

Feasibility Study of New Terminal  
Facilities in the Georgian Ports  
**Phase 3 Report**  
Vol. VI - Financial and  
Economic Impact Analysis  
May 1998

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## Volume 6

# Financial and Economic Analysis

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# 1. Introduction

During the Workshop in Kobuleti, held on March 18<sup>th</sup> and 19<sup>th</sup>, 1998 the Port Master Plans for the two Ports and the Phase Development Plans were presented and discussed.

The outcome of this workshop was, that the Ports should be developed in the following way:

Batumi	The Multi Purpose Terminal
Poti	The Container Terminal Rehabilitation and Extension.

Changes concerning Batumi, which were mentioned during the workshop, are not quantified in detail (additional space for the Multi Purpose Terminal and a Rail Ferry Ramp) and therefore no additional calculation could be made.

For Poti no changes concerning the planned port development were made, but in accordance to the Phased Development Plan, the first step of the restructuring and privatisation should correspond to the first development phase. Therefore, a profit and loss calculation as well as a cash flow analyses has been made, showing the results without the additional investment for the new container terminal in the extension area of the port. These results are presented in Section 1 of this volume.

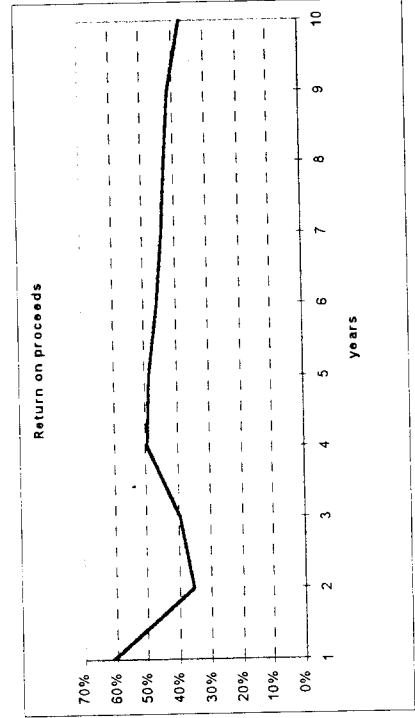
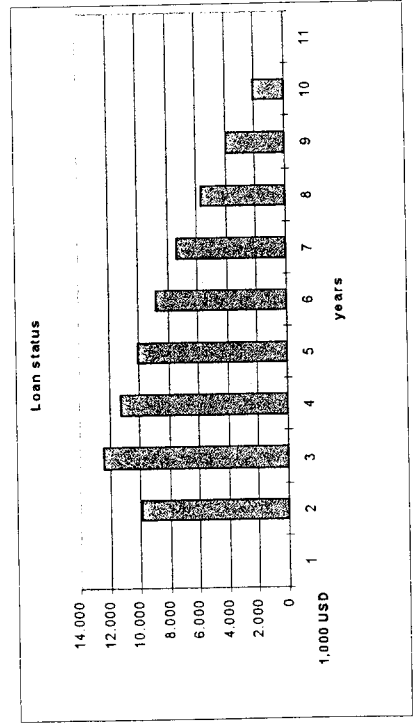
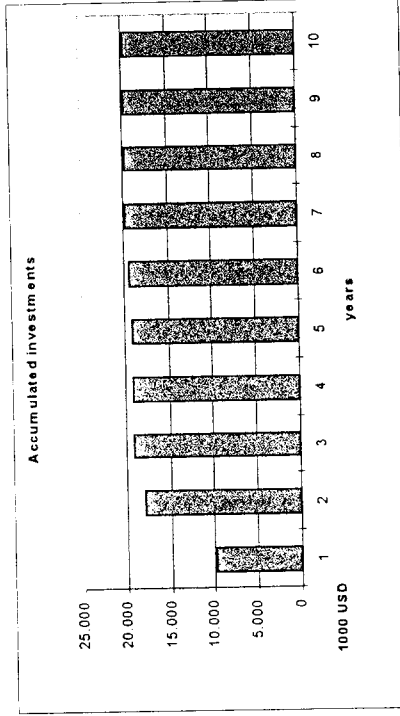
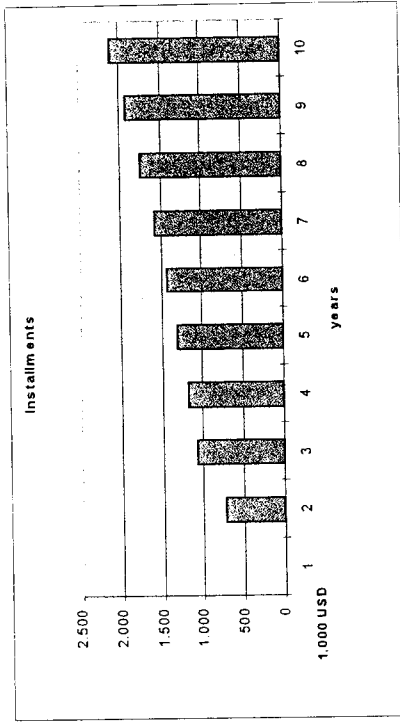
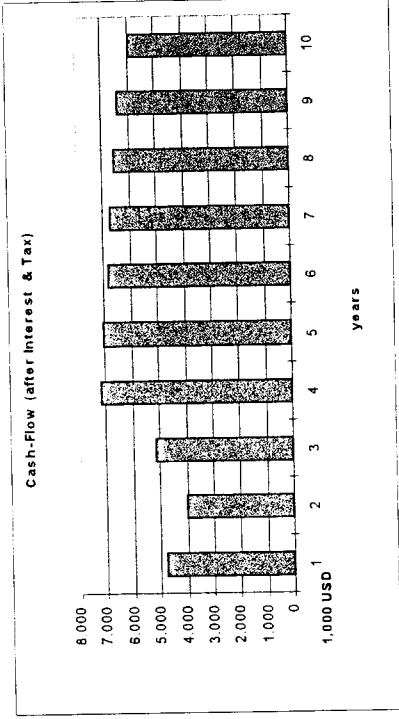
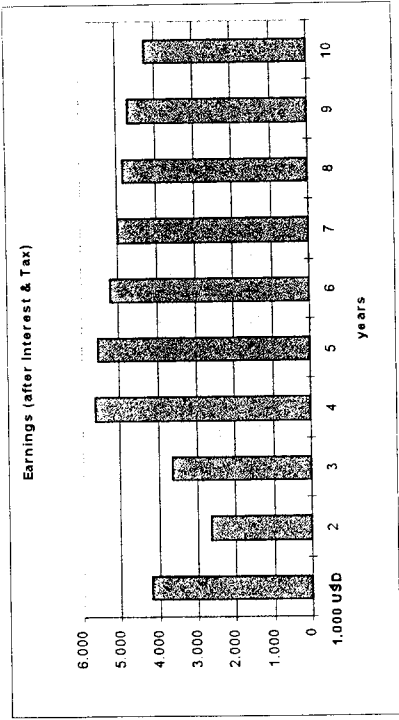
Based on the privatisation concept, the first parts to be privatised are the container and the Rail and Truck/trailer RoRo activities in the port of Poti. The privatisation concept is based on financing with own capital out of the share capital generated from private Georgian and Foreign shareholders.

An interest rate is because of this reason not included.



**Poti Container Terminal Extension: Cash flow analysis, real case, interest 10%**

Year	1	2	3	4	5	6	7	8	9	10
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Investment										
in 1,000 US\$	9,962	7,935	1,258	0	0	285	400	0	0	0
Investment berth 6+7										
in 1,000 US\$										
Investment berth 12-14										
in 1,000 US\$										
Incidental expenses										
in 1,000 US\$										
Investments total (per year)	9,962	7,935	1,258	0	0	285	400	0	0	0
in 1,000 US\$										
present value of investment	9,962	7,409	1,097	0	0	202	265	0	0	0
in 1,000 US\$										
net total accumulated	9,962	17,897	14,391	10,377	5,193	-1,723	-8,423	-15,305	-22,045	-28,644
in 1,000 US\$										
financed per Earnings incl. Deprec.	0	-4,764	-4,014	-5,184	-7,201	-7,099	-6,882	-6,740	-6,598	-6,437
in 1,000 US\$										
present value of cash flow	0	-4,448	-3,499	-4,220	-5,473	-5,038	-4,560	-4,170	-3,812	-3,242
in 1,000 US\$										
total accumulated	9,962	13,133	10,377	5,193	-2,008	-8,823	-15,305	-22,045	-28,644	-35,081
in 1,000 US\$										
Proceeds	8,559	9,430	11,572	14,203	14,203	14,203	14,203	14,203	14,203	14,203
in 1,000 US\$										
Handling										
in 1,000 US\$										
Storage										
in 1,000 US\$										
Other										
in 1,000 US\$										
Proceeds total	8,559	9,430	11,572	14,203	14,203	14,203	14,203	14,203	14,203	14,203
in 1,000 US\$										
Total costs (with depreciation)	2,812	4,196	4,686	4,796	4,924	5,333	5,615	5,792	5,993	6,572
in 1,000 US\$										
Costs (with depreciation)	7,427	7,757	9,249	9,403	13,749	14,076	14,236	14,416	15,771	17,117
in 1,000 US\$										
Costs (without depreciation)	2,247	2,859	3,151	3,261	3,389	3,687	3,686	4,063	4,264	4,843
in 1,000 US\$										
EBITDA (Cash Flow)	6,312	6,571	8,421	10,942	10,814	10,516	10,317	10,140	9,939	9,360
in 1,000 US\$										
Depreciation	564	1,337	1,535	1,535	1,535	1,646	1,729	1,729	1,729	1,729
in 1,000 US\$										
EBIT	5,747	5,234	6,886	9,407	9,279	8,870	8,588	8,411	8,210	7,631
in 1,000 US\$										
Accumulated Capital Requirements	498	1,888	2,324	2,324	2,324	2,324	2,324	2,324	2,324	2,324
in 1,000 US\$										
Earnings before Tax	5,249	3,345	4,561	7,083	6,955	6,545	6,264	6,086	5,885	5,306
in 1,000 US\$										
Tax	1,050	669	912	1,417	1,391	1,309	1,253	1,217	1,177	1,051
in 1,000 US\$										
Earnings (after Interest & Tax)	4,199	2,676	3,649	5,666	5,564	5,236	5,011	4,869	4,708	4,245
in 1,000 US\$										
Cash-Flow (after Interest & Tax)	4,764	4,014	5,184	7,201	7,099	6,882	6,740	6,598	6,437	5,974
in 1,000 US\$										
Loan status	0	9,962	12,399	11,315	10,122	8,810	7,367	5,780	4,034	2,113
in 1,000 US\$										





Revised Profit/Loss Calculation for the first Step Investments Poti Container Terminal Extension

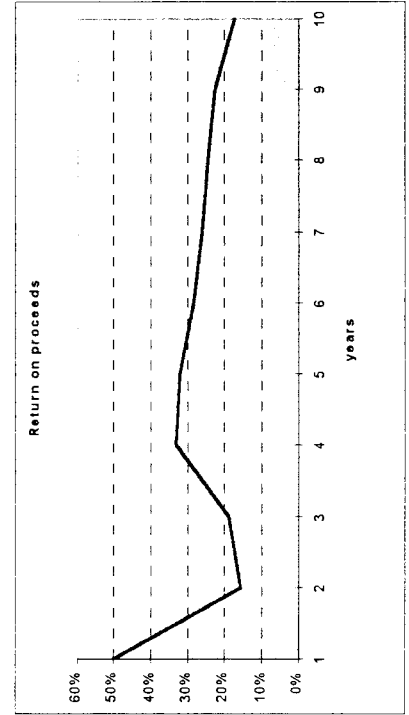
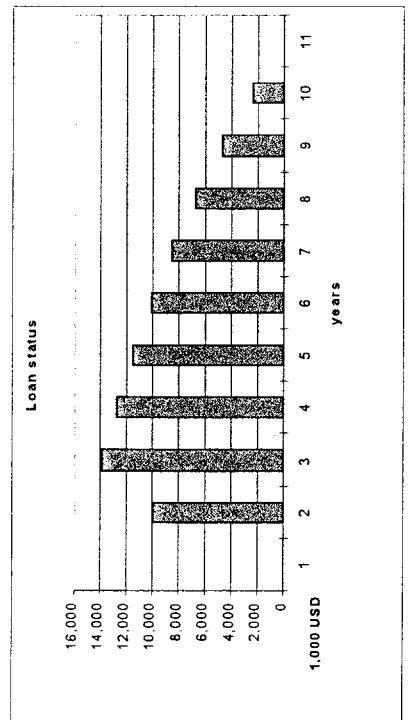
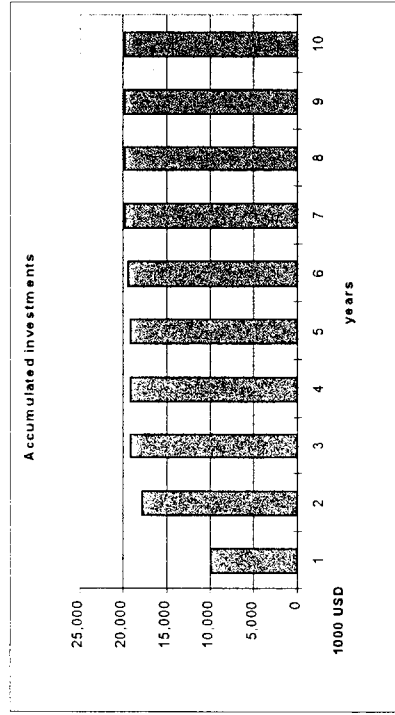
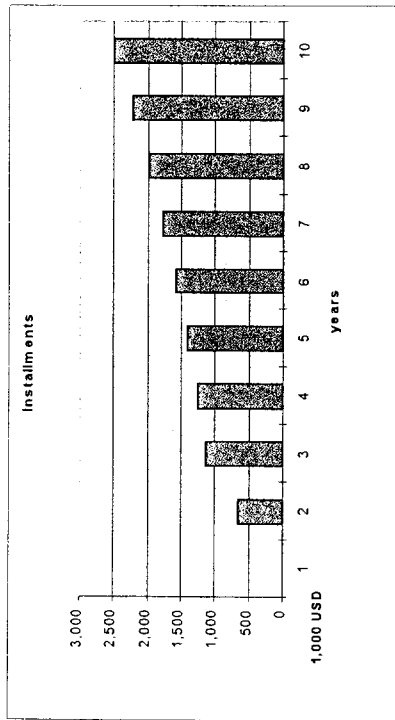
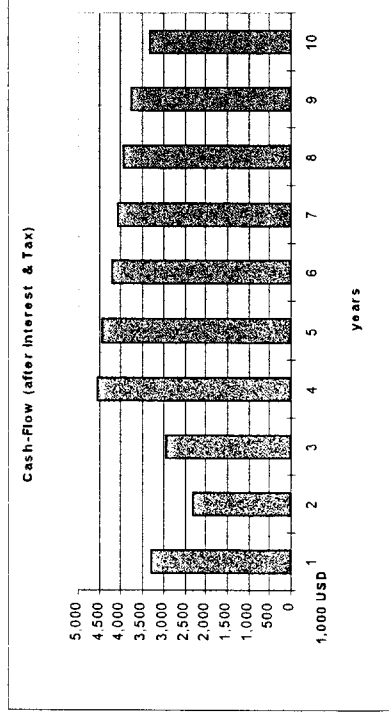
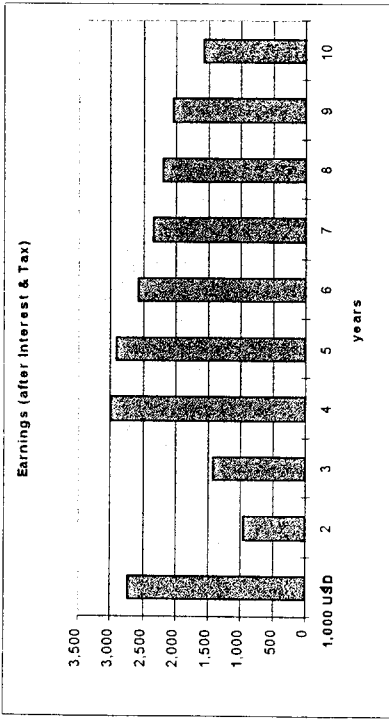
Years	1	2	3	4	5	6	7	8	9	10
<b>Investments for Berth 6 -7</b>										
Site Preparation	9.133.860	5.035.000	0	0	0	285.000	400.000	0	0	0
Environmental	1.945.360									
Civil Works	50.000									
Buildings	3.323.000									
Utilities	200.000									
Utilities	1.910.500					R)	R)			
Cargo handling Equipment	1.705.000	5.035.000				285.000	400.000			
<b>Investment for Berth 12-14</b>										
Incidental exp. (without equip.)	0	2.538.000	1.258.000							
Investment total	827.754	361.950	1.258.000	0	0	285.000	400.000	0	0	0
in 1,000 US\$	9.962	7.935	1.258	0	0	285	400	0	0	0
<b>Depreciation</b>										
As per specification	564.493	1.337.193	1.535.143	1.535.000	1.535.143	1.646.143	1.729.143	1.729.143	1.729.143	1.729.143
in 1,000 US\$	564	1.337	1.535	1.535	1.535	1.646	1.729	1.729	1.729	1.729
<b>Land Lease</b>										
85000 sqm a US\$ 1,-	85.000	85.000	85.000	85.000	85.000	85.000	85.000	85.000	85.000	85.000
<b>Operation Cost</b>										
As per specification	1.162.357	1.774.077	2.066.255	2.175.734	2.303.643	2.602.350	2.800.899	2.978.211	3.179.267	3.758.200
<b>Cost for Operational Compan</b>										
Total Cost	2.811.850	4.196.270	4.886.398	4.795.734	4.923.786	5.333.493	5.615.042	5.792.354	5.993.410	6.572.343
in 1,000 US\$	2.812	4.196	4.886	4.796	4.924	5.333	5.615	5.792	5.993	6.572
without depreciation (in 1,000 U	2.247	2.859	3.151	3.261	3.389	3.687	3.886	4.063	4.264	4.843
<b>Earnings</b>										
Handling	8.559.000	9.430.000	11.572.000	14.203.000	14.203.000	14.203.000	14.203.000	14.203.000	14.203.000	14.203.000
in 1,000 US\$	8.559	9.430	11.572	14.203	14.203	14.203	14.203	14.203	14.203	14.203
<b>Profit before costs of finance</b>	5.747.150	5.233.730	6.885.602	9.407.266	9.279.214	8.869.507	8.587.958	8.410.646	8.209.590	7.630.657
in 1,000 US\$	5.747	5.234	6.886	9.407	9.279	8.870	8.588	8.411	8.210	7.631

R) Replacement



**Poti Container Terminal Extension: Cash flow analysis, worst case, interest 12%, proceeds 80%**

Year	1	2	3	4	5	6	7	8	9	10
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Investment	approx.									
Investment berth 6+7	9,962	7,935	1,258	0	0	285	400	0	0	0
Investment berth 12-14										
Incidental expenses										
Investments total (per year)	9,962	7,935	1,258	0	0	285	400	0	0	0
present value of investment	9,962	7,409	1,097	0	0	202	285	0	0	0
net total accumulated	9,962	17,897	15,840	13,542	10,590	6,326	2,280	-1,950	-6,037	-9,983
financed per Earnings incl. Def	0	-3,315	-2,298	-2,952	-4,549	-4,446	-4,230	-4,087	-3,945	-3,785
present value of cash flow	0	-3,095	-2,003	-2,403	-3,457	-3,155	-2,803	-2,529	-2,279	-1,906
total accumulated	9,962	14,582	13,542	10,590	6,041	1,980	-1,950	-6,037	-9,983	-13,767
Proceeds	8,559	9,430	11,572	14,203	14,203	14,203	14,203	14,203	14,203	14,203
Handling										
Storage										
Other										
Proceeds total	6,847	7,544	9,258	11,362	11,362	11,362	11,362	11,362	11,362	11,362
Total costs (with depreciation)	2,812	4,196	4,686	4,796	4,924	5,333	5,615	5,792	5,993	6,572
Costs (with depreciation)	7,427	7,757	9,249	9,403	13,749	14,076	14,236	14,416	15,771	17,117
Costs (without depreciation)	2,247	2,859	3,151	3,261	3,389	3,687	3,896	4,063	4,264	4,843
EBITDA (Cash Flow)	4,600	4,685	6,106	8,102	7,974	7,675	7,477	7,299	7,098	6,519
Depreciation	564	1,337	1,535	1,535	1,535	1,646	1,729	1,729	1,729	1,729
EBIT	4,035	3,348	4,571	6,567	6,439	6,029	5,747	5,570	5,369	4,790
Accumulated Capital Requirement	598	2,147	2,800	2,800	2,800	2,800	2,800	2,800	2,800	2,800
Finance (average per 30 June/Year)	398	1,114	1,217	1,083	847	495	166	-156	-483	-799
Installment	0	0	0	0	0	0	0	0	0	0
Earnings before Tax	3,438	1,201	1,772	3,767	3,639	3,229	2,948	2,770	2,569	1,990
Tax	688	240	354	753	728	646	590	554	514	398
Earnings (after Interest & Tax)	2,750	961	1,417	3,014	2,911	2,583	2,358	2,216	2,055	1,592
Cash-Flow (after Interest & Tax)	3,315	2,298	2,952	4,549	4,446	4,230	4,087	3,945	3,785	3,321
Loan status	0	9,962	13,908	12,777	11,511	10,092	8,504	6,724	4,732	2,500



## Section 2

(see also Phase 2 Report)

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- Annex 8: Development of Proceeds of the Multi-purpose Terminal in Batumi

# 1. Introduction and Summary

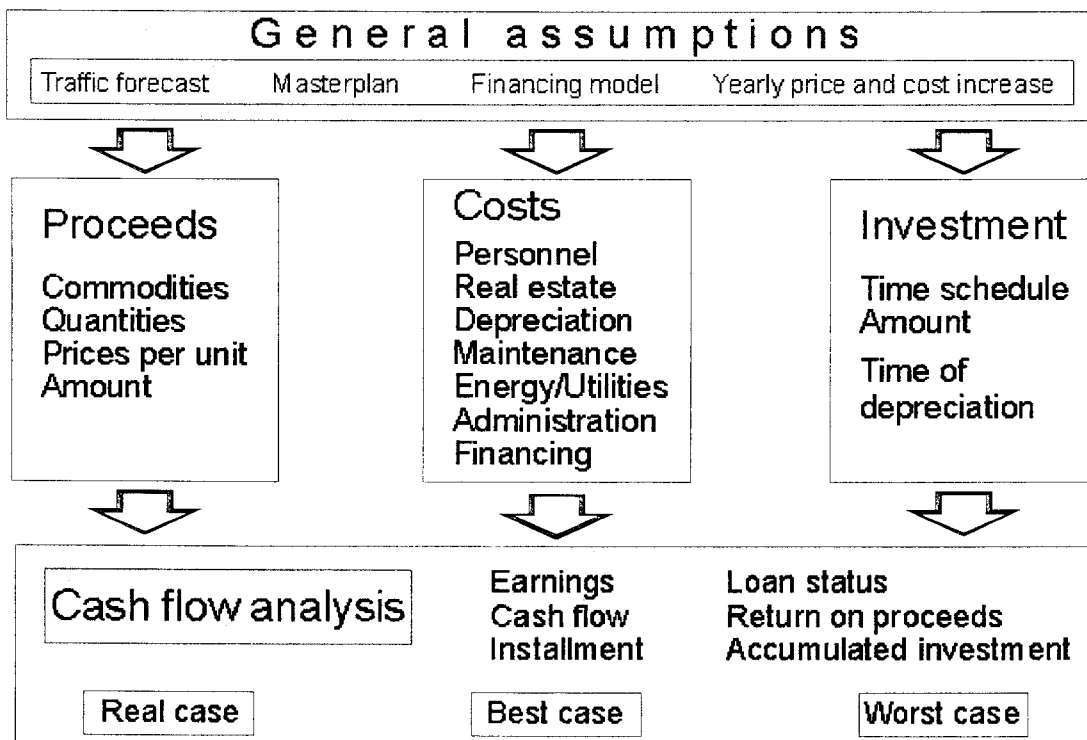
The purpose of this volume is to elaborate a financial plan for the development of the ports of Poti and Batumi. In this stage and in the available time a scheme was developed with which the relevant commodities can be calculated. The chosen example for the cash flow model is the planned new container terminal Poti. The other commodities can be adapted accordingly. The results of the calculation will lead to an intensive discussion about the input data and the assumptions on which the calculations are based in the next weeks.

The basis for the financial plan and the cash flow analysis is given in the previous volumes of the present report, especially in the traffic forecast and the master plan. Many discussions with the port management took place to get the relevant input data about the present situation and the expected development. Some adaptations to western standards were made both on the costside and the revenues.

The macro-economic situation in Georgia is in a phase of transition from the state planned economy of the former Soviet-Union to a modern market economy according to western example. As a result of this change the cost of the input factors can be expected to increase to a more realistic market price level within the forecast period. To avoid an estimation of a Georgian inflation rate, all figures have been expressed in constant USD. All increases in costs and revenues in this report are therefore real increases.

The cash flow and financial analysis are based on the evaluation of the proceeds and costs. For both ports detailed income and cost calculation have been made. The proceeds are orientated at the list of tariffs of the Georgian ports and the quantities calculated out of the traffic forecasts based on the real (most probable) scenario. The costs also based on the volumes out of the traffic forecasts and the productivity calculated in the port master plans.

The following scheme give an overview of the used cash flow model :



The general assumptions are based on the traffic forecast for the respective freight goods for a planning period of 15 years and on the master plan, which shows the technical implementation and development of the ports and the ports areas.

Other important assumptions are the financing conditions and an evaluation of the development of prices and costs over the planning period. On the basis of those assumptions the proceeds and costs can be calculated. Level and course of investment is depending on the traffic forecast and mainly determines the amount of required capital over the planning period. By way of the depreciation level the costs are determined. As you will see later the depreciation amounts to 30% up to 40% of the total costs.

The main cost elements are:

- Personnel costs, with annual increase rates stated in 5-year-steps:  
+ 20% until 2002                    + 15% until 2007                    + 10% until 2012
- The social insurance is calculated with 31% as usual.
- For real estate annual lease costs are calculated with 4 USD per sqm and year.
- For depreciation costs the west European standards have been used for the model and a linear depreciation is assumed, because the Georgian depreciation is lower.
- Maintenance costs are calculated differently with 1%, 4% and 10% depending on if for instance buildings (1%) or handling equipment (10%) is concerned.
- For utility costs estimated expenditure calculations have been carried out and annual increase rates of 1 to 10% have been added.
- Administration cost is the splitting of the total costs of ports administration on the separate terminal areas.
- The financing costs are assumed on the situation of a 100% debt financed project, interest rates differ between 8 and 12%. Each sum of required capital is seen as a separate loan which requires an intermediate financing from time of requirement (middle of the year) until the beginning of the regular period at the beginning of the following year. As far as possible costs of new investments were reduced by earnings including depreciation of the year before. Earnings after interest were submitted to a 20 percent corporation-tax (profit tax).

The results of the cash flow analysis are shown mainly by:

- earnings and cash flow (after interest and tax),
- instalments and loan status,
- accumulated investments and return on proceeds

The cash flow calculations are evaluated by several calculation runs. Calculations have been made for the planned new container terminal with and without the necessary infrastructure and the terminals for general cargo and bulk in Poti. For Batumi the multi purpose terminal has been calculated.

For all main project cases the real, best and worst case has been calculated.

The following 4 project cases have been defined for the cash flow analysis:

- Poti container terminal north with 2 variants  
with breakwater and infrastructure connections  
without breakwater and infrastructure connections
- Poti general cargo and bulk areas
- Batumi multi purpose terminal

The tables in chapter 1.1 and following will give an extract of the calculation runs. In fact, the real case variant calculation is shown.

All tables (every table consists of 4 pages) have the same structure:



First (page 1) the reader will find the time schedules of the investment with the yearly investment costs, the yearly proceeds depending on the traffic forecast and the annual total costs. One remark to the time axe: An optimistic beginning for the investment is the year 1998, but depending on the required decisions you can define year 1 as the beginning period. Further descriptions will be given in the following chapters.

Second (pages 2 and 3) the cash flow analyses for the real case is shown for the planned period of 15 years.

And third (page 4), you will find the characteristic indicators to evaluate the investment under financial aspects. Beside the indicators earnings and cash flow (both after interest and tax), instalments, accumulated investments and return on proceeds, the loan status is a very important criteria with its information about the repayment of the needed credits.

## 1.1 Poti, Container Terminal

As mentioned the cash flow analysis has been made for both container terminal including and excluding the big infrastructure costs (breakwater, rail and road infrastructure).

The phased development of the Poti container terminal is shown in table 1 (with breakwater) and table 2 (without breakwater) and has already been described in great detail.

Remark: The data in the time schedule base on yearly amounts and the data in the business plan show accumulated figures.

By the way of introduction it can be said, container handling is mainly executed at berth N° 7 with a handling area of about 20,000 sqm. The physical condition is poor and the rail/road entrance too small. To handle and store the expected container volumes in the next 2-3 years (forecast says in the year 2000 about 65,000 containers, in 2001 about 80,000 containers) it will be necessary to extend the available area. The purpose is to rehabilitate the site behind the berths 6 and 5. It is proposed to prepare an area of about 60,000 sqm including the reconstruction of the quay wall on a length of 500 m, so that 2-3 feeder container ships can be handled at the same time. The handling is proposed to be executed by the rehabilitated equipment and reachstackers as described already.

A completely new container terminal is being planned and it is intended to be realised until the year 2003/2004 – according to the traffic forecast. In the meantime container operation will also be made at the rehabilitated berths 12-14 on a handling area of about 20,000 sqm.

For the planned new container terminal two possibilities are identified:

- Terminal South (in the area berths 14/15)
- Terminal North (in the area berth 24)

In the current analysis the northern terminal is calculated because of better extension possibilities, though with the necessity to built a new breakwater and a very long rail connection with rail tracks of about 16 km and a road connection of about 2 km.

The cost estimations for

- Extension Container Terminal
- New Container Terminal North and South
- Infrastructure Connections and Breakwater

are the basis for the cash flow analysis.

All figures are based on western standards, that means that in some positions may be possibilities for cutting down the investment by using regional procurement.

The time schedule shows a very ambitious implementation time. The base year is 1998. According to the implementation decisions the real investments and start of operation for the new container terminal will vary.

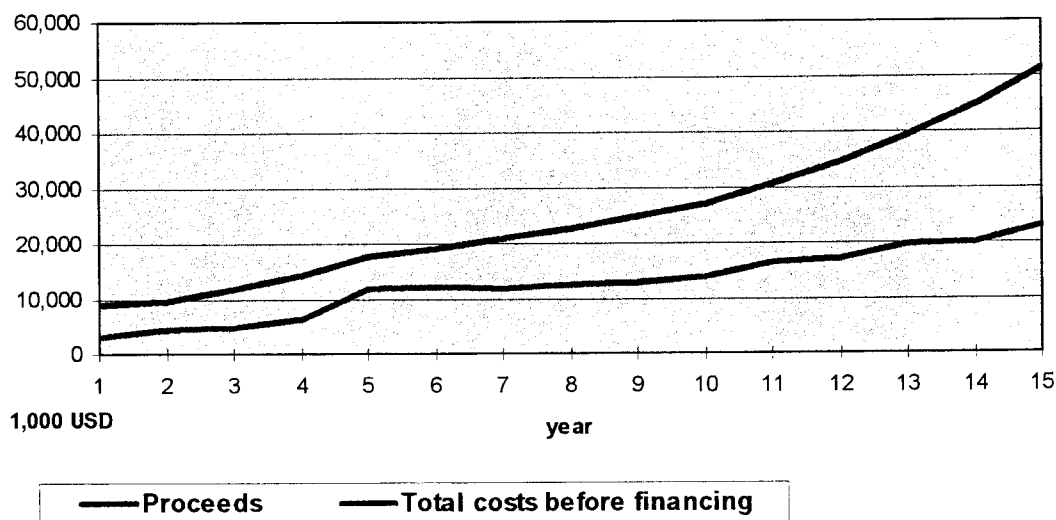
**Table 1** (in Annex 1) shows the calculation run in the real case variant for Poti container terminal **with** breakwater and the required infrastructure investment for rail tracks and road. The total investment sum amounts to 158.267 million USD, wherein the mentioned infrastructure is about 37 million USD plus incidental expenses. The investment peak will be in the fourth year when the finishing of the new container terminal will be started. The real case variant with 10% interest shows both earnings and cash flow with a bad line, the return on proceeds becomes mostly negative and above all there is no total repayment of the credits within the 15 years. (Remark: the replacement in the year 15 is not yet calculated as used credit!) Also the calculation run in the best case variant with 8% interest (see annex 1) shows no acceptable results.

The calculation runs for the container terminal **without** breakwater and the required external infrastructure shows an acceptable result, as to be seen in **table 2**. The real case variant produces a good result: Earnings and cash flow will get a good line after the phase of the high investment, just as the return on proceeds and the repayment of the loans in the 15 years period will be managed. Even the investment in the 15th year (11.5 million USD) can be financed with cash flow.

A comparison of the calculation runs shows that it must be recommended to discharge the container terminal from the investment costs for the infrastructure: The results of the runs with the infrastructure say that in the real case no repayment of the loan will be reached at the end of the 15 years period. The calculation run of the variant without the infrastructure as described above shows in the real case a very good course of the financial concept as the figures express. Both earnings and cash flow have a good line and the loan will be repaid in the project period.

The following graph shows the course of the proceeds and the costs.

Proceeds and costs:



**Finance conception :**

- Calculation period: 15 years
- Total investment: 116 million USD
- Operational turnover: 9 to 51 million USD p.a.
- Loan status: max. 53 million USD
- Earnings and depreciation will reduce the investment costs
- 100% dept finance
- Benefit tax: 20%
- 3 calculation variants :

real case:	10% interest
best case:	8% interest
worst case:	12% interest

See Table 2

Table 2 (4 pages, page 1 of 4)

Poti container terminal: Time schedule (without breakerwater)

year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	sum
Investment berth 6+7	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Extension berth 6 + 7	9,134	5,035	0	0	0	0	0	0	0	0	0	0	0	0	0	14,169
Rehabilitation equipment																
New equipment																
Other equipment																
Investment berth 12-14	0	2,538	1,258	0	0	0	0	0	0	0	0	0	0	0	0	3,796
Extension berth 12-14																
Utilities, site preparation																
New cargo equipment																
Investment New CT-Term.	0	0			24,144	0	420	0	0	3,954	11,044	3,258	8,233	0	11,500	92,202
Site preparation																
Utilities, other																
Civil works, buildings																
Warehouse																
EDP																
New cargo equipment																
Incidental expenses	828	362	579	3,557	225	0	0	0	0	0	0	0	0	0	0	5,551
Total	9,962	7,935	5,697	29,346	24,369	0	420	0	0	3,954	11,044	3,258	8,233	0	11,500	115,718
all in all	9,962	17,897	23,594	52,940	77,309	77,309	77,729	77,729	77,729	81,683	92,727	95,985	104,218	104,218	115,718	
Proceeds	8,550	9,430	11,572	14,203	17,466	19,039	20,751	22,619	24,655	26,955	30,594	34,724	39,412	44,733	51,290	
Total costs	2,847	4,425	5,508	7,436	13,115	13,384	13,585	13,762	13,963	14,957	17,698	18,324	20,835	21,466	24,259	

[R] Replacement



Table 2 (4 pages, page 2 of 4)

Year	1	2	3	4	5	6	7	8
	approx.							
Investment	9.962	7.935	5.697	29.346	24.369	0	420	0
Investment berth 6+7								
Investment berth 12-14								
Investment New CT-Term.								
Incidental expenses								
Investments total (per year)	9.962	7.935	5.697	29.346	24.369	0	420	0
net total accumulated	9.962	17.897	18.865	43.713	62.435	56.073	52.085	48.403
financed per Earnings incl. Deprec.	0	-4.729	-4.498	-5.647	-6.361	-4.408	-3.682	-5.193
total accumulated	9.962	13.168	14.367	38.066	56.073	51.665	48.403	43.210
Proceeds	8.550	9.430	11.572	14.203	17.466	19.039	20.751	22.619
Proceeds total	8.550	9.430	11.572	14.203	17.466	19.039	20.751	22.619
Total costs (with depreciation)	2.847	4.425	5.508	7.436	13.115	13.384	13.585	13.762
Costs (without depreciation)	2.282	2.721	3.221	3.856	6.529	6.798	6.999	7.176
EBITDA (Cash Flow)	6.268	6.709	8.350	10.247	10.937	12.241	13.752	15.443
Depreciation	564	1.704	2.286	3.479	6.586	6.586	6.586	6.586
EBIT	5.704	5.005	6.064	6.767	4.351	5.655	7.166	8.858
Accumulated Capital Requirements	498	1.513	1.864	3.165	6.529	8.559	8.559	8.559
Earnings before Tax	5.205	3.493	4.200	3.603	-2.178	-2.904	-1.393	298
Tax	1.041	699	840	721	0	0	0	60
Earnings (after Interest & Tax)	4.164	2.794	3.360	2.882	-2.178	-2.904	-1.393	239
Cash-Flow (after Interest & Tax)	4729	4498	5647	6361	4408	3682	5193	6825
Loan status	0	9.962	12.812	13.488	36.557	52.591	49.292	45.662



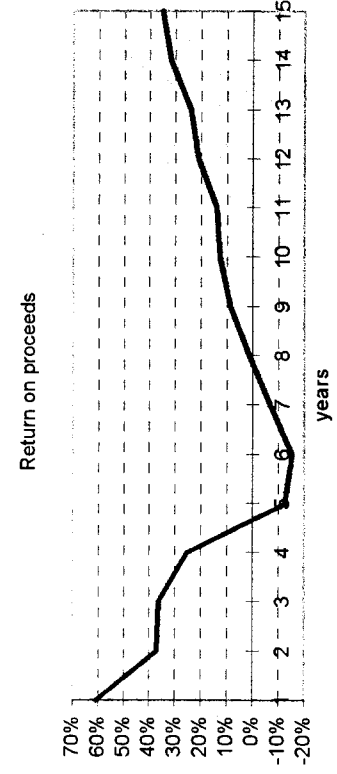
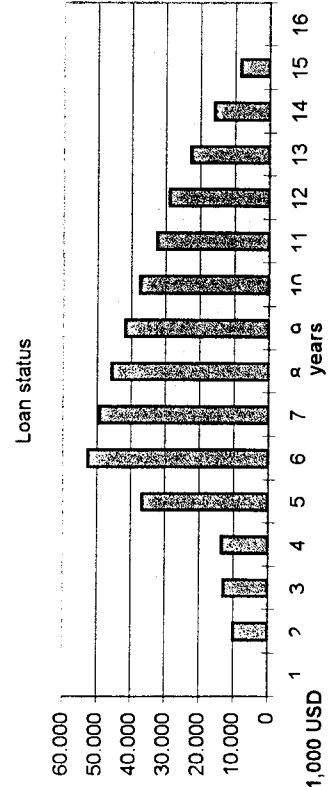
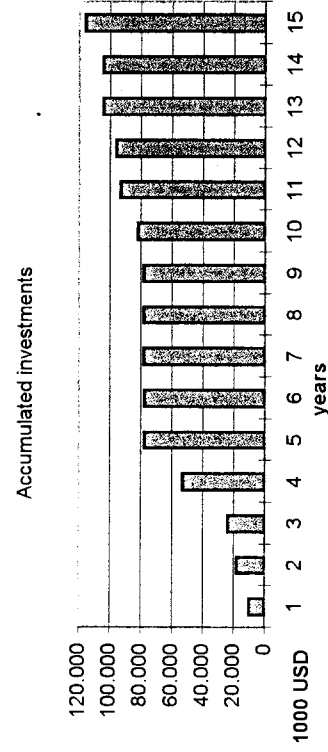
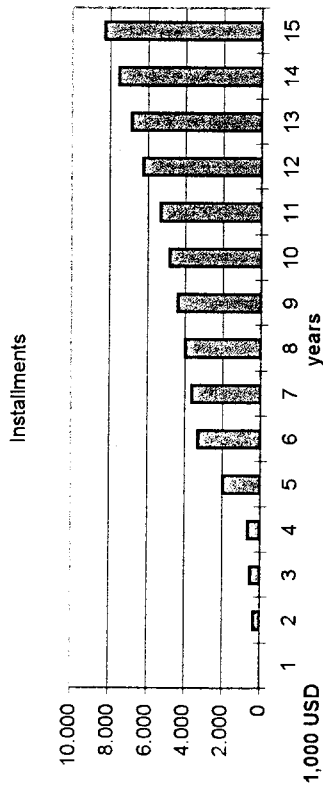
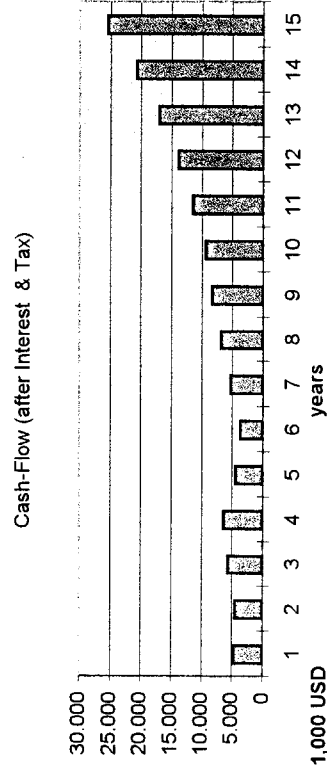
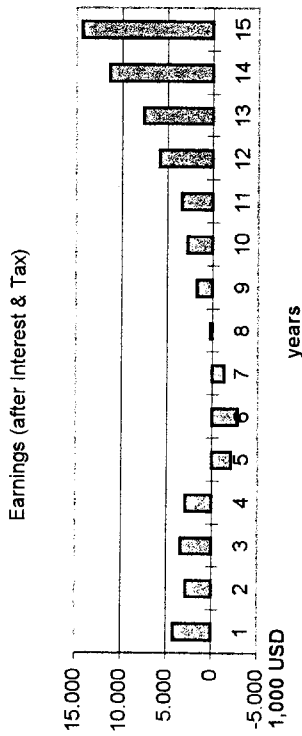
Table 2 (4 pages, page 2 of 4)

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Year	2006	2007	2008	2009	2010	2011	2012
	approx.						
Investment	in 1,000 US\$	0	3,954	11,044	8,233	0	11,500
Investment berth 6+7	in 1,000 US\$						
Investment berth 12-14	in 1,000 US\$						
Investment New CT-Term.	in 1,000 US\$						
Incidental expenses	in 1,000 US\$						
Investments total (per year)	in 1,000 US\$	0	3,954	11,044	8,233	0	11,500
net total accumulated	in 1,000 US\$	43,210	40,340	43,091	37,011	20,017	14,556
financed per Earnings incl. Deprec.	in 1,000 US\$	-6,825	-8,293	-9,337	-11,393	-16,961	-20,712
total accumulated	in 1,000 US\$	36,386	32,047	33,753	25,618	3,056	-6,157
Proceeds	in 1,000 US\$	24,655	26,955	30,594	34,724	44,733	51,290
Proceeds total	in 1,000 US\$	24,655	26,955	30,594	34,724	44,733	51,290
Total costs (with depreciation)	in 1,000 US\$	13,963	14,957	17,698	18,324	21,466	24,259
Costs (without depreciation)	in 1,000 US\$	7,377	8,371	9,706	10,331	12,089	13,266
EBITDA (Cash Flow)	in 1,000 US\$	17,278	18,584	20,888	24,392	27,956	38,024
Depreciation	in 1,000 US\$	6,586	6,586	7,992	7,992	9,377	10,992
EBIT	in 1,000 US\$	10,693	11,998	12,896	16,400	18,577	27,031
Accumulated Capital Requirements	in 1,000 US\$	8,559	8,559	8,644	9,097	9,097	9,097
Earnings before Tax	in 1,000 US\$	2,134	3,439	4,251	7,302	14,169	17,934
Tax	in 1,000 US\$	427	688	850	1,460	2,834	3,587
Earnings (after Interest & Tax)	in 1,000 US\$	1,707	2,751	3,401	5,842	11,335	14,347
Cash-Flow (after Interest & Tax)	in 1,000 US\$	8293	9337	11393	13834	20712	25339
Loan status	in 1,000 US\$	41,669	37,277	32,445	28,838	15,789	8,270

Page 8

**Table 2 (4 pages, page 4 of 4)**



## 1.2 Poti, General Cargo and Bulk Areas

**Table 3** shows the calculation run in the real case variant. The total sums up to nearly 30 million USD. All investments will be made in the first seven years. The beginning of replacement will take place after this time. This is the same time when the area of the extension container terminal can be used again for general cargo handling by reasons of operating the whole container activities by the new container terminal. Because of this, it is recommended to begin a new financing concept in the periods 7-9.

The calculation runs show that a very good result can be achieved with the input data given. To be on the safe side of evaluation the real case variant is calculated with a reduction of proceed of 10% to 90%. The result diagrams show that earnings as well as cash flow (after interest and tax) have a good line. The peak in year 5 (2002) is the result of transport level which continues in the same height from this year on (see traffic forecast). The loan will be repayed during the project period, the return on proceeds will settle down between 5 and 10% after the peak in year 5. A comparison with the 10% interest and 100% proceeds defined best case variant shows a return on proceeds between 15 and 20%, earnings and cash flow show an about 30% higher value.

*See Table 3*

The calculation runs for the best and worst case variant and the detailed input data are reproduced in annex 2.



Table 3 (4 pages, page 1 of 4)

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15 sum	
Site preparation	3,571															3,571
Civil works	7,962															7,962
Buildings	1,635															1,635
Utilities	664															664
Equipment	1,054	726	726	2,354	2,354	3,433	2,530									13,177
Other	50															50
Incidental expenses	1,975															1,975
<b>Total</b>	<b>16,911</b>	<b>726</b>	<b>726</b>	<b>2,354</b>	<b>2,354</b>	<b>3,433</b>	<b>2,530</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>29,034</b>
all in all	16,911	17,637	18,364	20,718	23,072	26,504	29,034	29,034	29,034	29,034	29,034	29,034	29,034	29,034	29,034	29,034
<b>Proceeds</b>	<b>6,812</b>	<b>7,890</b>	<b>9,236</b>	<b>10,961</b>	<b>13,181</b>	<b>13,673</b>	<b>14,204</b>	<b>14,778</b>	<b>15,398</b>	<b>16,080</b>	<b>17,121</b>	<b>17,725</b>	<b>18,363</b>	<b>19,040</b>	<b>19,756</b>	
<b>Total costs</b>	<b>4,058</b>	<b>4,486</b>	<b>5,038</b>	<b>6,003</b>	<b>7,007</b>	<b>8,295</b>	<b>9,351</b>	<b>10,001</b>	<b>10,692</b>	<b>11,479</b>	<b>12,272</b>	<b>12,839</b>	<b>13,473</b>	<b>13,848</b>	<b>14,304</b>	

Table 3 (4 pages, page 2 of 4)

Year	1	2	3	4	5	6	7
	1998	1999	2000	2001	2002	2003	2004
	approx.						
Site preparation	in 1,000 US\$ 3,571						
Civil works	in 1,000 US\$ 7,962						
Buildings	in 1,000 US\$ 1,635						
Utilities	in 1,000 US\$ 664						
New equipment	in 1,000 US\$ 1,054	726	726	2,354	2,354	3,433	2,530
Other	in 1,000 US\$ 50						
Incidental expenses	in 1,000 US\$ 1,975						
Investments total (per year)	in 1,000 US\$ 16,911	726	726	2,354	2,354	3,433	2,530
net total accumulated	in 1,000 US\$ 16,911	17,637	16,625	17,921	18,616	19,713	18,935
financed per Earnings Incl. Deprec.	in 1,000 US\$ 0	-1,739	-1,058	-1,659	-2,336	-3,308	-3,026
total accumulated	in 1,000 US\$ 16,911	15,898	15,567	16,262	16,280	16,405	15,909
Proceeds	in 1,000 US\$ 6,812	7,890	9,236	10,961	13,181	13,673	14,204
Handling	in 1,000 US\$ 0	0					
Storage	in 1,000 US\$ 0	0					
Other	in 1,000 US\$ 0	0					
Proceeds total	in 1,000 US\$ 6,812	7,101	8,313	9,866	11,863	12,306	12,784
Total costs (with depreciation)	4,058	4,486	5,038	6,003	7,007	8,295	9,351
Costs (without depreciation)	3,301	3,684	4,163	4,892	5,661	6,548	7,380
EBITDA (Cash Flow)	2,830	3,417	4,160	4,973	6,202	6,768	5,405
Depreciation	757	803	875	1,111	1,346	1,747	1,971
EBIT	2,072	2,615	3,275	3,862	4,856	4,011	3,433
Accumulated Capital Requirements	846	2,296	2,296	2,330	2,404	2,412	2,427
Earnings before Tax	1,227	319	979	1,532	2,452	1,599	1,006
Tax	245	64	196	306	490	320	201
Earnings (after Interest & Tax)	981	255	783	1,225	1,962	1,279	805
Cash-Flow (after Interest & Tax)	in 1,000 US\$ 1,739	1,058	1,659	2,336	3,308	3,026	2,776
Loan status	in 1,000 US\$ 0	16,911	16,306	15,641	15,605	14,781	13,979

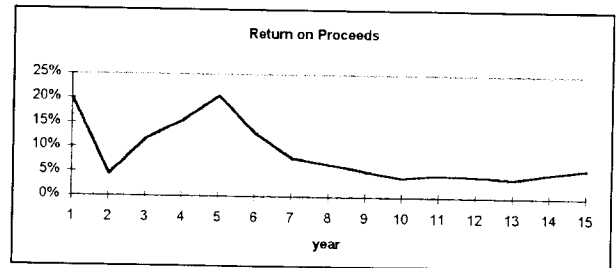
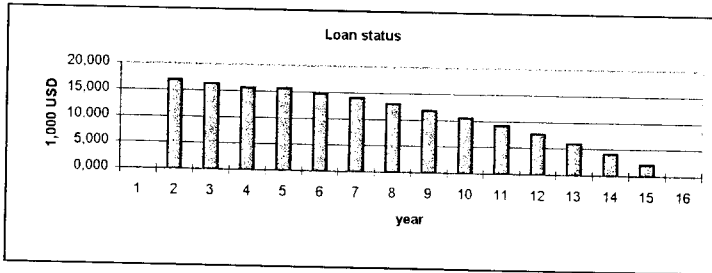
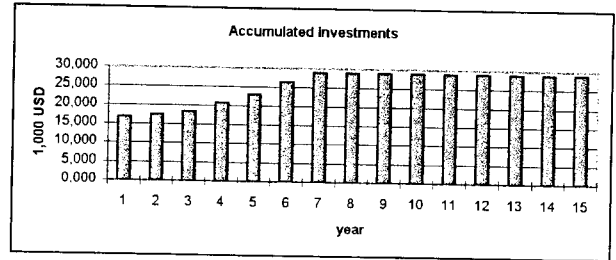
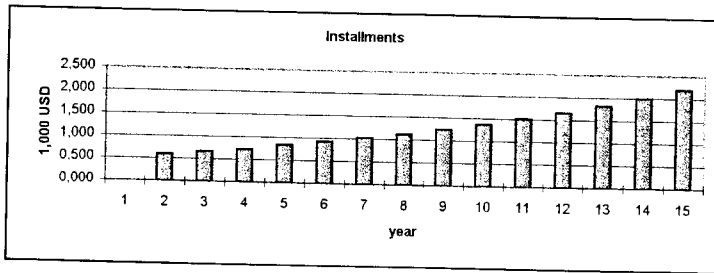
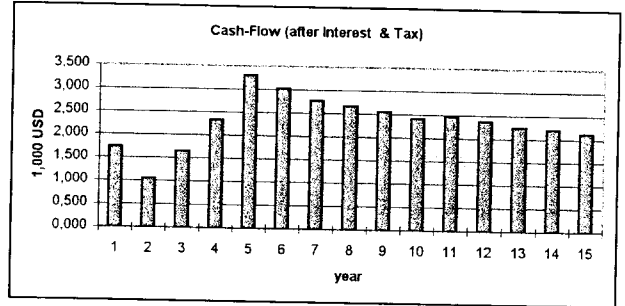
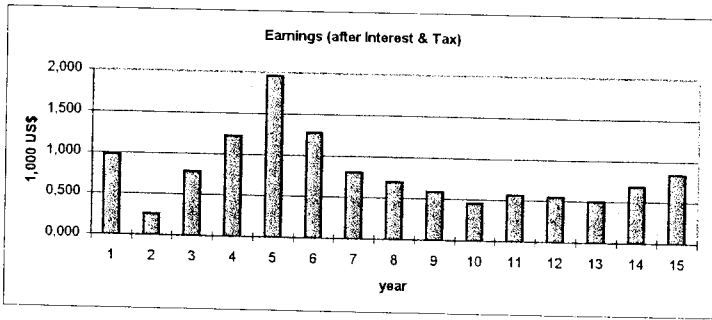


Feasibility Study of New Terminal Facilities in the Georgian Ports  
Phase 3 Report

Table 3 (4 pages, page 3 of 4)

8	9	10	11	12	13	14	15 Total
2005	2006	2007	2008	2009	2010	2011	2012 1998-2012
0	0	0	0	0	0	0	0
15,909	13,133	10,464	7,902	5,479	3,012	638	-1,616
-2,776	-2,669	-2,562	-2,423	-2,467	-2,374	-2,254	-2,206
13,133	10,464	7,902	5,479	3,012	638	-1,616	-3,822
14,778	15,398	16,080	17,121	17,725	18,363	19,040	19,756
13,300	13,858	14,472	15,409	15,952	16,527	17,136	17,781
10,001	10,692	11,479	12,272	12,839	13,473	13,848	14,303
8,030	8,721	9,508	10,373	11,013	11,720	12,330	13,021
5,270	5,137	4,964	5,036	4,939	4,807	4,805	4,760
1,971	1,971	1,971	1,898	1,826	1,753	1,518	1,282
3,299	3,166	2,983	3,138	3,113	3,054	3,287	3,478
2,427	2,427	2,427	2,427	2,427	2,427	2,427	2,427
872	739	566	710	686	626	860	34,428
174	148	113	142	137	125	172	1,050
698	591	452	568	549	501	688	210
2,669	2,562	2,423	2,467	2,374	2,254	2,206	840
12,949	11,817	10,571	9,201	7,694	6,036	4,213	2,207
							192,796
							120,345
							72,451
							49,662
							34,428
							15,224
							3,045
							12,179
							34,979
							0

Table 3 (4 pages)



### 1.3 Batumi, Multi Purpose Terminal

The phased development of the Batumi multi purpose terminal is shown in table 4. To sum up the results it can be said:

The concept of the multi purpose terminal provides to handle about 70% of the general cargo volume, all container and the RoRo-volume. A quay wall of 250m will be reconstructed between the present berth 4 and 5; the RoRo-ramp will be integrated. The planned area of the multi purpose terminal has about 31,250 sqm, the multi purpose terminal extra version will have about 47,750 sqm. This version is the basis for the calculation runs. The equipment planning assumes that above all self-sustaining ships are to be handled that means no expensive mobile cranes will be needed.

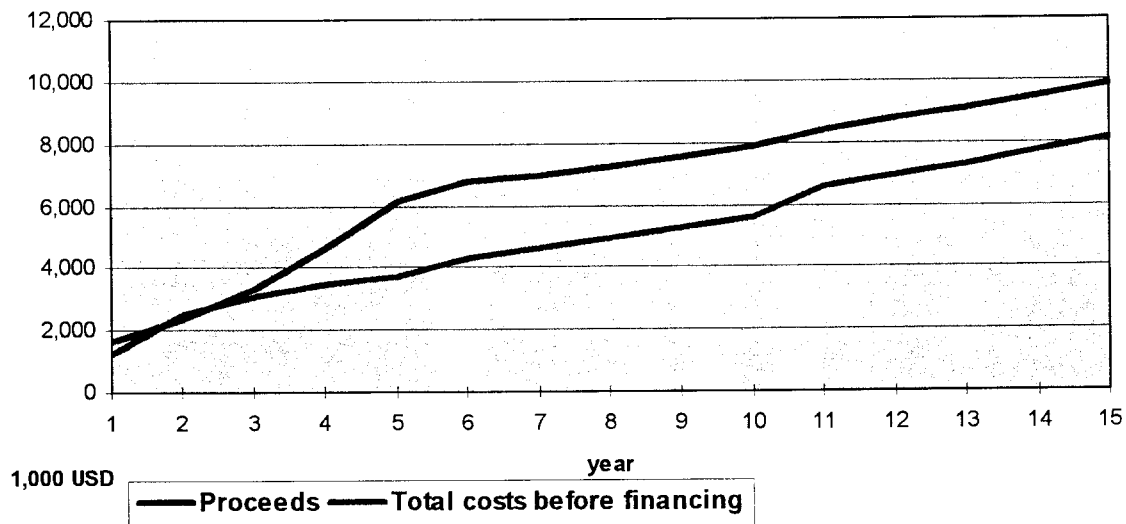
#### Cash flow analysis and general assumptions and inputs :

The same remarks as above explained are valid. The break-down of the investment is divided into the parts

- site preparation – exp. demolition of buildings and preparation of the ground
- environmental – cleaning of the soil is a significant cost position
- utilities and equipment

The proceeds are divided into general cargo and container handling proceeds and in storage proceeds. The other positions are the same as mentioned above.

Proceeds and costs :



The investments for the multi purpose terminal sum up to 30.6 million USD.

With the above mentioned assumptions the investment project is evaluated by several calculation runs. The calculation runs show a principle problem in the definition of the activities, proceeds and costs of the multi purpose terminal. In the first calculation run of the real case with the calculated proceeds, based on a certain part of the general cargo and bulk operation the earnings get to low. The cash flow analysis has a very bad result (see table 3.2.2.-2, calculations of the worst case). The financial team thus decided to increase the proceeds by 10%. The result is documented in the tables of the real case. After the powerful

investment in the first 4 years earnings and cash flow get a good result, the return on proceeds reach nearly 10% and the loan (the maximum loan sum is about 25 million USD) can be repaid in the project period.

### **Basis of the conception**

The finance model calculates investments and the operating of the terminal for a period of fifteen years. Within this period the investments shall be reduced by operational earnings. Present calculations predict a total investment of 30.547 million USD, the main investment will take place in the first period (four years).

The operational turnover will increase from 1.602 million USD (1st year) to 9.867 million USD (15th year). As mentioned the finance model has taken into account 110% of all proceeds, which are forecasted.

Operational costs will increase from 875,000 USD (1st year) to 4.294 million USD (15th year). The loan status is in the max. 25.4 million USD and will be repaid at the end of the project period.

### **Analysis of calculations (real case)**

Data show a reasonable project finance model.

The conception should further on calculate the possibility of being partly financed by equity capital. Equity capital usually expects an average of an annual interest of at least 15 percent after tax in Western Europe.

The loan status will grow up to a peak of 25.380 million USD (real case) in the 5th year of operation. The total of tax payment sums up to 1.432 million USD.

### **Finance conception :**

- Calculation period: 15 years
- Total investment: 31 million USD
- Operational turnover: 1.6 to 10 million USD p.a.
- Loan status: max. 25.4 million USD
- 3 calculation variants :
 

real case:	10% interest
best case:	8% interest
worst case:	12% interest
- Other criteria as mentioned above

**Table 4** shows the calculation run in the real case variant for the multi purpose terminal in Batumi. The whole investment amounts to about 30 million USD, the main activities as to the preparation, environmental and civil works are made in the first two years.

In the following chapter a detailed explanation of the cash flow analysis for the Poti container terminal and the Batumi multipurpose terminal is given.

*See Table 4 overleaf*



## Batumi, Multi purpose terminal, time schedule

Table 4 (Page 1 of 4)

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	sum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Site preparation	2,398	161														2,559
Environmental	5,400															5,400
Civil works		7,261														7,261
Buildings		1,250														1,250
Utilities		867														867
Equipment	1,875	1,976	1,800	1,304		886	110	360			1,821	116				10,248
Other																361
Incidental expenses	1,170	1,431														2,601
<b>Total</b>	10,843	13,308	1,800	1,304	0	886	110	360	0	0	1,821	116	0	0	0	30,547
all in all	10,843	24,151	25,951	27,255	27,255	28,141	28,251	28,611	28,611	28,611	30,431	30,547	30,547	30,547	30,547	
Proceeds	1,602	2,313	3,337	4,578	6,068	6,747	6,969	7,208	7,500	7,853	8,390	8,735	9,095	9,474	9,867	
<b>Total costs</b>	1,250	2,439	3,054	3,441	3,668	4,268	4,580	4,951	5,227	5,609	6,523	6,917	7,266	7,719	8,120	

[R] Replacement

Table 4 (4 pages, page 2 of 4)

Year	1	2	3	4	5	6	7	8
	1998	1999	2000	2001	2002	2003	2004	2005
Investment								
Site Preparation	10,843	13,307	1,800	1,304	0	886	110	360
Environmental	2,398	161						
Civil Works	5,400							
Buildings		7,261						
Utilities		1,250						
Equipment		867						
Other Equipment	1,875	1,976	1,800	1,304		886	110	360
Incidental Expenses	1,170	1,431						
Investments total (per year)	10,843	13,307	1,800	1,304	0	886	110	360
net total accumulated	10,843	24,150	25,637	27,321	27,878	28,523	27,230	25,598
financed per Earnings incl. Deprec.	0	-313	381	556	-241	-1,403	-1,992	-1,977
total accumulated	10,843	23,837	26,017	27,878	27,637	27,120	25,238	23,620
Proceeds								
Handling	1,602	2,313	3,337	4,578	6,068	6,747	6,969	7,208
Storage								
Other								
Proceeds total	1,762	2,545	3,670	5,036	6,675	7,422	7,666	7,929
Total costs (with depreciation)	1,063	1,621	1,936	2,261	2,488	2,826	3,116	3,452
Costs (without depreciation)	875	804	817	1,081	1,308	1,384	1,653	1,952
EBITDA (Cash Flow)	887	1,741	2,854	3,955	5,367	6,037	6,014	5,977
Depreciation	188	818	1,119	1,180	1,180	1,442	1,464	1,500
EBIT	699	923	1,735	2,775	4,187	4,596	4,550	4,477
Accumulated Capital Requirements	542	2,122	3,410	3,714	3,908	3,908	3,908	3,908
Earnings before Tax	157	-1,198	-1,675	-939	279	688	642	570
Tax	31	0	0	0	56	138	128	114
Earnings (after Interest & Tax)	126	-1,198	-1,675	-939	223	551	514	456
Cash-Flow (after Interest & Tax)	313	-381	-556	241	1,403	1,992	1,977	1,956
Loan status	0	10,843	23,449	24,673	25,380	24,011	22,504	20,847



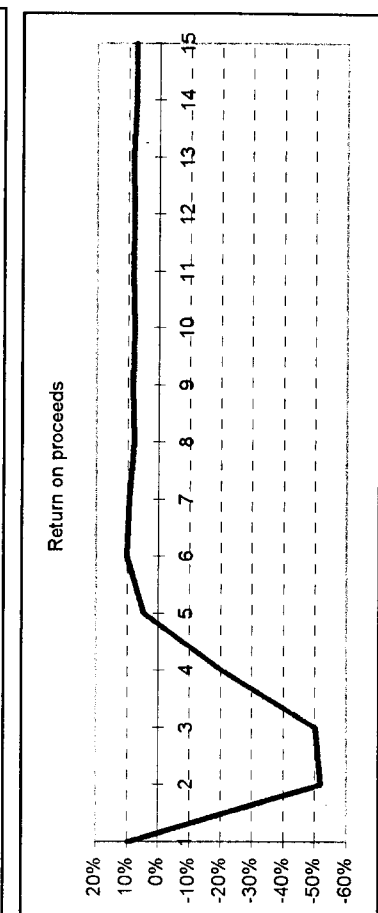
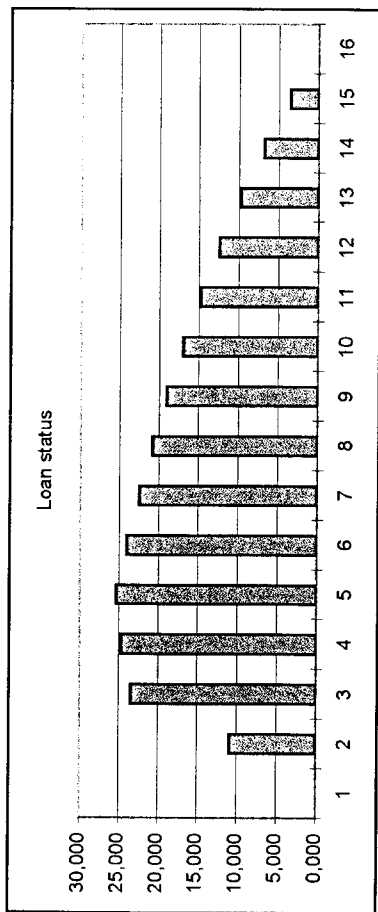
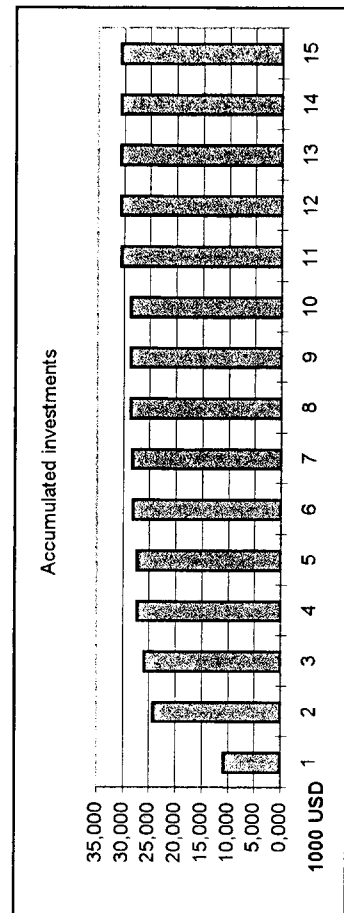
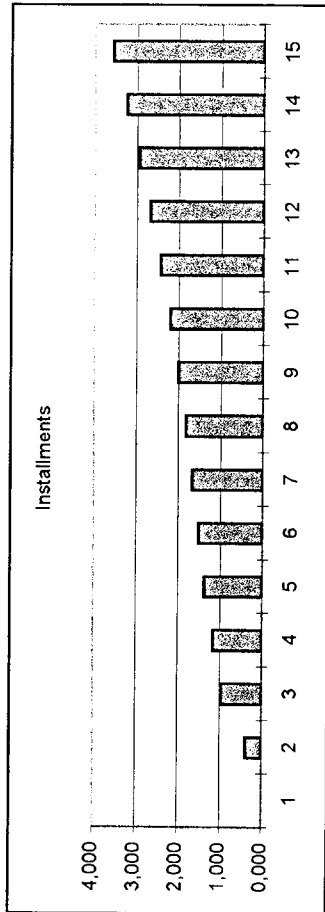
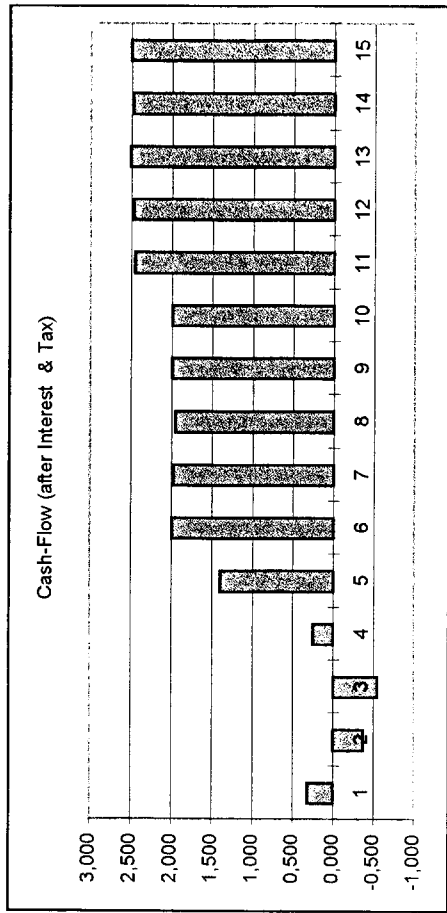
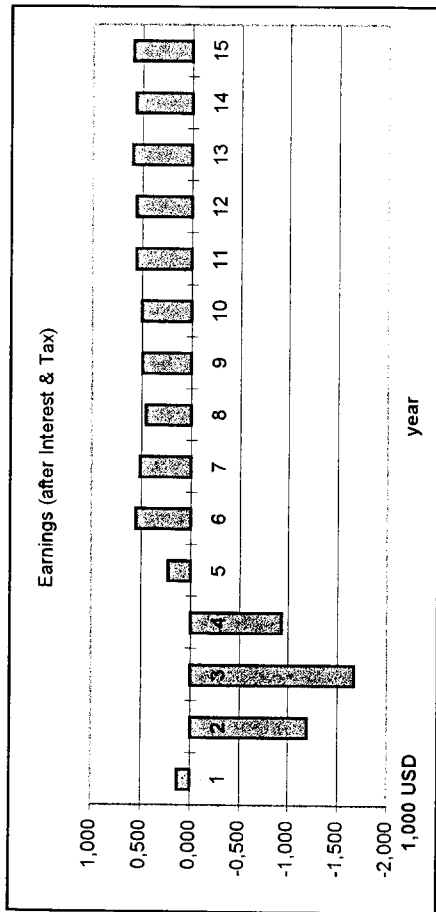


Table 4 (4 pages, page 3 of 4)

	9	10	11	12	13	14	15	Total
	2006	2007	2008	2009	2010	2011	2012	1998-2012
0	0	0	1,821	116	0	0	0	30,547
			1,821	116				
			1,821	116				
23,620	21,665	21,495	19,614	17,158	14,686	12,177	0	30,547
-1,956	-1,991	-1,997	-2,456	-2,471	-2,509	-2,480	0	
21,665	19,674	19,498	17,158	14,686	12,177	9,697	0	
7,500	7,853	8,390	8,735	9,095	9,474	9,867	0	
8,250	8,638	9,229	9,608	10,005	10,422	10,853	0	
3,728	4,109	4,626	5,003	5,352	5,806	6,207	0	109,711
2,228	2,610	2,726	3,090	3,439	3,892	4,294	0	53,593
6,022	6,029	6,803	6,519	6,566	6,530	6,559	0	32,153
1,500	1,500	1,899	1,913	1,913	1,913	1,913	0	77,558
4,522	4,529	4,604	4,605	4,663	4,616	4,646	0	21,440
3,908	3,908	3,908	3,908	3,908	3,908	3,908	0	56,118
614	621	697	698	745	709	738	0	52,772
123	124	139	140	149	142	148	0	3,346
491	497	557	558	596	567	591	0	1,432
1,991	1,997	2,456	2,471	2,509	2,480	2,504	0	1,914
19,024	17,019	14,813	12,387	9,718	6,782	3,552	0	23,354

**Table 4**

Page 4 of 4



## 2. Poti

The phased development of the Poti container terminal is shown above in table 1 (Annex 1) and table 2, pages 6 - 9 of this volume and is described in Vol.III (of Phase 2) and Vol. IV.

Presently, container handling is mainly executed at berth N° 7 with a handling area of about 20,000 sqm. The physical condition is poor and the rail/road entrance too small. To handle and store the expected container volumes in the next 2 - 3 years (see traffic forecast: in the year 2000 about 65,000 containers, in 2001 about 80,000 containers) it will be necessary to extend the available area. The purpose is to rehabilitate the site behind the berths 6 and 5. It is proposed to prepare an area of about 60,000 sqm including the reconstruction of the quay wall on a length of 500 m, so that 2 - 3 feeder container ships can be handled at the same time. The handling is proposed to be executed by the rehabilitated equipment and reachstackers as described in Phase 2, Vol. III, section 6.

A completely new container terminal is being planned and it is intended to be realised until the year 2003/2004 - according to the traffic forecast. In the meantime container operation will also be made at the rehabilitated berths 12 – 14 on an handling area of about 20,000 sqm.

For the planned new container terminal two possibilities are identified:

- Terminal South (in the area berths 14/15)
- Terminal North (in the area berth 24)

In the current analysis the northern terminal is calculated because of better extension possibilities, though with the necessity to built a new breakwater and a very long rail connection of about 16 km and a road connection of about 2 km. (For details please see Phase 2, Volume 3 - Port Master Planning, and Volume 4 - Civil Engineering considerations for the planned development.)

In the figures in Vol. IV Annex IV 2.1 and IV 3.1 a cost estimation is given :

- Extension Container Terminal
- New Container Terminal North and South
- Infrastructure Connections and Breakwater

These cost estimations are the basis for the cash-flow-analysis. All figures are based on western standards, that means that in some positions may be possibilities for cutting down the investment by using regional procurement.

### 2.1 Cash Flow Analysis

#### 2.1.1 General Assumptions and Inputs

In this chapter the assumptions made with respect to the inputs for the cash flow analysis will be described. The detailed input figures are listed in annex 3. For the planning period of 15 years (1998 till 2012, resp. year 1 till year 15) the forecast for the main factors of the calculation model

- investment
- proceeds
- costs

- general assumptions

will be considered. These cash flow analysis were made for the priority investments for the Poti container terminal, the Poti general cargo and bulk areas and the multipurpose terminal in Batumi. The model was developed for the Poti container terminal, therefore the following explanations are orientated on this model. It is negotiable without endorsement to the other commodities. The explanatory notes are made for the Poti container terminal and the Batumi multipurpose terminal.

The **investment** is divided into the parts

- Infrastructure, site preparation and environmental
- Civil works, utilities and buildings
- Cargo handling and other equipment
- Incidental expenses.

The **proceeds** are divided into **handling proceeds** and **storage proceeds**.

The **costs** are divided into the parts

- Real estate
- Depreciations
- Operating costs

The **profit/loss** is turn out **before tax** and **financing**.

The **financing costs** provide information about interest and repayment.

Corresponding to the time schedule the business and financing plan contains the investments for the extension of the existing container terminal, the area of berth 12-14 and the new terminal north, which is planned to begin its operation in the year 2002. After this time the area of the "old terminal" is free for other activities of the port. It is to be discussed if the net book value of the not transferable investments has to be calculated as special depreciation or if the container terminal company has the possibility to receive income by leasing the area and the buildings to another operator. An estimated calculation of the yearly saved depreciation sums up to about 260,000 USD.

### 2.1.2 Quantity framework

The investments and the operations depend on the forecasted container moves. The figures are:

Year	Container (TEU)	
	full	Empty (1/3 of full ct.)
1998	48 000	16 000
1999	52 940	17 500
2000	64 960	21 650
2001	79 730	26 580
2002	98 050	32 680
2003	106 880	35 630
2004	116 490	38 830
2005	126 980	42 330
2006	138 410	46 140

Year	Container (TEU)	
	full	Empty (1/3 of full ct.)
2007	151 320	50 440
2008	171 750	57 250
2009	194 930	64 980
2010	221 250	73 750
2011	251 120	83 710
2012	287 930	95 980

(rounded figures)

Beside the income from the container handling in these calculations another part of income are the storage fees. Therefore, it is necessary to define the proposed development of the part of container in storage. The share of container which will be stored is supposed with 10% of the total containers for an average storage time of 20 days. All other storage activities will be included in the total container handling prices.

### 2.1.3 Investments

The investments for the extension container terminal, the container terminal berths 12-14 and the new container terminal north with breakwater and infrastructure connections are listed in annex 3, summarised for the years 1998 till 2012 and without breakwater.

The investments (total, with incidental expenses) are shown sum accumulated until the regarded year such as

		with breakwater	without breakwater
for the year	1998	9,961,614 USD	9,961,614 USD
	2002	119,859,164 USD	77,309,164 USD
	2012	158,268,363 USD	115,718,363 USD

In these investment sums all replacement costs according to the depreciation time of the equipment are included.

Poti-Container-Terminal REPLACEMENT					
Description	Lifespan	US-\$	US-\$	US-\$	US-\$
		2004	2007	2009	2010
<b>I. Extension Container Terminal</b>		<b>420.000</b>	<b>3.953.950</b>	<b>3.258.500</b>	<b>152.749</b>
<b>6. Cargo handling equipment</b>					
Reachstackers	8	0	0	2.127.500	0
Spreaders	8	0	0	460.000	0
Terminal tractor	5	420.000	0	441.000	0
Containerchassis	10	0	0	230.000	0
<b>II. Container Terminal bearth 12-14</b>					
<b>4. Cargo handling equipment</b>					
Reachstackers	8	0	1.221.000	0	0
<b>III. New Container Terminal North</b>					
EDP hardware and software	5	0	550.000	0	0
<b>6. Cargo handling equipment</b>					
Terminal tractor (1st delivery)	5	0	1.732.500	0	0
Terminal tractor (2nd delivery)	5	0	0	0	0
Terminal tractor (3rd delivery)	5	0	0	0	0
Workshop equipment	5	0	288.750	0	0
Stevedoring gear	8	0	0	0	152.749
Containerstuffer	5	0	161.700	0	0
<b>Replacement of I. and II. will be used in the new container terminal north.</b>					

These figures are the basis for the above showed tables 1 and 2, where the time distribution of the investments are scheduled. The figures for the separate years are reproduced in annex 3 for the variant without breakwater and infrastructure connections.

#### 2.1.4 Income

The proceeds are orientated at the list of tariffs of the Georgian ports (dated of 30. August 1995, see annex 4) and discussed with the experts. It is proposed to calculate with the following rates of comparable ports.

Handling proceeds:

Full container (TEU)	140 USD per TEU
Empty container (TEU)	70 USD per TEU

In these rates all handling costs as well as the documentation are included.

Storage proceeds (as per tariff) :

Tariff	USD per day
20 ft container during 15days	5.00
20 ft container 16-30 days	6.25
20 ft container more then 30 days	7.25
40 ft container during 15days	6.00
40 ft container 16-30 days	7,50
40 ft container more then 30 days	9.00

We propose some modifications of the tariff rates, e.g. raising of the 40 ft container rate and only one average storage time.

In the calculations the storage rate will be fixed to 5,00 (9,00) USD per day for the 20 (40) ft container for 20 days average storage time.

The rates remain unchanged during the calculation period, that means that the calculations have a sound basis.

### 2.1.5 Costs

Real estate:

It is proposed to calculate a leasing rate for the required terminal area. A realistic rate as applied e.g. in Hamburg and Rotterdam and now proposed for this terminal is 4 USD per sqm and year. The rate is calculated unchanged during the period.

It is to be discussed, whether the quay walls can be regarded as an infrastructure investment financed by the port authority and leased by the terminal company. At present, the quay walls are regarded as investment of the terminal company. •

#### Depreciations:

In Georgia the depreciation rates are on a low level. In a market orientated economy the depreciation strategy of the companies are a very effective financing instrument. Therefore, it is proposed to use the depreciation rates of the western countries. The table gives an view of the used depreciation rates (European standard and Georgian rates).

Depreciation rates	European standard p.a., %	Georgian rates p.a., %
Breakwater	2,0	1,5
Sewage/water/electricity/gas-pipe/cable etc.	5,0	3,0
Paved areas and roads	5,0	4,0
Rail tracks and switches	5,0	3,5
Lighting	5,0	2,5
Office- and sanitary building	5,0	7,0
Transit sheds	10,0	5,0
Workshops	5,0	6,0
Workshop equipment	20,0	
Reefer Points	10,0	8,0
Transformation Building	5,0	2,5
Container cranes	10,0	4,0
Mobile harbour cranes	10,0	7,2
Transtainers	5,0	8,8
Forklifts	12,5	25,0
Reachstackers	12,5	5,0
Container stuffer	20,0	
Stevedoring gear (e.g. spreader)	12,5	15,0
Trucks/Tractors	20,0	12,5
Trailers/Rolltrailers	10,0	10,0
Security equipment	10,0	8,0
Security equipment-fence/perimeter wall	4,0	8,0
EDP	20,0	8,0
Rehabilitation equipment	10,0	

#### Operating cost:

The development of the operating costs shows annex 5

The personnel costs are divided in 3 categories:

- Interchange/guard
- cargo handling/repair
- administration

The present wages for the category guards/interchange are about 70 USD (92 Lari) and for the category cargo handling about 130 USD (170 Lari). The increase of rates for the next 5 years was quoted with about 20 %. It is assumed that the wages of the operational employees will have to be brought to a similar level to that of other countries in transition. There are three increasing rates for

- the years 1998-2002: 20% p.a.,
- the years 2003-2007: 15% p.a.,
- the years 2008-2112: 10% p.a.

The surcharge for social insurance is given with 31%.

It is to remark, that no costs for experts (national or international) are calculated.



The other costs as office material, office equipment, partial repair material and so on was given with 225,000 USD as the share (17%) of the container terminal of the whole sum of the port. Energy costs and electric power especially for the equipment and lighting are checked with current information of other ports.

The annual increasing rate of these costs are 5%. The costs for communication and water/sewage are estimated and show an increase of 10%.

The administration assessment is in accordance with present share of the container transshipments of the whole port (17%), the increase is calculated with 1%.

### 2.1.6 Taxes

An important assumption for the calculation is, that the present tax system will continue. The main tax which is calculated in the cash flow analysis is the corporation tax with 20% of the earnings.

## 2.2 Calculation of the cash flow

With the above mentioned assumptions the investment projects are evaluated by several calculation runs.

### Summary of the project finance conception of the Poti Container Terminal

The datas refer to the container terminal without breakwater and infrastructure connections.

- The finance model calculates investments and the operating of the terminal for a period of fifteen years. Within this period the investments shall be reduced by operational earnings.
- Present calculations predict a total investment of 116 million USD, the main investment will take place in the first period (five years) and in the 9th till 13th year of operation. The investment in the 15th year (11,5 million USD) can be financed by the actual cash flow.
- The operational turnover will increase from 8.550 million USD (1st year) to 51.290 million USD (15th year).
- Operational costs will increase from 2.282 million USD (1st year) to 13.266 million USD (15th year).
- The annual depreciation figures were taken into the finance model as mentioned above.
- As far as possible costs of new investments were reduced by earnings including depreciation of the year before.
- The calculation of the "real case" predicts a 100 percent debt finance with an annual interest rate of 10 percent. Intermediary financing was calculated for the new financial need in the middle of the year of new investments, after this year a reduction of the loan was calculated by an annuity loan which runs till the end of the project period.
- Earnings after interest were submitted to a 20 percent (benefit-) tax. Special tax effects by a forwarded loss declaration ("Verlustvortrag") were not taken into account.

### 2.2.1 Calculation of the “real case”

100 percent debt finance with an annual interest rate of 10 percent serves as the real case. The investor has to pay 15.102 million USD tax within the period of the project round about 50% in the last six years. As the earnings before tax will be reduced by the investment in the 15th year of operation (11,5 million USD), the total benefit tax will be reduced by 2,2 million USD.

*See chapter 1, table 2, pages 2 and 3*

### 2.2.2 Modified Calculation of the “best case”

100 percent debt finance with an annual interest rate of 8 percent serves as the best case. The investor has to pay 16.926 million USD tax within the period of the project - mostly within the last years. As the earnings before tax will be reduced by the investment in the 15th year of operation (11,5 million USD), the total benefit tax will be reduced by 2,2 million USD.

***Table and detailed description see Table 2.2.2-1 in Phase 2 Report and Annex 2.1***

### 2.2.3 Modified Calculation of the “worst case”

100 percent debt finance with an annual interest rate of 12 percent serves as the worst case. The investor has to pay 13.271 million USD tax within the period of the project - mostly within the last years. As the earnings before tax will be reduced by the investment in the 15th year of operation (11.5 million USD), the total benefit tax will be reduced by 2.2 million USD.

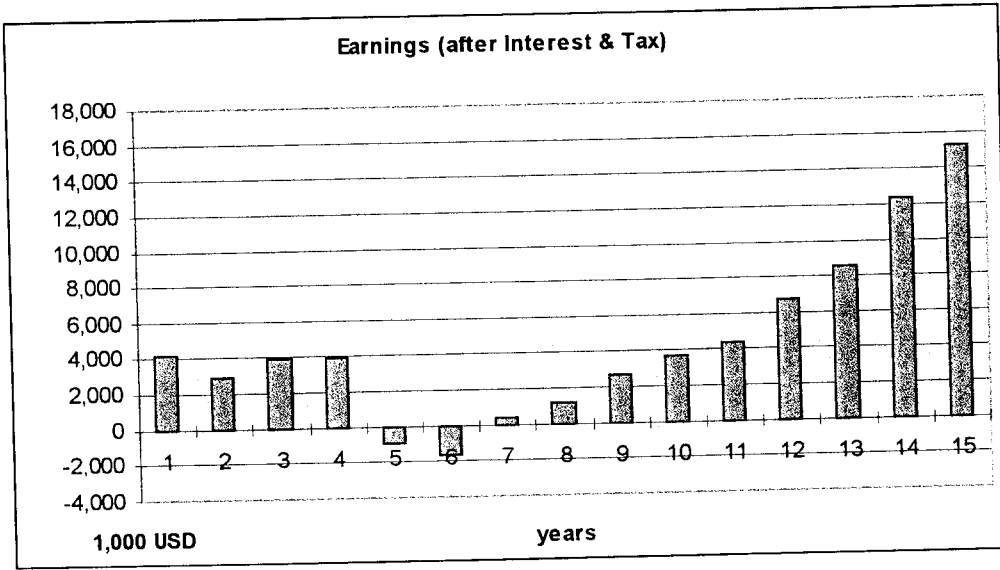
***Table and detailed description see Table 2.2.3-1 in Phase 2 Report and Annex 2.2***

### 2.2.4 Conclusions and recommendations (real case)

- Data provided by the HPTI/DSC/RMG-team show a reasonable project finance model.
- The conception should further calculate the possibility of being partly financed by equity capital. Equity capital usually expects an average of an annual interest of at least 15 percent after tax.
- The loan status will grow up to a peak of 52.591 million USD in the 6th year of operation.
- The total of tax payment shows the possibility of an improvement of the investment plan.
- Investments in the first period should be calculated carefully. The possible sale of the extension terminal after the North Terminal has been finished has not been taken into account up to this point.

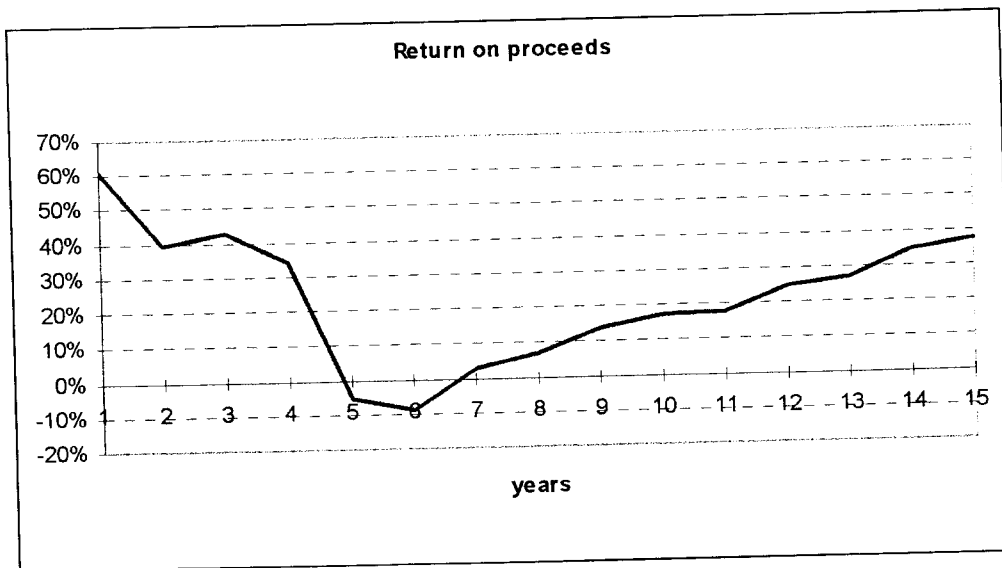
#### Earnings (after interest and tax, container terminal without breakwater)

- In the first years the project will achieve almost constantly positive earnings after interest and taxes.
- The accumulated earnings after interest and taxes equal 53.932 million USD over the project period.
- In the last years the project will have increasing earnings, which are partly used for the financing of new investment.
- Please take into account that in the last year 11.5 million USD will be used for the last investment in year 15.



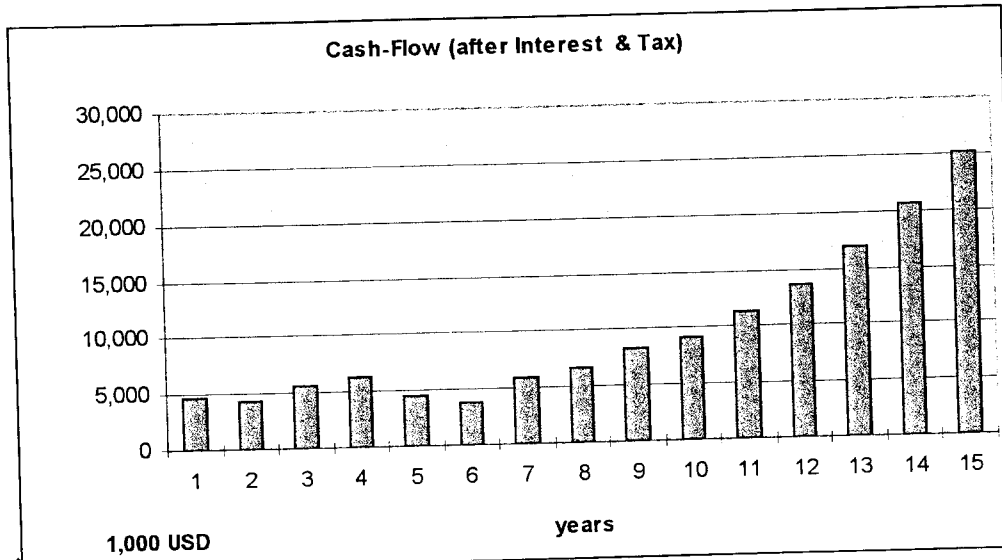
### Return on Proceeds

- The Return on Proceeds refers to the relation between the earnings before tax and the proceeds.
- Due to poor earnings in the years after the beginning of the operating in the new container terminal the Return of Proceeds is negative in the years 5 till 8
- The accumulated Return on Proceeds over the 15 years equals 18,3%



### Cash-Flow (after interest and tax)

- The cash-flow after interest and tax is used to finance a part of the investments.
- The cash-flow is rather constant during the project, with a strong increase after the 8th year.

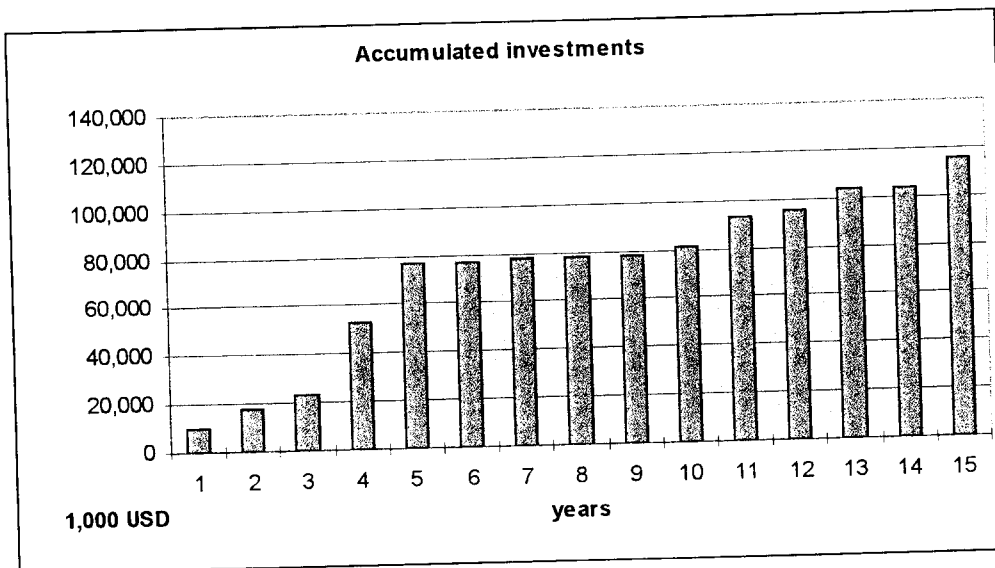


Accumulated investments

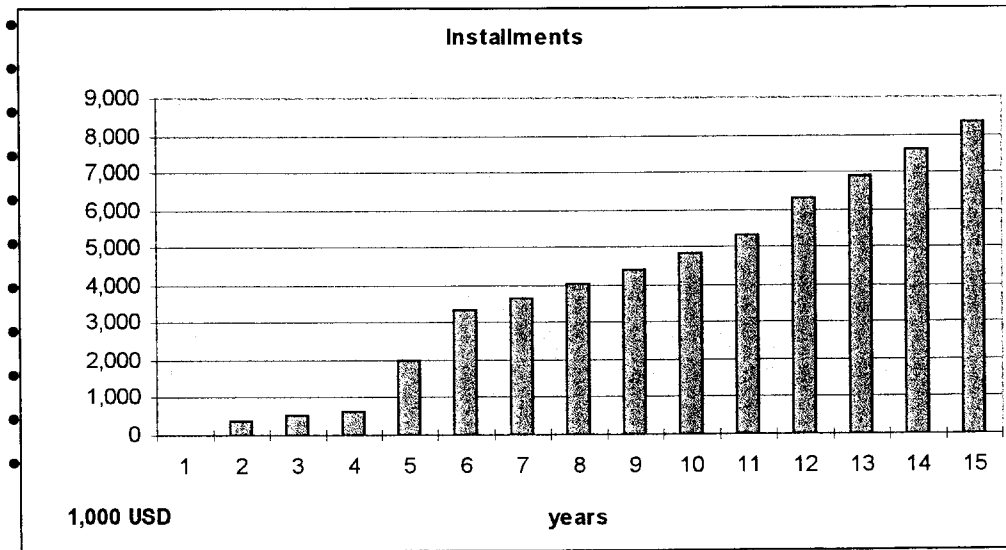
- The accumulated investments form the project's fixed assets.
- In this diagramm the effects of depreciations have not taken into account.
- The strongest increase in investments is within the first years due to the need of high initial investments.

### Annual Instalments

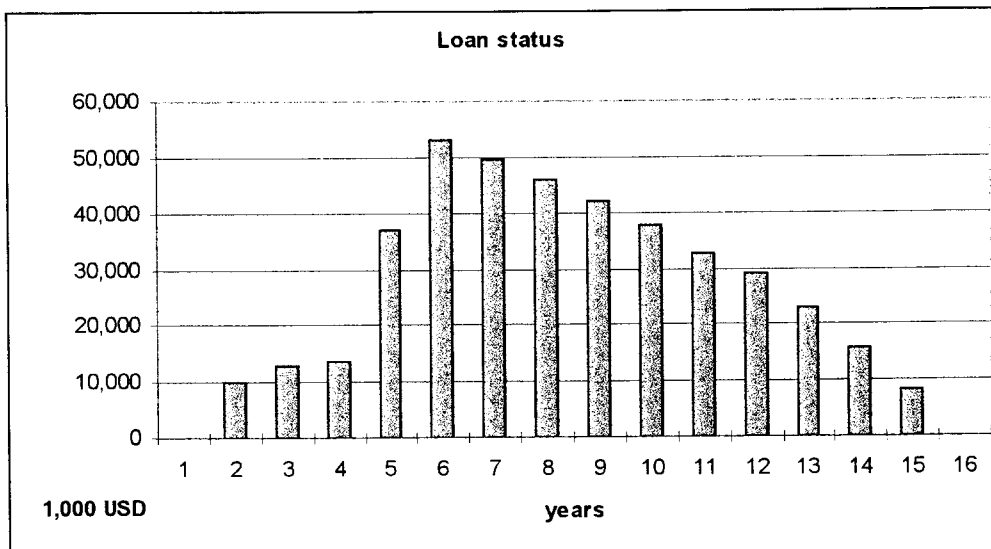
- The annual instalments form with the annual interest payments the annuity.



- The installments show a rather regular trend during the project period. At the end the repayments increase clearly, as the interest payment decreases.
- The investment in the last year is not financed by annuity loan but directly reduced by the present earnings



### Loan status



- The maximum loan status in the year 6 indicates the project's maximum loan need of 89,197 million USD.
- The whole loan amount can be paid back until the year 16 with own cash-flow.

### Reduction of project period:

The investor might think of a project period of ten years instead of fifteen years.

The finance model can hardly recommend this shortening.

Arguments are as follows:

- The annuity rate would sharply rise because of a shorter repayment period; meanwhile the effect from a lower interest rate (ten years instead of fifteen years) is only a little.
- The investor plans 10 percent of the investment in the last four years; meanwhile the investor sees 49 percent of the total earnings before interest and tax in the last five years.
- 48 percent of the total depreciation within the period is obtained in the last five years.

As a financial advise we would give the following recommendation:

**Conclusion:**

- A financing under conditions which usually are offered by the European Bank for Reconstruction and Development (EBRD) seems to be reasonable.
- A partly financing under conditions of equity capital (an interest rate after tax of at least 15 percent per annum would be expected) can be discussed.
- The project should take into regard that the investment plan should try to avoid tax payment.
- The high investment in the 15th year of operation causes a high capital requirement till the very end of the project period.
- At a later point the investor should check whether a loan in USD will be the optimum finance possibility. Long-term interest rates in other currencies might be lower. On the other hand the proceeds are gained in USD, this makes a financing on a USD-basis reasonable.
- The investment of the breakwater (and the infrastructure connections) should not be involved in the financing of the container terminal project.

**The calculation runs for the Poti general cargo and bulk areas are listed in annex 2.**

## 3. Batumi

The phased development of the Batumi Multi Purpose Terminal is shown above in table 4 and described in Phase 2, Vol.III and Vol.IV.

The concept of the multi purpose terminal provides to handle about 70% of the general cargo volume, all container and the RoRo - volume. A quay wall of 250m will be reconstructed between the present berth 4 and 5; the RoRo-ramp will be integrated. The planned area of the multi purpose terminal has about 31,250 sqm, the multi purpose terminal **extra** version will have about 47,750 sqm. This version is the basis for the calculation runs. The equipment planning assumes that above all self-sustaining ships are to be handled - that means no expensive mobil cranes will be needed.

In Vol.IV, annex IV, 2.2 and IV, 3.1 a cost estimation for the multi purpose terminal extra is given. Again it is to mention that all figures are based on western standards. Therefore in some positions may be possibilities for cutting down the investment by using regional procurements.

### 3.1 Cash Flow Analysis

#### 3.1.1 General Assumptions and Inputs

The same remarks as in chapter 2.1 are valid. The detailed input figures are listed in annex 6. The breakdown of the investment is divided into the parts

- site preparation - esp. demolition of buildings and preparation of the ground
- environmental - cleaning of the soil is a significant cost position
- civil works - esp. construction of the quay wall
- utilities and equipment

The proceeds are divided into general cargo and container handling proceeds and in storage proceeds. The other positions are the same as mentioned above.

#### 3.1.2 Quantity framework

The investments and the operations depend on the forecasted handling volume. The figures are:

See Annex 8, Development of Proceeds.

#### 3.1.3 Proposed Investments

The investments for the Batumi multi purpose terminal are listed in annex 6 summarised for the years 1998 till 2012. The investments are shown sum accumulated until the regarded year such as for the year 1998: 10,843,218 USD or for the year 2000 (expected beginning of operation): 25,951,445 USD. The total investment sum until the year 2012 amounts to 30,547,445 USD.

#### 3.1.4 Proceeds

The proceeds are orientated at the list of tariffs of the Georgian ports (dated of 30 August,1995), see annex 4). The rates remain unchanged during the calculation period, that means that they have a sound basis.

### 3.1.5 Costs

Real estate:

As in Poti it is proposed to calculate a leasing rate for the required terminal area of USD 4,00 per sqm and year. There is calculated no change during the calculation period.

Depreciations and operating costs:

The same assumptions are made as for the Poti terminal. You can see the development of the operating costs in annex 7. The basis of the figures are the present values. The increasing rates are given in the table. The interviews with the port administration are the sources of the data.

### 3.1.6 Taxes

The relevant tax is the benefit tax with 20% of the earnings.

## 3.2 Calculation of the cash flow

With the above mentioned assumptions the investment project is evaluated by several calculation runs. The calculation runs show a principle problem in the definition of the activities, proceeds and costs of the multi-purpose terminal. In the first calculation run of the real case with the calculated proceeds, based on a certain part of the general cargo and bulk operation the earnings get to low. The cash flow analysis has a very bad result (see table 3.2.2-1, Report Phase 2, calculation of the worst case). The financial team thus decided to increase the proceeds by 10%. The result is documented in the tables of the real case (table 4 in the chapter 1.3). After the powerful investment in the first 4 years earnings and cash flow get a good result, the return on proceeds reaches nearly 10% and the loan (the maximum loan sum is about 25 million USD) can be repaid in the project period.

The results are shown in the following chapters.

### 3.2.1 Basis of the conception

The finance model calculates investments and the operating of the terminal for a period of fifteen years. Within this period the investments shall be reduced by operational earnings. Present calculations predict a total investment of 30.547 million USD, the main investment will take place in the first period (four years).

The operational turnover will increase from 1.602 million USD (1 st year) to 9.867 million USD (15 th year). As mentioned the finance model has taken into account 110% of all proceeds, which are forecasted.

Operational costs will increase from 875,000 USD (1st year) to 4.294 million USD (15th year).

The annual depreciation as mentioned above were taken into the finance model.

Earnings after interest were submitted to a 20 percent (benefit-)tax. Special tax effects by a forwarded loss declaration ("Verlustvortrag") or by a taxation of the annual dividend payments were not taken into account.

### 3.2.2 Calculations of different cases

#### 1. Calculation of the "real case"

See chapter 1, table 4, pages 2 and 3

#### 2. Calculation of the "best case"

*See detailed description and table 3.2.2-1 in Phase 2 Report and Annex 2.3 of the present report*



### 3. Calculation of the "worst-case"

See detailed description and table 3.2.2-2 in Phase 2 Report and Annex 2.4 of the present report

#### 3.2.3 Analysis of Calculations (real case)

Data provided by the HPTI/DSC/RMG team show a reasonable project finance model.

The conception should furtheron calculate the possibility of being partly financed by equity capital. Equity capital usually expects an average of an annual interest of at least 15 percent after tax in Western Europe.

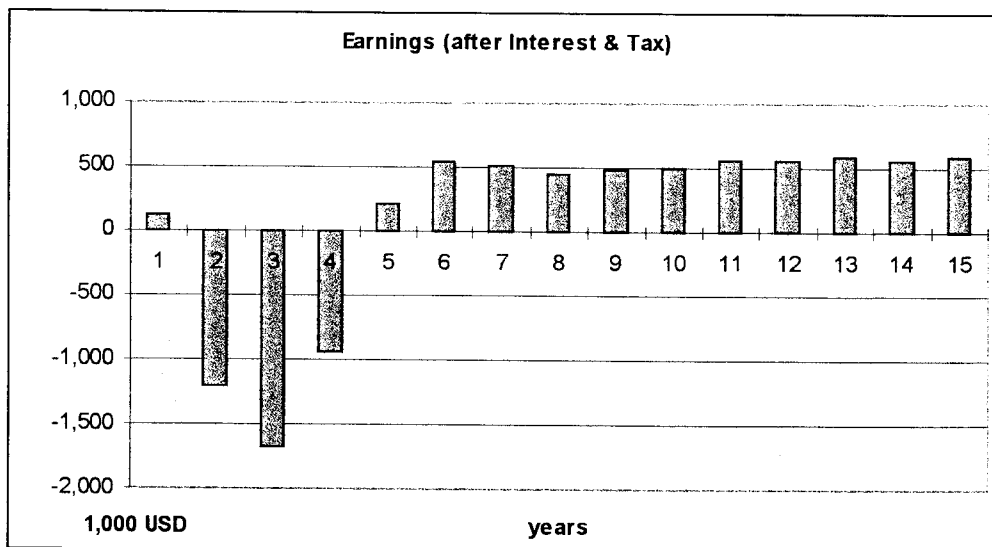
The loan status will grow up to a peak of 25.380 million USD (real case) in the 5th year of operation.

The total of tax payment sums up to 1.432 million USD.

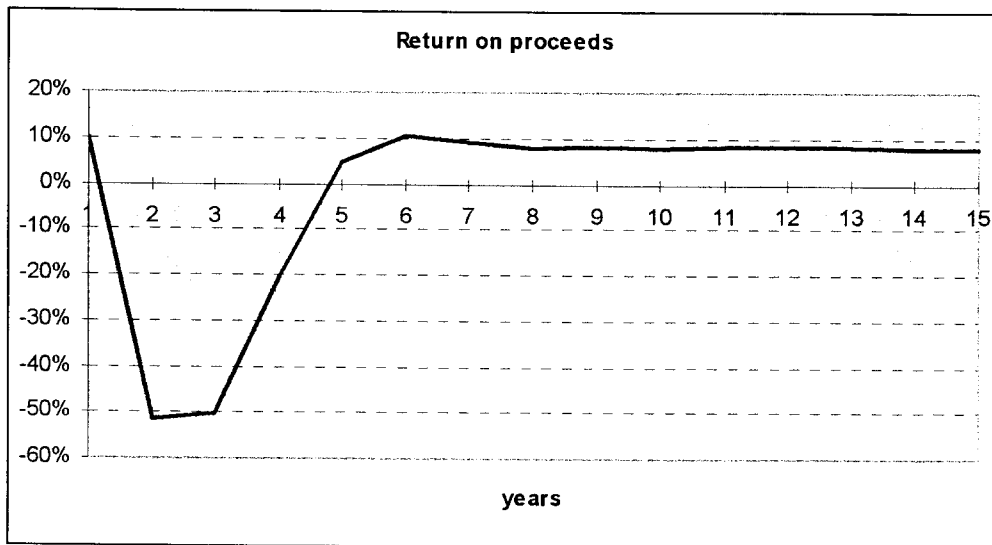
#### Earnings after Interest and Tax

- After 4 years the project produces earnings after interest and tax, which are nearly constant.
- The accumulated earnings after interest and tax equal show a typical line as usual in the project financing cases.

#### Return on Proceeds

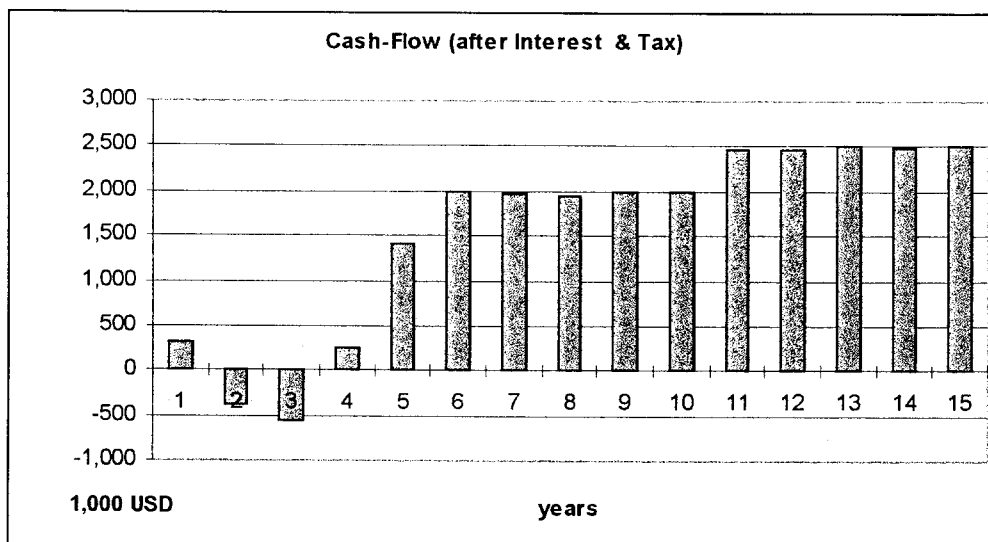


- The return on proceeds refers to the relation between the earnings before tax and the proceeds.
- After the negative figures in the first five years it becomes a nearly constant value of about 10%.



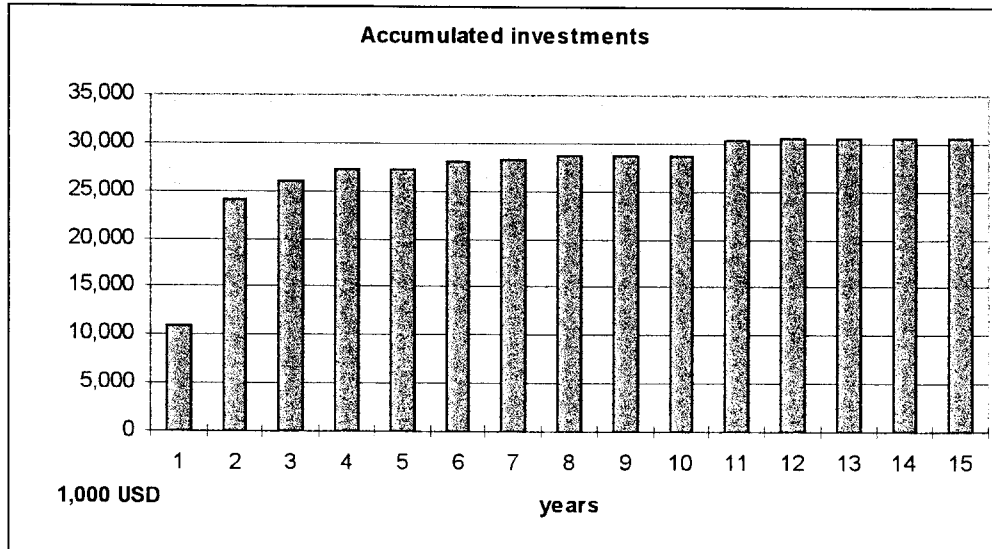
#### Cash-Flow (after interest and tax)

- The cash-flow after interest and tax is used to finance a part of the investments.
- After the first 4 years the cash-flow is rather constant during the project.
- The increase of the cash flow in the 11th year depends on lighter depreciations.

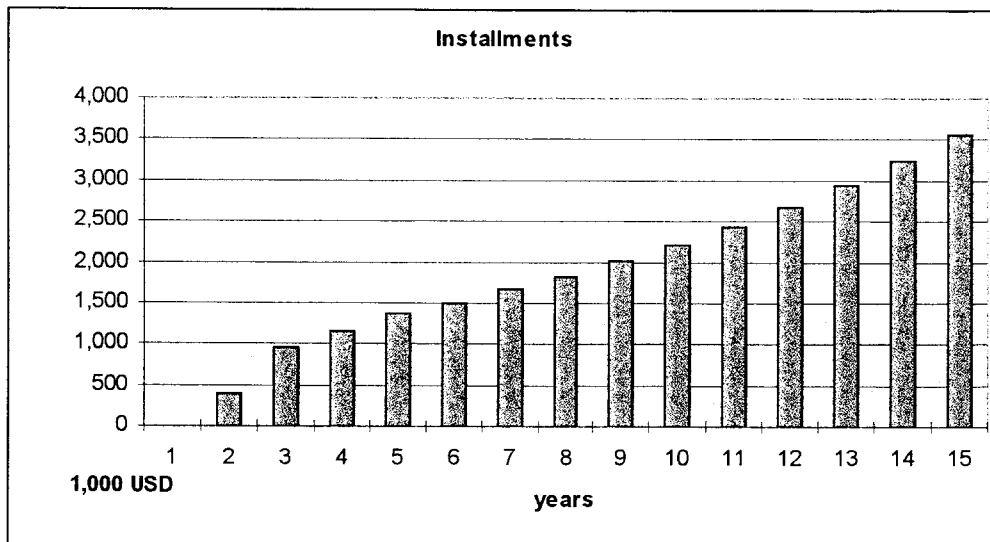


## Investments

- The accumulated investments (shown in the chart) form the project's fixed assets without depreciation.
- The strong increase in the first years is caused by the fact, that most of the project's investments are made in the initial period.

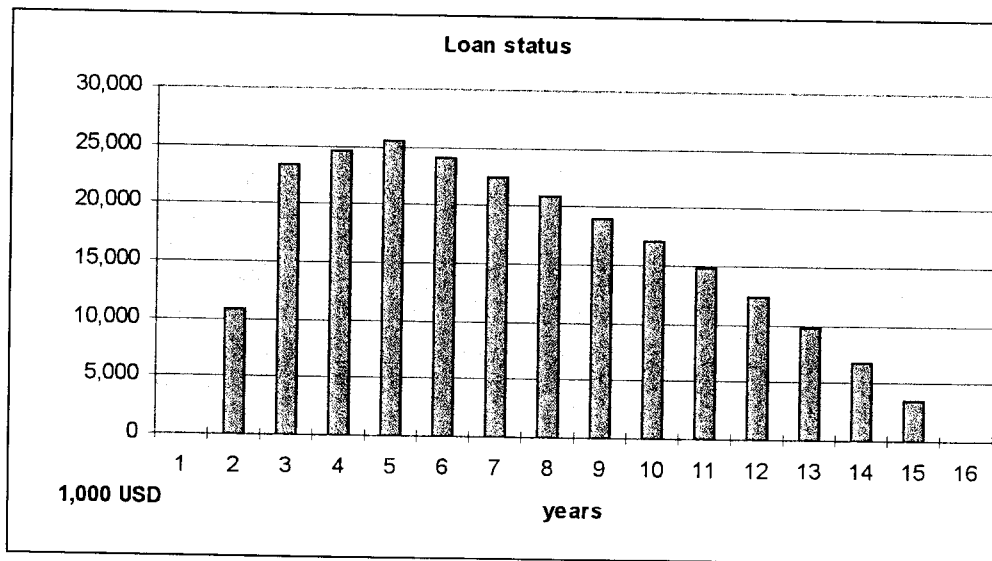


## Annual Instalments



- The annual instalments form with the annual interest payments the annuity.
- The instalments show a rather regular trend during the project period. The repayments increase clearly as the interest payment decreases.

## Loan Status



- The project reaches the maximum loan status in the 5th year, when the loan status equals 25,380 Mio. USD.
- In the beginning of the 16th year the loan is completely paid back.

### 3.2.4 Recommendations and conclusions

#### Reduction of the project period

The investor might think of a project period of ten years instead of fifteen years.

The finance model can hardly recommend this shortening.

- The annuity rate would sharply rise because of a short repayment period; meanwhile the effect from a lower interest rate is only a little.
- Nearly 50% of the total depreciation within the period is attained in the last 6 years.
- The same situation is given for the earnings (before interest and tax).
- In this context we want to outline that a part of the costs are calculated as overhead costs for non port expenses. At present this seems to be reasonable, in future a change might be recommendable.

#### Conclusion

A financing under conditions which usually are offered by the European Bank for Reconstruction and Development (EBRD) seems to be reasonable.

A financing under conditions of equity capital is not possible, because an interest rate of at least 15% p.a. would be expected.

At a later point the investor should check whether a loan in USD will be the optimum finance possibility. Long-term interest rates in other currencies might be lower. On the other hand the proceeds are mostly gained in USD, this makes a financing on a USD-basis reasonable.

As mentioned above we can recommended this project only under the condition of an increase of the forecasted proceeds by 10% at least.

## Section 3

# Preliminary Cost - Benefit Analysis

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# 1 Introduction

This Cost/Benefit Analysis is based on a methodical approach which has already been successfully used in the cost/benefit analysis for the Bremen Freight Traffic Centre. On behalf of the Federal Ministry of Transport, a Cost/Benefit Analysis has been implemented for the transport trade regions and the freight traffic centres and has been recommended for further use in the assessment of freight traffic centres in Germany.<sup>1</sup>

The method successfully proven on the practical case of the "Bremen Freight Traffic Centre" (terrain of more than 200 hectares with many traffic facilities, such as transshipment facilities for combined traffic, logistics centre, warehouses, community facilities, etc.) can also be applied to ports because of the comparative traffic situation of associated companies and the traffic facilities.

The Cost/Benefit Analysis, applied in the following, considers three accounting levels:

- the port with its traffic infrastructure and superstructure
- the regional aspects
- the international effects on freight transport

An important tool within this approach are the quantified internal and external effects of changes in freight transport structures. On this basis it is possible to quantify the i.e. resulting reductions in transport costs of the ports rehabilitation and extension and in addition the resulting environmental effects.

By the concrete planning case "Bremen Freight Traffic Centre", it could be demonstrated that the high infrastructure costs of a freight traffic centre could be more than compensated due to the benefit effects in money's worth, and in particular because of regional effects. As for the Bremen Freight Traffic Centre, the regional economic effect is similarly also very important for the ports of Poti and Batumi. In Batumi, and especially in Poti, the port is of great significance for a major part of the population as a workplace and source of income. Therefore, the regional economic consideration is a relevant part of methodology.

This methodical approach can also be applied to the port. The port, as a link between the land- and water-side traffic carriers and its logistical performance spectrum, has a strong regional and national effect. Two workplaces in the port results in the creation of one additional workplace in the hinterland. The development of the port function and the associated companies strengthen the economic power of the entire region.

The overall economic assessment of the planned projects (referring to the realistic case of the previous cash flow analysis), demands the comparison of all relevant project related advantages and disadvantages. The qualification, quantification and evaluation of effects is performed with the comparison of the planned cases and corresponding comparative cases. In view of the diversity of project effects, concerning the direction (positive and negative) as well as the extent, it is desirable to interpret them in a coherent manner (assessed in US\$) and not in different scales. Otherwise advantages and disadvantages of infrastructure projects may not be weighted.

In order to assess the costs and benefits, different points of view can be taken. The first can be named as the regional point of view on a small scale area i.e. the ports and the cities of Poti and Batumi. The second is the national point of view expanded by the effects to the national economy e.g. of the railways and road network. The third and most complex is the European point of view depicting the European networks of all

<sup>1</sup> Cost/benefit analysis of freight traffic centres pilot analysis by the example of the freight traffic centre Bremen - Federal Ministry of Transport 1993

transport modes. Undoubtedly, the last is the most interesting for the European Union as contractor of this study. This aspect is considered in the calculation of the benefits resulting of changes in the transport volume in seven routes connecting the TEN with the TRACECA-Routes.

## 2 Methodology of Assessment

### 2.1 Comparative Cases

For the evaluation of benefits of the port development in Poti and Batumi a definition of comparative cases is necessary, i.e. which consequences result on the regional, national and international economic point of view when the expansions and renewal projects are not carried out. The comparative cases are therefore described hypothetically as the status quo. This means in concrete, that the existing equipment of the ports is maintained and replaced if necessary, but not extended. The turnover of both ports is "frozen" therefore at about 4.5 million tons per year. The maintenance of this actual handling capacity needs only money to perform service and compensation investments of the port assets.

If the ports do not develop as described in the Port Master Plan, the traffic flows, which are mainly transit traffic flows, use other transport routes with less hindrances. Therefore other modes and transport routes will have more transport volumes. The cost/benefit analysis considers the following transport routes as defined in the simulation within this report:

#### **Route No. I**

The Corridor No. I is most popular for freight with origin and destination Kazakhstan from/to Russia/Belarus and basis on the TEN corridor II and partly on TEN IX. The sea link via St. Petersburg is a natural route to the North Sea ports. The shipping route via the Caspian Sea Ib is the alternative corridor to the land link via Uralsk Ia. This corridor, a rail link via the Russian Federation, under strong influence of the MPS, is quite reliable. For countries such as Kazakhstan this corridor is still the preferred choice. Road transport is also possible on this land link.

#### **Route No. II**

The second Corridor No. II is mainly the TEN corridor III for a rail and road with the origin and destination TRACECA and Central Europe. The transport mode by rail is characterised by transshipment of the goods via Brest/Przemyśl.

#### **Route No. III**

This corridor is the link between TRACECA corridors and the TEN corridors IV for rail/road and VII on the Danube through Constanta in Romania.

#### **Route No. IV**

Corridor IV is the southeast European route on shore. It connects the south of France, northern Italy and the Balkan States Yugoslavia, Albania and Bulgaria the TEN route VIII. The Black Sea ports of Varna and Burgas in Bulgaria are the link to the Georgian ports and the TRACECA route.

#### **Route No. V**

The sea link through the Black Sea and the Mediterranean Sea is the Corridor V. The main commodity here is the container.



### Route No. VI

At last the corridor VI is the shorebound link on road through Turkey. Therefore the cargo doesn't flow through the Georgian ports.

### Route No. VII

This route is the sea link through the Black Sea and the Mediterranean Sea. It connects i.e. the Port of Rotterdam and the "Hinterland" traffic.

(Route map see: "Recommendation of the most viable route connections between TRACECA and the TEN" in this report)

## 2.2 Discounting

The discount of benefit and cost values with respect to the base year (1998) is required. The discount rate is set on 6 % per year. This rate can be seen as very high, e.g. the German infrastructure plan calculates with only 3 %. But due to the high risks in political and economical stabilisation, this seems to be appropriate. The result of this calculation is the cash value of accumulated costs and benefits in the observation period of 15 years. A decision-orientated evaluation of the port development is possible therefrom.

## 2.3 Methods of Evaluation

Costs and benefits may be divided into three categories:

- direct values
- indirect values and
- non-assessable values

The direct values result directly from the projects e.g. expenditure or receipts for estates, expenditures for internal and external development of port areas and so on. The indirect values are the result of the impacts on the port e.g. changes in transport structures. Non assessable values are following impacts which cannot be expressed in monetary values. A typical example is the impact on the image of the Georgian transport market.

Effects of the extension of the Georgian ports on transport structures are calculated with two kinds of cost components of traffic. Internal costs reflect the costs of freight that are covered by the payments of transporting companies:

- costs of infrastructure,
- costs of transport time,
- taxes and insurance.

External costs reflect the costs of freight that are not covered by the payments of transporting companies:

- air pollution (damage for humans, vegetation and materials),
- noise (sound absorber),
- pollution of soil and waters (cleaning of road and railway waste waters),
- partition effects (crossing limitations of roads and railway),
- consumption of areas (ecological compensation) and
- accidents (not covered by insurance).

In the above mentioned study a well founded approach for values expressed in money value per ton kilometre for the internal and external costs is developed. Unfortunately the derived figures are relevant for the most parts of Europe. For Eastern Europe countries referring data do not exist. Therefore an estimate may be the only way to proceed. The following data are the result of an estimate based on the figures on European standard and actual transport cost in Eastern European countries.

	cost factors of traffic		in US-\$ per tkm	
	1998	internal costs	external costs	
road		0.150	0.045	
rail		0.035	0.011	
incl. waterways		0.045	0.003	
seaship		0.045	0.003	

For the following years escalation factors in costs are assumed:

1998 - 2002	20 %
2003 - 2007	15 %
2008 - 2012	10 %

## 3 Cost and Benefit Effects

In the following chapters first the costs of the rehabilitation and the extension of the Ports of Poti and Batumi are calculated. The additional cost of operation and maintenance are although included. In the second step the benefits with respect to three fields are calculated. These fields are the benefits of the reduction in transport costs on an international point of view, environmental benefits on the basis of external costs of traffic and regional benefits.

### 3.1 Assessment of Costs

Three projects of the Georgian Ports are calculated in the following pages:

- Container Terminal Poti
- General Cargo and Bulk Areas Poti
- Batumi Multi-Purpose Terminal

In detail the projects are characterised by the following data. The data are taken from the Vol. VI of this report ("Financial and Economic Impact Analysis"). More detailed descriptions and information are found in this volume.

#### Container Terminal Poti

The project to be calculated is the extension of the container operation in the existing port and the new construction in the north. The comparative case is therefore the maintaining of the existing container operation for the future time with the following characteristic numbers (based on the figures of 1998 with the assumption that the maximum capacity will be reached in 1999):

- 82 employees
- 0.5 mil tons of throughput per year (from 1999 onwards)
- 9.4 mil US-\$ of proceeds per year (from 1999 onwards)
- 2.6 mil US-\$ of operational costs per year (from 1999 onwards)

- 0.3 mil US-\$ of investment per year for replacements

The costs of the extension of the container terminal in Poti (included breakwater) referring to the total operational costs of 73.2 mil US-\$ (excluded the depreciation) and the capital requirements of 207.2 mil US-\$ (interest and repayment) of the cash flow analysis, the costs account to 280.5 mil US-\$.

### **General Cargo and Bulk Areas Poti**

The project to be calculated is the extension and renewal of the general cargo and bulk handling facilities. The comparative case contains therefore the maintaining of the existing operation for the future time with the following characteristic numbers (based on the figures of 1998 with the assumption that the maximum capacity will already be reached):

- 365 employees
- 1.3 mil tons of throughput per year
- 6.8 mil US-\$ of proceeds per year
- 3.3 mil US-\$ of operational costs per year
- 0.3 mil US-\$ of investment per year for replacements

The costs of the rehabilitation and extension of the port facilities including depreciation, additional operational costs etc. are 100.8 mil US-\$ (not discounted).

### **Batumi Multi-Purpose Terminal**

The project to be calculated is the establishment of the Multi-Purpose Terminal in Batumi for the handling of general cargo, bulk, RO/RO and container. The comparative case is not to use berths 4 and 5 further. The costs of investment and operation between 1999 and the year 2012 are 84.9 mil US-\$.

### **Total costs of investments and operation**

The total costs of investment and operation of the rehabilitation and extension of the Georgian ports account for 466.2 mil US-\$. The present value (in the year 1998) of these payments is 275.1 mil US-\$.

## **3.2 Assessment of Benefits**

Direct benefits of the investments in the Georgian ports are is the money earned for the services offered. These are the proceeds out of the port operations. Indirect benefits are expected in three fields. Reductions in the transport costs for the companies involved in the freight traffic between Central Asia, TRACECA and the European countries, environmental effects of changes in international traffic patterns and regional benefits.

### **3.2.1 Direct Benefits**

Direct benefits are the proceeds earned of the port activities. Within this chapter a detailed analysis and description of the proceeds is not necessary, because this is done in Vol. VI "Financial and Economic Impact Analysis". The proceeds are calculated for the three projects:

- Container Terminal Poti
- General Cargo and Bulk Areas Poti
- Batumi Multi-Purpose Terminal

The discounted value of the proceeds between 1998 until 2012 sum up to 263.1 mil US-\$.

### 3.2.2 Indirect Benefits

#### Transport Costs

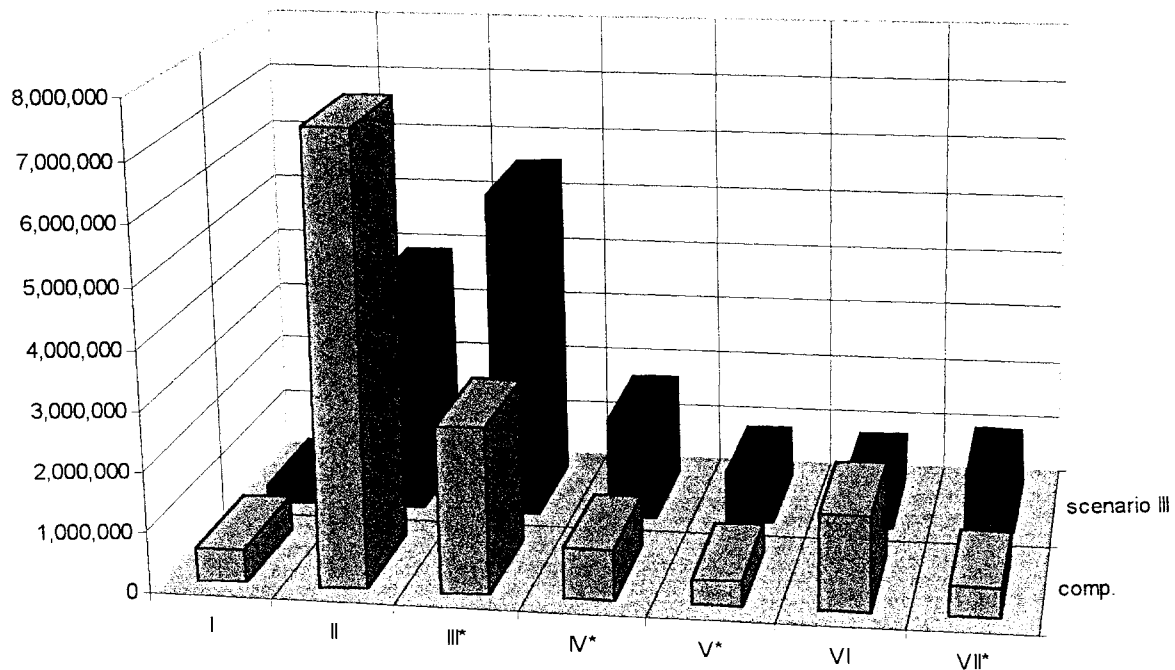
The effect of the rehabilitation and extension of the Georgian ports on the transport costs with respect to international cargo flows are estimated on the following steps of analysis.

1. Matter of consideration are the above mentioned transport routes I to VII. The total **transport volume** on these routes and the distribution is estimated. In addition the comparative case and the scenarios (scenario I to III) assumed in the traffic forecast have to be taken into consideration. Further more an estimate of the use of the different transport modes is necessary.
2. The **average transport distance** between origin and destination of the goods has to be estimated.
3. With the transport volume and the average transport distance the **transport performance** in ton kilometres (tkm) could be calculated.
4. When the transport performance (tkm) is multiplied with the cost data (internal and external costs as shown above) the **transport cost** of different transport structures could be calculated.
5. With the calculation of the difference between the cost of transport in the comparative case (without investments in the Georgian ports) and the derived scenarios (with investment in the ports and different turnover data) the **benefits** of the ports in its strengthened position could be compared.

The above presented method of calculation is necessary, because no reliable data concerning the relevant transport routes exist. Following the application of this method is documented with the data compiled within the analysis.

The estimated overall transport volume of the routes I to VII is 7 mil tons in the comparative case and the year 1998. In 2002 the volume is 10.8 mil tons, in 2007 14.1 mill tons and in the year 2012 18.5 mil tons. These data concern international long haulage transport only. Regional and national transport are not considered because the ports development has no influence on these kind of freight traffic. The distribution of the traffic volume with respect to the transport routes I to VII depend on the cases with/without port development (comparative case/scenarios) and the scenarios I to III of the traffic forecast for the ports. In the following diagram the distribution of the traffic volume i.e. for scenario III and the comparative case is shown.

**Distribution of traffic volume in tons with respect to the transport routes I to VII (Example: scenario III and comparative case)**



Routes marked with \* include transshipment in the Georgian ports

The case without development of the Georgian ports (comparative case) shows, that the other routes (I, II, VI) have a higher transport volume than in the case of development of the ports in the scenario III ("probable case"). In general the transport distances on the routes I, II and VI are longer than on the routes through the Georgian ports. Therefore it is to be expected, that the transport performance is in the case of the development of the ports much lower than in the comparative case (without ports development).

In the next step the average transport distances on the routes and the composition of transport modes has to be estimated resp. assumed. In the following table the used data are presented:

Routes	average distance in km	average composition of modes			
		road	rail	inland waterways	seaship
I	7,800	0	3,795	0	4,005
II	4,800	20	4,780	0	0
III*	4,600	19	3,115	0	1,466
IV*	5,700	2,255	0	0	3,445
V*	7,100	1,011	1,880	0	4,209
VI	8,600	1,912	1,875	0	4,813
VII*	7,500	1,058	0	228	6,213

The multiplication of the transport volumes with the average transport distances gives the transport performance. The results are shown in the following table. The term "ports" is relevant for the routes II, IV, V, and VII (transshipment in Georgian ports), others is relevant for the routes I, II and VI.

**Transport Performance of Routes in tkm**

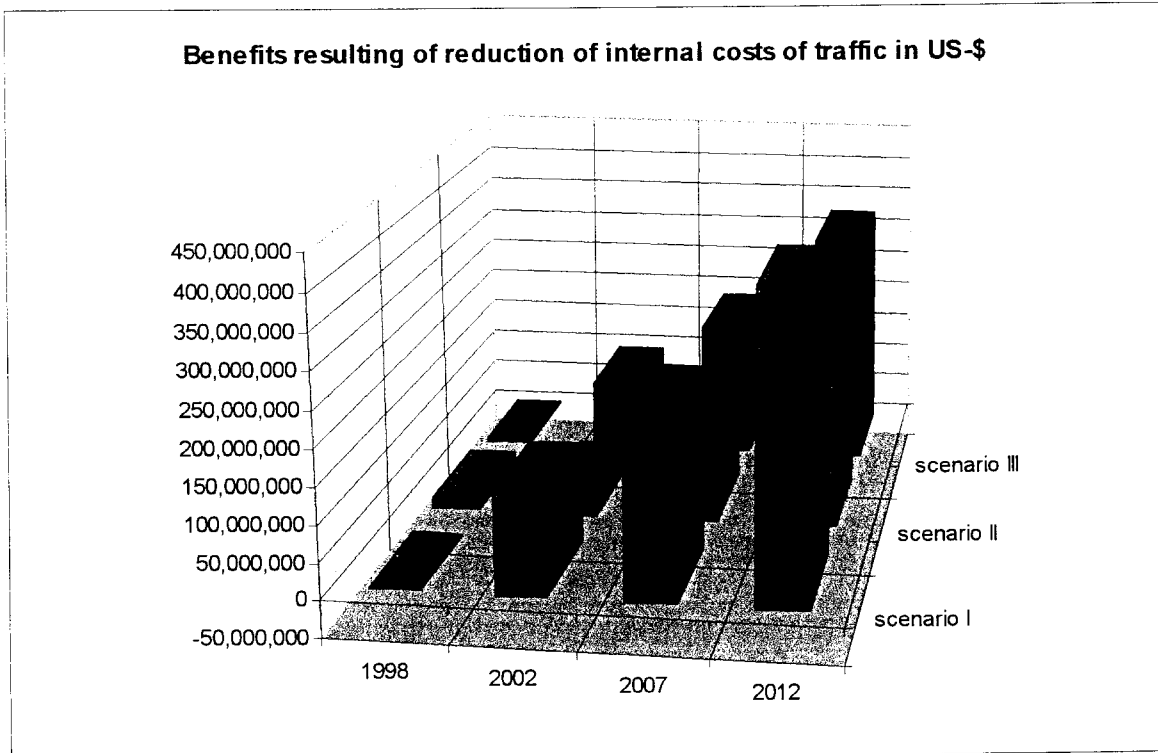
	1998	2002	2007	2012
<b>comparative case</b>	25,218,006,996	42,354,899,866	56,783,370,299	76,626,088,359
ports	12,590,822,776	12,590,822,776	13,490,167,260	13,490,167,260
others	12,627,184,220	29,764,077,089	43,293,203,039	63,135,921,099
<b>scenario I</b>	25,218,006,996	36,458,363,234	47,409,629,339	62,490,033,423
ports	12,590,822,776	24,282,600,850	32,076,619,930	41,519,437,230
others	12,627,184,220	12,175,762,384	15,333,009,410	20,970,596,193
<b>scenario II</b>	25,044,364,104	40,744,581,882	53,071,822,447	69,818,635,771
ports	12,417,179,884	15,783,795,476	20,849,503,173	26,988,128,839
others	12,627,184,220	24,960,786,406	32,222,319,275	42,830,506,932
<b>scenario III</b>	25,357,077,321	38,295,767,651	49,836,067,544	65,630,841,402
ports	12,742,521,959	20,639,356,345	27,265,426,722	35,291,776,460
others	12,614,555,362	17,656,411,306	22,570,640,822	30,339,064,942

Using the data for the internal costs of traffic and calculating the difference between the comparative case and the development scenarios, the benefits are the result.

**Benefits resulting of reduction of internal costs of traffic in US-\$**

	1998	2002	2007	2012
scenario I	0	137,271,546	250,954,109	416,296,033
scenario II	15,432,990	37,488,250	99,365,684	200,474,285
scenario III	-1,222,814	94,496,717	185,993,424	323,801,635

**Benefits resulting of reduction of internal costs of traffic in US-\$**



The presented figures take into consideration the reduction of transport performance and the change in the use of the transport modes.

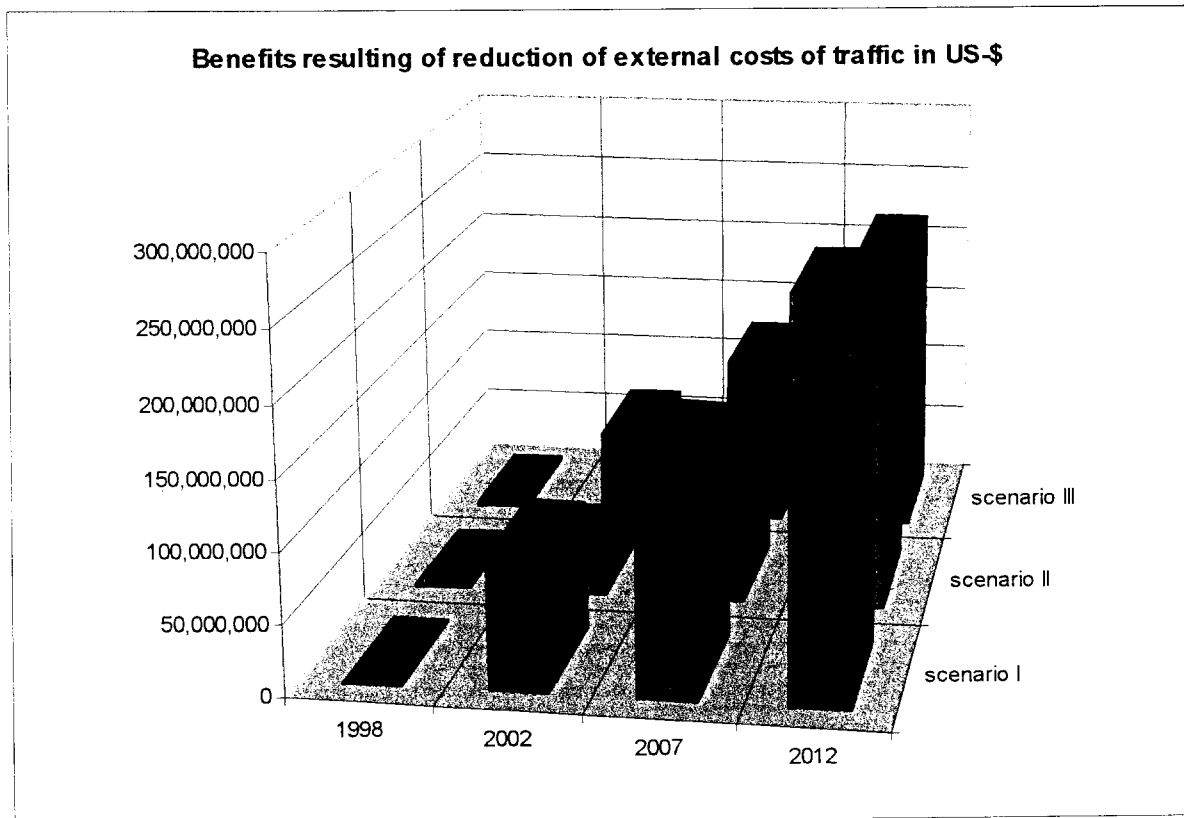
For the calculation of the cost-benefit-ratio the scenario III (probable case) was selected. The discounted value for the period of 1998 to 2012 of the benefits resulting of the reduction of internal costs of traffic is 1,300 mil US-\$.

### Environmental Effects

The same procedure as for the internal costs of traffic is executed for the internal costs. The different total transport performance and the different external costs of traffic for the modes in the comparative and the port development case result in noticeable reduction in the environmental effects of traffic. The results of the analysis is shown in the following tables.

**Benefits resulting of reduction of external costs of traffic in US-\$**

	1998	2002	2007	2012
scenario I	0	91,653,839	167,557,722	277,953,668
scenario II	934,498	25,030,257	66,344,750	133,853,216
scenario III	2,691,015	63,093,825	124,184,595	216,196,756



The calculation of the present value for the period 1998 until 2012 results in benefits of 880 mil US-\$.

### Regional Effects

The Georgian ports are of main importance for the region. The new workplaces emerging with the development of the ports according to the master plan present a component of ports benefits. The additional personnel necessary for the extension of ports activities is taken out of the "Financial and Economic Impact Analysis" (Vol. VI). The total additional personnel in the year 2012 is for both ports 390 persons. The average net wages of the personnel multiplied with the additional persons gives the income of the private households as part of the regional benefits. The present value for the period 1998 until 2012 is about 6.3 mil US-\$.

Every workplace in the ports of Poti and Batumi creates further workplaces in the regional and national districts. Examples are the busy companies who directly deal with the transport of goods, the forwarder, the road haulage or the railways, but also industry and manufacturers as well as further services like restaurants and hotels.

It is not possible within the scope of this study to exactly research the actual and future levels of the multiplier effect. Researches at other ports (i.e. Bremen, Hamburg) show results that corresponds to the specialisation of the ports multiplier effects from additionally 0.3 to 0.8 workplaces in addition. The Georgian ports are places for the handling of transit cargo which indicate a small effect. In the Caucasus region, the personnel costs are small compared to the originated international costs, which leads to an increase in the effects. Therefore the middle value from 0.5 further workplaces in the regional and national economies in reference to a workplace in the port itself is calculated.

The discounted present value of the multiplier effect is about 2.3 mil US-\$.

### 3.2.3 Non-assessable Benefits

For the following benefits of the ports development it is not possible to derive values in US-\$. They are non-assessable but have to be mentioned and described to be complete in the list of benefits.

#### **Industrial Site Effects and Structural Effects of Demand for Areas**

The costs of the developed areas, as well as the costs of measures for compensation have to be considered. The measures to enhance environmental benefits are recommended (environmental assessment Phase 2 report Vol. V.) and are already integrated in the Master Plan. Besides, since the prices for land and the population density are low, these effects can be neglected.

#### **Town Planing Effects**

The relief of the cities of the emissions and hazards caused by heavy trucks is an important goal of town planing. Concerning the urban traffic it is possible to concentrate the freight traffic of the ports to fixed routes. These effects are of intangible value and cannot be calculated.

#### **Effects for Nature and Landscape**

The ecological value of the necessary areas has to be assessed. Only for the possible extension of a container terminal in the north of Poti, new land has to be developed. Up to now, this area has been of high ecological value. But the ecological costs cannot only consider the container terminal but also future planing. According to the environmental assessment (Phase 2 Report Vol. V), no positive or negative effects can be calculated.

#### **Port Economies**

The companies in the ports are the main beneficiaries of a port development. Without the extensions, the companies would not exist or agglomerations and specialisations and therefore economies-of-scale could not be achieved. The port authorities and the operators in the ports are the executives for the port development. All direct costs and procedures accumulate to their budgets.

The first thing to do for the calculation of the cost and benefit ratio, is the demarcation of costs and benefits which are closely related to the port development. In the scope of the model of relevant regional and national economical costs and benefits the following values have to be derived:

- operation of the projected port development
- development of space
- all construction costs



### Industry and Trade

The range of services of the local industry and trade is highly influenced by impulses from the ports. Poti and Batumi have developed to important centres in the Georgia. This agglomeration will go on in the future. The extent of the effects of the port on the local industry and trade can be estimated not with acceptable reliability.

### Private Households

The possible development of economies will considerably improve the workplace situation in Poti and Batumi. Factors are

- new workplaces and securing of workplaces (already calculated)
- optimisation of procedures
- humanisation of workplaces
- enlargement of work fields
- new carrier chances
- education and professional training

Considering the high unemployment rate, this contribution to the regional economy is of high importance.

## 4 Cost/Benefit Ratio

As a result of the above analysed fields of costs and benefits of the ports development a complete compilation of all quantified effects is necessary. The following table shows the compiled data.

Effects	present value US-\$
<b>Costs</b>	
Costs of additional investment and operation	275,052,502
<b>Benefits</b>	
proceeds	263,129,811
reduction in internal costs of traffic	1,306,277,842
reduction in external costs of traffic	880,437,284
additional income of personnel	6,286,460
income multiplier effect	2,357,423
<b>Total benefits</b>	<b>2,458,488,820</b>
<b>Cost/Benefit Ratio</b>	<b>1 : 8.9</b>

As a result of the cost/benefit analysis an amount of cost of about 275 mil US-\$ induce benefits of an amount of 2,458 mil US-\$. The cost/benefit ratio of 1 : 8.9 could be qualified as very good. The investment in the Georgian ports is highly "profitable".

The main beneficiaries are the forwarding companies, integrators and other companies of the transport sector engaged in the freight transport between Eastern Europe, Asia, TRACECA and the Western European countries. Further more the relief of the environment of freight traffic counts on the second place of the row of benefits. But also the Georgian ports, the ports personnel and the region are beneficiaries of the investments.

As a conclusion the rehabilitation and extension of the Ports of Poti and Batumi result in remarkable benefits. On the basis of the cost/benefit analysis the realisation of the masterplans could be recommended.

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