CHAPTER 3 SHORT-TERM DEVELOPMENT PLAN

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3.1 Basic Concept of Short-Term Development Plan

The Short-Term Development Plan has been made as the first phase plan within the framework of the Master Plan that has been proposed as the target and guideline for phased development plans (see Chapter 2). The Short-Term Plan includes proposed projects (see in Chapter 4) for which feasibility will be assessed from standpoints of national economy and financial viability.

The Short-Term Plan has presupposed its target year of 2015 as a given condition. On this condition, the Master Plan has been divided into two phased plans taking account of various aspects including size and configuration of the entire plan and economical phasing of construction works. The first phase plan corresponds to the said Short-Term Plan and the second phase plan, to the remaining portion of the Master Plan. The target year of the second phase plan should be 2025 or before.

From the above, the following concept has been proposed in the Short-Term Plan:

- Establishment of an outer port on the north of the existing port entrance

  It has been proposed to establish an outer port on the north of the existing port entrance. The main functions of the new port are:

  - To handle cargoes to be overflowed from the existing port in the stage of the Short-Term Plan,
  - To provide deep-sea berths to accommodate Baltmax-type vessels,
  - To provide sufficient storage areas for port cargoes so as to back up efficient cargo-handling operations both on seaside (stevedoring) and landside (railway connection),
  - To provide streamlined railway sidings enabling short turnaround time in railway access to the port,
  - To provide lands for port-related activities such as distribution centres (logistic centres).

- Improvement of the sea channel

  It has been proposed to improve the existing sea channel so as to enable two-way navigation protected from waves penetrating from the open sea by new breakwaters.

- Conversion of the land use from reserved status into port use

  It has been proposed to convert the land use from reserved status into port use in the middle of the port territory so as to increase the existing port capacity through the preparation of additional storage areas.

- Improvement of the siding railways within the existing port territory

  It has been proposed to improve the existing siding railways so as to increase the existing port capacity through the preparation of additional lines.

3.2 Port Capacity Analysis

3.2.1 Purpose of Analysis

The port capacity analysis has been made on the assumption that the outer port expansion and inner port development proposed in the Short-Term Plan are completed by the target year 2015. The same computer simulation model as used in making the Master Plan has been applied (refer to Section 2.2).

The capacity analysis has been made according to the following two main purposes:

- To verify a probable saturation year in the port capacity of the Short-Term Plan that will be immediately followed by the starting year of the second phase plan
- To verify whether the Port could keep the adequate port service level in the stage of the Short-Term Plan extending from the year 2015 to immediately before the starting year of the second phase plan

The berth allocation conditions by vessel type used in the simulation are shown in Tables II.3.2-1 and II.3.2-2.

Table II.3.2-1 Berth Allocation Conditions Used in Simulation (1) - Short-Term Plan

Port Zone	Ship Category No.	Cargo Item	Storage	Actual Cargo-Handling Productivity (tons/hr.)		Allocated Berth No.											
North	1	Ferro alloys	Public	1	94	3	6	7	8								
	2	Ammonium nitrate	Public	2	88	11	13	14	15	16							
	3	Steel products	Public	3	82	3	7	8									
	4	Steel Products	Public	4	56	3	6	7	8								
	5	Fuel oil	Dedicated	1	816	1	2	48									
	6	UAN solution (1)	Dedicated	2	564	4											
	7	Gasoline	Dedicated	3	675	1	2	48									
	8	DAP(1)	Dedicated	4	600	5	6										
	9	Wheat(1)	Dedicated	5	540	4											
	10	Jet Fuel	Dedicated	6	493	1	2	48									
	11	Diesel oil	Dedicated	7	631	1	2	48									
	12	Apatite(1)	Dedicated	8	265	5	6	7									
	13	Raw sugar (1)	Dedicated	9	110	6	7	8									
	14	Frozen Fish (1)	Dedicated	10	34	9	10	12									
South	15	Fruit	Public	1	44	25	26	27									
	16	Scrap	Public	2	66	26	27	28	40								
	17	Timber	Public	3	96	19	26	27	28	29	30	36	37	38	39	40	41
	18	Miscellaneous	Public	4	50	29	30	31	32	40							
	19	Cement	Public	5	79	20	26	27	28								
	20	Fish Meal	Public	6	27	28	29	30									
	21	Stones	Public	7	71	26	27	28									
	22	Scrap	Public	8	46	26	27										
	23	UAN solution (2)	Dedicated	1	564	22											
	24	Potash	Dedicated	2	350	22	23	33	35								
	25	DAP(2)	Dedicated	3	350	21	22	23									
	26	Wheat(2)	Dedicated	4	540	25											
	27	Urea	Dedicated	5	93	21	33	35									
	28	Other dry fertilizer	Dedicated	6	350	21	23	33	35								
	29	Rapeseed	Dedicated	7	61	18											
	30	Ammonium sulphate	Dedicated	8	176	20	21	23									
	31	Apatite (2)	Dedicated	9	265	19	20	21									
	32	Raw sugar (2)	Dedicated	10	110	19	20	21									
	33	Frozen Fish (2)	Dedicated	11	34	28	29	30									
	34	Malt	Dedicated	12	52	28	29	30									
	35	Frozen Meat	Dedicated	13	20	28	29	30									
	36	Frozen food	Dedicated	14	21	28	29	30	31								
	37	Molasses	Dedicated	15	79	24											
Outer Port	38	Ferro alloy(3)	Public	1	400	50											
	39	Steel products (load) (3)	Public	2	200	50											
	40	Fuel oil(3)	Dedicated	1	816	1	2	48									
	41	UAN solution (3)	Dedicated	2	900	49											
	42	Wheat(3)	Dedicated	3	900	49											
	43	Apatite(3)	Dedicated	4	265	49											
	44	Raw sugar (3)	Dedicated	5	400	49	50										
	45	Orimulsion (3)	Dedicated	6	1,180	1	2	48									

Source: The JICA Study Team

Table II.3.2-2 Conditions Used in Simulation (2)

Berth No. in Simulation	Actual Berth No.	Terminal Operator	Water Depth (m)
1	No. 1	Klaipeda Nafta	14.0
2	No. 2	Klaipeda Nafta	14.0
3	No. 3	Cargo Terminal	14.0
4	No. 4	KLASCO	14.0
5	No. 5	KLASCO	14.0
6	No. 6,7	KLASCO	14.0
7	No. 7,8	KLASCO	13.0
8	No. 8,9	KLASCO	13.0
9	No.10	KLASCO	9.0
10	No. 11	KLASCO	9.0
11	No. 12	KLASCO	10.0
12	No.13,14	KLASCO	8.0
13	No. 15	KLASCO	8.0
14	No. 16	KLASCO	8.0
15	No. 17	KLASCO	8.0
16	No. 18	KLASCO	8.0
17	No. 66	BEGA	6.0
18	No. 67	BEGA	6.0
19	No. 67,68	BEGA	12.0
20	No. 68,69	BEGA	12.0
21	No. 70	BEGA	12.0
22	No. 71	BEGA	12.0
23	No. 72	BEGA	12.0
24	No. 80	Molasses	10.0
25	No. 82	Smelte	12.0
26	↓	Smelte	12.0
27	↓	Smelte	12.0
28	↓	Smelte	12.0
29	↓	Smelte	12.0
30	↓	Smelte	12.0
31	↓	Smelte	12.0
32	No. 100	Smelte	12.0
33	No. 101	Smelte	12.0
34	↓	Smelte	12.0
35	No. 104	Smelte	12.0
36	No.118	Peat	7.5
37	No. 127	Klaipeda Terminal	7.5
38	No. 128	Klaipeda Terminal	7.5
39	No. 130	Klaipeda Terminal	7.5
40	No. 140	Western Ship Yard	10.0
41	No. 141	Timber Terminal	10.0
42	No. 143	Eurogate (KLASCO)	10.0
43	No. 144	Eurogate (KLASCO)	10.0
44	No. 146	Eurogate (KLASCO)	10.0
45	No. 147	Eurogate (KLASCO)	10.0
46	No. 150	Ro-Ro Terminal	8.0
47	No. 151	Ro-Ro Terminal	8.0
48	Outer No.1	Petroleum Jetty	17.0
49	Outer No.2	Grain Terminal	17.0
50	Outer No.3	Multi-purpose Terminal	17.0

Source: The JICA Study Team

3.2.2 Seaside Capacity (Navigation and Berthing)

According to the results of the simulation, if the outer port is not developed (Without-the-Project Case), the annual cargo throughput of the Port would exceed the adequate capacity (corresponding to the adequate service level of 10% or less) of the existing port in 2015 with the throughput of 34 million tons per annum and then absolute capacity in 2017 with the throughput of 37 million tons per annum generating the absolute saturation caused partly by the shortage of berth capacity and partly by the shortage of the channel capacity (see Chapter 2). On the other hand, if the Port is expanded according to the projects proposed in the Short-Term Plan (With-the-Project Case), the port service level will be kept at the adequate level of 10% or less from 2015 through 2024 (see Figure II.3.2-1 and Table II.3.2-3). The resulting period from 2015 through 2024 satisfying the adequate port service level mentioned above is considered to be the stage of the first phase plan (Short-Term Plan) followed by the second phase plan starting from 2025.

Table II.3.2-3 Cargo Throughput and Service Level

Development Case	Year	Cargo throughput (million tons)	Service level at the whole port
Existing port development only (A)	2015	32	20%
	2017	34	26%
	2019	37	57%
A + Outer port expansion	2015	34	4%
	2017	37	5%
	2019	39	6%
	2024	47	10%

Source: Estimate by the JICA Study Team

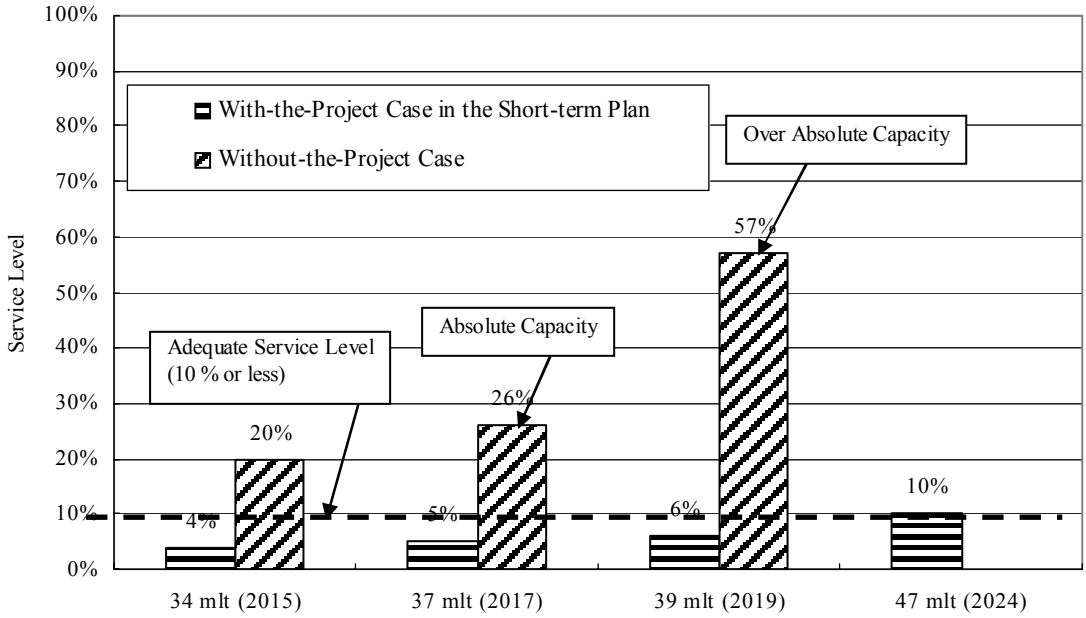


Figure II.3.2-1 Port Service Levels in Short-Term Plan

3.2.3 Landside Capacity (Storage and Railway Access)

(1) Storage

According to the results of the simulation, the required storage area in the year 2015 as the starting year of the Short-Term Plan is estimated as 11 ha in total (for conventional cargo): 6 ha for the existing inner port and 5 ha for the planned outer port. Then in the ending year 2024 immediately before the starting year of the second phase plan, the required area is estimated as 15 ha in total (for conventional cargo): 8 ha for the existing inner port and 7 ha for the planned outer port (see Table II.3.2-4).

It has been estimated that within the reserved area behind berths, approximately 14ha could be available by being converted into port cargo storage use. Thus, in this study towards the year 2024, the required lands of 8 ha in total are planned to be gradually converted for the above purpose. The remaining 7 ha storage area required for the outer port has been planned to be placed just behind their deepwater berths (see Section 3.3.4).

Table II.3.2-4 Required Storage Capacities in Stages of Short-Term Plan

Year	Port territory	No.	Category	Annual throughput (unit: '000 t, '000 TEUs)	Storage Capacity (unit: '000 t, 000 sq. m)				Additionally required storage area (Unit: ha)
					Type of storage	Existing	Required	Balance	
2015	Existing port	1	Petroleum	9,333	Tank	485	582	-98	1.2
		2	Dry fertilizer	6,568	Warehouse	252	368	-116	2.6
		3	Liquid fertilizer	1,870	Tank	177	139	39	-
		4	Grains	924	Silo	80	99	-19	0.2
		5	General cargo	6,262	Open yard	178	54	124	-
					Warehouse	63	39	24	-
		6	Frozen food	334	Cold storage	25	40	-15	1.5
		7	Containers	350	Stacking yard	82	124	-42	4.2
	Outer port	2	Dry fertilizer	200	Warehouse	-	24	-24	0.5
		3	Liquid fertilizer	620	Tank	-	63	-63	0.5
		4	Grains	361	Silo	-	110	-110	1.2
		5	General cargo	500	Open yard	-	24	-24	2.4
					Warehouse	-	7	-7	0.7
2020	Existing port territory	1	Petroleum	10,667	Tank	485	614	-130	1.6
		2	Dry fertilizer	8,243	Warehouse	252	390	-138	3.1
		3	Liquid fertilizer	2,164	Tank	177	157	20	-
		4	Grains	1,233	Silo	80	111	-31	0.3
		5	General cargo	7,072	Open yard	178	48	130	-
					Warehouse	63	51	12	-
		6	Frozen food	334	Cold storage	25	40	-15	1.5
		7	Containers	480	Stacking yard	82	170	-88	8.8
	Outer port	2	Dry fertilizer	200	Warehouse	-	24	-24	0.5
		3	Liquid fertilizer	1,063	Tank	-	96	-96	0.8
		4	Grains	446	Silo	-	110	-110	1.2
		5	General cargo	754	Open yard	-	27	-27	2.7
					Warehouse	-	8	-8	0.8
2024	Existing port	1	Petroleum	11,733	Tank	485	667	-182	2.2
		2	Dry fertilizer	9,583	Warehouse	252	408	-156	3.5
		3	Liquid fertilizer	2,400	Tank	177	163	15	-
		4	Grains	1,481	Silo	80	123	-43	0.5
		5	General cargo	7,719	Open yard	178	55	123	-
					Warehouse	63	60	3	-
		6	Frozen food	334	Cold storage	25	40	-15	1.5
		7	Containers	570	Stacking yard	82	201	-119	11.9
	Outer port	2	Dry fertilizer	200	Warehouse	-	24	-24	0.5
		3	Liquid fertilizer	1,418	Tank	-	121	-121	1.0
		4	Grains	513	Silo	-	110	-110	1.2
		5	General cargo	958	Open yard	-	30	-30	3.0
					Warehouse	-	9	-9	0.9

Note (1): Required storage capacities of general cargo and containers are expressed in '000 sq. m
Source: Estimate by the JICA Study Team

(2) Railway Access

The existing railway capacity has been broadly evaluated zone by zone as briefed below. Railway capacities of the main terminals are shown in Table II.3.2-5.

1) North Zone

The freight volume forecast for the year of 2015 at Klaipedos Nafta and Klasco are approximately 7.8 million tones or 470 wagons per day and 9.3 million tones or 550 wagons per day, respectively. According to the results of calculation, Klasco handling volume is exceeding maximum capacity of 8.8 million tones due to the current condition of access line which restrict transport capacity. Recently LG has started to overhaul this section to replace of all existing concrete and wooden sleepers by prestressed concrete sleepers, and laid on crushed rock ballast. Furthermore, they are planning to replace existing 12m rail by new 25m rail in the near future. In that case, maximum capacity will be 9.3 million tonnes which can handle till the year of 2015 as the target year of Short-Term Plan. As for the Klaipedos Nafta, maximum capacity is 10 million tonnes. Therefore it has enough capacity to handle in the year of 2015 but it will exceed in the year of 2021.

2) South Zone

The freight volume forecast for the year of 2015 at BEGA and Smelte are approximately 4.7 million tones or 280 wagons per day and 2.4 million tones or 150 wagons per day, respectively. With improvement of operation and management to be performed on this line, there is not much prospect of big increase for transport capacity. Because Smelte has no arrival/departure and enough storage tracks and wagons to/from there territory is obstructing train movement on access line. First of all, it is necessary to avoid confliction between BEGA and Smelte on access line near Smelte entrance. However, since the amount of handling volume is extended so far, it will exceed in the year of 2012. Therefore, it is necessary to construct the additional access line for the South Zone and new yard for Smelte.

3) Marshalling Yard

Since Klaipeda and Draugyste Marshalling Yard have sufficient capacity, they can handle forecast freight volume in the year of 2025 as the target year of the Master Plan. However, examination for the main line transport capacity should carried out in the future. Because number of freight and passenger train which depart and arrive from each station will be increase. Especially, between Klaipeda and Pauoscio Yard section which conflict with freight train to the terminals and passenger or freight train to the station. It is necessary to have careful examination for train movement also.

Table II.3.2-5 Railway Capacity of Terminal and Access Line

Zone	Terminal Operator	Year	Handling Volume per year (tonne)	Handling Wagon per day (wagon)
North	Klasco	Maximum Handling Volume	9,300,000	550
		2002 Handling Volume	4,800,000	300
		2015 Handling Volume	9,300,000	550
		2025 Handling Volume	8,700,000	520
	Access Line (Klasco)	Maximum Transport Capacity	9,300,000	550
	Klaipedos Nafta	Maximum Handling Volume	10,000,000	630
		2002 Handling Volume	5,900,000	350
		2015 Handling Volume	7,800,000	470
		2025 Handling Volume	12,000,000	740
	Access Line (Klaipedos Nafta)	Maximum Transport Capacity	16,200,000	970
South	BEGA	Maximum Handling Volume	6,200,000	370
		2002 Handling Volume	2,200,000	130
		2015 Handling Volume	4,700,000	280
		2025 Handling Volume	5,100,000	310
	Smelte	Maximum Handling Volume	4,800,000	290
		2002 Handling Volume	1,800,000	100
		2015 Handling Volume	2,400,000	150
		2025 Handling Volume	3,100,000	190
	Access Line (BEGA&Smelte)	Maximum Transport Capacity	6,200,000	370

Source: Estimate by the JICA Study Team

3.3 Port Development Plan within Existing Territory

Port development plan within the existing territory in the stage of the Short-Term Plan has been proposed herein that has made by using the results of the port capacity analysis as mentioned in Section 3.2. On-going or planned projects by KSSA or terminal operators have been incorporated in this proposal.

3.3.1 Expansion Plan of Berthing Capacity

KSSA has renovated the existing berths by deepening water depths along berths including Berths No.5 and No.6 with a water depth of 14 m (infra-structures were completed in 2003 and super structures are under construction as of February of 2004). In addition, the renovation of Berths No. 82 – 100 is planned to deepen up to 12 m. In this study, it has been assumed that those on-going or planned projects would be completed.

3.3.2 Expansion Plan of Stevedoring Capacity

(1) Bulk Cargo Handling

Behind the berths under renovation or with a plan of renovation mentioned above, it has been assumed that the following loaders would be installed:

- Berth No. 5 – 6: two units of loaders with rated capacity of 1,000 tons/hr for shipping dry fertilizer

- Berth No. 82: a unit of loader with rated capacity of 900 tons/hr for shipping grains
- Berth No. 101: a unit of loader with rated capacity of 1,000 tons/hr for shipping dry fertilizer

(2) Container Handling

In the stage of the Short-Term Plan, containers are supposed to be handled at the existing two terminals: one is Eurogate Container Terminal behind berth Nos. 43 and 44 and the other is Klaipeda Terminal behind Berth Nos. 128 and 130. To meet the increasing demand for handling containers, the required types and additionally required numbers of main container-handling machines at Eurogate Container Terminal are listed below:

- 3 units of RTGs

3.3.3 Expansion Plan of Storage Capacity

(1) Conventional Cargo Storage

As mentioned in Section 3.2.3 (1), in the stage of the Short-Term Plan from 2015 through 2024, required area for cargo storage for the existing port is 6 – 8 ha in total. Categories and places of the required storage area in the stage of the Short-Term Plan (the first phase development plan) are shown in Table II.3.3-1. As shown in the table, the required lands for the storage facilities would be obtainable from the reserved area (see Figures II.2.3-1 and II.2.3-2 in Chapter 2).

Table II.3.3-1 Expansion Plan for Storage within Existing Port in Stage of Short-Term Plan (2015 - 2024)

Zone	Connected berths	Stored cargo category	Storage type	Required area (ha)	Source of land acquisition
North	Inner Port (Nos. 1, 2) and Outer Port (No.1)	Petroleum	Tank	2	Reserved area
South	Nos. 70 - 72	Dry fertilizer	Warehouse	4	Reserved area
	Nos. 82 -83	Grains	Silo	1	Reserved area
	Nos. 92 -100	Frozen food	Cold storage	2	Existing port area
Total area				9	

Source: Estimated by the JICA Study Team

(2) Container Storage

The required container storage area for the demand in 2015 has been estimated as 12ha in total for stacking laden and empty containers. The required area will exceed the existing storage area of 8 ha at Eurogate Terminal and Klaipeda Terminal. Hence, the currently reserved area on the south of the existing container yard within Eurogate Container Terminal needs to be used for an additional container yard mainly for empty container storage. Beyond the year 2020, the required container-handling capacity to meet the forecast demand seems to exceed the potential capacities of the existing container terminals within the inner port even if the above-mentioned reserved area is fully utilized.

Full-fledged container-handling services at Klaipeda Port would be provided if the second phase project is materialized, which including the preparation of full-scale dedicated container terminal behind Berth No.6 of the Planned Outer Port.

3.3.4 Improvement Plan of Railway Access to the Port

As mentioned in Section 3.2.3 (2), to meet the demand of handling volume for BEGA and Smelte, construction of additional access line and new yard in Smelte territory for increasing transport capacity between Draugyste Station and BEGA is required. The location of selected additional track and yard are shown in Chapter 2 Section 2.3.4 (see Figure II.2.3-3 and Figure II.2.3-4 in Chapter 2).

In addition, KSSA has conducted feasibility study of Development of Klaipeda Railway Network in 2002. It was also mentioned necessity of additional track in south zone and Terms of Reference for detailed design of above project was issued in beginning of the year 2004. Hearing from KSSA, additional track in south zone will be divided into few stages and first stage will be construction of additional track between Varnenu Street and Kalnupes Street (see Figure II.2.3-3). This first stage section is considered as on-going project in this study.

(1) Construction of Additional Access Track in South Zone

Required railway structures and facilities are listed below:

- Track: 4.1 km
- Turnout: 2 set
- Embankment section: 2.4 km
- Reinforced concrete bridge: 20 m
- Level crossing facility: 4 locations (automatic crossing control with crossing barrier)
- Signalling facility: 1 unit

(2) Construction of New Yard in Smelte Territory

Required railway structures and facilities are listed below:

- Track: 3.7 km
- Turnout: 11 set
- Control Centre and signalling facility: 1unit

Railway alignment and structures for the Short-Term Plan are based on the Lithuanian Railway standard and regulations. Main parameters for track structure, construction gauge and typical cross section are referred to Appendix C.

3.3.5 Improvement Plan of Road Access to the Port

There are no major problems for the access road to the port from the main road. Most of them are improved by widening and renovating the pavement to be a standard condition.

3.3.6 Land Use Plan of Reserved Areas

It is proposed that the reserved areas behind the berths Nos. 69 – 96 be gradually integrated to the port territory in the stage of the Short-Term Plan from 2015 through 2024. The required land use would be mainly port cargo storage and site for port access railway as mentioned in Section 3.3.3 and 3.3.4. In addition, the land uses for port utility services such as inside port road, parking lots, port related offices, etc. are listed for the required land use. The said portion of the reserved area is 15 ha in total (see Figures II.2.3-1 and II.2.3-2 in Chapter 2).

3.4 Port Expansion Plan outside Existing Territory

3.4.1 Necessity of Establishment of Outer Port

To meet the forecast demand for increase in cargo-handling capacity in the stage of the Short-Term Plan with the target year 2015, it is necessary to establish an outer port outside the existing port territory together with the development of the existing port so as to make the most of it as verified through the port capacity analysis mentioned in Section 3.2.2. The outer port needs to be placed to the north of the existing port entry so as to free the Port from the constraint of the limited existing channel capacity but not to the south that worsens channel congestion as verified in Section 2.2.2 of Chapter 2.

In addition to the demand for a quantitative increase in cargo-handling capacity, it is required to give competitiveness to the Port among the ports in the Baltic Sea by the preparation of high-efficient marine terminals with deepwater berths catering for Baltmax-typed vessels and connected with well-designed railway access lines from the stage of the Short-Term Plan.

3.4.2 Required Marine Terminals

The marine terminals required from the first phase plan stage, viz. the Short-Term Plan, have been extracted from the five terminals (Petroleum Jetty, Grain Terminal, Fertilizer Terminal, General Cargo Terminal and Container Terminal) proposed in the Master Plan through the verification by the computer simulation. In the first step, a combination of extracted terminals and allocation of port cargo in the stage of the Short-Term Plan between the inner port and the outer port have been assumed, and then, it has been verified whether the required service level has been satisfied. If not satisfied, in the next step, a different combination and/or cargo allocation have been given for the further simulation trial. After trial and error procedure, eventually, Petroleum Jetty, Grain Terminal and the southern part of Fertilizer Terminal with one berth have been extracted from the Master Plan so as to meet the port demand from the early stage.

Fertilizer Terminal with two deepwater berths appropriated to fertilizer handling in the stage of the Master Plan has been divided into the two terminal areas, viz. the southern and northern areas having one berth each and then the southern terminal area on the north of Grain Terminal has been planned to handle various-type cargoes including both bulk and break-bulk cargoes functioning as so-called Multi-purpose Terminal in the stage of the Short-Term Plan. The planned Multi-purpose terminal would enable smooth transition from the first phase plan stage (Short-Term Plan)

towards the second phase plan stage in the constraint of limited number of dedicated terminals serving specific-type cargoes.

The remaining portion of Fertilizer Terminal, General Cargo Terminal and Container Terminal have been left without being extracted in the first phase plan are expected to be established in the second phase plan stage.

(1) Petroleum Jetty (Berth No. 1 of Outer Port)

It has been planned to prepare a deepwater jetty with a water depth of 17 m and a length of 310 m. The principal dimensions of the design tanker of Baltmax type (a portion of Capesize type) are:

- 109,000 DWT
- LOA: 244 m
- Summer draft: 14.9 m
- Moulded breadth: 42.3 m

There are two main purposes of the preparation of the jetty. One is to reduce high berth occupancy rates at the existing petroleum berths, Nos. 1 and 2 (the inner port) otherwise. The other is to generate economic benefits from receiving larger tankers.

(2) Grain Terminal behind Berth No. 2 of Outer Port

It has been planned to prepare a marine terminal having a deepwater berth with a water depth of 17 m and a length of 310m. The principal dimensions of the design bulker of Baltmax type (a portion of Capesize type) are:

- 123,000 DWT
- LOA: 266 m
- Summer draft: 15.5 m
- Moulded breadth: 41.0 m

The main purpose of the preparation of the terminal is to attract transit grains from CIS countries to be shipped to distant destinations on long-sea routes. Great economic benefits would be generated from using larger bulkers.

A unit of loader with rated capacity of 1500 tons/hr and grain silos with a total storage capacity of 110,000 tons connected with belt conveyors with each other has been planned. Grain receiving facility from railway wagons connected with the silos through belt conveyors has also been planned (access railway refer to Section 3.4.7).

No.2 Berth is planned to receive a tanker for UAN solution as well as a grain carrier. Behind grain silos, a tank farm for UAN solution with a total capacity of 120,000 tons has been planned. UAN solution receiving facility from railway tanks connected with the tanks through pipelines has also been planned (access railway refer to Section 3.4.7).

(3) Multi-purpose Terminal behind Berth No. 3 of Outer Port

It has been planned to prepare a marine terminal having a deepwater berth with a water depth of 17 m and a length of 310 m. The maximum receivable size of vessels at the berth is the Baltmax type bulker (the principal dimensions refer to the previous Paragraph (2)).

The installation of two rail-mounted level-ruffing cranes with a lifting capacity of 40 tons each has been planned on the dockside so as to function as a multi-purpose terminal; the supposed cargoes to be handled at this terminal would be ferroalloy, steel products, raw sugar, apatite etc. Rubber-tyred tower cranes would be usable to supplement the planned rail-mounted cranes as well as ship cranes/derrick cranes so as to ensure swift cargo-handling operations alongside.

As to storage facilities, an open yard of 3 ha has been planned just behind Berth No.3. A warehouse with 12,000 sq. m in floor space has also been planned behind the above open yard.

Between the open yard and warehouse mentioned above, the installation of railway sidings has been planned. As to cargo-handling machines within the terminal area, forklift trucks and truck cranes will be usable to shift cargoes from railway cars to the open yard or the warehouse or vice versa. In addition, railway sidings have been planned on the dockside (between quayside crane rails) so as to enable direct loading/unloading to ensure flexible dockside operations alongside though direct loading/unloading operations alongside are not necessarily recommendable due to inefficiency (access railway refer to Section 3.4.7).

In the second phase plan, the above-mentioned open yard and warehouse planned in the first phase plan (Short-Term Plan) will be converted into the site for a dedicated fertilizer warehouse and dedicated fertilizer warehouse, respectively. Thus, in the next phase plan, the Multi-purpose Terminal will be converted into the dedicated Fertilizer Terminal with two warehouses connected with shiploader/unloader on dockside through belt conveyors will be available as proposed in the Master Plan. Mechanized cargo-handling system for bulk cargo using belt conveyors has not yet planned in the first phase plan.

3.4.3 Planned Sea Channel and Basins

(1) Necessity of Improvement of Existing Sea Channel

To meet traffic demand through the sea channel in the stage of the Short-Term Plan, it is necessary to improve the existing channel from one-way to two-way, which has been verified the results of the simulation (refer to Section 2.4.3 of Chapter 2).

(2) Alignment

Taking account of the statistical wave directions off the Port, the current channel direction of N92.5° has been judged optimum. To enable two-way navigation through the sea channel, it is necessary to shift the existing centre line to the north in parallel.

(3) Width

The bottom width of the planned two-way sea channel has been designed through the verification by the application of the prevailing guidelines including PIANC and the standard of KSSA for the representative principal dimensions of the design vessels indicated in Section 3.4.2. Thus, in this study, 300 m has been designed as width of the sea channel (refer to Section 2.4.3 of Chapter 2).

(4) Water Depth

The water depths of the planned two-way sea channel and basins within the outer port protected breakwaters have been designed through the verification by the application of the prevailing guidelines including PIANC and the standard of KSSA for the representative principal dimensions of the design vessels indicated in Section 3.4.2. Thus, in this study, 17.5 m and 17 m has been designed as the water depths of the sea channel and the inner basins, respectively related to the outer port (refer to Section 2.4.3 of Chapter 2).

(5) Turning Basin

The turning basin within the outer port protected breakwaters has been designed so as to provide a turning circle with a diameter of twice of LOA of the design vessel. The maximum length among design vessel shown in the previous Section 2.4.2 of Chapter 2 is 294 m. Thus a diameter of 600 m for turning circle has been considered in the design of a turning basin though it will be necessary in the stage of the Master Plan; it is essential to make the Short-Term Plan preventing the possible hindrance to navigation traffic due to additional dredging works even if the possibility would be realized in the next phase plan.

3.4.4 Breakwaters

Breakwaters are required for the outer port to protect inner channel, turning basins and berths of the outer port. Breakwaters need to be placed in the three directions rectangular to the south, west and north so as to halt the waves in the outer sea penetrating to the port waters.

The planned north breakwater needs to be shifted north in the stage of the second phase plan. Materials for the north breakwater used in the stage of the first phase plan such as concrete blocks and stones could be reused for the new north breakwater in the stage of the second phase plan.

3.4.5 Facility Layout Plan

The site of the outer port has been selected on the north to the existing port entrance as mentioned in Section 2.4.5 of Chapter 2. At the area, the layout plan satisfying facility requirements to the new port in the stage of the Short-Term Plan mentioned in Sections 3.4.2 – 3.4.4 have been made (see Figures. 3.4-1). The main components of the plan are summarized in Table II.3.4.1.

Table II.3.4-1 Facility Components of Layout Plan of Short-Term Plan

Component			Dimensions
Access channel		Bottom width (m)	300
		Water depth (m)	17 - 17.5
Basins		Water depth (m)	17
Breakwaters		Length (m)	2,900
Seawalls (Open Sea)		Length (m)	700
Marine Terminal	Petroleum Jetty	Berth length (m)	310
		Water depth (m)	17
	Grain Terminal	Berth length (m)	310
		Water depth (m)	17
		Grain Silos ('000 tons)	110
		UAN Tanks ('000 tons)	120
	Multi-purpose Terminal	Berth length (m)	310
		Water depth (m)	17
		Open storage (ha)	3
		Warehouse ('000 sq. m)	11,000
Land use (ha)		Terminal area	20
		Port related business	13
		Railway yard	4
		Others	22
		Total	59

Source: The JICA Study Team

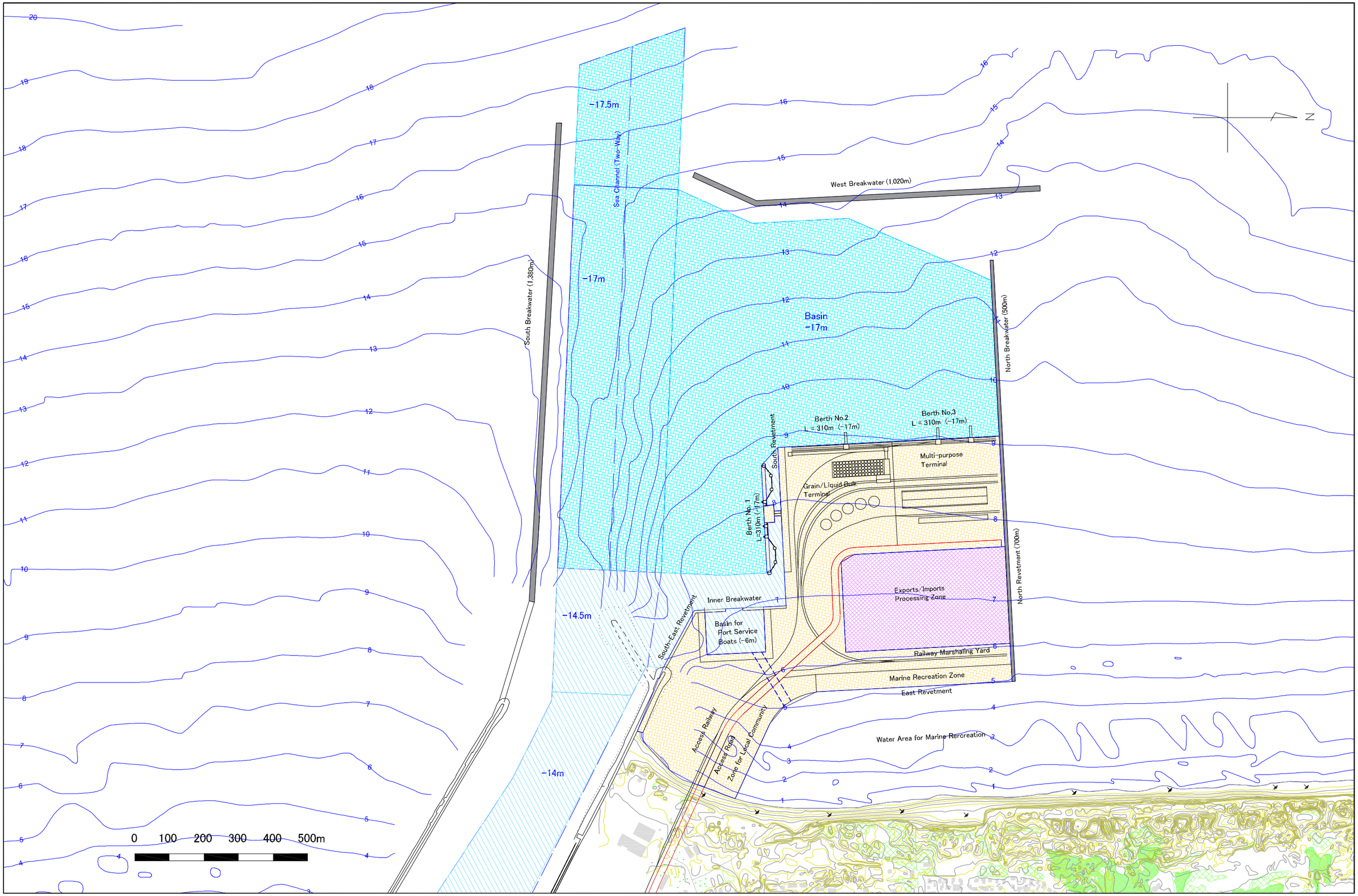


Figure II.3.4-1 Facility Layout Plan of Outer Port in Short-Term Plan

3.4.6 Cargo-Handling Systems

The cargo-handling systems individually designed to meet different requirements from different-typed cargoes in the material nature, package type and lot size mentioned in Section 3.4.2 are summarized in Table II.3.4-2.

Table II.3.4-2 Cargo-Handling System at Outer Port in Short-Term Plan (2015-2024)

Berth	Handled Cargo	Dockside Facilities	Storage facilities		Railway Connection
No.1	Petroleum	Manifold with loading/unloading arms with rated capacity of 2,000 t/hr for orimulsion and 1,500 t/hr for fuel oil (pipelines 24 - 36 in)	Tank Farm of NAFTA		Receiving facility
No.2	Grain	Ship loader: 1 unit with rated capacity of 1,500 t/hr	Silos	Width (45m) x Length (140m)	Receiving facility
	UAN Solution	Manifold with hose connecting joint with rated capacity of 1,500 t/hr	Tanks: 5 units	Radius (15m)	Receiving facility
No.3	General Cargo	Level-ruffing crane: 2 units with each 40 tons lifting capacity	Shed	Width (45m) x Length (240m)	Shifted by using forklifts or truck cranes
			Open Yard	Width (120m) x Length (290m)	

Source: The JICA Study Team

3.4.7 Railway Development Plan for Port Expansion Plan

(1) Basic Concept of Outer Port Plan

To meet forecast demand for railway handling in the stage of the Short-Term Plan with the target year of 2015 at outer port, the required number and length of tracks have been determined through the calculation with considering the location and capacity of loading/unloading facilities. Location of tracks required in the Short-Term Plan is part of the location in the Master Plan. Therefore, second phase will be extension of these tracks and construction of additional tracks to meet the handling demand of Master Plan. Railway handling data at outer port in the year of 2015 is shown in Table II.3.4-3.

(2) Railway Layout Plan in Outer Port

Track layout plan at outer port in the year of 2015 is shown in Figure II.3.4-2 and calculation result of day workload is shown in Table II.3.4-4. Required railway structures and facilities are listed below:

- Track: 8.2 km
- Turnout: 14 set
- Loading/unloading facility: Bottom discharge facility 1 unit, Liquid discharge facility 1 unit

- Control Centre and signalling facility: 1unit (Electric signalling, interlocking and motorised turnout)

(3) Access Line Between Pauoscio Yard and Outer Port

Proposed access line is single track with one siding track located near the outer port. It has been planed at south side of Melnrage I and behind the Klaipedos Nafta. Location of access line is shown in Section 2.4.8 Figure II.2.4-8. Siding track located just behind the outer port is mainly use as run-round track for locomotive for the train to the quayside. Required railway structures and facilities are listed below:

- Track: 2.5 km
- Turnout: 3 set
- Level crossing facility: 1 location (automatic crossing control with crossing barrier)
- Deforestation: 0.7 ha

Railway alignment and structures for the Short-Term Plan are based on the Lithuanian Railway standard and regulations. Main parameters for track structure, construction gauge and typical cross section are referred to Appendix C.

Table II.3.4-3 Railway Handling Data at Outer Port (2015)

Berth No.	Cargo Item	Handling Volume (ton)	Railway Handling Berth No.	Handling Track No.	Effective Length (m)	Effective No. of Wagon	Loading/Unloading Facility	Storage
No.1	Petroleum	-	-	-	-	-	Not handled by railway	
No.2	Wheat	361,000	No.2	T6	300	16 (max.20)	Bottom discharge facility: 4 wagons with 20 minutes	Silos
				T7	300	16 (max.20)		
	Apatite (in)	200,000	No.2	T1	250	12 (max.16)	Direct loading: 20 minutes per wagon, 1unit/track	Direct
				T2	250	12 (max.16)		
	UAN	620,000	No.3	T16	200	14	Discharging facility: 14 wagons with 90 minutes	Tanks
No.3	Raw suger (in)	300,000	No.3	T3	180	12	Direct loading: 20 minutes per wagon, 1unit/track	Direct
				T4	180	12		
	Ferro Alloys	160,000	No.3	T10	260	16	Trackcrane or forklift 30 minutes per wagon, 2 units/track	Open yard
				T11	260	16		
		40,000		T11	260	16		Shed
	Steel Product	210,000	No.3	T10	260	16	Trackcrane or forklift 30 minutes per wagon, 2 units/track	Open yard
				T11	260	16		
		90,000		T11	260	16		Shed
	TOTAL	1,981,000						

Source: Estimate by the JICA Study Team

Table II.3.4-4 Day Workload at Outer Port (2015-2024)

Berth No.	Berth No. for Railway	Track No.	Item	Max. Handling Capacity (wagon/day)	Capacity Used (wagon/day)	Ratio (%)	Cycle Time per trip (hour)	No. of wagon per cycle	Remarks
No.2	No.2	T1,T2	Apatite (in)	79	15	19	5.13	32	Direct loading 20min/wagon, 1facility/track
	No.2	T6,T7	Wheat	161	39	24	3.81	32	Bottom discharge hopper 0.33h/4wagons
	No.3	T16	UAN solution	101	85	84	2.67	14	Discharge facility 90min/14wagons
No.3	No.3	T3,T4	Raw Sugar (in)	90	36	40	5.13	24	Direct loading 20min/wagon, 1facility/track
	No.3	T10,T11	Ferro alloys Steel product	115	58	50	4.67	28	Trackcrane or forklift 0.5h/4wagon
			TOTAL	**546**	**233**	**43**			
			Access Line	**415**	**266**	**64**			Max 32wagon/trip

Train length (no. of wagon)	470m	(32 wagons)
Working method	Pull/Push	(Access Line :Pull)
Working day per year	336day	
Working hour per day	24 hours	
Loading volume per wagon	40t	(Liq. Fer & F.A, Steel: 50t)
Freight handling volume	3,564,000 t	

Source: Estimate by the JICA Study Team

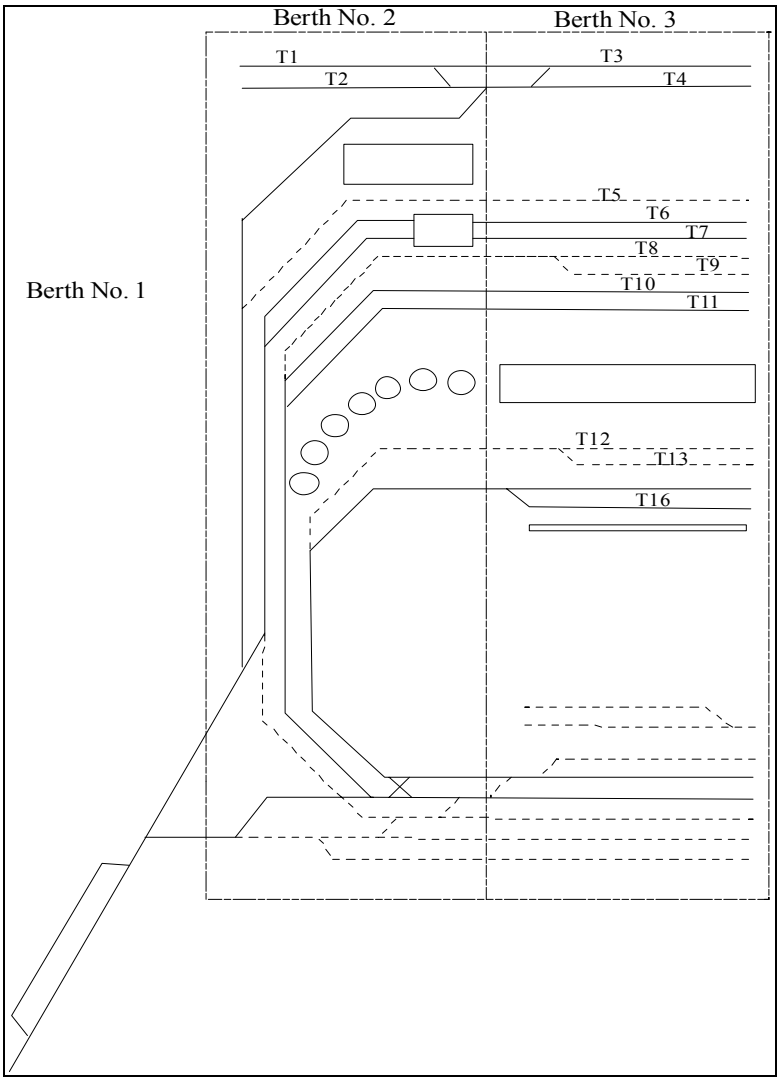


Figure II.3.4-2 Track Layout Plan at Outer Port (2015)

3.4.8 Road Development Plan for Port Expansion Plan

It is necessary to construct access road to outer port for port related traffic. Location of proposed road is shown in Section 2.4.8 Figure II.2.4-8. At present Giruliu Street is used as access road to the Klaipedoa Nafta, Cargo Terminal and second gate for KLASCO. Based on this situation, proposed road would be expansion into four-lanes of Giruliu Street from the junction of P.Lideikio Street with the length of 0.3 km and from there construct four-lanes road to outer port with consideration of intersection at existing road. Required length of road inside outer port area and access road are listed below:

Outer Port Area

- Length: 0.7 km
- Width: 20 m
- Bridge section: 200 m
- Approach section: 200 m

Access Road

- Length (new section): 1.4 km
- Length (expansion section): 0.3 km
- Width: 20 m
- Deforestation: 1.0 ha

CHAPTER 4 KEY PROJECTS IN SHORT-TERM PLAN

CHAPTER 4 KEY PROJECTS IN SHORT-TERM PLAN

4.1 Extraction of Key Projects

The Short-term development Plan will comprise various projects, some of which will be implemented by KSSA, but their financial viabilities were not analyzed. These projects have been extracted as the Key Projects. The following are the Key Projects.

- Outer Port Development Project
- Southern Access Railway Improvement Project

The scope of the projects are outlined below.

4.2 Outer Port Development Project

4.2.1 Project Site

The project site is placed off the Baltic Sea coast on the north of the existing port entrance (see Figure II.3.4-1 in Chapter 3).

4.2.2 Project Components

The main project components are listed as follows:

(1) Infra-structures

- Construction of breakwaters
  - West Breakwater: 1,000 m
  - South Breakwater: 1,400 m
  - North Breakwater: 500 m
- Widening of the existing Sea Channel
  - Width: 300 m
  - Water depths: 17 - 17.5 m
- Creation of basins
  - Water depths: 6 - 17 m
  - Diameter of turning circle: 600 m
- Land reclamation
  - Area: 58 ha
  - Revetments: 1,830 m
- Construction of berths
  - No.1 Berth: 310 m, 17 m (water depth)
  - No.2 Berth: 310 m, 17 m (water depth)
  - No.3 Berth: 310 m, 17 m (water depth)

- Construction of railway
  - Inner port tracks: 8,200 m
  - Access line: 2,500 m, (with siding track)
- Construction of access road
  - Inner port road: 850 m, 4 lanes
  - Flyover bridge: 200 m, 4 lanes
  - Access road: 1,700 m, 4 lanes
- Preparation of a basin for port service boats
  - Basin: 6 m (water depth)
  - Berth length: 410 m

(2) Super-structures

- Installation of quayside cranes
  - One unit of ship loader of rated capacity of 1,500 tons per hour
  - Two units of level-ruffing crane of lifting capacity of 40 tons each
- Construction of Storage facilities
  - Grain silos with storage capacity of 110,000 tons
  - Liquid fertilizer tanks with storage capacity of 120,000 tons in total
  - General cargo warehouse with floor space of 11,000 sq. m

4.2.3 Demarcation of Capital Investment

The supposed demarcation of the capital investment in the said project is as follows:

- Port infra-structures: KSSA
- Access railway: KSSA
- Access road: KSSA and/or Klaipeda Municipality
- Super-structures: Marine terminal operators as concessionaires

4.2.4 Financial Resources

The potential financial resources required for KSSA to invest in the said project are supposed as those from the Central Government and multi-lateral financial institutes including EIB (European Investment Bank), IBRD (World Bank) and NIB (Nordic Investment Bank).

4.2.5 Implementation Schedule

The schedule of the said project in terms of implementation has been roughly drafted as follows:

1) 2009: Selection of terminal operator
2) 2011: Start of construction works
3) 2014: Completion of construction works

4) 2015: Start of terminal operations

Detailed construction program from the beginning of 2010s through 2014 is mentioned in Chapter 4 of Part-III.

4.2.6 Schedule of Second Phase Project

As previously mentioned in Section 3.1 of Chapter 3, the whole outer port development plan has been phased into the plans, viz. the first phase plan and the second phase plan. The key project proposed herein in this Chapter corresponds to the first phase plan and its components are presented in the above sections.

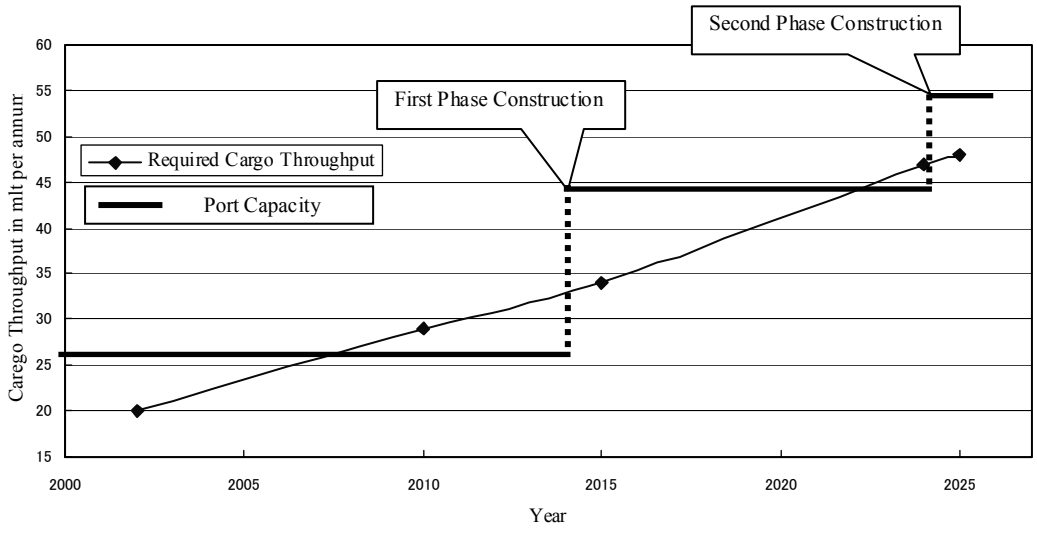
The implementation schedule of the second phase project has been roughly drafted for the reference so as to facilitate the understanding of the whole project and shown as follows though the second phase project is not included in the said key project mentioned herein in this chapter:

1) Beginning of 2020s: Start of construction works

2) 2024: Completion of construction works

3) 2024: Bidding and contract procedures for the selection of concessionaires as marine terminal operators

4) 2025: Start of terminal operations



Source: Estimate by the JICA Study Team

Figure II.4.2-1 Required Cargo Throughput and Port Capacity

4.2.7 Required Considered in Implementation of Project

The following matters need to be considered in the implementation of the said key project so as to ensure smooth implementation:

- Adequate functional allotment between the existing inner port and the new outer port so as to make the most of their potential capacities

- Reasonable demarcation of investment in access railway between the National Railway and the Port Authority (KSSA) through the coordination between them
- Minimization of the potential negative social impact on the residential areas in the vicinity of the project site through the collaborative works with the Municipality
- Settlement of potentially generated conflicts of interests between the current or newly participating port users due to the emergence of the new outer port

4.3 Southern Access Railway Improvement Project

4.3.1 Project Site

The project site is placed at the southern part of existing port located next to the existing access track between Draugyste Station and BEGA (see Figure II.2.3-4 in Chapter 2).

4.3.2 Project Components

The main project components are listed as follows:

- Track construction
  - Track length: 4.1 km
  - Embankment 2.4 km (average width 8 m, hight 2 m)
  - Turnout: 2 units
- Bridge construction
  - Bridge length: 20 m (single-track bridge)
- Installation of railway facility
  - Level crossing: 4 units (automatic crossing control)
  - Signalling & telecommunication device: 1 unit

4.3.3 Capital Investment

The capital investment in the said project is KSSA.

4.3.4 Financial Resources

The potential financial resources required for KSSA to invest in the said project are supposed as those from the Central Government and multi-lateral financial institutes including EIB (European Investment Bank), IBRD (World Bank) and NIB (Nordic Investment Bank).

4.3.5 Implementation Schedule

The schedule of the said project in terms of implementation has been roughly drafted as follows:

1) 2009: Financial arrangement
2) 2010: Engineering Service

3) 2011: Construction

4) 2012: Start of operation

Detailed construction program from 2009 through 2012 is mentioned in Chapter 4 of Part-III.

4.3.6 Required Considered in Implementation of Project

The following matters need to be considered in the implementation of the said key project so as to ensure smooth implementation:

- Establishment of train operation and management policy between Lithuanian Railways (LG) and Port Authority (KSSA) with terminal operator in order to realize safe and reliable railway freight transportation.
- Reasonable demarcation of investment in access railway between the LG and KSSA through the coordination between them.

CHAPTER 5 STUDY ON OPERATION AND MANAGEMENT

CHAPTER 5 STUDY ON OPERATION AND MANAGEMENT

5.1 Selection of Terminal Operators for New Port Developments

5.1.1 The Issues

As discussed in Part I (Chapter 2.8), when the port was reorganised following independence from the Soviet Union, the operators for the port terminals were selected more or less naturally from the organisations and people who were operating them at the time. The Law on Klaipeda Port says: "Port Authority can lease the land of the port only in competition, except when: (1) land of the port is leased to persons who purchased buildings. … (etc.)". The initial allocation of operators was done without competition. It seems that the exception above covered the existing operators. It is hard to see what else could have been done. The remaining state-owned operators were privatised later.

However, if new port territories are developed, or if unallocated port territory is to be allocated to operators, or if reserve port territory is to be released for port operation, certain issues arise:

- How to select the operator for new (or newly released) territory?
- How to determine the land-lease rates?
- How to decide what facilities should be provided at KSSA expense?

To say that the KSSA can lease the land "only in competition" is too simplistic, and does not answer the practical questions. Furthermore, allocation in competition implies the ability of the KSSA to agree to different land-lease rates, which makes the subsidiary law on land-lease rates redundant. The further issue may therefore arise:

- What changes, if any, are needed to the port law?

5.1.2 Discussion

Around the world there are many different port organisation structures. The port structure tends to determine how terminal operators are selected.

In many ports, the port authority is the operator of the terminals. Many state-owned ports (or quasi state-owned ports such as regional ports) do their own planning, and run their own operations. For them the issue of selecting an operator does not arise, although there may be planning restrictions and environmental considerations, which may, and probably should, be under the control of a different body. Within such ports, there may also be private terminals. These may wish to develop and require additional territory. In these cases, the private terminal operator usually does not expect the port to provide the infrastructure – the operator would buy or lease the undeveloped territory and construct his own berth(s). State owned ports are sometimes suspicious about such private development because they fear it would compete with the port's own operations, and so refuse such development, or put obstacles in the way. Such a refusal is usually to the detriment of the port user and of the general economic good of the country.

As a variation on the port authority as operator, there are ports (for example in the Middle East) where the port authority operates the terminals and provides the main equipment such as shore-side cranes, but sub-contracts the stevedoring to a

stevedoring or labour contractor, who may or may not be required to provide forklift trucks and/or other cargo-handling equipment. Selection is usually competitive, on price per ton and/or a guarantee on performance. With what is in effect a piece-work system of remuneration, such arrangements can give good performance initially for general cargo and other labour-intensive operations, but tend to be less satisfactory the more sophisticated or expensive the equipment involved. This model is not recommended for developments in Klaipeda Port.

As well as state-owned ports that operate their own terminals, there are private ports do so. These must raise their own capital, and are likely to be prudent and not to embark upon ambitious developments until they are necessary, unlike some state-owned ports. In many ways this is an ideal scenario, and in a developed country with several ports it provides (or anyway helps to provide) a healthy, competitive and efficient port industry, such as now exists in the UK. A variation on this is an estuary or region with one marine authority but with independent (public or private) terminal operators. Harwich Haven in UK is an example of such a port authority, with independent terminals at Harwich Town, Parkestone Quay, Shotley, Ipswich and others, and most famously, Felixstowe Port which is the largest and most successful UK container port, with TEU throughput exceeding that of all the other UK container ports put together. Only by being in control of its own planning and development could a port have grown so successfully, and a few comments are therefore in order. The design of Trinity terminal was closely dependent on the operational methods to be used in the port. Crane rails were designed with extra wide gauge for the planned size of shore-side gantries (anticipating the need for post-Panamax gantries), and integrated with the design of the quay wall and the secondary tension wall sheet piling for support. A very cost-effective and innovative yard paving method was used, such that some subsidence on the reclaimed land could be tolerated and adjusted for in the maintenance programme, in the knowledge that load-spreading 16-wheel RTGs were to be used in the container yard. (Some of these techniques have become accepted as standard for RTG operated yards.) Only those areas where heavy TLTs and reachstackers were expected to be used were specially reinforced. The most cost-effective solution overall was to use more expensive cargo-handling equipment in order to save infrastructure cost. The depth of quay wall itself was chosen by the private terminal, after close consultation and agreement with the port authority on the dredging to be undertaken by the port authority to deepen the port. Loans to finance the capital dredging project were taken out by the port authority, backed by a guarantee from Felixstowe Port to pay the shortfall in the event that the subsequent ship dues were not adequate to service the loan.

The example of Felixstowe Port is quoted in detail to illustrate three things:

- Very close coordination and understanding between infrastructure design and port operation is needed for the most cost-effective solution.
- Only because the costs and the benefits fall to the same party was the optimum solution found.
- The demand for the development was market-led. It was the terminal operator (in this case Felixstowe Port) who wanted the development and led the project throughout.

In contrast, Klaipeda Port is a landlord port. This is a common and generally successful arrangement, and the trend is for state-owned ports to switch to this model.

In landlord ports, the infrastructure remains under the ownership (or guardianship) of the port authority, and is leased to terminal operators who are usually private (or due to be privatised), and who lease the infrastructure from the port authority. This usually means that the construction costs are borne by the port authority, although not always. Unless the state subsidises the port, the cost must be recovered, usually through the land lease rate and from increased ship and cargo dues. In theory, the port authority plans and designs the development, and invites potential lessees to tender for the use of the territory. In the past, when much of the cargo was break-bulk general cargo, such a system worked adequately well. However, for modern specialist terminals it no longer works well. In Japan for example, there have been mismatches between what was provided and what the operator required. Furthermore, it is no longer necessarily the case that there are several potential operators vying for new terminals; in practice, it is usually known who the operator will be, and the idea of competitive tenders is unrealistic. (In the big Japanese ports, most of the container terminal operators are the shipping lines themselves.) This gives the opportunity for cooperation between the port authority and the prospective operator from the earliest planning stage, which is what actually happens, albeit 'unofficially'. There is nothing wrong with this if it is handled correctly and openly, and it would be preferable for this arrangement to be acknowledged officially.

A further development scenario that is used especially in developing countries is the Build, Operate and Transfer model (BOT). Typically, the port authority reaches agreement with a terminal operator who (as the name implies) builds the terminal at his own expense, supplies his own equipment and superstructure and operates the terminal, and after the agreed number of years transfers the terminal (plus agreed equipment) to the port authority. The time scale is usually somewhere between 30 and 50 years, perhaps with an option to continue to operate as a lessee. There are variations on the model, but the principle is the same: the terminal operator provides the capital, and benefits from the operation for an agreed number of years (perhaps net of a fee or percentage of revenue); thereafter the 'ownership' reverts to the port authority. Usually prospective BOT terminal operators are selected by competitive tender, although quality of design and operation are as important as price. As with a private terminal, the operator should be permitted to make the design to suit his best interest; provided that the length of term is long enough, the fact that he hands back the terminal at the end of the term should not distort the design from the optimum. (There will be conflict of interest towards the end of the term as regards renewal of equipment and maintenance; this can and should be anticipated at the time of negotiation and covered in the contract.) In practice, much was expected of BOT projects a few years ago, but the reality has been disappointing, with few successful examples. Port authorities have expected too much, and prospective operators have been put off by the (often unnecessary) constraints imposed, and the risk exposure.

5.1.3 Selection of Terminal Operators in Klaipeda Port

For the reasons discussed in the Halcrow/APEC 1993 Master Plan, the recommendation was that Klaipeda Port should be a landlord port, with independent, autonomous terminals. That remains the recommendation of this study. The basic structure is correct, and the Law on Klaipeda Port should remain fundamentally intact. With only one main port (albeit in competition with other Baltic ports), it would not be prudent to privatise the port itself. However, within that framework, where

possible, the advantages and benefits of private enterprise and market forces should be used.

(1) Practical Issues for Major Port Development

Consider first a major port development, such as the possible outer port which it appears may become necessary in the next ten or twenty years.

In Klaipeda Port, one issue is made simple. The water depth in the main access channel between the North Sea and the Baltic Sea, through the Great Belt through Denmark, is 17m. It is a long channel, and dredging is necessary to maintain 17m. It seems that it would be impossible to increase that depth, both for cost and environmental reasons. There are sections where special priority one-way transit is necessary for vessels at the maximum draft of 14.5m. For Klaipeda Port therefore, there is a clear limit to the maximum depth that might be required for the port (unlike non-Baltic ports where the issue is open-ended for most of them). It is clear that some, if not all, the new berths should have 17m water depth, or be capable of being dredged to that depth. It is not known whether throughput studies have been undertaken for the Great Belt and the other (shallower) access channels to the Baltic, nor whether this could become a bottleneck in the future, as is happening for tankers in the Bosphorus channel to the Black Sea. In this study, it is assumed that the Great Belt will not become a bottleneck.

As conceived now, a new outer port would ultimately comprise six terminals: an oil terminal, a grain/liquid bulk terminal, two other bulk terminals, a container terminal, and a general cargo terminal. In addition, it is thought that land will be needed in the outer port for an export/import processing zone and a distribution centre.

Immediately one can foresee dilemmas. Irrespective of the exact requirements (which cannot be known with certainty that far ahead), one thing is certain: the new terminals will not all be required at the same time. Phasing the development in two phases (as proposed) partly solves the dilemma, but some major elements such as the breakwaters and access dredging must be provided in the first phase; the cost of Phase 1 will be disproportionately high.

The demand for new terminals in Klaipeda Port will arise in one of two ways (or possibly in combination):

- Demand for the terminal itself, either to provide new facilities such as greater water depth, or because an existing terminal is congested, or because a new operator wants the facilities; or
- Because of congestion of the ship movements in the port (as forecast in this study).

Both the oil terminal and the grain exporters already claim that there would be commercial benefits if 17m water depth were available. However, it seems unlikely that the huge cost of even phase one of the outer port can be justified by the marginal increase in these cargoes only. If there were a genuine pressing demand, it would be likely to come earlier than 2015; rival ports with 17m facilities may have taken the trade from Klaipeda Port by that date.

If the reason for the outer port is to relieve ship traffic congestion, all port users share the benefit. The individual terminal operator who has had his operation extended or moved to the new outer port may gain little or no more benefit than anyone else.

(2) Transitional Problems

Experience from other ports' developments leads one to anticipate an initial reluctance by cargo interests to switch to the new port. This is partly a dislike of change of routine, and often there are increases in road haulage or other inland transport costs initially. Terminal operators may even have to adjust their tariffs initially to attract cargo to the new terminal. If however the development is properly conceived and executed, an improvement in service usually becomes apparent, and the cargo interests come to accept the change.

(3) Possible Development Sequence

When should the KSSA start the outer port development? This study has concentrated on the particular years 2015 and 2025 because those are convenient short and long-term milestones. The economic and financial analyses will be undertaken for 2015, not for earlier years, and 2015 is not necessarily the optimum year for commencing the operation on Phase 1, even for the traffic as forecast by the study.

It seems likely that something will trigger the development. According to the study simulation, ship delays will start to rise, primarily because of ship movement congestion in the channel. Queuing theory suggests that ship delays from this cause would rise from barely noticeable levels to serious congestion rather suddenly as the theoretical capacity limit is approached. If this is true, it is a cause for concern. However, the real situation is unlikely to be so close to the theoretical model, and there should be practical ways to ameliorate the situation in the short term (such as by using a convoy system in the channel) to prevent a crisis. Nevertheless, the KSSA will need to be on the alert for signs of ship traffic congestion, and be ready for outer port development if it should start to happen. Even capital dredging of the outer channel to create the planned two-way entrance channel would go a small way to relieve the build-up of congestion. What would not be desirable when approaching the capacity limit would be additional traffic restrictions, such as might be caused by the dredging operation itself. Note that, if ship movement congestion is the trigger, it may be difficult to attract terminal operators to the new outer port.

Although not in accordance with the forecast, a more likely trigger would seem to be a demand for a deep terminal, for example a new terminal for import of Orimulsion. If it is true that Lithuanian power generation is to switch to Orimulsion as its fuel (an emulsion of bitumen and water that can be pumped and shipped safely, originating in the Orinoco region of Venezuela), then a new deepwater terminal may be needed. In theory, a single point mooring buoy (SPM) like that at Butinge could be used which one would expect to be much cheaper, but there may be environmental objections. (In Venezuela, Orimulsion is loaded for shipment at an SPM.) Baltmax size vessels would be the cheapest means of transportation. It seems likely that the Klaipedos Nafta terminal would not have the capacity for the extra traffic, quite apart from the water depth.

If a demand for a deep terminal is the trigger, the terminal operator for that 'trigger' terminal selects itself. (In the example given, of Orimulsion import for power stations, one would expect an associate or subsidiary or of the Power Generating Board to be the operator, rather than Klaipedos Nafta.) However, the problem remains for the other terminals; it may be difficult to attract operators for those.

(4) Selection for Major Port Development

From the discussions above, it is clear that the selection of terminal operators for major port development will not be a simple matter of building the port and inviting tenders from operators.

It appears likely that there will not be rival operators competing for the terminals. Operators may be reluctant to come to the new port, especially if they have to pay a full economic land lease rate that reflects the cost of construction. This appears to contradict the desire to allow market forces to prevail, and to recover costs from those on whose behalf it has been incurred. This apparent contradiction is especially evident if the trigger for port development is shipping movement congestion. The explanation is simple enough – the benefit of the new terminal(s) falls not exclusively to the terminal operator, but to all (or most of) the port users through the relief of the congestion. This also indicates that in this case at least part of the cost of development should be recovered from all port users, probably through ship or cargo dues.

The recommendations are therefore as follows:

- All terminal development should be undertaken in close cooperation with the prospective terminal operator. The aim should be to find the overall optimal development solution for the long term.
- Selection of terminal operator(s) will therefore be in advance of development. In many cases it will be self-evident who the operator should be for a particular terminal. But the opportunity to take part in negotiations should be open to all, including overseas companies. If demand exceeds supply, then efforts should be made to satisfy demand (i.e. develop more terminals) rather than to limit the supply of facilities. Over supply with competition is almost always better than undersupply with monopolistic practices. The discussion on EU competition policy is also relevant (I.2.8.6).
- In principle, costs should be recovered from those for whom it is incurred. This would normally be through the land lease rate, which should therefore not be restricted by the existing formula. In the unusual situation that shipping movement congestion is the trigger for development, the same principle applies, and some at least of the cost recovery should initially come from all relevant port users, probably through ship or cargo dues, which could justifiably be increased for this purpose if necessary. But the terminal operator should not have a ‘free’ new terminal for ever; the terms should be such that after say 3 or 5 years the land lease rate is increased to reflect the true value of the terminal.
- If the trigger for Phase 1 development is the demand for one terminal, the demand for the other terminals in Phase 1 may not be there initially. If there is no demand (and no prospective operator), then the development of those other terminals should be postponed. It is appreciated that the breakwaters, channel dredging, access roads and railways, and ancillary services will have to be provided in anticipation of the complete development, but there is no purpose in incurring more than the minimum cost on terminal development until the demand is established. There is no disgrace in having undeveloped terminal sites awaiting suitable demand.

- The recovery of the cost of the breakwaters, channel dredging, access roads and railways, and ancillary services poses an interesting question. To what extent should these be considered as services to the new terminals only (and therefore should ideally be recovered from them), and to what extent as services to all port users? There is no perfect answer. The most pragmatic argument is that these are common services, such as those provided (in general) throughout the port. On this basis, it is suggested that the cost of these should be recovered through ship and cargo dues. Note that ship dues are related to ship size (GT), so to some extent the cost of deeper access is charged to the larger ships. If however in the financial analysis it is found necessary to raise extra revenue from ship dues for providing the extra water depth of 17m, it would be possible (and there are precedents for this) to adjust the dues so that the very large vessels pay disproportionately more, either by adjusting the scaling against GT, or by a surcharge based on ship draft[1].
- Inherent in the above is the need for flexibility. The KSSA should be free to negotiate with prospective terminal operators. Land lease rates should not be constrained to a formula. Ship and cargo dues may need adjustment. Provided it is done openly and honestly, this would be the best way. There should be minimum legal constraints apart from the obligation to be open and even-handed. The involvement of MOTC should be only to ensure the correctness of procedures, including those to ensure the competence and suitability of the negotiators.

(5) Developments within the Existing Port

The above recommendations should also apply within the existing port. The current phase of development is nearing completion, but more will surely be needed. Market forces need to be able to work as far as possible.

Almost all quayside territory is occupied at present, but much of it is underused. As the simulation has shown, with efficient usage the quay length and territory of the inner port is adequate for the forecast traffic up to at least 2015. The issue arises: in view of the anticipated development of an outer port, should the development of the inner port be limited or changed in any way?

It is tempting to argue that further development of the inner port would be wasted; that the money should be saved for the development of the outer port; that the outer port is inevitable and the sooner it becomes necessary the better.

Such arguments are false. It is not certain that the outer port will be necessary, and even if it is, there is no certainty about when the need will occur. The trigger for Phase 1 may occur before or after 2015, or may never occur at all[2]. Development of the inner port should proceed as though the outer port were never to happen. To obtain maximum efficiency from the inner port is desirable in its own right. To hold back from developments at this stage would be a mistake, particularly any

[1] Conceptually, it should be actual ship draft, different for arrival and departure. But it is difficult to check ship draft, and the master should not be tempted to mis-declare his ship's draft, because the draft has navigational safety implications. Although less fair, it is probably better to use summer loadline draft.

[2] The behaviour of Russia in the past few years with regard to its transport policy and railway tariffs has been very uncertain, to the detriment of trade through the Baltic States. The forcing of Russian trade through Russian ports may be good internal politics, but it is almost certainly economically damaging, for Russia as well as for the Baltic States (presumably there were overall benefits in developing links through the Baltic ports in Soviet times?) So it is to be hoped that when Russia recovers its self-confidence it will reverse its restrictive transport policy.

developments that might delay the necessity for the outer port. The longer the cost burden of the outer port development can be delayed, the better, as long as port performance does not suffer. Only when development of the outer port is inevitable and imminent should any consideration be given to withholding inner port developments.

For improvement in the utilisation of port territory, greater flexibility is needed in the system, as argued in I.2.8. The recommendations are as follows:

- Increase land lease rates progressively, as and when possible under the existing leases, to reflect market values. An increase of at least threefold would appear justified at today's prices.
- Balance the increased land lease revenues by a reduction in ship and/or cargo dues.
- Remove the restrictions on sale of leases and sub-letting. The KSSA may feel it has to retain a veto on sales and sub-letting. If so, it should only be able to exercise its veto for good reason.
- Terminal operators should be free to develop their territories as they wish, with minimal restrictions. For example, it seems unnecessary to have to obtain permission to demolish buildings.

Dredging and quay wall developments will remain the responsibility of KSSA, but in accordance with the earlier recommendations, cooperation and flexibility should be the foremost considerations.

5.2 How to Determine the Land Lease Rates

For major port developments, the principle recommended above is that the land lease rate for the terminals should reflect the cost. Are there any alternatives? And how do you convert a one-off cost into an on-going land lease rate?

(1) Alternatives

It would be very unusual for a port authority to charge more than the cost. That would effectively be a form of taxation on trade. There are more direct and more efficient ways for the government to do that if it is felt to be economically necessary, by targeting different commodities with customs tariffs. This is not a matter for KSSA.

Are there arguments for charging less than the cost? If KSSA charges less than the cost, then KSSA must either (a) recover more from ship and cargo dues, i.e. cross-subsidise from other port users, or (b) operate at a loss, allowing the government to subsidise the terminal operator. As discussed above, in the unusual situation that shipping movement congestion triggers the development it may be necessary for KSSA to cross-subsidise the new facilities in order to relieve the congestion for all users. Assuming that the trigger for the development is a demand for new facilities, there are two other situations when a subsidy (or cross-subsidy) might be considered economically justified:

- The existence of overriding economic or strategic reasons for the development that are not reflected in the potential revenue stream that can be created by the terminal operator. As shown in I.2.8.9 there appear to be no significant external economic benefits that could be attributed to port developments. As for strategic

factors, it is arguable that national security might require some alternative method of receiving crude oil (or other emergency fuel supplies) into the country against the possibility of Russia shutting off supplies. However, the Butinge SPM terminal satisfies this requirement.

- A business that will become profitable in the future, but needs a temporary subsidy to enable it to reach a viable size or turnover. Some centrist governments, for example in the Far East, steer their economies in the direction they think they should go by subsidising loss-making businesses. However, whatever the merits or otherwise of such government policies, it is not a matter for the KSSA to make such judgements. In a normal market economy, companies can raise bridging finance from shareholders or banks if the future looks profitable.

In general, therefore, KSSA should not subsidise or cross-subsidise developments. The cost incurred in building the terminals should be recovered over time by the equivalent cash flow from land lease rates.

(2) Facilities to be provided by KSSA

If the principles discussed above are followed, the question of what facilities are to be provided in port development ceases to be a strategic issue. The whole development would be discussed in details with prospective terminal operators, including discussions on services and other facilities in addition to the basic infrastructure. If, as proposed, the full cost of development is recovered in land lease rates, the dividing line between what is provided by the terminal operator and what is provided by KSSA becomes less critical. Common sense should provide the solution.

When considering developments that comprise several new terminals or berths, there are common services that are most sensibly provided communally, such as road access, rail access, power, domestic services such as water, drainage and sewage. These are normal facilities provided throughout the port, and as suggested above, the pragmatic solution is to charge for these through ship and cargo dues.

However, apart from the basic infrastructure, facilities that are specific to any one terminal should in principle be provided and paid for by the terminal operator. It is no longer true that all terminals need to be provided with standard equipment such as crane rails and railway lines (let alone quayside portal cranes and transit sheds). Each terminal should be individually designed. It will probably evolve and change over time, according to the needs of the operator. The more the terminal operator is in control of and responsible for his own development the better.

The only reason for KSSA to provide more than the minimum is if KSSA has access to cheaper finance. In this case there might be mutual benefit in ‘stretching’ the facilities to be provided at KSSA’s cost to include railways, power distribution, lighting, boundary fences, and other terminal-specific items. If this is done, it is the consultant’s view that these facilities should be, and should remain, the responsibility of the terminal operator, even though by their nature they are things that will be handed over at the end of the lease.

5.3 Changes to the Law of Klaipeda Port

As suggested earlier, more flexibility is required in the fixing of land lease contracts and land lease rates. In general, the Law of Klaipeda Port permits this flexibility if interpreted in the right way, but if changes are to be made in the law, the opportunity should be taken to incorporate this requirement. Suggestions are made in the table below (Table II.5.3-1). The subsidiary laws (orders) need more amendment, as indicated in the table.

Table II.5.3-1 Suggested Changes to Port Law

Law on Klaipeda Port 1996, amended to 2002		
5.4	Interest for using state capital is not taken.	Reconsider. An interest rate should be used in the calculation of equivalent land lease rate.
23.1	Port Authority can lease land … only in competition, except …	OK, provided not taken too literally. There may be only one prospective lessee.
23.2	…rent may be increased or decreased taking into consideration … user's stevedoring extent …	It is hard to understand the purpose of this sentence. Suggest delete.
25.2 (1)	Contract must include minimum volumes of cargo handling …	Suggest delete. No attempt is made to monitor or enforce this clause. Clause 4.2 is sufficient.
25.2 (3)	Contract must include terms and conditions of sub-lease.	OK, provided subletting and/or sale of lease are permitted unless there is good reason otherwise.
25.6	The terms and conditions of the … lease … are as provided for by the government …	Government should not dictate the terms. Suggest change to a more general requirement for openness and fairness (unless covered in more general contract law).
26.1	The improvement or establishment of the port infrastructure is possible only at the permission of the Lessor.	Change this to refer only to hydraulic engineering structures. Lessee should be free to improve paving, railways, etc.
26.2	The lessee willing to improve the port infrastructure … and to acquire the right to recover the costs … shall have to conclude a contract with the Port Authority.	Change this to refer only to hydraulic engineering structures.
26.3	If the port infrastructure is improved … without contract …, the expenditure … is not reimbursed.	Change this to refer only to hydraulic engineering structures.
Typical Klaipeda State Seaport Land Lease Contract (MOTC Order, January 2001)		
General	Whilst a pro-forma contract is useful, it is suggested that it should not have the force of law.	
4	The lessee (may) make use of the side railway … under the right of trust. The procedure is in Annex …	Delete paragraphs 2 and 3 of the Annex. Suggest delete the whole Annex.
8	The lessee … undertakes to handle not less than … tonnes of cargo …	Delete
9	The construction of structures and facilities … can be implemented … only by written consent of the lessor.	Either delete, or add: "which shall not unreasonably be withheld."
11, 12	… repair works of buildings …	Suggest delete. A general requirement to keep the territory and superstructures in good and safe condition is preferred.
21	If the lessee, with the consent of the lessor, builds new infrastructure … on the plot, he has the right to claim for expenses to be reimbursed …	Change this to refer only to hydraulic engineering structures.
26	The lessee shall be forbidden to sublease the leased port land plot.	Delete. Permit subletting, with written consent "which shall not be unreasonably withheld."
35	The port land lease charge can be lowered if … the land use conditions got worse …	Suggest delete. In event of *force majeur,* there should be flexibility for KSSA to renegotiate the contract.
Formula for Calculating Land-Lease Rates (MOTC Order, September 2002)		
General	This order should not apply to new leases. (Rates for existing leases also should be reviewed in accordance with the recommendations given.)	
5.4	If the … land is leased by way of auction or competition (tender), the coefficient is established by dividing the land lease rate offered by the winner of the auction or competition by the land lease rate.	This is the existing exclusion clause. New development may not necessarily be by auction or competition, so the clause needs revision if the Order is to remain in force for new leases.

(1) Adjustment of Land Lease Rate for Cargo Handling Volume

Since the compilation of Table II.5.3-1, the 2004 revision of the Formula for Calculating Land Lease Rates has come to our attention.[3] The revised procedure includes a new clause, Clause 8, which starts:

> Clause 8. The port land-lease rate for the port land users involved in cargo handling activities can be increased or lowered at the agreement of the parties of the port land-lease contract, taking into account the cargo handling volumes of/by the port land user.

The clause goes on to give the method of calculating the adjustment to the land lease. Effectively it gives the implementation procedure for the corresponding Clauses 23.2 and 25.2(1) in the Law on Klaipeda Port, and Clause 8 in the Typical Klaipeda State Seaport Land Lease Contract. It has already been suggested in Table II.5.3-1 that these clauses should be deleted. That was because they go against the general principle of allowing the terminal operators to carry out their business in their own way, without government interference. The preference is that there should be minimal government control, and that market forces should be allowed as far as possible to lead the way in which terminal development evolves, including the possibility of closure, or transfer, or sale, or sub-letting of terminal leases. If such evolution is permitted, which would be helped if land lease rates correspond to market rentals and/or the cost of development of terminals (as propounded in I.2.8.3 (3)), the need for additional controls or adjustments from MOTC and KSSA is minimised.

In addition to the general objection above, there are particular objections to Clause 8 as drafted:

- It is illogical and impractical to penalise a terminal operator with an increase in land lease rate just at the time when his business is doing less well. Volume may vary through no fault of the operator.
- Setting the norms of cargo handling volumes for terminals is difficult and rather arbitrary.
- According to 8.1 and 8.2, the adjustment to the land lease rate is to be equated in cash terms to the difference in berth dues. Berth dues comprise rather less than 10% of port dues, whereas the revenue from land lease rates is about one fifth of the revenue from port dues. Thus the general level of adjustment is proportionately about half the change in cargo volumes. However, berth dues are charged on GT, and give only an approximate indication of cargo handling volume. For example, improvements in trade efficiency whereby ship capacity is used more fully (which is a desirable objective, especially if ship traffic congestion threatens to be a problem in the port) would be discouraged because they would lead to a reduction in berth dues for the equivalent cargo volume.
- Increases in land lease rate (8.1) are related to the <u>average</u> berth dues for the previous five years; decreases (8.2) are related to the <u>maximum</u> berth dues for the previous five years. This makes it more difficult for operators to decrease the land lease rate than to increase it. This asymmetry seems unfair.

[3] MOTC Order No. 3-43 dated 28th January 2004, published on 1st February 2004, No. 16-494.

- If information provided by the lessee (as required in Clause 17 of the Typical Contract) is used as a method of assessing a possible triggering of Clause 8, there might be a temptation to falsify or obfuscate the statistics.
- Clause 8.3 attempts to allow for the possibility of infrastructure improvements. Again, the purpose and logic of this are not clear. Furthermore, it appears that the clause has been wrongly drafted, with the use of the word 'after' where it should be 'before'.

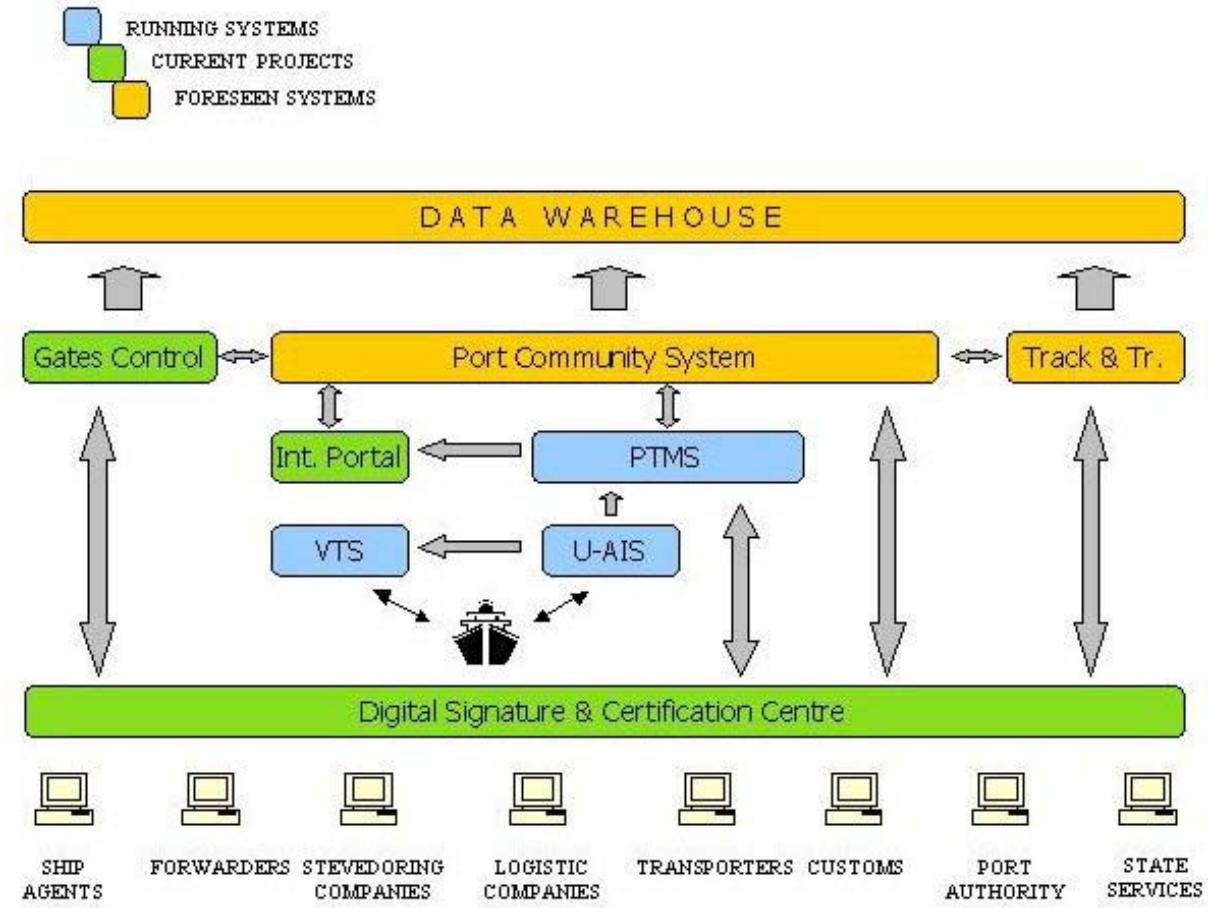
It is suggested that this whole new clause should be deleted.

5.4 Information Systems in Klaipeda Port

Information technology (IT) systems in Lithuania have been transformed since independence thirteen years ago. Despite the shortage of capital, many businesses have IT systems comparable to equivalent businesses elsewhere in the developed world. The importance of IT is recognised.

5.4.1 IT Systems in KSSA

The importance of IT is recognised in KSSA. Big steps have already been taken, and plans and budgets to further develop the systems are in place. The strategy paper 'Programme of Information System Development in Klaipeda Port' was presented in its final form in May 2003 and approved by top management. Many of the following comments are made in relation to that paper, using as a tool a diagram from that paper, Future Vision of Information Systems in Klaipeda Port (Figure II.5.4-1).



Source: KSSA

Figure II.5.4-1 Future Vision of Information Systems in Klaipeda Port

(1) Existing IT Systems

As with most ports, indeed most businesses, the IT components have built up piece by piece. Accounting system, invoicing, collection and reporting of statistics, individual PCs, local area network (LAN), the usual office tools. These have not been investigated in detail, but appear to be in good order, with properly organised support, security, etc.

The first port-specific system was the vessel traffic system (VTS) system. For many years ports have had radar systems to assist vessel traffic control by the harbourmaster's office. As radar systems have become more sophisticated, with computerised monitoring and anti-collision devices, radar image tracking, etc., so these have evolved into genuine IT systems, operating digitally and therefore capable of interlinking with other IT systems. The KSSA system is modern and efficient. Furthermore it is linked by modern cables to the coastal radar network on the coast of Lithuania operated by the MSA.

A recent extension to the VTS system is the universal automatic identification system (UAIS). In accordance with the IMO code, since 2002 all new vessels are fitted with an AIS transponder that automatically responds to interrogation by shore-based radar with an identification code and summary details of the vessel. By end 2005 all vessels over 500GT will be fitted with AIS. The appropriate receiving equipment has been installed in Lithuania and the information is becoming a standard part of the

VTS. The vessel information is being integrated into the KSSA internal port traffic management system. Note however that the vessel information is limited to that which is important for navigation purposes (including the categories of hazardous cargoes on board); it is not intended for commercial details.

As a further international security initiative, there are proposals for the exchange of AIS information with other Baltic countries by 2005. As the data is not confidential, there should be no difficulty in arranging this. Lithuania is represented by the MSA in this project.

(2) Current Projects and Future IT Systems

1) KSSA Internal System

The port traffic management system (PTMS) is to become the heart of the KSSA's internal port-specific IT system. The intention is to automate the processing of services. The examples quoted are "vessel traffic timetables, berth assignment, ordering of services such as pilots, vessel declarations, calculation of dues, etc." It is true that there is a lot of information that is common between these various services and operations, and in theory IT can help. However, the benefits tend to be exaggerated (especially by IT consultants), and the difficulties and expense of creating the system are underestimated. The recommendation to the KSSA is this: Maintain the concept of PTMS as a target, and when developing the various elements that make up PTMS, create the information transfer links between them where they are necessary. However, do not prejudice the individual elements for the sake of integration, and do not build elements that are not worthwhile on their own. Collection and integration of historical data can be done at the Data Warehouse.

The Data Warehouse will be an extended data storage and data analysis system. Data from the real-time systems will be transferred to the warehouse, which will be separate, and will not interfere with the operating elements. This is becoming a standard way of both storing data and making it available for later analysis without risk to ongoing operations.

Next to the PTMS is shown the Internet Portal. This is the gateway into the KSSA web site whereby anyone can access information on ships in port. Conceptually this is a simple service to provide, and very welcome to the shipping community (and to satisfy general curiosity). The addition of a text-messaging portal was clever, although the added benefit is probably not significant.

2) Port Community System

The Port Community System, which as the name implies is a system for the port community, can be distinguished from PTMS, which is a system internal to KSSA. The Klaipeda Port Community Information System (KUBIS, from the initials in Lithuanian) does not yet exist in Klaipeda, although some of the essential elements have been established and an organisation structure for managing it has been arranged. The aim is to simplify and speed up the exchange of information between different members of the port community, as shown at the bottom of Figure II.5.4-1: ship agents, forwarders, stevedoring companies, logistics companies, transporters, customs, KSSA and state services.

As with PTMS systems, claims for such systems tend to be exaggerated. Singapore is usually quoted as an example, and indeed the Singapore community system is impressive; it was set up by the government for the trading community, with legal support, and hugely expensive hardware. The actual extent, and indeed objectives, of most other systems are much more limited.

The key area where a community system can improve the port performance is in customs clearance. This particularly applies to containers and Ro-Ro traffic. Any other benefits are secondary. Initially the system should concentrate entirely on this objective. It is mostly for improved communication between ship agents and customs. The procedure is basically as for the submission of paper documents, but with the benefits outlined below:

- Most trade is now undertaken with electronic versions of Bills of Lading, invoices, etc., so the preparation of customs clearance 'documents' in electronic form is far simpler for ship agents, and much less prone to error. Furthermore, the documentation can be prepared before the ship arrives.
- The transfer of the 'document' to customs, instead of being taken by messenger, is electronic and almost instantaneous. Customs can electronically vet the document and confirm it or reject it as complying with the format and content demanded by them. Thus the document can if necessary be returned, corrected, and resubmitted with minimal delay.
- Customs analyse the document, using their own techniques and algorithms (which are secret). If the consignment is approved for clearance, customs dues are calculated (and checked against the approval for payment by the agent), payment is processed, and the clearance is given, within a few seconds, by return message to the agent. On the other hand, if customs require to inspect the consignment, the ship agent knows in advance.
- Customs can collect their trade statistics automatically from the submissions.
- If the stevedoring company is connected into the system, extra benefits arise: the terminal gate has confirmation of the clearance by customs; alternatively, if not released, the stevedoring company knows in advance, or anyway much more quickly, that the consignment is required to be checked by customs, and can move the goods to the customs inspection area immediately. They may also link the information to their billing system for invoicing purposes.

Clearly, there are further benefits if, for example, forwarders and transporters also receive the information, in order to plan and execute movement from the port. However, these are 'add-ons' that can come later. The big benefit is the data exchange between ship agent and customs. Interestingly, this is also the exchange involving the most commercially sensitive information.

Note that the KSSA involvement in the above is not essential; their link is another 'add-on'. (Only a small portion of the data would be useful to KSSA for invoicing or statistical purposes.) This raises the issue whether KSSA should be the operator of KUBIS. In most ports with community systems, an independent company, owned by the members of the port community, operate the system, albeit often on the computer hardware of the port authority or the major terminal operator. Under Lithuanian law, KSSA as a state body cannot be involved as a

minority shareholder in such a company, so a management organisation has been set up as the next best option.

The recommendation is that utmost priority should be given to a community system involving ship agents and customs, and preferably the relevant stevedoring companies (for containers and ro-ro). The add-ons to that system, and other interchange of data in the community can come later.

Irrespective of the details of the community system, an essential element is security. This is in two parts: assurance that the information comes from a recognised and approved source; and assurance that the information will not be leaked to bodies who should not receive it. The latter must be inherent in the system. The Digital Signature and Certification Centre provides the first of these assurances. Many earlier systems were installed before the existence of the world wide web, and depended on hard-wired networks. They were thus inherently more secure. KUBIS will use the web, which of course saves enormously on set-up costs. Whether it is necessary to use more than a high security password system (plus maybe encryption) is not immediately obvious, but the experts clearly think it is necessary, and the Digital Signature and Certification Centre is complete, the use of digital signatures is at least partly recognised under Lithuanian law.

In theory therefore, the structure for KUBIS is almost ready to operate. Early experiments have been made for information flow between an agent and KSSA. However, the benefits of this link alone are not great and not obvious, so progress has stalled. This illustrates another principle: never increase the workload (or expense) of clients, port users or other contacts, or internal staff, without a corresponding benefit that is clearly greater, either financially or in improved service. As suggested earlier, it is to be expected that the greatest benefits arise from improved customs clearance, and it is recommended that that should be the priority. If necessary, pressure should be brought to bear on the customs through the MOTC and/or the Port Development Committee; this is no less a port development than are structural developments.

Alongside the Port Community System box in Figure II.5.4-1 is shown Tracking and Tracing. This refers to a possible container tracking system. It is not clear whether KSSA needs to be involved directly in tracking systems; shipping lines have their own worldwide systems, each for their own containers. As discussed in Part I Chapter 2.8, it is more important for KSSA to help provide facilitation for through-transportation of containers, such as ICDs with inland customs clearance, block trains, and through clearance to hinterland countries.

3) Port Security

The remaining box in Figure II.5.4-1 is Gates Control. This is an electronic control system at the port gates for monitoring entrance and exit of pedestrians and vehicles. Combined with security cameras at gates, this will improve port security, helping towards satisfying the IMO ISPS Code (I.2.8).

4) KSSA Organization for IT

It is interesting to observe that the Information Technology Department is a small two-man unit in the Strategy Division. This allows the IT specialists to

concentrate on strategic issues and developments, without getting caught up in day-to-day matters of running a computer department. The computers are managed by the Technical Department. As long as the IT specialists keep in touch with what is happening in the computer department, this appears to be a successful arrangement.

(3) Conclusion

KSSA information systems are progressing along the correct lines. As in the declared strategy, IT developments should continue to be targeted towards specific goals that benefit the port operations, security and marketing. Care must be taken not to be over-ambitious simply for the sake of integrated systems if they do not have clear benefits.

5.4.2 IT Systems in KLASCO

KLASCO is the largest terminal operator in the port and handles more consignments than any of the others. It is therefore good to observe that they have developed an IT cargo system, with due emphasis on electronic data interchange with other port users and the Customs Department. The system has been running for two months at the time of writing, and includes exchange of data on weights, storage, cargo movements (especially and external), cargo status, etc., and includes facilities to order services, enter claims forms, etc. Some of the incentive for the system has been to cater for the peculiarities of the Lithuanian customs department requirements (which it is hoped will become more rational as time passes); it is notable that the customs, after initial reluctance, are apparently now enthusiastic for the system, The intention is that the KLASCO system will complement and become an adjunct to the community system KUBIS under development by KSSA. As indicated earlier, there are significant benefits from coordination of stevedoring companies into the Port Community System.

As throughput at the container terminal increases, it can be expected that a proper container yard operating system will be required if best use is to be made of the facilities, and a ship planning operation, or at least an interface with shipping lines' planners. Whilst automation of these operations is not yet needed, the skills in these areas should be developed in advance: there are indications that at present these skills are inadequate (I.2.8).

It is to be hoped that these developments trigger other improvements in management attitudes and service to customers in the company.

5.5 Marketing the Port

At the time KSSA was formed, shortly after independence from the Soviet Union, there was no marketing of the port, indeed marketing was disapproved of. That has changed, and marketing is recognised as a necessary activity by KSSA and port users.

5.5.1 Marketing Activities in Klaipeda Port

In KSSA, the three basic elements of marketing - market information and research; contracting and pricing; and port representation and advertising - have been brought together into one department within the Strategy Division. The plan and budget are approved annually, and within a budget that amounts to approximately 2.5% of KSSA turnover and with a staff of about 6, the department organises advertising and

produces brochures, attends two major exhibitions each year (Moscow and one other in W Europe) and three or four lesser ones, and undertakes analytical work. There is a representative in Minsk, and an office in Moscow, currently with only a secretary. The department also coordinates the statistical work of KSSA, ensuring that the relevant statistics are submitted to the government Statistical Department by the appropriate port bodies. The one element that is not entirely under the department's control is contracting and pricing. In the context of a state service organisation, that is not surprising.

The terminal operators and other port users also have their own marketing activities. In order to rationalise the activities and economise on expenditure, the yearly plan and budget is presented to the Association of Lithuanian Stevedoring Companies. Thus exhibitions are divided between the bodies, and joint advertisements are sometimes placed, especially in expensive trade papers and periodicals in Western Europe.

Marketing is expensive, and the issues remain: How much should be spent? Is the cost justified? How much should KSSA undertake and how much the terminal operators? There is no way of judging the correct answer. It is not known what proportion of turnover is spent by other equivalent port authorities, but 2.5% seems about the upper limit. The expenditure must continue to be well targeted, towards the objectives of ensuring that the port is known in the shipping industry, that information about new developments or potential developments is distributed, that the function of the port is understood and appreciated in Lithuania, and to provide a channel for information feedback from port users on the port's performance.

5.5.2 Marketing of New Port Developments

The question arises: in the event of a major new port development (such as the proposed outer port), how can the marketing function assist in attracting additional port users, particularly to induce more calls of larger–sized vessels up to Baltmax size?

In all normal respects, the marketing function should continue as it does now. The new outer port development will be no different in principle from other port developments such as the recent cruise ship terminal, or the new quays, or the deepening of the inner channel. The information will need to be widely publicised, initially to ensure that all prospective operators are aware of the intended development. Once work commences, there will be plenty of time during construction for the shipping industry to be informed.

An issue arises regarding tariffs. When a major new development occurs there is almost always overcapacity in the port. Should tariffs be adjusted to induce more calls, especially perhaps from the large vessels that could not previously use the port?

This is a classic pricing question: Would a reduction in price create a sufficient increase in the sales? The ports industry is not like a retailing situation where such a question is normally asked. In general, the transport industry is not very price sensitive; the overall amount of goods that is transported varies little with change in cost of transport. The transportation route, however, is price sensitive – if there is a choice of route, traders are quick to discover the cheapest route. For many cargoes, the cheapest route is determined by factors other than (relatively small) changes in the port tariff. However, there might be some cargoes that would switch to Klaipeda port from an alternative transport route. In the case of the proposed developments in

Klaipeda Port, we are concerned with the large-volume bulk cargoes that could benefit from the increased water depth. The shippers of these cargoes are relatively few in number. Furthermore, the terminal operators almost certainly will be in discussion with them, probably in negotiation, regarding the provision of the special terminal facilities needed. It may therefore be possible to establish the competitive position of Klaipeda Port for those cargoes, and if so, it should be possible to do this before the new development takes place and incorporate it into the justification for the development. If a tariff change can be shown to make the difference between attracting a new type of cargo to the port, then there is a case for making a tariff reduction.

However, there is also the need to justify the development financially and economically. As suggested elsewhere (II.5.1), it might be found necessary to increase the ship dues for the largest vessels in order to justify the cost of providing the extra water depth.

In practice, some temporary reduction in charges for some selected cargoes might be justified, to attract them to the port and (hopefully) to establish their preferred long-term route through Klaipeda Port. However, special tariff reductions in a state enterprise can be difficult to gain approvals for. Any such special arrangements should anyway be open and 'transparent', which creates risk that everyone would want the same special arrangement.

It is suggested that if the port development is justified by demand for port services, then it should not be necessary for KSSA to make special tariff discounts. There is of course nothing to prevent terminal operators from using their commercial judgement to adjust their charges for different cargoes, in order to maximise their throughput.

CHAPTER 6 ECONOMIC AND FINANCIAL ANALYSIS

CHAPTER 6 ECONOMIC AND FINANCIAL ANALYSIS

6.1 Economic Evaluation

In this report, the Economic Evaluation on Key Projects proposed in Chapter 4 is a prerequisite. The economic analysis is conducted based on the assumed project life, the estimated economic return on "With & Without cases", and the estimated costs of the Key Projects. The computation and in-depth economic evaluation will be performed later and described in the Draft Final Report.

6.1.1 Purpose of Analysis

The purpose of the economic analysis is to appraise economic feasibility from the viewpoint of national economy in the target year for the Key Projects extracted from the Short Term Development Plan.

Based on the analysis of economic benefits as well as of economic costs arising from the Projects, evaluation will be done to see whether the project benefits exceed those that could be obtained from other investment opportunities in Lithuania.

6.1.2 Methodology

In this analysis, the Key Projects are defined as the case with project (hereinafter referred to as "With Case") and the analysis is performed by comparing it with the with the case without project (hereinafter referred to as "Without Case"). All the benefits and costs in market prices of the difference between "With Case" and "Without Case" will be calculated and converted into the economic prices.

Feasibility of each project is appraised through a cost-benefit analysis based on the economic internal rate of return (EIRR) and the benefit/cost ratio (B/C ratio).

EIRR is a discount rate derived from the values of both total costs and benefits of a project during the project life. In other word, the EIRR shows the maximum interest rate of borrowing for the project. It is calculated by the following formula:

$$\sum_{i=1}^{n} \frac{Bi - Ci}{(1+r)^{i-1}} = 0$$

IRR = r

Where C_0: Capital cost
Bi: Benefit in ith year
Ci: Cost in ith year
r: Discount ratio

The benefit/cost ratio (B/C ratio) is obtained by dividing the benefits by the costs. In this method, it is necessary to set a suitable discount ratio based on the prevalent socio-economic conditions in the country. If the benefit/cost ratio is more than or equal to 1.0 with a suitable discount ratio, the project is deemed to be economically feasible.

$$\frac{\sum_{i=1}^{n} \frac{B_i}{(1+r)^i}}{\sum_{i=1}^{n} \frac{C_i}{(1+r)^i}} = B/C \ ratio$$

The net present value (NPV) is obtained by deducting the costs from the benefits at present value. In this method, it is also necessary to set a suitable discount ratio based on the prevailing socio-economic conditions. If NPV is more than zero with a suitable discount ratio, the project is deemed profitable from the socioeconomic viewpoint. This method is usually used to grade the priority of projects.

$$\sum_{i=1}^{n} \frac{Bi - Ci}{(1+r)^{i-1}} = NPV$$

The procedure of the analysis is shown in Figure II.6.1-1

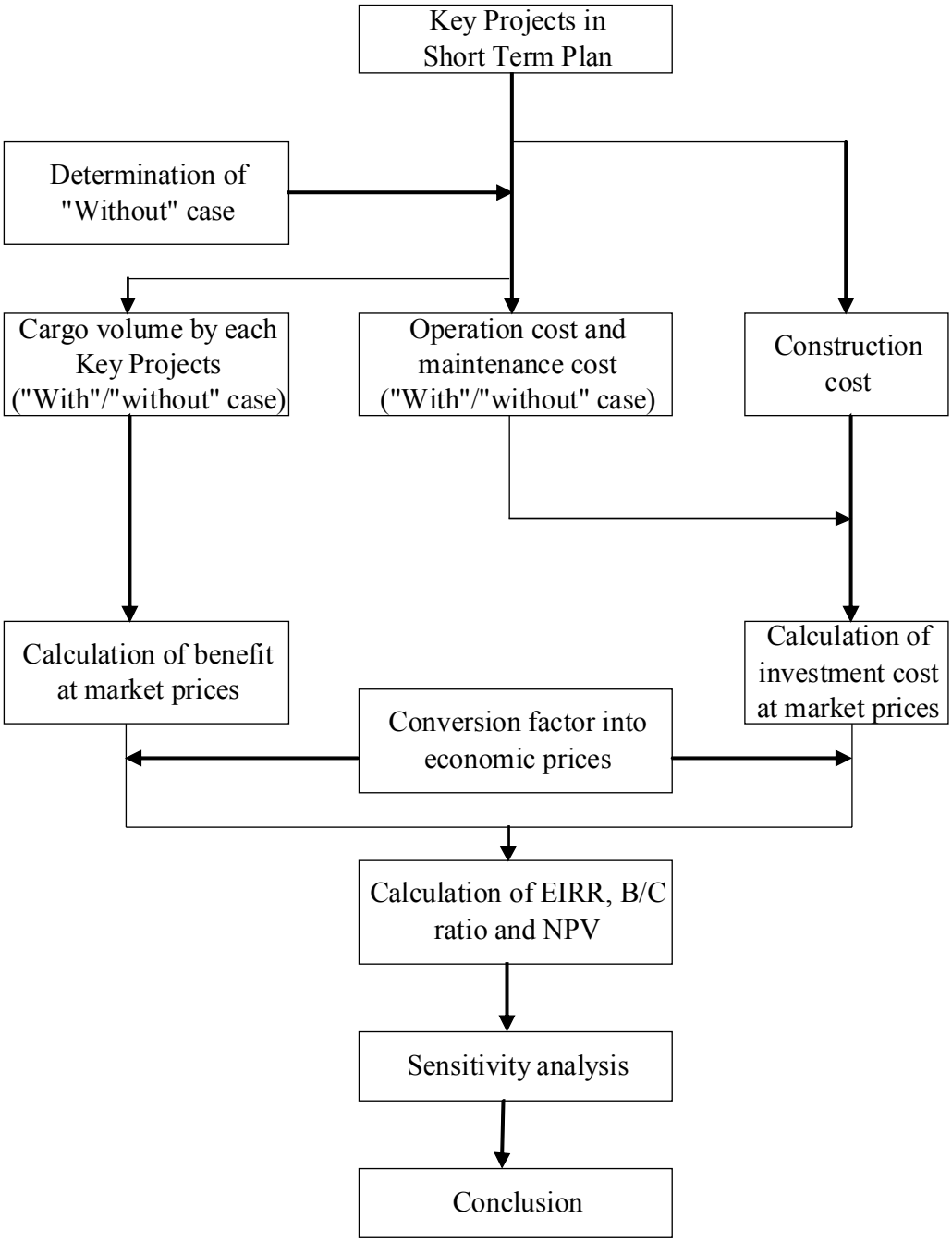


Figure II.6.1-1 Procedure of Economic Analysis

6.1.3 Economic Prices

For the economic analysis, prices must be expressed as the economic prices based on the border price concept. There are various methods to convert the market prices into the border prices. Here, the border prices (economic prices) are calculated by eliminating transfer items such as taxes, subsidies, etc. In general, conversion factors are used to convert from the market prices to the economic prices.

All the costs and benefits of the Key Projects are divided into tradable goods and non-tradable goods for materials, skilled labour and unskilled labour. In general, the values of goods quoted at domestic market prices do not always represent the border prices (economic prices) of goods. The domestic market prices for non-tradable goods must be converted into the economic prices using the standard conversion factor because the domestic market prices usually include transfer items such as customs duties, subsidies, etc, which do not actually reflect consumption of resources.

Because the unskilled labour cost is controlled by the minimum wage system and other regulations, the unskilled labour cost at market prices often does not reflect the actual economic situation. The unskilled labour cost of the Projects should be converted using the conversion factor for unskilled labour into the economic prices. As for skilled labour, the economic price is determined by multiplying the market wage by the conversion factor for consumption.

Formulas of conversion factors for goods and labour are mentioned below:

(1) Standard Conversion Factor (SCF)

The difference between the domestic market prices and the border prices is mainly attributed to customs duties. SCF is used to determine the economic prices of non-tradable goods that have only the market prices and make up for this price difference. SCF is calculated by the following formula.

$$SCF = (I + E) / \{(I + D_i) + (E - D_e)\}$$

Where I: Total value of imports (CIF)
E: Total value of exports (FOB)
Di: Total value of import duties
De: Total value of export duties

(2) Conversion Factor for Consumption (CFC)

The conversion factor for consumption is used to convert the market prices of consumer goods into the economic prices. This factor is set as an equivalent to the standard conversion factor, replacing the total value of imports and exports in SCF by the total value of consumer goods (imports and exports) in CFC. CFC is calculated by the following formula.

$$CFC = (I_c + E_c) / \{(I_c + D_{ic}) + (E_c + D_{ec})\}$$

Where Ic: Total value of imported consumer goods
Ec: Total value of exported consumer goods
Dic: Total value of import duties for consumer goods
Dec: Total value of export duties for consumer goods

(3) Conversion Factor for Skilled Labour (CFSL)

In general, the actual domestic market wages are used for skilled labour on an assumption that the skilled labour market is functioning properly. The data should be converted to the economic prices because they are expressed by domestic prices or market prices. CFSL is calculated by the following formula.

$CFSL = (O_s / W_{ns}) \times CFC$

$O_s = W_{ns} = W_s$

Therefore

$CFSL = CFC$

Where O_s: Opportunity cost of skilled labour
W_{ns} : Nominal wage rate of skilled labour
W_s: Actual market wage rate of skilled labour

(4) Conversion Factor for Unskilled Labour (CFUL)

A common practice is to set the economic cost of unskilled labour as equal to the per capita income of the agriculture sector (including the fishing sector), which is normally the lowest in all the sectors. CFUL is calculated by the following formula.

$CFUL = (O_{us} / W_{nus}) \times CFC$

O_{us} = (GDP of agriculture sector) / (Population of agriculture sector)

Where O_{us} : Opportunity cost of unskilled labour
W_{nus}: Nominal wage rate of unskilled labour

(5) Determination of Conversion Factors

The total values of imported/exported consumer goods have roughly been estimated based on the Import/Export by CN sections, which are issued by the Department of Statistics of the Government of Lithuania and the total values of imported/exported duties for consumer goods have also roughly been estimated using the estimated import/export consumer goods and the ratio of customs duties. This is because the total values of imported/exported consumer goods, and those of import/export duties for consumer goods are not published, although the imported/exported values are published by the Section of Import/Export Statistical Schedule for Statistic of Customs, and the total values of import/export duties by the Department of Statistics and the Lithuanian Customs respectively.

Since the total import and export prices of consumer goods and the total import and export customs duties for consumer good are not published, CFC has been calculated using the above estimated total values of import/export consumer goods and the total value of import/export duties for consumer goods.

Table II.6.1-1 shows the estimated total import/export values for consumer goods and the estimated total import/export duties for consumer goods.

Table II.6.1-1 Estimated Total Import/Export Value and Duties for Consumer Goods

(Unit: Thousand US$)

		1999	2000	2001
Consummer goods	Import	2,194,380	2,282,794	2,506,782
	Export	1,735,981	2,240,597	2,316,578
Capital goods	Import	3,877,174	4,569,953	5,472,245
	Export	2,036,452	3,515,133	4,054,129
Import duties for consummer goods		54,059	42,913	39,822
Import duties for capital goods		2,252	1,788	2,096

Source: The JICA Study Team

Table II.6.1-2 shows the results of calculation for SCF and CFC.

Table II.6.1-2 SCF and CFC

	1999	2000	2001	Average
SCF	0.994	0.996	0.997	0.996
CFC	0.986	0.991	0.992	0.990

Source: The JICA Study Team

Conversion factor for unskilled labour (CFUL) is shown in Table II.6.1-3.

Table II.6.1-3 CFUL

	1999	2000	2001	2004
GDP Agriculture sector (constant 1995, thousand US$)	736,150	771,711	791,004	
Population in Agriculture sector (thousand)	1,125	1,117	1,103	
Opportunity cost of unskilled labor (constant 1995, US$	655	691	717	812
Nominal wage rate (US$)				1620
CFUL in 2004				0.495

Source: The JICA Study Team

6.1.4 General Prerequisites of Economic Analysis

(1) Base Year

"Base Year" means the year in the estimation of costs and benefits. In this study, the year 2004 has been adopted as the "Base Year".

(2) Project Life

Period of calculation, namely the project life in the economic analysis, is assumed based on depreciation of the main facility in the project in general. In this study, the Key Projects are the Outer Port Development Project and the Southern Access Railway Improvement Project. Major facilities of both projects are infrastructures such as concrete structures, rocks, gravel, etc. Considering the depreciation periods of major facilities of both projects, the period of 40 years is adopted as the "Project Life" for both projects.

(3) Foreign Exchange Rate

The foreign exchange rate adopted for this analysis is the same as that used in the cost estimation, namely 1 Euro = 3.44 Litas = 130 Japanese Yen = US$1.238.

(4) "With Case" and "Without Case"

A cost-benefit analysis is conducted on the difference between the "With Cases" where investments are made for execution of the Key Projects and the "Without Cases" where no investments are made.

There are two key projects in the Short Term Plan; one is the Outer Port Development Project and the other is the Southern Access Railway Improvement Project.

Items of investment for the two projects are as follows:

1) The Outer Port Development Projects

[With Case]

- Expansion and construction of breakwaters.
- Construction of quay facilities with basins and navigation aid (including revetments).
- Construction of storage facilities with cargo handling equipment (including railway facilities).

[Without Case]

In the "without case", no investment will be made for Outer Port Development Project, viz:

- Break waters will not be expanded or constructed.
- Quay facilities including revetments with basins and navigation aid will not be constructed.
- Storage facilities with cargo handling equipment including railway facilities will not be constructed.

2) The Southern Access Railway Improvement Project

[With Case]

- Improvement of railway facilities for Southern Access Railway.

[Without Case]

- No improvement of railway facilities for Southern Access Railway.

6.1.5 Benefits of Project

(1) Items of Benefits

There are two Key Projects, viz. the Outer Port Development Project and the Southern Access Railway Improvement Project.

Items of direct benefits of both projects have been considered as follows:

1) Savings in the vessel waiting costs at offshore anchorage

The vessel waiting costs at offshore anchorage are decreased by construction of the berths in the outer port with installation of efficient equipment.

2) Savings in the land transportation cost

As for bulk cargoes in Lithuania, the land transportation cost of the cargo volumes exceeding the present capacities of the Port and Southern Access Railway at Klaipeda Port will be decreased by improving capacities of the Ports and Southern Access Railway for avoiding the long way round about routes through ports in the neighbouring countries.

3) Growth in port revenues

Port revenues will increase in "With Case" because the number of calling vessels will be increased by construction of the deep sea berths in the outer port.

(2) Calculation of Benefits

1) Savings in the vessel waiting costs at offshore anchorage

The vessels' waiting time for "With Case" and "Without Case " is calculated using queuing simulations based on the actual data of Klaipeda Port and estimated cargo volume.

According to the simulation, the vessels waiting time for berthing in "With Case" is negligible small. So, whole waiting costs of vessels for berthing in "Without Case" can be counted in the benefit. The results of the calculation are shown in Table II.6.1-4.

2) Saving in the land transportation cost

As for "Without Case", the cargo handling volume of the Port will not be increased from 2017 because the annual cargo throughput would reach the absolute capacity of the Port according to the result of the port planning in this study. After reached absolute capacity, excess volumes of sea transportation cargoes are transported with increased transportation costs by the land transportation through ports in neighbouring countries in "Without Case". Accordingly, the difference of the land transportation costs between "With Case" and "Without Case" can be counted in the benefit.

In this study, excess volumes of foreign trade cargoes over the absolute capacity of the Port in "Without Case" are assumed to transport through Kaliningrad for general cargoes and scraps, Liepaja and Riga for bulk cargoes considering their locations and port conditions. As for the origins or destinations of their cargoes in Lithuania are assumed Vilnius for general cargoes, Kaunas for dry bulk cargoes and Mazeikia for oil and oil products considering the population density, condition of transportation and the industrial distribution in Lithuania. These assumed locations are used to calculate the transportation costs in "With Case" and "Without Case". The result of the calculation of the benefits for reduction of the land transportation costs are shown in Tables II.6.1-5 and II.6.1-6.

As for the Southern Access Railway Improvement Project, the benefits for reduction of land transportation costs can be calculated by the same way as the Outer Port Development Project. Table II.6.1-7 shows the result of the calculation.

3) Growth in the Port revenues

In "Without Case", the number of calling vessels cannot be increased from 2017 for absolute capacity of the Port. But on the other hand, according to the result of the cargo forecast in this study, the cargo handling volume of the Port is increased after 2017 to 2025. The number of calling vessels is increased after 2017 in "With Case. Accordingly, the different of number of calling vessels between "With Case" and "Without Case" can be counted in the benefit of this project for growth in the Port revenues. Table II.6.1-8 shows the result of the calculation.

The same kind of benefits of the Southern Access Railway Improvement Project can be calculated by the same way as the Outer Port Development Project. Table II.6.1-9 shows the result of the calculation.

Table II.6.1-4 Total Vessels Waiting Time and Waiting Costs in Without Case

Year	Total ship waiting time at offshore anchorage (Days)	Total ship waiting cost (Thousand EURO)
2015	312	2,285
2016	1,213	8,360
2017	5,946	27,645

Source: Estimate by the JICA Study Team

Table II.6.1-5 Reduction of Land Transportation Costs for General Cargoes (including scraps)

Year	Excess cargo volume for saturated port capacity in Klaipeda Port (General cargo) (thousand tons)	Road transportation cost		Reduction of land Transportation Costs (1) (EURO)
		Klaipeda/origin or destination in Lithuania (EURO)	Kaliningrad / origin or destination in Lithuania (EURO)	
2017	71	397,600	745,500	347,900
2018	143	800,800	1,501,500	700,700
2019	215	1,204,000	2,257,500	1,053,500
2020	286	1,601,600	3,003,000	1,401,400
2021	358	2,004,800	3,759,000	1,754,200
2022	429	2,402,400	4,504,500	2,102,100
2023	501	2,805,600	5,260,500	2,454,900
2024	572	3,203,200	6,006,000	2,802,800
2025	844	4,726,400	8,862,000	4,135,600

Source: Estimate by the JICA Study Team

Table II.6.1-6 Benefit of Reduction of Land Transportation for Dry Bulk Cargoes

Year	Excess cargo volume for saturated port capacity in Klaipeda Port (dry bulk) (thousand tons)	Railway transportation cost		Reduction of land Transportation Costs (2)
		Klaipeda/origin or destination in Lithuania (EURO)	Liepaya or Riga/ origin or destination in Lithuania (EURO)	(EURO)
2017	70	73,500	138,600	65,100
2018	140	147,000	277,200	130,200
2019	210	220,500	415,800	195,300
2020	281	295,050	556,380	261,330
2021	351	368,550	694,980	326,430
2022	421	442,050	833,580	391,530
2023	491	515,550	972,180	456,630
2024	561	589,050	1,110,780	521,730
2025	632	663,600	1,251,360	587,760

Source: Estimate by the JICA Study Team

Table II.6.1-7 Benefit of Reduction of Land Transportation Cost for the Southern Access Railway Improvement Project

Year	Excess dry bulk cargo volume for saturated the Southern Access Railway capacity at Klaipeda Port (tons)	Railway transportation cost		Reduction of land Transportation Costs (1)
		Klaipeda/origin or destination in Lithuania (EURO)	Liepaya or Riga/ origin or destination in Lithuania (EURO)	(EURO)
2015	198,297	208,212	392,628	184,416
2016	282,385	296,504	559,122	262,618
2017	36,050	37,853	71,379	33,526
2018	65,800	69,090	130,284	61,194
2019	92,190	96,800	182,536	85,736
2020	116,615	122,446	230,898	108,452
2021	139,698	146,683	276,602	129,919
2022	161,664	169,747	320,095	150,348
2023	182,652	191,785	361,651	169,866
2024	203,643	213,825	403,213	189,388
2025	222,464	233,587	440,479	206,892

Source: Estimate by the JICA Study Team

Table II.6.1-8 Number of Increased Calling Vessels in "With Case"

Year		2017	2018	2019	2020	2021	2022	2023	2024	2025
Number of increased Vessels in "With Case"for Export/ Import Cargoes	Vessels	411	501	592	683	773	864	955	1,045	1,137
Number of increased vessels in "With Case" for Transit Cargoes	Vessels	206	252	297	343	388	433	479	524	570
Increased Port Revenues by increasd Vessels	Thousand EURO	13,260	14,914	16,886	18,858	20,829	22,801	24,773	26,744	28,398

Source: Estimate by the JICA Study Team

Table II.6.1-9 Number of Increased Calling Vessels in "With Case" for Southern Access Railway Improvement Project

Year		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Number of increased vessels in "With Case"	Vessels	26	172	318	354	390	426	462	498	534	570	601
Increased Port Revenues by increased vessels in "With Case"	Thousand EURO	192	1,888	3,585	3,967	4,350	4,733	5,115	5,498	5,881	6,264	6,646

Source: Estimate by the JICA Study Team

6.1.6 Cost of Project

(1) Construction Cost

The construction costs are estimated based on the market prices and consists of the costs for skilled labour, unskilled labour, and non-tradable materials.

The classified construction costs are converted from the market prices to the economic prices by multiplying the conversion factors.

Table II.6.1-10 shows the construction cost of key projects.

(2) Re-investment

The re-investment cost for facilities and equipment after their useful lifetime are considered.

(3) Maintenance Cost

The annual maintenance costs for facilities and machinery are calculated based on the estimated fixed rate for the annual maintenance costs vs. their initial investments. In this study, the fixed rates are set as follows:

1% for structures made mainly of concrete and stones, 3% for those made of steel stocks and machines, and 5% for transportation machinery.

Table II.6.1-10 (1) Construction Cost of Outer Projects for Economic Price

Description	Market Price (EURO)	Ratio of Foreign Portion	Ratio of Non tradable goods (0.996)	Ratio of Skilled Local Labour (0.990)	Ratio of Unskilled Local Labour (0.496)	Overall Convertion Factor	Economic Price (EURO)
Mobilization Cost of Floating and Heavy Equipment	500,000	0.050	0.950	0.000	0.000	0.996	498,100
West Breakwater - Rock Mound with Accropod	38,117,000	0.484	0.421	0.071	0.023	0.986	37,585,404
South Breakwater - Caisson or Rock Mound with Accro	44,994,000	0.472	0.421	0.077	0.031	0.982	44,186,250
North Breakwater - Rock Mound with Accropod	13,676,000	0.444	0.466	0.070	0.020	0.987	13,503,081
Dredging and Reclamation	14,659,000	0.125	0.811	0.003	0.061	0.966	14,159,266
Quay Facilities	38,048,000	0.372	0.530	0.061	0.037	0.979	37,242,187
Navigation Aid	2,867,000	0.550	0.430	0.010	0.010	0.993	2,847,332
Revetments	27,543,000	0.550	0.430	0.010	0.010	0.993	27,354,055
Basin for Port Service Boats	2,916,000	0.550	0.430	0.010	0.010	0.993	2,895,996
Removal of Existing North Breakwater	4,618,000	0.050	0.930	0.010	0.010	0.991	4,577,085
Road and Pavement	11,975,000	0.140	0.628	0.098	0.133	0.929	11,128,578
Drainage & Water Supply	3,000,000	0.015	0.955	0.020	0.010	0.991	2,972,820
Electrical Work	3,000,000	0.015	0.955	0.020	0.010	0.991	2,972,820
Railway	11,850,000	0.277	0.630	0.015	0.078	0.958	11,350,658
Cargo Handling System and Storage	36,585,000	0.407	0.495	0.049	0.049	0.973	35,595,012
Total for Construction Cost	254,348,000	0.416	0.428	0.088	0.068	0.963	244,950,290
Engineering Cost	15,261,000	0.600	0.100	0.250	0.050	0.972	14,832,166
Total	269,609,000					0.964	259,782,456

Source: Estimate by the JICA Study Team

Table II.6.1-10 (2) Construction Cost of South Access Railway for Economic Price

Description	Market Price (EURO)	Ratio of Foreign Portion	Ratio of Non tradable goods (0.996)	Ratio of Skilled Local Labour (0.990)	Ratio of Unskilled Local Labour (0.496)	Overall Convertion Factor	Economic Price (EURO)
Southern Access Railway Improvement	991,279	0.030	0.876	0.012	0.082	0.955	946,520
Engineering Cost	59,477	0.600	0.100	0.250	0.050	0.972	57,805
Total excluding VAT	1,050,756	0.062	0.832	0.025	0.081	0.956	1,004,325

Source: Estimate by the JICA Study Team

6.1.7 Evaluation of Project

(1) EIRR and B/C Ratio

EIRR and B/C ratio discussed in 6.1.2 of this chapter have been calculated for each key project and shown in Table II.6.1-11.

Table II.6.1-11 EIRR and B/C Ratio

Key Project	EIRR	B/C ratio
The Outer Port Development Project	12.57%	1.32
The Southern Access Railway Improvement Project	25.46%	4.90

Source: Estimate by the JICA Study Team

(2) Sensitivity Analysis

Sensitivity analysis will be performed in order to assess the effects of unexpected changes in cargo volumes, construction costs, benefits, etc. for each project.

In this study, the following three cases are envisioned:

Case 1: Where the costs increase by 10%

Case 2: Where the benefits decrease by 10%

Case 3: Where the costs increase by 10% and the benefits decrease by 10%

Table II.6.1-12 shows results of calculations for Sensitivity Analysis.

Table II.6.1-12 Result of Calculation for Sensitivity Analysis

Key Project	EIRR		
	Case1	Case 2	Case 3
The Outer Port Development Project	11.65%	11.56%	10.67%
The Southern Access Railway Improvement Project	24.28%	24.16%	23.03%

Source: Estimate by the JICA Study Team

(3) Evaluation

A project of which EIRR is more than 10% is generally considered economically feasible by considering the capital opportunity cost. As for B/C ratio, it should be higher than 1.

The proposed key projects in Short Term Plan in this study are considered feasible from the viewpoint of the national economy because the result of calculations for EIRR and B/C ratio respectively exceeds 10% and 1.0.

As for the results of the calculation for the sensitivity analysis, the EIRR of all cases exceed 10%.

Table II.6.1-13 Cost and Benefit Analysis (Outer Port Project)

EIRR= 12.57%
B / C = 1.32
(Unit : EURO)

	Benefit					Costs				Difference	Net Present Volume(NPV)		
Year	Vessel Waiting Costs at Offshor Anchorag	Saving in Land Transportaion Cost	Growth in Port Revenues	Increasing of Employees	Total	Construction Costs	Maintenance Costs	Re-Investment	Total	Benefit - Cost	Benefit	Cost	Benefit - Cost
2,009					0	3,066,053			3,066,053	-3,066,053	0	3,066,053	-3,066,053
2,010					0	3,041,148			3,041,148	-3,041,148	0	2,764,680	-2,764,680
2,011					0	36,907,107			36,907,107	-36,907,107	0	30,501,741	-30,501,741
2,012					0	76,036,305			76,036,305	-76,036,305	0	57,127,201	-57,127,201
2,013					0	65,754,065			65,754,065	-65,754,065	0	44,910,911	-44,910,911
2,014					0	78,896,131			78,896,131	-78,896,131	0	48,988,290	-48,988,290
2,015	2,285,000	0	0	1,725,610	4,010,610		4,552,431	0	4,552,431	-541,821	2,263,885	2,569,729	-305,844
2,016	8,360,000	0	0	1,725,610	10,085,610		4,552,431	0	4,552,431	5,533,179	5,175,513	2,336,117	2,839,396
2,017	27,645,000	393,800	13,260,150	1,725,610	43,024,560		4,552,431	0	4,552,431	38,472,129	20,071,275	2,123,743	17,947,532
2,018	27,645,000	792,500	14,914,238	1,725,610	45,077,348		4,552,431	0	4,552,431	40,524,917	19,117,196	1,930,675	17,186,521
2,019	27,645,000	1,191,200	16,885,932	1,725,610	47,447,742		4,552,431	173,800	4,726,231	42,721,511	18,293,159	1,822,167	16,470,992
2,020	27,645,000	1,585,930	18,857,624	1,725,610	49,814,164		4,552,431	0	4,552,431	45,261,733	17,459,561	1,595,599	15,863,961
2,021	27,645,000	1,984,630	20,829,318	1,725,610	52,184,558		4,552,431	0	4,552,431	47,632,127	16,627,608	1,450,545	15,177,064
2,022	27,645,000	2,378,430	22,801,009	1,725,610	54,550,049		4,552,431	0	4,552,431	49,997,618	15,801,206	1,318,677	14,482,529
2,023	27,645,000	2,777,130	24,772,701	1,725,610	56,920,441		4,552,431	0	4,552,431	52,368,010	14,988,931	1,198,797	13,790,134
2,024	27,645,000	3,170,930	26,744,395	1,725,610	59,285,935		4,552,431	1,146,083	5,698,514	53,587,421	14,192,581	1,364,179	12,828,403
2,025	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	13,562,569	990,742	12,571,827
2,026	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	12,329,608	900,674	11,428,934
2,027	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	11,208,735	818,795	10,389,940
2,028	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	10,189,759	744,359	9,445,400
2,029	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	173,800	4,726,231	57,593,407	9,263,417	702,524	8,560,893
2,030	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	8,421,288	615,173	7,806,116
2,031	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	7,655,717	559,248	7,096,469
2,032	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	6,959,742	508,407	6,451,335
2,033	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	6,327,039	462,188	5,864,850
2,034	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	6,205,371	10,757,802	51,561,836	5,751,853	992,902	4,758,951
2,035	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	5,228,957	381,974	4,846,984
2,036	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	4,753,598	347,249	4,406,349
2,037	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	4,321,452	315,681	4,005,772
2,038	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	3,928,593	286,983	3,641,611
2,039	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	173,800	4,726,231	57,593,407	3,571,448	270,853	3,300,595
2,040	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	3,246,771	237,176	3,009,596
2,041	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	2,951,610	215,614	2,735,996
2,042	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	2,683,282	196,013	2,487,269
2,043	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	2,439,347	178,194	2,261,154
2,044	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	1,146,083	5,698,514	56,621,124	2,217,588	202,777	2,014,812
2,045	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	2,015,989	147,267	1,868,722
2,046	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	1,832,718	133,879	1,698,838
2,047	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	1,666,107	121,709	1,544,398
2,048	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	1,514,643	110,644	1,403,999
2,049	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	173,800	4,726,231	57,593,407	1,376,948	104,426	1,272,522
2,050	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	1,251,771	91,441	1,160,329
2,051	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	1,137,973	83,129	1,054,845
2,052	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	1,034,521	75,571	958,950
2,053	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	0	4,552,431	57,767,207	940,474	68,701	871,773
2,054	27,645,000	4,550,560	28,398,468	1,725,610	62,319,638		4,552,431	6,205,371	10,757,802	51,561,836	854,976	147,589	707,388
	1,061,155,000.0	150,791,350	1,011,019,407	69,024,400	2,291,990,157	263,700,809	182,097,240	15,398,108	461,196,157	1,830,794,000	284,629,410	216,080,985	68,548,424

Table II.6.1-14 Cost and Benefit Analysis (Southern Access Railway Improvement Project)

EIRR = 25.46%
B / C = 4.90
(Unit : EURO)

Year	Benefit			Costs			Difference	Net Present Volume(NPV)		
	Land Transportaion Cost	Growth of Port Revenues	Total	Construction Costs	Maintenance Costs	Total	Benefit - Cost	Benefit	Cost	Benefit - Cost
2,009			0	0		0	0	0	0	0
2,010			0	119,310		119,310	-119,310	0	108,464	-108,464
2,011			0	3,335,568		3,335,568	-3,335,568	0	2,756,668	-2,756,668
2,012			0	0		0	0	0	0	0
2,013			0	0		0	0	0	0	0
2,014			0	0		0	0	0	0	0
2,015	92,208	96,002	188,210		32,560	32,560	155,650	106,240	18,379	87,860
2,016	131,309	944,154	1,075,463		32,560	32,560	1,042,903	551,883	16,709	535,174
2,017	16,763	1,792,306	1,809,069		32,560	32,560	1,776,509	843,944	15,190	828,754
2,018	30,597	1,983,659	2,014,256		32,560	32,560	1,981,696	854,241	13,809	840,432
2,019	42,868	2,175,012	2,217,880		32,560	32,560	2,185,320	855,089	12,553	842,535
2,020	54,226	2,366,365	2,420,591		32,560	32,560	2,388,031	848,402	11,412	836,990
2,021	64,960	2,557,718	2,622,678		32,560	32,560	2,590,118	835,666	10,375	825,291
2,022	75,174	2,749,072	2,824,246		32,560	32,560	2,791,686	818,083	9,432	808,652
2,023	84,933	2,940,425	3,025,358		32,560	32,560	2,992,798	796,671	8,574	788,097
2,024	94,694	3,131,778	3,226,472		32,560	32,560	3,193,912	772,392	7,795	764,597
2,025	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	745,723	7,086	738,637
2,026	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	677,930	6,442	671,488
2,027	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	616,300	5,856	610,444
2,028	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	560,273	5,324	554,949
2,029	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	509,339	4,840	504,499
2,030	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	463,035	4,400	458,635
2,031	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	420,941	4,000	416,941
2,032	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	382,674	3,636	379,038
2,033	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	347,885	3,306	344,580
2,034	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	316,259	3,005	313,254
2,035	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	287,508	2,732	284,777
2,036	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	261,371	2,484	258,888
2,037	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	237,610	2,258	235,352
2,038	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	216,009	2,053	213,957
2,039	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	196,372	1,866	194,506
2,040	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	178,520	1,696	176,824
2,041	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	162,291	1,542	160,749
2,042	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	147,537	1,402	146,135
2,043	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	134,125	1,274	132,850
2,044	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	121,932	1,159	120,773
2,045	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	110,847	1,053	109,794
2,046	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	100,770	958	99,812
2,047	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	91,609	870	90,739
2,048	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	83,281	791	82,490
2,049	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	75,710	719	74,991
2,050	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	68,827	654	68,173
2,051	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	62,570	595	61,976
2,052	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	56,882	541	56,342
2,053	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	51,711	491	51,220
2,054	103,446	3,323,131	3,426,577		32,560	32,560	3,394,017	47,010	447	46,563
	3,791,112	120,430,421	124,221,533	3,454,879	1,302,411	4,757,290	119,464,243	15,015,465	3,062,839	11,952,626

6.2 Financial Evaluation

6.2.1 Outline of Financial Analysis

The purpose of the financial analysis is to appraise the financial viability of the two key projects proposed in Chapter 4 from the viewpoint of capital investment whether they could yield sufficient returns individually. In this study, to measure the financial viability quantitatively, the FIRR Analysis and the Ratio Analysis have been applied.

In the FIRR Analysis, the Financial Internal Rate of Return (FIRR) on gross capital bases has been used as its indicator. On the other hand, in the Ratio Analysis, profitability, operational efficiency and long-term solvency have been assessed using the typical financial ratios as their indicators calculated from financial statements.

In case of "the Outer Port Development Project", a financially independent single entity have been envisaged, which owns the equity capital, constructs the new port facilities, and operates the marine terminals functioning as an investor, administrator

and port service provider. The entity is an imaginary entity, not a legal entity, and is further divided into the two components as legal entities, viz. the port authority (KSSA) and a potential private terminal operator(s) at the new outer port. In other words, they are the grantor (the government (KSSA)) and a lessee(s) (a private terminal operator(s)) in terms of lease contract. Thus, in the first step, the financial statements were made on the above-mentioned imaginary entity that implicitly includes the port authority (KSSA) and the potential private terminal operator(s). In the second step, the financial statements were made for the grantor and a potential lessee(s) respectively by assuming contract conditions in the marine terminals containing Grain Terminal behind Berth No.2 of the outer port and Multi-purpose Terminal behind the Berth No. 3.of the outer port.

On the other hand, "the Southern Access Railway Improvement Project", will enable to increase KSSA's revenues from port dues after the estimated saturation year of 2012 in terms of access railway capacity if the project is not implemented. Such incremental revenues from port dues with the linkage of the operations mainly at BEGA and Smelte terminals will be generated not only from the access railway project but also from the outer port project in which access channel improvement as one of project components will contribute to the increase in the said revenues. Taking into account the difficulty of clearly allocation of the incremental revenues into the two key projects, viz. "the Outer Port Development Project" and "the Southern Access Railway Improvement Project", and much smaller project cost of the latter project compared with the former project (only 1.4%), the railway project was regarded as one project component of the outer port project in the financial analysis in this study. The two projects, however, are still identified as two independent projects in view of project implementation apart from financial analysis mentioned above.

6.2.2 Prerequisites for the Financial Analysis Common in the Two Key Projects

(1) Base Year

Revenues and costs/expenses estimated in the financial analysis are expressed in the price as of some fixed year throughout the "Project Life" mentioned below. The year is called as "Base Year". In this analysis, the year 2003 has been adopted as the "Base Year" since the costs of the Project have been prepared on the bases of current price as of the same year.

(2) Project Life

Taking account of the sum of construction period and probable concession period relating to the Project, 30 years has been adopted as the "Project Life".

(3) Financial Terms of Loans to be Raised for the Project

As potential lenders for funds required for the key projects, European Investment Bank (EIB), World Bank (IBRD) and Nordic Investment Bank (NIB) have been considered. The current financial terms (as of February 2004) are listed below and have been referred in the financial analysis:

1) EIB Loans

Interest Rate: EURIBOR (fixed at a rate of disbursement): 2.24% (the rate as of January 29, 2004 will be used as a substitute)

Maturity (grace period): 17 years (5 years)

Amortization: LRP (Level Repayment Principle)

2) IBRD Loans

Interest Rate: LIBOR (floating: an average rate of proceeding 6 months from a disbursement date and repayment date): 2.29% (the average interest rate as of January 2004 (in the past 6 months) has been used as a substitute)
+0.55%
Maturity (grace period): 17 years (5 years)
Amortization: LRP (Level Repayment Principle)

3) NIB Loans

Interest Rate: EURIBOR (floating: a rate on a disbursement date and repayment date): 2.24% (the rate as of January 29, 2004 has been used as a substitute)
+0.6%
Maturity (grace period): 10 years (5 years)
Amortization: LRP (Level Repayment Principle)

The above interest rates in the initial investment are in the range of 2.24 – 2.84%.

(4) Evaluation Criteria in FIRR Analysis

The Government of Lithuania that funded and will fund statutory capital to its state-owned entities including KSSA sets a target financial ratio of 7% in ROI (return on investment) or ROE (return on equity). On the other hand, as mentioned in the above paragraph (3), the maximum interest rate of potential lenders is 2.84%. The two figures have been referred as criteria of FIRR analysis to judge financial soundness on the proposed projects.

6.2.3 Prerequisites for the Financial Analysis in the Two Key Projects

(1) Outer Port Development Project

1) Volume of Cargo

Cargo handling at the new outer port has been assumed to start in 2015. Yearly cargo throughput from the starting year of the port operations through the expiration of the project has been cited from the results of demand forecast and cargo allocation between the new outer port and the existing port (see Chapters 1 and 2).

2) The Number of Calling Vessels

The number of calling vessels has been estimated based on the cargo volumes, lot sizes and anticipated vessel sizes (see Appendix D.2).

3) Port Tariff

To estimate revenues for the Project, current tariff level of the Port have been referred (see Section 1.3 of Chapter 1 of Volume I).

4) Access Railway Infrastructure Fee

Currently, there is no fee specified in the usage of railway infrastructures (hereinafter referred to as "railway infrastructure fee"). Instead, ordinary railway tariff charged for cargo transport by using railway cars is considered to cover investment and maintenance costs of railway infrastructures as well as railway car operation costs. There is an idea to divide the Lithuanian National Railway (LG) into two financially independent entities. One is the entity specialized in railway car operations and the other is the entity specialized in railway infrastructure investment and maintenance. The collection of "railway infrastructure fee" is planned to appropriate to the major revenue sources for the latter entity to be separated from the current LG. It is planned to allow the state enterprises to collect the fee. KSSA is considered to be eligible in the fee collection. In this study, the necessity to collect the fee by KSSA has been examined.

(2) Southern Access Railway Improvement Project

1) Railway Traffic

The number of railway wagons to pass through the said access railway lines has been estimated using the results of the simulation (see Chapter 3)

2) Railway Infrastructure Fee

In this study, the necessity to collect the fee by KSSA has been examined.

6.2.4 Revenues

(1) Outer Port Development Project

Revenues will be gained from providing port services to consignees/shippers and shipping lines. The amount of the revenues is estimated by multiplying the port tariff and the volume of cargo in terms of cargo handling charge or by calculating vessel service charge considering the size and staying days in each vessel calling according to the tariff.

Major Revenue sources are divided into the following three categories:

1) Port dues from vessels calling at the outer port (to KSSA)

2) Cargo handling charges at the outer port terminals (to a Terminal Operator)

3) Port dues from vessels calling at the inner port (to KSSA)

The incremental revenues of the above third category will be generated from the increase in channel capacity through the improvement of the existing sea channel otherwise curbed at the revenue level in the access channel saturation year of 2010 in terms of adequate capacity.

(2) Southern Access Railway Improvement Project

Revenues of port dues from bulk carriers calling at mainly BEGA or Smelte terminals will be indirectly generated from the increase in railway capacity through the improvement of the southern access railway otherwise curbed at the revenue level in the access railway saturation year of 2012. The amount of revenues the access railway project is partly overlapped with the outer port project, and hence, the combined

project comprising the two projects has been financially assessed as one project as mentioned previously.

6.2.5 Costs

(1) Outer Port Development Project

1) Initial Investment Costs

Initial investment costs are summarized in Chapter 4 of Part-3 by cost component.

2) Management/Operations and Maintenance Expenses

Expenses items for management/operations and maintenance are listed below:

a) Maintenance Dredging
Annual dredging volume has been estimated to be 100,000 cu. m. with unit dredging expenses of 1.9 EURO/cu. m

b) Maintenance for Infrastructures
It has been assumed to be one percent of initial investment expenses of depreciable infrastructures. Thus, reclamation expenses, etc were excluded

c) Maintenance for Equipment
It has been assumed to be four percent of initial investment expenses of equipment.

d) Fuel and Utilities Expenses
It has been assumed to be four percent of initial investment expenses of equipment.

e) Labour Expenses
Labour expenses at the terminals of the outer port will be expended by the terminal operator(s) as lessees.

f) General and Administrative Expenses
General and administrative expenses will be expended at a local office(s) of the terminal operator(s). Main expenses item is personnel expense.

3) Renewal Investment Costs

From the start of operations and through the project life, equipment that will be procured in the initial stage will be renewed when use life expires. Individual use lives are assumed referring to actual operational experience in the leading ports in the range of 7 to 25 years. The shortest ones (7 years) are forklift trucks and yard trucks. Longer lives (25 years) have been assumed in a ship-loader and shore cranes.

4) Total Cost

Total project cost comprising those of initial investment costs, yearly management/operations and maintenance expenses and renewal investment costs for equipment from time to time during the project life are summarized in Table II.6.2-1 together with revenues to be generated from the Project and the result of subsequent FIRR calculation mentioned in the subsequent Section 6.2.6.

(2) Southern Access Railway Improvement Project

1) Initial Investment Costs

Initial investment costs are summarized in Chapter 4 of Part-3 by cost component.

2) Maintenance for Infrastructures

It has been assumed to be one percent of initial investment expenses.

Table II.6.2-1 Summary of FIRR Calculation (Base Case)

Unit: '000 EURO

No.	Year	Initial Investment Costs	Management/Operations and Maintenance Expenses						Renewal Investment Costs	Salvage Values	Cost Total (Out)	Revenue Total (In)	In-Out	Net Present Value (NPV)
			Maintenance Dredging	Infra-tructures/ buildings	Equipment	Fuel and Utilities	Labor Costs	General and Administrative Costs						
1	2009	3,602									3,602		-3,602	-3,602
2	2010	3,602									3,602		-3,602	-3,352
3	2011	43,477									43,477		-43,477	-37,654
4	2012	90,369									90,369		-90,369	-72,838
5	2013	78,427									78,427		-78,427	-58,828
6	2014	93,263									93,263		-93,263	-65,104
7	2015		190	2,865	364	364	824	613			5,220	21,903	16,682	10,837
8	2016		190	2,865	364	364	824	613			5,220	24,218	18,997	11,485
9	2017		190	2,865	364	364	824	613			5,220	27,453	22,233	12,509
10	2018		190	2,865	364	364	824	613			5,220	29,716	24,495	12,826
11	2019		190	2,865	364	364	824	613			5,220	31,978	26,758	13,039
12	2020		190	2,865	364	364	824	613			5,220	34,240	29,020	13,160
13	2021		190	2,865	364	364	824	613			5,220	36,503	31,282	13,202
14	2022		190	2,865	364	364	824	613	1,107		6,327	38,765	32,437	12,740
15	2023		190	2,865	364	364	824	613			5,220	41,027	35,807	13,088
16	2024		190	2,865	364	364	824	613			5,220	43,289	38,069	12,950
17	2025		190	2,865	364	364	824	613			5,220	43,289	38,069	12,051
18	2026		190	2,865	364	364	824	613			5,220	43,289	38,069	11,215
19	2027		190	2,865	364	364	824	613			5,220	43,289	38,069	10,437
20	2028		190	2,865	364	364	824	613			5,220	43,289	38,069	9,713
21	2029		190	2,865	364	364	824	613	1,107		6,327	43,289	36,962	8,777
22	2030		190	2,865	364	364	824	613			5,220	43,289	38,069	8,413
23	2031		190	2,865	364	364	824	613			5,220	43,289	38,069	7,829
24	2032		190	2,865	364	364	824	613			5,220	43,289	38,069	7,286
25	2033		190	2,865	364	364	824	613			5,220	43,289	38,069	6,781
26	2034		190	2,865	364	364	824	613			5,220	43,289	38,069	6,310
27	2035		190	2,865	364	364	824	613			5,220	43,289	38,069	5,872
28	2036		190	2,865	364	364	824	613	1,107		6,327	43,289	36,962	5,306
29	2037		190	2,865	364	364	824	613			5,220	43,289	38,069	5,086
30	2038		190	2,865	364	364	824	613		-17,120	-11,899	43,289	55,189	6,862
Total		309,138	4,560	68,762	8,748	8,748	19,772	14,701	3,321	-17,120	420,629	935,142	514,513	0

Source: The JICA Study Team

FIRR = 7.5%

Table II.6.2-2 Summary of FIRR Calculation (Case A of Sensitivity Analysis: Cost: +5%, Revenue: -5%)

Unit: '000 EURO

No.	Year	Initial Investment Costs	Management/Operations and Maintenance Expenses						Renewal Investment Costs	Salvage Values	Cost Total (Out)	Revenue Total (In)	In-Out	Net Present Value (NPV)
			Maintenance Dredging	Infra-structures/ buildings	Equipment	Fuel and Utilities	Labor Costs	General and Administra-tive Costs						
1	2009	3,782									3,782		-3,782	-3,782
2	2010	3,782									3,782		-3,782	-3,551
3	2011	45,651									45,651		-45,651	-40,240
4	2012	94,888									94,888		-94,888	-78,530
5	2013	82,348									82,348		-82,348	-63,986
6	2014	97,926									97,926		-97,926	-71,440
7	2015		190	2,865	364	364	824	613			5,220	20,808	15,587	10,676
8	2016		190	2,865	364	364	824	613			5,220	23,007	17,786	11,438
9	2017		190	2,865	364	364	824	613			5,220	26,081	20,860	12,595
10	2018		190	2,865	364	364	824	613			5,220	28,230	23,009	13,043
11	2019		190	2,865	364	364	824	613			5,220	30,379	25,159	13,390
12	2020		190	2,865	364	364	824	613			5,220	32,528	27,308	13,645
13	2021		190	2,865	364	364	824	613			5,220	34,677	29,457	13,819
14	2022		190	2,865	364	364	824	613	1,107		6,327	36,827	30,499	13,434
15	2023		190	2,865	364	364	824	613			5,220	38,976	33,755	13,959
16	2024		190	2,865	364	364	824	613			5,220	41,125	35,904	13,940
17	2025		190	2,865	364	364	824	613			5,220	41,125	35,904	13,088
18	2026		190	2,865	364	364	824	613			5,220	41,125	35,904	12,288
19	2027		190	2,865	364	364	824	613			5,220	41,125	35,904	11,537
20	2028		190	2,865	364	364	824	613			5,220	41,125	35,904	10,832
21	2029		190	2,865	364	364	824	613	1,107		6,327	41,125	34,798	9,856
22	2030		190	2,865	364	364	824	613			5,220	41,125	35,904	9,548
23	2031		190	2,865	364	364	824	613			5,220	41,125	35,904	8,964
24	2032		190	2,865	364	364	824	613			5,220	41,125	35,904	8,417
25	2033		190	2,865	364	364	824	613			5,220	41,125	35,904	7,902
26	2034		190	2,865	364	364	824	613			5,220	41,125	35,904	7,419
27	2035		190	2,865	364	364	824	613			5,220	41,125	35,904	6,966
28	2036		190	2,865	364	364	824	613	1,107		6,327	41,125	34,798	6,338
29	2037		190	2,865	364	364	824	613			5,220	41,125	35,904	6,140
30	2038		190	2,865	364	364	824	613		-17,120	-11,899	41,125	53,024	8,513
Total		324,595	4,560	68,762	8,748	8,748	19,772	14,701	3,321	-17,120	436,086	888,385	452,299	0

Source: The JICA Study Team

FIRR = 6.5%

Table II.6.2-3 Summary of FIRR Calculation (Case B of Sensitivity Analysis: Cost: +10%, Revenue: -10%)

Unit: '000 EURO

No.	Year	Initial Investment Costs	Management/Operations and Maintenance Expenses						Renewal Investment Costs	Salvage Values	Cost Total (Out)	Revenue Total (In)	In-Out	Net Present Value (NPV)
			Maintenance Dredging	Infra-structures/ buildings	Equipment	Fuel and Utilities	Labor Costs	General and Administra-tive Costs						
1	2009	3,962									3,962		-3,962	-3,962
2	2010	3,962									3,962		-3,962	-3,752
3	2011	47,824									47,824		-47,824	-42,893
4	2012	99,406									99,406		-99,406	-84,434
5	2013	86,270									86,270		-86,270	-69,396
6	2014	102,590									102,590		-102,590	-78,153
7	2015		190	2,865	364	364	824	613			5,220	19,712	14,492	10,455
8	2016		190	2,865	364	364	824	613			5,220	21,796	16,575	11,325
9	2017		190	2,865	364	364	824	613			5,220	24,708	19,488	12,610
10	2018		190	2,865	364	364	824	613			5,220	26,744	21,524	13,190
11	2019		190	2,865	364	364	824	613			5,220	28,780	23,560	13,673
12	2020		190	2,865	364	364	824	613			5,220	30,816	25,596	14,068
13	2021		190	2,865	364	364	824	613			5,220	32,852	27,632	14,383
14	2022		190	2,865	364	364	824	613	1,107		6,327	34,888	28,561	14,079
15	2023		190	2,865	364	364	824	613			5,220	36,924	31,704	14,801
16	2024		190	2,865	364	364	824	613			5,220	38,960	33,740	14,917
17	2025		190	2,865	364	364	824	613			5,220	38,960	33,740	14,127
18	2026		190	2,865	364	364	824	613			5,220	38,960	33,740	13,379
19	2027		190	2,865	364	364	824	613			5,220	38,960	33,740	12,670
20	2028		190	2,865	364	364	824	613			5,220	38,960	33,740	11,999
21	2029		190	2,865	364	364	824	613	1,107		6,327	38,960	32,633	10,991
22	2030		190	2,865	364	364	824	613			5,220	38,960	33,740	10,762
23	2031		190	2,865	364	364	824	613			5,220	38,960	33,740	10,192
24	2032		190	2,865	364	364	824	613			5,220	38,960	33,740	9,652
25	2033		190	2,865	364	364	824	613			5,220	38,960	33,740	9,141
26	2034		190	2,865	364	364	824	613			5,220	38,960	33,740	8,657
27	2035		190	2,865	364	364	824	613			5,220	38,960	33,740	8,199
28	2036		190	2,865	364	364	824	613	1,107		6,327	38,960	32,633	7,510
29	2037		190	2,865	364	364	824	613			5,220	38,960	33,740	7,353
30	2038		190	2,865	364	364	824	613		-17,120	-11,899	38,960	50,860	10,497
Total		340,051	4,560	68,762	8,748	8,748	19,772	14,701	3,321	-17,120	451,542	841,628	390,085	0

Source: The JICA Study Team

FIRR = 5.6%

6.2.6 Methodology and Results of Evaluation of the Key Projects

(1) FIRR Analysis

1) Calculation of the FIRR (Base Case)

The financial internal rate of return (FIRR) of the Outer Port Development Project in which the Southern Access Railway Project has been regarded as a project component as mentioned previously has been used to appraise the financial viability of the said Projects. The FIRR is the discount rate that makes net present values of cash inflow and outflow during the project life equal. The formula is as follows:

$$\sum_{i=1}^{n} \frac{Ii - Oi}{(1+r)^{i-1}} = 0$$

where, n: Project life
i: Year
Ii: Cash inflow in the i-th year
Oi: Cash outflow in the i-th year
r: Discount rate

The resulting FIRR of the Outer Port Development Project is 7.5% (see Table II.6.2-1).

2) Sensitivity Analyses

In order to see if the Project is still financially viable when some factors vary, the following cases have been tested as sensitivity analyses:

Case A: The total cost (cash outflow) increase by 5% and the revenue (cash inflow) decrease by 5%

Case B: The total cost increase by 10% and the revenue decrease by 10%

The resulting FIRRs of the Outer Port Development Project in Cases A and B in the above sensitivity analyses are 6.5% and 5.6%, respectively (see Tables II.6.2-2 – II.6.2-3).

3) Evaluation

The resulting FIRR of the Outer Port Development Project is 7.5%, and exceeds the evaluation criteria on the range of 2.84% to 7% mentioned in Section 6.2.2.

In addition, even in sensitivity analyses, all of the cases exceed the maximum interest rate of potential lenders. Thus, the Outer Port Development Project is judged financially viable.

(2) Ratio Analysis

Assessment of the financial soundness of the key projects to be implemented by imaginary entities, respectively, has been done by so-called ratio analysis through drafting the financial statements to be supposedly reported by the imaginary entity responsible for administration, management and operations of the new outer port or

the another imaginary entity responsible for administration of the new access railway infrastructures.

1) Profitability

The profitability of the key projects has been assessed by Rate of Return on Assets (ROI) defined as follows:

$$\text{Rate of Return on Assets (ROI)} = \frac{\text{Net Operating Income}}{\text{Net Fixed Assets}}$$

In the Outer Port Development Project, the criterion of the financial indicator is to exceed the maximum interest rate of the potential lenders that is estimated to be 2.84% from the starting year 2015, and from the year 2021, the criterion of over 7% is satisfied (see Table II.6.2-4, Financial Indicators).

2) Operational Efficiency

The operational efficiency of the key projects has been assessed by the two financial indicators. One is Operating Raito defined as follows:

$$\text{Operating Raito} = \frac{\text{Operating Expenses}}{\text{Operating Revenues}}$$

The criterion of the above financial indicator is to be less than 0.70 – 0.75. In the Outer Port Development Project from the starting year of 2015, the criterion is satisfied through the project life (see Table II.6.2-4, Financial Indicators).

The other is Working Ration defined as follows:

$$\text{Working Raito} = \frac{\text{Operating Expenses} - \text{Depreciation Expenses}}{\text{Operating Revenues}}$$

The criterion of the above financial indicator is to be less than 0.50 – 0.60. From the starting year of 2015, the criterion is satisfied through the project life (see Table II.6.2-4, Financial Indicators).

3) Long-Term Solvency

The long-term solvency (debt repayment capacity) of the port management and operations entity will be assessed by Debt Service Coverage Ratio defined as follows:

$$\text{Debt Service Coverage Ratio} = \frac{\text{Net Operating Income and Depreciation Expense}}{\text{Repayment Amount of Principal and Interest for Long-Term Debt}}$$

The criterion of the above financial indicator is to exceed 1.0. Excluding the five years from the starting year of 2015, the criterion is satisfied all of the years through the project life (see Table II.6.2-4, Financial Indicators).

Table II.6.2-4 Financial Statements of the Entire Project (EURO'000s)

Income Statement (EURO'000s)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
REVENUE																															
Port Dues (Vessel, Tonnage and other dues) (for KSSA)							15,193	16,925	19,579	21,258	22,938	24,618	26,298	27,977	29,657	31,337	31,337	31,337	31,337	31,337	31,337	31,337	31,337	31,337	31,337	31,337	31,337	31,337	31,337	31,337	31,337
Cargo Handling Charge (for TOC)							6,710	7,292	7,875	8,457	9,040	9,622	10,205	10,787	11,370	11,952	11,952	11,952	11,952	11,952	11,952	11,952	11,952	11,952	11,952	11,952	11,952	11,952	11,952	11,952	11,952
Land Lease Fee (from TOC)																															
TOTAL REVENUE							21,903	24,218	27,453	29,716	31,978	34,240	36,503	38,765	41,027	43,289	43,289	43,289	43,289	43,289	43,289	43,289	43,289	43,289	43,289	43,289	43,289	43,289	43,289	43,289	43,289
EXPENSE																															
DIRECT EXPENSE																															
Labor (TOC)							-824	-824	-824	-824	-824	-824	-824	-824	-824	-824	-824	-824	-824	-824	-824	-824	-824	-824	-824	-824	-824	-824	-824	-824	-824
Maintenance of equipment (TOC)							-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364
Fuel & Utilities (TOC)							-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364	-364
Maintenance of Super-structures (TOC)							-391	-391	-391	-391	-391	-391	-391	-391	-391	-391	-391	-391	-391	-391	-391	-391	-391	-391	-391	-391	-391	-391	-391	-391	-391
Maintenance of infrastructures (KSSA)							-2,721	-2,721	-2,721	-2,721	-2,721	-2,721	-2,721	-2,721	-2,721	-2,721	-2,721	-2,721	-2,721	-2,721	-2,721	-2,721	-2,721	-2,721	-2,721	-2,721	-2,721	-2,721	-2,721	-2,721	-2,721
Maintenance dredging (KSSA)							-209	-209	-209	-209	-209	-209	-209	-209	-209	-209	-209	-209	-209	-209	-209	-209	-209	-209	-209	-209	-209	-209	-209	-209	-209
Total Direct Expense							-4,874	-4,874	-4,874	-4,874	-4,874	-4,874	-4,874	-4,874	-4,874	-4,874	-4,874	-4,874	-4,874	-4,874	-4,874	-4,874	-4,874	-4,874	-4,874	-4,874	-4,874	-4,874	-4,874	-4,874	-4,874
INDIRECT EXPENSE																															
Depreciation (Infrastructures) (for KSSA Assets)							-5,416	-5,416	-5,416	-5,416	-5,416	-5,416	-5,416	-5,416	-5,416	-5,416	-5,416	-5,416	-5,416	-5,416	-5,416	-5,416	-5,416	-5,416	-5,416	-5,416	-5,416	-5,416	-5,416	-5,416	-5,416
Depreciation (equipment) (for TOC's Assets))							-478	-478	-478	-478	-478	-478	-478	-478	-478	-478	-478	-478	-478	-478	-478	-478	-478	-478	-478	-478	-478	-478	-478	-478	-478
Depreciation (Super-structures)(for TOC's Assets)							-978	-978	-978	-978	-978	-978	-978	-978	-978	-978	-978	-978	-978	-978	-978	-978	-978	-978	-978	-978	-978	-978	-978	-978	-978
Land Lease Fee (to KSSA)																															
Total Indirect Expense							-6,872	-6,872	-6,872	-6,872	-6,872	-6,872	-6,872	-6,872	-6,872	-6,872	-6,872	-6,872	-6,872	-6,872	-6,872	-6,872	-6,872	-6,872	-6,872	-6,872	-6,872	-6,872	-6,872	-6,872	-6,872
GENERAL & ADMINISTRATIVE																															
Administrative Personnel (TOC)							-438	-438	-438	-438	-438	-438	-438	-438	-438	-438	-438	-438	-438	-438	-438	-438	-438	-438	-438	-438	-438	-438	-438	-438	-438
Others (TOC)							-175	-175	-175	-175	-175	-175	-175	-175	-175	-175	-175	-175	-175	-175	-175	-175	-175	-175	-175	-175	-175	-175	-175	-175	-175
Total General & Administrative							-613	-613	-613	-613	-613	-613	-613	-613	-613	-613	-613	-613	-613	-613	-613	-613	-613	-613	-613	-613	-613	-613	-613	-613	-613
TOTAL EXPENSE							-12,359	-12,359	-12,359	-12,359	-12,359	-12,359	-12,359	-12,359	-12,359	-12,359	-12,359	-12,359	-12,359	-12,359	-12,359	-12,359	-12,359	-12,359	-12,359	-12,359	-12,359	-12,359	-12,359	-12,359	-12,359
OPERATING INCOME							9,544	11,859	15,095	17,357	19,619	21,881	24,144	26,406	28,668	30,931	30,931	30,931	30,931	30,931	30,931	30,931	30,931	30,931	30,931	30,931	30,931	30,931	30,931	30,931	30,931
OTHER INCOME/(EXPENSE)																															
Interest Expense (KSSA)							-6,857	-6,328	-5,760	-5,200	-4,639	-4,079	-3,519	-2,959	-2,399	-1,838	-1,278	-718	-228	0	0	0	0	0	0	0	0	0	0	0	0
Interest Expense (TOC)							-2,385	-2,257	-2,095	-1,933	-1,771	-1,609	-1,447	-1,313	-1,178	-1,013	-851	-689	-527	-365	-231	-115	-47	-39	-32	-24	-17	-38	-57	-47	-39
Interest Expense for Short-term Borrowings (Government)							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL OTHER							-9,242	-8,585	-7,855	-7,133	-6,410	-5,688	-4,966	-4,272	-3,576	-2,851	-2,129	-1,407	-754	-365	-231	-115	-47	-39	-32	-24	-17	-38	-57	-47	-39
EARNINGS before TAXES							302	3,274	7,240	10,224	13,209	16,193	19,178	22,134	25,092	28,079	28,802	29,524	30,176	30,566	30,700	30,815	30,884	30,891	30,899	30,906	30,914	30,893	30,873	30,884	30,891
(Taxable Earnings)							-14,891	-13,652	-12,339	-11,034	-9,729	-8,424	-7,120	-5,843	-4,565	-3,258	-2,535	-1,813	-1,161	-771	-637	-522	-453	-446	-438	-431	-423	-444	-464	-453	-446
INCOME TAX							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NET INCOME after tax							302	3,274	7,240	10,224	13,209	16,193	19,178	22,134	25,092	28,079	28,802	29,524	30,176	30,566	30,700	30,815	30,884	30,891	30,899	30,906	30,914	30,893	30,873	30,884	30,891
Retained Earnings							302	3,576	10,815	21,040	34,249	50,442	69,620	91,755	116,846	144,926	173,727	203,251	233,427	263,993	294,693	325,509	356,392	387,283	418,182	449,088	480,002	510,895	541,768	572,652	603,543

Statement of Cash Flows (EURO'000s)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Cash Beginning	0	0	-50	-779	-3,334	-8,124	-20,578	-35,817	-48,099	-56,415	-61,746	-64,093	-63,455	-59,832	-53,253	-43,779	-31,256	-18,010	-4,041	20,442	55,179	90,049	126,261	163,892	201,530	239,175	276,828	314,489	352,129	389,687	427,317
CASH FLOWS FROM OPERATING ACTIVITIES																															
Net Income							302	3,274	7,240	10,224	13,209	16,193	19,178	22,134	25,092	28,079	28,802	29,524	30,176	30,566	30,700	30,815	30,884	30,891	30,899	30,906	30,914	30,893	30,873	30,884	30,891
Noncash Items included in Net Income																															
Depreciation (equipment) (for KSSA Asset)							5,416	5,416	5,416	5,416	5,416	5,416	5,416	5,416	5,416	5,416	5,416	5,416	5,416	5,416	5,416	5,416	5,416	5,416	5,416	5,416	5,416	5,416	5,416	5,416	5,416
Depreciation (equipment) (for TOC's Assets)							478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478	478
Depreciation (Super-structures)(for TOC's Assets)							978	978	978	978	978	978	978	978	978	978	978	978	978	978	978	978	978	978	978	978	978	978	978	978	978
Total Noncash Items included in Net Income							6,872	6,872	6,872	6,872	6,872	6,872	6,872	6,872	6,872	6,872	6,872	6,872	6,872	6,872	6,872	6,872	6,872	6,872	6,872	6,872	6,872	6,872	6,872	6,872	6,872
Net Cash Flow From Operating Activities							7,174	10,146	14,112	17,096	20,081	23,065	26,050	29,006	31,964	34,951	35,674	36,396	37,048	37,438	37,572	37,687	37,756	37,763	37,771	37,778	37,786	37,765	37,745	37,756	37,763
CASH FLOWS FROM INVESTING ACTIVITIES																															
Construction in Progress (KSSA)	-3,962	-4,121	-52,352	-99,406	-86,270	-49,542																									
Capitalized Interst (KSSA)	0	-50	-729	-2,555	-4,790	-6,424																									
Assets Acquired (TOC)		0	0	0	0	-51,832	-1,218	0	0	0	0	0	0	-1,107	0	0	0	0	0	0	-1,107	0	0	0	0	0	0	-1,107	0	0	0
Capitalized Interset (TOC)						-1,318																									
Net Cash Used by Investing Activities	-3,962	-4,171	-53,081	-101,961	-91,060	-109,116	-1,218	0	0	0	0	0	0	-1,107	0	0	0	0	0	0	-1,107	0	0	0	0	0	0	-1,107	0	0	0
CASH FLOWS FROM FINANCING ACTIVITIES																															
Proceeds from Long-Term Borrowings (KSSA)	0	3,492	44,366	84,242	73,110	41,985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paid-in Statutory Capital from the Government to KSSA	3,962	629	7,986	15,164	13,160	7,557																									
Repayment to Long-Term Debt (KSSA)	0	0	0	0	0	0	-19,726	-19,726	-19,726	-19,726	-19,726	-19,726	-19,726	-19,726	-19,726	-19,726	-19,726	-19,726	-9,863	0	0	0	0	0	0	0	0	0	0	0	0
Proceeds from Long-Term Borrowings (TOC)						39,932	938	0	0	0	0	0	0	938	0	0	0	0	0	0	938	0	0	0	0	0	0	938	0	0	0
Paid-in Capital from the Sock Holders (TOC)						7,188	169							169							169							169			
Repayment to Long-Term Debt (TOC)	0	0	0	0	0	0	-2,576	-2,701	-2,701	-2,701	-2,701	-2,701	-2,701	-2,701	-2,764	-2,701	-2,701	-2,701	-2,701	-2,701	-2,701	-1,476	-125	-125	-125	-125	-125	-125	-188	-125	-125
Proceeds from Short-Term Borrowings (KSSA)																															
Repayment Short-Term Borrowings (KSSA)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0										
Net Cash Provided by Financing Activities	3,962	4,121	52,352	99,406	86,270	96,662	-21,195	-22,428	-22,428	-22,428	-22,428	-22,428	-22,428	-21,321	-22,490	-22,428	-22,428	-22,428	-12,564	-2,701	-1,594	-1,476	-125	-125	-125	-125	-125	982	-188	-125	-125
NET INCREASE IN CASH	0	-50	-729	-2,555	-4,790	-12,454	-15,239	-12,282	-8,316	-5,331	-2,347	638	3,623	6,579	9,474	12,524	13,246	13,968	24,484	34,737	34,870	36,212	37,631	37,638	37,646	37,653	37,661	37,640	37,558	37,631	37,638
Cash Ending	0	-50	-779	-3,334	-8,124	-20,578	-35,817	-48,099	-56,415	-61,746	-64,093	-63,455	-59,832	-53,253	-43,779	-31,256	-18,010	-4,041	20,442	55,179	90,049	126,261	163,892	201,530	239,175	276,828	314,489	352,129	389,687	427,317	464,955

Balance Sheet (EURO'000s)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
CURRENT ASSETS	0	-50	-779	-3,334	-8,124	-20,578	-35,817	-48,099	-56,415	-61,746	-64,093	-63,455	-59,832	-53,253	-43,779	-31,256	-18,010	-4,041	20,442	55,179	90,049	126,261	163,892	201,530	239,175	276,828	314,489	352,129	389,687	427,317	464,955
Cash and Cash Equivalent Investments	0	-50	-779	-3,334	-8,124	-20,578	-35,817	-48,099	-56,415	-61,746	-64,093	-63,455	-59,832	-53,253	-43,779	-31,256	-18,010	-4,041	20,442	55,179	90,049	126,261	163,892	201,530	239,175	276,828	314,489	352,129	389,687	427,317	464,955
PROPERTY, PLANT AND EQUIPMENT	3,962	4,171	57,252	159,213	250,273	359,389	353,735	346,863	339,991	333,119	326,247	319,375	312,503	306,738	299,866	292,994	286,122	279,250	272,378	265,506	259,741	252,869	245,997	239,125	232,253	225,381	218,509	212,744	205,872	199,000	192,128
Construction in Progress (KSSA)	3,962	4,171	57,252	159,213	250,273																										
Fixed Assets (KSSA)						306,240	306,240	306,240	306,240	306,240	306,240	306,240	306,240	306,240	306,240	306,240	306,240	306,240	306,240	306,240	306,240	306,240	306,240	306,240	306,240	306,240	306,240	306,240	306,240	306,240	306,240
Fixed Assets (TOC)						53,150	54,367	54,367	54,367	54,367	54,367	54,367	54,367	54,367	54,367	54,367	54,367	54,367	54,367	54,367	54,367	54,367	54,367	54,367	54,367	54,367	54,367	54,367	54,367	54,367	54,367
Accumulated Depreciation (KSSA)							-5,416	-10,832	-16,248	-21,663	-27,079	-32,495	-37,911	-43,327	-48,743	-54,158	-59,574	-64,990	-70,406	-75,822	-81,238	-86,654	-92,069	-97,485	-102,901	-108,317	-113,733	-119,149	-124,565	-129,980	-135,396
Accumulated Depreciation (TOC)							-1,456	-2,912	-4,368	-5,825	-7,281	-8,737	-10,193	-10,542	-11,998	-13,455	-14,911	-16,367	-17,823	-19,279	-19,628	-21,084	-22,541	-23,997	-25,453	-26,909	-28,365	-28,714	-30,171	-31,627	-33,083
TOTAL ASSETS	3,962	4,121	56,473	155,879	242,149	338,812	317,918	298,764	283,576	271,373	262,155	255,920	252,671	253,485	256,087	261,738	268,112	275,209	292,820	320,685	349,790	379,130	409,889	440,655	471,428	502,209	532,998	564,873	595,559	626,317	657,083
CURRENT LIABILITIES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Short-Term Borrowings (KSSA)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LONG-TERM LIABILITIES	0	3,492	47,859	132,101	205,211	287,128	265,764	243,336	220,909	198,481	176,054	153,626	131,199	109,709	87,219	64,792	42,364	19,936	7,316	4,052	2,289	813	688	563	438	313	188	1,001	813	688	563
Long-Term Loans (KSSA)	0	3,492	47,859	132,101	205,211	247,196	227,470	207,744	188,018	168,291	148,565	128,839	109,113	89,387	69,660	49,934	30,208	10,482	562	0	0	0	0	0	0	0	0	0	0	0	0	0
Long-Term Loans (TOC)	0	0	0	0	0	39,932	38,294	35,593	32,891	30,190	27,489	24,787	22,086	20,323	17,559	14,857	12,156	9,455	6,753	4,052	2,289	813	688	563	438	313	188	1,001	813	688	563
CAPITAL	3,962	629	8,615	23,778	36,938	51,683	52,154	55,428	62,667	72,892	86,101	102,294	121,472	143,775	168,867	196,947	225,748	255,272	285,448	316,014	346,883	377,698	408,582	439,473	470,372	501,278	532,192	563,254	594,127	625,011	655,902
Paid-in Statutory Capital from the Government to KSSA	3,962	629	8,615	23,778	36,938	44,495	44,495	44,495	44,495	44,495	44,495	44,495	44,495	44,495	44,495	44,495	44,495	44,495	44,495	44,495	44,495	44,495	44,495	44,495	44,495	44,495	44,495	44,495	44,495	44,495	44,495
Paid-in Capital from the Sock Holders (TOC)						7,188	7,357	7,357	7,357	7,357	7,357	7,357	7,357	7,526	7,526	7,526	7,526	7,526	7,526	7,526	7,694	7,694	7,694	7,694	7,694	7,694	7,694	7,863	7,863	7,863	7,863
Retained Earnings							302	3,576	10,815	21,040	34,249	50,442	69,620	91,755	116,846	144,926	173,727	203,251	233,427	263,993	294,693	325,509	356,392	387,283	418,182	449,088	480,002	510,895	541,768	572,652	603,543
TOTAL LIABILITIES AND CAPITAL	3,962	4,121	56,473	155,879	242,149	338,811	317,918	298,764	283,576	271,373	262,154	255,920	252,671	253,485	256,086	261,738	268,112	275,209	292,764	320,066	349,172	378,511	409,270	440,036	470,810	501,591	532,379	564,254	594,940	625,699	656,465

Financial Indicators	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
PROFITABILITY																															
Rate of Return on Net Fixed Assets (Criterion: over 7%)							2.7%	3.4%	4.4%	5.2%	6.0%	6.9%	7.7%	8.6%	9.6%	10.6%	10.8%	11.1%	11.4%	11.6%	11.9%	12.2%	12.6%	12.9%	13.3%	13.7%	14.2%	14.5%	15.0%	15.5%	16.1%
OPERATIONAL EFFICIENCY																															
Operating Ratio (Criterion: under 0.7- 0.75)							0.56	0.51	0.45	0.42	0.39	0.36	0.34	0.32	0.30	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Working Ratio (Criterion: under 0.5- 0.6)							0.25	0.25	0.22	0.20	0.19	0.17	0.16	0.15	0.15	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
LONG-TERM SOLVENCY																															
Debt Service Coverage Ratio (Criterion: over 1.0)							0.52	0.60	0.73	0.82	0.92	1.02	1.13	1.25	1.36	1.50	1.54	1.59	2.84	12.33	12.89	23.76	219.79	229.82	240.81	252.90	266.27	232.47	154.39	219.79	229.82

Source: JICA Study Team

(3) Consideration on Adequate Land Lease Fee in the New Outer Port

Port operations at the new outer port are considered to be provided by private terminal operators to be granted lease to the use of terminal land from the government (KSSA) according to a lease contract. For the government (KSSA), lease fee affects the repayment capacity for long-term debt to potential lenders. On the other hand, for the potential private terminal operators, the lease fee also controls the fate of the management of their terminal operations business.

The change from a certain level of the land lease fee creates a gainer on one hand and a loser on the other hand between them. In this regard, within the financial framework of the entire port business, sensitivity has been tested, in which the amount of the lease fee has been varied by comparing their respective sets of financial statements in the consideration of financial soundness of both a gainer and a loser. It has also been assumed that the land lease fee should cover a portion of investment costs of port basic infrastructures including breakwaters and basins in addition to the costs of land creation that will be prepared by KSSA. The current land lease fee rate of 3.9 Lt. per sq. m per annum has been used in the base case in the above-mentioned sensitivity analysis.

Table II.6.2-5 Sensitivity Analysis of Land Lease Rate Level

Unit' million EURO

Case/Item		-30%	-20%	-10%	Base Case	+10%	+20%	+30%
Total Land Lease Fee		0.26	0.30	0.33	0.37	0.41	0.45	0.48
Retained Earnings (Current Value.)	124	124	123	122	121	121	120	119
		458	459	460	461	462	463	463
	458	78.7%	78.9%	79.0%	79.0%	79.3%	79.4%	79.6%
Retained Earnings (Present Value.)	TOC	50	50	49	49	48	48	48
	KSSA	188	188	189	189	190	190	191
		79.0%	79.2%	79.3%	79.5%	79.7%	79.8%	80.0%

Source: Estimate by the JICA Study Team
Note (1): Above retained earnings is an amount accumulated through the project term.
Note (2): In the base case current land lease rate of 3.9 Lt./sq. m per annum has been used.

As shown in Table II.6.2-5, fluctuation of land lease rate level from the current level hardly affects the accumulated retained earnings of both KSSA and a potential terminal operator. As to the project of KSSA, an amount of revenue from land lease fee is much smaller than other revenue source, viz. port dues On the other hand, as to the project of a potential terminal operator (TOC), an amount of expense incurred by TOC is also much smaller than other expenses. In addition, financial viability in both KSSA and TOC in terms of the outer port development project has been verified in the condition of the current lease rate level. Thus, there is no reason why to increase the current lease rate. It is preferable to offer lower land lease fee rate to attract potential investors for the outer port if KSSA's financial conditions can afford to do it. Other Baltic seaports presently offers lower lease rates than Klaipeda Port.

(4) Consideration on the Necessity of Railway Infrastructure Fee

According to the results of the financial analyses mentioned above, the combined project composed of the Outer Port Development Project and Southern Access

Railway Improvement Project has been verified to be financially viable without collecting so-called "Railway Infrastructure Fee" to cover the investment for port access railways for the two key projects. The fact, however, does not necessarily rule out the right of the fee collection by KSSA. It is advisable to consider the collectability of the fee taking account of the consistency of railway tariff system covering the whole railway network in Lithuania.