandar Abbas as well as exports and imports of Iran to the Central Asian republics, while the Turkish trucks are carrying exports and imports of Turkish companies, which are establishing a strong presence in Central Asia. The few European trucking companies are in the main carrying cargoes on behalf of European freight forwarders serving the oil industry in the region and other industrial enterprises establishing a presence in the region.<sup>6</sup>

Despite the current major limitations of the road network and the limited availability of trucks of international standard, trucking - including shipping of loose trailers both by rail as TOFC and on the ferry between Baku and Turkmenbashi - will increase significantly from the very low current base volume, and will during the first decade of the next century emerge as a dominant mode of transportation, particularly of general cargoes. Long distance truck haulage will increasingly be handled by international trucking companies, most of whom will operate from or have bases in the Central Asian republics in addition to Turkey and Iran. European truckers will increasingly participate in this haulage.

### 5.3.3 Intermodal Transportation of Containers

At the present time containerization of the Central Asian trade is so minimal to be equivalent to be nonexistent. One of the major reasons is a general lack of equipment and facilities to handle containers. Experience from other developing and emerging economies and trades should indicate that the containerization of the general cargo will reach international levels within a time period of between five to seven years. In the time period between 2000 and 2005 the level of containerization of the Central Asian general cargo trade will be expected to have reached the world level of approximately 80% .

As a result intermodal transportation of containers, which at the present time is virtually nonexistent, will increase dramatically. This will be driven by the shippers of imports of consumer goods, machinery and other manufactured materials to the Central Asian Republics, most of which will be containerized in the future in line with developments in the rest of the world. Container operators can be expected offer container transportation for exports from the Central Asian republics at favorable rates in order to avoid having to return their containers empty.

---

<sup>6</sup> As examples it can be mentioned that all the equipment for the new Coca Cola bottling plant in Baku, most of which was supplied by Western European companies, was transported to Baku by truck. The same was the case for the equipment supplied to the refurbished cotton textile and other industries of Turkmenistan. The trucks for the latter used the TRACECA route and the ferry between Baku and Turkmenbashi.

#### 5.3.4 Ship Transportation

Although the port of Baku and the ferry terminal is open to serve vessels of all nationalities, the ships of the Caspian Shipping Company (CSC) has dominated the use of the port and has had exclusive use of the ferry terminals in both Baku and Turkmenbashi. The challenge to the ferry operator will be to ensure that the service is competitive to be able to keep current and future cargoes in the event new operators establish services in competition with the ferry. Potential new competitive services could be:

- Nonscheduled bulk and general cargo shipping services on the Caspian Sea and Russian waterways. The ship transportation between Turkmenbashi and Baku will in the main be in the form of dry and liquid bulk cargoes that cannot be transported in a cost effective manner by rail and ferry. In the Soviet times such cargoes were also carried by the ferry regardless of the cost. It can be expected that some bulk cargoes that have been and currently are transported by rail and ferry will be shifted to ship transportation. Typical candidate cargoes that in previous times were shipped extensively in large quantities by railcars on the ferry, which have the potential to be transferred to ship transportation in bulk are various dry bulks, such as salt and sulfur, gravel and liquid bulks such as oil products.
- Entry of a conventional roll-on/roll-off (ro-ro) ferry vessels or lift-on/lift-off (lo-lo) container vessels to operate in competition with existing rail ferries between Baku and Turkmenbashi. The poor service level and extensive waiting times combined with the extortion and corrupt practices of the current ferry service could present itself as an excellent opportunity for an operator to establish a service in competition with the existing ferry. In the event that the ferry service in terms of availability of space, reliability and frequency is not improved combined with the increased truck/trailer/container traffic on the ferry link opens the possibility of and gives an incentive for other ferry operators to establish alternative services such as a conventional roll-on/roll-off (ro-ro) ferry for trucks and trailers, automobiles and passenger or alternatively a lift-on/lift-off (lo-lo) container ship in direct competition with the current Caspian Shipping Co. (CSC) operated ferry services. Potential competitors will most likely refrain from the transportation of railcars and leave that market segment to CSC or the operator of the rail ferries. The reasons for commercial ferry operators' reluctance to carry railcars are in the main:
  - The transportation of railcars requires special vessels equipped with special ramps and reinforced decks equipped with rails in the correct gauge.
  - Vessels equipped with rail carrying capacity are generally dedicated to special ferry routes, are not easily available in the market and command higher prices both to buy or to charter.
  - The railcars require substantial cubic capacity (space) and represent significant deadweight, which reduces the overall cargo carrying capacity of the ferries compared to the transportation of trucks, trailers and general cargoes.
  - The terminal facilities that have to be built for rail transportation are more costly than conventional port facilities. The additional investments made by

the terminal operators will have to be reflected in higher terminal charges and handling fees for rail ferries.

In addition to the Baku - Turkmenbashi link, the trade route between Baku and Aktau, Kazakhstan and between the new port of Olya in the Volga delta and both Baku and Turkmenbashi would most likely be the most interesting new links to open. The establishment of Baku as a CY (see below) would be an added impetus to the establishment of such ferry/feeder services.

The alternative to other operators coming in to establish such services will naturally be for the CSC to take preemptive actions by both improving its services on the existing service links and also establish new ferry links and thus utilize currently unused ferry and terminal capacity.

### **5.3.5 Passenger and Automobile Transportation**

The number of passengers and cars will most likely present a relatively stable growth. Since Turkmenbashi has a limited population and the distance to Ashgabat is very long, most of the current passenger traffic is and will for the foreseeable future continue to be small traders with limited recreational travel.

### **5.3.6 Air Transportation of Cargoes**

As a result of the lack of transportation infrastructure, uncertainties as to reliability of existing modes of transportation and time pressures large quantities of the early supplies of equipment and supplies to the oil industry and its contractors were airlifted both to Baku and Ashgabat. As the both the infrastructure and the reliability of transportation services on the TRACECA route is continually improved, shippers and consignees in close cooperation with their freight forwarders are shifting these cargoes to truck or container transportation. While air freighting of time critical materials can be expected to continue also in the future, the volume cargoes which previously were air freighted can be expected to be shifted to overland modes of transportation with trucks/trailers and containers as the dominant modes.

## **5.4 New Business Opportunities for the Ferry Terminals in Baku and Turkmenbashi**

There exist several opportunities for the establishment of new ferry services, which will create new business opportunities for and increase the business volume of the ferry terminals in Baku and Turkmenbashi. The major of these developments are described below.

### **5.4.1 Establishment of a Ferry Route Between Baku and Aktau, Kazakhstan**

The major export cargo to be shipped on this route would be grain and various metal products from Kazakhstan to world markets, most of which is currently shipped via Russian Black Sea and Baltic Sea ports. Kazakhstan is also a supplier of grain to Azerbaijan. Currently a long term intergovernmental agreement have been signed between the Azer-

baijan and Kazakhstan for the import of 100,000 tons per year to be shipped. According to officials of the importing organization, the State Corporation "Azerbreadproduct", their preference would be to ship the entire volume of imports from Kazakhstan via the ports of Aktau in Kazakhstan and Baku, since water transportation is the lowest cost alternative. However, due to the poor technical condition of the cargo handling equipment and the port facilities in Aktau resulting in unexpected delays and extra costs, it is unlikely that it will be feasible to ship more than approx. 30,000 tons by ship from Aktau in 1997, which equal to the volume in 1996. The remaining volume will have to be shipped by rail.<sup>7</sup> Since the grain is not originating in the Aktau area and is already in the railcars, shipment by rail ferry could be a cost effective alternative to shipment by bulk vessels and the additional loading and discharging operations in the ports of Aktau and Baku respectively.

Transit export cargoes coming from Kazakhstan include various chemicals. Transit imports include Lada automobiles reexported from Turkey and miscellaneous general cargoes.

Several of the freight forwarders, transportation companies and also shippers and consignees contacted as part of this project have pointed out significant cargo volumes to be shipped between Baku and Aktau and have requested that a ferry service be established. Interviews with the freight forwarders, trucking and container transportation companies have indicated future potential of increasing volumes of containerized cargoes and requirement of truck ferry transportation between Baku and Aktau, Kazakhstan, if regularly scheduled ferry or container feeder/ro-ro liner service had been available on this route. The primary cargoes generated by the freight forwarders and trucking and containers transportation companies would initially be equipment and supplies to the oil industry and their contractors operating both onshore and offshore in the Aktau area, transit cargoes from Turkey and Europe destined for points inland in Kazakhstan and exports of general cargoes from Kazakhstan destined for Azerbaijan and world markets, in addition to return of oil equipment by oil industry contractors once their assignments are completed. Presently these cargoes are partially shipped on the Baku-Turkmenbashi ferry service and transported via Turkmenistan and partially shipped the northern route via Dagestan and Russia. In future years the oil industry operating both offshore Aktau and onshore in the immediate hinterland will require substantial volumes of supplies. Currently most of the supplies for the oil industry is for oil exploration. When the development of the fields will be started shortly after the turn of the century, the volumes required by the oil industry will increase substantially.

The TRACECA route via Baku is expected to be a preferred transportation route based on the interviews with freight forwarders serving the oil industry. It has been indicated that initially a weekly service interval with fixed departure days and times, on which forwarders, transport companies and shippers/consignees can plan on being adhered to has been indicated as being satisfactory. Potential cargo volumes indicated by freight forwarders as being available currently could conservatively warrant a twice weekly schedule for a ferry with the capacity of those operated on the Baku - Turkmenbashi route.

---

<sup>7</sup> The cost of ship transportation was quoted as being USD 35 per ton, while transportation via rail on the Tchetchniya route would be USD 40 per ton (when the route is available). If the Tchetchniya route would continue to be unavailable as was the situation in 1996 the only route would be to ship by rail through Turkmenistan and onwards by ferry from Turkmenbashi to Baku. The total cost of the latter route was stated to be USD 80 per ton. In 1996 approximately 60,000 tons would be shipped by water from Aktau to Baku, while the remaining volume of 40,000 tons would be shipped on the rail route via Turkmenistan and the ferry.

It should also be mentioned that the International Sea Port of Baku has signed (January 1997) a contract with a major private Russian transportation and trading company for the handling and stripping of 40 ft. containers to be shipped from the Ukraine and Russia to Baku with cargoes to be shipped onwards to Aktau. The initial volume of containers to be stripped and transshipped via conventional vessels to Aktau is relatively limited. Expectations are, however, that volumes will increase in the near future. The containers will be stripped in the port of Baku as a result of the lack of container handling facilities for 40 ft. containers in the port of Aktau. While Aktau is scheduled to obtain container handling facilities in the future, the Baku route would still be an all weather route and usable for winter.

#### **5.4.2 Establishment of a Ferry Route Between Baku and Astrakhan/Olya, Russia**

As a result of the unrest in Chechnya and the poor roads and the general and omnipresent danger of hijackings and highway robbery in Dagestan, cargoes between both Georgia and Azerbaijan, and Russia and the CIS countries in Europe are currently being transported on the ferry link between Baku and Turkmenbashi. Local truckers and truck drivers/operators interviewed at the ferry terminal expressed a strong preference for a ferry service between Baku and Astrakhan/Olya, Russia. In addition it is expected that this link would attract volumes of truck transit traffic between Iran and Russia. A frequency of weekly sailings with fixed departure days and times would be satisfactory.

In the event that the Jolfa rail border station between Azerbaijan and Iran should be reopened, this ferry link should have the potential of attracting substantial volumes of transit traffic by rail between Iran and Russia.

It has been reported but not confirmed that the Caspian Shipping Company is considering establishing such ferry link.

#### **5.4.3 Establishment of a Ferry Route Between Turkmenbashi and Astrakhan/Olya, Russia**

It was reported in May 1996 by government sources in Turkmenistan that an agreement in principle had been reached between the governments of Russia and Turkmenistan to establish a ferry service between Astrakhan/Olya in the Volga delta and Turkmenbashi, and that the Russian ports would be upgraded to accommodate such service.

In a normally well informed Russian business publication<sup>8</sup> it is reported that the new port of Olya will be opened in May 1997 with an initial handling capacity of 200,000 tons of cargo per year. The total required investments to complete the current works amount to 20 billion Russian rubles, which is equivalent to USD 4 million. It is furthermore reported that an allocation of USD 580 million has been made in the Russian government plans for the redevelopment of the Russian fleet and ports for the further development of first phase to create the port of Olya as a high capacity sea port. The main impetus for the Russian government to develop the port of Olya is that it unlike the neighboring port of Astrakhan is ice free all year, and that the government plans to establish ferry links to Azerbaijan, Turkmenistan and Iran.

---

<sup>8</sup> "Volga inflows to...the Persian Gulf", Business World, Moscow, February 17, 1997.



In the event such ferry services are started it is expected that they will have minimal impact on the volumes of the existing ferry service between Baku and Turkmenbashi. It could, however, attract significant volumes of cargoes currently transported between Turkmenistan and Russia via the northern rail lines via Russian Siberia and Kazakhstan as well as transit cargoes between Russia and Iran to be transported on the new rail link established between Sarahs, Turkmenistan and Meshed, Iran.

## **5.5 Recent Developments and Planned Projects Influencing the Cargo Flows on the Baku - Turkmenbashi Ferry**

There are several recent developments which is expected to have a positive influence on the cargo flows on the ferry link between Turkmenbashi and Baku. Some of the major developments are briefly described below.

### **5.5.1 Baku - a Transportation Gateway on the Caspian Sea**

In addition to its role as a ferry terminal for the rail ferries operating in the Caspian Sea, the port of Baku has also acted as a transshipment point for cargoes to and from Iranian ports to and from Ukraine and Russia. The Chechnya conflict and the closing of the rail link through Chechnya has resulted in a dramatic decline in these cargoes. A future lasting peace agreement resulting in lasting peace in Chechnya and reopening of the rail link will most likely reestablish Baku as a transshipment point for Russian and Ukrainian cargoes.

Another feature of Baku with its strategic location, its modern airport and position as a transportation center is the potential of establishing the port of Baku as a cargo "groupage" or "consolidation" center. Several of the major freight forwarders are reportedly evaluating establishing "groupage" or "consolidation" centers in Baku, primarily to serve the oil industry but also to serve the burgeoning distribution businesses being established in the area. Establishment of such "groupage" or "consolidation" services will undoubtedly benefit the ferry services, which most likely will carry the cargoes generated by these new services.

On a total basis the role of Baku as a transportation gateway in this region will undoubtedly benefit the ferry service by bringing new business opportunities.

### **5.5.2 Baku - the Emerging Oil Capital in the Caspian Sea Region**

Aside from the establishment of the TRACECA route and the investments made in this route, the most positive development for Baku as well as for the national economy of Azerbaijan and indirectly also the ferry link, is the establishment of the Azerbaijan International Oil Consortium (AIOC) and its signing of a 30 year oil exploration agreement with the government in September 1994. Currently the consortium is engaged in the upgrading of existing production fields and are also upgrading a semisubmersible drilling rig to undertake drilling in the Caspian Sea. The latter is expected to be starting exploration drilling within a relatively short time. There are also plans for a second rig to be upgraded and outfitted for exploration drilling.

At the present time these initial activities of the AIOC are generating cargo volumes, which are estimated to be approximately 20,000 to 30,000 tons per year, most of which is brought in via the TRACECA route. Some large oversize or overweight units, which cannot be handled on the railway, are also brought in by ship via the Volga Don waterway. In addition cargoes are brought by ship from Northern Europe via the Volga Balt waterway. Over the next few years until the year 2000, when the fields are expected to be developed for production, a conservative estimate of the annual cargo volumes needed to be transported for the AIOC is expected to exceed 200,000 to 300,000 tons per year by the year 2000. In the following years this volume is expected to increase as new fields will be opened for production.

Most of the cargoes transported for the oil industry is however brought directly to the facilities operated by the AIOC in two shipyards in the Baku region, ShelfProektStroi (SPS), which is a major module fabrication yard, and the STRIZH plant, where among other things pipes are being coated before being transported to the offshore production sites. There will, however, also be cargo volumes shipped in by the many contractors of the AIOC coming in smaller volumes, which will have the potential of being handled at the port of Baku. Significant proportions of these cargoes will be supplies and equipment that will be containerized.

The upgrading of the pipelines for the "First oil" (the initial major production volume in the terminology of the oil industry) and the construction of the pipeline for the "main oil" (full production of the fields) will generate substantial volumes, some of which also will be transported by the ferry. The construction work will be completed in about 1.5 years from the present time (i.e. the spring of 1998). The construction and upgrading of this pipeline is also expected to generate substantial cargo volumes. The construction team will be headquartered in Baku.

Recently three other oil consortia have been established in Baku. The second of these consortia, the Caspian International Petroleum Co. (CIPCO), whose main participants are Pennzoil and Agip, are currently in the process of starting exploration, and will initially drill three wells. For each well approximately 3000 to 4000 tons of supplies will have to be brought in through Baku, most of which will be transported on the TRACECA route. A representative from CIPCO has indicated that this consortium will rely heavily on the experience of AIOC in terms of transportation of its equipment and supplies once the operation is expanded, and the TRACECA route is expected to be used extensively.

The other consortia are also expected to start exploration drilling followed by production activities, all of which will ensure substantial volumes of cargoes flowing through the region and also via the ferry.

Another interesting development in the oil industry, which could be of importance to the ferry operations based in Baku, is the activities undertaken on the Tengiz field near the port of Aktau in Kazakhstan. These activities are led by the American oil company Chevron. Currently most of the activities are concerned with seismic exploration. If production quantities of oil are found, it will be a significant boost to the region and substantial quantities of cargoes will be transported to Tengiz via Aktau. The ferry services based in Baku could be well positioned to be used as the means of transportation for supplies and equipment to be transported for both the current relatively small volumes and the future significant tonnage required for the development of the oil activities in this region. While a direct ferry link between Aktau and Baku would be the ideal situation, the ferry between

Baku and Turkmenbashi would in the absence of a direct link be an attractive alternative whereby trucks would bring the supplies between Turkmenbashi and Aktau.

In addition the oil companies have started exploration of the offshore areas near Turkmenbashi, Turkmenistan. The expectations for these areas are similar to those of the oil and gas fields in the Azeri sector of the Caspian Sea. With a time lag of two to three years, the cargo volumes that can be generated for supplies to the development of these fields have the potential of being at the same order of magnitude as the supplies to the consortia operating in Azerbaijan.

### **5.5.3 Baku as a Regional Oil Supply Center**

Major oil companies and their contractors involved in development projects in the Caspian Sea both inside and outside Azerbaijan are in the process of establishing Baku as a major oil development center. Baku is considered to have the best transportation services in the region by all modes of transportation including air services, good communications services of international standard and adequate living standard for expatriates. Several contractors and suppliers to the oil industry are in addition actively considering changing their supply bases to serve the Central Asian region from Dubai, UAE to Baku. These developments will undoubtedly increase the importance of Baku as a regional distribution and transportation center and will also tend to increase the cargo potential for the existing and other ferry services that may be established with bases in Baku.

### **5.5.4 Baku as a "Container Freight Yard" (CY)**

The opening of the TRACECA route, the developments of the oil industry in the region and the general recovery of economic activity both in Azerbaijan and the other Central Asian republics, the overall volume of general cargoes, most of which will be containerized in the relatively near future, will create the need for the establishment of a "Container Freight Yard" (CY) in the Baku area. The primary functions of such a CY are in the main:

- Function as the terminal, through which container to and from the Baku area and its immediate hinterland are handled.
- Provide stuffing and stripping of "less than container load" (LCL) cargoes
- Storage of cargoes and containers
- Transshipment of containers between different modes of transportation
- Repair and maintenance of containers as needed.

The port of Baku has all the prerequisites for the establishment a CY for the Baku area:

- The port has the necessary area and storage facilities required
- The port has cranes and handling equipment for lifting of containers. Relatively small investments are required for additional handling equipment
- The port has all the functions required of a multimodal terminal:
  - It has more than sufficient railroads tracks to be able to handle significant volume of cargoes and containers to and from railroad cars
  - It has adequate road access and is serving the trucking industry both in the port and in the ferry terminal

- It has direct access to the general port and the ferry terminal for onwards shipment of the cargoes and containers
- It has a labor force of skilled cargo handling professionals.
- Customs officials are already established in the port, and the process has been started to establish the port area as a "Free Port Zone".

The alternative sites for a CY in the Baku area would be one of the existing railway yards, since the major volumes of containerized cargoes can be expected to be received via rail in block trains operated on the TRACECA route. The importance of the TRACECA route and thus the railway in the transportation of containers to and from Baku clearly signifies that the establishment of a CY in Baku will have to be done in close cooperation with the railway authorities.

The establishment of the port of Baku as a CY will represent a significant business opportunity for the International Sea Port of Baku and also for its ferry terminal, which will also greatly enhance the port's marketability as a multimodal cargo handling center and thus create new business opportunities.

From the perspective of the ferry terminal and the operation of the ferry it would be an advantage that the CY is established in close proximity to the ferry terminal, and thus enable a close cooperation between the ferry terminal operator and the CY operator. If the CY was established at the rail yard, which is the alternative to the port of Baku, the practical implications for the ferry operator will be minimal.

#### **5.5.5 The Port of Baku as a "Free Port" and Sumgait as an "Industrial Free Zone".**

A proposal has been made to establish the International Sea Port of Baku as an "Free Port" modeled on the free ports established in Hamburg and other ports in the world.

Establishment of Baku as a "free port" will undoubtedly encourage companies to use Baku as the central distribution point for the Central Asian region, which will attract increased flows of cargo through Baku and the ferry link, most of which will be containerized.

In addition, a team from the United Nations is currently working with the government of Azerbaijan to establish the Sumgait area as an "industrial free zone" in order to encourage investments for the reconstruction and renewal of the petrochemical and other industries in Sumgait. Such an "industrial free zone" will initially generate imports of equipment, machinery and supplies for the renewal and reconstruction of the industrial infrastructure in addition to various input factors such as raw and semiprocessed materials and supplies to be used in the production process. Once a diversified industrial base is reestablished, volumes of exports from these industries both destined for the CIS and the rest of the world can be expected. All modes of transportation will be used for the inputs and outputs, including containers. Most of the containerized cargoes will most likely be handled through the CY in the port.

Both these developments will if they are realized tend to strengthen the position of Baku as the "gateway" to Central Asia and will have the potential of attracting significant addi-

tional cargo volumes for the existing ferry between Baku and Turkmenbashi and potential new ferry routes based in Baku.

### **5.5.6 Uzbekistan Cotton Exports**

An agreement was reached in the spring of 1996 between the governments of Georgia, Azerbaijan, Turkmenistan and Uzbekistan on the shipment by rail of one million tons of cotton per year from Uzbekistan to the ports of Poti and Batumi in Georgia for further shipment to markets in Europe and America. The railcars will be transported on the ferry between Turkmenbashi and Baku. The Georgian government has assured the safe transit of the cargoes through Georgian territory.

An agreement has been reached between the railway ministries of the transit countries whereby the cotton will be transported at 40% of the tariff rates.

### **5.5.7 Guaranteed Safe Transport Through Georgia**

The Georgian authorities has assured the safe transit of rail cargoes through Georgian territory. Based on the assurances from Georgian authorities several freight forwarders, transportation companies and transportation users have stated to use Georgia to transit cargoes to and from Central Asia.

A representative example is presented by the British-owned and controlled freight forwarding company Bertling Caspian Ltd. in Baku. When we visited their office in May 1996, this company had just completed a major contract to transport steel to the state oil company, SOCAL, in Baku:

- 8,000 tons of steel pipe from Quantan, Malaysia
- 2,500 tons of steel and equipment from Antwerp and London

These cargoes were shipped on two vessels via the port of Poti, Georgia. The vessel carrying the pipe from Malaysia was discharged in three working days using direct discharge from the vessel onto railcars, while the second vessel from Europe was discharged in approximately two days. The latter had a mixed load, which explains the lower productivity. A total of 200 railcars were provided in six days, all of which were organized into seven block trains. There were no delays, and everything worked perfectly. The discharging of the vessels started on May 15 and the first train arrived in ZIKH outside of Baku at the SOCAL plant on May 19, 1996. In ZIKH plant all the pipes would be coated before being taken its ultimate destination, i.e. the subsea pipeline from the Sirak oil and gas field to the Sangchal terminal.

Overall conclusions of the Bertling team were:

- The efficiency of the port of Poti and the Georgian railway's ability to marshal and organize the necessary railcars and trains had impressed the local management of this freight forwarding company.
- Bertling's local staff in Georgia and Azerbaijan had ensured the full cooperation from all involved transportation companies and government authorities at all lev-

els and stages of the operation, which was a major factor in the success of the operation.

Alternative routes for this type of cargoes had been considered based on experiences gained in 1994 using Ukrainian vessels on the Volga-Don river system. This alternative was based on their experience not acceptable due to some major drawbacks compared to the overland rail link:

- The transit time via the waterway system was estimated to be 11 to 12 days, versus 2 to 3 days by rail
- The river system is open only six months of the year, since ice conditions close the river system from November to April.
- Draft restrictions limits the cargoes to be loaded on river vessels to approximately 2,500 dwt.
- The overall cost of water transportation was found to be higher than transport on the shorter rail link.

#### **5.5.8 Container and Ferry Transportation via Georgian Ports**

Several development of importance to the ferry service are taking place in this connection with the intermodal transportation of containers.

##### **5.5.8.1 P&O Containers Changing their Transportation Concept**

One of the world's largest container transportation companies, the UK-based P&O Containers, has offices serving the Central Asian region in Ashgabat, Tashkent and Baku. All cargoes are currently shipped via Dubai and Bandar Abbas, and then trucked through Iran to and from their ultimate origin or destination. The major problems experienced by P&O are cargoes to and from the US, which cannot be shipped through Iran, the high cost of shipping through the Gulf and the relatively long transit time.

At the present time P&O has no cross-Caspian Sea traffic. In May 1996 P&O reached an agreement and made arrangements with the authorities in Georgia that will ensure the safe transport of their cargoes through Georgia. In this connection the port of Poti, Georgia will be transit port for all containers shipped to and from the Central Asian republics using the Baku - Turkmenbashi ferry link . All containers will initially be transported by truck.

By bringing cargoes to and from Europe through Poti, Georgia the transit time is expected to be reduced by 20 days and the overall freight charges by 40 - 45% compared to the Gulf route via Dubai and Bandar Abbas.

According to the representative of P&O in Baku there are a number of customer waiting for the service to be opened. With the cost and transit time reductions plus the possibility of handling containers to and from the US, expectations are that cargo volumes will increase significantly. Imports consist of all types of consumer goods, electronics and foods (although reefer truck service is poor). Exports are cotton, metals (iron rods) and various chemicals.

The Georgian route would only be used for cargoes to and from the US and Europe. Cargoes to and from the Far East would continue to be shipped through the Arabian Gulf ports.

#### **5.5.8.2 Sea-Land Service Entering the Central Asian Market**

Sea-Land Service, one of the leading container operators in the world, is in operational cooperation with P&O in the process of entering the Central Asian container transportation market. Sea-Land is reported to be in the process of negotiating an agreement with the port of Poti for the operation of the container terminal in the port. Sea-Land is in addition reported to be planning the deployment of 1000 TEU feeder vessels to be operated between a load center port in Southern Italy and Poti in addition to other ports in the Black Sea.

Sea-Land Service in close cooperation with its agents and freight forwarders are aggressively marketing their services in the entire Central Asian region.

It is expected that also other container operators will follow the lead of P&O and Sea-Land and ship their container traffic between the US and Europe and the Central Asian republics via the ports in Georgia and the Baku - Turkmenbashi ferry link. In this way Poti will challenge St. Petersburg's current role as the main gateway to the CIS.

#### **5.5.8.3 Block Train Service Established Between Poti and Baku**

In November 1996 with support from the Tacis TRACECA program the Azerbaijan and Georgian railways started a weekly, regularly scheduled container block train service between Poti and Baku. As pointed out in Section 3, rail transportation is the lowest cost transportation mode for general cargoes between Poti and points in Central Asia. Based on experiences from other parts of the world the establishment of block train services have the effect of significantly increasing the container traffic on these routes.

#### **5.5.8.4 Commercial Feeder Service Established Between Mediterranean Container Load Centers and Poti**

At the initiative of P&O and Sea-Land Service a commercial container feeder service has been established to operate between the load center port operated by P&O and Sea-Land in Southern Italy and Poti plus other ports in the Black Sea. The feeder service is reported to be operated with an initial frequency of one sailing every ten days, which shortly will be increased to weekly sailings. Sea-Land is also reported to be planning to input a 1000 TEU feeder vessel currently under construction to this service.

In addition to the above service there is reported to be three other commercial container feeder operators serving the trade between Mediterranean and Georgian ports.

#### 5.5.8.5 Ferry Services Between Poti and Other Black Sea Ports

The port of Poti is currently served by two ro-ro ferry services:

- One ro-ro ferry operating on a weekly schedule between the port of Ilyichevsk near Odessa in the Ukraine and Poti.
- One ro-ro ferry operating on a weekly schedule between the port of Burgas in Rumania and Poti.

#### 5.5.9 Far East Rail Landbridge Link

Japanese companies have shown active interest in being selected as suppliers to the oil industry based in Baku, and also to participate in supplying all types of goods required for the reconstruction of the industrial infrastructure in addition to consumer electronics and other products demanded in the burgeoning Azerbaijan economy. In this connection a competitive and cost effective transportation service is a prerequisite.

One major Japanese manufacturing and trading company supplying pipe and oil equipment in addition to various industrial machinery has with their freight forwarders explored alternative routes to supply their products to the oil and general industry in Baku. In connection with the negotiations for a major contract to supply pipe to the oil industry in Azerbaijan, an investigation was made as to alternative transportation routes. Their conclusion was that for shipload lots (i.e. more than 3000 - 4000 tons), ship transportation via the port of Bandar Abbas in the Arabian Gulf was considered to be the most cost effective alternative. For less than shipload lots, however, shipment via a Russian Far East port and by rail via the Central Asian republics to Turkmenbashi and the rail ferry to Baku was found to be highly cost effective. The freight forwarding company was actively working to open this rail link in connection with ongoing negotiations for delivery contracts.

The representative of the Japanese company expressed confidence that the Far East rail and ferry service link would be a competitive alternative for cargoes between Japan and Azerbaijan compared to transportation of the cargoes via Bandar Abbas in Iran.<sup>9</sup>

The Japanese government is reported to be considering giving development grants to the Azerbaijan government in the form of medicines, food and equipment. The representative of the company expected the volumes to be transported of both development aid and commercial cargoes between Japan and Azerbaijan increase significantly and that the landbridge rail link via Russian Far East ports and the ferry would be an important transportation route for these cargoes.

---

<sup>9</sup> It should also be noted that a major Korean automobile manufacturer has established a plant to assemble cars in Uzbekistan. It is reported that this plant is supplied with containers with auto parts and CKDs by rail via the Russian Far East ports.



### **5.5.10 Europe - Far East/Peoples Republic of China Landbridge Link via Central Asia**

Prior to the breakup of the Soviet Union the Trans-Siberian Railroad was a major competitor on the container transportation trade between Europe and the Far East. As a result of low freight rates and low transit times<sup>10</sup>. Currently the international container operator Sea-Land Service has resumed operation of the Trans-Siberian Landbridge container transportation between Central Europe and the Far East with transshipment of containers in the Far East ports of Europe. The axles of the railcars are changed at Brest on the border between Belorussia and Poland. As such there is strong precedence for such landbridge links utilizing the extensive rail network of the FSU nations.

The opportunity exist for a cost and time effective landbridge rail link to be established between Europe and the PRC and also to link with the Trans-Siberian Railroad to connect with the Russian Far East Ports.

### **5.5.11 Major Turkmenistan Development and Export Projects**

Several major development projects have been undertaken or are planned in Turkmenistan, all of which will create cargo opportunities for the ferry between Baku and Turkmenbashi:

- The construction of pipelines between Turkmenistan and Pakistan via Afghanistan is currently being planned. It is at the present moment not clear when the construction of this pipeline will start. Although it is expected that the major volume of supplies will be shipped via India/Pakistan and Afghanistan, it is expected that supplies also will be shipped via the Baku - Turkmenbashi ferry both from Europe and the United States.
- The decision to build a pipeline to Iran has been made, which in stage two will be extended to Turkey. The construction is expected to start in mid 1997, and international construction companies will be engaged.
- The contract for the reconstruction and modernization of the oil refinery near Turkmenbashi was given to a German/French/Japanese consortium in the first half of 1996. Large volumes of cargoes will be shipped in for the reconstruction (including oversize cargoes such as catalytic crackers and reformers). Following the reconstruction the plant will export large volumes of refined products and petrochemicals to world markets.
- Turkmenistan has rich deposits of natural chemicals and various raw materials that may be exported to world markets:
  - In the Kara Bogas Gol area one of the world's largest deposits of natrium sulfates and natural salts is located. The potential exports of natrium sulfates and salts can exceed one million tons per year. In connection with

---

<sup>10</sup> The rates were maintained at a level approximately 10% to 15% below the rates quoted by the freight conferences of the major liner operators, and the transit time was up to 10 days faster than by ship depending on origins and destinations.

this area there are also plants producing large quantities of caustic soda with potential to be exported to world markets.

- In the Gaurdag area close to the border with Uzbekistan and Afghanistan there are vast deposits of sulfur, which is one of the major export of Turkmenistan. Currently approximately 200,000 tons per year are exported, while the capacity is over 600,000 tons.
- Bentonite (cyalid) is mined in Nebitdag near Turkmenbashi. The quality of this bentonite is reported to be unique, and Turkmen government officials are confident that there should be excellent opportunities in the world market.<sup>11</sup>
- Gypsum is being mined in the western part of Turkmenistan. The production capacity is reported to be up to one million tons per year. The major buyer in previous years was Russia. Turkmen officials are now searching for alternative markets for this gypsum.

The main mode of transportation for these cargoes has been and is also in the future expected to be by rail, since most of the production areas are located far from the ports. The major problem in terms of increasing the volume of exports are reported by Turkmen government officials to be a general lack of railcars to transport the volume of exports

- Large quantities of cement for export is being produced in Bezmein near Ashgabat. In May 1996 it was reported that negotiations were being conducted for the construction of a new cement plant, which would be operational by the year 1999.
- Turkmenistan has also been an exporter of gravel, which is primarily mined in Bezmein and in gravel pits near Turkmenbashi. The buyers have traditionally been Russia and Azerbaijan. As the building industries of these countries are revived, the export of Turkmen gravel is expected to resume.
- The Turkmen cotton industry is a major exporter to both Russia and to world markets. Currently the Turkmen government agency in charge of the cotton exports expects exports of approx. 200,000 to 300,000 tons per year. Increases of

---

<sup>11</sup> The optimism of the Turkmen officials should, however, be tempered by the problems reported by the management of the Dashsalakli Bentonite Clay Plant in Azerbaijan, which could also be representative for those that can be expected for the Turkmen bentonite plant. The annual production capacity of the Dashsaliki plant in Azerbaijan is one million tons, out of which most was exported in the past to the metallurgical industries of primarily Russia and Ukraine and to a lesser extent to Kazakhstan. A dramatic decline in the demand from their former customers have forced the management to find new customers in the world markets. The relatively low value of the product combined with high transportation costs have prevented them from securing new contracts. The product will have to be shipped out by rail to Georgian ports and onwards to world markets. According to the management the current world market price is USD 36/ton, while their production cost is USD 12/ton. The rail transportation cost in Azerbaijan is USD 7/ton, and USD 8/ton in Georgia. In addition the cost of handling in the port of Poti is USD 6/ton for a total transportation cost FOB Poti of USD 21/ton. The total cost FOB Poti is therefore USD 33/ton, which leaves USD 3/ton for transportation and handling in the receiving market. Even at a price of USD 30/ton FOB Poti management has been unable to find interested buyers in world markets. Since the bentonite produced at the Turkmen plant would have even higher transportation costs than the Azerbaijan bentonite, it is unlikely that the Turkmen plant will succeed in selling large quantities of this product in world markets.

export volumes are expected. The cotton is sold F.O.R. ex. works, which implies that the buyer selects the mode of transportation. In recent years some of the cotton was shipped from Turkmenbashi to Italian ports via the Russian waterway system as return cargoes on vessels carrying oil equipment for the Argentinean oil company Bidas. The operation of these vessels have ceased. Currently the cotton is shipped primarily by rail and to a lesser extent by truck via the ferry to destinations in Turkey, Western Europe and the US, while cargoes to the Far East are shipped by the new rail link and by truck via the port of Bandar Abbas in Iran.

- Several western oil companies have entered agreements with the Turkmen government to develop the offshore oil and gas deposits in the Turkmen sector of the Caspian Sea outside of Turkmenbashi. Currently exploration drilling is taking place, which is reported to have indicated reserves that can be produced. Increased exploration activities, reconstruction of existing fields and development of new fields for production will generate significant cargo opportunities for the ferry, since most of the supplies are expected to be transported to Turkmenbashi via Baku and the ferry.

#### **5.5.12 Major Azerbaijan Export Cargoes with Potential for the Ferry**

Azerbaijan has several major industries with significant export potential to the Central Asian nations, for which the ferry could present an interesting mode of transportation:

- Metallurgical products. All business activities of the ferrous and non-ferrous metals and minerals industry is handled by the Azerbaijan state owned company "Metallurgy" State Concern with headquarters in Baku. This industry generates substantial volumes of cargoes both for import and export from its three main divisions, all of which have the potential to generate cargoes to be shipped to the Central Asian nations via rail on the ferry:
  - The ferrometals division, which has three entities:
    - Azerbanda Mining Industries produce ferrous ore concentrates with a sulfuric content of 60%. The production capacity is one million tons per year, all of which in prior times were supplied to Georgia by rail. Due to the current situation in Georgia, its only customer, the production is next to nothing.
    - Azerbaijan Pipemaking Plant. The production capacity of this plant is 650,000 tons of pipe per year, which in previous years were primarily exported to Russia, Ukraine, Kazakhstan and the other republics of the FSU. Due to the slowdown in the economic activity of their customers within the FSU, the annual production volume is now reduced to 50,000 tons, which is shipped to their customers in the FSU in addition to Turkey and Iran. All their output has been and is currently shipped by rail.
  - The non-ferrous metals division with three entities as follows:

- Zaglik Aluniti Ore Management plant located in the Dashkestan region of Azerbaijan, in which alunite is mined and converted to alumina. Of the total output the following volumes could be considered to have some potential for shipment via the ferry:
  - About 100,000 tons per year per shipped by rail and ferry from Baku to Turkmenbashi and onwards to an aluminum plant in Tajikistan
  - Volumes of alumina is shipped by rail to Russia and other markets, primarily by rail. The Russian customers are aluminum plants located in Bratsk, Irkutsk and Krasnojarsk in Siberia, and shipment by a mode of transportation other than rail is impractical and costly.
- The Gendja Aluminum Plant used to receive between 600,000 to 700,000 tons of bauxite from Georgia in addition to the alumina from Zaglik. Currently the bauxite is received from Australia, and in 1995 the volume received through the port of Poti in Georgia was 77,000 tons. Bauxite is also produced in Turkmenistan, and the bauxite could potentially be supplied from this source. The output capacity was stated to be about 450,000 tons of aluminum per year shipped to the FSU and other markets by rail.
- The Sumgait Aluminum Plant. This plant receives also input materials from Russia, all of which is shipped in by rail:
  - 20,000 tons of anode mass
  - 2,000 tons of cryolite
  - 1,500 tons of torite

All raw materials and finished goods of the three divisions of this major stateowned group of companies are shipped by rail from the respective plants. Russian companies are currently both major suppliers of input materials and major customers of the finished products. During the Chechnya conflict and the closing of the northbound rail corridor, the cargo to and from Russia have been shipped via the Baku - Turkmenbashi ferry and onwards through Turkmenistan and Kazakhstan to Russia. The management would not consider shipment by the Caspian Sea and the Russian waterways as a viable alternative for the following main reasons:

- The Russian waterways are only open six months of the year, which is unacceptable from the point of view of logistics.
- The cargo carrying capacity of river vessels of 3,000 tons is small and therefore increase the cost of transportation.
- Since none of their customers are located on the Russian waterways, there would be both additional costs and risks associated with multiple cargo handling and cargo transfer operations, (i.e. rail to Baku for loading on a river vessel, transportation to a Russian inland river port for transloading to rail for transportation by rail to the customers' plants.)

Although there is a possibility that the cargo volumes generated by this industry could be shifted to overland rail transportation via Dagestan and Chechnya or to the potential rail ferries to be opened to Astrakhan/Olya and Aktau, it nevertheless presents interesting business opportunities for the Baku - Turkmenbashi ferry.

- Fresh and canned fruits and vegetable - exports. Azerbaijan is a major producer of fruits and vegetables, and has an extensive canning industry for these products. Although the vegetable and fruit crops have decreased in recent years, it is expected that the agricultural production of fruits and vegetables and also the canning and preserving industry will be revived in the coming years to a level equal to that achieved in the recent past. These cargoes should have export potential to neighboring countries, to be shipped via the ferry including the Central Asian Republics and Russia and Ukraine. The potential export volumes are<sup>12</sup>:

<u>Commodity</u>	<u>Est. export volume (tons)</u>
Fresh vegetables	300,000 to 350,000
Fresh fruits	70,000 to 100,000
Canned and preserved vegetables and fruits	350,000
Total	<u>720,000 to 800,000</u>

The fresh fruits and vegetables will require refrigeration facilities in the form of reefer railcars, trucks or containers. The canned and preserved vegetables can, however, be handled without such facilities and equipment.

- Chemicals and petrochemicals industry . This industry produces a wide variety of chemicals and petrochemicals at the major chemical, refinery and petrochemical complexes in Sumgait and the Abseron peninsula. Immediate cargo opportunities for the ferry include handling the export of caustic soda and various detergents from HimZavod, which will be shipped to Turkmenistan in a barter arrangement for salt received in bulk by vessels from Turkmenbashi via the port of Baku. Significant quantities of polyethylene is also produced, and Azerbaijan was the major supplier of this product in the former Soviet Union, also to the Central Asian Republics. In the longer term refurbishment of the chemical and petrochemical industry using the increased output of oil and gas as feedstocks will represent interesting opportunities for the shipment of cargoes to the Central Asian republics.
- Oil industry equipment. In Soviet times the "Azneftemash" Group in Azerbaijan was the primary supplier of oil equipment to the entire union. Currently the major markets for this group of companies are in the Central Asian republics. In addition they are actively marketing their products in the Peoples Republic of China (PRC). Railcar via the ferry is the major mode of transportation to both Central Asia and to PRC. Currently approximately 200 railcars per year are shipped via the ferry.
- Air conditioners. Azerbaijan was designated as the producer of air conditioners for the entire Soviet Union, and as a consequence a major air conditioner factory built with Japanese technology is located in Baku. This plant continues to supply its products to Russia and the Central Asian republics. Preferable modes of transportation is by truck or container, although railcars are also used.

<sup>12</sup> These volumes are compiled based on data received from the Ministry of Trade.

## 5.6 Key Prerequisites for Successful Terminal and Ferry Operations

In the past the ferry terminals and the ferry operator were allocated cargoes by government fiat or decree according to the plans developed by central authorities. Although the ferry terminals and the Caspian Shipping Company has a virtual monopoly on ferry operations on the Caspian Sea, the ferry is in direct competition with other routes (e.g. the Northern route via Russia or the Southern route via Iran) and for virtually all cargoes handled by the ferry, the shippers and consignees will have the choice of using other routes of transportation.

In the Soviet Union all water transportation activities in the Caspian Sea region was controlled from Baku through the Caspian Shipping Company headquartered in Baku. The Caspian Shipping Company was and is one of the major providers of general cargo, dry bulk and liquid bulk transportation services in the Caspian Sea, all of which is based in Baku. The vessels of the Caspian Shipping Company served both the transportation requirements inside the Caspian Sea as well as on the Volga Don and Volga Balt inland waterways. Following the breakup of the Soviet Union and a dramatic decline in the demand for transportation services, more than 40% of the total fleet has been moved outside the Caspian Sea and is operated on international transportation routes in the Baltic Sea, the Black Sea and the Mediterranean.

Until 1991 the Caspian Shipping Company was the only local operator of vessels including ferries in the Caspian Sea. Since that time several companies owned by the republics bordering the Caspian Sea has been established with the potential to operate between the various ports in the Caspian Sea and the Russian waterway system, in addition to operate in competition with the ferries operated by CSC. These are:

- The North Caspian Shipping Company based in Astrakhan, Russia was established in 1992. This company operates three tugboats, ten one thousand dwt barges and seven river tugs. In addition several of the Russian river shipping companies like the White Sea - Unega Shipping Company, Volgo Tankers based in Samara and Volga Shipping Company based in Rostov also operate their vessels in the Caspian Sea.
- Kazakhstan currently operates three bulk carriers outside the Caspian Sea plus one small reefer vessel of about 60 dwt used to carry fruits and vegetables in the Caspian Sea. The Kazakhstan Shipping Company is reported to have ordered two ro-ro vessels of about 7,000 dwt for delivery in 1997-98.
- Turkmen Shipping Company based in Turkmenbashi currently operates four dry cargo vessels of about 3000 dwt. One of these vessels is a modern open hatch type vessel capable of carrying 176 TEU (twentyfoot equivalent units of containers). Orders for two river sea bulkers have been placed, and plans have been presented to expand the fleet to 20 vessels. Currently the vessels are primarily engaged in the transportation of Turkmen cotton exports via Russian river system to the Black Sea and the Mediterranean.
- Two Iranian shipping companies are currently operating in the Caspian Sea. These are the Caspian Sea Shipping Company, which is a subsidiary of Iranian Line and Khazar Shipping Company. The latter company has since 1992 oper-

ated the route between Baku and Bandar-e-Anzali carrying primarily metals and containerized cargoes.

Holding onto the current traffic volumes handled and developing future cargo potential will not happen as a result of the mere existence of or the upgrading of the ferry terminals and the existence of the ferries operated by the CSC with its current virtual monopoly. Two key areas should be evaluated in this connection:

- Professional management of the ferry operation
- Establishment of a joint service

### **5.6.1 Improvements of the Operation of the Ferry Service**

The key prerequisites for the future success of the ferry terminal and ferry operations in attracting cargoes are in the main for the terminal management and its administrative and operational staff in both Baku and Turkmenbashi and the ferry company management and staff both ashore and onboard the ferries to adopt a commercial attitude to the conduct of its business. In this respect it will be necessary for the terminal and ferry operators to recognize that despite the existence of a virtual monopoly on the ferry operations, the ferry is operating in a competitive environment where alternate routes and modes of transportation exist. It is therefore necessary to:

- Operate the ferry service on a "common carrier" basis making the service available to all transportation users without restrictions or discrimination other than those that pertain the safe carriage of cargoes and international conventions for the transportation of goods by vessels.
- Market and sell its services to the shippers and consignees, the freight forwarders and other transportation companies, their representatives and intermediaries serving both the shippers and consignees and the transportation companies.
- Market and sell the services of the terminals and the ferry service to attract forwarders, container transportation companies and other transportation companies to use the terminals as part of their services to serve the needs of the transportation users. In this connection it is important to recognize that the terminals and the ferry operator should recognize that its primary business is terminal and ferry operations and not enter into competition with its customers/user and their representative. As examples it would be detrimental to the interests of the ferry terminal and the ferry operator to establish freight forwarding, shipping agency or other services in competition with other commercial entities.
- Ensure operation and productivity according to normal world standards. The transportation industry is an international business, and as such the user of the terminal and ferry services will expect the productivity, operating standards and terminal and ferry charges are maintained according to international norms and standards. This will include but not be limited to:
  - Operate the ferry according to a fixed time schedule which is published and distributed to the users.
  - Establish a system whereby users can make reservations and thereby ensure that their cargoes, vehicles, trucks and trailers can be ensured a space at the agreed time.

- Upgrade the public facilities and sanitary conditions for passengers and drivers accommodating their vehicles
- Ensure efficient and prompt loading and discharge of the ferries at the terminals and fast and efficient processing in and out of the terminals.
- Eliminate any unauthorized payments in connection with the ferry services.

While not a prerequisite it would be a clear advantage to invite an international ferry operator with extensive experience in the operation of similar short sea ferry links to participate in the operation of the ferries.

### **5.6.2 Establishment of the Ferry Link as a Joint Service Between Azerbaijan and Turkmenistan**

At the present time the ferry service between Baku, Azerbaijan and Turkmenbashi, Turkmenistan is operated on an exclusive basis with vessels owned and operated by the Caspian Shipping Company based in Baku, Azerbaijan. A total of eight sister vessels were built to operate the ferry link, all of which are combination rail/truck/automobile/passenger ro-ro ferries (in the shipping industry normally referred to as "ro-pax" ferries) built in Yugoslavia in the mid-1980's. Two of these vessels have been refurbished to European standard and are operated in international ferry trades, one is laid up at the shipyard in Baku while the remaining five are maintaining the ferry service on an ad-hoc schedule. In fact, with the current traffic volume the service could have been maintained with a maximum of two ferries operating in a continuous service. As the traffic increases based on the overall developments in the region as described in this report, it is expected that within the planning period (i.e. up until 2015) all the vessels will be required to maintain the service and handle the expected traffic volumes. With proper maintenance and continuous upgrading to conform with international safety rules and regulations, operational efficiency and overall market demand, the currently operated vessels should have a total life expectancy of 30 years or more.

A major concern in the evaluation of the overall viability and feasibility of the project is the fact that all the vessels are owned and operated by the national shipping company of one of the two newly independent nations served by the ferry service, viz. the Caspian Shipping Company domiciled in Baku, which is owned and controlled by the government of Azerbaijan. The investments in the terminal facilities in the ports on either end of the ferry service, i.e. Turkmenbashi, Turkmenistan and Baku, Azerbaijan, will be made by the ports owned and controlled by the governments of the respective countries. At the same time it is recognized that the government of Turkmenistan has ambitions to build a national fleet under the control of the Turkmen Shipping Company, and the company is considering a fleet expansion program. As a result it is envisioned that the potential for conflicts of interests may arise, which may cause disruptions of the ferry service.

The ferry service across the Caspian Sea between Baku and Turkmenbashi represents a major and important part of the transportation infrastructure not only for the two countries, but for all the nations in the Central Asian region and is and will continue to be of major strategic and vital importance in the development of inter-regional and international trading relationships.

The national interests of both Azerbaijan and Turkmenistan as well as the lenders funding the reconstruction of the ferry terminals and not the least the users of the ferry service would be well protected, if the governments of Azerbaijan and Turkmenistan would decide



to operate the ferry service on a joint basis whereby the national shipping companies of both countries would participate in the operation of the ferry service between Turkmenbashi and Baku.

Joint services and revenue pools managed by a joint operating company (JOC) are operated with success in all sectors and market segments of the international shipping industry from ferry and regularly scheduled liner operations to dry and liquid bulk operations. Some typical examples are:

- Silja Line - the largest and leading ferry operator serving the ferry services between the major Swedish and Finnish ports - is a JOC created by a major Swedish shipping and investment company (The Johnson Group based in Stockholm) and a the leading Finnish (stateowned) shipping company (Oy Finncarriers AB of Helsinki).
- Scandic Line - the largest ferry operator serving the ferry link between Helsingborg, Sweden and Elsinor, Denmark with combination rail/truck/car/passenger ferries - is a JOC owned by the national railways of Sweden (SJ) and Denmark (DSB).
- Hoegh-Ugland Auto Carriers - one of the world's leading operators of specialized automobile carriers - is a JOC owned by two major Norwegian shipping companies.
- Star Bulk Shipping - one of the largest specialized forest products shipping lines operating a fleet of "open hatch bulk carriers" - is a JOC owned by a group of shipowners based in Bergen, Norway.

Numerous other examples of successful joint services and JOCs exist, and precedences for the establishment of a successful joint service on the ferry link between Baku and Turkmenbashi are therefore many. The strategic importance of the ferry link for both Azerbaijan and Turkmenistan as well as the other Central Asian republics will require an agreement between the respective governments of Azerbaijan and Turkmenistan to establish a jointly operated ferry service.

## **5.7 Professional Operation of and Cooperation Between the Railroads of the Central Asian Nations**

Although truck transportation will grow in importance in the transportation of general cargoes and containers, the rail transportation will continue to be a major factor in the overall transportation of the cargoes to be carried on the ferry. The following are the main prerequisites in terms of operation of the rail system to ensure realization of the cargo potential on the ferry route:

- Ability to muster sufficient equipment both in terms of railcars and locomotives to be able to handle the expected increase in the cargo volumes
- Setting of through tariffs that will be conducive to and competitive with the alternative transportation routes, particularly those through Russia and Kazakhstan

- Establishment of regularly scheduled container block trains between the Georgian ports and major load centers in the Central Asian republics, and also ensure that proper equipment is available to ensure the swift and efficient handling of the containers for onward distribution.
- Establishment of regularly scheduled and efficiently operated freight trains between the various load centers.
- Development of efficient marketing and sales programs to market and sell the rail transportation routes via the ferry.

## **5.8 Operation of the Gateway Ports in Georgia**

In the overall TRACECA system the Georgian ports of Poti and Batumi will have a pivotal role as the gateway ports for cargoes to and from the Central Asian region. The lead times in terms of expansion of capacity of ports are generally long. As a result the ports may become a "bottleneck" in the overall transportation system where the cargo flows are expected to increase significantly over a relatively short time span, as is expected in the case of the TRACECA route.

The key prerequisites for the future success of the Georgian ports in attracting cargoes are in the main for the port management and its administrative and operational staff to adopt a commercial attitude to the conduct of its business. In this respect it will be necessary for the ports to:

- Ensure operation and productivity according to normal world standards, and also ensure that sufficient cargo handling equipment, manpower and storage space will at all times be available to handle the expected throughput volumes to be handled on the TRACECA route, other transit cargoes and cargoes to and from Georgia. The transportation industry is an international business, and as such the users of the port services will expect the productivity, operating standards and port and cargo handling charges of the port are maintained according to international norms and standards.
- Ensure that the port services are available to all users without restrictions and discriminations other than those established by international conventions for the safe handling of goods.
- Market and sell its services to the shippers and consignees both as an independent operation and in close cooperation with ship operators and other transportation companies, their representatives and intermediaries serving both the shippers and consignees and the transportation companies.
- Market and sell the services of the port to attract shipping companies and other transportation companies to use the port as part of their services to serve the needs of the transportation users.
- Set a rate structure that will ensure that the ports are competitive with those of competing ports and ports on other competitive routes to the TRACECA route

In developing the cargo forecasts presented in the next section of the report it is assumed that the unprofessional practices of the recent past will be replaced with accepted international norms, standards and practices for terminal, rail and ferry operations. Furthermore it is assumed that no physical "bottlenecks" obstructing the free flow of cargoes to the ferry exist.

## 6. CARGO FORECASTS FOR THE FERRY LINK

As has been pointed out in Section 4 of the report, the cargo flows on the ferry service has experienced a dramatic decline over the past years. It should be noted that even under the most optimistic scenario described below the cargo flows in the year 2015 is not expected to reach the peak cargo flows of the mid 1980's (i.e. between 7 and 8 million tons). This is also supported by experience and forecasts for other economies in transition and under restructuring (e.g. Russia, Ukraine, Baltic States), all of which have not experienced and are not expected to achieve cargo growth above 10% and thus will not reach pre-restructuring cargo flow levels till well into the next century.

### 6.1 Trade Routes and the Current Market Potential of the Ferry

A general observation that can be made based on the data and the analyses in the preceding chapters with respect to the routes and cargoes that will be handled via the ferry is:

- **Interregional transportation** of bulk, neobulk and general cargoes generated from trade between Azerbaijan, Georgia and Armenia on the west side of the Caspian Sea and inland points on the Central Asian nations of Turkmenistan, Uzbekistan, Tajikistan and Kyrgyzstan on the east side of the Caspian Sea. Although other routes can be considered, the ferry connection will have a cost and transit time advantage. These cargoes, particularly those destined for or originating in inland points removed from the ports at either side of the Caspian Sea, can therefore be considered as captive cargoes, for which ferry transportation will have a competitive advantage.
- **Interregional transportation** of bulk, neobulk and general cargoes generated from trade between inland points in Azerbaijan, Georgia and Armenia on the west side of the Caspian Sea and inland points of Kazakhstan and to a lesser extent also to Russia and other CIS countries in Europe. When open, the rail and truck routes through Dagestan and Chechnya and onwards through Russia will be competitive to the ferry for these cargoes. In the event that ferry links are established between Baku and Astrakhan/Olya in Russia or Baku and Aktau, Kazakhstan, most if not all these cargoes will be rerouted on these alternate transportation routes. These cargoes can therefore be considered to be competitive cargoes that will disappear from the ferry if and when the routes via Dagestan and Chechnya will be considered safe.
- **Transshipment cargo transportation** coming primarily by rail to and from Ukraine and Southern Russia to and from Central Asian republics and to a lesser extent to and from Iran and possibly also India and Pakistan via the new rail link between Turkmenistan and Iran. These cargoes will only be available when the

rail and road routes through Dagestan and Chechnya will be considered safe by shippers, consignees and transportation companies. These cargoes will have several other routing alternatives and can be considered competitive cargoes.

- **Transshipment on the TRACECA route** via the port of Poti transported between the Central Asian republics and Europe, North and Latin America and Africa. This traffic will be bulk, neobulk and general cargoes carried on railcars and container block trains in addition to increasing volumes of trucks and trailers. As discussed in Section 3 of this report, the ferry will have a competitive advantage for the transportation of these cargoes and they can therefore be considered captive cargoes for the ferry.
- **Landbridge cargo transportation** via the ferry connection to and from origins and destinations in the Far East (Japan, Korea, Hong Kong and Taiwan via Russian Far East ports and Peoples Republic of China, Afghanistan and Mongolia:
  - Cargoes to and from Azerbaijan, Georgia and Armenia
  - Transit cargoes to and from Europe via Poti or the Russian rail system.

These cargoes will have alternative routing alternatives both by other landbridge routes, via the Iranian port of and by all water transportation. These cargoes have to be considered as competitive cargoes.

Given the above definitions the preliminary data base of the total cargo flows in 1995 the Central Asian region developed by W.S. Atkins Planning Consultants under a contract with Tacis<sup>13</sup> was used to estimate the current total cargo volumes as the basis for the forecast of future cargoes that can be attracted to the ferry. While it is stated by the consultants having performed the data collection that there are inconsistencies in the reporting of the data between the various statistical sources of the respective countries, the data can nevertheless give an overall indication of the magnitude of the total market for the ferry service. Data have been extracted and summarized for the trade routes described above. This is summarized in Table 6.1

**Table 6.1 The 1995 Estimated Potential Cargo Volume for the Ferry Service between Baku and Turkmenbashi (all figures in tons)**

Trade route:	Cargoes without Group 5 - Minerals etc.		Cargoes with Group 5 - Minerals etc.	
	Westbound	Eastbound	Westbound	Eastbound
Interregional - Captive	10,582	67,592	321,546	100,855
Interregional - Competitive	101,476	10,261	142,414	48,603
Total Interregional	112,058	77,853	463,960	149,458
Transshipment - Competitive	1,110,806	2,358,004	1,569,850	2,902,047
Transshipment TRACECA - Captive	1,208,698	1,954,641	2,473,650	2,073,245
Total Transshipment	2,319,504	4,312,645	4,043,500	4,975,292
Landbridge - China and Far East	12,406	4,142	12,406	4,142
Total Market Potential	2,443,968	4,394,640	4,519,866	5,128,892

<sup>13</sup> TRACECA: Regional Traffic Forecasting Model, Dossier of Basic Data about the Model as at January 1997, January 1997, WS Atkins Planning Consultants, Epsom, Surrey, England.

The following assumptions have been made:

- Where the same set of trade have been reported by both the importing and exporting country, statistics of the exporting country have consistently been used.
- Interregional - Captive includes cargoes between Azerbaijan, Georgia and Armenia and Turkmenistan, Kyrgyzstan, Uzbekistan and Tajikistan.
- Interregional - Competitive include cargoes between Azerbaijan, Georgia and Armenia, and Kazakhstan.
- Transshipment - Competitive include cargoes between Turkmenistan, Kyrgyzstan, Uzbekistan and Tajikistan, and Russia, Belorussia, Ukraine and Moldova.
- Transshipment TRACECA - Captive include trade between Turkmenistan, Kyrgyzstan, Uzbekistan and Tajikistan and North-Western Europe, Southern Europe, North-Central Europe, Northern Europe, West Africa, East Coast America and West Coast America.
- Landbridge includes cargoes between Azerbaijan, Georgia and Armenia, and China, East Asia Developing and East Asia Industrial.
- Group 5 - Mineral products include commodity codes 25 to 27. Since most of these cargoes may not be susceptible to transportation by the ferry, the cargo volumes have been reported both with and without these cargoes.

## 6.2 Modal Split of Cargoes

Although the data available is considerably more limited, an estimate of the modal split on the different routes in terms of rail and road has been made. Cargoes carried by sea have been excluded since these cargoes would not have been available to the ferry service. Also cargoes in Group 5 - Minerals etc. have been excluded for the same reason. The estimated modal split based on the data available is presented as Table 6.2.

Table 6.2 The 1995 Estimated Modal Split of Trade Routes (all figures in %)

Trade route:	Eastbound without Group 5 - Minerals etc.		Westbound without Group 5 - Minerals etc.	
	Rail	Truck	Rail	Truck
Interregional - Captive	58	42	87	13
Interregional - Competitive	70	30	97	3
Transshipment - Competitive	93	7	94	6
Transshipment TRACECA - Captive	57	43	76	24

As shown in this table rail is, not surprisingly given the history of transportation in the FSU countries, the dominant mode of transportation. On the shorter hauls represented by the Interregional trades truck transportation was used relatively extensively.

As discussed in Section 5.3 changes in the pattern of modal split can be expected. While rail will continue to be a major mode of transportation, the containerization and increased use of trucks and trailers will tend to change the modal split in the future.

### **6.2.1 The Factors Influencing the Growth of Containerization of and the Modal Split on the Central Asian Trade Routes**

One key feature of the Central Asia trades will be rapid increase in the rate of containerization, particularly of the general cargo trades. The containerization of the cargo flows will be "import driven". "Import driven" in this context means that shippers and also the consignees of the expected increase in import cargoes to Azerbaijan and the other Central Asian republics will increasingly require their cargoes to be transported in containers; at the same time international container operators and the major international freight forwarders will establish operations and offer their container services to and from the area. Once the containers have been discharged and the cargoes received by the consignees, the container operators and the forwarders will be searching for export cargoes that can be containerized.

At the present time the level of containerization of the Azerbaijan and Central Asian foreign trade is limited, and most of the containers currently handled are carrying imports from Europe, the Far East and North America transited via Dubai and Bandar Abbas, Iran or a Turkish port and then carried by truck to their destinations.

Over the coming years up to the year 2000 the situation with respect to and the level of the containerization of the Azerbaijan and Central Asian general cargo trades can be expected to increase dramatically. The driving forces of this increase will in the main be:

- The oil industry developments in Azerbaijan and the other Central Asian republics. As discussed in Section 5.5.2 the volumes of cargoes will be substantial. A large proportion of the cargoes for the oil industry will be containerized.
- The development of the Turkmen oil and gas industry. A development similar to that in Azerbaijan will also be experienced in the development of the Turkmen oil industry, particularly the offshore fields currently being developed. In this case it is not unlikely the port of Turkmenbashi will be used as a staging area and coastal base for these developments.
- Subcontractors to the oil industry. In addition to the direct cargo volumes of the oil industry there are a number of subcontractors and various service companies serving the oil industry. These companies will also bring in substantial volumes of equipment and supplies, most of which will be containerized. Most of these shipments will be in relatively small lots (from one to twenty container loads) and will therefore most likely be handled through the CY in the ports of Baku and Turkmenbashi.
- Establishment of Baku as staging area for oil industry contractors and suppliers. As discussed in Section 5.5.3. Since most of the equipment and supplies to and from these distribution centers and staging areas will be containerized, such a development will boost the overall volume of containerized cargoes handled through Baku. These cargoes would also naturally be handled through the CY to be established in the port.

- The development of the TRACECA route for container transportation. As discussed in section 5.5.8. the development of the TRACECA route is followed closely by the container transportation industry and the international forwarders. The major initial driving force for the development of the container trade on the TRACECA route will be the transportation requirements of the international oil industry currently being established in Baku and in the other Central Asian countries. The oil companies and their contractors are major users of container transportation services. Several developments that will enable significant increases in the volumes of containers that can be transported on the TRACECA route are currently underway:
  - P&O Containers and Sea-Land Service Inc., two of the world's leading container operators and pioneers in bringing containerized transportation services to the Central Asian region, is in the process of changing their logistics services to and from this region.
  - Ro-ro services to the port of Poti. The port of Poti is served by two ro-ro ferry lines, one operating between Poti and Odessa, Ukraine and the other between Poti and Burgas, Romania. Both are operating on a weekly schedule.
  - A container block train services has already been established between Poti and Baku on a trial basis funded by Tacis.
- Major international freight forwarders in Baku. At the behest of the oil companies and based on the general prospects of significant business opportunities in Azerbaijan and the Central Asian region, major international freight forwarding companies have established operations in Baku. The general consensus among these forwarding companies is that the volume of containerized cargoes will show a dramatic increase in the near future. Several of the forwarders are also considering the establishment of consolidation/groupage services based in Baku, to establish warehousing and distribution services to serve the Central Asian market.
- Baku as a "free port" and Sumgait as a "free industrial zone". As discussed in Section 5.5.5 these developments will have the potential of developing large volumes of containerized and general cargoes to the ferry link

As mentioned above it is expected that the containerization of the Central Asian trade will be import driven. In order to establish a regular service, container operators and forwarders will consider the availability of return cargoes to reposition their containers. Several opportunities currently exist for containerizable return cargoes in the form of major exports from Azerbaijan and the other Central Asian republics:

- Polyethylene from the petrochemical industry in Sumgait, Azerbaijan is an excellent containerizable cargo, which will be actively solicited by the container operators and freight forwarders as a return cargo for the containers used in the import trade.

- Caustic soda, chlorides, detergents and other miscellaneous chemicals derived from salt produced at HimZavod in Sumgait can be containerized for shipment to world markets. In addition caustic soda and various chemicals will also be exported from the chemical and petrochemical industry in Turkmenistan.
- One of the largest air conditioner factories in the world is located in Baku. This factory used to supply all of the FSU. Currently this factory is actively marketing their products in and establishing contacts in new export markets worldwide to replace markets lost in Russia and the FSU. Supplies are currently shipped in primarily by truck from Turkey, Iran, Russia and Europe. To the FSU countries their products are primarily shipped by rail and truck, due to the non-availability of container transportation in these trades. For worldwide markets the preference of the management of this factory is to containerize the shipment of their products. The factory is operating at a low level of utilization; the management is, however, confident that export volumes to markets outside the FSU will increase significantly over the next few years.
- The oil equipment industry for the FSU was concentrated in Azerbaijan. As a result of the break-up of the FSU, the capacity utilization of the production capacity of this industry is low. Like the air conditioner factory these companies are also developing new markets outside the FSU in addition to their traditional customers within the FSU. Exports from this industry are containerizable cargoes.
- Azerbaijan as well as Uzbekistan and Turkmenistan are major producers of cotton. Major portions of the world cotton trade is now containerized, since cotton exports represent an attractive return cargo for the container operators. It is expected that increasing proportions of the cotton trade from Azerbaijan and the Central Asian nations will be containerized as containers are becoming available.
- Fruits and vegetables - both canned and fresh - are produced in significant quantities in the Central Asian republics and can represent interesting return cargoes for the container operators. Availability of refrigerated containers used for imports of food products will allow producers of fruits and vegetables an opportunity to develop new market opportunities for their products using these containers to ship their products to new markets, e.g. Europe.

In terms of container transportation on the ferry, containers will initially be carried by trucks or as accompanied containers transported on Mafi-type trailers. As the container volumes increase and block trains are becoming available, the heavy volume of containers will be carried by the block trains or on railcars, while containers will also be handled by truck and as unaccompanied containers.

As discussed in Sections 5.3.1 and 5.5.4 the CYs and TYs in Baku and Turkmenbashi will function as a multimodal terminal facility for the handling of containers and trailers shipped as TOFC, and as such the CYs and TYs will handle containers arriving and departing by rail, truck and ships operating on the Caspian Sea. In the case of the ferry link most of the containers handled will be coming from or destined to the port of Poti, Georgia, to and from where the containers will be transported by container feeder vessels.

As discussed in Section 3 of this report, the lowest cost and fastest transportation mode between Baku and Poti and between Poti and Ashgabat is rail transportation. The most



efficient and least cost rail transportation alternative for containers is by block trains. Thus one of the key prerequisites for the inland CYs in Baku and Turkmenbashi and the attraction of container cargoes to the ferry link is for the national railroads of Azerbaijan, Georgia and Turkmenistan as well as the railroad companies of the other Central Asian republics in close cooperation with the ports of Baku, Poti and Turkmenbashi and the container operators to establish regularly scheduled, frequent container block trains operating in the transportation corridor between Poti and Baku, and then onwards between Turkmenbashi and the other Central Asian load centers. The unavailability of container block trains or dependable, regularly scheduled train service and proper handling equipment has forced the container operators at the present time to depend entirely on truck transportation between Baku and Poti and onwards between Turkmenbashi and the Central Asian republics.

Between Baku and the Iranian port of Bandar Abbas truck transportation is the only alternative, since all rail transportation is blocked by the Armenian occupation of the Jolfa border station. Until May 1996 when the new rail link between Iran and Turkmenistan was opened, truck transportation was the only mode of transportation available.

Hence, one of the central assumptions in developing the cargo volume forecast for the ferry service presented in the next section of the report is the establishment of regularly scheduled container block trains between Poti and Baku and between Turkmenbashi and the Central Asian republics shuttling large volumes of containers between these points. It is furthermore expected that the regularly block train service will be operational and functioning efficiently by the year 2000 (the baseline year). At that time a major proportion of containers transported between Poti and Baku for onwards transportation by the ferry will be handled by rail both as a result of lower cost and faster transit time compared to truck transportation. It is expected that the railroads should be able to capture a market share of between 60% and 70%, while trucks will handle between 30% and 40%. The rail traffic will be divided between block trains and containers transported in regular cargo trains. While it can be expected that a major proportion of the containers transported by rail will be handled by block trains, there will be instances where container traffic will be included in regular freight trains as part of project shipments or for shipments directly to and from industrial companies or freight forwarders. The distribution of the traffic by train to and from the CY is expected to be:

- Rail transportation in block trains - 70 - 80% of volume
- Rail transportation in regular cargo trains - 20 - 30% of volume

Those containers that will be transported by truck will primarily be delivered directly by truck operators, which will carry the same container empty or loaded with new cargoes back to Poti, and these containers will not be handled in the CYs in either Baku or Turkmenbashi.

A small, but growing trade will also be represented by containerized cargoes to and from the Russian ports in the Far East and the People's Republic of China transported by the rail landbridge via Siberia and Central Asia and then via the ferry. These containers to be carried on the ferry will in the main be cargoes traded between the CIS countries west of the Caspian Sea and the Far East and the Peoples Republic of China and East Asian nations (particularly Korea and Japan). When the TRACECA link to Europe is fully established it is expected that also that this landbridge connection will be extended to also encompass Europe as an alternative to all water transportation. Those containers originating

and destined for Azerbaijan are expected to be handled through the Baku and Turkmenbashi CYs, while others will be handled by rail directly on the ferry.

The CYs in both Baku and Turkmenbashi will be required to handle containers and trailers to and from Central Asia transported by the ferry between Baku and Turkmenbashi. In this connection the CYs will in the main be required to handle containers arriving in or departing from either Baku or Turkmenbashi by rail, which are shipped or have arrived by the ferry by truck or unaccompanied on chassis or on a Mafi-type trailer. Since no specific handling area has been defined in the ferry terminal in Baku for the handling of such traffic, these transit containers will have to be handled in the CYs to be established in both ports. The extra handling of the containers in the respective ports between rail and truck/chassis/Mafi-type trailer will, however, add a cost element for additional handling and require more time, plus that it will also imply the necessity of additional follow-up and administration of the part of the freight forwarder or transportation company. As a consequence it is expected that the major portion of the transit container traffic via the ferry will be handled directly on a through basis on railcars or trucks/chassis to avoid extra container handling in the port.<sup>14</sup>

As discussed above the driving force for the containerization of the trades will initially be the import trades to Central Asia. Once the import containers are discharged at their destination in Azerbaijan or one of the Central Asian nations, the container operators will seek cargoes suitable for containerization among the export cargoes. A prime example will be to carry a commodity such as cotton, which in other world trades are almost exclusively containerized. This commodity can be handled in both in 40 ft. as well as in 20 ft. containers. The Central Asian nations also has the potential to export significant quantities of industrial goods, plus various chemical and petrochemical products. All these are also containerizable commodities.

The container operators and freight forwarders shipping containers to the Central Asian republics will use their ingenuity and experience from other developing trades to find cargoes that can be containerized in order to find return cargoes for their equipment to avoid having to ship the containers empty in return.

Another issue is the expected distribution between size of containers, i.e. 20 ft. vs. 40 ft. containers. In the former Soviet Union and currently in the CIS countries the container trade has been minimal, and to the extent a container transportation trade has existed it has been handled almost exclusively in 20 ft. containers. The primary reason is that specialized equipment for handling containers has been and still is virtually non-existent. Outside of the ports in the CIS, only two or three inland railroad stations have equipment to handle 40 ft. containers, of which one of the rail freight stations in Moscow is one. Some major rail stations are equipped with cranes or large fork lifts with lifting capacity sufficient to handle loaded 20 ft. containers. (All Soviet 20 ft. containers were equipped with fork lift pockets.)

---

<sup>14</sup> This situation will, however, to a large extent be driven by the rate structure and policy of both the ferry company and the railroads. The current rate structure of the ferry favor the transportation of railcars, i.e. the ferry cost of transporting a railcar is less than for a tractor/trailer. If the ferry charges are changed to reflect the true economic cost of the transportation of railcars and trucks/chassis, freight forwarders and transportation may find it advantageous to use the Baku and Turkmenbashi CYs as a transshipment point whereby they would elect to use block trains between Poti and Baku, ship the containers unaccompanied on Mafis or chassis on the ferry and use truck or rail transportation between Turkmenbashi and other points in the Central Asian republics.

When the container trade to and from the Central Asian republics and the other industrialized countries, which as stated above will be import driven, is firmly established (i.e. in the time frame after the year 2015), the split between 20 ft. and 40 ft. containers is expected to be similar to that of other developed container trades, i.e. between 70% and 80% 40 ft. and between 20% and 30% 20 ft. containers. Prior to that period, the containerized trade to and from the Central Asian countries can be expected to be similar to other developing container trades, where the proportion of 20ft. containers tend to be considerably higher as a result of a higher proportion of small lot shipments, heavy project cargoes and large proportion of raw and semiprocessed export cargoes (which generally are relatively heavy). The assumptions made with respect to the development of the distribution of container sizes are:

<u>Time frame</u>	<u>% 20ft.</u>	<u>% 40ft.</u>
Now to 2005	80	20
2005 - 2010	60	40
2010 - 2015	50	50

After this time a gradual development in the direction of the worldwide split 20% to 30% 20 ft and 70% to 80% 40 ft. containers can be expected.

### **6.2.2 Truck and Trailer Traffic on the Ferry**

As discussed in Section 5.3.2 truck and trailer transportation is expected to be a dominant mode of transportation, particularly for general cargoes, on the future transportation scene in the Central Asian republics both in terms of local and interregional as well as international transportation. Initially in the planning period most if not all of the trucks and trailers will be accompanied by the drivers. As forwarders and trucking companies are able to establish transportation systems modeled on the systems existing in most developed countries, increasing volumes of unaccompanied trailers will be carried on the ferry link.

The factors driving the developments of the containerization will also tend to spur the development of the trucking industry. In many cases, particularly for cargoes from areas where overland transportation is possible (e.g. Turkey, Europe, Russia and the other CIS countries), truck and trailer transportation will compete with container transportation via ship and/or rail.

### **6.2.3 Rail Transportation**

As discussed the heritage of the past with respect to the dominance of the rail transportation combined with the establishment of container block trains and that rail is the lowest cost alternative for transportation of bulk materials and is also highly competitive for general cargoes, will secure rail transportation will maintain a high share of the transportation in the Central Asian region and also on the ferry.

#### 6.2.4 Expected Modal Split on the Ferry

Table 6.3 presents the assumptions with respect to the future modal split on the various trade routes. It is assumed that the modal split will be determined by the eastbound movements. The implication is that the westbound modal split will be influenced by the equipment that will be positioned in the Central Asian region by the eastbound movements. With respect to the modal split on the Transshipment TRACECA the modal split reflects all cargoes except imports of grains and cereals. The latter are all expected to be transported by rail.

**Table 6.3 The Estimated Modal Split of Trade Routes 2000 - 2015 (all figures in %)**

<b>Modal split - Interregional</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>
	<b>Baseline</b>			
Rail	0.55	0.50	0.40	0.40
Trailers/trucks, total	0.40	0.40	0.45	0.45
Trailers with tractors	1.00	0.90	0.80	0.80
Trailers without tractors	0.00	0.10	0.20	0.20
Containers	0.05	0.10	0.15	0.15
<b>Modal split - Transshipment - competitive:</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>
	<b>Baseline</b>			
Rail	0.80	0.70	0.60	0.60
Trailers/trucks, total	0.15	0.20	0.25	0.25
Trailers with tractors	1.00	0.90	0.80	0.80
Trailers without tractors	0.00	0.10	0.20	0.20
Containers	0.05	0.10	0.15	0.15
<b>Modal split - Transshipment - TRACECA:</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>
	<b>Baseline</b>			
Rail	0.40	0.30	0.20	0.20
Trailers/trucks, total	0.40	0.40	0.40	0.40
Trailers with tractors	1.00	0.90	0.80	0.80
Trailers without tractors	0.00	0.10	0.20	0.20
Containers	0.20	0.30	0.40	0.40

Containers are expected to be handled in three ways:

- Directly on railcars in block trains or on conventional trains. Three TEU are expected to be carried on each railcar.
- By truck or trailer on chassis. Two TEU are expected to be carried on each chassis pulled by a truck tractor.
- Indirect handling of unaccompanied containers through the container yards at the ports of Baku and Turkmenbashi. These containers will be handled on ferry owned/controlled trailers or chassis loaded and discharged by "loadmasters" or yard tractors. Each trailer or chassis will carry two TEU.

The ferry will, however, be transporting units of equipment in terms of railcars, trailers and containers. The cargo tonnages have been converted to units using the following conversion factors:

- Railcars carry an average payload of 56 tons
- Trailers and trucks (standard road trains (18 meters) or 13.6 meter Eurotrailers carry an average of 20 tons
- The average load of a container (TEU) is 12 tons.

### **6.3 Forecasts of Future Cargo Potential for the Ferry Using Scenario Analysis**

The Central Asian economies have experienced dramatic changes, and the overall economic output as measured by the GDP and the industrial production has for many of the countries been more than halved. The expected developments of the cargo flows will to a large extent be determined more by the ability of the respective governments to redirect its trade flows from their traditional orientation of trading within the former Soviet block countries to trade with the rest of the world.

In this overall picture Azerbaijan will be an influence on the cargo flows only to the extent of its local trade with the other Central Asian republics on the other side of the Caspian Sea. The cargo flows will therefore be driven by the trade developments and thus transit cargoes to and from Turkmenistan, Uzbekistan, Tajikistan and Kyrgyzstan.

Given the uncertainty and the major changes that have happened in the recent past and the major changes that can be expected in the near future we have found that traditional methods of cargo projections may not be able to describe these changes. Instead we have decided to use the method of scenario description. In this respect we have selected major issues that can be expected to influence the cargo flow and modal split developments on the trade.

Key issues for scenario description of potential developments are:

- General macroeconomic developments. Since the economies of both Azerbaijan and Turkmenistan are highly dependent upon the petroleum industry, their ability to attract foreign investments for the development of oil and gas fields and infrastructure in the form of pipelines will to a large extent determine the rate of growth in the economies. The development of the oil and gas fields will initially create traffic in terms of the equipment and supplies brought in, and later the sale of oil and gas will create infusions of funds to the economy will contribute to the overall economic development and thereby increased trade and cargo flows. Major issues in this respect influencing this development will be:
  - Liberalization of the economic policies. The policies adopted in this respect will influence the attraction of foreign investments in the basic industries both in oil and gas and other industries.
  - Political stability and the ability to create peace. The development of the conflicts in Nagorno Karabak, Chechnya and other regions plus the overall

political climate will influence or disrupt economic development and the expected cargo flows.

- Direction of the trade. The cargo flow of the ferry service will be influenced by the direction of the trade, e.g. to the FSU, the Far East, China and Iran/India/Pakistan or Western Europe and the USA. The success of the Central Asian republics of developing trade with Turkey, Western Europe and the US will clearly influence the cargo flows on the ferry.
- Development of alternative transportation patterns and routings including transportation infrastructure. The main alternatives that will influence the use of the ferry service are:
  - The Volga-Don canal upgrading
  - The Olya/Astrakhan port development and start of alternative ferry services
  - The Iranian connection through Bandar Abbas and overland transit through Iran
  - The Chechnya overland connection

### **6.3.1 Likely Scenario**

This scenario describes the overall situation expected by the majority of observers of the region, and should represent a development trend with a probability of more than 50%.

#### **6.3.1.1 Macroeconomics Development**

Under this scenario it is expected that the uncertainties associated with respect to key political issues, which has clouded the economic situation of Azerbaijan in the recent past, are resolved in the near future:

- Creation of peace with Armenia over Nagorno Karabak. The current cease fire agreement is conflict, which has displaced more than 900,000 people and caused massive destruction of the infrastructure, is replaced with a permanent peace agreement brokered by international mediators. The lingering uncertainty and the possibility of resumption of open warfare is superseded by optimism and internationally supported program to rebuild the war zone.
- The Chechnya conflict is ended with a cease fire followed by lasting peace. The Russian government and the separatists is resolved by the republic gaining a more independent status while still being a part of Russia.
- Liberalization of the economy and attraction of foreign investments. With its long history of oil and gas exploration and strong influence of the private sector in the economy, the entrepreneurial spirit has survived the many years of communist regime, and the reform program of the government has rekindled the spirit. The private sector flourishes both as a result of the increased activities in the oil and gas sector and creates new employment opportunities and increasing incomes among the population. Economic output is, however, not at a level similar to the peak output of previous years until approximately 2005.

- Development of the oil and gas reserves. The agreement signed in September 1994 with an international oil consortium to develop the Azeri, Chirag and Gune-shli oil and gas fields is followed by other similar agreements with international oil consortia on the basis of the Caspian Sea oil producing countries reaching an agreement covering the sharing of the oil resources following the break-up of the FSU. The major issue of the investment in the construction of alternate pipelines to export the increased output countries outside the FSU is made, and the construction is started around the turn of the century.

The expected economic development of the Azerbaijan economy is summarized in Table 6.4.

**Table 6.4 Azerbaijan: Projected trends 1994-2003**

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Percent changes in real output:										
GDP	-21.9	-8.9	-1.3	-0.8	-0.3	3.5	6.3	11.5	10.9	10.0
Oil and gas	-8.2	-3.5	-7.1	-7.0	-7.0	6.3	13.6	29.0	23.2	17.8
Rest of economy	-24.2	-10.0	0.0	0.5	1.0	3.0	5.0	8.0	8.0	8.0
Balance of payments (in millions of USD):										
Exports	637	613	464	468	512	577	891	1412	1982	2552
Imports	849	839	739	919	1139	1365	1800	2434	2863	3384
Resource gap	-212	-226	-275	-451	-626	-788	-908	-1010	-881	-831

Source: Azerbaijan, Economic Update, World Bank, April 24, 1995

The development of the Turkmenistan economy depends on the success of the Turkmen government in attracting interest from Western oil companies in building pipelines to markets outside the FSU to diversify and increase its gas exports. Construction is expected to be finalized in 1997 on a pipeline through to Iran, which as a stage two development will be extended to Turkey with planned completion in 1999. Plans are also made for a pipeline through Afghanistan to Pakistan, and it is reported that construction may start on this pipeline already in 1997, although observers are doubtful as to the possibility of success of this ambitious venture. The government is also actively soliciting interest in and investments for its gas industry and the pipeline projects from major international oil companies and financial institutions.

Turkmenistan is also dependent upon attracting foreign investments to exploit its vast natural resources. Although efforts have been made to redirect the economy from the inherited central control system of the Soviet times in the direction of liberalization and a market economy, the efforts have not produced significant visible results, and major portions of the economy including the important gas and cotton sectors are under the control of government institutions.

In the coming years it is expected that the government will continue its policy of retaining control of the economy, the limited efforts at privatization of government owned industries and agriculture and overall liberalization of the economy. This will tend to retard economic growth and foreign investments both in the gas industry as well as the traditional industries of Turkmenistan.

In the near future a continued low activity is expected in the Turkmen oil and gas industry, while the other industries are expected to have bottomed out in 1995, and real growth can be expected from 1996 onwards. Estimated annual growth of the GDP up until the year 2000 is expected to be approximately 5 to 6% per year, while after completion of the pipelines to Iran/Turkey and the planned pipeline through Afghanistan to Pakistan the annual growth rate will increase to in excess of 6%. It should be noted, however, that the growth will be from a very low base and following significant declines in the recent past. High growth rates will therefore not necessarily translate into immediate improvements in the overall economic situation in terms of the overall trade volumes and purchasing power of the population.

The economies of the Georgia, Armenia and the remaining Central Asian republics will experience a moderate recovery between 1996 and the year 2000 whereby growth will again be positive, and continuous growth in excess of 4% to 5% on average will be expected in the years 2000 to 2015. Although the growth rate of the Azerbaijan economy will be higher than the average, the overall rate of growth of the economies will be expected to average between 4% to 5% for the region as a whole.

The elasticity of trade for the world as a whole is calculated at 1.25, while for many countries, particularly developing economies, the elasticity are higher than that. Following the liberalization of their economies, the elasticity of trade of some of the former communist countries of Eastern Europe have even exceeded 2.0. Given estimates of average GDP growth of between 4% and 5% per year, a conservative estimate of the growth of the trade will be between 5% and 7% per year.

The economic recovery and development in the region will be expected to be characterized by the following:

- It will to a large extent be driven by the development of the oil and gas resources, with which the region is richly endowed. Major investments will be made by the international oil companies to explore for and develop the oil and gas fields of the region. Substantial volumes of cargoes will be imported from abroad for the purpose of this development.
- The region will, starting around the turn of the century, to gain increasing revenues from the sale of oil and gas. These large revenues will be used for the development of the other sectors of the economy, including the rebuilding of the industrial infrastructure and to improve the agricultural sectors. Most of the industrial goods and equipment to be used for this development will be imported from the industrialized nations of the world.
- The general lack and scarcity of consumer goods in the Soviet era will be replaced by a consumer oriented society. As the purchasing power of the general population increases, growing volumes of consumer goods and consumable products will be imported. Until the agricultural sectors of the respective economies is liberalized and upgraded, it will be necessary to continue the import of agricultural basic necessities to augment the domestic production of these products. Increasingly imports of other consumer goods will also be performed to supply an increasingly affluent population in the republics.



- Although constantly larger shares of the oil and gas exports of the republics will be sold for hard currency, barter arrangements will continue to be a feature of the energy trade to the republics of the FSU. This will particularly be the case in Turkmenistan, whose gas by necessity due to the lack of pipelines to other areas than to the FSU has to be sold to the FSU states with limited foreign reserves and with limited possibilities to sell its gas reserves elsewhere.
- Azerbaijan is the economy, in which the liberalization of the economy and the development of the oil and gas reserves have progressed the furthest. In this respect Azerbaijan will be a "locomotive" in terms of the development of the region both in terms of buying supplies from the other nations in the region and also in rebuilding its industrial base to export to the other countries in the region.

### 6.3.1.2 The Direction and Composition of Trade

The strong ties to the countries of the FSU cemented in old Soviet times, the existing transportation infrastructure, which to a large extent is structured on the former Soviet system and the past history of trade with the FSU countries, will continue at least for the first part of the planning period (i.e. to the time period 2003 - 2005) to dominate the direction of trade in favor of Russia and the other FSU countries both in Central Asia and in Europe. The close cultural ties and the close geographic proximity to Turkey and Iran, and to a lesser extent the Peoples Republic of China, will ensure that these countries will grow rapidly in importance as trading partners. The largest growth, however, will be accounted for by Western Europe, United States and Japan, and by the end of the planning period these countries will be expected to have surpassed the FSU, Turkey and Iran in importance as trading partners.

As a result of the overall development the composition of the trade will be heavily slanted in favor of the export of oil and gas and the exploitation of the rich natural reserves of the region. These oil and gas cargoes will in the main be transported via pipelines or in tankers on the Caspian Sea and onwards via pipelines or rail, and will not affect the cargo volumes to be transported on the ferry service between Baku and Turkmenbashi. As pointed out above, the extensive investments to be made in the oil and gas sectors in the republics followed by investments in the industrial infrastructure and agricultural sectors will shift the overall direction of the cargo in favor of cargoes in the eastbound direction, i.e. an import driven trade of goods from the industrialized world to the region. Toward the end of the forecast period the exports from the region will increasingly be replaced by finished industrial goods as opposed to raw or semiprocessed materials (e.g. cotton fabrics and textiles rather than raw cotton).

Another development is a shift in the focus of the transportation flows of international cargoes to and from the countries of the Central Asian region on the east side of the Caspian Sea (i.e. Turkmenistan, Kazakhstan, Uzbekistan, Tajikistan and Kyrgyzstan). Under the Soviet regime cargo flows were not so much directed by economic realities and the cost of transportation, but more by the overall priorities of the centrally developed plans. Traditionally these countries were required to and have until recently continue to ship large proportions of their international cargoes by rail to and from St. Petersburg and the other ports on the Baltic and the Russian ports on the Black Sea. As indicated in the cost analysis of transportation to and from the Central Asian region represented by Ashgabat, Turkmenistan presented in Section 3, the combination of the TRACECA route and the ferry link is highly competitive with other routes of transportation. As a result a shift will be

observed in the ferry trade. In the recent years the cargo flows have been in favor of the westbound trade. This will gradually be changing so that the eastbound trades will gradually become more dominant, not the least as a result of the expected import driven trading pattern:

- The eastbound cargoes will be a combination of regional cargoes, which will be raw materials and semiprocessed products from Georgia (e.g. tea, wine, water, various agricultural products) and Azerbaijan (miscellaneous industrial and consumer goods plus fruits and vegetables) and increasing volumes of transit cargoes imported from the industrial countries of Europe, America, Australasia and the Far East:
  - Agricultural products including tea, wine and various processed materials from Georgia will continue to be shipped to the Central Asian republics both as payment for gas from Turkmenistan (primarily tea). In the season fruits and vegetables will be transported from both Georgia and Azerbaijan to the Central Asian republics on the east side of the Caspian Sea. In addition it can be expected that the fruit and vegetable trade by truck to Russia and the other CIS countries in Europe will continue via the ferry as long as the truck route via Dagestan and Chechnya is considered to be unsafe and as long as no alternative ferry routes are established either to Astrakhan, Russia or Aktau, Kazakhstan.
  - Although the Central Asian nations are aiming to increase their production of grain and will most likely also buy grain from the vast export production of Kazakhstan, it is likely that the Central Asian nations will import grain also from Europe and North and South America. In addition they will require the import of sugar from the Ukraine and the world markets. The traditional route of these shipments have been through the ports in the Baltic or the Russian Black Sea ports and thereafter rail transpiration on the northern route via Russia and Kazakhstan. Increasingly these shipments can be expected to be shifted to the more cost effective TRACECA route as railroads start stating real market rates for transportation.
  - Raw materials, primarily, alumina from Azerbaijan, can again expected to be to be transported by railcar and ferry to the aluminum plants in Tajikistan.
  - Industrial goods, such as oil equipment and various electrical appliances from Azerbaijan to the other Central Asian republics will continue to be major cargo potential of the cargoes from Azerbaijan. As the economies of the other Central Asian republics recover, these cargoes will continue to grow. Although Azerbaijan manufacturers have had to find new markets to compensate for the lessened demand in the Central Asian nations and Russia.
  - Following the reconstruction of the Azerbaijan chemical and petrochemical industry, it will also be expected to continue to market its products in the Central Asian region. Various petrochemicals and chemicals such as polyethylene, caustic soda etc. will be shipped from these plants by rail, truck and containers via the ferry.

- The container, trailer and truck trades from Turkey, Europe and the rest of the world with industrial goods, machinery, equipment and building materials for the reconstruction of industrial plants and infrastructure; consumer durable and consumable goods, and not the least equipment and supplies for the rapidly expanding onshore and offshore oil industry in Turkmenistan and the other Central Asian regions will increase dramatically from its current minimal base to being the dominant cargo on the ferry within the first decade of the next century.
- Industrial goods, machinery and parts, various semiprocessed materials and also some agricultural products will be traded from Ukraine and Russia to the Central Asian nations. Part of this trade will be barter payments for gas supplied by Turkmenistan. In addition these will also be transit trade that will be going onwards to Iran and also to India and Pakistan.
- Exports from Azerbaijan, Georgia and Armenia to the Far East, South East Asia and the Indian subcontinent will consist of various industrial products and chemicals and petrochemicals in addition to cotton and various general cargoes. Most of these cargoes will be routed via the Arabian Gulf port of Bandar Abbas. Increasingly cargoes can, however, be expected to be routed via the landbridge rail route via the Russian Far East ports and directly to the Peoples Republic of China.
- The westbound trade has been and will continue to be dominated by raw and semiprocessed materials plus some finished products:
  - Cement and building materials from Turkmenistan and Uzbekistan to Azerbaijan have been some of the major cargoes on the ferry. Although there are major cement plants in Azerbaijan, the production is far from sufficient to cover the domestic demand. The expected recovery of the Azerbaijan economy and thus the domestic construction industry combined with the development of the oil industry, which also is a major user of high quality cement, will ensure markets for both the Uzbek and Turkmen cement and building materials industries in the future. The reconstruction of the war devastation in Chechnya will also provide market opportunities for both cement and building products from Turkmenistan and Uzbekistan.
  - Cotton from Uzbekistan and Turkmenistan has been and will continue to be a major export cargo, most of which will be transported via the TRACECA route. It is reported that the governments of Uzbekistan, Turkmenistan, Azerbaijan and Georgia have reached an agreement whereby a total annual volume of one million tons of Uzbek cotton will be exported to markets in Europe and overseas via the TRACECA route and the ports of Poti and Batumi in Georgia. In 1995 a total of 300,000 tons of cotton was exported from Turkmenistan. The total potential volume assuming a relatively stable production volume in both countries will be in excess of 1.3 mill. tons. It is, however, highly unlikely all volumes in the reported agreement of one million tons will be carried via the TRACECA route, since the transportation systems will not have sufficient capacity to handle such large volumes at

this stage.<sup>15</sup> Significant volumes of Uzbek cotton will be transported on the TRACECA route; the volumes will, however, for the foreseeable future be less than the ambitious goal of one million tons of exports as stated in the agreement between the Uzbek, Turkmen, Azeri and Georgian governments. As the volume of westbound container and truck traffic grows, the transport operators and freight forwarders will be seeking return cargoes to increase the utilization of this equipment and also reduce the overall cost of transportation in both directions. As a result they will be seeking return cargoes. Based on experience of other major cotton exporting countries, where major volumes are containerized or shipped by trucks as return cargoes, such a development is also highly likely to occur also in this region. The overall effect for the Central Asian exporters of cotton will be a significant increase in transportation capacity and reduction of the transportation costs, which in turn will increase the competitiveness of their products and expand their market opportunities.

- Salts, sulfur and other chemicals are important raw materials provided by Turkmenistan for the chemical industry of Azerbaijan based in the city of Sumgait. The bulk of these cargoes will be carried in bulk vessels across the Caspian Sea, while relatively small quantities can be expected to be carried by rail or truck on the ferry.
- The volumes of general cargoes carried by rail, trucks and containers can be expected to increase significantly in the future as the industries of the Central Asian republics are reconstructed and new plants established both by joint ventures with international companies and by local entrepreneurs. Trucks and containers used to carry import cargoes as described above will to a large extent be used to transport these cargoes as interesting return cargoes.
- The trade with the Far East, South East Asia and the Indian subcontinent to Azerbaijan, Georgia and Armenia, which will be industrial goods, supplies to the oil industry (e.g. pipes) and various consumer durable and electronics plus agricultural products such as tea, rice and flour can be expected to be increased significantly. Most of these cargoes will be traded via the Arabian Gulf and shipped via Bandar Abbas by rail and truck. Cargoes will also be shipped by the landbridge route via Russian Far East ports and to some extent also the Peoples Republic of China, the latter for trade with PRC.

---

<sup>15</sup> If it is assumed an average of 60 tons of cotton per railcar, a volume of one million tons will require 16,700 railcars to be shipped on the TRACECA route including the ferry per year. Given a total capacity of 28 railcars per ferry, this volume will require almost 600 ferry voyages per year or almost two voyages per day only to handle the Uzbek cotton exports. In addition it should be noted that the Central Asian cotton shall also be sold on the world markets. While it is recognized that the Central Asian cotton is considered to be high quality, it will be competing with other cotton producers, most of which will have lower transportation costs to bring their products to the world markets.

### 6.3.1.3 Development of Alternative Transportation Patterns and Routings

The investments by the EU in the TRACECA corridor including the ferry terminals, combined with the resolution of the Nagorno Karabak and the Chechnya conflicts ensure the success of the TRACECA route as a major transportation link of the Central Asian countries' foreign trade.

The main developments on the alternative routes that will influence the use of the ferry service under this scenario are:

- The Volga-Don waterway is upgraded and is operational with the extended draft and improved locks ensuring minimal delays and the use of the full draft and loading capacity of the vessels. The waterway is also opened to international traffic. During the navigation season this route is primarily used for bulk shipments, while shippers and consignees of general cargoes prefer the use of the trans-Caspian ferry both due to lower transportation costs and shorter transit times.
- The Russian government proceeds with the development of the port of Olya near Astrakhan, and alternative ferry services from this port to Aktau, Kazakhstan, Turkmenbashi, Turkmenistan and Iranian ports are started. The opening of this route is considered a contingency in the event that the more efficient route through Chechnya should for any reason be closed for political or other reasons in the future. The cargo volumes on this route are therefore relatively limited.
- The Iranian connection through Bandar Abbas and overland transit through Iran continue to be developed as an important route. Improved infrastructure between Turkmenistan both by rail and road makes this an attractive route primarily for local and Far East cargoes. Cargoes to and from Europe and the US are shipped on the more cost and time efficient TRACECA route. The Iranian route is also experiencing increased competition from the rail connection via the Russian Far East ports, particularly for general cargoes to and from the Far East (primarily Japan and Korea).
- The peace agreement between Armenia and Azerbaijan enables the reopening of the Jolfa border crossing station to Iran, and this route regains its importance as a border crossing.
- The Chechnya overland connection is reopened, and rapidly regains its previous importance as an important route for cargoes between the Central Asian republics and Central and Northern Russia, Ukraine and the Baltic countries. This route is preferred to the considerably longer route through Kazakhstan.
- The landbridge rail link between Central Asia and the Russian Far East ports is reopened and increasing volumes of general and containerized cargoes to and from the Far East markets are shipped on this route in competition with the Iran route via Bandar Abbas. Its popularity is spurred by both being faster and more cost effective compared to the Arabian Gulf route. Increasingly cargoes between Azerbaijan and the Far East are shipped on this route via the ferry.

#### 6.3.1.4 Cargo Potential of the Ferry Service and Baseline Cargo Forecast for the Year 2000

The above analysis combined with interviews with shippers and consignees, freight forwarders, transportation companies, ports and officials in ministries in both Azerbaijan and Turkmenistan and review of the cargo forecasts made by other Tacis TRACECA projects presents an overall picture of the cargo flows that can be expected on the ferry service between Baku and Turkmenbashi under the most likely scenario.

With the significant disruptions of the trade pattern established in Soviet times, the precipitous declines in the overall GDP and industrial production following the break-up of the Soviet Union and the establishment of entirely new trading patterns, the cargo flows observed in the recent past is not necessarily a correct baseline for projections of the future cargo potential of the ferry service between Baku and Turkmenbashi. Given the above and assumptions of a normally functioning terminal and ferry management structure and rehabilitated terminal infrastructure in addition to upgraded and well functioning cargo handling equipment and practices, a baseline cargo volume of existing cargoes and cargoes that can be attracted to the ferry for the year 2000 has been developed. This baseline has then been used to project the future growth to the year 2015. The recent past, the baseline 2000 and the projections for cargo opportunities available to the ferry are presented as Table 6.2 and can be summarized as follows:

**Eastbound cargo forecast.** As a result of the overall positive transportation environment and expected economic growth, new cargo opportunities will be added to the existing cargo volumes, which will ensure an overall positive growth of the cargo volumes. While in the recent past most of the cargoes have constituted Interregional transportation between the Central Asian republics, the opening of the TRACECA route bringing new and redirected trade flows in addition to cargoes routed via the Chechnya and Dagestan rail and road link, which under this scenario is expected to be functioning normally, will increase the baseline cargo flows available to the ferry. The new trades will be expected to contribute to increase the eastbound cargo volume from a mere 235 thousand tons in 1995 to 1.1 million tons in the baseline year 2000. The average growth rate in the following years is expected to reach 6%, and in the year 2015 the eastbound cargo volume on the ferry will have increased to 2.1 million tons.

- **Interregional transportation - captive cargoes.** The cargo flows observed in the recent years (1993 to 1995) are to a large extent represented by these cargoes (ref. Table 4.8 in Section 4). It is estimated that approximately 80% of the cargo flow in 1995 was represented by this route, while the remaining 20% were distributed between the other routes. The gradual recovery of the economies in the Central Asian region combined with the fact that the barter arrangements of the supply of various agricultural and industrial products as payments for gas and oil that have been made between Turkmenistan and Georgia will continue also into the next century, will ensure a solid cargo base and steady growth of the cargo volumes during the planning period. The region is also a captive market for the raw and semiprocessed industrial input materials in addition to the chemicals and industrial products of both Azerbaijan and Georgia. The Interregional trade will, however, over the planning period experience increased competition from other suppliers as the transportation infrastructure is improved and high quality products are becoming available from other parts of the world.

- **Interregional transportation - competitive cargoes.** The sudden surge of cargoes on the ferry, which was experienced following the outbreak of hostilities in Chechnya and the virtual closing of the northern route through Dagestan and Chechnya, will under this scenario abate significantly. As a result of the reopening of the Chechnya and Dagestan routes most of the cargoes transported on this route to Russia and the CIS countries in Europe that was shipped via the ferry while the northern route was closed will be routed through Dagestan and Chechnya. Consequently cargoes transported via the ferry will primarily be destined for points in Kazakhstan and Russia, where the ferry connection and routing via Central Asia to points in Asian Russia is considered to be cost effective. For the year 2000 it is expected that the volume shipped will be a minimal 10,000 tons per year. A growth rate similar to the Interregional transportation - captive cargoes is assumed for the planning period.
  
- **Transshipment cargo transportation - competitive cargoes.** With the opening of the Chechnya and Dagestan routes, the ferry connection is again an attractive routing alternative for cargoes from Ukraine, European Russia and also from the European CIS countries. In 1995 the total eastbound cargo volumes originating in Russia, Belorussia, Ukraine and Moldova to Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan were 2.4 million tons excluding minerals and oil, and 2.9 million tons including minerals and oil. In addition to the cargoes originating in the CIS countries, forwarders and transportation companies can be expected to be routing both rail, truck and containerized cargoes originating in Northern Europe (i.e. Scandinavia, Finland, Poland and Northern Germany) via Chechnya and Dagestan as an alternative to the northern route via Russia and Kazakhstan and also to the TRACECA route. In the baseline year 2000 it is conservatively estimated that less than 5% of the total 1995 volume or 100,000 tons from Russia, Belorussia, Ukraine and Moldova are shipped on this route, while another 25,000 tons originating in Northern Europe are shipped via Chechnya and Dagestan and via the ferry. In the following years these cargoes are expected to follow the general growth rate of the demand in the region.
  
- **Transshipment on the TRACECA route - captive cargoes for the ferry.** In the recent years (i.e. 1993 to 1995 there have been minimal cargoes transported on this routing. Up to the baseline year significant increases can be expected:
  - **Bulk cargoes.** In 1994 Uzbekistan imported 1,478,000 tons of grain, Turkmenistan 338,000 tons and Tajikistan 296,000 tons, all from non-CIS countries. In 1995 the volumes of "Products of vegetable origin", of which grain would constitute a major part, as reported in the database of the TRACECA forecasting model<sup>16</sup>, Uzbekistan is reported to have imported a volume of 1,963,689 tons, Turkmenistan 396,514 tons, Tajikistan 481,733 tons and Kyrgyzstan 160,873 tons for a total of 3,002,809 tons. Although the total volume of cargoes in 1995 to these four countries from the regions that constitute the "Transshipment on the TRACECA route" reached 1,239,760 tons or 41% of the total imports, none of these grain imports were carried on the TRACECA route in 1994 or in 1995. In 1996 on the other hand volumes of the grain imports were carried on the TRACECA

---

<sup>16</sup> TRACECA: Regional Traffic Forecasting Model, Dossier of Basic Data about the Model as at January 1997, January 1997, WS Atkins Planning Consultants, Epsom, Surrey, England.

route.<sup>17</sup> Uzbekistan has embarked upon a program of self-sufficiency of grain and has the goal of reducing grain imports to one million tons per year. Assuming that the Uzbeks are successful in this goal and further assuming that the other countries maintain their grain imports at the same level, total grain imports in the year 2000 can be expected to be at least 1.5 million tons. With the normalization of relations within the CIS it can be expected that a portion of this grain requirement will be bought from Kazakhstan, Russia and Ukraine<sup>18</sup>, which will be shipped on routes not involving ferry transportation (e.g. the northern rail routes through Russia and Kazakhstan and the Russian waterway system). At the same time it can be expected that some of the imports from outside the CIS will be routed via Russian ports (Baltic Sea and Black Sea ports) and onwards by rail on routes competitive to the routes utilizing the ferry or via the Russian waterways. It is, however, not unreasonable to expect that one third of the total volume will be routed via the TRACECA route or otherwise via the ferry (e.g. via the reopened rail route via Chechnya and Dagestan), i.e. 500,000 tons per year. It is assumed that this volume will be maintained at this level over the remaining planning period through the year 2015. Since rail transportation is by far the most cost-effective mode of transportation for bulk cargoes on the TRACECA route, all this volume will be transported by railcars between the Georgian ports or its origins in Europe and the destinations in Central Asia.

- Other cargoes. Once the development of the offshore oil fields and major development projects in Turkmenistan is started (ref. Sections 5.5.2 and 5.5.11) combined with the general developments in the other Central Asian nations, the cargo volumes of general cargoes transported on this route will be substantial. Based on estimates given by freight forwarders, container operators and others, a conservative estimate for the baseline 2000 is a volume of 200,000 tons per year. These will be project cargoes and supplies for the oil industry, machinery and parts to reconstruct the industrial base, various building materials and various consumer goods. In the following years of the planning period the expected growth rate will be at the average expected growth rate. Most of these cargoes will be transported by truck or in containers.
- **Landbridge cargo transportation - competitive cargoes.** These cargoes will be driven by freight forwarders in close cooperation with the railroads of the nations on the route. Although the cargo potential is substantial, so will be the problems of coordination of the movements between all the railroad companies and participants involved. The major direction will be the westbound leg, and the eastbound movements will primarily be involved in the repositioning of the equipment in the form of containers used for the shipment of cargoes in the westbound direction, i.e. the eastbound movements will be balanced with the westbound movements. Two major possibilities exist:

---

<sup>17</sup> Based on data derived from the analysis of the manifest data from May to October 1996, a total of 48,000 tons of grain were carried on the TRACECA route by railcar on the ferry in this period.

<sup>18</sup> In 1995 the imports from Kazakhstan were 938,121 tons or 31% of the total, Russia and Belorussia accounted for 276,432 tons or 9%, while Ukraine and Moldova supplied 166,478 tons or 6% of the total according to the statistics collected by WR Atkins Planning Consultants referenced as Group 2 including codes 06-14 Products of vegetable origin, which include grain.



- Cargoes from Azerbaijan, Georgia and Armenia to the Far East/PRC. As discussed below in connection with the westbound movements, the baseline cargo volume will be 6,000 tons per year equivalent to 500 TEU.
- Transit cargoes from Europe and the PRC/Far East via Poti or the Russian rail system. The cargo volume is assumed to be a modest 6,000 tons per year (500 TEU) for the baseline year 2000.

**Westbound cargo volumes.** The westbound cargo volumes will be driven by the export of raw and semiprocessed materials produced in the Central Asian nations. In addition, the transportation companies' need to reposition their equipment in the form of containers, trailers/trucks and railcars brought in on the eastbound leg via the ferry will tend to contribute to the redirection of the exports to the routes served by the ferry.

- **Interregional transportation - captive cargoes.** Like the eastbound trade most of the cargo volumes observed on the ferry route in recent years is represented by this route (ref. Table 4.8 in Section 4). It is estimated that approximately 80% of the 1995 volume was represented by this route, while most of the remaining volume was represented by Interregional transportation - competitive cargoes. The main products traded on this route in the future will continue to be bulk materials such as cement and other building materials for the construction and oil industry in Azerbaijan, salt, sulfur and various chemicals to be used as input material for the chemical industry and relatively small volumes of general cargoes in the form of various industrial and consumer goods produced in the Central Asian region. The baseline volume for the year 2000 is expected to be 340,000 tons. In the ensuing years of the planning period this volume is expected to increase at an average growth rate of 6% per year over the planning period.
- **Interregional transportation - competitive cargoes.** The transportation of grain, flour and general cargoes from Kazakhstan to Azerbaijan and Georgia in addition to various supplies from Russia, which in the recent past (1993 to 1995) constituted most of the cargoes on this route will be diverted to the more cost and time effective route via Dagestan and Chechnya. Various bulk cargoes will increasingly be shipped by vessels from the renovated and upgraded port of Aktau. Like on the eastbound direction of this route, cargoes on the westbound direction on this route in the future years will primarily be originating in points in Kazakhstan and Russia, where the ferry connection and routing via Central Asia and the ferry is considered to be advantageous. It is expected that the trade will be balanced by the forwarders and transportation companies, and thus the westbound trade will be based on cargoes, which the forwarders and transportation companies find to secure return loads for their equipment positioned from the eastbound trade. The baseload westbound cargoes are therefore expected to be similar to that of the eastbound volume, i.e. 10,000 tons in the year 2000.
- **Transshipment cargo transportation - competitive cargoes.** The opening of the Chechnya and Dagestan routes, the increased capacity of the ferry link and the positioning of Ukrainian, Russian, Belorussian and other European CIS railcars, trucks and containers carrying eastbound cargoes enables Turkmenistan and the other to resume its exports of the relatively low value bulk raw materials its industry in the past exported to Russia and Ukraine in addition to various

manufactured goods, such as building materials, fruits etc. in addition to the cotton and cotton fabrics also exported in the past to Russia, Ukraine and the European CIS countries (ref. also Sections 1.2.1, 1.3.2, 5.5.6 and 5.5.11). It is expected that transportation equipment used to transport the eastbound cargoes will to a large extent be sought used for Turkmen, Uzbek, Tajik and Kyrgyz exports as return cargoes. It is therefore expected that the east- and westbound cargo flows will be balanced, and a baseline year 2000 cargo flow of 125,000 tons and the same growth rate as the eastbound trade will be expected.

- **Transshipment on the TRACECA route - captive cargoes for the ferry.** In the recent past, for which commodity statistics are available (1993 to 1995) minimal volumes were carried on the TRACECA route in this direction. This is also confirmed by the trucking companies interviewed. It was stated by the forwarders and trucking companies that most of the European trucks returned empty from Central Asia, while some of the returning Turkish trucks carried cotton and cotton fabric, fish products, hides and miscellaneous consumables to Turkey. As shown in Table 6.1 the total cargo volume excluding "Group 5" cargoes as defined in the WS Atkins report (i.e. minerals and oils) available on this route in 1995 was 1.2 million tons. Of this total volume cotton and textiles represented 848,000 tons. As shown in Table 4.9 in Section 4.3 only 2,000 tons of cotton was carried on the westbound ferry leg in 1995, indicating that fully 846,000 tons of this cotton was shipped on other routes than via the ferry. In 1996 on the other hand volumes of cotton from Uzbekistan via the ports of Poti ad Batumi started to be transported by rail. These shipments represent the first movement under the agreement, which was reached in the spring of 1996 between the governments of Georgia, Azerbaijan, Turkmenistan and Uzbekistan on the shipment by rail of one million tons of cotton per year from Uzbekistan to the ports of Poti and Batumi in Georgia for further shipment to markets in Europe and America.<sup>19</sup> For the baseline forecast year 2000 and the planning period it is expected that most of the exports to be shipped on this route will be cotton from Uzbekistan and Turkmenistan in addition to non-ferrous metals and ores plus small quantities of consumer goods. The majority of these cargoes will like cotton be relatively low value goods traded as commodities in world markets, all of which will be highly sensitive to transportation costs. It is unlikely that transportation companies will position empty equipment in order to carry these cargoes, and consequently it is expected that all these commodities will be considered typical return cargoes to reposition rail-cars, trucks/trailers and containers. The westbound trade on this route will therefore be balanced by the eastbound cargo volumes and the equipment that is positioned in the Central Asian region by the eastbound cargo volumes. The basic assumptions made with respect to the cargo volumes for the baseline year 2000 and the planning period to the year 2015 are the following:
  - Trade on this route will be import driven with transportation equipment positioned in the Central Asian region with the transportation companies and freight forwarders seeking cargoes to return the equipment.

---

<sup>19</sup> In the six month period from May through September 1996, for which all rail manifests for ferry transportation were reviewed a total of 509 railcars with a total of 24,589 tons of cotton were carried from Uzbekistan to the ports of Poti ad Batumi in Georgia. These cotton shipments were the only cargoes carried by rail on the TRACECA route to the Georgian ports in the period observed.

- The transportation companies will act rationally and will seek to balance the movements of their equipment to the available return cargoes
- Although other alternative routings exist for the cargoes originating in the Central Asian region, the TRACECA route is the most cost and time effective, and will be the preferable route to ship the export cargoes available. The TRACECA route will therefore be the preferable routing for the cargoes available.

The cargo volumes for the baseline year 2000 and the planning period to 2015 will therefore be balanced with the eastbound cargo movements on this routing and those on the "Interregional transportation - captive cargoes" route. The baseline cargo volume for this trade in 2000 will be 588,000 tons, which represents less than 50% of the total cargo volume excluding minerals and oils available in 1995.

- **Landbridge cargo transportation - competitive cargoes.** These cargoes will be driven by the westbound trades with cargoes originating in the Far East and the PRC, which is the dominant trading direction:
  - Cargoes from the Far East/PRC to Azerbaijan, Georgia and Armenia. As discussed in Section 5.5.9 investigations have been undertaken by a Japanese company to evaluate the establishment of this link between the Far East and Azerbaijan. In addition shipments to and from PRC have been observed on the rail manifests of the ferry in the period from May to October 1996. The baseline forecast a moderate volume of 6,000 tons of containerized cargoes (500 TEU) per year is assumed. This volume is expected to increase at the average rate of growth assumed.
  - Transit cargoes from the PRC/Far East via Poti or the Russian rail system to Europe. The cargo volume potential is substantial, since the Europe - Far East trade route is one of the largest and busiest trade lanes in the world. In addition the trade between Europe and PRC is growing rapidly. It is, however, assumed a modest volume of 6,000 tons per year for the baseline year 2000, all of which will be containerized (500 TEU). This volume is assumed to grow at the average rate for the region.

#### 6.3.1.5 Cargo Forecast to the Year 2015

The expected cargo flows under this scenario is expected to experience an average annual growth of 6% for cargoes other than bulk grain to Uzbekistan, see Table 6.5 for tonnage growth by mode and 6.6 for number of units.

**Table 6.5 Forecast of cargo flows on the Caspian Sea ferry service to 2015 ('000 tons)  
Most likely scenario**

Service:	1993	1994	1995	2000	2005	2010	2015
<b>Baku - Turkmenbashi</b>	Actual	Actual	Actual	Baseline			
Interregional - captive	133.8	154.5	234.8	251	336	450	602
Rail	28.1	108.2	133.8	138	168	180	241
Truck/trailer	40.1	46.4	101.0	101	135	203	271
Container	0.0	0.0	0.0	13	34	68	90
Interregional - competitive				10	13	18	24
Rail				6	7	7	10
Truck/trailer				4	5	8	11
Container				1	1	3	4
Transshipment - competitive				125	167	224	300
Rail				100	117	134	180
Truck/trailer				19	33	56	75
Container				6	17	34	45
Transshipment - TRACECA				700	768	858	979
Rail - bulk				580	580	572	596
Truck/trailer				80	107	143	192
Container				40	80	143	192
Landbridge - Central Asia/Far East							
Container on rail				6	8	11	14
Landbridge - Europe/Far East							
Container on rail				6	8	11	14
<b>Total Baku-Turkmenbashi</b>	<b>133.8</b>	<b>154.5</b>	<b>234.8</b>	<b>1098</b>	<b>1301</b>	<b>1572</b>	<b>1934</b>
Rail	93.7	108.2	133.8	824	872	893	1026
Truck/trailer	40.1	46.4	101.0	203	280	410	548
Container	0.0	0.0	0.0	71	148	269	359
<b>Turkmenbashi - Baku</b>							
Interregional - captive	231.4	205.7	344.4	352	449	520	603
Rail	162.0	144.0	196.3	193	224	208	241
Truck/trailer	69.4	61.7	148.1	141	180	234	271
Container	0.0	0.0	0.0	18	45	78	90
Interregional - competitive				10	13	18	24
Rail				6	7	7	10
Truck/trailer				4	5	8	11
Container				1	1	3	4
Transshipment - competitive				125	167	224	300
Rail				100	117	134	180
Truck/trailer				19	33	56	75
Container				6	17	34	45
Transshipment - TRACECA				600	655	788	979
Rail				525	524	544	596
Truck/trailer				40	62	112	191
Container				35	69	133	192
Landbridge - Central Asia/Far East							
Container on rail				6	8	11	14
Landbridge - Europe/Far East							
Container on rail				6	8	11	14
<b>Total Turkmenbashi - Baku</b>	<b>231.4</b>	<b>205.7</b>	<b>344.4</b>	<b>1098</b>	<b>1301</b>	<b>1572</b>	<b>1934</b>
Rail	162.0	144.0	196.3	824	872	893	1026
Truck/trailer	69.4	61.7	148.1	203	280	410	548
Container	0.0	0.0	0.0	71	148	269	359
<b>Total ferry</b>	<b>365.2</b>	<b>360.2</b>	<b>579.2</b>	<b>2197</b>	<b>2602</b>	<b>3143</b>	<b>3868</b>
Modal split total:							
Rail	255.6	252.1	330.1	1648	780	943	1160
Truck	109.6	108.1	249.1	407	1431	1729	2127
Container	0.0	0.0	0.0	143	390	471	580
<b>Total</b>	<b>365.2</b>	<b>360.2</b>	<b>579.2</b>	<b>2197</b>	<b>2602</b>	<b>3143</b>	<b>3868</b>
Automobile traffic ('000)	N.A.	5.2	6.4	9	11	15	20
Passenger traffic ('000)	93	52	48	64	86	115	154

The number of units that are expected to be carried using the previously described conversion factors are presented as Table 6.6

**Table 6.6 Forecast of cargo flows on the Caspian Sea ferry service to 2015 (units)  
Most likely scenario**

<b>Service:</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>
<b>Baku - Turkmenbashi</b>	Baseline			
Rail	14710	15576	15950	18324
Trailers/trucks, total	10165	14021	20493	27425
- Trailers with tractors	10165	12619	16395	21940
- Trailers without tractors	0	1402	4099	5485
Containers, total	5943	12338	22379	29948
- Containers, intermodal/unaccomp.	3500	4684	6288	8388
- Containers, by rail	1222	4592	11264	17248
- Containers, by truck	1222	3062	4827	4312
<b>Turkmenbashi - Baku</b>				
Rail	14710	15576	15950	18324
Trailers/trucks, total	10165	14021	20493	27425
- Trailers with tractors	10165	12619	16395	21940
- Trailers without tractors	0	1402	4099	5485
Containers, total	5943	12338	22379	29948
- Containers, intermodal/unaccomp.	3500	4684	6288	8388
- Containers, by rail	1222	4592	11264	17248
- Containers, by truck	1222	3062	4827	4312
<b>Total ferry</b>				
Rail	29420	31153	31899	36649
Trailers/trucks, total	20330	28042	40987	54849
- Trailers with tractors	20330	25238	32789	43880
- Trailers without tractors	0	2804	8197	10970
Containers, total	11886	24676	44758	59896
- Containers, intermodal/unaccomp.	7000	9368	12576	16776
- Containers, by rail	2443	9185	22527	34496
- Containers, by truck	2443	6123	9655	8624
Automobile traffic	8524	11408	15266	20429
Passenger traffic	64235	85961	115035	153942

### 6.3.2 Optimistic/High Growth Scenario

This scenario describes the more optimistic development compared to the likely scenario, and is assessed to have a probability of occurring of approximately 20%. The expected developments are similar to those of the most likely scenario described in Section 6.3.1.

#### 6.3.2.1 Macroeconomic Development

Under this scenario it is expected that developments in Azerbaijan will be identical to that of the most likely scenario.

In Turkmenistan the development will be the same with the exception of privatization and liberalization of the economy in order to increase the level of foreign investments both to rejuvenate the industrial activities and to exploit the vast natural resources of the country:

Although efforts have been made in the past to redirect the economy from the inherited central control system of the Soviet times in the direction of liberalization and a market economy, the efforts have not produced significant visible results, and major portions of

the economy including the important gas and cotton sectors remain under the control of government institutions. At the behest of the IMF, major international lending institutions and the governments of major donor countries, the Turkmenistan government embarks on an earnest effort to privatize government held industries and institute decrees to liberalize the overall economic policies to implement a true market oriented system. Efforts are also made to liberalize the concession rules with respect to foreign oil companies' access to explore and develop the vast gas and oil reserves of the country.

The results of the changes in policy with respect to privatization and liberalization, which under this scenario will be implemented and started in 1997, will have a immediate, albeit small effect in the initial years up to the turn of the century, while significant effects will be felt from the year 2000 and onwards. Estimated annual growth of the GDP up until the year 2000 is expected to be approximately 5% per year, while after completion of the pipelines to Iran/Turkey and through Afghanistan to Pakistan and completion of the privatization of government held industries and liberalization of the economy, the annual growth rate will increase to 8 - 10%.

#### **6.3.2.2 The Direction of Trade**

The development will in the main follow the trends of the "Most likely scenario" described in Section 6.3.1.2 above. The more pro-Western and liberalization of economic policies of the Turkmenistan government will tend to redirect their trade more in favor of Europe and the United States, which will imply more cargoes via the TRACECA route.

#### **6.3.2.3 Development of Alternative Transportation Patterns and Routings**

The investments by the EU in the TRACECA corridor including the ferry terminals, combined with the resolution of the Nagorno Karabak and the Chechnya conflicts ensure the success of the TRACECA route as a major transportation routing of the Central Asian countries' foreign trade.

The main developments on the alternative routes that will influencing the use of the ferry service under this scenario are:

- The peace agreement between Armenia and Azerbaijan enables the reopening of the Jolfa border crossing station to Iran, and this route regains its importance as a border crossing.
- The Chechnya overland connection is reopened, and rapidly regains its previous importance as an important route for cargoes between the Central Asian republics and Central and Northern Russia, Ukraine and the Baltic countries. This route is preferred to the considerably longer route through Kazakhstan.
- The upgrading of the Volga-Don waterway and the planned developments of the Olya port near Astrakhan is postponed by Russian authorities, and resources are redirected to rebuild and upgrade the transportation infrastructure destroyed during the Chechnya conflict. Priority is given by the Russian authorities to use this route for cargoes both to and from Central Asia and Iran.

- The landbridge rail link between Central Asia and the Russian Far East ports is reopened and increasing volumes of general and containerized cargoes to and from the Far East markets are shipped on this route. This route is preferred by shippers and consignees for cargoes between Azerbaijan and the Far East both due to lower costs and faster transit times.
- The Iranian connection through Bandar Abbas and overland transit through Iran continue to be developed as an important route. Improved infrastructure between Turkmenistan both by rail and road makes this an attractive route primarily for local and Far East cargoes. The Iranian route is, however, experiencing increased competition from the rail connection via the Russian Far East ports, particularly for general cargoes to and from the Far East (primarily Japan and Korea).
- Cargoes to and from Europe and the US are almost exclusively shipped on the more cost and time efficient TRACECA route.

#### 6.3.2.4 Optimistic Cargo Potential to 2015

The assumptions with respect to the baseline cargo flows, the overall trading pattern and the modal split will be the same as for the "Most likely scenario". The expected increased economic growth in the region will however ensure an average cargo growth of between 10 to 12% per year. The cargo flows and modal split are described in Table 6.7 and 6.8 below:

**Table 6.7 Forecast of cargo flows on the Caspian Sea ferry service to 2015 ('000 tons)  
Optimistic scenario**

Service:	1993	1994	1995	2000	2005	2010	2015
<b>Baku - Turkmenbashi</b>	Actual	Actual	Actual	Baseline			
Interregional - captive	133.8	154.5	234.8	317	533	899	1514
Rail	28.1	108.2	133.8	174	267	359	606
Truck/trailer	40.1	46.4	101.0	127	213	404	681
Container	0.0	0.0	0.0	16	53	135	227
Interregional - competitive				10	17	28	48
Rail				6	8	11	19
Truck/trailer				4	7	13	22
Container				1	2	4	7
Transshipment - competitive				125	211	355	598
Rail				100	147	213	359
Truck/trailer				19	42	89	150
Container				6	21	53	90
Transshipment - TRACECA				700	837	1068	1457
Rail - bulk				580	601	614	691
Truck/trailer				80	135	227	383
Container				40	101	227	383
Landbridge - Central Asia/Far East							
Container on rail				6	10	17	29
Landbridge - Europe/Far East							
Container on rail				6	10	17	29
<b>Total Baku-Turkmenbashi</b>	<b>133.8</b>	<b>154.5</b>	<b>234.8</b>	<b>1164</b>	<b>1618</b>	<b>2384</b>	<b>3675</b>
Rail	93.7	108.2	133.8	860	1024	1197	1675
Truck/trailer	40.1	46.4	101.0	229	397	733	1235

Service:	1993	1994	1995	2000	2005	2010	2015
Container	0.0	0.0	0.0	75	197	454	764
Turkmenbashi - Baku							
Interregional - captive	231.4	205.7	344.4	464	782	1318	2221
Rail	162.0	144.0	196.3	255	391	527	889
Truck/trailer	69.4	61.7	148.1	186	313	593	1000
Container	0.0	0.0	0.0	23	78	198	333
Interregional - competitive				10	17	28	48
Rail				6	8	11	19
Truck/trailer				4	7	13	22
Container				1	2	4	7
Transshipment - competitive				125	211	355	598
Rail				100	147	213	359
Truck/trailer				19	42	89	150
Container				6	21	53	90
Transshipment - TRACECA				552	588	648	750
Rail				499	477	446	409
Truck/trailer				21	35	38	65
Container				33	76	164	277
Landbridge - Central Asia/Far East							
Container on rail				6	10	17	29
Landbridge - Europe/Far East							
Container on rail				6	10	17	29
Total Turkmenbashi - Baku	231.4	205.7	344.4	1164	1618	2384	3675
Rail	162.0	144.0	196.3	860	1024	1197	1675
Truck/trailer	69.4	61.7	148.1	229	397	733	1235
Container	0.0	0.0	0.0	75	197	454	764
Total ferry	365.2	360.2	579.2	2327	3236	4768	7349
Modal split total:							
Rail	255.6	252.1	330.1	1719	971	1430	2205
Truck	109.6	108.1	249.1	459	1780	2622	4042
Container	0.0	0.0	0.0	149	485	715	1102
Total	365.2	360.2	579.2	2327	3236	4768	7349
Automobile traffic ('000)	N.A.	5.2	6.4	11	18	30	51
Passenger traffic ('000)	93	52	48	81	136	230	387

The number of units that are expected to be carried under the optimistic scenario using the previously described conversion factors are presented as Table 6.8.

**Table 6.8 Forecast of cargo flows on the Caspian Sea ferry service to 2015 ( units)  
Optimistic scenario**

Service:	2000	2005	2010	2015
<b>Baku - Turkmenbashi</b>	Baseline			
Rail	15350	18279	21382	29913
Trailers/trucks, total	11468	19851	36655	61765
- Trailers with tractors	11468	17866	29324	49412
- Trailers without tractors	0	1985	7331	12353
Containers, total	6215	16451	37795	63686
- Containers, intermodal/unaccomp.	3500	5898	9938	16746
- Containers, by rail	1357	6332	19500	37552
- Containers, by truck	1357	4221	8357	9388



Service:	2000	2005	2010	2015
<b>Turkmenbashi - Baku</b>				
Rail	15350	18279	21382	29913
Trailers/trucks, total	11468	19851	36655	61765
- Trailers with tractors	11468	17866	29324	49412
- Trailers without tractors	0	1985	7331	12353
Containers, total	6215	16451	37795	63686
- Containers, intermodal/unaccomp.	3500	5898	9938	16746
- Containers, by rail	1357	6332	19500	37552
- Containers, by truck	1357	4221	8357	9388
<b>Total ferry</b>				
Rail	30700	36559	42764	59826
Trailers/trucks, total	22936	39701	73309	123531
- Trailers with tractors	22936	35731	58648	98825
- Trailers without tractors	0	3970	14662	24706
Containers, total	12429	32901	75589	127372
- Containers, intermodal/unaccomp.	7000	11796	19876	33492
- Containers, by rail	2715	12663	38999	75104
- Containers, by truck	2715	8442	16714	18776
Automobile traffic	10734	18087	30478	51357
Passenger traffic	80883	136292	229660	386991

### 6.3.3 Pessimistic/Low Growth Scenario

The pessimistic/low growth scenario presumes failure to reach a lasting peace agreement with Armenia with respect to the Nagorno Karabak area. At the same time the Russians fails to create a lasting peace in Chechnya, and continued guerrilla fighting prevents efforts to restart the peace negotiations.

#### 6.3.3.1 Macroeconomic Developments

The macroeconomic development of the Central Asian republics is negatively affected by the failure to reach peace and political stability in the region:

- Under the pretext of the unstable political situation brought about by the failure to reach an agreement with the Armenian over Nagorno Karabak and the continued fighting in the neighboring Chechnya, the government of Azerbaijan slows down the democratization process, the privatization of government enterprises and overall liberalization of the economy.
- The consortia of oil companies operating in Azerbaijan having committed themselves to develop the oil reserves of Azerbaijan continue to honor their commitment, but the rate of development is slowed down compared to the original plans. Plans for the construction of new pipelines are postponed pending a peaceful resolution of the conflicts in the region.
- The peace agreement reached between the various political groups and factions seeking independence for Chechnya and the Russian government breaks down. As a result fighting breaks out between rival Chechen groups, and the Russian military forces are also involved in the fighting.

- The Turkmenistan government fearing repercussions of the ominous developments in the neighboring Azerbaijan and Chechnya the government continues its policy of retaining control of the economy and will stop even its limited efforts at privatization of government owned industries and agriculture and liberalization of the economy. This will tend to reduce the economic growth and limit foreign investments both in the gas industry as well as the traditional industries of Turkmenistan. Increased efforts are directed at developing the ties with Iran and also the Peoples Republic of China at the same time that the ties to Russia is strengthened for reasons of "national security".
- The international banks are becoming more restrictive with funding investment projects in the Central Asian republics, and Western government grants and aid funds are reduced considerably. Foreign investment activity in all the Central Asian economies slows down both in the important oil and gas industry as well as in other industries.

Although the decline in the overall economic activity is halted in the late 1990's and a moderate growth is achieved by the year 2000, the overall economic growth of the region from the year 2000 measured by the GDP is maintained at a level between 1-3% per year.

### **6.3.3.2 The Direction of Trade**

The overall trading patterns will follow the overall trends described in the "Most likely scenario" and the "Optimistic Scenario". The more restrictive political and economic policies of both the Azerbaijan and Turkmenistan governments will, however, tend to slow the growth of the trade and also tend to redirect their trade more in favor of Iran, China and the FSU, which will imply less cargoes via the TRACECA route.

Western companies mirror the activities of their respective governments and tend to reduce and slow their overall investment activities in the region. The interest in developing trade with the Central Asian republics is also lessened due to the perceived instability in the region.

### **6.3.3.3 Development of Transportation Patterns and Routings**

The investments by the EU in the TRACECA corridor including the ferry terminals will ensure the success of the TRACECA route, despite the lower cargo flows. As a result the TRACECA route maintains its position as a major transportation route for the Central Asian countries' foreign trade. The main developments on the alternative routes that will influencing the use of the ferry service under this scenario are:

- The continuation of hostilities between Armenia and Azerbaijan over Nagorno Karabak casts shadows over the stability of the TRACECA route through Azerbaijan and Georgia, and the potential for or threats of sabotage and terrorist attacks reduces the cargo flows on this route.
- The rail and road routes through Chechnya and Dagestan remain closed for the planning period as a result of the never-ending conflict and continual strafes. Although there are periods of relative stability, rival groups of Chechens continually

disrupt the rail and road infrastructure and the flow of transportation on this route. Cargoes between Ukraine/Russia and Central Asia are therefore almost exclusively routed through the northern route via Kazakhstan.

- The Russian government allocates the necessary funds to upgrade and improve the navigability of the Volga-Don waterway with the extended draft and improved locks ensuring minimal delays and the use of the full draft and loading capacity of the vessels. The waterway is also actively marketed to and cargoes are solicited from both local and international liner and bulk operators, and the cargo volumes of both general cargoes and bulk cargoes are shipped on this waterway.
- The Russian government takes advantage of the actual and perceived instability of the areas through which the TRACECA and other routes serving the ferry link have to pass through and actively market and promote their rail corridor through northern Russia and Kazakhstan as an alternative to the TRACECA route and the ferry link. They are successful in attracting both bulk and general cargoes that under normal circumstances would have been using the TRACECA route or the rail corridor through Chechnya.
- As a result of the continued conflict in Chechnya the Russian government speeds up the development of the port of Olya near Astrakhan followed by the establishment of alternative ferry services from this port to Aktau, Turkmenbashi, Baku and Iranian ports. The cargo volumes on this route are growing rapidly following the opening and expansion of the port of Olya.
- The reopening of landbridge rail link between Central Asia and the Russian Far East ports is followed by upgrading of the handling capacity of the border crossings with the Peoples Republic of China. Increasing volumes of both imports and exports from the Central Asian republics east of the Caspian Sea are carried on these routes to compensate for the lowered trade volumes to and from the Europe and the United States.
- The Iranian and Turkmenistan governments allocates additional resources to upgrade both rail and road links to Bandar Abbas, and overland transit through Iran is becoming a serious challenge to the TRACECA route.
- The reduced cargo volumes to and from Europe and the US continue to be shipped on the more cost and time efficient TRACECA route, although many shippers and consignees select alternative routes due to the uncertainties surrounding the security situation on the route.

#### **6.3.3.4 Pessimistic Cargo Forecast for the Year 2015**

As a result of the different environment compared to the "Most Likely Scenario" and the "Optimistic Scenario", both the baseline forecast for the year 2000, the overall trade flow patterns and the cargo flows on the trade routes will change. The baseline 2000 and the projections for cargo opportunities available to the ferry under the "Pessimistic Scenario" are presented as Table 6.9 and can be summarized as follows:

**Eastbound cargo forecast.** As a result of the overall negative political situation and the stunted economic growth, only limited new cargo opportunities will be added to the exist-

ing cargo volumes. The overall cargo volume is expected to increase from 235 thousand tons in 1995 to merely 756 thousand tons in the baseline year 2000. In the year 2015 the eastbound cargo volume on the trade will have increased to only 960 thousand tons. The non-availability of the Chechnya and Dagestan rail and road links, which under this scenario are expected to be closed, will change the transportation routing of cargoes to and from Russia, Ukraine and the other CIS countries in Europe.

- **Interregional transportation - captive cargoes.** Despite the slow growth or stagnation of the economies in the Central Asian region, the barter arrangements of the supply of various agricultural and industrial products as payments for gas and oil that have been made between Turkmenistan and Georgia will continue to ensure a cargo base and limited growth of the cargo volumes during the planning period. Like in the "Most likely scenario" the region will continue to be a captive market for the raw and semiprocessed industrial input materials in addition to the chemicals and industrial products of both Azerbaijan and Georgia. The baseline volume for the year 2000 is expected to be at a level of 1995. The annual growth rate in the ensuing years is expected not to exceed 2-3%.
- **Interregional transportation - competitive cargoes.** Under this scenario the rerouting of cargoes, which prior to the outbreak of hostilities in Chechnya and the virtual closing of the northern route through Dagestan and Chechnya was routed via the ferry and shipped through the Central Asian road and rail system, will continue. Since this route will be the only way to safely bring cargoes to Russia, Ukraine and the other CIS countries in Europe, the growth of cargo will be steady through the planning period. For the year 2000 it is expected that the volume shipped will have reached a volume of 100,000 tons per year. A significant proportion of this trade is carried by intrepid and entrepreneurial local and CIS independent truckers and trucking companies. A growth rate similar to the Interregional transportation - captive cargoes is assumed for the planning period. A part of these cargoes will be diverted when the Russians are successful in opening ferry services between Baku and the new port of Olya in the Volga delta.
- **Transshipment cargo transportation - competitive cargoes.** With the continued closing of the Chechnya and Dagestan routes due to hostilities in the region, the ferry connection is not considered an alternative routing for cargoes from Ukraine, European Russia and also from the European CIS countries. Forwarders and transportation companies are as a consequence routing both rail, truck and containerized cargoes originating in Northern Europe (i.e. Scandinavia, Finland, Poland and Northern Germany) via the northern route through Russian Siberia and Kazakhstan. In the baseline year 2000 it is estimated that merely token volumes of 5,000 tons from Russia, Ukraine and the CIS, while another 5,000 tons originating in Northern Europe are shipped on this route via the ferry from Baku to Turkmenbashi. In the following years these cargoes are expected to follow the general low growth rate of the demand in the region.
- **Transshipment on the TRACECA route - captive cargoes** for the ferry. While increases in the cargo volumes can be expected, the growth both to the baseline year and in the following years of the planning period will be lower than the "Most likely scenario":

- Bulk cargoes. The grain imports to Uzbekistan Turkmenistan and Tajikistan will be maintained at the same overall level as under the "Most likely scenario". While the importers for strategic reasons will continue to ship part of their cargoes on the TRACECA route, the major portion will be shipped on routes not involving ferry transportation (e.g. the northern rail routes through Russia and Kazakhstan and the Russian waterway system). Out of the total volume of 1.5 million tons of grain to be imported, it is expected that no more than 20% of the total volume will be routed via the TRACECA route, i.e. 300,000 tons per year. It is assumed that this volume will be maintained at this level over the remaining planning period through the year 2015. Since rail transportation is by far the most cost-effective mode of transportation for bulk cargoes on the TRACECA route, all this volume will be transported by railcars between the Georgian ports and the destinations in Central Asia.
- Other cargoes. The development of the offshore oil fields and major development projects in Turkmenistan will both be delayed and some projects will be shelved. The development and the general growth in the other Central Asian nations will also be slower. As a consequence, the cargo volumes of general cargoes transported on this route will be halved compared to the expected volume under the "Most likely scenario", i.e. the estimated volume for the baseline year 2000 will be 100,000 tons. In the following years of the planning period the expected growth rate will be at the average expected growth rate of between 2 and 3%. Most of these cargoes will be transported by truck or in containers as in the "Most likely scenario".
- **Landbridge cargo transportation - competitive cargoes.** The unstable political and perceived transportation problems, will restrain the freight forwarders to route cargoes via the landbridge. The expected volumes will therefore be lower than under the "Most likely scenario":
  - Cargoes from Azerbaijan, Georgia and Armenia to the Far East/PRC. As discussed below in connection with the westbound movements, the baseline cargo volume will be 4,200 tons per year equivalent to 350 TEU.
  - Transit cargoes from Europe and the PRC/Far East via Poti or the Russian rail system. The cargo volume is assumed to be a modest 4,200 tons per year (350 TEU) for the baseline year 2000.

**Westbound cargo volumes.** The westbound cargo volumes will, like the "Most likely scenario" be driven by the export of raw and semiprocessed materials produced in the Central Asian nations and the transportation companies' need to reposition their equipment in the form of containers, trailers/trucks and railcars brought in on the eastbound leg via the ferry.

- **Interregional transportation - captive cargoes.** Like the eastbound movements, the westbound baseline volume for the year 2000 is expected to be at the same level as observed in 1995, i.e. 312,000 tons. In the ensuing years of the planning period this volume is expected to increase at an average growth rate of 2 to 3% per year over the planning period.

- **Interregional transportation - competitive cargoes.** As a result of the renovation and upgrading of the port of Aktau, the closing of the rail corridor through Chechnya and Dagestan and the high cost of shipping grain and bulk cargoes via the ferry, most of the transportation of grain by rail from Kazakhstan to Azerbaijan via the ferry, which constituted a significant volume on this route in the recent past, will by the baseline year be shifted to be shipped by vessel from Aktau to Baku. Like on the eastbound direction, cargoes on this route will in the future years be based on cargoes, which the local and CIS truckers, forwarders and transportation companies find to secure return loads for their equipment. The baseload westbound cargo volume is therefore expected to be similar to that of the eastbound volume, i.e. 100,000 tons in the year 2000, and the growth will be the same as on the westbound trade.
- **Transshipment cargo transportation - competitive cargoes.** Due to the continued closing of the Chechnya and Dagestan rail and truck routes, it is expected that the east- and westbound cargo flows will be balanced. The baseline cargo flow in the year 2000 will be a token volume of 10,000 tons and the same growth rate as the eastbound trade will be expected.
- **Transshipment on the TRACECA route - captive cargoes** for the ferry. Like in the "Most likely scenario" the main westbound cargoes will be cotton and other relatively low value goods, which will be used by the forwarders and the various transportation companies to secure return loads for their equipment. The considerably lower eastbound trade volume will therefore also reduce the westbound trade volume. The basic assumptions made with respect to the cargo volumes for the baseline year 2000 and the planning period to the year 2015 for the "Pessimistic scenario" are the following:
  - Trade on this route will be import driven with transportation equipment positioned in the Central Asian region with the transportation companies and freight forwarders seeking cargoes to return the equipment.
  - The transportation companies will act rationally and will seek to balance the movements of their equipment to the available return cargoes
  - Although other alternative routings exist for the cargoes originating in the Central Asian region, the TRACECA route is the most cost effective, and will be the preferable route to ship the export cargoes available. The TRACECA route will therefore be the preferable routing for the cargoes available.

The cargo volumes for the baseline year 2000 and the planning period to 2015 will therefore be balanced with the eastbound cargo movements on this routing and those on the "Interregional transportation - captive cargoes" route.

- **Landbridge cargo transportation - competitive cargoes.** These cargoes will be driven by the westbound trades with cargoes originating in the Far East and the PRC, which is the dominant trading direction:
  - Cargoes from the Far East/PRC to Azerbaijan, Georgia and Armenia. This volume is expected to increase at the average rate of growth assumed.

- Transit cargoes from the PRC/Far East via Poti or the Russian rail system to Europe. The perceived instability of the Central Asian region will tend to make the forwarders and their customers reluctant to use this routing. Despite these uncertainties it is, however, assumed a modest volume of 4,200 tons per year for the baseline year 2000, all of which will be containerized (350 TEU). This volume is assumed to grow at the average rate for the region.

Under this scenario the cargo volumes, except the bulk and neobulk cargoes on the TRACECA route, are expected to grow at a low rate of 2 to 3% per year as presented in Table 6.9 and 6.10.

**Table 6.9 Forecast of cargo flows on the Caspian Sea ferry service to 2015 ('000 tons)**  
Pessimistic scenario

Service:	1993	1994	1995	2000	2005	2010	2015
<b>Baku - Turkmenbashi</b>	Actual	Actual	Actual	Baseline			
Interregional - captive	133.8	154.5	234.8	213	240	272	308
Rail	28.1	108.2	133.8	117	120	109	123
Truck/trailer	40.1	46.4	101.0	85	96	122	139
Container	0.0	0.0	0.0	11	24	41	46
Interregional - competitive				10	11	13	14
Rail				6	6	5	6
Truck/trailer				4	5	6	7
Container				1	1	2	2
Transshipment - competitive				125	141	160	181
Rail				100	99	96	109
Truck/trailer				19	28	40	45
Container				6	14	24	27
Transshipment - TRACECA				400	413	428	445
Rail - bulk				340	334	326	329
Truck/trailer				40	45	51	58
Container				20	34	51	58
Landbridge - Central Asia/Far East				4	5	5	6
Container on rail				4	5	5	6
Landbridge - Europe/Far East							
Container on rail							
<b>Total Baku-Turkmenbashi</b>	133.8	154.5	234.8	756	816	884	960
Rail	93.7	108.2	133.8	562	559	536	567
Truck/trailer	40.1	46.4	101.0	148	174	219	248
Container	0.0	0.0	0.0	46	83	129	146
<b>Turkmenbashi - Baku</b>							
Interregional - captive	231.4	205.7	344.4	312	353	399	451
Rail	162.0	144.0	196.3	171	176	160	181
Truck/trailer	69.4	61.7	148.1	125	141	180	203
Container	0.0	0.0	0.0	16	35	60	68
Interregional - competitive				10	11	13	14
Rail				6	6	5	6
Truck/trailer				4	5	6	7
Container				1	1	2	2
Transshipment - competitive				125	141	160	181
Rail				100	99	96	109
Truck/trailer				19	28	40	45
Container				6	14	24	27

Service:	1993	1994	1995	2000	2005	2010	2015
Transshipment - TRACECA				301	301	301	301
Rail				285	278	275	271
Truck/trailer				0	0	-6	-7
Container				15	23	32	36
Landbridge - Central Asia/Far East							
Container on rail				4	5	5	6
Landbridge - Europe/Far East							
Container on rail				4	5	5	6
Total Turkmenbashi - Baku	231.4	205.7	344.4	756	816	884	960
Rail	162.0	144.0	196.3	562	559	536	567
Truck/trailer	69.4	61.7	148.1	148	174	219	248
Container	0.0	0.0	0.0	46	83	129	146
Total ferry	365.2	360.2	579.2	1512	1632	1767	1921
Modal split total:							
Rail	255.6	252.1	330.1	1125	490	530	576
Truck	109.6	108.1	249.1	296	897	972	1056
Container	0.0	0.0	0.0	92	245	265	288
Total	365.2	360.2	579.2	1512	1632	1767	1921
Automobile traffic ('000)	N.A.	5.2	6.4	7	8	9	10
Passenger traffic ('000)	93	52	48	54	61	70	79

The number of units that are expected to be carried under the optimistic scenario using the previously described conversion factors are presented as Table 6.10.

**Table 6.10 Forecast of cargo flows on the Caspian Sea ferry service to 2015 ( units)  
Pessimistic scenario**

Service:	2000	2005	2010	2015
Baku - Turkmenbashi	Baseline			
Rail	10043	9979	9563	10116
Trailers/trucks, total	7388	8712	10969	12411
- Trailers with tractors	7388	7841	8776	9929
- Trailers without tractors	0	871	2194	2482
Containers, total	3815	6897	10724	12133
- Containers, intermodal/unaccomp.	3500	4684	6288	8388
- Containers, by rail	157	1328	3105	2996
- Containers, by truck	157	885	1331	749
Turkmenbashi - Baku				
Rail	10043	9979	9563	10116
Trailers/trucks, total	7388	8712	10969	12411
- Trailers with tractors	7388	7841	8776	9929
- Trailers without tractors	0	871	2194	2482
Containers, total	3815	6897	10724	12133
- Containers, intermodal/unaccomp.	3500	4684	6288	8388
- Containers, by rail	157	1328	3105	2996
- Containers, by truck	157	885	1331	749
Total ferry				
Rail	20085	19958	19127	20232
Trailers/trucks, total	14776	17425	21939	24822
- Trailers with tractors	14776	15682	17551	19857
- Trailers without tractors	0	1742	4388	4964
Containers, total	7629	13794	21448	24266
- Containers, intermodal/unaccomp.	7000	9368	12576	16776
- Containers, by rail	315	2656	6210	5992



## **7.4 Basic Assumptions and Inputs**

The purpose of this section of the report is to describe the assumptions made with respect to the inputs to the financial and economic analysis. These are made both with respect to expected revenues and the various cost factors.

### **7.4.1 Revenues**

The revenues of the ferry terminal operations of the port are generated from two sources:

- Dues and charges assessed on the ferry vessel calling at the FT of the port
- Activities associated with the loading and discharging of railcars, trucks and trailers, containers, automobiles and passengers in the FT of the port

#### **7.4.1.1 Cargo Forecasts**

The expected revenues are generated based on the forecasted cargo flows to be handled through the FT of the port. The forecasted cargo flows used in the feasibility analyses are the most likely, optimistic and pessimistic cargo flow forecasts described in Chapter 6 of this report.

#### **7.4.1.2 Operational Assumptions Based on Engineering and Design**

The cargo flow forecasts have been used as an input to evaluate the overall cargo handling facility and equipment requirements and thus the overall investments needed and also the overall operational scheme for the FT developed as part of the design and engineering plan, all of which is described in the preceding chapters of this report. The operational assumptions used in the financial analyses are all described below.

#### **7.4.1.3 Ferry Vessel Operations**

As discussed in Chapter 5 other ferry services in addition to the current ferry service between Baku and Turkmenbashi may be established in the future. In this report, however, the analysis has been limited to the currently operated ferry service between Baku and Turkmenbashi. The following assumptions have been made:

- A total of eight "Dagestan" type ferries were built and can be made available to operate on the ferry service between Baku and Turkmenbashi. Five are currently operating the ferry service, one is idle at the shipyard in Baku, while two vessels are operating outside the Caspian Sea basin.
- The ferries are assumed to operate according to a fixed schedule with the number of vessels determined by the availability of cargoes. An average maximum utilization of 80% of the capacity is assumed. When the cargo volumes have reached an average level of 80%, additional ferries will be assigned to operate the service.

- The number of voyages is calculated based on the current reduced sailing pattern as follows:
 

• Sailing time Baku - Turkmenbashi - Baku	28 hours
• Port time Baku:	4 hours
• Port time Turkmenbashi:	<u>4 hours</u>
Total round trip time	36 hours <sup>20</sup>
  
- The maximum operating days per year is assumed to be 330 for each of the ferries.
  
- The average loads of the cargo carrying units to be carried by the ferry, from which the forecasted cargo volumes have been converted from the forecasted volumes in Chapter 6 are as follows:
 

• Railcar	56 tons
• Truck/trailer	20 tons
• Container - Twenty foot Equivalent Unit (TEU)	12 tons
  
- Each standard railcar carrying containers can handle two TEU.<sup>21</sup>
  
- The maximum carrying capacity of the "Dagestan" class vessels are:
 

• Railcars	28
• Trucks with Eurotraileras	30
• Eurotrailers, unaccompanied	41
• Containers, TEU	80
• Automobiles, in lower hold	50
• Passengers	202

The maximum practical vessel utilization is assumed to be an average of 80%.

#### 7.4.1.4 Vessel Dues and Cargo Handling Rates

At the present time the ferry terminal operators in the port of Baku and Turkmenbashi respectively are remunerated by receiving a total of 5% of the revenues collected by the ferry operator, the Caspian Shipping Company (CSC). This system, which only can be considered as an inheritance of the former Soviet system, is unique to the FSU countries. In all other countries of the world, terminal operators base their charges levied on ferry

---

<sup>20</sup> With the cargo volumes expected under the "Most likely scenario" CSC will have the choice of improving the operating performance to a world standard level for "short sea" ferries or face the situation of having to acquire additional vessels. Given the current performance level of 330 operating days per year and an average voyage time of 36 hours, all the eight ferries will be fully utilized by the year 2007. Given an average service speed of 15.5 knots (max. speed of the vessels is 17 knots) and an average service time in each port of two hours, each vessel will be able to complete each voyage in 26 hours. In this case the current eight vessels will be able to handle the expected traffic until the year 2015.

<sup>21</sup> It is recognized that there exist larger rail flatcars that can carry three TEU. For the calculation of the financial feasibility analysis that standard flatcars carrying two TEU are used.

operators on vessel dues combined with charges for handling railcars, trucks and trailers, automobiles and passengers through the terminal.

The ferry charges for typical Scandinavian ports serving rail/truck/automobile/passenger ferries are as shown in Table 7.2

**Table 7.1 Cargo and passenger handling tariffs of major Scandinavian ferry ports (in Danish kroner (DKK) per unit)**

Port	Railcars	Trucks/trailers	Cars	Cont.	Pass.
Helsingborg		25	18		2
Rødby	25	35	6	25	1.5
Fredrikshavn		25-35	10		2

Source: Survey by consultants (Exchange rate app. 5.90 DKK per USD).

Port dues for vessels vary and average between DKK 2 to 5 per gross ton (grt). In some cases the vessel charges are based on a fixed fee per vessel per month irrespective of the number of calls of DKK 15/grt.

It is assumed that the charges for the use of the refurbished ferry terminals in both Baku and Turkmenbashi will be set according to a level commensurate with rates in major European ferry ports. The rates used for both Baku and Turkmenbashi for assessing the financial viability of the investments in the refurbishment of the respective ferry terminals are as follows:

**Table 7.2 Handling Charge**

<b><u>Handling charge per loaded unit:</u></b>	<b><u>USD</u></b>
Railcars	4.25
Trucks and trailers	4.25
Containers, unacc. or truck/trailer	4.25
Handling charge per empty unit:	
Railcars	4.25
Trucks and trailers	4.25
Containers	4.25
Passenger and automobile charges:	
Passenger handling charge	0.30
Cars and automobile handling charge	1.70

Vessel dues are assumed to be charged at USD 0.30 per grt. per vessel call. Given a tonnage of 11,200 grt of the "Dagestan" class vessels, the charges per call will be assessed at USD 3,360.

## 7.4.2 Proposed Investments

As discussed in Chapter 6 a one phased investment plan has been proposed. The investments to be made in the ferry terminal are expected to be financed with loans for the European Bank for Reconstruction and Development (EBRD).

### 7.4.2.1 Summary Overview of the Investment Projects in the Turkmenbashi Ferry Terminal

The investments to be made include rehabilitation and construction of the basic infrastructure of the port as well as rehabilitation, replacement and acquisition of new equipment has been presented in the technical report in two options, which can be summarized as presented in Table 7.3.

**Table 7.3 Summary of investments in the ferry terminal in Turkmenbashi. (in '000 USD)**

Type of activity:	Option 1		Option 2	
	Phase 1	Additional Final stage	Phase 1	Additional Final stage
Terminal area arrangement	3,174	230	3,400	0
Marine works	9,018	190	9,070	0
Ramp rehabilitation	3,890	0	3,890	0
Railway works	62	954	984	0
Terminal building works	639	220	859	0
<b>Subtotal</b>	<b>16,783</b>	<b>1,594</b>	<b>18,203</b>	<b>0</b>
Contingency - ramp work <sup>22</sup>	1,500		1,500	
<b>Total works</b>	<b>18,283</b>		<b>19,703</b>	
Additional activities:				
Site surveys, toto, bathy	30		30	
Site surveys soil	100		100	
Supervision of works	890		890	
<b>Total Additional Services</b>	<b>1,020</b>		<b>1,020</b>	
Contingency for price variations	1,930		2,072	
<b>GRAND TOTAL</b>	<b>21,233</b>		<b>22,795</b>	

The Option 1 is used as the basis for the evaluation of the financial viability, while Option 2 has been evaluated as alternatives in assessing the sensitivity of the Option 1 investments.

### 7.4.2.2 Financing of the Investments

EBRD is expected to provide 100% financing of the total cost of the proposed investments in the ferry terminal. The terms of the financing discussed with representatives of the EBRD to be used as the basis for this analysis are:

<sup>22</sup> This contingency cost has not been included as part of the investment and financial feasibility analysis, since it is assumed to be highly unlikely that this investment will be required.

- Grace period: 3 years
- Term of repayment: 12 years
- Type of loan: Annuity with annual payment of interest and installments
- Interest: LIBOR + 1%. LIBOR to be based on 6 months interest period
- Front end fee: 1% of loan amount
- Commitment fee: 0.5% of unused portion of loan amount granted.

### 7.4.3 Operating Costs

Limited cost data is available on the port of Turkmenbashi. It is expected, however, that the cost levels currently are similar to those of the port of Baku. When appropriate data has not been available, cost factors based on those in similar ports and situations world-wide have been used

#### 7.4.3.1 Manpower - Administrative and Operational Employees

The current organizational manning level of the Ferry Terminal in Turkmenbashi, which is expected to be relatively unchanged over the planning period is presented as Table 7.4.

**Table 7.4 Administration of the ferry terminal of Turkmenbashi.**

Type of personnel	No. of employees
Manager, ferry terminal	1
Deputy Manager	1
Shift controllers	4
Group mechanic	1
Shift electro mechanics	4
Chief cashier	1
Cashiers	4
Metal workers	3
Territory cleaners	5
Chief coastal sailor	1
Coastal sailors	4
Cloak and rest room attendants	8
<b>Total</b>	<b>37</b>

#### 7.4.3.2 Salaries and Wages - Administrative and Operational Personnel

The operational staff of the port shall be considered to be specialized workers with skills that are attractive to employers engaged in similar activities as those of the port. Presently several international oil companies have established operations in the Turkmenbashi area to explore the oil and gas deposits in the Caspian Sea sector of Turkmenistan, and it is not unlikely that freight forwarders and other transport operators are establishing offices and terminal and warehouse facilities in the Turkmenbashi area to serve these oil companies and to work in the Turkmen transport industry. Representatives of European transport and freight forwarding organizations have indicated that local warehouse personnel hired by them is paid a minimum of USD 120 to USD 150 per month, while more skilled

personnel and professionals (e.g. freight forwarders, despatchers, supervisors, foremen etc.) are paid between USD 400 and USD 500 per month.

It cannot be expected that the port of Turkmenbashi shall be a wage leader in terms of the wages paid to the operational staff. At the same time it cannot be expected that the current low level of pay can persist in an environment where skilled port workers can be expected to be recruited by the increasing number of international transport organizations establishing themselves with services competing with those of the port. As a consequence it will be expected that the port will have to increase the wage levels to that of the market established by the other transport organizations operating in the Turkmenbashi area. To this effect the assumption is made that the minimum wage level of port operational workers will have to be increased. By the year 2000 it is assumed that the wages of the operational employees of the port will have to be brought to a level competitive with those of the foreign transportation companies operating in Turkmenbashi. In the years up to the year 2015 it is assumed that the wage level will be increased to a real level similar to that of other developing countries.

The wages of the management and operational personnel are assessed based on a schedule dependent upon both by the years of employment and the type of work performed. Starting in the year 2000 the salaries of skilled administrative and clerical personnel will have to be raised to a minimum level of approximately USD 450 per month, while the salaries of middle management and supervisory staff will have to be increased to a level of USD 550 per month. The top management (i.e. operations and port administrative directors) should be raised to a level of minimum USD 900 per month. Similar to that of the port workers, the wages of the management and administrative staff will have to be increased to a level similar to those of developing countries by the year 2015.

The following pay scale has been used in this analysis:

Level:	Description	Total wages USD/month	
		Year 2000	Year 2015
1	Top management	900	5000
2	Middle management	550	3100
3	Foremen, leading clerical staff	450	2500
4	Labor A - Specialized workers	400	2200
5	Labor B - General port workers	300	1800
6	General labor	200	1500

#### 7.4.3.3 Taxes

The basic assumptions is made that the current tax scheme will continue in the future. Thus the calculation of the taxation has been made on the currently levied taxes and tax basis, which are to be paid by the company. These taxes are:

- Value Added Tax (VAT) is assessed on all services at 16.67% for public catering organization and 20% for all other organizations. All revenues presented in the revenue forecast are, however, assumed to be net of VAT.
- Profit tax is assessed at a rate of 25% of the net profit of the company.

- Social insurance tax is assessed at a rate of 30% of the gross salaries of the companies' employees to be paid by the company.

In addition there are certain taxes deducted from withheld by the company from the wages and salaries of the employees:

- Income taxes calculated at a rate of 8% withheld from the employees' wages and salaries
- Pension fund contributions are deducted at a rate of 1% of the wages and salaries received
- Medical insurance are deducted at a rate of 4% of the wages and salaries received

#### **7.4.3.4 Depreciation**

The method of depreciation used is straight line depreciation based on a percentage rate of the original cost of the asset. The depreciation rates used stem from a decree issued in July 1996, and the average depreciation rate for tax purposes is assessed to be 20%.

For the new investments to be made, however, an assessment has been made as to the technical and economic life span of the assets to depreciate these at a realistic level. The technical and economic depreciation rates used in the analysis are based on the expected lifetime of the respective assets as described in Appendix 2.

#### **7.4.3.5 Maintenance**

The maintenance charges for the new investments in facilities and equipment has been assessed based on the rates described in the investment tables in Appendix 2.

#### **7.4.3.6 Utility and Electricity Costs**

The key input in this respect is electricity. The current charges paid is Manats 75 or 0.013 USD per kwh, a level which in real terms is expected to remain at this level for the forecast period. The consumption of electricity is a minor cost for the ferry terminal.

#### **7.4.3.7 Fuel Costs and Consumption**

The average cost of diesel fuel is currently Manats 300 or USD 0.053 per liter of diesel fuel, and this cost is assumed to remain stable in real terms through the forecast period. This cost will be minimal for the ferry terminal.

#### **7.4.3.8 Other Costs**

All other costs are relatively small and are to a large extent independent of the volume of cargo volume and new investments made. These costs include communications, office

supplies, travel and other miscellaneous costs and are assumed to be USD 50,000 per year.

#### **7.4.3.9 Corporate Overhead**

The cargo handling operations will have to share in the overall cost of the corporate administration of the port. These costs are assessed on an annual basis to be USD 75,000 allocated to the ferry terminal.

### **7.5 Projection of the Feasibility of Investments in Facilities and Equipment**

In performing the feasibility analyses the basic assumptions described above have been applied. Using these inputs, the investment projects are evaluated on two bases:

- Project investment analysis basis to evaluate the overall feasibility of the proposed investments the IRR and NPV of the proposed investments.
- Financial analysis to evaluate the after tax profitability and the cash flow implications using the proposed financing terms and the current taxation scheme existing in Turkmenistan.

These are briefly described below.

#### **7.5.1 Feasibility Analysis of the Proposed Investments in the Ferry Terminal**

The purpose of this analysis is to evaluate and assess if the planned investments in the Ferry Terminal are feasible and viable independent of the method of financing selected and the tax regime, in which the port will have to operate. The methodology used for this purpose is to make an assessment of the total revenues and costs on a pretax basis excluding the depreciation and interest costs of the new investments to find the net cash flow from port operations. The viability and feasibility of these investments are then evaluated based on the expected internal rate of return (IRR) and the discounted net present value (NPV) of the cash flow expected to be generated from these projects.

The assets, for which the investments are made have for the most part an economic and technical life beyond the year 2015, which is the final year of this analysis. In order to obtain a reasonable assessment of the NPV and the IRR, it is necessary to use a residual value of the assets at the end of the year 2015. Since it will be difficult if not impossible to make an assessment of the market value of the port assets at that time, the residual value is defined as the depreciated book value of the assets (i.e. total investments and reinvestments minus the sum of the depreciations).

##### **7.5.1.1 The Most Likely Scenario - Option 1 Investments**

Using the cargo flows from the most likely scenario and the assumptions with respect to revenues and costs described above, an assessment has been made of the overall viability and feasibility of the proposed investments in the ferry terminal of the port of Turkmenbashi. The detailed results of this analysis is presented as Table B.1 in Appendix 2. As



shown in this table the overall cargo operations is expected to be highly profitable given the assumptions of the most likely scenario. Some key figures are:

- The operating margin of the ferry terminal operations of the port in the year 2000 is expected to be 73% decreasing to 44% in 2005, when the tax depreciation has been used and full taxes are applied. In following years the margin will increase to 48% in 2015.
  - The NPV is as follows:
  - With a 10% discount rate: USD 13.1 million
  - With a 15% discount rate: USD 4.8 million
- The IRR is 20%.

The overall conclusion is that the ferry terminal operations of the port can be expected to be highly profitable.

The analysis was also made under this scenario with the assumption that the additional investments in Phase 2 are made in the year 2008. The results of this analysis are presented in Appendix 2 as Table B.2. The key figures are:

- The operating margin of the cargo operations of the port in the year 2000 is expected to be 74% decreasing to 48% in 2005. Up to the year 2015 the margin will increase to 47%.
  - The NPV is as follows:
  - With a 10% discount rate: USD 12.8 million
  - With a 15% discount rate: USD 4.6 million
- The IRR is 20 %.

Also under this scenario the investment will be very favorable, and the overall expected return will only be marginally reduced.

#### **7.5.1.2 The Pessimistic/Low Growth Scenario - Option 1 Investments**

Under this scenario the basic change is the lowered cargo flows, which will reduce the overall revenues to the ferry terminal. The expected results are presented in Table B.3 in Appendix 2 and can be summarized as follows:

- The profit margin of the cargo operations of the port will be reduced to 63% in 2000 and will be reduced to 35% in the year 2005. Thereafter it will gradually be reduced to 30% in 2015.
  - The NPV is expected to be as follows:
  - With a 10% discount rate: minus USD 0.5 million
  - With a 15% discount rate: USD minus 4.7 million
- The IRR is expected to be 10%.

The overall conclusion is that although the revenues will be reduced, it will still provide an acceptable level of profitability and expected return on the investments to make the investments in the port feasible and viable.

### **7.5.1.3 Sensitivity of Options 2 with the Most Likely Scenario**

As discussed in Section 7.4.2.1 above and presented in Table 7.3, one other options has been defined for the development of the Ferry Terminal in Turkmenbashi. This alternative has been evaluated with the cargo flows of the Most Likely Scenario. In Option 2 both the shore end of the ramp and the railway yard are raised to the final level in Phase 1. The expected results of Option 2, are presented in Table B.4 in Appendix 2 and can be summarized as follows:

- The profit margin of the Ferry Terminal operations of the port will be similar to the Option 1 and will decrease from 74% in 2000 to 43% in 2005, when the tax depreciation has been used. Thereafter the profitability rates will increase to 47% in 2015.
  - The NPV is as follows:
  - With a 10% discount rate: USD 12.1 million
  - With a 15% discount rate: minus USD 3.7 million
- The IRR is expected to be 19%.

The overall conclusion is that with the additional investments required by Option 2, the difference in profitability compared to Option 1 will be marginal.

## **7.5.2 Financial Analysis of the Proposed Investment Projects**

The purpose of this analysis is to evaluate the overall financial viability of the operations of the port based on the proposed financing scheme and the current tax regime existing in Turkmenistan. The methodology used is to present the expected revenues and costs including interest payments on the loan, both the actual and tax depreciation and the profit taxes to arrive at the expected after tax profit of the port. This is presented in the form of expected future income statements of the cargo operations of the port. In addition the expected net cash flow from the projects with the financing scheme and terms of the loan proposed by the EBRD is developed.

### **7.5.2.1 Financial Analysis of the Most Likely Scenario**

This analysis has been made with the same basic inputs as described in Section 7.5.1.1 above. In this analysis the expected income statement of cargo operations of the port has been evaluated based on the financing terms proposed by the EBRD and the tax regime currently in effect in Turkmenistan. The result of this analysis is presented as Table B.5 in Appendix 2 and can be summarized as follows:

- Profitability. The port will under this scenario experience an overall profitability from Ferry Terminal operations starting at 42% in the year 2000 increasing to 50% in 2004. In 2005 when the tax depreciation is used and the taxes increase,

the profitability is reduced to 35%. Thereafter the profit margin will increase to 56% in 2015.

- The port will experience positive net annual cash flows throughout the planning period starting at USD 2.5 million in the year 2000 and will decrease to USD 1.2 million in 2005, when the overall tax burden increase. Thereafter the annual net cash flow will increase to USD 5.9 mill. in 2015. The expected cumulative cash after repayment of the loan and interest charges is expected to be USD 42.4 million in 2015. The Ferry Terminal will under this scenario be in a position to repay the loan prior to maturity, if desired or required.
- The debt service ratio will never go below 1.0.

Under this scenario the Ferry Terminal of the International Seaport of Turkmenbashi will have no difficulties in servicing the loans with the EBRD.

The analysis was also made under this scenario with the assumption that the additional investments in Phase 2 are made in the year 2008. The results of this analysis are presented in Appendix 2 as Table B.6. The key figures are:

- The operating margin of the cargo operations of the port will be identical up to 2007, and in 2008 the margin will increase to be 58% as a result of the decreased taxation with the increased depreciation, after which it will be increasing to 55% in 2015.
- The cash flow will be positive also after the investments in Phase 2 and the cumulative cash flow will allow the Ferry Terminal to repay the loans before maturity, if desired or required.
- The debt service ratio will only marginally be affected by the additional investments to be made in 2008.

The overall difference when adding the Phase 2 investments will be marginal.

#### **7.5.2.2 Financial Analysis of the Pessimistic Scenario**

The changes to the investments and costs are the same as those described in Section 7.5.1.2 above. The difference with the investment analysis is that the interest expenses for the loans and potential profit taxes have been added to present the expected income statement and the cash position given the cargo flows of the pessimistic/low growth scenario. The results of this analysis is presented as Table B.7 in Appendix B, and can be summarized as follows:

- The profitability of the Ferry Terminal operations in the port will yield a profitability of 13% in the year 2000 increasing to 30% in 2004. From the year 2005, when the depreciation for tax purposes have been exhausted, it will decline to 19%, after which it will increase to 37% in 2015, when the loan will have been repaid.
- The cash flow will be positive the three first years without installments to be paid, after which the cash flow will be marginal for the remainder of the planning period

until the loan has been repaid in the year 2015. The accumulated cash position will be positive throughout the planning period.

- The debt cover ratio will be below 1.0 for the planning period. The port will, however, be in a position to service the loans as scheduled even under the "Pessimistic scenario".

### **7.5.2.3 Sensitivity of Option 2 with the Most Likely Scenario**

The comments and assumptions for this analysis are the same as those described in Section 7.5.1.3. above. The results of the analysis for Option 2 investments are presented as Table B.8 in Appendix 2 and can be summarized as follows:

- The Ferry Operation will be expected to experience a rate of profitability increasing from 38% in 2000 to 47% in 2004. In 2005 with the full effect of the reduced depreciation, the profitability will decrease to 33%, after which it will increase to 56% in 2015.
- The Ferry Terminal of the port will experience positive net annual cash flows starting at USD 2.4 million in 2000 decreasing USD 1.1 million in 2005, as a result of the installments and increased tax burden. In the ensuing years the net annual cash flow will increase to USD 5.9 million in 2015.
- The cumulative cash position of the allow the port to be able to repay the loans prior to maturity if desired or required.
- The debt service ratio will with the exception of the year 2005 never go below 1.0 indicating that the port will at all time be able to service the loan from the annual cash flows.

The investment in the ferry terminal will even under the Option 2 and the Most Likely Scenario will be viable and feasible.

## **7.6 Economic Impact Analysis**

The purpose of this section is to describe the overall expected economic impact of the cargoes expected to be handled in and through the port of Turkmenbashi. An economic model developed in the United States has been used to evaluate the economic impact of port development on the region, in which the port the located, in terms of the added value in USD to the overall economy of the region and the number of jobs created in the region in addition to those directly involved in the operation of the port. The model calculates the value added to the economy in terms of the multiplier effect of each ton of cargo of various cargo types from economic activity created in the region of the port based on the cargo flows through the port, and the same way with the number of jobs created. Examples of value added activities are various transportation services (trucking, rail etc.), warehousing, miscellaneous port related services (freight forwarding, shipping agents, various suppliers of goods and services etc.), establishment or relocation of new industries or businesses as a result of the port etc.

The coefficients used are based on those developed for US ports and port hinterlands. While it is recognized that the Azeri economy is less developed than that of the United States, the coefficients for economic impact can nevertheless give an indication of the order of magnitude the impact of the investments to made and the resultant expected increased cargo flows will have on the regional and national economy of Turkmenistan.

## **7.6.1 Overall Economic Impact of the Ferry Terminal of the Port of Turkmenbashi**

### **7.6.1.1 Most Likely Scenario**

The economic impact of the cargo flows of the most likely scenario is presented as Table B.9 in Appendix B. As shown in this table the overall added value of the cargo flows to the economy is expected to increase from USD 218 million in the year 2000 and increase to an estimated USD 498 million in 2015. The discounted value of the future economic impacts in the year 2000 (for the planning period to the year 2015) at a discount rate of 10% will be USD 2.4 billion, while at a discount rate of 15% it will be USD 1.8 billion.

The number of jobs that will be created from the expected cargo flows through the port is presented in Table B.10 in Appendix 2. As shown in this table the total number of jobs that will be supported as a direct result of the ferry terminal activities in the port is expected to increase from approximately 2,300 in the year 2000 and will increase to more than 5,700 in the year 2015.

### **7.6.1.2 Pessimistic Scenario**

Although the cargo flows are dramatically reduced in the pessimistic scenario, the expected impact on the Azerbaijan economy will still be significant. As shown in Table B.11 in Appendix 2, the annual contributions that will be made by the cargo flows through the port will increase from USD 152 mill. in the year 2000 to USD 232 in 2015. The NPV of the future economic impacts in the year 2000 will be USD 1.4 billion with a discount rate of 10%, while at 15% it will be USD 1.1 billion.

The number of new employment created by the cargo flows through the port will also be significant even under the pessimistic/low growth scenario. As shown in Table B.12 in Appendix 2, the total number of jobs created and supported by the cargo flows through the port is expected to increase from 1600 in 2000 to 2600 in the year 2015.



**APPENDIX 1 - LIST OF PROJECT REFERENCES**

- /1/ Renovation of the Ferry Terminals of Baku and Turkmenbashi  
Phase 1 Final Report, Design Basis  
RAMBØLL, January 1997
  
- /2/ Renovation of the Ferry Terminals of Baku and Turkmenbashi  
Phase 2 Pre-Design and Feasibility Note  
RAMBØLL, December 1996
  
- /3/ Renovation of the Ferry Terminals of Baku and Turkmenbashi  
Phase 2 Detailed Design Report  
RAMBØLL, March 1997





## APPENDIX 2 - LIST OF FINANCIAL TABLES

Table B.1	Investment Feasibility Analysis - Turkmen Sea Administration - Ferry Terminal - Most Likely Scenario - Option 1 - 2000 to 2015
Table B.2	Investment Feasibility Analysis - Turkmen Sea Administration - Ferry Terminal - Most Likely Scenario - Option 1 - with Additional Final Stage Investment in 2008-2000 to 2015
Table B.3	Investment Feasibility Analysis - Turkmen Sea Administration - Ferry Terminal - Pessimistic Scenario - 2000 to 2015
Table B.4	Investment Feasibility Analysis - Turkmen Sea Administration - Ferry Terminal - Most Likely Scenario - Option 2 - 2000 to 2015
Table B.5	Investment Feasibility Analysis - Turkmen Sea Administration - Ferry Terminal - Most Likely Scenario - Option 1 - 2000 to 2015
Table B.6	Investment Feasibility Analysis - Turkmen Sea Administration - Ferry Terminal - Most Likely Scenario with Additional Final Stage Investments in 2008-2000 to 2015
Table B.7	Investment Feasibility Analysis - Turkmen Sea Administration - Ferry Terminal - Pessimistic Scenario - Option 1 - 2000 to 2015
Table B.8	Investment Feasibility Analysis - Turkmen Sea Administration - Ferry Terminal - Most Likely Scenario - Option 2 - 2000 to 2015
Table B.9	Port Related Economic Impact from the Ferry Terminal in Turkmenbashi
Table B.10	Port Related Employment Impact from the Ferry Terminal in Turkmenbashi
Table B.11	Port Related Economic Impact from the Ferry Terminal in Turkmenbashi
Table B.12	Port Related Employment Impact from the Ferry Terminal in turkmenbashi

Table B.1 Investment feasibility analysis - Turkmen Sea Administration - Ferry Terminal - Most likely scenario - Option 1 - 2000 to 2015 (all figures in USD '000).

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Revenues:</b>																
Vessel dues, all inclusive	4 435	4 435	5 174	5 174	5 174	5 174	5 914	5 914	6 653	6 653	7 392	7 392	8 131	8 131	8 870	8 870
<b>Cargo handling charges:</b>																
Vessel dues, all inclusive	125	127	128	129	131	132	133	134	134	135	136	140	144	148	152	156
Railcars	86	91	95	99	103	107	114	120	127	133	139	149	158	168	177	186
Trailers with tractors	0	2	5	7	10	12	17	21	26	30	35	37	40	42	44	47
Trailers without tractors	30	32	34	36	38	40	43	45	48	51	53	57	61	64	68	71
Containers, intermodal unaccompanied	5	8	11	14	17	20	25	31	37	42	48	53	58	63	68	73
Containers by rail	10	14	17	20	23	26	29	32	35	38	41	40	39	38	38	37
Containers by truck	14	15	16	17	18	19	21	22	23	25	26	28	29	31	33	35
Automobiles	19	21	22	23	24	26	28	29	31	33	35	37	39	42	44	48
Passengers	291	309	327	345	364	382	408	434	460	486	513	540	568	596	623	651
<b>Total</b>	<b>4 726</b>	<b>4 744</b>	<b>5 502</b>	<b>5 520</b>	<b>5 538</b>	<b>5 557</b>	<b>6 322</b>	<b>6 348</b>	<b>7 113</b>	<b>7 139</b>	<b>7 905</b>	<b>7 932</b>	<b>8 699</b>	<b>8 727</b>	<b>9 494</b>	<b>9 521</b>
<b>Total revenues</b>																
<b>Operating Costs:</b>																
<b>Direct costs:</b>																
Labor:																
Direct wages	136	182	227	273	319	364	410	456	501	547	593	638	684	730	775	821
Contribution pension and unemployment fund	54	73	91	109	128	146	164	182	201	219	237	255	274	292	310	328
Total labor	191	255	318	382	446	510	574	638	702	766	830	894	957	1 021	1 085	1 149
Maintenance and repair - new facilities/equipment	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291
Total direct	481	545	609	673	737	801	865	928	992	1 056	1 120	1 184	1 248	1 312	1 376	1 440
<b>Indirect costs:</b>																
Depreciation - new facilities:																
Tax depreciation	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947
Add'l depreciation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total depreciation - new facilities	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947
Utilities, electricity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other indirect costs	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Total indirect costs	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997
<b>General and administrative costs:</b>																
Management wages	17	23	28	33	39	44	49	55	60	65	71	76	81	87	92	97
Contribution pension and unemployment fund - mgmt	7	9	11	13	15	18	20	22	24	26	28	30	32	35	37	39
Corporate management and G & A - TSA	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Total G & A	99	107	114	122	129	137	144	151	159	166	174	181	189	196	204	211
Total costs and expenses	4 577	4 649	4 720	4 791	4 863	4 935	5 007	5 079	5 151	5 223	5 295	5 367	5 439	5 511	5 583	5 655
<b>Operating income, taxable</b>	<b>149</b>	<b>96</b>	<b>782</b>	<b>729</b>	<b>676</b>	<b>623</b>	<b>570</b>	<b>517</b>	<b>464</b>	<b>411</b>	<b>358</b>	<b>305</b>	<b>252</b>	<b>199</b>	<b>146</b>	<b>93</b>
<b>Taxes payable:</b>																
Profit tax	52	33	274	255	236	1 599	1 842	1 826	2 069	2 053	2 296	2 281	2 524	2 509	2 753	2 737
Total taxes	52	33	274	255	236	1 599	1 842	1 826	2 069	2 053	2 296	2 281	2 524	2 509	2 753	2 737
<b>Correction for high tax depreciation:</b>																
Add back tax depreciation	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947
Deduct normal technical/commercial depreciation	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540
<b>Net income after taxes</b>	<b>3 503</b>	<b>3 469</b>	<b>3 915</b>	<b>3 880</b>	<b>3 846</b>	<b>2 430</b>	<b>2 881</b>	<b>2 852</b>	<b>3 303</b>	<b>3 273</b>	<b>3 724</b>	<b>3 696</b>	<b>4 148</b>	<b>4 120</b>	<b>4 572</b>	<b>4 543</b>
<b>Net profit margin in % of revenues</b>	<b>74</b>	<b>73</b>	<b>71</b>	<b>70</b>	<b>69</b>	<b>44</b>	<b>46</b>	<b>45</b>	<b>46</b>	<b>46</b>	<b>47</b>	<b>47</b>	<b>48</b>	<b>48</b>	<b>48</b>	<b>48</b>
<b>Cash flow analysis:</b>																
Cash received:																
Net income after taxes	3 503	3 469	3 915	3 880	3 846	2 430	2 881	2 852	3 303	3 273	3 724	3 696	4 148	4 120	4 572	4 543
Add back depreciation	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540
Net cash flow from operations	4 043	4 009	4 455	4 420	4 386	2 970	3 421	3 392	3 843	3 813	4 264	4 236	4 688	4 660	5 112	5 083
Total cash received	4 043	4 009	4 455	4 420	4 386	2 970	3 421	3 392	3 843	3 813	4 264	4 236	4 688	4 660	5 112	5 083
Cash payments:																
Payments for investments	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total cash payments	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table B.1 Investment feasibility analysis - Turkmen Sea Administration - Ferry Terminal - Most likely scenario - Option 1 - 2000 to 2015 (all figures in USD '000).

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Net cash fl	-19 733	4 043	4 009	4 455	4 420	4 386	2 970	3 421	3 392	3 843	3 813	4 236	4 688	4 660	5 112	5 083	
Cumulative net cash flow		4 043	8 052	12 507	16 927	21 313	24 283	27 704	31 095	34 938	38 751	43 016	47 252	51 940	56 599	61 711	66 795
Residual value of assets 2015		11 091															11 091
Investment evaluation:																	
Net present value - 10% discount rate	13 102																
Net present value - 15% discount rate	4 779																
Internal rate of return	20%																
<b>Assumptions and bases for calculations:</b>																	
<b>Carries in units or no. of persons:</b>																	
Railcars	29 420	29 767	30 113	30 460	30 806	31 153	31 302	31 451	31 601	31 750	31 899	32 048	32 197	32 346	32 495	32 644	32 793
Trailers with tractors	20 330	21 312	22 293	23 275	24 256	25 238	26 219	27 201	28 182	29 164	30 145	31 127	32 108	33 089	34 071	35 052	36 034
Trailers without tractors	0	561	1 122	1 682	2 243	2 804	3 365	3 926	4 487	5 048	5 609	6 170	6 731	7 292	7 853	8 414	8 975
Containers, intermodal unaccompanied	7 000	7 474	7 947	8 421	8 894	9 368	9 842	10 315	10 789	11 262	11 736	12 209	12 683	13 156	13 630	14 103	14 577
Containers, by rail	2 443	3 791	5 140	6 488	7 837	9 185	10 533	11 881	13 229	14 577	15 925	17 273	18 621	19 969	21 317	22 665	24 013
Containers by truck	2 443	3 791	5 140	6 488	7 837	9 185	10 533	11 881	13 229	14 577	15 925	17 273	18 621	19 969	21 317	22 665	24 013
Automobiles	8 524	9 101	9 678	10 254	10 831	11 408	11 985	12 562	13 139	13 716	14 293	14 870	15 447	16 024	16 601	17 178	17 755
Passengers	64 235	68 580	72 925	77 271	81 616	85 961	90 306	94 651	98 996	103 341	107 686	112 031	116 376	120 721	125 066	129 411	133 756
No. of vessels arriving	1 320	1 320	1 540	1 540	1 540	1 540	1 760	1 760	1 980	1 980	2 200	2 200	2 420	2 420	2 640	2 640	2 860
<b>Handling charges:</b>																	
Railcars	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Trailers with tractors	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Trailers without tractors	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Containers, intermodal unaccompanied	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Containers, by rail	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13
Containers by truck	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Automobiles	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
Passengers	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Vessel dues per ship call:																	
Vessel dues - average per vessel call	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360
<b>Operating and cost assumptions:</b>																	
Number of port workers:																	
Level 1 - Top management	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Level 2 - Middle management	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Level 3 - Foremen, equipment operators, clerical staff	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Level 4 - Labor A - specialized labor/dockers	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Level 5 - Labor B - general port workers	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Level 6 - General labor	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Total work force	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Monthly wages - all inclusive:																	
Level 1 - Top management	900	1 173	1 447	1 720	1 993	2 267	2 540	2 813	3 087	3 360	3 633	3 907	4 180	4 453	4 727	5 000	5 273
Level 2 - Middle management	550	720	890	1 060	1 230	1 400	1 570	1 740	1 910	2 080	2 250	2 420	2 590	2 760	2 930	3 100	3 270
Level 3 - Foremen, equipment operators, clerical staff	450	587	723	860	997	1 133	1 270	1 407	1 543	1 680	1 817	1 953	2 090	2 227	2 363	2 500	2 637
Level 4 - Labor A - specialized labor/dockers	400	520	640	760	880	1 000	1 120	1 240	1 360	1 480	1 600	1 720	1 840	1 960	2 080	2 200	2 320
Level 5 - Labor B - general port workers	300	400	500	600	700	800	900	1 000	1 100	1 200	1 300	1 400	1 500	1 600	1 700	1 800	1 900
Level 6 - General labor, janitors etc.	200	287	373	460	547	633	720	807	893	980	1 067	1 153	1 240	1 327	1 413	1 500	1 587
Electricity consumption kwh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Avg. cost per kwh	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
<b>Total investments:</b>																	
Terminal area arrangements	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174
Marine works	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018
Ramp rehabilitation	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890
Railway works	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Terminal building works	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639
Additional activities	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020

Table B.1 Investment feasibility analysis - Turkmen Sea Administration - Ferry Terminal - Most likely scenario - Option 1 - 2000 to 2015 (all figures in USD '000).

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Contingencies	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930
Total investments	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733
<b>Depreciation calculation:</b>																
Terminal area arrangements - 30 Years	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106
Marine works - 40 years	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225
Ramp rehabilitation - 25 years	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156
Railway works - 20 years	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Terminal building works - 30 years	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
Total depreciation	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540
<b>Tax depreciation - new projects:</b>																
Total tax depreciation - new assets 20%	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947
<b>Maintenance costs - new investments</b>																
Terminal area arrangements	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Marine works	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158
Ramp rehabilitation	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Railway works	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Terminal building works	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Total	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291
<b>Investments - phase 1</b>																
Terminal area arrangements	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174
Marine works	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018
Ramp rehabilitation	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890
Railway works	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Terminal building works	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639
Additional activities	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020
Contingencies	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930
Total	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733
Cumulative total	19 733															
<b>Investments - phase 2</b>																
Terminal area arrangements																
Marine works																
Ramp rehabilitation																
Railway works																
Terminal building works																
Additional activities																
Contingencies																
Total	0															
Cumulative total	0															
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Loan payments	19 733								0							

Table B.2 Investment feasibility analysis - Turkmen Sea Administration - Ferry Terminal - Most likely scenario - Option 1 - with additional final stage Investments in 2008-2010 to 2015 (all figures in USD '000).

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Revenues:</b>																
Vessel dues:	4 435	4 435	5 174	5 174	5 174	5 174	5 914	5 914	6 653	6 653	7 392	7 392	8 131	8 131	8 870	8 870
Cargo handling charges:																
Relifers	125	127	128	129	131	132	133	134	134	135	136	140	144	148	152	156
Trailers with tractors	86	91	95	99	103	107	114	120	127	133	139	149	158	168	177	186
Trailers without tractors	0	2	5	7	10	12	17	21	26	30	35	37	40	42	44	47
Containers, intermodal unaccompanied	30	32	34	36	38	40	43	45	48	51	53	57	61	64	68	71
Containers, by rail	5	8	11	14	17	20	25	31	37	42	48	53	58	63	68	73
Containers by truck	10	14	17	20	23	26	29	32	35	38	41	44	47	50	53	56
Automobiles	14	15	16	17	18	19	21	22	23	25	26	28	29	31	33	35
Passengers	19	21	22	23	24	26	28	29	31	33	35	37	39	42	44	46
<b>Total revenues</b>	291	309	327	345	364	382	408	434	460	486	513	540	568	596	623	651
<b>Operating Costs:</b>	4 726	4 744	5 502	5 520	5 538	5 557	6 322	6 348	7 113	7 139	7 905	7 932	8 699	8 727	9 494	9 521
Direct costs:																
Labor:																
Direct wages	136	182	227	273	319	364	410	456	501	547	593	638	684	730	775	821
Contribution, pension and unemployment fund	54	73	91	109	128	146	164	182	201	219	237	255	274	292	310	328
Total labor	191	255	318	382	446	510	574	638	702	766	830	894	957	1 021	1 085	1 149
Maintenance and repair - new facilities/equipment	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291
Total direct	481	545	609	673	737	801	865	929	1 037	1 101	1 165	1 229	1 293	1 356	1 420	1 484
Indirect costs:																
Depreciation - new facilities:																
Tax depreciation	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947
Add'l depreciation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total depreciation - new facilities	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947
Utilities, electricity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other indirect costs	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Total indirect costs	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997
General and administrative costs:																
Management wages	17	23	28	33	39	44	49	55	60	65	71	76	81	87	92	97
Contribution pension and unemployment fund - mgmt	7	9	11	13	15	18	20	22	24	26	28	30	32	35	37	39
Corporate management and G & A - TSA	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Total G & A	99	107	114	122	129	137	144	151	159	166	174	181	189	196	204	211
Total costs and expenses	4 577	4 649	4 720	4 791	4 863	4 935	5 007	5 079	5 151	5 223	5 295	5 367	5 439	5 511	5 583	5 655
Operating income, taxable	149	96	782	729	676	4 569	5 263	5 218	5 503	5 503	6 197	6 154	6 849	7 124	7 820	7 776
Taxes payable:																
Profit tax	52	33	274	255	236	1 599	1 842	1 826	1 942	1 926	2 169	2 154	2 397	2 493	2 737	2 722
Total taxes	52	33	274	255	236	1 599	1 842	1 826	1 942	1 926	2 169	2 154	2 397	2 493	2 737	2 722
Correction for high tax depreciation:																
Add back tax depreciation	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947
Deduct normal technical/commercial depreciation	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540
Net income after taxes	3 503	3 469	3 915	3 880	3 846	2 430	2 881	2 852	3 354	3 325	3 776	3 748	4 200	4 060	4 512	4 484
Net profit margin in % of revenues	74	73	71	70	69	44	46	45	47	47	48	47	48	47	48	47
<b>Cash flow analysis:</b>																
Cash received:																
Net income after taxes	3 503	3 469	3 915	3 880	3 846	2 430	2 881	2 852	3 354	3 325	3 776	3 748	4 200	4 060	4 512	4 484
Add back depreciation	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540
Net cash flow from operations	4 043	4 009	4 455	4 420	4 386	2 970	3 421	3 392	3 896	3 896	4 347	4 319	4 771	4 631	5 083	5 055
Cash payments:																
Payments for investments	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total cash payments	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table B.2 Investment feasibility analysis - Turkmen Sea Administration - Ferry Terminal - Most likely scenario - Option 1 - with additional final stage investments in 2008-2009 to 2015 (all figures in USD '000).

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Net cash fl	-19 733	4 043	4 009	4 455	4 420	4 386	2 970	3 421	3 392	2 331	3 896	4 347	4 771	4 631	5 083	5 055
Cumulative net cash flow		4 043	8 052	12 507	16 927	21 313	24 283	27 704	33 427	37 322	41 669	45 988	50 759	55 390	60 472	65 527
Residual value of assets 2015	12 439															12 439
Investment evaluation:																
Net present value - 10% discount rate	12 844															
Net present value - 15% discount rate	4 563															
Internal rate of return	20%															
Assumptions and bases for calculations:																
Cargoes in units or no. of persons:	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Railcars	29 420	29 767	30 113	30 460	30 806	31 153	31 302	31 451	31 601	31 750	31 899	32 049	32 199	32 349	32 499	32 649
Trailers with tractors	20 330	21 312	22 293	23 275	24 256	25 238	26 219	27 200	28 181	29 162	30 143	31 124	32 105	33 086	34 067	35 048
Trailers without tractors	0	561	1 122	1 682	2 243	2 804	3 365	3 926	4 487	5 048	5 609	6 170	6 731	7 292	7 853	8 414
Containers, intermodal unaccompanied	7 000	7 474	7 947	8 421	8 894	9 368	9 842	10 315	10 789	11 262	11 736	12 209	12 683	13 156	13 630	14 103
Containers, by rail	2 443	3 791	5 140	6 488	7 837	9 185	10 533	11 881	13 229	14 577	15 925	17 273	18 621	19 969	21 317	22 665
Containers by truck	2 443	3 179	3 915	4 651	5 387	6 123	6 859	7 595	8 331	9 067	9 803	10 539	11 275	12 011	12 747	13 483
Automobiles	8 524	9 101	9 678	10 254	10 831	11 408	11 985	12 562	13 139	13 716	14 293	14 870	15 447	16 024	16 601	17 178
Passengers	64 235	68 580	72 925	77 271	81 616	85 961	90 306	94 651	98 996	103 341	107 686	112 031	116 376	120 721	125 066	129 411
No. of vessels arriving	1 320	1 320	1 540	1 540	1 540	1 540	1 760	1 760	1 980	1 980	2 200	2 200	2 420	2 420	2 640	2 640
Handling charges:																
Railcars	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Trailers with tractors	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Trailers without tractors	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Containers, intermodal unaccompanied	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Containers, by rail	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13
Containers by truck	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Automobiles	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
Passengers	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Vessel dues per ship call:																
Vessel dues - average per vessel call	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360
Operating and cost assumptions:																
Number of port workers:																
Level 1 - Top management	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Level 2 - Middle management	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Level 3 - Foremen, equipment operators, clerical staff	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Level 4 - Labor A - specialized labor/dockers	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Level 5 - Labor B - general port workers	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Level 6 - General labor	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Total work force	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Monthly wages - all inclusive:																
Level 1 - Top management	900	1 173	1 447	1 720	1 993	2 267	2 540	2 813	3 087	3 360	3 633	3 907	4 180	4 453	4 727	5 000
Level 2 - Middle management	550	720	890	1 060	1 230	1 400	1 570	1 740	1 910	2 080	2 250	2 420	2 590	2 760	2 930	3 100
Level 3 - Foremen, equipment operators, clerical staff	450	587	723	860	997	1 133	1 270	1 407	1 543	1 680	1 817	1 953	2 090	2 227	2 363	2 500
Level 4 - Labor A - specialized labor/dockers	400	520	640	760	880	1 000	1 120	1 240	1 360	1 480	1 600	1 720	1 840	1 960	2 080	2 200
Level 5 - Labor B - general port workers	300	400	500	600	700	800	900	1 000	1 100	1 200	1 300	1 400	1 500	1 600	1 700	1 800
Level 6 - General labor, janitors etc.	200	287	373	460	547	633	720	807	893	980	1 067	1 153	1 240	1 327	1 413	1 500
Electricity consumption kwh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Avg. cost per kwh	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Total investments:																
Terminal area arrangements	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 404	3 404	3 404	3 404	3 404	3 404	3 404	3 404
Marine works	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 208	9 208	9 208	9 208	9 208	9 208	9 208	9 208
Ramp rehabilitation	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890
Railway works	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Terminal building works	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639
Additional activities	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020

Table B.2. Investment feasibility analysis - Turkmen Sea Administration - Ferry Terminal - Most likely scenario - Option 1 - with additional final stage investments in 2008-2000 to 2015 (all figures in USD '000).

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Contingencies	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930
Total investments	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	21 327	21 327	21 327	21 327	21 327	21 327	21 327	21 327
Depreciation calculation:																
Terminal area arrangements - 30 years	106	106	106	106	106	106	106	106	113	113	113	113	113	113	113	113
Marine works - 40 years	225	225	225	225	225	225	225	225	230	230	230	230	230	230	230	230
Ramp rehabilitation - 25 years	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156
Railway works - 20 years	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Terminal building works - 30 years	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
Total depreciation	540	540	540	540	540	540	540	540	571	571	571	571	571	571	571	571
Tax depreciation - new projects:																
Total tax depreciation - new assets 20%	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	4 265	4 265	4 265	4 265	4 265	4 265	4 265	4 265
Maintenance costs - new investments																
Terminal area arrangements	35	35	35	35	35	35	35	35	41	41	41	41	41	41	41	41
Marine works	158	158	158	158	158	158	158	158	181	181	181	181	181	181	181	181
Ramp rehabilitation	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Railway works	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Terminal building works	11	11	11	11	11	11	11	11	13	13	13	13	13	13	13	13
Total	291	291	291	291	291	291	291	291	335	335	335	335	335	335	335	335
Investments - phase 1																
Terminal area arrangements	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174
Marine works	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018
Ramp rehabilitation	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890
Railway works	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Terminal building works	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639
Additional activities	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020
Contingencies	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930
Total	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733
Cumulative total																
Investments - phase 2																
Terminal area arrangements																
Marine works																
Ramp rehabilitation																
Railway works																
Terminal building works																
Additional activities																
Contingencies																
Total																
Cumulative total	1 594															
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Loan payments	19 733								1 594	1 594	1 594	1 594	1 594	1 594	1 594	1 594

Table B.3 Investment feasibility analysis - Turkmen Sea Administration - Ferry Terminal - Pessimistic scenario - 2000 to 2015 (all figures in USD '000).

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Revenues:																
Vessel dues:	2 957	2 957	2 957	2 957	3 696	3 696	3 696	3 696	3 696	3 696	3 696	3 696	3 696	4 435	4 435	4 435
Cargo handling charges:																
Railcars	85	85	85	85	85	85	84	83	83	82	81	82	83	84	85	86
Trailers with tractors	63	64	64	65	66	67	68	70	71	73	75	77	79	80	82	84
Containers, intermodal unaccompanied	0	1	3	4	6	7	10	12	14	16	19	19	20	20	21	21
Containers, by rail	30	32	34	36	38	40	43	45	48	51	53	57	61	64	68	71
Containers by truck	1	2	3	4	5	6	7	9	10	12	13	13	13	13	13	13
Automobiles	1	3	4	5	6	8	8	9	10	10	11	10	9	8	7	6
Passengers	12	13	13	13	14	14	14	15	15	15	16	16	17	17	17	18
Total	16	17	17	18	18	18	19	19	20	20	21	21	22	22	23	24
Total revenues	208	216	223	230	237	244	253	262	271	280	289	296	303	310	316	323
Operating Costs:	3 165	3 172	3 180	3 187	3 933	3 940	3 949	3 958	3 967	3 976	3 985	3 992	3 999	4 745	4 752	4 758
Direct costs:																
Labor:																
Direct wages	136	182	227	273	319	364	410	456	501	547	593	638	684	730	775	821
Contribution pension and unemployment fund	54	73	91	109	128	146	164	182	201	219	237	255	274	292	310	328
Total labor	191	255	318	382	446	510	574	638	702	766	830	894	957	1 021	1 085	1 149
Maintenance and repair - new facilities/equipment	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291
Total direct	481	545	609	673	737	801	865	929	992	1 056	1 120	1 184	1 248	1 312	1 376	1 440
Indirect costs:																
Depreciation - new facilities:																
Tax depreciation	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947
Add'l depreciation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total depreciation - new facilities	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947
Utilities, electricity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other indirect costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total indirect costs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
General and administrative costs:	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997	3 997
Management wages	17	23	28	33	39	44	49	55	60	65	71	76	81	87	92	97
Contribution pension and unemployment fund - mgmt	7	9	11	13	15	18	20	22	24	26	28	30	32	35	37	39
Corporate management and G & A - TSA	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Total G & A	99	107	114	122	129	137	144	151	159	166	174	181	189	196	204	211
Total costs and expenses	4 577	4 649	4 720	4 791	4 863	4 935	5 007	5 079	5 151	5 223	5 295	5 367	5 439	5 511	5 583	5 655
Operating income, taxable	-1 412	-1 476	-1 540	-1 605	-930	2 953	2 890	2 828	2 766	2 703	2 641	2 576	2 512	3 187	3 122	3 058
Texas payable:																
Profit tax	0	0	0	0	0	1 033	1 012	990	968	946	924	902	879	1 115	1 093	1 070
Total taxes	0	0	0	0	0	1 033	1 012	990	968	946	924	902	879	1 115	1 093	1 070
Correction for high tax depreciation:																
Add back tax depreciation	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947
Deduct normal technical/commercial depreciation	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540
Net income after taxes	1 995	1 930	1 866	1 802	2 477	1 379	1 339	1 298	1 258	1 217	1 177	1 135	1 093	1 531	1 489	1 447
Net profit margin in % of revenues	63	61	59	57	63	35	34	33	32	31	30	28	27	32	31	30
Cash flow analysis:																
Cash received:																
Net income after taxes	1 995	1 930	1 866	1 802	2 477	1 379	1 339	1 298	1 258	1 217	1 177	1 135	1 093	1 531	1 489	1 447
Add back depreciation	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540
Net cash flow from operations	2 535	2 470	2 406	2 342	3 017	1 919	1 879	1 838	1 798	1 757	1 717	1 675	1 633	2 071	2 029	1 987
Total cash received	2 535	2 470	2 406	2 342	3 017	1 919	1 879	1 838	1 798	1 757	1 717	1 675	1 633	2 071	2 029	1 987
Cash payments:																
Payments for investments	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total cash payments	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Table B.3 Investment feasibility analysis - Turkmen Sea Administration - Ferry Terminal - Pessimistic scenario - 2000 to 2015 (all figures in USD '000).

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Net cash fl	-19 733	2 000	2 470	2 406	2 342	2 406	2 406	2 406	2 406	2 406	2 406	2 406	2 406	2 406	2 406	2 406
Cumulative net cash flow		2 535	5 005	7 411	9 753	12 771	14 890	16 589	18 407	20 205	21 962	23 679	25 353	26 986	28 613	30 240
Residual value of assets 2015		11 091														
Investment evaluation:																
Net present value - 10% discount rate		-450														
Net present value - 15% discount rate		-4 717														
Internal rate of return		10%														
Assumptions and bases for calculations:																
Cargoes in units or no. of persons:																
Railcars	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Trailers with tractors	20 085	20 060	20 034	20 009	19 983	19 958	19 792	19 626	19 459	19 293	19 127	19 348	19 569	19 790	20 011	20 232
Trailers without tractors	14 776	14 957	15 138	15 320	15 501	15 682	16 056	16 430	16 803	17 177	17 551	18 012	18 473	18 935	19 396	19 857
Containers, intermodal unaccompanied	0	348	697	1 045	1 394	1 742	2 271	2 800	3 330	3 859	4 388	4 503	4 618	4 734	4 849	4 964
Containers, by rail	7 000	7 474	7 947	8 421	8 894	9 368	10 010	10 651	11 293	11 934	12 576	13 416	14 256	15 096	15 936	16 776
Containers by truck	315	783	1 251	1 720	2 188	2 656	3 367	4 078	4 788	5 499	6 210	6 166	6 123	6 079	6 036	5 992
Automobiles	315	606	897	1 188	1 479	1 770	1 948	2 126	2 305	2 483	2 661	2 428	2 196	1 963	1 731	1 498
Passengers	7 207	7 396	7 586	7 775	7 965	8 154	8 368	8 583	8 797	9 012	9 226	9 468	9 711	9 953	10 196	10 438
No. of vessels arriving	54 308	55 735	57 162	58 590	60 017	61 444	63 059	64 674	66 288	67 903	69 518	71 345	73 172	75 000	76 827	78 654
Handling charges:	880	880	880	880	1 100	1 100	1 100	1 100	1 100	1 100	1 100	1 100	1 100	1 320	1 320	1 320
Railcars	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Trailers with tractors	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Trailers without tractors	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Containers, intermodal unaccompanied	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Containers, by rail	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13
Containers by truck	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Automobiles	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
Passengers	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Vessel dues per ship call:																
Vessel dues - average per vessel call	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360
Operating and cost assumptions:																
Number of port workers:																
Level 1 - Top management	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Level 2 - Middle management	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Level 3 - Foremen, equipment operators, clerical staff	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Level 4 - Labor A - specialized labor/dockers	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Level 5 - Labor B - general port workers	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Level 6 - General labor	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Total work force	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Monthly wages - all inclusive:																
Level 1 - Top management	900	1 173	1 447	1 720	1 993	2 267	2 540	2 813	3 087	3 360	3 633	3 907	4 180	4 453	4 727	5 000
Level 2 - Middle management	550	720	890	1 060	1 230	1 400	1 570	1 740	1 910	2 080	2 250	2 420	2 590	2 760	2 930	3 100
Level 3 - Foremen, equipment operators, clerical staff	450	587	723	860	997	1 133	1 270	1 407	1 543	1 680	1 817	1 953	2 090	2 227	2 363	2 500
Level 4 - Labor A - specialized labor/dockers	400	520	640	760	880	1 000	1 120	1 240	1 360	1 480	1 600	1 720	1 840	1 960	2 080	2 200
Level 5 - Labor B - general port workers	300	400	500	600	700	800	900	1 000	1 100	1 200	1 300	1 400	1 500	1 600	1 700	1 800
Level 6 - General labor, janitors etc.	200	287	373	460	547	633	720	807	893	980	1 067	1 153	1 240	1 327	1 413	1 500
Electricity consumption kwh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Avg. cost per kwh	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Total investments:																
Terminal area arrangements	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174
Marine works	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018
Ramp rehabilitation	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890
Railway works	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Terminal building works	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639
Additional activities	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020

Table B.3 Investment feasibility analysis - Turkmen Sea Administration - Ferry Terminal - Pessimistic scenario - 2000 to 2015 (all figures in USD '000).

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Contingencies	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930
Total investments	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733
Depreciation calculation:																
Terminal area arrangements - 30 years	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106
Marine works - 40 years	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225
Ramp rehabilitation - 25 years	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156
Railway works - 20 years	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Terminal building works - 30 years	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
Total depreciation	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540
Tax depreciation - new projects:																
Total tax depreciation - new assets 20%	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947
Maintenance costs - new investments																
Terminal area arrangements	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Marine works	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158
Ramp rehabilitation	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Railway works	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Terminal building works	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Total	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291
Investments - phase 1																
Terminal area arrangements	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174
Marine works	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018
Ramp rehabilitation	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890
Railway works	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Terminal building works	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639
Additional activities	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020
Contingencies	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930
Total	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733
Cumulative total																
Investments - phase 2																
Terminal area arrangements																
Marine works																
Ramp rehabilitation																
Railway works																
Terminal building works																
Additional activities																
Contingencies																
Total																
Cumulative total																
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Loan payments																
	19 733															

Table B.4. Investment feasibility analysis - Turkmen Sea Administration - Ferry Terminal - Most likely scenario - Option 2 - 2000 to 2015 (all figures in USD '000).

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Revenues:</b>																
Vessel dues, all inclusive	4 435	4 435	5 174	5 174	5 174	5 174	5 914	5 914	6 653	6 653	7 392	7 392	8 131	8 131	8 870	8 870
<b>Cargo handling charges:</b>																
Vessel dues, all inclusive	125	127	128	129	131	132	133	134	134	135	136	140	144	148	152	156
Railcars	86	91	95	99	103	107	114	120	127	133	139	149	158	168	177	186
Trailers with tractors	0	2	5	7	10	12	17	21	26	30	35	37	40	42	44	47
Trailers without tractors	30	32	34	36	38	40	43	45	48	51	53	57	61	64	68	71
Containers, intermodal unaccompanied	5	8	11	14	17	20	25	31	37	42	48	53	58	63	68	73
Containers, by rail	10	14	17	20	23	26	29	32	35	38	41	40	39	38	38	37
Containers, by truck	14	15	16	17	18	19	21	22	23	25	26	28	29	31	33	35
Automobiles	19	21	22	23	24	26	28	29	31	33	35	37	39	42	44	46
Passengers	291	309	327	345	364	382	408	434	460	488	513	540	568	596	623	651
<b>Total</b>	<b>4 726</b>	<b>4 744</b>	<b>5 502</b>	<b>5 520</b>	<b>5 538</b>	<b>5 557</b>	<b>6 322</b>	<b>6 348</b>	<b>7 113</b>	<b>7 139</b>	<b>7 905</b>	<b>7 932</b>	<b>8 699</b>	<b>8 727</b>	<b>9 494</b>	<b>9 521</b>
<b>Operating Costs:</b>																
<b>Direct costs:</b>																
Labor:																
Direct wages	136	182	227	273	319	364	410	456	501	547	593	638	684	730	775	821
Contribution pension and unemployment fund	54	73	91	109	128	146	164	182	201	219	237	255	274	292	310	328
Total labor	191	255	318	382	446	510	574	638	702	766	830	894	957	1 021	1 085	1 149
Maintenance and repair - new facilities/equipment	311	311	311	311	311	311	311	311	311	311	311	311	311	311	311	311
Total direct	502	565	629	693	757	821	885	949	1 013	1 077	1 141	1 204	1 268	1 332	1 396	1 460
<b>Indirect costs:</b>																
Depreciation - new facilities:	4 259	4 259	4 259	4 259	4 259	0	0	0	0	0	0	0	0	0	0	0
Tax depreciation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Add'l depreciation	4 259	4 259	4 259	4 259	4 259	0	0	0	0	0	0	0	0	0	0	0
Total depreciation - new facilities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Utilities, electricity	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Other indirect costs	4 309	4 309	4 309	4 309	4 309	50	50	50	50	50	50	50	50	50	50	50
Total indirect costs	17	23	28	33	39	44	49	55	60	65	71	76	81	87	92	97
General and administrative costs:	7	9	11	13	15	18	20	22	24	26	28	30	32	35	37	39
Management wages	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Contribution pension and unemployment fund - mgmt	99	107	114	122	129	137	144	151	159	166	174	181	189	196	204	211
Corporate management and G & A - TSA	4 910	4 981	5 053	5 124	5 195	5 266	5 337	5 408	5 479	5 550	5 621	5 692	5 763	5 834	5 905	5 976
Total G & A	-184	-237	-290	-343	-396	-449	-502	-555	-608	-661	-714	-767	-820	-873	-926	-979
Total costs and expenses	4 910	4 981	5 053	5 124	5 195	5 266	5 337	5 408	5 479	5 550	5 621	5 692	5 763	5 834	5 905	5 976
Operating income, taxable																
Taxes payable:	0	0	157	139	120	1 592	1 835	1 819	2 062	2 046	2 289	2 274	2 517	2 502	2 745	2 730
Profit tax	0	0	157	139	120	1 592	1 835	1 819	2 062	2 046	2 289	2 274	2 517	2 502	2 745	2 730
Total taxes	0	0	157	139	120	1 592	1 835	1 819	2 062	2 046	2 289	2 274	2 517	2 502	2 745	2 730
Correction for high tax depreciation:																
Add back tax depreciation	4 259	4 259	4 259	4 259	4 259	0	0	0	0	0	0	0	0	0	0	0
Deduct normal technical/commercial depreciation	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567
Net income after taxes	3 507	3 454	3 984	3 949	3 915	2 389	2 841	2 811	3 262	3 233	3 684	3 655	4 108	4 079	4 531	4 503
Net profit margin in % of revenues	74	73	72	72	71	43	45	44	46	45	47	46	47	47	48	47
<b>Cash flow analysis:</b>																
Cash received:																
Net income after taxes	3 507	3 454	3 984	3 949	3 915	2 389	2 841	2 811	3 262	3 233	3 684	3 655	4 108	4 079	4 531	4 503
Add back depreciation	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567
Net cash flow from operations	4 075	4 022	4 551	4 516	4 482	2 957	3 408	3 378	3 829	3 800	4 251	4 223	4 675	4 646	5 099	5 070
Total cash received	4 075	4 022	4 551	4 516	4 482	2 957	3 408	3 378	3 829	3 800	4 251	4 223	4 675	4 646	5 099	5 070
Cash payments:																
Payments for investments	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total cash payments	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table B.4 Investment feasibility analysis - Turkmen Sea Administration - Ferry Terminal - Most likely scenario - Option 2 - 2000 to 2015 (all figures in USD '000).

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Net cash I/																
-21,295	4 075	4 022	4 551	4 516	4 482	2 957	3 408	3 378	3 829	3 800	4 251	4 223	4 675	4 646	5 099	5 070
Cumulative net cash flow																
Residual value of assets 2015	12 219	8 096	12 647	17 164	21 645	24 602	28 010	31 388	35 218	39 018	43 269	47 492	52 167	56 813	61 912	66 982
Investment evaluation:																
Net present value - 10% discount rate	12 052															
Net present value - 15% discount rate	3 658															
Internal rate of return	19%															
Assumptions and bases for calculations:																
Charges in units or no. of persons:																
Railcars	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Trailers without tractors	29 420	29 767	30 113	30 460	30 806	31 153	31 302	31 451	31 601	31 750	31 899	32 048	33 799	34 749	35 699	36 649
Trailers without tractors	20 330	21 312	22 293	23 275	24 256	25 238	26 219	27 201	28 182	29 163	30 144	31 125	32 106	33 087	34 068	35 049
Containers, intermodal unaccompanied	0	561	1 122	1 682	2 243	2 804	3 365	3 926	4 487	5 048	5 609	6 170	6 731	7 292	7 853	8 414
Containers, by rail	7 000	7 474	7 947	8 421	8 894	9 368	9 841	10 315	10 788	11 261	11 734	12 207	12 680	13 153	13 626	14 100
Containers by truck	2 443	3 791	5 140	6 488	7 837	9 185	10 533	11 881	13 229	14 577	15 925	17 273	18 621	19 969	21 317	22 665
Automobiles	2 443	3 179	3 915	4 651	5 387	6 123	6 859	7 595	8 331	9 067	9 803	10 539	11 275	12 011	12 747	13 483
Passengers	84 235	68 580	72 925	77 271	81 616	85 961	90 306	94 651	98 996	103 341	107 686	112 031	116 376	120 721	125 066	129 411
No. of vessels arriving	1 320	1 320	1 540	1 540	1 540	1 540	1 760	1 760	1 980	1 980	2 200	2 200	2 420	2 420	2 640	2 640
Handling charges:																
Railcars	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Trailers with tractors	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Trailers without tractors	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Containers, intermodal unaccompanied	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Containers, by rail	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13
Containers by truck	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Automobiles	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
Passengers	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Vessel dues per ship call:																
Vessel dues - average per vessel call	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360
Operating and cost assumptions:																
Number of port workers:																
Level 1 - Top management	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Level 2 - Middle management	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Level 3 - Foremen, equipment operators, clerical staff	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Level 4 - Labor A - specialized labor/dockers	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Level 5 - Labor B - general port workers	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Level 6 - General labor	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Total work force	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Monthly wages - all inclusive:																
Level 1 - Top management	900	1 173	1 447	1 720	1 993	2 267	2 540	2 813	3 087	3 360	3 633	3 907	4 180	4 453	4 727	5 000
Level 2 - Middle management	550	720	890	1 060	1 230	1 400	1 570	1 740	1 910	2 080	2 250	2 420	2 590	2 760	2 930	3 100
Level 3 - Foremen, equipment operators, clerical staff	450	587	723	860	997	1 133	1 270	1 407	1 543	1 680	1 817	1 953	2 090	2 227	2 363	2 500
Level 4 - Labor A - specialized labor/dockers	400	520	640	760	880	1 000	1 120	1 240	1 360	1 480	1 600	1 720	1 840	1 960	2 080	2 200
Level 5 - Labor B - general port workers	300	400	500	600	700	800	900	1 000	1 100	1 200	1 300	1 400	1 500	1 600	1 700	1 800
Level 6 - General labor, janitors etc.	200	287	373	460	547	633	720	807	893	980	1 067	1 153	1 240	1 327	1 413	1 500
Electricity consumption kwh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Avg. cost per kwh	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Total investments:																
Terminal area arrangements	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400
Marine works	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070
Ramp rehabilitation	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890
Railway works	984	984	984	984	984	984	984	984	984	984	984	984	984	984	984	984
Terminal building works	859	859	859	859	859	859	859	859	859	859	859	859	859	859	859	859
Additional activities	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020

Table B.4 Investment feasibility analysis - Turkmen Sea Administration - Ferry Terminal - Most likely scenario - Option 2 - 2000 to 2015 (all figures in USD '000).

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Contingencies	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072
Total investments	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295
Depreciation calculation:																
Terminal area arrangements - 30 years	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113
Marine works - 40 years	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227
Ramp rehabilitation - 25 years	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156
Railway works - 20 years	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Terminal building works - 30 years	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Total depreciation	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567
Tax depreciation - new projects:																
Total tax depreciation - new assets 20%	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259
Maintenance costs - new investments																
Terminal area arrangements	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Marine works	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159	159
Ramp rehabilitation	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Railway works	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Terminal building works	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Total	311	311	311	311	311	311	311	311	311	311	311	311	311	311	311	311
Investments - phase 1																
Terminal area arrangements	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400
Marine works	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070
Ramp rehabilitation	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890
Railway works	984	984	984	984	984	984	984	984	984	984	984	984	984	984	984	984
Terminal building works	859	859	859	859	859	859	859	859	859	859	859	859	859	859	859	859
Additional activities	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020
Contingencies	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072
Total	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295
Cumulative total																
Investments - phase 2																
Terminal area arrangements																
Marine works																
Ramp rehabilitation																
Railway works																
Terminal building works																
Additional activities																
Contingencies																
Total																
Cumulative total	0															
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Loan payments	21 295								0							



Assumptions and basis for calculations	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Crane in use or no. of hours:</b>																
Riggers	28 420	28 787	30 113	30 480	30 800	31 153	31 502	31 851	31 601	31 760	32 789	32 948	33 778	34 248	35 089	36 048
Tractors with tractors	20 330	21 312	22 283	23 275	24 266	25 238	26 248	28 258	29 769	31 278	32 789	35 007	37 225	39 444	41 662	43 880
Containers, intermodal unaccompanied	0	561	1 122	1 682	2 243	2 804	3 365	4 921	6 477	8 033	9 589	11 145	12 701	14 257	15 813	17 370
Containers by rail	7 000	7 424	7 847	8 271	8 694	9 118	10 010	10 851	11 743	12 635	13 527	14 419	15 311	16 203	17 095	17 987
Containers by truck	2 443	3 781	5 140	6 498	7 857	9 215	10 574	11 933	13 292	14 651	16 010	17 369	18 728	20 087	21 446	22 805
Automobiles	8 524	9 101	9 678	10 255	10 832	11 409	12 100	12 851	13 723	14 684	15 645	16 606	17 567	18 528	19 489	20 450
Personnel	64 535	68 580	72 625	77 271	81 618	85 965	91 716	97 467	103 218	108 970	114 721	120 473	126 224	131 975	137 726	143 477
No. of vessels arriving	1 320	1 320	1 540	1 540	1 540	1 540	1 760	1 760	1 980	1 980	2 200	2 200	2 420	2 420	2 640	2 640
Handling charges	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25
Tractors with tractors	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25
Tractors without tractors	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25
Containers, intermodal unaccompanied	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25
Containers by rail	2 13	2 13	2 13	2 13	2 13	2 13	2 13	2 13	2 13	2 13	2 13	2 13	2 13	2 13	2 13	2 13
Containers by truck	2 13	2 13	2 13	2 13	2 13	2 13	2 13	2 13	2 13	2 13	2 13	2 13	2 13	2 13	2 13	2 13
Automobiles	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25	4 25
Personnel	1 70	1 70	1 70	1 70	1 70	1 70	1 70	1 70	1 70	1 70	1 70	1 70	1 70	1 70	1 70	1 70
Vessel dues per ship call	0 30	0 30	0 30	0 30	0 30	0 30	0 30	0 30	0 30	0 30	0 30	0 30	0 30	0 30	0 30	0 30
Vessel dues, average per vessel call	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360
<b>Operating and fleet assumptions:</b>																
Number of port workers:																
Level 1 - Top management	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Level 2 - Middle management	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Level 3 - Foremen, equipment operators, clerical staff	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Level 4 - Labor A - specialized labor/locks	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Level 5 - Labor B - general port workers	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Level 6 - General labor	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Total work force	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Monthly wages, all inclusive	800	1 173	1 447	1 720	1 993	2 267	2 540	2 813	3 087	3 360	3 633	3 907	4 180	4 453	4 727	5 000
Level 1 - Top management	550	720	890	1 060	1 230	1 400	1 570	1 740	1 910	2 080	2 250	2 420	2 590	2 760	2 930	3 100
Level 2 - Middle management	450	567	723	880	1 037	1 193	1 350	1 507	1 663	1 820	1 977	2 133	2 290	2 447	2 603	2 760
Level 3 - Foremen, equipment operators, clerical staff	400	520	640	760	880	1 000	1 120	1 240	1 360	1 480	1 600	1 720	1 840	1 960	2 080	2 200
Level 4 - Labor A - specialized labor/locks	300	400	500	600	700	800	900	1 000	1 100	1 200	1 300	1 400	1 500	1 600	1 700	1 800
Level 5 - Labor B - general port workers	200	287	373	460	547	633	720	807	893	980	1 067	1 153	1 240	1 327	1 413	1 500
Level 6 - General labor, porters etc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Avg. cost per hwh	0 035	0 035	0 035	0 035	0 035	0 035	0 035	0 035	0 035	0 035	0 035	0 035	0 035	0 035	0 035	0 035
Total investments:	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174
Terminal area arrangements	8 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018
Ramp rehabilitation	3 880	3 880	3 880	3 880	3 880	3 880	3 880	3 880	3 880	3 880	3 880	3 880	3 880	3 880	3 880	3 880
Railway works	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Terminal building works	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639
Additional activities	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020
Contingencies	1 830	1 830	1 830	1 830	1 830	1 830	1 830	1 830	1 830	1 830	1 830	1 830	1 830	1 830	1 830	1 830
Total investments	18 733	18 733	18 733	18 733	18 733	18 733	18 733	18 733	18 733	18 733	18 733	18 733	18 733	18 733	18 733	18 733
Depreciation adjustment:																
Terminal area arrangements - 30 years	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106
Marine works - 40 years	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225
Ramp rehabilitation - 25 years	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158
Railway works - 20 years	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Terminal building works - 30 years	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
Total depreciation	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540
Less liquidation - new projects:																
Total tax depreciation - new assets 20%	3 847	3 847	3 847	3 847	3 847	3 847	3 847	3 847	3 847	3 847	3 847	3 847	3 847	3 847	3 847	3 847
Terminal area investments	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Marine works	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158
Ramp rehabilitation	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Railway works	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Terminal building works	281	281	281	281	281	281	281	281	281	281	281	281	281	281	281	281
Financing costs - Phase 1	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187	187
Front end fee - 1% of investment sum																
Commitment fee - 0.5% pt of unpaid loan																





Table B.6. Financial feasibility analysis - Turkmen Sea Administration - Ferry Terminal - Most likely scenario - Option 1 with additional final stage investments in 2008-2000 to 2015 (all figures in USD '000).																
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Revenues:</b>																
Vessel dues:																
Vessel dues, all inclusive	4,435	4,435	5,174	5,174	5,174	5,174	5,914	5,914	6,653	6,653	7,392	7,392	8,131	8,131	8,870	8,870
<b>Cargo handling charges:</b>																
Railcars	125	127	128	129	131	132	133	134	134	135	136	140	144	148	152	156
Trailers with tractors	86	91	95	99	103	107	114	120	127	133	139	149	158	168	177	186
Trailers without tractors	0	2	5	7	10	12	17	21	26	30	35	37	40	42	44	47
Containers, intermodal unaccompanied	30	32	34	36	38	40	43	45	48	51	53	57	61	64	68	71
Containers, by rail	5	8	11	14	17	20	25	31	37	42	48	53	58	63	68	73
Containers by truck	10	14	17	20	23	26	29	32	35	38	41	44	47	50	53	56
Automobiles	14	15	16	17	18	19	21	22	23	25	26	28	29	31	33	35
Passengers	19	21	22	23	24	26	28	29	31	33	35	37	39	42	44	46
<b>Total</b>	291	309	327	345	364	382	408	434	460	486	513	540	568	596	623	651
<b>Operating Costs:</b>	4,726	4,744	5,502	5,520	5,538	5,557	6,322	6,348	7,113	7,139	7,905	7,932	8,699	8,727	9,494	9,521
<b>Direct costs:</b>																
Labor:																
Direct wages	136	182	227	273	319	364	410	456	501	547	593	638	684	730	775	821
Contribution social insurance fund	54	73	91	109	128	146	164	182	201	219	237	255	274	292	310	328
Total labor	191	255	318	382	446	510	574	638	702	766	830	894	957	1,021	1,085	1,149
Maintenance and repair - new facilities/equipment	291	291	291	291	291	291	291	291	335	335	335	335	335	335	335	335
Total direct	481	545	609	673	737	801	865	928	1,037	1,101	1,165	1,229	1,293	1,356	1,420	1,484
Indirect costs:																
Depreciation - new facilities:																
Tax depreciation	3,947	3,947	3,947	3,947	3,947	0	0	0	4,265	4,265	4,265	4,265	4,265	4,265	4,265	4,265
Add'l depreciation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total depreciation - new facilities	3,947	3,947	3,947	3,947	3,947	0	0	0	4,265	4,265	4,265	4,265	4,265	4,265	4,265	4,265
Utilities, electricity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest on loans - new investments	1,381	1,381	1,381	1,381	1,304	1,221	1,133	1,038	1,049	941	825	701	562	413	254	0
Other finance costs - new investments	197	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0
Other indirect costs	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Total indirect costs	5,575	5,378	5,378	5,378	5,301	1,271	1,183	1,088	5,380	5,256	5,140	5,016	4,877	4,63	304	134
General and administrative costs:																
Management wages	17	23	28	33	39	44	49	55	60	65	71	76	81	87	92	97
Contribution social insurance fund - mgmt	7	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36
Corporate management and G & A - TSA	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Total G & A	99	106	113	121	128	135	143	150	157	164	172	179	186	194	201	208
<b>Total costs and expenses</b>	6,156	6,029	6,100	6,172	6,165	2,207	2,190	2,167	6,574	6,521	6,476	6,424	6,356	2,013	1,925	1,826
<b>Operating income (taxable)</b>	-1,430	-1,285	-599	-652	-627	3,349	4,132	4,181	539	618	1,428	1,509	2,343	6,714	7,569	7,695
<b>Taxes payable:</b>																
Profit tax	0	0	0	0	0	837	1,033	1,045	135	155	357	377	586	1,678	1,892	1,924
Total taxes	0	0	0	0	0	837	1,033	1,045	135	155	357	377	586	1,678	1,892	1,924
<b>Correction for high tax depreciation:</b>																
Add back tax depreciation	3,947	3,947	3,947	3,947	3,947	0	0	0	4,265	4,265	4,265	4,265	4,265	4,265	4,265	4,265
Deduct normal technical/commercial depreciation	540	540	540	540	540	540	540	540	571	571	571	571	571	571	571	571
<b>Net income after taxes</b>	1,976	2,121	2,808	2,755	2,779	1,972	2,559	2,596	4,099	4,158	4,766	4,826	5,452	4,464	5,106	5,201
<b>Net profit margin in % of revenues</b>	42	45	51	50	50	35	40	41	58	58	60	61	63	51	54	55
<b>Cash flow analysis:</b>																
Cash received:																
Net income after taxes	1,976	2,121	2,808	2,755	2,779	1,972	2,559	2,596	4,099	4,158	4,766	4,826	5,452	4,464	5,106	5,201
Add back depreciation	540	540	540	540	540	540	540	540	571	571	571	571	571	571	571	571

Net cash flow from operations	2 516	2 661	3 348	3 295	3 319	2 512	3 099	3 136	4 670	4 729	5 336	5 397	6 023	5 035	5 676	5 771
Loans from EBRD	19 733	0	0	0	0	0	0	0	1 594	0	0	0	0	0	0	0
Total cash received	22 249	2 661	3 348	3 295	3 319	2 512	3 099	3 136	6 264	4 729	5 336	5 397	6 023	5 035	5 676	5 771
Cash payments:																
Installments - EBRD loan	0	0	0	1 103	1 180	1 263	1 351	1 446	1 547	1 655	1 771	1 984	2 123	2 272	2 431	117
Payments for investments	19 733	0	0	0	0	0	0	0	1 594	0	0	0	0	0	0	0
Total cash payments	19 733	0	0	1 103	1 180	1 263	1 351	1 446	3 141	1 655	1 771	1 984	2 123	2 272	2 431	117
Net cash flow - year	2 516	2 661	3 348	2 192	2 139	1 249	1 747	1 690	3 122	3 074	3 565	3 412	3 899	2 763	3 245	5 655
Cumulative net cash flow	2 516	5 178	8 526	10 718	12 857	14 105	15 853	17 543	20 665	23 739	27 304	30 716	34 616	37 379	40 624	46 279
Residual value of assets 2015	12 439															12 439
Credit evaluation ratios:																
Debt service cover ratio	1.82	1.93	2.42	1.33	1.34	1.01	1.25	1.26	1.80	1.82	2.06	2.01	2.24	1.88	2.11	
Interest service cover ratio	1.82	1.93	2.42	2.39	2.55	2.06	2.73	3.02	4.48	5.03	6.47	7.70	10.72	12.19	22.34	
Assumptions and bases for calculations:																
Cargoes in units or no. of persons:																
Railcars	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Trailers with tractors	29 420	29 767	30 113	30 460	30 806	31 153	31 302	31 451	31 601	31 750	31 899	32 849	33 799	34 749	35 699	36 649
Trailers without tractors	20 330	21 312	22 293	23 275	24 256	25 238	26 248	28 258	29 769	31 279	32 789	35 007	37 225	39 444	41 662	43 880
Containers, intermodal unaccompanied	0	561	1 122	1 682	2 243	2 804	3 883	4 961	6 040	7 118	8 197	9 306	9 306	9 861	10 415	10 970
Containers, by rail	7 000	7 474	7 947	8 421	8 894	9 368	10 010	10 651	11 293	11 934	12 576	13 416	14 256	15 096	15 936	16 776
Containers by truck	2 443	3 791	5 140	6 488	7 837	9 185	11 853	14 522	17 190	19 859	22 527	24 921	27 315	29 708	32 102	34 496
Automobiles	8 524	9 101	9 678	10 254	10 831	11 408	12 180	12 951	13 723	14 494	15 266	16 239	17 331	18 364	19 396	20 429
Passengers	64 235	68 580	72 925	77 271	81 616	85 961	91 776	97 591	103 405	109 220	115 035	122 816	130 598	138 373	146 161	153 942
No. of vessels arriving	1 320	1 320	1 540	1 540	1 540	1 760	1 760	1 760	1 980	1 980	2 200	2 200	2 420	2 420	2 640	2 640
Handling charges:																
Railcars	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Trailers with tractors	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Trailers without tractors	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Containers, intermodal unaccompanied	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Containers, by rail	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Containers by truck	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Automobiles	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Passengers	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
Vessel dues - average per vessel call	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Vessel dues - per ship call:																
Operating and cost assumptions:																
Number of port workers:	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360
Level 1 - Top management	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Level 2 - Middle management	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Level 3 - Foremen, equipment operators, clerical staff	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Level 4 - Labor A - specialized labor/dockers	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Level 5 - Labor B - general port workers	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Level 6 - General labor	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Total work force	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Monthly wages - all inclusive:																
Level 1 - Top management	900	1 173	1 447	1 720	1 993	2 267	2 540	2 813	3 087	3 360	3 633	3 907	4 180	4 453	4 727	5 000
Level 2 - Middle management	550	720	890	1 060	1 230	1 400	1 570	1 740	1 910	2 080	2 250	2 420	2 590	2 760	2 930	3 100
Level 3 - Foremen, equipment operators, clerical staff	450	587	723	860	997	1 133	1 270	1 407	1 543	1 680	1 817	1 953	2 090	2 227	2 363	2 500
Level 4 - Labor A - specialized labor/dockers	400	520	640	760	880	1 000	1 120	1 240	1 360	1 480	1 600	1 720	1 840	1 960	2 080	2 200
Level 5 - Labor B - general port workers	300	400	500	600	700	800	900	1 000	1 100	1 200	1 300	1 400	1 500	1 600	1 700	1 800
Level 6 - General labor, janitors etc.	200	287	373	460	547	633	720	807	893	980	1 067	1 153	1 240	1 327	1 413	1 500
Electricity consumption kwh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Avg. cost per kwh	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035



Total	1 594	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Cumulative total	1 594																
Year	2000																
Loan payments	19 733																
No. of vessels operated to serve the cargo volumes																	
Vessel carrying capacity:																	
Railcars																	
Trailers, incl. tractor	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Trailers, excl. tractors	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Containers	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41
Avg. max. utilization of vessel	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Max. number of voyages per vessel per year (max. 330 day	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Min. number of vessels operated	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220
Number of vessels operated	5.51	5.84	6.16	6.48	6.80	7.12	7.58	8.04	8.50	8.96	9.41	9.89	10.37	10.84	11.32	11.80	12.20
Min. no. of voyages per year	6	6	7	7	7	7	8	8	9	9	10	10	10	11	11	12	12
No. of voyages per year	1213.09	1283.90	1354.72	1425.54	1496.36	1567.18	1667.92	1768.67	1869.41	1970.16	2070.90	2175.76	2280.61	2385.47	2490.32	2595.18	2640
	1320	1320	1540	1540	1540	1540	1760	1760	1980	1980	2200	2200	2200	2420	2420	2640	2640
Depreciation calculation																	
Cumulative tax depreciation	3 947	7 893	11 840	15 786	19 733	23 680	27 626	31 573	319	638	956	1 275	1 594	1 913	2 232	2 550	2 550
Residual value, tax	19 733	15 786	11 840	7 893	3 947	0	-3 947	-7 893	-1 594	1 275	956	638	319	0	-319	-638	-638

Table B.7 Financial feasibility analysis - Turkmen Sea Administration - Ferry Terminal - Pessimistic scenario - Option 1 - 2000 to 2015 (all figures in USD '000).																
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Revenues:</b>																
Vessel dues, all inclusive	2 957	2 957	2 957	2 957	3 696	3 696	3 696	3 696	3 696	3 696	3 696	3 696	3 696	4 435	4 435	4 435
Cargo handling charges:																
Railcars	85	85	85	85	85	84	83	83	83	82	81	82	83	84	85	86
Trailers with tractors	63	64	65	66	67	70	71	73	75	77	79	80	82	84	86	88
Trailers without tractors	0	1	3	4	6	7	10	12	14	16	19	20	20	21	21	21
Containers, intermodal unaccompanied	30	32	34	36	38	40	43	45	48	51	53	57	61	64	68	71
Containers, by rail	1	2	3	4	5	6	7	9	10	12	13	13	13	13	13	13
Containers by truck	1	3	4	5	6	8	8	9	10	11	11	10	9	8	7	6
Automobiles	12	13	13	14	14	15	15	15	15	15	16	16	17	17	17	18
Passengers	16	17	17	18	18	18	19	19	20	21	21	22	22	23	24	24
Total	208	216	223	230	237	244	253	262	271	280	289	296	303	310	316	323
Total revenues	3 165	3 172	3 180	3 187	3 933	3 940	3 949	3 958	3 967	3 976	3 985	3 992	3 999	4 745	4 752	4 758
<b>Operating Costs:</b>																
Direct costs:																
Labor:																
Direct wages	136	182	227	273	319	364	410	456	501	547	593	638	684	730	775	821
Contribution social insurance fund	54	73	91	109	128	146	164	182	201	219	237	255	274	292	310	328
Total labor	191	255	318	382	446	510	574	638	702	766	830	894	957	1 021	1 085	1 149
Maintenance and repair - new facilities/equip	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291
Total direct	481	545	609	673	737	801	865	928	992	1 056	1 120	1 184	1 248	1 312	1 376	1 440
Indirect costs:																
Depreciation - new facilities:																
Tax depreciation	3 947	3 947	3 947	3 947	3 947	0	0	0	0	0	0	0	0	0	0	0
Add'l depreciation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total depreciation - new facilities	3 947	3 947	3 947	3 947	3 947	0	0	0	0	0	0	0	0	0	0	0
Utilities, electricity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest on loans - new investments	1 381	1 381	1 381	1 304	1 221	1 133	1 038	937	829	713	589	456	314	163	0	0
Other finance costs - new investments	197	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other indirect costs	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Total indirect costs	5 575	5 378	5 378	5 301	5 301	1 271	1 183	1 088	987	879	763	639	506	364	213	50
General and administrative costs:																
Management wages	17	23	28	33	39	44	49	55	60	65	71	76	81	87	92	97
Contribution social insurance fund - mgmt	7	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36
Corporate management and G & A - TSA	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Total G & A	99	106	113	121	128	136	143	150	157	164	172	179	186	194	201	208
Total costs and expenses	6 196	6 029	6 100	6 172	6 165	2 207	2 190	2 187	2 137	2 100	2 055	2 002	1 941	1 870	1 789	1 698
Operating income (taxable)	-2 991	-2 857	-2 921	-2 985	-2 232	1 733	1 759	1 791	1 830	1 876	1 930	1 990	2 058	2 875	2 962	3 061
<b>Taxes payable:</b>																
Profit tax	0	0	0	0	0	433	440	448	458	469	483	497	515	519	741	765
Total taxes	0	0	0	0	0	433	440	448	458	469	483	497	515	519	741	765
Correction for high tax depreciation:																
Add back tax depreciation	3 947	3 947	3 947	3 947	3 947	0	0	0	0	0	0	0	0	0	0	0
Deduct normal technical/commercial depreciat	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540
Net income after taxes	416	550	486	422	1 174	759	779	803	833	867	907	952	1 003	1 616	1 682	1 755
Net profit margin in % of revenues	13	17	15	13	30	19	20	21	22	23	24	25	26	34	35	37
<b>Cash flow analysis:</b>																
Cash received:																
Net income after taxes	416	550	486	422	1 174	759	779	803	833	867	907	952	1 003	1 616	1 682	1 755
Add back depreciation	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540
Net cash flow from operations	956	1 090	1 026	962	1 714	1 300	1 319	1 343	1 373	1 407	1 448	1 492	1 544	2 156	2 222	2 295
Loans from EBRO	19 733	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total cash received	20 689	1 090	1 026	962	1 714	1 300	1 319	1 343	1 373	1 407	1 448	1 492	1 544	2 156	2 222	2 295
Cash payments:																
Installments - EBRO loan	19 733	0	0	0	1 103	1 180	1 263	1 351	1 446	1 547	1 655	1 771	1 895	2 028	2 170	2 322
Payments for investments	19 733	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total cash payments	19 733	0	0	0	1 103	1 180	1 263	1 351	1 446	1 547	1 655	1 771	1 895	2 028	2 170	2 322

Net cash flow - year	956	1 090	1 026	-141	534	37	-32	-102	-174	-248	-324	-403	-485	-14	-100	2 295	1 1091.4
Cumulative net cash flow	956	2 046	3 072	2 930	3 464	3 501	3 468	3 366	3 192	2 943	2 619	2 216	1 732	1 718	1 618	3 913	
Residual value of assets 2015	11 091															11 091	
Credit evaluation ratios:																	
Debt service cover ratio	0.69	0.79	0.74	0.39	0.69	0.52	0.53	0.54	0.55	0.57	0.58	0.60	0.62	0.87	0.89		
Interest service cover ratio	0.69	0.79	0.74	0.70	1.31	1.06	1.16	1.29	1.46	1.70	2.03	2.53	3.38	6.86	13.67		
Assumptions and bases for calculations:																	
Cargoes in units or no. of persons:	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Railcars	20 085	20 060	20 034	20 009	19 983	19 958	19 932	19 906	19 880	19 854	19 828	19 802	19 776	19 750	19 724	19 698	
Trailers with tractors	14 776	14 957	15 138	15 320	15 501	15 682	16 030	16 430	16 830	17 177	17 551	18 012	18 473	18 935	19 396	19 857	
Trailers without tractors	0	348	697	1 045	1 394	1 742	2 071	2 800	3 330	3 859	4 388	4 503	4 618	4 734	4 849	4 964	
Containers, intermodal unaccompanied	7 000	7 474	7 947	8 421	8 894	9 368	10 010	10 651	11 293	11 934	12 576	13 416	14 256	15 096	15 936	16 776	
Containers, by rail	315	783	1 251	1 720	2 188	2 656	3 367	4 078	4 788	5 499	6 210	6 166	6 123	6 079	6 036	5 992	
Containers by truck	7 207	7 396	7 586	7 775	7 965	8 154	8 368	8 583	8 797	9 012	9 226	9 440	9 654	9 868	10 082	10 296	
Automobiles	54 308	55 735	57 162	58 590	60 017	61 444	63 059	64 674	66 288	67 903	69 518	71 133	72 748	74 363	75 978	77 593	
Passengers	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	
No. of vessels arriving																	
Handling charges:	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	
Railcars	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	
Trailers with tractors	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	
Trailers without tractors	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	
Containers, intermodal unaccompanied	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	
Containers, by rail	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	
Containers by truck	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	
Automobiles	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	
Passengers	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	
Vessel dues per ship call:	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	
Vessel dues - average per vessel call																	
Operating and cost assumptions:																	
Number of port workers:																	
Level 1 - Top management	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Level 2 - Middle management	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Level 3 - Foremen, equipment operators, clerks	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
Level 4 - Labor A - specialized labor/dockers	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	
Level 5 - Labor B - general port workers	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
Level 6 - General labor	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	
Total work force	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	
Monthly wages - all inclusive:																	
Level 1 - Top management	900	1 173	1 447	1 720	1 993	2 267	2 540	2 813	3 087	3 360	3 633	3 907	4 180	4 453	4 727	5 000	
Level 2 - Middle management	550	720	890	1 060	1 230	1 400	1 570	1 740	1 910	2 080	2 250	2 420	2 590	2 760	2 930	3 100	
Level 3 - Foremen, equipment operators, clerks	450	587	723	860	997	1 133	1 270	1 407	1 543	1 680	1 817	1 953	2 090	2 227	2 363	2 500	
Level 4 - Labor A - specialized labor/dockers	400	520	640	760	880	1 000	1 120	1 240	1 360	1 480	1 600	1 720	1 840	1 960	2 080	2 200	
Level 5 - Labor B - general port workers	300	400	500	600	700	800	900	1 000	1 100	1 200	1 300	1 400	1 500	1 600	1 700	1 800	
Level 6 - General labor, janitors etc.	200	287	373	460	547	633	720	807	893	980	1 067	1 153	1 240	1 327	1 413	1 500	
Electricity consumption kwh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Avg. cost per kwh	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	
Total investments:																	
Terminal area arrangements	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	
Marine works	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	
Ramp rehabilitation	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	
Railway works	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	
Terminal building works	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639	
Additional activities	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	
Contingencies	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	
Total investments	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	
Depreciation calculation:																	
Terminal area arrangements - 30 years	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	
Marine works - 40 years	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225	
Ramp rehabilitation - 25 years	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156	
Railway works - 20 years	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	

	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
Terminal building works - 30 years	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540
Total depreciation	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947	3 947
Tax depreciation - new projects:																					
Total tax depreciation - new assets 20%	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Maintenance costs - new investments	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158
Terminal area arrangements	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Marine works	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Ramp rehabilitation	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Railway works	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291
Terminal building works	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291
Financing costs - Phase 1																					
Front end fee - 1% of investment sum																					
Commitment fee - 0.5% pa of unused loan																					
Interest - LIBOR + 1% (LIBOR = 6%)	1 381	1 381	1 304	1 221	1 133	1 038	937	829	713	589	456	314	163								
Installments: 3 year grace period - 12 years payback	1 103	1 103	1 180	1 263	1 351	1 446	1 547	1 655	1 771	1 895	2 028	2 170	2 322								
Loan amount																					
Financing costs - Phase 2																					
Front end fee - 1% of investment sum																					
Commitment fee - 0.5% pa of unused loan																					
Interest - LIBOR + 1% (LIBOR = 6%)																					
Installments: 3 year grace period - 12 years payback																					
Loan amount																					
Investments - Phase 1																					
Terminal area arrangements	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174	3 174
Marine works	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018	9 018
Ramp rehabilitation	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890
Railway works	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
Terminal building works	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639	639
Additional activities	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020
Contingencies	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930	1 930
Total	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733
Cumulative total																					
Investments - Phase 2																					
Terminal area arrangements																					
Marine works																					
Ramp rehabilitation																					
Railway works																					
Terminal building works																					
Additional activities																					
Contingencies																					
Total																					
Cumulative total																					
Loan payments	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015					
Year	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733	19 733					
No. of vessels operated to serve the cargo volumes																					
Vessel carrying capacity:																					
Railcars	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Trailers, incl. tractor	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Trailers, excl. tractor	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41
Containers	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Avg. max. utilization of vessel	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Max. number of voyages per vessel per year	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220
Min. number of vessels operated	3.73	3.84	3.95	4.05	4.16	4.27	4.40	4.53	4.66	4.79	4.92	5.00	5.08	5.16	5.24	5.32					
Number of vessels operated	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4					
Min. no. of voyages per year	820.92	844.43	867.94	891.45	914.95	938.46	967.26	996.07	1024.88	1053.69	1082.50	1111.31	1140.12	1168.93	1197.74	1226.55					
No. of voyages per year	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880	880					
Depreciation calculation																					
Cumulative tax depreciation	3 947	7 893	11 840	15 786	19 733	23 680	27 626	31 573	35 519	39 466	43 412	47 359	51 305	55 252	59 198	63 145					
Residual value, tax	19 733	15 786	11 840	7 893	3 947	0	-3 947	-7 893	-11 840	-15 786	-19 733	-23 680	-27 626	-31 573	-35 519	-39 466					

Table B.B Financial feasibility analysis - Turkmen Sea Administration - Ferry Terminal - Most likely scenario - Option 2 - 2000 to 2015 (all figures in USD '000).

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Revenues:</b>																
Vessel dues:																
Vessel dues, all inclusive	4 435	4 435	5 174	5 174	5 174	5 174	5 914	5 914	6 653	6 653	7 392	7 392	8 131	8 131	8 870	8 870
<b>Charge handling charges:</b>																
Railcars	125	127	128	129	131	132	133	134	134	135	136	140	144	148	152	156
Trailers with tractors	86	91	95	99	103	107	112	117	127	133	139	149	158	168	177	186
Trailers without tractors	0	2	5	7	10	12	17	21	26	30	35	37	40	42	44	47
Containers, intermodal unaccompanied	30	32	34	36	38	40	43	45	48	51	53	57	61	64	68	71
Containers, by rail	5	8	11	14	17	20	25	31	37	42	48	53	58	63	68	73
Containers by truck	10	14	17	20	23	26	29	32	35	38	41	40	39	38	38	37
Automobiles	14	15	16	17	18	19	21	22	23	25	26	28	29	31	33	35
Passengers	19	21	22	23	24	26	28	29	31	33	35	37	39	42	44	46
Total	291	309	327	345	364	382	408	434	460	486	513	540	568	596	623	651
<b>Total revenues</b>	<b>4 726</b>	<b>4 744</b>	<b>5 502</b>	<b>5 520</b>	<b>5 538</b>	<b>5 557</b>	<b>6 322</b>	<b>6 348</b>	<b>7 113</b>	<b>7 139</b>	<b>7 905</b>	<b>7 932</b>	<b>8 699</b>	<b>8 727</b>	<b>9 494</b>	<b>9 521</b>
<b>Operating Costs:</b>																
Direct costs:																
Labor:																
Direct wages	136	182	227	273	319	364	410	456	501	547	593	638	684	730	775	821
Contribution social insurance fund	54	73	91	109	128	148	164	182	201	219	237	255	274	292	310	328
Total labor	191	255	318	382	446	510	574	638	702	766	830	894	957	1 021	1 085	1 149
Maintenance and repair - new facilities/equipment	311	311	311	311	311	311	311	311	311	311	311	311	311	311	311	311
Total direct	502	565	629	693	757	821	885	949	1 013	1 077	1 141	1 204	1 268	1 332	1 396	1 460
Indirect costs:																
Depreciation - new facilities:																
Tax depreciation	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259
Add 1. depreciation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total depreciation - new facilities	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259
Utilities, electricity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest on loans - new investments	1 491	1 491	1 491	1 491	1 491	1 491	1 491	1 491	1 491	1 491	1 491	1 491	1 491	1 491	1 491	1 491
Other finance costs - new investments	213	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other indirect costs	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Total indirect costs	6 013	5 800	5 800	5 800	5 716	5 688	5 688	5 688	5 688	5 688	5 688	5 688	5 688	5 688	5 688	5 688
<b>General and administrative costs:</b>																
Management wages	17	23	28	33	39	44	49	55	60	65	71	76	81	87	92	97
Contribution social insurance fund - mgmt	7	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36
Corporate management and G & A - TSA	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Total G & A	99	106	113	121	128	135	143	150	157	164	172	179	186	194	201	208
Total costs and expenses	6 614	6 471	6 542	6 614	6 601	6 601	6 601	6 601	6 601	6 601	6 601	6 601	6 601	6 601	6 601	6 601
Operating income (taxable)	-1 888	-1 727	-1 041	-1 094	-1 063	-1 063	-1 063	-1 063	-1 063	-1 063	-1 063	-1 063	-1 063	-1 063	-1 063	-1 063
<b>Taxes payable:</b>																
Profit tax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total taxes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Correction for high tax depreciation:</b>																
Add back tax depreciation	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259	4 259
Deduct normal technical/commercial depreciation	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567
<b>Net income after taxes</b>	<b>1 804</b>	<b>1 964</b>	<b>2 651</b>	<b>2 588</b>	<b>2 628</b>	<b>2 628</b>	<b>2 628</b>	<b>2 628</b>	<b>2 628</b>	<b>2 628</b>	<b>2 628</b>	<b>2 628</b>	<b>2 628</b>	<b>2 628</b>	<b>2 628</b>	<b>2 628</b>
Net profit margin in % of revenues	38	41	48	47	47	47	41	41	41	41	41	41	41	41	41	41
<b>Cash flow analysis:</b>																
Cash received:																
Net income after taxes	1 804	1 964	2 651	2 588	2 628	2 628	2 628	2 628	2 628	2 628	2 628	2 628	2 628	2 628	2 628	2 628
Add back depreciation	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567
Net cash flow from operations	2 371	2 532	3 218	3 165	3 196	3 196	3 196	3 196	3 196	3 196	3 196	3 196	3 196	3 196	3 196	3 196
Loans from EBRD	21 295	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total cash received	23 666	2 532	3 218	3 165	3 196	3 196	3 196	3 196	3 196	3 196	3 196	3 196	3 196	3 196	3 196	3 196
Cash payments:																
Installments - EBRD loan	0	0	0	1 190	1 274	1 363	1 458	1 560	1 670	1 787	1 912	2 045	2 189	2 342	2 506	2 672
Payments for investments	21 295	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total cash payments	21 295	0	0	1 190	1 274	1 363	1 458	1 560	1 670	1 787	1 912	2 045	2 189	2 342	2 506	2 672



Net cash flow - year	2 371	2 532	3 218	1 975	1 922	1 061	1 558	1 498	1 992	1 929	2 418	2 352	2 838	2 767	3 248	5 852	12218.73333
Cumulative net cash flow	2 371	4 903	8 121	10 096	12 018	13 079	14 637	16 135	18 127	20 056	22 474	24 825	27 663	30 430	33 678	39 531	
Residual value of assets 2015	12 219															12 219	
<b>Credit evaluation ratios:</b>																	
Debt service cover ratio	1.59	1.70	2.16	1.18	1.19	0.90	1.12	1.14	1.37	1.39	1.61	1.64	1.87	1.91	2.15		
Interest service cover ratio	1.59	1.70	2.16	2.12	2.27	1.84	2.47	2.73	3.62	4.15	5.63	6.92	10.21	15.06	32.80		
<b>Assumptions and bases for calculations:</b>																	
Cargoes in units or no. of persons:	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Railcars	29 420	29 767	30 113	30 460	30 806	31 153	31 500	31 847	32 194	32 541	32 888	33 235	33 582	33 929	34 276	34 623	35 649
Trailers with tractors	20 330	21 312	22 295	23 278	24 261	25 244	26 227	27 210	28 193	29 176	30 159	31 142	32 125	33 108	34 091	35 074	36 480
Trailers without tractors	0	561	1 122	1 682	2 243	2 804	3 365	3 926	4 487	5 048	5 609	6 170	6 731	7 292	7 853	8 414	9 070
Containers, intermodal unaccompanied	7 000	7 474	7 947	8 421	8 894	9 368	9 842	10 315	10 789	11 262	11 736	12 209	12 683	13 156	13 630	14 103	14 776
Containers, by rail	2 443	3 791	5 140	6 488	7 837	9 185	10 533	11 881	13 229	14 577	15 925	17 273	18 621	19 969	21 317	22 665	23 960
Containers by truck	4 557	3 683	2 807	2 943	3 057	3 157	3 253	3 345	3 433	3 518	3 600	3 679	3 756	3 831	3 904	3 975	4 044
Automobiles	8 524	9 101	9 678	10 254	10 831	11 408	11 985	12 562	13 139	13 716	14 293	14 870	15 447	16 024	16 601	17 178	17 735
Passengers	64 236	68 580	72 925	77 271	81 616	85 961	90 306	94 651	98 996	103 341	107 686	112 031	116 376	120 721	125 066	129 411	133 756
No. of vessels arriving	1 320	1 320	1 540	1 540	1 540	1 540	1 760	1 760	1 980	1 980	2 200	2 200	2 420	2 420	2 640	2 640	
<b>Handling charges:</b>																	
Railcars	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Trailers with tractors	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Trailers without tractors	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Containers, intermodal unaccompanied	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Containers, by rail	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13
Containers by truck	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Automobiles	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70
Passengers	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
<b>Vessel dues per ship call:</b>																	
Vessel dues - average per vessel call	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360	3 360
<b>Operating and cost assumptions:</b>																	
<b>Number of port workers:</b>																	
Level 1 - Top management	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Level 2 - Middle management	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Level 3 - Foremen, equipment operators, clerical staff	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Level 4 - Labor A - specialized labor/dockers	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Level 5 - Labor B - general port workers	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Level 6 - General labor	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Total work force	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
<b>Monthly wages - all inclusive:</b>																	
Level 1 - Top management	900	1 173	1 447	1 720	1 993	2 267	2 540	2 813	3 087	3 360	3 633	3 907	4 180	4 453	4 727	5 000	5 000
Level 2 - Middle management	550	720	890	1 060	1 230	1 400	1 570	1 740	1 910	2 080	2 250	2 420	2 590	2 760	2 930	3 100	3 100
Level 3 - Foremen, equipment operators, clerical staff	450	587	723	860	997	1 133	1 270	1 407	1 543	1 680	1 817	1 953	2 090	2 227	2 363	2 500	2 500
Level 4 - Labor A - specialized labor/dockers	400	520	640	760	880	1 000	1 120	1 240	1 360	1 480	1 600	1 720	1 840	1 960	2 080	2 200	2 200
Level 5 - Labor B - general port workers	300	400	500	600	700	800	900	1 000	1 100	1 200	1 300	1 400	1 500	1 600	1 700	1 800	1 800
Level 6 - General labor, janitors etc.	200	287	373	460	547	633	720	807	893	980	1 067	1 153	1 240	1 327	1 413	1 500	1 500
Electricity consumption kwh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Avg. cost per kwh	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
<b>Total investments:</b>																	
Terminal area arrangements	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400	3 400
Marine works	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070	9 070
Ramp rehabilitation	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890	3 890
Railway works	984	984	984	984	984	984	984	984	984	984	984	984	984	984	984	984	984
Terminal building works	859	859	859	859	859	859	859	859	859	859	859	859	859	859	859	859	859
Additional activities	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020	1 020
Contingencies	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072	2 072
Total investments	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295	21 295
<b>Depreciation calculation:</b>																	
Terminal area arrangements - 30 years	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113
Marine works - 40 years	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227
Ramp rehabilitation - 25 years	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156	156
Railway works - 20 years	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43



Table B.9 Port related economic impact from the ferry terminal in Turkmenbashi (all figures in mill. USD)																	
Cargo	Most likely scenario																
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Bulk/neobulk cargoes	107	109	110	111	112	114	114	115	115	116	116	120	123	127	130	134	
Trailers and trucks	80	86	92	98	105	111	121	131	141	152	162	173	184	194	205	216	
Containers	28	34	40	46	52	58	68	77	87	96	106	113	120	127	135	142	
Automobiles	3	3	3	3	3	3	4	4	4	4	5	5	5	6	6	6	
<b>Total</b>	218	232	245	259	272	286	306	327	347	368	388	410	432	454	476	498	
Avg. per ton	99	101	104	106	108	109	113	115	118	121	123	124	125	126	127	128	
NPV 10%	2415																
NPV 15%	1752																
<b>Tonnage</b>																	
Bulk/neobulk cargoes	1648	1667	1687	1706	1726	1745	1753	1761	1770	1778	1786	1839	1892	1946	1999	2052	
Trailers and trucks	407	438	469	499	530	561	613	665	716	768	820	875	931	986	1042	1097	
Containers	143	174	204	235	265	296	344	392	441	489	537	573	610	646	683	719	
Automobiles	9	9	10	10	11	11	12	13	13	14	15	16	17	18	19	20	
<b>Grand total</b>	2207	2288	2369	2451	2532	2613	2722	2831	2940	3049	3158	3304	3450	3596	3742	3888	
<b>Factors - impact per ton</b>																	
Bulk in rail	65.075																
Trailers and trucks	197.220																
Containers	197.220																
Autos	308.950																

Table B.10 Port related employment impact from the ferry terminal in Turkmenbashi (all figures in mill. USD)																	
Most likely scenario																	
Cargo	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Bulk/neobulk cargoes	927	938	949	960	971	982	986	991	995	1000	1005	1035	1064	1094	1124	1154	
Trailers and trucks	1007	1084	1160	1236	1312	1388	1517	1645	1773	1901	2030	2167	2304	2441	2578	2715	
Containers	354	430	505	581	657	733	852	971	1090	1210	1329	1419	1509	1599	1689	1780	
Automobiles	29	30	31	33	34	35	38	40	43	45	48	51	54	57	61	64	
Total	2317	2481	2645	2809	2974	3138	3392	3647	3902	4156	4411	4671	4932	5192	5452	5713	
Tonnage	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Bulk/neobulk cargoes	1648	1667	1687	1706	1726	1745	1753	1761	1770	1778	1786	1839	1892	1946	1999	2052	
Trailers and trucks	407	438	469	499	530	561	613	665	716	768	820	875	931	986	1042	1097	
Containers	143	174	204	235	265	296	344	392	441	489	537	573	610	646	683	719	
Automobiles	9	9	10	10	11	11	12	13	13	14	15	16	17	18	19	20	
Grand total	2207	2288	2369	2451	2532	2613	2722	2831	2940	3049	3158	3304	3450	3596	3742	3888	
Factors - impact per '000 tons																	
Bulk in rail	0.5625																
Trailers and trucks	2.4750																
Containers	2.4750																
Autos	3.1900																

Table B.11 Port related economic impact from the ferry terminal in Turkmenbashi (all figures in mill. USD)

Cargo	Pessimistic scenario														2015	Total
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
Bulk/neobulk cargoes	73	73	73	73	73	72	72	71	71	70	70	71	71	72	73	74
Trailers and trucks	58	60	62	65	67	72	76	79	83	87	87	89	91	93	96	98
Containers	18	21	24	27	30	36	40	44	47	51	51	52	53	55	56	57
Automobiles	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3
<b>Total</b>	152	157	162	167	172	183	190	196	203	210	210	214	219	223	228	232
Avg. per ton	100	102	103	105	106	110	112	114	116	118	118	119	119	119	120	120
NPV 10%	1422															
NPV 15%	1056															
<b>Tonnage</b>																
Bulk/neobulk cargoes	1125	1124	1122	1121	1119	1109	1099	1090	1080	1071	1071	1083	1096	1108	1121	1133
Trailers and trucks	296	306	317	327	338	366	384	403	421	439	439	450	462	473	485	496
Containers	92	107	122	136	151	184	202	221	239	257	257	264	271	277	284	291
Automobiles	7	7	7	8	8	8	8	9	9	9	9	9	9	10	10	10
<b>Grand total</b>	1520	1544	1568	1592	1616	1667	1694	1722	1749	1776	1776	1807	1838	1868	1899	1930
<b>Factors - impact per ton</b>																
Bulk in rail	65.075															
Trailers and trucks	197.220															
Containers	197.220															
Autos	308.950															

Table B.12 Port related employment impact from the ferry terminal in Turkmenbashi (all figures in mill. USD)																	
Pessimistic scenario																	
Cargo	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Bulk/neobulk cargoes	633	632	631	630	630	629	624	618	613	608	602	609	616	623	630	637	
Trailers and trucks	733	758	784	810	836	861	906	951	996	1041	1087	1115	1143	1171	1199	1228	
Containers	228	264	301	338	374	411	456	501	546	591	636	653	670	687	703	720	
Automobiles	22	23	24	24	25	26	26	27	27	28	29	29	30	31	31	32	
<b>Total</b>	1615	1678	1740	1802	1864	1927	2012	2097	2183	2268	2354	2406	2459	2512	2564	2617	
<b>Tonnage</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	
Bulk/neobulk cargoes	1125	1124	1122	1121	1119	1118	1109	1099	1090	1080	1071	1083	1096	1108	1121	1133	
Trailers and trucks	296	306	317	327	338	348	366	384	403	421	439	450	462	473	485	496	
Containers	92	107	122	136	151	166	184	202	221	239	257	264	271	277	284	291	
Automobiles	7	7	7	8	8	8	8	8	9	9	9	9	9	10	10	10	
<b>Grand total</b>	1520	1544	1568	1592	1616	1640	1667	1694	1722	1749	1776	1807	1838	1868	1899	1930	
<b>Factors - impact per '000 tons</b>																	
Bulk in rail	0.5625																
Trailers and trucks	2.4750																
Containers	2.4750																
Autos	3.1900																