

the Trunk Road No.16. According to the statistics of the National Port Institute, Ciudad Bolivar Port has not handled cargo since 1973.

At present almost all import consumer products are transported to Bolivar State by vehicle via Guanta Port, Cabello Port and La Guaira Port through trunk roads. There is a little possibility to change transportation mode from vehicle to ship (using Orinoco River channel) from a viewpoint of economic scale and population of the hinterland and shipping route.

(2) Agriculture Products

Maize silo is equipped at San Felix Port. But it is practically unused and there was no importation in 1996,1997 and 10,019 tons in 1998. Maize is placed in the commodity category "Others" since the volume is slight.

(3) International Transit Cargo

International transit cargo to/from Colombia has a huge potential to increase in the future, because trade between Venezuela and Colombia is forecast to be more prosperous due to trade agreement "G3" (see section 4.3.2 (1)) and "CAN" (see section 4.3.2(2)). Additionally, "Integrated Development Plan of the Orinoco/Meta River Basin" will promote the transportation on the Orinoco River channel.

On the other hand, Venezuela expressed its intention to become a member of "MERCOSUR" (see Table 4.3.2). Accordingly, trade between Venezuela and Brazil is forecast to be prosperous coupled with "Free Trade Zone Program (provisional name)" (see section 4.3.3 (3)), in the future. At any rate, both plans are in a preliminary stage and there is no analysis factor for cargo forecast such as development area and schedule, and it is impossible to forecast the cargo volume at present.

There is only one general port which is handling cargo for several enterprises, namely San Felix Port in Guayana City and its handling capacity (around 200 thousand tons per year) is not sufficient for the future cargo increase. Thus, construction of a new general port is a principal prerequisite for handling the above mentioned cargo.

4. 7 Assumption of Plant Schedule and Forecast Summary

4.7.1 Summary of Cargo Throughput by Plan

The result of the above mentioned forecast by project/plan of enterprises is summarized in Table 4.7.1. Project/plan up to 2005 is taken into the forecast as an enterprise's schedule by considering the progress of project, forwarding trend and market condition. While Stage I' as for aluminum related

industry and Stage I, II, III as for steel related industry are examined in next section based on several factors.

As to iron ore and direct reduced iron, Venezuela has a policy of value-adding to iron ore, namely producing direct reduced iron from iron ore from the viewpoint of present situation and competitive power in the world market as referred in section 4.6.1 and section 4.6.2.

Table 4.7.1 Summary of Project/Plan and Forwarding Volume

(Unit: Thousand Tons)

Year	Project/Plan	Enterprise	Transportation Category	Commodity	Volume Variation
1999	Sales Plan	Ferrominera	Export	Iron Ore	▲1,900
	Modal Shift	CEMEX	Domestic (In)	Clinker	180
	Wood Chip Plant	Veneston	Export	Wood Chip	450
	Direct Reduced Iron	COMSIGUA	Export	Direct Reduced Iron	1,000
2000	Sales Plan	Ferrominera	Export	Iron Ore	▲ 637
	Direct Reduced Iron	POSVEN	Export	Direct Reduced Iron	1,500
2001	Sales Plan	Ferrominera	Export	Iron Ore	▲ 1,347
	Direct Reduced Iron	ORINOCO IRON	Export	Direct Reduced Iron	2,200
2002	Sales Plan	Ferrominera	Export	Iron Ore	▲ 718
	Full Capacity	Veneston	Export	Wood Chip	750
2003	Sales Plan	Ferrominera	Export	Iron Ore	▲ 718
	Expansion Plan	SIDETUR	Export	Steel Bar	102
		ORINOCO IRON	Export	Direct Reduced Iron	▲ 90
	Full Capacity	BAUXILUM	Domestic (In) ^{*1)}	Bauxite	1,093
			Export	Bauxite	223
			Export	Alumina	260
			Import	Caustic Soda	32
		VENALUM/ALCASA	Export	Aluminum Ingot	49
			Import	Coke, Tar, Carbon	18
2005	Expansion Plan	CEMEX	Domestic (In)	Clinker	130
	Plant Renewal	SIDOR	Export	Steel Products	591
			Domestic (Out)	Steel Products	32
			Import	Raw Materials	116
Stage I'	Aluminum Plant	ALCASA	Export	Aluminum Ingot	180
			Import	Coke, Tar, Carbon	125
		SURAL/Others	Export	Aluminum Products	15
		BAUXILUM	Export	Alumina	▲ 490
Stage I	Expansion Plan	SIDOR	Export	Steel Products	970
			Domestic (Out)	Steel Products	175
			Import	Raw Materials	292
Stage II	Concentration Plant & Slab Plant	Ferrominera	Export	Slab	1,800
			Import	Raw Materials	406
Stage III	Concentration Plant & Slab Plant	Ferrominera	Export	Slab	1,800
		SIDOR	Import	Raw Materials	406

Note; ▲ Decrease in volume

^{*1)} From El Jobal Port to Puerto Ordaz

4.7.2 Assumption of Plant Schedule

(1) Aluminum Ingot Plant

According to the forecast of Aluminum Data Book 1998, world aluminum ingot demand is estimated to be 37.84 million tons in 2008 with an average growth rate of 5.3% (see Table 4.7.2). Operation of aluminum ingot plant by ALCASA is forecast to be practicable in near future taking a side view of demand growth.

Table 4.7.2 Demand Forecast of Aluminum Ingot (World)

(Unit; Million Tons)									
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008
Volume	25.01	26.39	27.05	28.03	30.18	32.37	33.85	35.60	37.84

Source; Aluminum Data Book 1998/Japan Aluminum Association

On the other hand, Group of aluminum Industry composed of ALCASA and three other enterprises is moving forwards privatization and the new ALCASA administrations after privatization will elaborate a sales strategy. The other part, the feasibility study has not been completed yet, and it will take years before feasibility study and plant construction are realized.

Considering the above mentioned world market and present situation of ALCASA and the plan, starting operation of aluminum ingot plant (Stage I') is assumed to be 2010.

(2) Concentration Plants and Slab Plants

According to the forecast of Skilling Mining Review-86, world crude iron demand is estimated to be around 980 million tons in 2010. Average growth rate is around 1.9% in this forecast.

As to present situation of concentration plants by Ferrominera, there is no prospect for project finance. Enforcement of prominent projects like concentration plants is determined by government policy and required to some government supports.

On the other hand, as to progress of slab plant by Ferrominera and other plant by SIDOR, both plants are in a preliminary stage and need further study including market research and financial analysis. Moreover, berth expansion and increase of loading/unloading port facilities is required.

SIDOR was privatized in 1997 and has been restructuring of its organization and producing system since then. Production volume of steel products is estimated to decrease in 1998. In this case, production volume is influenced by internal conditions of SIDOR rather than the market.

Three cases, namely high, medium and low growth cases are assumed as shown in Table 4.7.3 considering the present situation of projects and enterprises, because there are presently some indefinite factors like above mentioned, the production volume is so large and an influence on total cargo is considerable. Here, Stage I is referred in Fig. 4-6-8, Stage II in Fig. 4-6-9 and Stage III in Fig. 4-6-10.

Table 4.7.3 Assumption of Starting Operation Year of Three Stages

	Stage I	Stage II	Stage III
Low Growth Case	2020	After 2020	After 2020
Medium Growth Case	2015	2020	After 2020
High Growth Case	2010	2015	2020

4.7.3 Summary of Cargo Throughput Forecast

The trend of cargo throughput forecast by growth case (downstream from Puerto Ordaz) is given in Fig. 4-7-1. Moreover, details of cargo throughput forecast are given in Table 4.7.4 and Fig. 4-7-2.

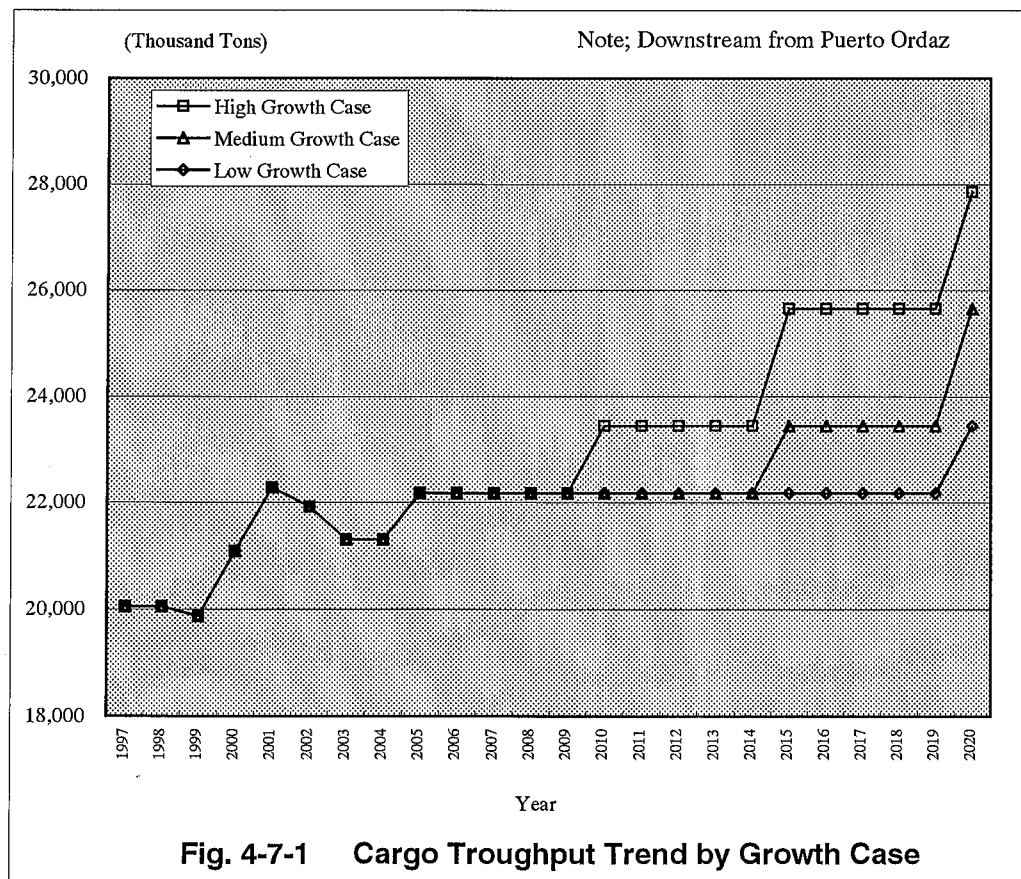


Table 4.7.4 Summary of Cargo Throughput Forecast

(Unit; Thousand Tons)

	Commodity	Enterprise	(Low)	1997	1999	2000	2001	2002	2003	2005	2020		
			(Medium)	1997	1999	2000	2001	2002	2003	2005	2015	2020	
			(High)	1997	1999	2000	2001	2002	2003	2005	2010	2015	2020
Downstream from Puerto Ordaz													
Export	Iron Ore	Ferrominera		9,320	7,420	6,783	5,436	4,718	4,000	4,000	4,000	4,000	4,000
	Direct Reduced Iron	Six Enterprises ^{*1)}		1,810	2,710	4,210	6,410	6,410	6,320	6,320	6,320	6,320	6,320
	Steel Products	SIDOR/Ferrominera		1,439	1,439	1,439	1,439	1,439	1,439	2,030	3,000	4,800	6,600
	Bauxite	BAUXILUM		217	291	329	366	403	440	440	440	440	440
	Alumina	BAUXILUM		480	567	610	653	697	740	740	250	250	250
	Aluminum Ingot	VENALUM/ALCASA		411	427	436	444	452	460	460	640	640	640
	Crude Oil	Corpoven		3,940	3,940	3,940	3,940	3,940	3,940	3,940	3,940	3,940	3,940
	Wood Chip	Veneston			450	700	950	1,200	1,200	1,200	1,200	1,200	1,200
	Steel Bar	SIDETUR		448	448	448	448	448	550	550	550	550	550
	Aluminum Products	SURAL/Others		50	50	50	50	50	50	50	65	65	65
	Silicon	FESILVEN/Others		35	35	35	35	35	35	35	35	35	35
	Anode	INMCO		29	29	29	29	29	29	29	29	29	29
	Others	VENALUM/HEVENSA/Others		27	27	27	27	27	27	27	27	27	27
	(Sub-Total)			18,206	17,833	19,035	20,227	19,848	19,230	19,821	20,496	22,296	24,096
Import	Coke, Tar, Carbon	Aluminum Related Enterprises		502	508	511	514	517	520	520	645	645	645
	Steel Materials	SIDOR		495	495	495	495	495	495	611	903	1,309	1,715
	Caustic Soda	BAUXILUM		247	258	263	268	274	279	279	279	279	279
	Others	FESILVEN/HEVENSA/Others		81	82	82	82	82	82	82	82	82	82
	(Sub-Total)			1,325	1,343	1,351	1,359	1,368	1,376	1,492	1,909	2,315	2,721
Domestic (Out)	Steel Products	SIDOR		339	339	339	339	339	339	371	546	546	546
	(Sub-Total)			339	339	339	339	339	339	371	546	546	546
Domestic (In)	Clinker	CEMEX		180	360	360	360	360	360	490	490	490	490
	(Sub-Total)			180	360	360	360	360	360	490	490	490	490
(Total)				20,050	19,875	21,085	22,285	21,914	21,305	22,174	23,441	25,647	27,853
From El Jobal Port to Puerto Ordaz													
Domestic (In)	Bauxite	BAUXILUM		4,907	5,271	5,454	5,636	5,818	6,000	6,000	6,000	6,000	6,000
	(Sub Total)			4,907	4,907	4,907	4,907	4,907	6,000	6,000	6,000	6,000	6,000
(Grand Total)				24,957	24,782	25,992	27,192	26,821	27,305	28,174	29,441	31,647	33,853

Note; ^{*1)} VENPRECAR, FIOR, OPCO, COMSIGUA, POSVEN, ORINOCO IRON

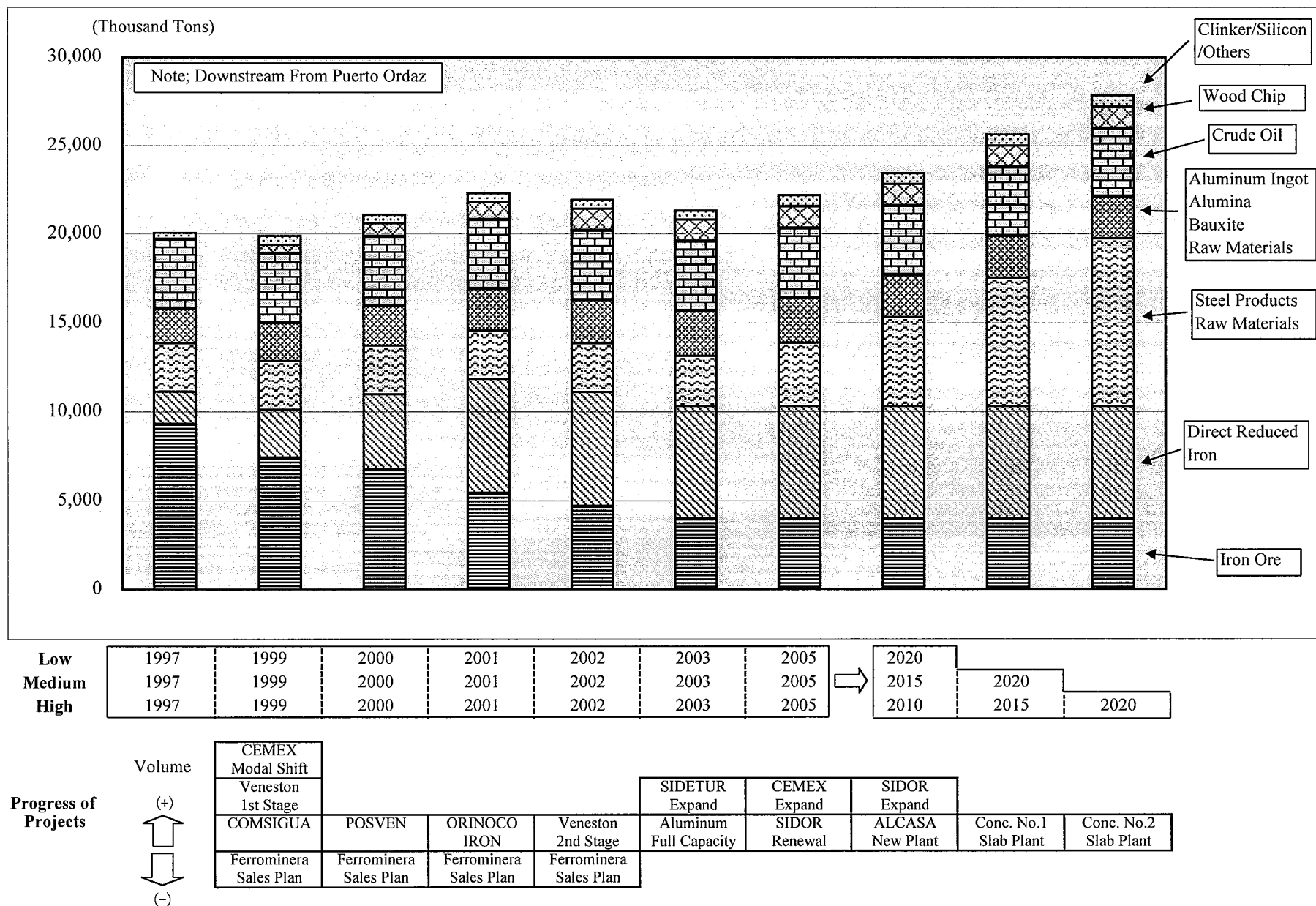


Fig. 4-7-2 Summary of Cargo Throughput Forecast by Industry